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OBSERVATIONS ON FOSSIL PLANTS FROM
THE DEVONIAN OF EASTERN
NORTH AMERICA

V. *HYENIA BANKSII*, SP. NOV.

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THE material on which the following account is based was secured during the summer of 1940 approximately one mile southeast of the summit of Mount Peter on Highway No. 17a, between Greenwood Lake and Warwick, Orange County, New York, about four miles from Warwick. At this place the plant-bearing formation is exposed along the west side of the road. The strata are tilted to a nearly vertical position and consist of hard coarse sandstone and shale lenses, the latter containing the plants. Quartz veins are abundant throughout the beds. The shale is slightly metamorphosed and has developed a slaty cleavage, with the result that the plant tissue has become reduced to a very thin film of minutely checked anthracitic substance showing only a little structural detail.

The plant-bearing bed in question appears to belong to the Bellvale sandstone member of the Hamilton group. No data are readily available on the stratigraphy at this particular locality, but for the Green Pond Mountain syncline in New Jersey, where the Bellvale is exposed, Willard (4, p. 262) gives the following sequence:

Catskill continental facies
 Skunnemunk conglomerate
Marine Middle Devonian
 Hamilton group
 Bellvale sandstone
 Onondaga group
 Cornwall shale
 Kanouse sandstone and conglomerate

Willard assigns the Bellvale sandstone to the Marcellus, but admits the possibility of its belonging to the lower Skaneateles, and the underlying clastic sediments are usually believed equivalent to the Onondaga limestone. The Bellvale is overlain conformably by the Skunnunk conglomerate. Occurring as it does at or slightly below the middle of the Middle Devonian, it is roughly contemporaneous with the Honseler Schichten of Germany and the plant-bearing Middle Devonian strata of western Norway, both of which have yielded *Hyenia*. Also, the sediments were probably deposited within the time interval represented by the Middle Old Red Sandstone of Scotland, which contains the *Rhynia* flora. The Bellvale is, therefore, among the oldest plant-bearing beds in eastern North America.

Although the present account is concerned principally with remains of *Hyenia*, a few other plants worthy of brief mention are known in the Bellvale sandstone. There are occasional broad leaflike organs referable to either *Archaeopteris obtusa* or *Psygmo-phyllum Kolderupi*. *Archaeopteris* is mainly an Upper Devonian type, but *A. obtusa* is not readily distinguishable from *Ps. Kolderupi*, which occurs with *Hyenia* in the Middle Devonian of Norway (Nathorst, 1915). A few curled branchlet tips resemble those of either *Psilophyton* or *Aneurophyton*. Assignment to the latter genus seems preferable because of the widespread occurrence of *Aneurophyton* and the rarity of *Psilophyton* in eastern New York. In Germany *Aneurophyton* occurs with *Hyenia* in the upper Middle Devonian Honseler Schichten, and in eastern New York it ranges throughout the Hamilton group and into the Portage of the Upper Devonian. There are remains of undescribed lycopods and large branched stems of undetermined affinity. In its entirety the plant assemblage is rather typical of the Middle Devonian.

So far as we know at present, *Hyenia* occurs only in the Middle Devonian. The genus was first described from western Norway (Nathorst, 1915), but until further discoveries were made in Germany (Kräusel and Weyland, 1926, 1932) nothing was known of its fructifications, and little of its habit. It is now regarded as a primitive member of the sphenopsid complex, and is assigned to the Protoarticulatae. Previous reports of its existence in North America

have been based on a few rather poorly preserved stems from Gilboa, New York, which have been identified by some as *Hyenia*, but by others as *Protolepidodendron*. The discovery, however, of unquestionable *Hyenia* remains in the Bellvale sandstone strengthens the likelihood of its occurrence at Gilboa.

The specimen described here consists of a short length of an upright leafy stem bearing two branches (Pl. I, Fig. 1). For reasons to be explained it is assigned to a new species, and is diagnosed as follows:

***Hyenia Banksii*, sp. nov.**

(Pl. I, Figs. 1-3)

Stems slender, 1-4 mm. broad, branched. Leaves 7-11 mm. long, usually two- but sometimes three-forked, 0.5 mm. broad, attached in whorls at intervals of 8 mm. along the stem.

The fructifications, anatomy, and basal parts are unknown. The species is named after Harlan P. Banks, who discovered the specimen.

The upright stem bearing the two lateral branches is 5.5 cm. long and about 0.5 cm. in diameter. Neither the basal nor the terminal parts are present. Both branches depart at the same level. Kräusel and Weyland (1932) have shown that in *H. elegans* the upright stems arise from a horizontal rhizome. In our specimen, however, the thicker stem portion cannot be interpreted as a rhizome because it is leaf-bearing (Pl. I, Fig. 1). Moreover, there is evidence of the attachment of branches on the opposite side from those shown, although they are not present in the figure. The attachment of the two branches at the same level may be seen in Figures 2 and 3 on Plate I. These figures represent the counterpart of the specimen in Figure 1. Figure 2 illustrates the attachment of the upper branch, and Figure 3 shows the same slab after removal of a fragment of shale matrix to reveal the attachment of the lower branch at approximately the same level. This manner of branching appears to be slightly different from that of either *H. sphenophylloides* or *H. elegans*, and is believed to characterize the new species. Probably the upright stem portion of *H. Banksii* was itself attached to an underground rhizome, as in *H. elegans*.

However, the axes of the German species are described as sparsely branched, and in this respect *H. Banksii* seems different from it.

The leaves of *H. Banksii* are smaller than those of the European species. There is no evidence that any of them were more than three-forked, and most of them show only a single division. In this way they resemble those of *H. sphenophylloides* rather than *H. elegans*, in which they are frequently many-forked, after the manner of *Asterocalamites*. In agreement with the smaller leaves, the branches of *H. Banksii* are also smaller, and the intervals between adjacent whorls are proportionally shorter. The plant therefore presented a finer and more delicate aspect, even though it might have been larger in over-all dimensions. The number of leaves per whorl cannot be determined because the stems show none of the original surface markings. The leaves appear to have been stiff bristly structures, which probably remained attached during the life of the plant.

Although the fructifications and some other important diagnostic features are absent there remains, nevertheless, ample reason for setting the Bellvale sandstone plant apart from the European forms as a distinct species. *H. sphenophylloides* and *H. elegans* are much alike, and the justification for naming the latter must be sought more in the completeness of the remains than in any clearly recognizable differences. The dimensions of the leaves and the stem parts are similar.

No positive opinion can be expressed on the exact determination of the supposed *Hyenia* material from Gilboa because only one poorly preserved fragment is at hand for examination. In size, however, it agrees more with *H. sphenophylloides* and *H. elegans* than with *H. Banksii*. It has a stem about 5 mm. broad, which is unbranched. The leaves are quite long, one measuring 3 cm. This particular one is forked beyond the middle.

LITERATURE CITED

1. KRÄUSEL, R., UND WEYLAND, H. 1926. Beiträge zur Kenntnis der Devonflora. II. Abh. Senckenberg. naturf. Gesell., Vol. 40, pp. 115-155.
2. ——— 1932. Pflanzenreste aus dem Devon. III. Über *Hyenia* Nath. Senckenbergiana, Vol. 14, pp. 274-280.
3. NATHORST, A. G. 1915. Zur Devonflora des westlichen Norwegens. Bergens Mus. Aarb., pp. 12-34.
4. WILLARD, B. 1939. The Devonian of Pennsylvania. Pennsylvania Geol. Surv., 4th Ser., Bull. G19. Harrisburg.

EXPLANATION OF PLATE I

Hyenia Banksii Arnold, sp. nov.

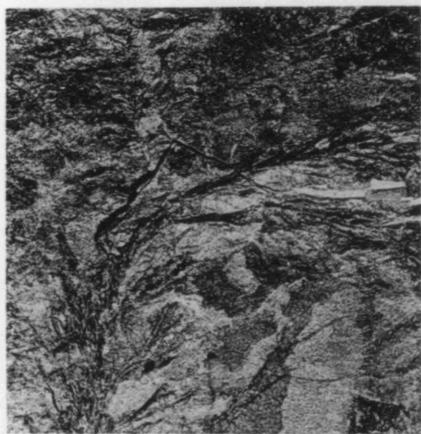
Specimens from locality and horizon described in text.
No. 21749, U. M. Holotype

- FIG. 1. Portion of upright stem bearing two branches. $\times 1$
FIG. 2. Counterpart of specimen in Figure 1, showing attachment of uppermost branch. Slightly enlarged
FIG. 3. Same slab as in Figure 2, after removal of a fragment of matrix to show attachment of lower branch. Slightly enlarged

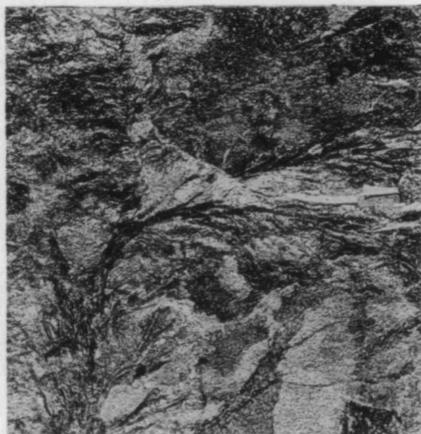
PLATE I



1



2



3

