64 Autotype ptd
publd Newcastle 1877

Full Flor gr, somewhat crudely retouched with
orig sp laid down.

Yours most truly

Wm Hutton

ILLUSTRATIONS

OF

FOSSIL PLANTS:

BEING

AN AUTOTYPE REPRODUCTION OF SELECTED DRAWINGS.

PREPARED UNDER THE SUPERVISION OF THE LATE

DR. LINDLEY AND MR. W. HUTTON,

BETWEEN THE YEARS 1835 AND 1840, AND NOW FOR THE FIRST TIME

PUBLISHED BY

THE NORTH OF ENGLAND INSTITUTE OF MINING AND

MECHANICAL ENGINEERS.

EDITED BY G. A. LEBOUR,

MEMBER OF THE INSTITUTE, F.G.S. LONDON AND BELGIUM, F.R.G.S., CORR. MEM. OF THE SOC.
GEOL. DU NORD, AND LECTURER IN GEOLOGICAL SURVEYING IN THE UNIVERSITY
OF DURHAM COLLEGE OF PHYSICAL SCIENCE, NEWCASTLE-ON-TYNE.

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INTRODUCTORY NOTICE.

Mr. Hubert Laws, a Member of the Council of the North of England Institute of Mining and Mechanical Engineers, having presented to that body a large collection of original drawings and papers which had belonged to the late Mr. William Hutton, the Council caused them to be examined and reported on.

The collection was found to consist of a great number of the original drawings, from which had been taken the engravings illustrating Lindley and Hutton's "Fossil Flora," and a large number which had not been published, but which, from pencil notes on them, had evidently been prepared under their supervision and with the intention of forming a continuation of that work.

These drawings represent important and sometimes unique specimens; it was therefore resolved by the Council to publish sixty-four of them, which were thought most likely to prove of value to students of Fossil Botany; and the task of editing the work was entrusted to Mr. G. A. Lebour, who is solely responsible for the views expressed in his descriptions accompanying the plates.

Mr. Lebour was at the same time entrusted with editing the Catalogue of the specimens in the Hutton Collection of Fossil Plants, which is the "Catalogue" referred to in the present work.

As the Hutton Collection of Fossils, from which these drawings were made, is the property of the Institute, the presentation by Mr. Laws of the original drawings is considered by the Institute as a most valuable acquisition. The Council hopes that the missing drawings may be found, and also presented to the Institute.

The Fossils themselves have for some years been deposited by the Council in the Museum of the Natural History Society of Newcastle for exhibition. The original drawings will remain in the Library of the Institute.

The portrait of Hutton, which forms the frontispiece, is a copy of the original by Carrick, in the possession of the Institute.

Newcastle, December, 1877.

EDITOR'S PREFACE.

The Sixty-four Plates now published by the North of England Institute of Mining and Mechanical Engineers, are a selection from a much larger number, which were prepared under the direction of Dr. Lindley and Mr. Hutton, at a time when they still had the intention of continuing the publication of their "Fossil Flora." In the task of selection, the Editor has received much kindly help from Professor W. C. Williamson, F.R.S., who was himself one of the chief contributors to the "Fossil Flora." Those Plates have been chosen which represent apparently undescribed, rare, beautiful, or problematical specimens—such specimens, in fact, as would, if brought together, form the chief attractions of a collection. In the brief remarks which accompany the Plates, the Editor has made as much use as he could of the notes referring to them left by the authors of the "Fossil Flora" or their correspondents. He has followed, as far as he could, from indications of date, etc., the order in which Hutton evidently intended to publish the Plates, and hence their present somewhat unsystematic arrangement. The manuscripts left by Hutton comprise not only notes by himself and Lindley, but interesting letters from Professors Phillips and W. C. Williamson, Sir Roderick I. Murchison, and Messrs. Bean, Witham, Conway, Murray, etc., of which a small selection will be found printed in the Appendix. The drawings have for the most part an artistic value of their own, apart from their scientific importance, and the Autotype process by which they have been reproduced is such as to leave nothing to be desired as to perfect accuracy. Special attention may perhaps be directed to the Plates by Prior, whilst others are from the hands of eminent naturalists, such as the late Professor Phillips, Professor Williamson, the late Mr. Denny, etc.

G. A. LEBOUR.

CONTENTS.

ERRATA.

Page 53, line 5 from top, for "*oxyphilla*" read "*oxyphylla.*"
Page 128, line 5 from bottom, for "*Sphenopteris*" read "*Sigillaria.*"

Tab. I

FOSSIL PLANTS.

PLATE I.

Calamites cannæformis.

SCHLOTH.

The very beautiful specimen represented in this Plate comes from the shale lying immediately above the Bensham coal-seam, in Jarrow Colliery.

Owing to the fact that towards their base the stems and branches of Calamites are very similar in several of the so-called species allied to *Calamites cannæformis*, absolute certainty cannot be claimed for the present reference. It is, however, that adopted by both LINDLEY and HUTTON, in speaking of this specimen, and that likewise followed in the "Catalogue," p. 6.

Unfortunately, beyond mere mention, the Hutton papers do not contain any details respecting this, in some respects, unique fossil.

It is from a structural point of view that it derives importance, since it shows us in a most clear and precise manner the mode of attachment of branches to stem, or branchlets to branch—for it is, of course, impossible to say whether the central column be the main stem of a somewhat slender plant, or the branch of a larger individual, although the latter alternative is probably the right one.

We have here, then, a horizontal section of a Calamitean stem or branch, from seven points of the circumference of which spring seven leaf-bearing branches or branchlets in a regular verticillate or candelabra-like arrangement, upon which we look vertically, either from above, or, more probably, from below.

Perhaps nothing is shown more conclusively in this specimen than the very variable manner in which the gradual lengthening of the internodes from the base upwards takes place in different branches, even belonging to the same whorl. Clearly specific characters based upon this point alone (as they have more than once been based) must be of very small value. In the present case two species of this kind could obviously be claimed growing on the same stem.

At the point of junction between the branches and the stem a more or less confused mass of carbonized matter, rather better shown in the fossil than in the Plate, represents the outer bark and sub-jacent vascular zone uniting the members to the parent trunk.

The Plate is slightly reduced from the original drawing by Mr. T. Johnson, which is itself about half the size of the specimen.

Half Natural Size

PLATE II.

Calamites nodosus.

Schloth.

At Plate XV. of the "Fossil Flora" a specimen very similar to the present one is figured. Each lacks something possessed by the other. In the former a branchlet, with attached Asterophyllitic leaf-whorls, is seen apparently in place with regard to the Calamitean stem by its side, but the actual junction, if it ever were there, is not visible. On the other hand, our drawing shows the embranchment very clearly, but the leaf-whorls are missing.

Referring to their figure the authors of the "Fossil Flora" remark:—"Although we have examined a fine series of specimens of this fossil [Calamites], where the leaf-bearing branch is always associated with the stem, yet, as in no instance they have been found actually in conjunction, Fig. 1, Tab. 15, being the nearest approach to it that we have seen, we pause before we finally decide [that the leaves are really those of Calamites]." ("Fossil Flora," Vol. I., p. 54; see also "Catalogue," p. 9.)

Hutton, in naming his collection, seems to have had no doubt as to the propriety of referring all the foliaged specimens like the one described above to *Calamites nodosus*. There is no reason to doubt the specific identity of his and our figured fossils, and the only question open to discussion is the larger one: "Do the stems in question

PLATE III.

Calamites nodosus.

LINDL. AND HUTT.

The name given is that in the "Fossil Flora." This specimen could with equal authority be referred to *Asterophyllites*, or to SCHIMPER'S provisional, convenient, but compromising genus *Calamocladus*. So far as external characters are concerned (and of these alone we can judge here), it is a Calamarian or Asterophyllitic stem, with attached Asterophyllitic foliage. It is not the *Calamites nodosus* of STERNBERG, but forms one of that large group of leaf-covered branches which SCHIMPER has brought together under the name *Calamocladus longifolius*. This Plate forms an instructive supplement to the preceding one.

"The Newcastle coal-field" is the only locality given.

The original specimen and drawing (by PRIOR) are twice the size of the Plate.

Plate 4

PLATE IV.

Asterophyllites. Sp.

This specimen is in many respects very like an *Equisetites*, especially in the sheath-like processes which are discernible at some of the nodes. The very delicate foliage distinguishes it from any of the figured Asterophyllites with which we are acquainted. The name under which it is here placed is that given by HUTTON. It resembles BRONGNIART'S *Asterophyllites pygmæa*, of which there is, however, no description extant.

This elegant fossil was discovered in light brown shale, at Low Moor, Yorkshire.

The figure is very slightly reduced from the original drawing by PRIOR.

T. Johnson

PLATE V.

Asterophyllites tuberculata.

STERNB. Sp. (?).

Although no locality is given with the original drawing, it is probable that the specimen represented came from the rich plant-shale above the Bensham seam, at Jarrow.

It is an Asterophyllitic stem, in which the nodes are obscurely marked, except on one side, by the leaf-bearing branchlets (as LINDLEY and HUTTON considered them to be), or fructification spikes (according to GEINITZ and SCHIMPER). It closely resembles the *Annularia latifolia* of Professor SCHIMPER, but according to our rule we have placed it under the Lindleyan name.

The drawing, by T. JOHNSON, is, like the Plate, probably of the size of nature, but we have no means of being certain of this.

Natural Size

PLATE VI.

Asterophyllites. Sp.

The terminal extremity of a leaf-bearing Asterophyllitic branchlet. In its fragmentary state it would be useless to attempt to refer it with certainty to any particular species. Although apparently allied to *Asterophyllites longifolia*, yet it seems to be distinct from it, as its leaves are shorter and more numerous.

The manner in which the terminal whorls are turned upwards and squeezed together in this specimen is one common in the remains of this group of plants.

Referring to this fossil, HUTTON remarks, in sending it to Dr. LINDLEY: "Rather an unsatisfactory specimen. . . . I already possess fragments from which, when we get properly to understand it, I have no doubt you will be able to make out several species of this interesting genus." (Hutton MSS.)

The horizon is the shale above the Bensham coal-seam, and the locality, Jarrow Colliery.

Natural size, by PRIOR.

Plate

PLATE VII.

Asterophyllites. Sp.

A very beautiful specimen from the roof of the Bensham seam, Jarrow Colliery.

The original drawing, by Prior, is of the natural size, the reproduction in this Plate being reduced one-third. The remarks made respecting the Asterophyllite in Plate VI. apply equally well in this case. The leaves in both cases are much more numerous and shorter than in *Asterophyllites longifolia*, although, as a whole, the plants are nearly allied to that elastic species.

The most important feature in this specimen is the central stem, the form of the base of which is well shown. The leaf-bearing branches belong to two whorls.

Plate 8

PLATE VIII.

Asterophyllites Huttonii. N. sp.

This extremely elegant fragment appears to belong to an undescribed species of *Asterophyllites*. Its most salient characters (so far as a mere leaf-bearing branchlet can enable one to determine them) are the distinctly ribbed stem with slightly prominent nodes, the leaves very nearly or quite as long as the internodes, broad, lanceolate, and arranged in whorls of four.

No description of this graceful species from the hand of either HUTTON or LINDLEY, to whom the specimen was communicated in November, 1835, can now be found.

In the meanwhile, perhaps the name *Asterophyllites Huttonii* may not be thought unsuitable to it.

The fossil comes, like so many others, from the shale forming the roof of the Bensham coal-seam, at Jarrow Colliery.

The figure is of the natural size, and is one of PRIOR'S most graceful delineations.

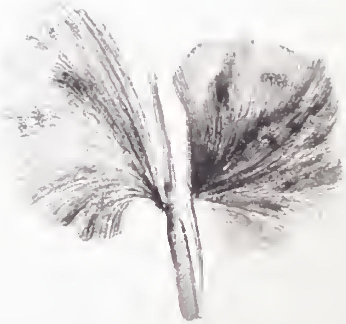


PLATE XI.

Cyclopteris (Nephropteris) obliqua.

BRONG.

These two pinnules differ from those commonly met with under the name *Cyclopteris* in being still adherent to the rachis of what would probably be a species of *Neuropteris*, possibly *Neuropteris auriculata*. The frond of which these pinnules formed part must have been of very great size.

The name *Nephropteris* has been conveniently attached by BRONGNIART to a very varied assemblage of detached pinnæ or pinnules of this character, the true genus *Cyclopteris* containing only a few foreign species establishing a passage between the Sphenopterids and the Neuropterids.

It would in the present instance be quite proper, no doubt, to denote the specimen figured as *Neuropteris* sp., but the Huttonian name (with the qualifying *Nephropteris*) has again been preferred.

The specimen figured is of the size represented, and was found in the Bensham shale, at Jarrow Colliery.

The drawing is by PRIOR. The Plate is reduced one-third.

Fig. 1

PLATE XII.

Neuropteris tenuifolia.

(Schloth.) Brong. (?)

This specimen, one-third larger than in the Plate, is one of the few British representatives of this species, if it really belong to it. It is more probably a variety of that or some closely allied form.

Beyond a note to the effect that it comes from Jarrow, nothing is known of this handsome example.

The drawing is by Prior.

Plate 13

PLATE XIII.

Neuropteris heterophylla.

Sternb.

Fronds so variable as those belonging to this specific group need more frequent figuring than others. The present example is the more normal form, and closely resembles that figured in Plate 200 of the "Fossil Flora."[*] The venation is, however, better shown in the latter specimen than in ours.

Schimper inclines to look upon this species, together with *Neuropteris tenuifolia* and *Neuropteris Soretii*, as forming a single group, the passage between each type of which is imperceptible. They are undoubtedly nearly allied forms. All were large, handsome, perhaps arborescent ferns, of which we now rarely find any but small detached fragments. ("Paléontologie Végétale," t. i., p. 439.)

The drawing, by Prior, and the Plate, are of the natural size.

The specimen is from the Bensham shale, Jarrow Colliery.

Plate 14

Magnified

PLATE XIV.

Neuropteris heterophylla.

STERNB.

Another, but more uncommon, form of this species. The size of specimen is very slightly reduced in the Plate, which is from a drawing by PRIOR.

This handsome fragment comes from the shale roof of the Bensham coal-seam, Jarrow Colliery.

Plate 15

PLATE XV.

Fragment of Neuropterid-Frond (?).

Referring to the drawing, of which this Plate is a faithful copy, HUTTON wrote to Dr. LINDLEY as follows, in a note dated the 15th November, 1835:—" A beautiful fern, from the roof of the Bensham coal-seam, in Jarrow Colliery, of which this fragment is the only indication I have seen. The impression is on a coarse micaceous schistus, which has not preserved any other marks of the veining than the drawing represents." (Hutton MSS.)

The drawing is by PRIOR.

PLATE XVI.

Pecopteris (Alethopteris) aquilina.

(Schloth.) Goepp.

It is with some diffidence that, in the absence of the specimen itself, this figure is named thus. In general form it closely resembles the species as figured by Schimper ("Paléontologie Végétale," Atlas, Plate 30, fig. 8), but the details of venation, so far as they can be made out in our drawing, are somewhat different.

The drawing is by Prior, and on its margin is a pencil note in Lindley's handwriting which illustrates the mode of working followed by the authors of the "Fossil Flora," and which, had it been more closely adhered to by Lindley and Hutton, would have much enhanced the value of these Plates. It runs thus:—"As to Ferns in general—pray compare them carefully with what is figured in Brongniart and the F. F. ['Fossil Flora']. Send me only such as are well preserved, and state to what you conceive them nearest to approach. Pray also write the notes upon the drawings, or on paper stuck to the drawings."

Plate [illegible]

PLATE XVII.

Pecopteris (Alethopteris) marginata.

Goepp.

This Plate aptly supplements Plate 213 of the "Fossil Flora." In the latter a specimen is represented under the name *Pecopteris marginata*, the pinnules of which "seem to have been drawn a little together before the plant was fixed in the matrix" ("Fossil Flora," Vol. III., p. 165). In the present case the plant-fragment is preserved in its natural position, and bears therefore but little resemblance in general form to that previously figured.

There is no locality attached to this specimen, but the species is recorded from the shale lying immediately above the Bensham seam at Jarrow, whence this example probably came.

Both drawing (by Prior) and Plate are of natural size.

PLATE XVIII.

Pecopteris. Sp.

The drawing from which this Plate is taken is marked "*Pecopteris abbreviata*" in HUTTON's handwriting. This fern very probably belongs to the very variable group comprising the species *Pecopteris polymorpha* and *Pecopteris Miltoni*, of which also the type *Pecopteris abbreviata* forms part. The latter variety has never, to our knowledge, been found in the Northern coal-field, but *Pecopteris* (or *Cyatheites*) *Miltoni* is recorded from the High Main shale whence the present specimen was obtained at the Felling Colliery.

The drawing is by PRIOR, and is, like the Plate, of the size of nature.

Referring to this example is a note by Dr. LINDLEY:—"Too vague for determination." (Hutton MSS.)

Plate 19

Magnified

PLATE XIX.

Sphenopteris macilenta.

LINDL. and HUTT. Var.

This fragment seems to approach nearest to this species, which is, however, a rare one in the North of England.

The locality is Jarrow, and the horizon is the shale above the Bensham seam.

From the notes which have been preserved it appears that the authors of the "Fossil Flora" intended to attach a new name to this example.

Natural size, original drawing by PRIOR.

Plate 20

Magnified

PLATE XX.

Pecopteris (Cyatheides) arborescens.

Brong.

To this specific group, variable and elastic as it is, we refer this interesting specimen, which illustrates in a peculiarly obvious manner the great uncertainty which must always attend any serious attempt to follow a truly natural classification with regard to mere detached fragments of fern-fronds. Here we have fortunately preserved for us a sudden modification of pinnules which gives rise in the same plant to a diversity which, in less happily conditioned remains, would inevitably lead to the assumption that we had two species to deal with.

With all but some very marked and constant species, nothing can be done beyond reference to some *group* of forms, with which a more or less close alliance can be claimed.

The Pecopterids are perhaps more open to remarks of this kind than other Orders. "The natural classification of these fossils," says Schimper, "often so imperfect, presents difficulties against which all endeavours in this direction have hitherto failed." ("Paléontologie Végétale," Vol. I., p. 498).

The drawing is by Prior, and is of the size of nature.

The specimen comes from the shale roof of the Bensham coal-seam, Jarrow Colliery.

Plate 21

Magnified

PLATE XXI.

Pecopteris (Cyatheides) oreopteridia.

BRONG.

This small fragment of a frond of great size differs in some respects from the typical form of this species, with which, however, it agrees in essential particulars. It was found in the Bensham shale, Jarrow Colliery.

The Plate and drawing (by PRIOR) are of the natural size.

Plate 22

PLATE XXII.

Pecopteris (Alethopteris) serra (?).

Lindl. and Hutt.

This elegant fern seems to hold a position midway between the type above named and *Pecopteris Serlii* (Brong.) The group which embraces these types is a sufficiently distinct one in itself, but the forms composing it are very difficult to separate, since they pass almost imperceptibly from one to the other by very minute gradations. In this specimen the number of lobes is much smaller than on the pinnules of the *Pecopteris serra* figured in the "Fossil Flora," and the lobes are marginally entire.

The fossil was found in the shale associated with the High Main coal in Felling Colliery.

The drawing is by Prior, and is, as well as the Plate, of the natural size.

Plate 8.

Magnified

PLATE XXIII.

Pecopteris serra (?).

Lindl. and Hutt.

This example belongs to the same group as the last (Plate XXII.) from which it differs in more closely appoximating to the *Pecopteris serra* type. The lobes are more strongly serrated than in the figured specimen already referred to ("Fossil Flora," Plate 107).

The original drawing is inscribed in pencil (by Hutton?) "*Pecopteris Silesiaca;*" the narrow rachis, however, sufficiently separates it from that form, to which otherwise it bears considerable resemblance.

The specimen comes from the shale above the Bensham seam, Jarrow Colliery.

Drawing (by Prior) and Plate are of the natural size.

Plate 24

PLATE XXIV.

Pecopteris (Alethopteris) lonchitidis.

Sternb.

(Pecopteris heterophylla.)

Lindl. and Hutt.

A remarkably fine specimen of this elegant fern. Here the ordinary characters of the species (which is a very common one) are found at the extremity of the pinna only. The rest presents many points of similarity with *Pecopteris dentata* although the lobes of the pinnules are quite entire. The species should be compared also with *Pecopteris Glockeri* (Goepp.) and with *Pecopteris Serlii*, through which it is allied to the group referred to in connexion with Plates XXII. and XXIII.

The autotype is about two-thirds of the original drawing (by Prior) which is of the natural size.

This beautiful fossil came from the shale roof of the Bensham seam, Jarrow Colliery.

Plate 25

Magnified

PLATE XXV.

Pecopteris pennæformis.

BRONG.

Another species of the same general character as the three last. Closely allied to *Pecopteris dentata* this form appears to differ from it, as the authors of the "Fossil Flora" remark, solely almost in the absence of crenelling of the lobes.

This specimen is also from the Bensham shale in Jarrow Colliery.

The drawing (by PRIOR) and the Plate are both of the natural size.

Half Natural Size

PLATE XXVI.

Pecopteris Silesiaca.

GOEPP. Var.

This specimen is nearly akin to the type-form of this species, from which it differs principally in the spacing of the lobes, which is greater than in GOEPPERT'S figure ("Sytema Filicum Fossilium," Plate 27). It is also allied, but more distantly, to *Pecopteris oxyphilla* of the same author.

The fern, of which this is a mere fragment, must have been of very large size, since the drawing (by PRIOR) is one-half the size of nature, whilst the figure in the Plate is one-third smaller than in the drawing.

N.B.—The words "half natural size" in the Plate apply to the original drawing only.

The fossil comes from the Bensham shale, Jarrow Colliery.

Plate 27

T. J [illegible] sc.

mag.d

PLATE XXVII.

Neuropteris. Sp.

Unfortunately no notes are to be found by means of which the history of this very beautiful specimen can be traced. It is called *Pecopteris* on the original drawing, but the manner in which the lobes are attached to the mid-rib, and the angles at which the nervures spring from it, give the frond an essentially Neuropterid character. The heterophyllous nature of the plant is remarkably well shown.

The locality and horizon are both unknown.

Plate 28

magnified.

PLATE XXVIII.

Sphenopteris. Sp.

A most elegant Sphenopterid fern, allied to, but quite distinct from, *Sphenopteris obovata.* The specimen is, unfortunately, not to be found. It probably came from the Scarborough Oolites.

The drawing is by T. Johnson.

The extreme difficulty of specific determination with regard to the beautiful fronds which form the so-called genus *Sphenopteris*, is too generally admitted to need enlarging on here. The almost endless variety of forms, which there is yet good reason to believe belong to identical groups within the genus, affords a too ample field to the nomenclator, and commands caution in proposing new specific names.

Plate 29

Magnified

Magnified

PLATE XXIX.

Pecopteris laciniata.

Lindl. and Hutt.

(Pecopteris [Alethopteris] muricata.)

Goepp.

In many respects this fern is strikingly Sphenopteridian in form, a fact which may account for the name attached to the original drawing—*Sphenopteris macilenta.* The venation is well seen in this specimen, an important character which was entirely absent in that figured in the "Fossil Flora," Plate 122. The unusually acute angle at which the veins spring from the mid-ribs of the lobes is particularly well-shown here.

This fossil was found in the Bensham shale in Jarrow Colliery.

Drawing (by Prior) and Plate are both of the natural size.

Plate 30

One Third Size

PLATE XXX.

Sphenopteris latifolia.

Brong. Var.

A handsome form of this variable species.

The specimen comes from the Bensham shale in Jarrow Colliery.

The drawing, by Prior, is one-third of the natural size, as marked in our Plate, which is two-ninths of the natural size.

Plate 31

PLATE XXXI.

Sphenopteris latifolia.

BRONG. Var.

Another, but very different variety of this species. In the absence of venation little need be said respecting this specimen, which, like the last, comes from the shale roof of the Bensham seam, Jarrow Colliery.

The drawing is by PRIOR, and is, like our figure, of the natural size.

The Pecopteridian affinities (as to form) of this variety will be readily observed.

Plate 32

Magnified

PLATE XXXII.

Sphenopteris linearis.

STERNB. Var.

This pretty fern appears to hold an intermediate position between the typical form of this species and the *Sphenopteris obovata* of the "Fossil Flora," Plate 109 (= *Adiantides microphyllus* (Goepp.), a Cyclopterid form). The lobes are, in the present case, in nowise wedge-shaped, but the absence of the details of venation precludes detailed description.

The drawing (by PRIOR) and the Plate are of the natural size.

The specimen comes from the Bensham shale, Jarrow Colliery.

PLATE XXXIII.

Sphenopteris (Eremopteris) artemisiæfolia (?).

(Sternb.) Sch. Var.

It is with much doubt that this remarkable specimen is referred to this group—one which includes forms so delicate as *Sphenopteris crithmifolia* of Lindley and Hutton, and others, more like the present one, such as *Sphenopteris stricta* of Sternberg.

One of the authors of the "Fossil Flora," in a pencil note, seems to hint that this may possibly be the impression of an alga.

This and the three following Plates are from drawings by Mr. T. W. Embleton. The specimens represented came from the shale forming the roof of the High Main at Fawdon Colliery.

PLATE XXXIV.

Sphenopteris. Sp.

This fossil also came from Fawdon Colliery, and from the same horizon as the last.

The Plate is reduced one-third from the original drawing by Mr. Embleton.

Plate 35

PLATE XXXV.

Sphenopteris. Sp.

Probably the same as the last. (See remarks in the description of Plate XXXIII.)

Both Plate and drawing are of the same size, and the latter is signed with Mr. Embleton's monogram.

Also from Fawdon Colliery.

Plate 36

Magnified

PLATE XXXVI.

Sphenopteris. Sp.

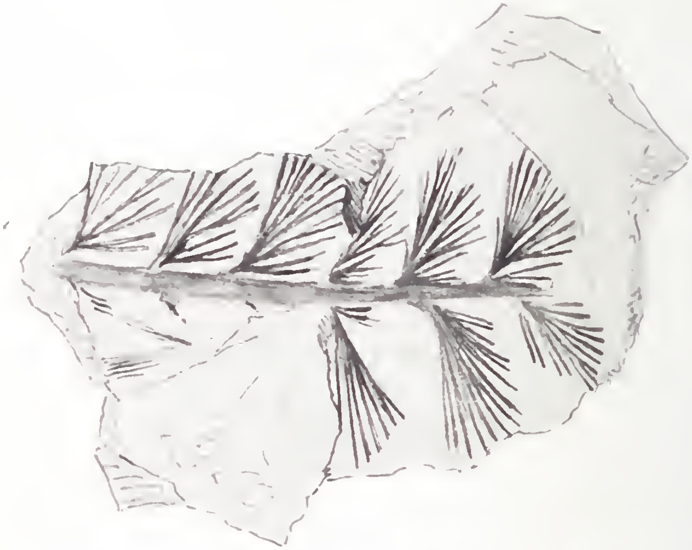
This plant is as curious and as unsatisfactory as the three last. (See the remarks made with reference to Plate XXXIII.)

From Fawdon Colliery.

Drawing and Plate are of the same size; the former is by Mr. Embleton.

Plate 37

Magnified



Magnified

PLATE XXXVII.

Sphenopteris alciphylla.

PHILL. MS.

Nothing need be added to the following letter of the late Professor JOHN PHILLIPS, the first part of which relates to this fossil. The rest will be welcome, it is thought, to all connected with Newcastle-on-Tyne, or interested in the British Association:—

YORK, 26*th April*, 1837.

MY DEAR HUTTON,

I think it probable that the little favourite fossil plant, of which I send a drawing and enlargement [our Plate is a fac-simile of this original drawing by Professor PHILLIPS], will win your affection, and cause LINDLEY no trouble. The specimen was found in sinking a Pit on the North-west side of the River Lune, near Oughton, in the series of Millstone Grit Rocks, near a thin bed of coal, worked to some considerable extent, on the River Lune. With this Coal, which corresponds to that of Tan Hill, Pea Hill, Colsterdale, Penyghent, &c., as described in my work on the geology of Yorkshire, Vol. 2, occur Lepidodendron, Stigmaria, traces of ferns, Calamites, etc. At some distance above it are Goniatites, Posidoniæ, and many other marine shells, some Crinoids, Corals, etc.

The plant lies in a sandy laminated rock, here called Shiver (sandy shale); its substance is coal; the state of Conservation admirable. Its structure, etc., will be fully apparent to you from the drawing, which is of the natural size, and the enlargements. I never like to cause embarassment on the subject of names, else I might propose for the plant the specific name of Alciphylla, from the odd resemblance to an elk's horn which the leaf exhibits. It is in the possession of Mr. Webster, of Lancaster, who made the experiments for coal, and is kept by him as a specimen of the Rocks sunk through, else I should have been allowed to transfer it to York.

I think the Newcastle Institutions have an excellent chance of persuading the Association [Professor PHILLIPS was one of the founders and the General Secretary of the British Association for the Advancement of Science] to visit the Tyne, either next year or very soon, because of the excellent spirit in which the deputations from the Lit. and N. H. Society [Literary and Philosophical and Natural History Societies] have urged and withdrawn their invitations—urged respectfully and withdrawn very generously, to save awkward discussions. I think you must be on the alert, to gain the next visit. You must assure the Committee, at Liverpool, of the good extent of your apartments, their contiguity, etc. As many as seven sectional rooms, holding *in seats* from 150 to 450 members each, seven committee rooms adjacent, general evening conversation parties, the General Committee, Council, *reception rooms*, etc., must be also provided for (at least twenty in all).

As to money, I hope the expenses of the visits may be gradually reduced to the compass of a philosopher's wishes. At present it is a serious cost to the town which entertains; but on this, if you want any hints, I will send to you further. *The apartments are the essential desiderata.*

Ever yours most truly,
(Signed) JOHN PHILLIPS.

(Hutton MSS.)

One of the magnified portions shows the exterior of the dorsal face of the rachis wrinkled and longitudinally striated, whilst the larger of the magnified lobes shows the striæ of neuration on the anterior face.

The specimen was found at a depth of twenty yards in the Wegber Pit, in the locality above mentioned.

Plate 39

Magnified

PLATE XXXIX.

Sphenopteris. Sp.

A variety belonging to the elegant group of linear ferns, of which *Sphenopteris affinis* and *Sphenopteris linearis* may be regarded as the type. It is in some respects not unlike *Sphenopteris arguta* ("Fossil Flora," Plate CLXVIII.) We have unfortunately no information of any kind respecting this beautiful specimen.

Probably from Yorkshire.

The Plate is reduced one-fourth of the original drawing.

PLATE XL.

Pecopteris. Sp.

We have no information respecting this specimen.

The original drawing by Prior (presumably of the natural size) is twice the size of our Plate.

A pencil note on the back of the drawing gives the generic name *Steffensia*. This is an obvious mistake, however. The fronds figured are in some respects very like *Pecopteris obtusifolia*, Murray ("Fossil Flora," Plate CLVIII.)

Plate 41

T. Johnson.

PLATE XLI.

Sphenopteris. Sp.

We much regret having no information concerning this interesting specimen. It is apparently a most abnormal form of Sphenopterid in many respects resembling the linear ferns which form so important a group of that assemblage, but in others it seems to claim relationship with *Stenopteris.* In general form, again, it can claim alliance with the Moravian Kulm fern, the *Pecopteris divaricata* of Gœppert.

The drawing is by T. Johnson.

PLATES XLII. AND XLIII.

Rhacophyllum (?)

These are two renderings of one specimen, one by JOHNSON and the other by PRIOR, slightly reduced in Plate XLIII. They differ so materially that, in the absence of the specimen itself, it has been thought best to autotype both. Judging by the almost perfect and unfailing accuracy in essentials which characterizes PRIOR'S drawings in general, we prefer to base our remarks on Plate XLIII. The portion of Calamite stem which is omitted in the other Plate need not be enlarged upon, unless, as is possible, it formed the surface on which the supposed parasitic Rhacophyllum grew. It is with the utmost diffidence that any name is assigned to the plant-remains here represented, chiefly to call attention to the likeness which the upper left-hand portion at least bears to *Rhacophyllum flabellatum* of STERNBERG.

Plate 14

Magnified

PLATE XLIV.

(?)

Another very vague specimen which LINDLEY declined to name, his memorandum respecting it being:—"too imperfect." The drawing was, nevertheless, intended for publication. It came from the Bensham coal-seam horizon, Jarrow Colliery.

Our figure is slightly reduced from that of the original drawing by PRIOR.

Plate 16

PLATE XLVI.

Spiropteris.

SCHIMPER.

Another beautiful specimen of circinate vernation, this time probably in a Pecopterid fern.

The drawing is by PRIOR, but no further information beyond the fact that the specimen comes from the Bensham seam horizon, at Jarrow Colliery, is to be found respecting it.

Natural Size

PLATE XLVII.

Spiropteris (?)

SCHIMPER.

A very puzzling specimen. Probably another form of circinate vernation, but the impression is too imperfect as to details to enable anything but the general aspect of the plant being seen. HUTTON himself could assign it no name, and sent one side of the fossil to DR. LINDLEY, together with the drawing, "that you may have a better guess what this is." LINDLEY, however, returned the drawing marked with a query.

The specimen is an impression "in shale from Jarrow Colliery."

The drawing, by PRIOR, is of the natural size, and so is the Plate.

PLATE XLVIII.

Fern Stem.

Probably the basal portion, or root extremity, of a fern.

The drawing, by Prior, is taken from a specimen found in the Bensham shale, Jarrow Colliery. Our figure is of the natural size.

Plate 49

PLATE XLIX.

Fern Stem.

This stem has a very Sigillarian appearance, but it is more probably a fern stem somewhat allied to the smoother forms of the Triassic pseudo-genus *Chelepteris* of CORDA. The spiral arrangement of the scars is well known.

Our Plate is reduced one-fourth from PRIOR's drawing.

The locality is not known.

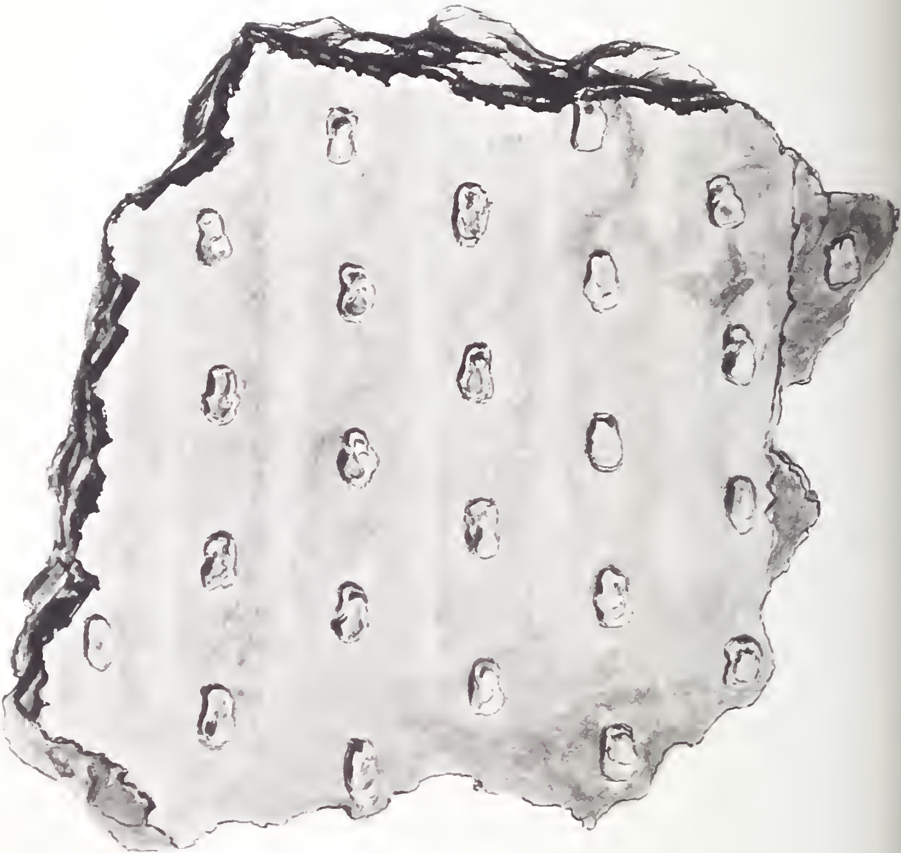


PLATE L.

Sigillaria reniformis.

Brong. Var.

The drawing of which our Plate is a slight reduction is named thus, in pencil, by Hutton ; but although the specimen (an unbarked one) bears much resemblance in some respects to that species, yet, in the form of the scars and in their much more marked alternation, it differs obviously from the types figured in the " Fossil Flora" (Plates LVII. and LXXI.)

The following note is all the information we have with regard to this specimen :—" Scars in relief—Bolton."

The drawing is by Prior.

PLATE LI.

Sigillaria. Sp.

The figure is about one-eighth of the natural size, and shows a good example of the casts of Sigillarian trees, which are common in the Carboniferous Sandstones of the North of England.

The locality of this particular specimen is not given.

The original drawing (one-fifth of the natural size) is by Prior.

PLATE LII.

Lepidophyllum binerve.

Hutton MS.

An undescribed leaf of Lepidodendron, well defined and easily distinguished from *Lepidophyllum majus*, *intermedium*, and *acuminatum* (= *Lepidophyllum trinerve* Lindley and Hutton, "Fossil Flora," Plate CLII.) by the two broad longitudinal nervures and the indistinctness or apparent absence of midrib.

This fossil is especially interesting, since it approaches very near to certain Sigillarian leaves. Compare, for instance, with the leaves of Sigillaria, figured in Plate XLIII. of the "Fossil Flora" (Figs. 1 and 2), under the name *Cyperites bicarinata.*

The specimen represented came from Bolton.

The drawing, by Prior, and our figure, are of the natural size.

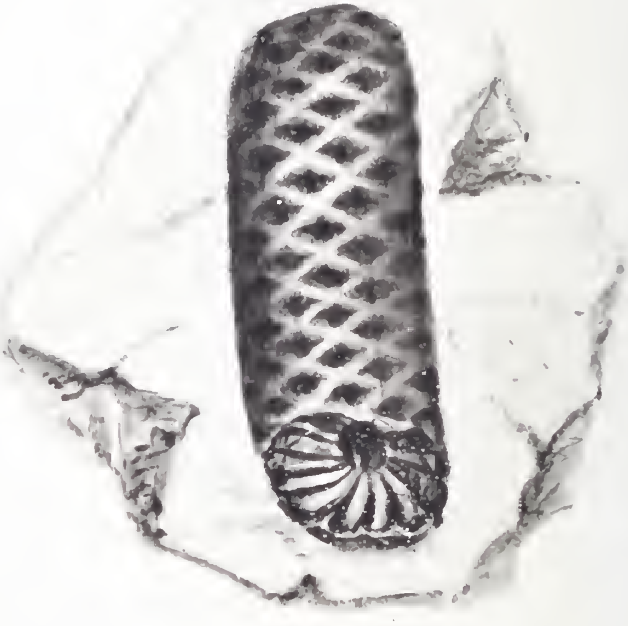
PLATE LIII.

Lepidophyllum lanceolatum.

LINDL. AND HUTT.

A large specimen of this so-called species, nearly allied to *Lepidophyllum majus* of BRONGNIART.

The specimen (of the size represented) came from the Bensham coal shale, Jarrow Colliery.



PLATES LIV., LV., AND LVI.

Lepidodendroid strobili.

The three cones or *Lepidostrobi* figured in these Plates form part of a series illustrated by the late Mr. H. DENNY, a well-known Yorkshire naturalist. Beyond these drawings we have no information respecting the specimens, but as we have hope of finding the notes which evidently accompanied the drawings (they are numbered for reference) among some more of the late Mr. HUTTON's papers, we will withhold any remarks on these fossils for the present.

Plate 57

Natural Size

Magnified

PLATE LVII.

Cryptomerites divaricatus.

PHILL.

This specimen is thus referred to by Professor W. C. WILLIAMSON, F.R.S. :—

April 27th, 1837.

No. 1 [the upper figure] is a very peculiar little plant of which I have only had two specimens: it appears to have been of a semi-succulent nature, but being preserved in a gray granular ironstone its *more minute* characters are ill-defined. At first sight it resembles Lycopodites, but its more regular pinnated form and the thick and distinct stem and rachis distinguish it. The central stem has evidently not been smooth, but a scaly character, though from the change the plant has undergone these scales present no distinct form. The small pinnules branch irregularly from the rachis, sometimes opposite or sometimes alternating, but the little leaflets are generally alternate, and these are arranged in a similar manner though less distinctly on either side of the rachis. They are from a seam of ironstone in the Upper Sandstone of Phillips, a few miles north of Scarborough. No. 2 [the lower figure] is a magnified pinnule.

(Hutton MSS.)

PLATE LVIII.

A Cycad.

This Plate is a reproduction of another drawing by Mr. Denny, and forms part of the series mentioned with reference to Plates LIV., LV., and LVII. The observations there made apply equally to this figure.

Plate 59

PLATE LIX.

Rootlets.

In this Plate and the three following ones we have excellent examples of some of those numerous ambiguous plant-remains which have afforded such a wide field for the ingenuity of describers. Whether they be roots or rootlets, and if so of what plants, or whether they be algoid growths, are questions which, in the fragmentary state of most of the specimens of the kind, and in the absence of any details of structure, cannot be decided.

In the present case there is little reason to doubt that we have rootlets to deal with.

The drawing, by Prior, and our figure, are of the natural size.

The specimen comes from the Bensham coal shale, in Jarrow Colliery.

Plate 60

PLATE LX.

Rootlets.

A much more delicately ramified specimen than the last. Something very like it is to be seen at the lower left hand corner of the slab figured in Plate XLIII., and indeed examples of this kind are frequently met with in coal shales, although seldom so perfect as this one.

The drawing and the Plate are both of the natural size; the former is by Prior.

This fossil was found in the shale above the High Main coal, in Felling Colliery.

Plate 61

PLATE LXI.

Root (?)

A very obscure specimen, from the Bensham coal shale, at Jarrow Colliery. Probably of the same nature as the two last.

The original drawing, by Prior, is of the natural size, and slightly larger than our figure.

Plate 62

PLATE LXII.

Root.

This closely resembles the *Myriophyllites gracilis* of Artis, which is figured in Plate CX. of the "Fossil Flora" as "a fossil aquatic root." Nothing need be added to the description there given of these problematical remains. ("Fossil Flora," Vol. II., p. 77, etc.)

Like the specimen above referred to, this one comes from the Low Main horizon of Felling Colliery.

Plate and drawing are of the natural size, the latter is by Prior.

Plate 63

PLATE LXIII.

Root (?)

If this be indeed a root, as Hutton supposed, it is certainly of a very different character from either of the three last figured specimens. There is a certain symmetry about the embranchments, and a certain leaf-like form about the filaments, that might make one doubt the reference. On the other hand, it is difficult to say to what other department of vegetable organization it may belong, especially as no signs of structure are visible.

The figure is about one-third smaller than the original drawing by Prior, which was of the natural size.

"The Newcastle coal-field" is all the locality given.

Plate 64

PLATE LXIV.

Calamites.

A remarkable confused mass of broken calamarian stems, being a small portion of a continuous bed or band of the same nature. It affords an excellent insight into the profuse occurrence of these plants, and the manner in which they assisted in the formation of coal—probably more than any other plants.

An instructive specimen, twice the size of our figure, from the Newcastle coal-field.

The drawing is by Prior.

APPENDIX.

The following is a selection from a number of letters forming part of the "Hutton MSS." Some of them referring to drawings or specimens which are not to be found may be to some extent unintelligible, but they are printed here in the hope that their publication may cause the discovery of such missing drawings or fossils.

LETTERS FROM THE LATE PROF. JOHN PHILLIPS, F.R.S., ETC.

I.

(No date.)

MY DEAR HUTTON,—As to these Stone Plants (fossilized Hazle), I have intended to send you another bit, and will do so if you write to say again and want it. Pray let this little vegetable beauty, from Wray, in Lancashire, out of shale full of Posidonia, Goniates, etc., be figured; and if Lindley can prove it to be distinct from a young broom, or something of that sort, let it be so. I think it to be the greatest curiosity I ever saw from the Millstone Grit series. Pray return it very safely. Why do you talk of ending your Fossil Plants? Johnston is going else I would add more.

Ever yours, etc.,
(Signed) JOHN PHILLIPS.

II.

REMARKS ON FIVE DRAWINGS OF FOSSIL PLANTS, BY JOHN PHILLIPS, F.R.S., etc.

(No date.)

1.—These are all drawn by myself from specimens which I have examined carefully, in the collections of my friends or in my own cabinet. The drawings are all of the natural size.

A.—This is the plaster cast of a fossil stem from Camerton Colliery, in Somersetshire, where the specimen was, I believe, found in the year 1800. It was, I think, in the possession of the late C. J. Harford, Esq., a friend of the late Rev. J. Townsend, of Pewsey (author of a well-known geological work embodying many of Mr. Wm. Smith's early views), and of the late Rev. — Benjamin, of Farley, in whose collection . . . . . It was given to me by . . . . [A large portion of the letter is here cut out, and no drawing corresponding to this description can be found.]

B.—Also from the Somersetshire coal-field. I have never seen another specimen. This is in the collection of Thomas Meade, Esq., of Chatley Lodge, near Bath. The plant lies in the centre of a large flattened round module of ironstone, and is represented as to substance by a thin scaly bituminous coal. The structure was copied faithfully, but it is supposed that more of the fine venation of the leaves might have been discovered by longer examination. Each leaf has a midrib of great regularity and parallel fine veins. The leaves appear to have been verticillate in two rows, like a double flower, and to have supported in the centre a tumid portion, giving the notion of a convex receptacle, of which the surface is granulated, or rather marked with many curved lines. [The drawing thus described is fortunately preserved. Here the portion of the letter already mentioned as being cut out again interferes with the sequence.]

C.—Is the internal portion, rather flattened, with articulations at unequal distances, furrows of slight depth, the intervening spaces slightly convex, and no ramuscular impressions. The verticillar belt of cicatrices of branches presents oblong approximate concave impressions, with some dubious traces of central structure.

D.—Is the external impression, with the cicatrices of branches convex, and the longitudinal sulci, less distinct, near them. [C and D refer to *Calamites verticillatus,* the drawing marked C being figured as Plate CXXXIX. of the "Fossil Flora," at p. 159 (Vol. II.), of which will be found quoted the missing passage in this letter. The drawing D is preserved, but has not been published. It is dated April 13, 1828.]

I may take this opportunity of noticing that the occurrence of Calamites, Sigillaria, and Lepidodendra in sandstone rocks is common in the Yorkshire coal-field, through most parts of the series; that is to say, through a thickness of 1,000 yards. It does not appear at present that the different species can be assigned to different parts of the series, but on this subject we have much to learn. Some of the species occur in the sedimentary rocks associated with the Mountain Limestone, as do also Stigmaria, Sternbergia, and several Lepidodendra.

E.—The structure in this specimen appears to me better exhibited than in any which I have ever seen. It is from Somersetshire, and is in my cabinet. [This drawing is missing.]

(Signed) J. Phillips.

As a P.S. comes the following :—

Dear Hutton,—I have written as you wished my remarks on my drawings, and hope they may be of use. But I have scrawled (*currente calamo* as befits one who writes concerning Calamites), and you must round sentences or rub them out as you may find most convenient. I have some other odd things *in your line* at home.

J. P.

III.

The following letter is endorsed "unintelligible," by Hutton :—

Buxton, 27*th June,* 1836.

My dear Hutton,—I have found, or rather my sister, to-day in the midst of the great mass of Derbyshire Limestone—which corresponds to the lower portion of the Mountain Limestone series of Yorkshire—some interesting specimens of marine plants which, perhaps, may be worthy of notice in one of the forthcoming parts of the "Fossil Flora." You know I have been always on the look out for *marine plants,* because this is precisely the part of fossil botany which appears to me the least explored. And it is probable that we shall find yet a considerable number of them in the marine calcareous strata, which yield so few land plants. I therefore make no apology for sending you very careful drawings of the best portions, with some remarks. [Here come full detailed references which it would be useless to print without the drawing. The latter is carefully preserved. He goes on :]—The plants I suppose to be marine, notwithstanding the aspect of [Nos.] five and six. They lie in smoky, laminated limestone, holding Producta Martini, and in the midst of much more massive beds of light grey, compact limestone, only partially crinoidal and shelly.

Yours, etc.,

(Signed) J. Phillips.

Here follows a P.S. on personal matters which we omit.

IV.

This letter will be found printed in full at p. 75, in the reference to Plate XXXVII.

The next is a note from the late Sir Roderick I. Murchison, Bart., etc.:—

Nursted House, Petersfield,
March 30*th*, 1837.

Dear Lindley,—My chapter on the Clee Hills coal-field is going to the press, and among the plants cited *on your authority* are three species of Sphenopteris, S. crenata, S. zamioides, S. furcata, which I state *are to be figured* by you (1834 your MSS.), and yet I cannot find them in the "Fossil Flora."

You certainly so named the plants, for I have your letter to that effect. Is it that they have been mislaid or forgotten ?

Yours ever,
(Signed) Rod. I. Murchison.

The rest follows as a P.S.

I intended to have gone to Worcester this week, and I therefore requested that the plants of the New Red might not be sent until I saw them and selected from them.

Having, however, given up my journey for the present, intending to go at Whitsuntide, I shall order them up to town.

If there is any one of the species alluded [to] not figured I would request you to name it Sphenopteris Lewisii, after Mr. Lewis, in whose coal-field of *Knowlbury* they were all found.

Whenever you publish a list of errata, permit me to send you some essential corrections of spelling (Knowlbury among others).

Whose name is Lepidodendron tetragonum ? Is it Sternberg's ?

I further observe that in this Knowlbury basin, in the Clee Hills, there are two unpublished Sigillariæ, besides the Sphenopteris Murchisoni —either of these might be named after Mr. Lewis.

If there has been any mistake the original specimens are at the Geological Society.

I shall be in town on Wednesday next.

Sphenopteris furcata is figured at Plate CLXXXI., and *Sphenopteris crenata* at Plate XXXIX. of the "Fossil Flora." The suggestion of the new specific name *Lewisii* came too late to be acted on, as the issue of the "Fossil Flora" was brought to a close in 1837.

LETTERS FROM PROFESSOR W. C. WILLIAMSON, F.R.S.:—

I.

SCARBOROUGH, *November 28th*, 1832.

SIR,—I have at length been able to complete the promised drawings, which I hope will be of use to the "British Flora," as they are on a subject rather different to any you have yet described—the following part of the vegetable kingdom:—

No. 1 is copied from a fragment of a large stem which, when perfect, measured about three feet in length, but owing to its being compressed so flat and thin, and to the hard nature of the rock where it was embedded, it could not be got out entire. At its top it was about three and a quarter inches in diameter: it is grooved or sulcated longitudinally, the grooves becoming more indistinct as they approach the lower end, which increased to about three and a half inches in width. It is divided into joints from four to five inches long at the upper part, but they become shorter as they are nearer the root. The leaves, of one of which there is a small fragment shown in the drawing No. 1, are found crushed and broken in immense quantities by the side of the stem, but never attached. My father [the late Mr. Williamson, of Scarborough, who died on the 15th July, 1877, at the age of ninety-three] has seen them upwards of two feet long and neither of the ends perfect. How much longer they may have been we cannot say. The Petiole is deeply sulcated longitudinally, and is nearly half an inch in width; it is frequently decomposed, and the residuum is a white powder which falls out when exposed to the air. The Folioles are long and pointed, strongly sulcated in the same manner as the Petiole to which they are attached by the whole of their base.

The FLOWER, FIG. 2, is round and bulky. The petals are long, smooth, and lanceolate, curling outwards towards the stalk. From the base of the petals to the edge of where the receptacle has been, is deeply and irregularly striated. There is a perforation through the stem where the stalk has been, which fell out in the form of the white powder before mentioned. In the centre is a large cavity formed by the decay of the receptacle or calyx.

Fig. 3 is an outline of the specimen, *Fig.* 1, about the natural size as it lay in the rock when found. The stem, as I mentioned before, was nearly an equal thickness its whole length, convex at the top whence ran out three small stalks from the centre, with a perfect flower at the end of each, all which are now in our Museum. They only differ from the one I have figured in being much smaller, and have the cavity of the receptacle filled up with nothing in which any character can be observed.

In all the specimens I have examined I can find no traces of scars or cicatrices. That it has been hollow there is no doubt about, for the impression is so thin, and the stone in the interior is exactly the same as the rock in which it is embedded. These plants differ from the Palmæ (Lindley's Introduction to Natural History of Botany) in having the flower composed of many petals, and having no scars. From Filices in their bearing flowers, and though I have taken all the pains in my power, I cannot find any other genus to refer them to, but must leave it to your superior judgment.

This singular Plant was found in an Ironstone bed, forming the base of the Lower Sandstone and Shale near Runswick, which frequently falls down in immense masses, containing the vegetables.

I remain, dear Sir,
Your obedient Servant,
(Signed) Wm. Williamson.

The above letter is probably one of the earliest contributions of Professor Williamson, to a branch of science which he has since made so thoroughly his own. The drawing is wanting, but the fossils referred to are no doubt still to be found in the Scarborough Museum.

II.

Scarborough, *Feb. 27th*, 1835.

My Dear Sir,—I have again sent you a small assortment of descriptions of our interesting fossil vegetables, of which the most important are what I suppose are parts of Cycadean fructification. These singular remains were some time ago partially brought under your notice, when I sent you a drawing of a collar, or annular assemblage of petal-like scales, with a stem and leaves. The stem, I think you decided, was that of a calamite, and of the other parts you wished for further illustrations. Since then my father and I went to Whitby, expressly to examine the locality, and our examination was in some measure crowned with success. The first new object we met with was the beautiful impression of a stem, with large, smooth, oval cicatrices, regularly disposed, and the intervening spaces filled up with rough ridges, evidently impressions of the fissures in the cortical integuments.* Fearful of not being able to obtain it entire, as it was only a hollow impression, and in a dreadfully hard, irony rock, I took the drawing, a copy of which I have sent you (No. 1.) The upper part was strongly marked with the cortical fissures, as well as the bottom; but from my endeavours to take a faithful representation of the one, I had not time to complete the other, as we had a considerable distance to travel to our destination for the night. It appears to have been a part from the centre of a large stem, as there was little or no difference in the diameter at the respective ends.

As I foresaw, the most careful efforts of my father's practised chisel were only able to preserve some fragments of the cicatrices, which are now in the Museum.

No. 2 is a small collar, which we more frequently find than the large ones. They differ in having, as far as I can discover in the specimens found, *no perforation* passing *through* them, and have not the striated interior sent some time ago.

No. 3 is an impression of part of a collar, the scales and stalk of which have been destroyed by exposure to the atmosphere and sea. It shows that the form under which we find the collars has not been the perfect one, but that the cavity, where the stamens and pistil ought to have been had it been a flower, has been filled up with a continuous stalk. The impression of the scales are rather narrow, and closely attached to one another at the base.

No. 4 is a similar impression of scales, but here they have been older, become broader and more widely separated from one another.

No. 5 is a fragment of a frond of immense size, which I think you will find to be a more accurate drawing than the one before sent. The leaflets are long and lanceolate, broadest at the middle, or rather towards the

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* Round each of the scars there is an irregular strong line, forming a kind of circle. Some smaller ones range transversely and the others longitudinally.

base, which is convex. Apex, sharp-pointed. The nerves are numerous, regular, simple, and like most of the Monocotyledons, the greater part of them terminate at the narrow apex, though some few of them have formed their little orifices at the margin of the leaflets. The leaflets are attached to the upper surface of the stalk, which being partly broken, and the interior exposed to view, appears to have been furnished with little protuberances, to which the leaflets has been fixed. These fronds we have seen of considerable length, sometimes exceeding three feet.

Such, then, are the fragments from which we have to draw our conclusions concerning this interesting species. The perforation, which passes through the centre of the large "Collar," is of the following form [pen and ink sketch given] when cut transversely. Its widening at both extremities evidently shows that there have been other appendages above as well as below the collar, and that both have been thicker than the centre of the perforation, whilst No. 3 shows that the collar has been sometimes erect, and not always with the points of the scales turned inwards; and No. 4 leads us to the same conclusion. That the scaly collar, fronds, and stem have all belonged to the same plant, I think little doubt remains, but the most difficult question is how they have been situated with regard to one another, as we have not been able to detect anything resembling the portion that has been above the collar.

I think that the opinion advanced by M. Brongniart, that they have been collars round the base of a spike of fructification in some of the Cycads, appears the most probable, resembling those figured in Vol. I., Plates XXI., XX., and XXIII., but I have not been able to see that work, and consequently cannot give an opinion, but hope that you will be able to come to some conclusion on the subject.

The rest of this interesting letter is, unfortunately, mutilated. The drawings referred to are not all to be found, but No. 5 is the one re-produced in Plate CLXV. of the "Fossil Flora," under the name *Zamia gigas*.

III.

Natural History Society's Hall,
Manchester, *April 27th,* 1837.

Dear Sir,—I herewith send you drawings of what I suppose to be new species of Plants. I know not whether they will reach you in time for the next number of the "Flora." In your last letter you express a strong desire to retain the drawings I have supplied you with, since the commencement of the work. This I shall have no objection to allow, if you have any loose sheets of such of them as have been engraved, which you can send me, in which case you can retain the originals in your collection. [This arrangement was, we understand, never carried out on Mr. HUTTON's side.]

No. 1 is a very peculiar little Plant . . . . etc. . . [This paragraph is given in full in the reference to our Plate LVII., page 109. This Plate is a reproduction of the drawing described. The next paragraph, describing Drawing No. 3, is in a similar manner given in the reference to our Plate representing it, Plate XXXVIII., page 77.]

No. 5 is a specimen found whilst pursuing my researches amongst the limestones of the Upper Coal Measures. The long leaf is Neuropteris cordata, which you have figured from Buckland's specimen ["Fosil Flora," Plate XLI.] The other I suppose to be a Cyclopteris, different from anything I have seen before. The Neuropteris cordata, from Leebotwood, is found in connection with some fresh water limestones, of which Bowman, of Wrexham, has given me specimens, containing minute fresh water shells, and also in the same neighbourhood they have, I believe, Megalichthys and other remains of fish. My specimen I found under similar circumstances. At the top of our Coal Measures we have a group of fresh water shales and limestones, containing Planorbes, Unios, Entomostraca, apparently a Cypris, Megalichthys Hibberti, Palæoniscus, Coprolites, and other remains of a larger fish; and between two of the main seams of limestone was a thin shale containing the above specimen, together with Lepidodendron Sternbergii, Stigmaria ficoides, Calamites, and several other coal plants. The shale is very soft, and about the colour I have given it in the drawing. See Phil. Magazine, August and September, 1836. The geological position of the Leebotwood limestone is nearly the same as ours, showing something like a connection between our Lancashire and the Shrewsbury coal-field.

I suppose you have not met with any of the fish at Ferry Hill [in the Permian Marl Slate there] I wrote to you about. My friend Professor Johnstone, of Durham, told me the other day that the workmen are destroying numbers of them . . . .

Yours sincerely,

(Signed) W. C. WILLIAMSON.

From Mr. John Dunn (Vice-President of the Scarborough Philosophical Society).

Scarborough, *September 3rd*, 1832.

Dear Sir,—The Plant most resembling No. 1 is called by Phillips, Plate VIII., Fig. 8, Pecopteris longifolia, and at page 148 it is denominated Pecopteris paucifolia, where it says, "the leaves are never attached." These leaves are attached by a pedicle in the form of an umbelle to the stem. The midrib very obvious and lateral nerves branching from it ending in dichotomous subdivisions. The leaf is by no means so narrow in the centre as Phillips', nor so long in proportion to its width. The two extremities of the leaf are nearly equal.

No. 2 is also attached to the stem, which is thicker than the last. The nerves also proceed from a central rib in a similar manner. The shape of the leaf is very different, being twice the length and, except at the extremities, of a more uniform size all the way through.

No. 3 explains pretty nearly itself. The nerves are fine, parallel, longitudinal, about ten or twelve in number. The leaf forms a sort of leafy stalk at the insertion of the stem. They are not opposite. Two here and there are comprised together.

The specimen belongs to Mr. Bean, and the drawings were taken by my friend and patient, Miss Helen Thornhill, a lady of high family from Derbyshire, now staying here, etc.

Yours sincerely,
(Signed) John Dunn.

The drawings referred to in the above letter are those reproduced in Plate LXIII. of the "Fossil Flora" under the name *Glossopteris Phillipsii.*

This small selection will be concluded with a letter from the Rev. W. T. Bree, describing the Allesley Fossil Tree:

Allesley Rectory, near Coventry,
April 25th, 1840.

Dear Sir,—Herewith I have the pleasure of sending you a lithograph of the Allesley Fossil Tree, the entire production of a self-taught genius, our Village Carpenter. You will understand that the tree extended some yards further towards the spectator; these portions were removed when the ground was lowered, on which occasion the tree was discovered. The specimen you received from Mrs. Corrie was not from this tree, but from similar ones, which were found a few hundred yards distant in making a new turnpike road, and which extended more than the breadth of the road.

Dr. Buckland made notes on the spot, when he was here a few years ago, with a view to publish some account of the fossil in the Geo. Trans. [See Buckland "On the occurrence of silicified trunks of trees in the New Red Sandstone at Allesley" (1836), *Geol. Soc. Proceedings*, Vol. II., 1838, p. 439.] I have not seen his description, but no doubt it is accurate. Besides these fossil trees imbedded in the sandstone, numbers of fragments are occasionally found in getting gravel, etc., and these latter are for the most part of a much firmer and closer texture than the fossil trees; and accordingly better adapted to the purpose of polishing, I apprehend too, that they exhibit the structure of the wood more perfectly. At the same time, much as our fossil wood varies in colour and external appearance, I believe that it is all of the same kind.

If specimens of the lithographed tree, or any others, are worth your having, I shall be very happy to send them, if you will point out the best mode of conveyance. I have also many thin sections on glass (and amongst them some from the lithographed tree) which show the structure very satisfactorily; these I should be happy to lend you, should they be of use. [What has become of these?]

I am collecting fossil woods with some considerable energy; and besides a large collection from this parish, I have numerous fine specimens from the West Indies. Should you at any time have any duplicates to spare, from other quarters, I should be greatly obliged to you for them.

Believe me, dear Sir,
Very truly yours,
(Signed) W. T. Bree.

To W. Hutton, Esq.

INDEX OF SPECIES.

The names of species figured in this work are printed in ordinary type, all others (including synonyms) are in italics.

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