LIST OF FOSSIL PLANTS COLLECTED BY MR. I. C. RUSSELL, AT BLACK CREEK, NEAR GADSDEN, ALA., WITH DESCRIPTIONS OF SEVERAL NEW SPECIES.

BY LEO LESQUEREUX, COLUMBUS, OHIO.

[Compiled and prepared for publication by F. H. Knowlton, Assistant Curator Fossil Plants.]

(With Plate XXIX.)

In relation to the exact locality and stratigraphic position of these fossil plants, Mr. I. C. Russell, under date of March 12, 1888,* furnishes the following information:

"The fossil plants which were forwarded to Professor Lesquereux for identification were collected at some small coal mines on Black Creek, about 2 miles northwest of Gadsden, Ala. Black Creek flows south along the axis of the gentle synclinal forming the Lookout Mountain plateau, and furnishes an escape for the drainage of between 50 and 60 square miles at the southern end of that table-land.

"The plants in question occurred in the shale above a seam of coal 18 inches thick, and are all from one stratum, the horizon of which is about 750 or 800 feet above the top of the heavy conglomerate known as Millstone Grit, which forms the abrupt escarpment bounding the Lookout Mountain on all sides. The rocks in which the plants occur evidently belong to the true Coal Measures, and were once continuous with the Great Warrior coal field, from which they have been separated by the elevation of an anticlinal fold, the position of which is now occupied by Wills Valley.

"The southern end of the Lookout Mountain plateau is terminated abruptly by an east and west fault, having a throw of several thousand feet, which has brought the coal-measure strata in contact with shales of Lower Silurian times. This fault occurs at the junction of the synclinal of Lookout Mountain with an anticlinal of equally grand proportions, the erosion of which has produced the broad, level-floored valley stretching south from Atalla and Gadsden. The axes of the two folds we have mentioned fall approximately in the same line, and the adjustment of the fold, one being an upward bending of the rock and the other a downward bending, is accomplished by a fracturing and displacement of the strata. This is the only instance known to me where a great anticlinal and a great synclinal occur end to end in immediate contact."

1. **Calamites ramosus** Artis.

Four specimens; Museum number, 2657.

* In a letter to Prof. Lester F. Ward.

2. **Sphenopteris (Diplothmema) Dicksonioides** (Göpp.). Schültze.

Two specimens; Museum number, 2661.

3. **Sphenopteris (Diplothmema) subgeniculata** (Stur.). Schültze.

This may be a variety of the sterile plants of *Sphenopteris harveyi*, Lx., which are the most abundantly represented specimens in both sterile and fertile fragments.

Two specimens; Museum number, 2662.

4. **Sphenopteris Höheninghausi** Brgt.

One specimen; Museum number, 2663.

5. **Sphenopteris divaricata** Göpp.

One specimen; Museum number, 2663½.

6. **Sphenopteris (Zeilleria) Harveyi** Lx. Sterile and fertile plants with rachis, Pl. XXIX, figs. 5, 5*a*, 6.

This fern, extremely variable and represented by many specimens and under divers forms in the collection of Mr. I. C. Russell, was described as *Sphenopteris Harveyi* Lx. (U. S. Coal Flora, p. 766, Pl. 103, figs. 7, 7*b*), and later as *Zeilleria delicatula* Kidst. in Quart. Journ. Geol. Soc., Vol. XL, p. 592, Pl. XXV, the author, Mr. Robert Kidston, considering it as a synonym of *Sphenopteris delicatula* Stern., Vers. I, fasc. II, p. 30, Pl. XXVI, fig. 5; *S. meifolia* Stern., Vers. II, p. 56, Pl. XX, fig. 5. *Cheilantheites meifolius* Goepp., System Filic., p. 241, Pl. XV, figs. 3, 4; *S. delicatula* Brgt., all forms represented by fragments of sterile plants, whose relation to the above species is very obscure and doubtful, while Mr. Kidston's figures represent only the fertile pinnæ and pinnules.

The species had evidently two forms, one for sterile parts of the plants generally larger or at least with pinnules and lobes stronger (Pl. XXIX, figs. 9, 9*c*), with tertiary or ultimate main rachis more or less flexuous or subgeniculate, the pinnæ and pinnules either at right angles or curved down at base, with divisions open or oblique, all the divisions flat; pinnules ovate in outline, two to six lobed; lobes alternate dichotomous or opposite, linear, obtuse at apex, without trace of a medial nerve, except at the base of the primary divisions or pinnules. In other forms the lobes are narrower and longer, filiform, acuminate, open or divaricate, the rachis of pinnæ being subgeniculate, and altogether comparable to *Diplothmema subgeniculata* Stur. In others still, the pinnules are shorter, the lobes shorter, erect, obtuse, bifid at apex, traversed in the middle by a distinct percurring medial nerve, of character similar to those of *Sphenopteris divaricata* Goepp. Indeed the pinnules by their size, their mode of division being either bifid or dichotomous, the lobes flat and without nerves, short and broad, or long and filiform, oblique or divaricate, or distinctly simple nerved, may be compared to a large number of species of *Sphenopteris* with more evidence than to *S. delicatula* Sternb., *S. meifolia* Sternb., etc.

The fertile plants (Pl. XXIX, figs. 5–8) have a broad, flat, distinctly striate primary rachis; the secondary division oblique, with rachis of the same character, the tertiary oblique, or at right angles, with rachis flat and smooth, sometimes round in the middle, and the ultimate divisions oblique, simple, or trifid, curved, bearing at the apex small globose involucrate sporanges parting at maturity into three to five lanceolate lobes curved inward, figs. 8, 5*a*, 6*a*. The divisions of these sporanges are varied apparently from the angle and degree of compression, some of them ovoid, figs. 6, 6*a*, being only split in two lobes. As the sporanges are much larger upon some of the specimens, one might admit two species. But fig. 6 is upon the same specimen as fig. 5, and evidently the form which I have named, var. *robusta*, is, like the multiple forms of the sterile plants, a mere variety, the size of the sporanges depending on a more advanced stage of maturity or on a different position of the pinnæ upon the fronds. The pinnæ seen upon the fertile plants without sporanges do not seem to be sterile pinnules, but merely pedicels from which the sporanges have been detached.

There is no reason for changing the name originally given to the plant. The specific name has priority and the genus *Zeilleria*, though well described by its author, represents only the characters of the fruiting part of plants referable to the group *Sphenopteris* (*Hymenophyllites*), but may be changed until more is known upon the fruiting parts of the numerous species described as *Sphenopteris*.

Six specimens; Museum number, 2664.

7. **Sphenopteris Harveyi** Lx., var. **robusta** Lx. Plate XXIX, figs. 7, 8.

Seven specimens; Museum number, 2665.

8. **Sphenopteris laxifrons?** Zeiller.

One specimen; Museum number, 2666.

9. **Sphenopteris polyphylla?** L. & H.

One specimen; Museum number, 2667.

10. **Pseudopecopteris (Sphenopteris) macilenta** (L. & H.) Lx.

Six specimens; Museum number, 2668.

11. **Pseudopecopteris (Sphenopteris) muricata** (Brgt.) Lx.

Twenty-four specimens; Museum number, 2669.

12. **Pseudopecopteris trifoliata** Brgt. sp.

One specimen; Museum number, 2670.

13. **Pseudopecopteris latifolia** Brgt., sp.

Five specimens; Museum number, 2671.

14. **Pseudopecopteris Pluckeneti** Brgt., sp.

One specimen; Museum number, 2672.

15. **Pseudopecopteris (Sphenopteris) Schillingsii** And.

One specimen; Museum number, 2673.

16. Sphenophyllum tenerrimum Ett.

Two specimens; Museum number, 2674.

17. Neuropteris Elrodi Lx. Plate XXIX, figs. 1–3.

In the U. S. Coal Flora, p. 107, I remarked on this species that it might be a variety of *N. Smithii* Lx., and also (*l. c.*) that it is closely related to *N. Duloschi* Stur., Culm Flora, Pl. XI, Fig. 9. In Vol. III of the same work (U. S. Coal Flora, p. 735), I remarked again of the close affinity of *N. Elrodi* and *N. Smithii*, considering them as two different species, the first with oblong, larger, obtuse or obtusely pointed pinnules, the terminal long-lanceolate, acuminate, or blunt at apex, as in Pl. XXIX, figs. 1–3; the second with pinnules very small, nearly round, the terminal shorter and always obtuse, as in Pl. XXIX, fig. 4. At the same time I recognized (p. 736), the identity of *N. elrodi* with *N. Duloschi*. The figures of Pl. XXIX, figs. 1–4, from specimens of Mr. I. C. Russell's collection, where the two forms are represented in many fragments, show the differences in their characters. It is certain that if the two forms ear sometimes found upon the same specimens they are always upon different stems or never attached to the same rachis. I may remark, also, that the finest specimens of *N. Smithsii* were communicated to me from the Coal Measures of Alabama by Prof. Eug. A. Smith, and later by Prof. William M. Fontaine, from West Virginia, and that the specimens from which the species of *N. Elrodi* was first described were sent years after from the Whetstone quarries of the Chester group of Indiana, and that in none of these specimens the two forms are observed. *N. Schlearii* Stur. has priority on *N. elrodi*.

Twenty-five specimens; Museum number, 2675.

18. Neuropteris Smithii Lx., Plate XXIX, fig. 4.

Six specimens; Museum number, 2676.

19. Rachophyllum adnascens L. & H.

One specimen; Museum number, 2677.

20. Calymmotheca Linkii Stur.

Four specimens, Museum number, 2678.

21. Cordaites validus Lx.

One specimen;. Museum number, 2658.

22. Trigonocarpus ampullæformis Lx.

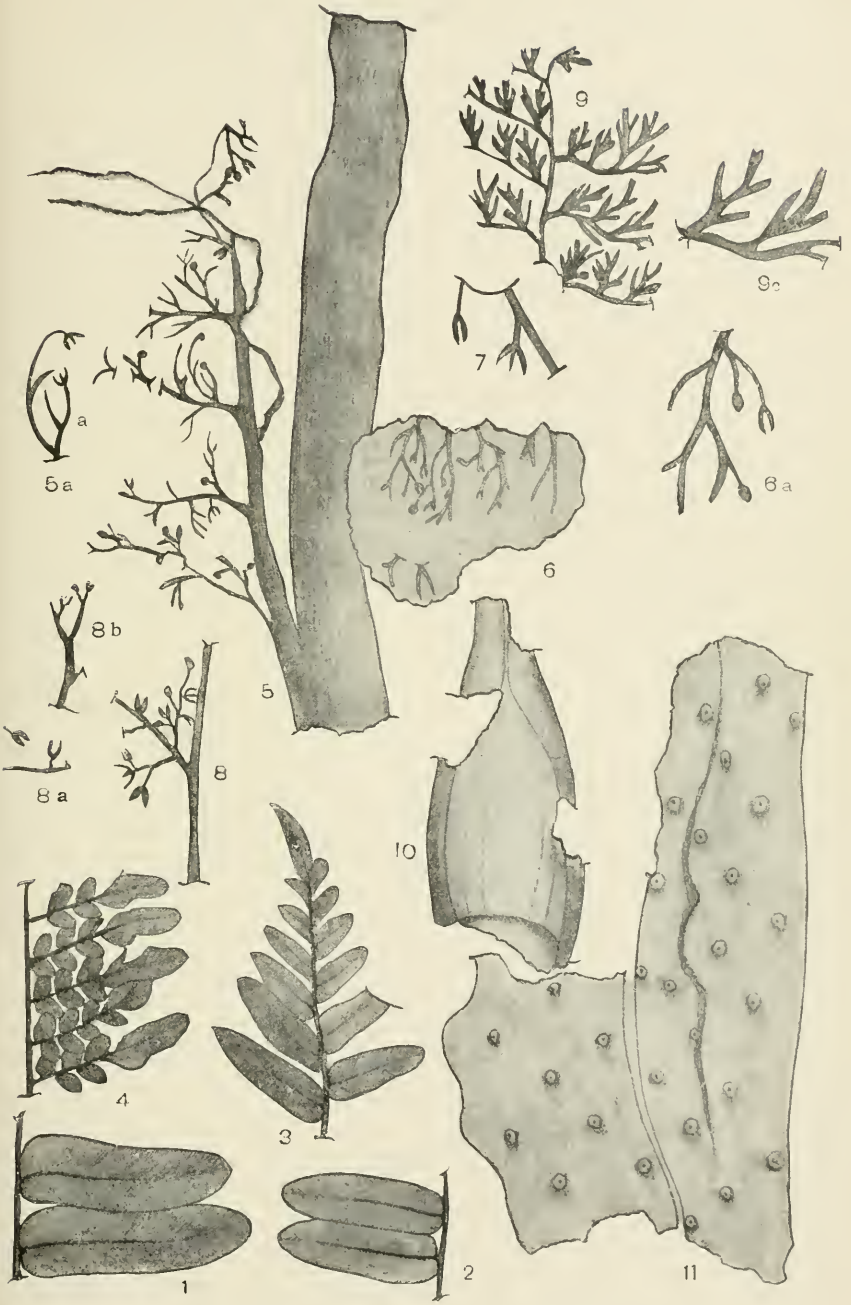
One specimen, Museum number, 2679.

23. Rhabdocarpus multistriatus Sternbg.

One specimen; Museum number, 2680.

24. Rhabdocarpus Russellii, n. sp. Plate XXIX, fig. 10.

Fruit large, ovate in the middle, enlarged truncate (or broken) at base, nucleus oblong, gradually narrowed upward in passing to a narrow tubular appendage, distinct to the apex, outer testa forming a flat border continued upward, enlarged toward the apex; thinly closely striate as well as the surface of the nucleus, truncate at apex.



FOSSIL PLANTS FROM ALABAMA. (Page 83.)

FIGS. 1-3. *Neuropteris Elrodi* LX.
FIG. 4. *Neuropteris Smithii* LX.
FIGS. 5, 5a, 6, 6a, 9, 9c. *Sphenopteris Harveyi* LX.
FIGS. 7, 8, 8a, 8b. *Sphenopteris Harveyi* LX., var. *robusta* LX.
FIG. 10. *Rhabdocarpus Russellii*, n. sp.
FIG. 11. *Stigmaria Russellii*, n. sp.

Comparable to *Cardiocarpus longicollis* Lx., but smaller, less enlarged in the middle, the marginal ring narrower in the lower part, broader in the upper; surface striate.

One specimen; Museum number, 2681.

25. **Lepidodendron aculeatum** Sternbg.

One specimen; Museum number, 2659.

26. **Stigmaria Russellii**, n. sp. Pl. XXIX, fig. 11.

Part of flattened branch or stem; surface narrowly obscurely striate lengthwise; areoles small, in regular spiral or quincunxial order, 1^{cm} distant, round or oval, without rings but with a slightly prominent central point.

Species comparable to *Stigmaria stellaris* Lx. (U. S. Coal Flora, p. 516, Pl. LXXIV, figs. 5, 7), differing by areoles marked with a distinct central vascular scar, the surface smooth or vertically striate. The areoles are a little less than 2^{mm} in diameter. There are, on the reverse of the specimen smooth, flat, linear leaves nearly 1^{cm} broad, similar to leaves of *Stigmaria* possibly referable to the species.

One specimen; Museum number, 2660.

27. **Poa-cordaites** Grand 'Eury.

One specimen; Museum number, 2682.

EXPLANATION OF PLATE XXIX.

Figs. 1–3. Neuropteris Elrodi Lx., p. 92.
Fig 4. Neuropteris Smithii Lx., p. 92.
Figs. 5, 5*a*, 6, 6*a*, 9, 9*a*. Sphenopteris Harveyi Lx., p. 90.
Figs. 7, 8, 8*a*, 8*b*. Sphenopteris Harveyi, Lx., var. robusta Lx., p. 91.
Fig. 10. Rhabdocarpus Russellii, n. sp., p. 92.
Fig. 11. Stigmaria Russelli, n. sp., p. 93.