

American fossil mosses, with description of a new species from
Florissant, Colorado

ELIZABETH GERTRUDE BRITTON AND ARTHUR HOLLICK

(WITH PLATE 9)

During the summer of 1906 Professor Theo. D. A. Cockerell and his wife spent several weeks at Florissant, Colorado, collecting fossil plants. Among those collected was found a beautifully preserved fruiting tuft of a moss, which was kindly transmitted to us for examination and description. The specimen was obtained from the well-known Tertiary shales of that locality, from which quantities of fossil insect and plant remains have been secured by many different collectors from time to time; but among the thousands of specimens thus brought to light only three have been heretofore described as mosses, viz.

Hypnum Haydenii Lesq. Ann. Rept. U. S. Geol. and Geog. Surv. Terr. 1874: 309. 1876; Bull. U. S. Geol. and Geog. Surv. 1: 583. "1875" [1876]; Rept. U. S. Geol. Surv. Terr. 7 (Tert. Fl.): 44. pl. 5. f. 14, 14a, 14b. 1878. (PLATE 9, FIGURES 1, 1a.)

Fontinalis pristina Lesq. Rept. U. S. Geol. Surv. Terr. 8 (Cret. and Tert. Fl.): 135. pl. 21. f. 9. 1883. (PLATE 9, FIGURES 2, 2a.)

Hypnum Brownii Kirchner, Trans. Acad. Sci. St. Louis 8: 178. pl. 12. f. 4, 4a. 1898. (PLATE 9, FIGURES 3, 3a.)

None of these, however, is a fruiting specimen, and the generic determinations were based entirely on the leaf-characters, which, even if well defined, would not in themselves be characters from which generic or even family relationships could be satisfactorily determined. In this connection it may be suggested that the species first mentioned is more indicative of a *Lycopodium* or a conifer than of a moss, and the author voices his uncertainty in acknowledging that "the apparently thick leaves seem abnormal for a species of

moss," and that "the mode of division . . . separates it from the Lycopods." *

In regard to the second species cited it may be merely remarked that the correctness of its reference to the genus *Fontinalis* is questionable, so far as may be judged by the figures, while in regard to the one last mentioned the author, in his description, says: "The leaves in most cases are indistinct and only the more solid stems are discernible." It is apparently a moss, but satisfactory evidence of its relationship with the genus *Hypnum* is not apparent in the figures.

The only other American fossil-plant remains described as mosses, with the exception of several existing species from deposits of Pleistocene and more recent age, are *Hypnum columbianum* Penhallow, in Dawson, Trans. Roy. Soc. Canada 8^t: 77. fig. 3. 1890 (PLATE 9, FIGURE 4), from lower Tertiary beds at Quesnel, B. C., which is more likely a conifer, apparently related to *Widdringtonia helvetica* Heer, Fl. Tert. Helv. 1: 48. pl. 16, f. 2-18, or to *Glyptostrobus Ungerii* Heer, as depicted by several authors; and *Rhynchostegium Knowltoni* E. G. Britt., described and figured in Bull. Torrey Club 26: 79, 80. 1899 (PLATE 9, FIGURE 5), from the upper Eocene or Miocene sandstone at Cle Elum, Kittitas County, Washington. These specimens, as in the case of those previously mentioned, are also sterile, so that in our specimen from Florissant we have the first fossil moss with fruit thus far recorded from America.

Glyphomitrium Cockerelleae sp. nov.

(PLATE 9, FIGURES 6, 6a)

Plants pulvinate, forming a dark-brown tuft 1 cm. high and 2.5 cm. wide, with lignitic remains appearing like a mass of dark-brown radicles. Stems erect and crowded, evidently branching: leaves

* Through the kindness of Dr. J. N. Rose, Associate Curator of the Division of Plants, U. S. National Museum, the type specimen of *Hypnum Haydenii* was transmitted to us for examination, from which our figures were made. We are satisfied that it is not a moss, and Dr. L. M. Underwood, of Columbia University, has expressed his opinion that it can not be a *Lycopodium*. The closest comparisons which we have been able to make are with certain conifers, especially with forms of *Juniperus communis* L., in which the young growing branchlets often present a striking similarity in general appearance to this specimen.

2-3 mm. long, linear-lanceolate, straight or curved, apparently with a thick vein and slender sharp apex: sporophytes terminal: seta erect and straight, 1-1.5 cm. long: calyptra mitrate and plicate, 2-2.5 mm. long, with well-marked ridges forming darker grooves in the light-colored stone.

The capsules were not yet developed when this specimen was buried and nothing but the calyptra remains to indicate the nature of the sporophyte, but from general aspect and characters it seems to belong nearest to the *Grimmiaceae* with a resemblance to the *Ptychomitriaceae*, the calyptra being grooved and long, completely enclosing the sporophyte when young, as in *Ptychomitrium*, and prolonged into an acute apex as if the lid were rostrate.

This species is dedicated to Mrs. Wilmatte Porter Cockerell, in recognition of her devotion to science and her invaluable assistance in securing specimens from this locality.

This genus has been known in American bryological works as *Ptychomitrium*, but the older name has been reinstated by Brotherus in Engler & Prantl, *Pflanzenfamilien* (1³: 440. 1902) while keeping the name of the section, as indicated above. The synonymy is as follows:

Glyphomitrium Brid. Mant. 30. 1819; emend. Mitt. Jour. Linn.

Soc. 12: 105. 1869.

Brachysteleum Reichenb. Consp. 34. 1828.

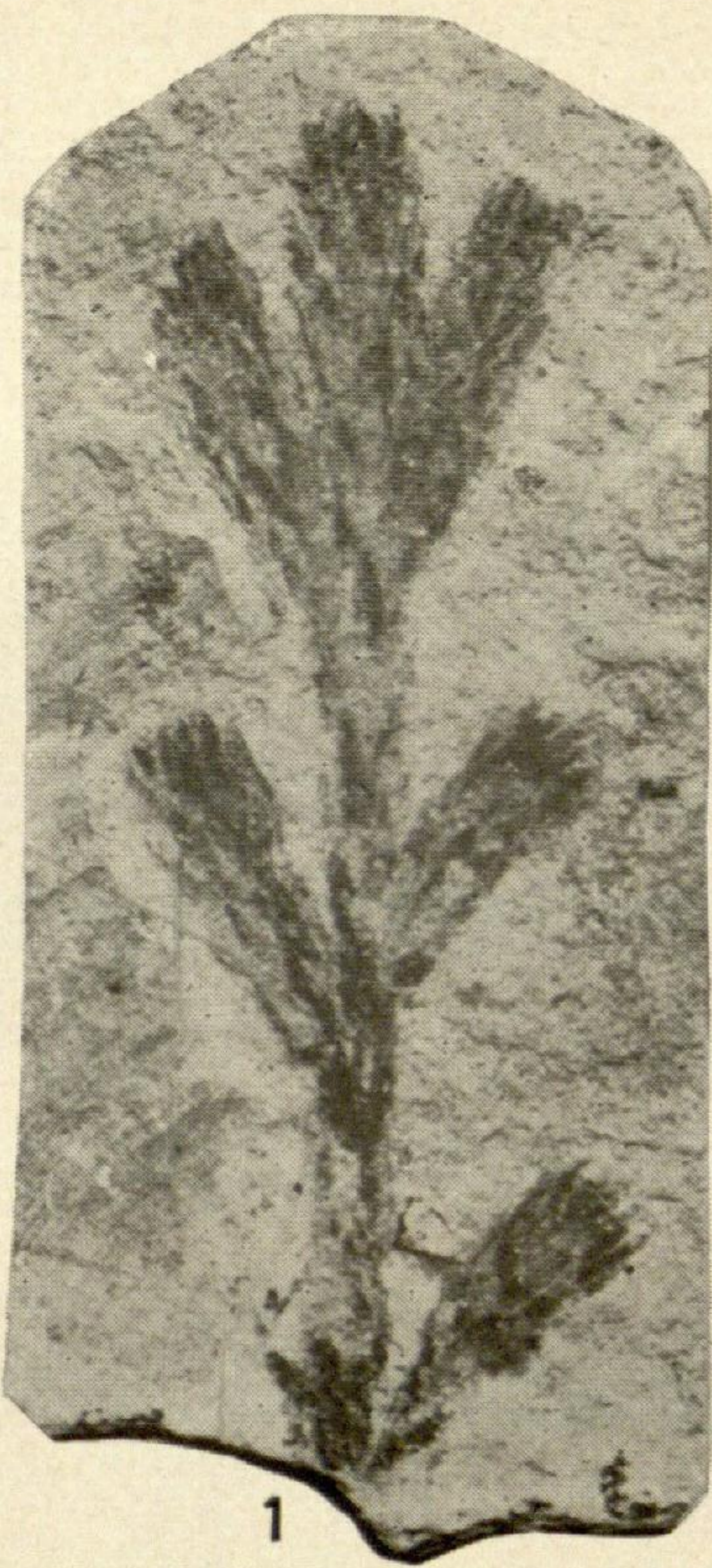
Ptychomitrium (Bruch) Furnr. Flora 1829, Erg. 2: 19. 1829.

Notarisia Hampe, Linnaea 11: 379. 1837.

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Explanation of plate 9

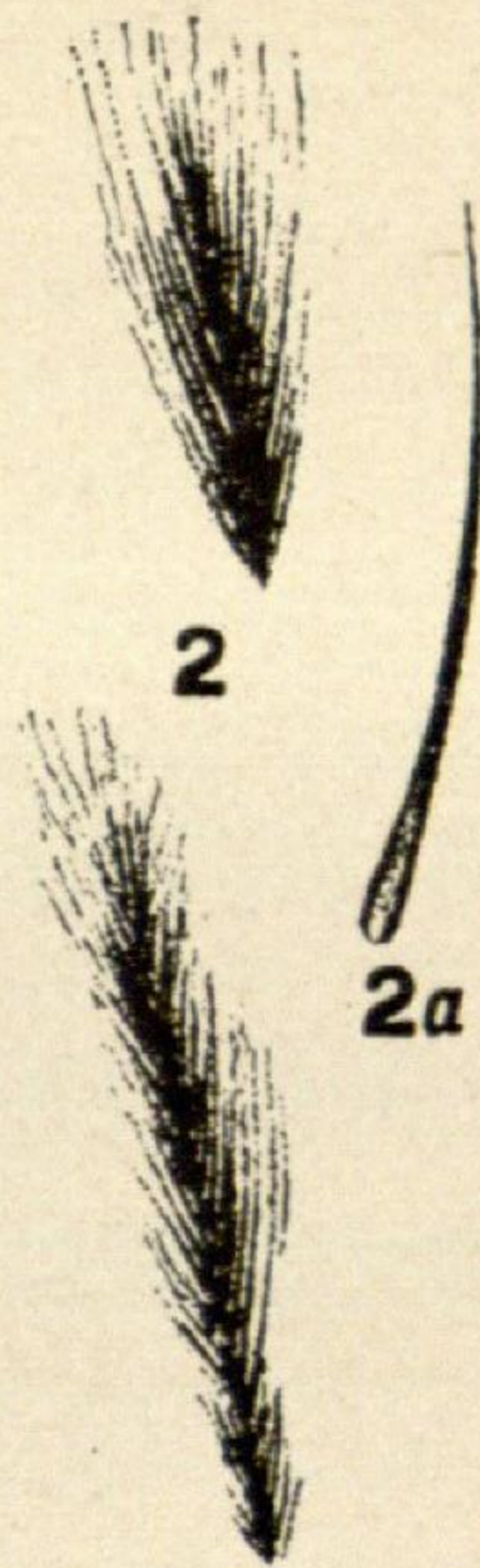
- Figs. 1, 1a — *Hypnum Haydenii* Lesq.
 Fig. 1 \times about $1\frac{2}{3}$.
 Fig. 1a \times about 2.
- Figs. 2, 2a — *Fontinalis pristina* Lesq.
 Fig. 2 natural size.
 Fig. 2a \times about $1\frac{1}{2}$.
- Figs. 3, 3a — *Hypnum Brownii* Kirchner.
 Fig. 3 natural size.
 Fig. 3a \times about 5 (?).
- Fig. 4 — *Hypnum columbianum* Penhallow. Natural size.
- Fig. 5 — *Rhynchostegium Knowltoni* E. G. Britt. \times about 9.
- Figs. 6, 6a — *Glyphomitrium Cockerelleae* E. G. Britt. and Hollick
 Fig. 6 \times about $1\frac{2}{3}$.
 Fig. 6a \times about 7.



1

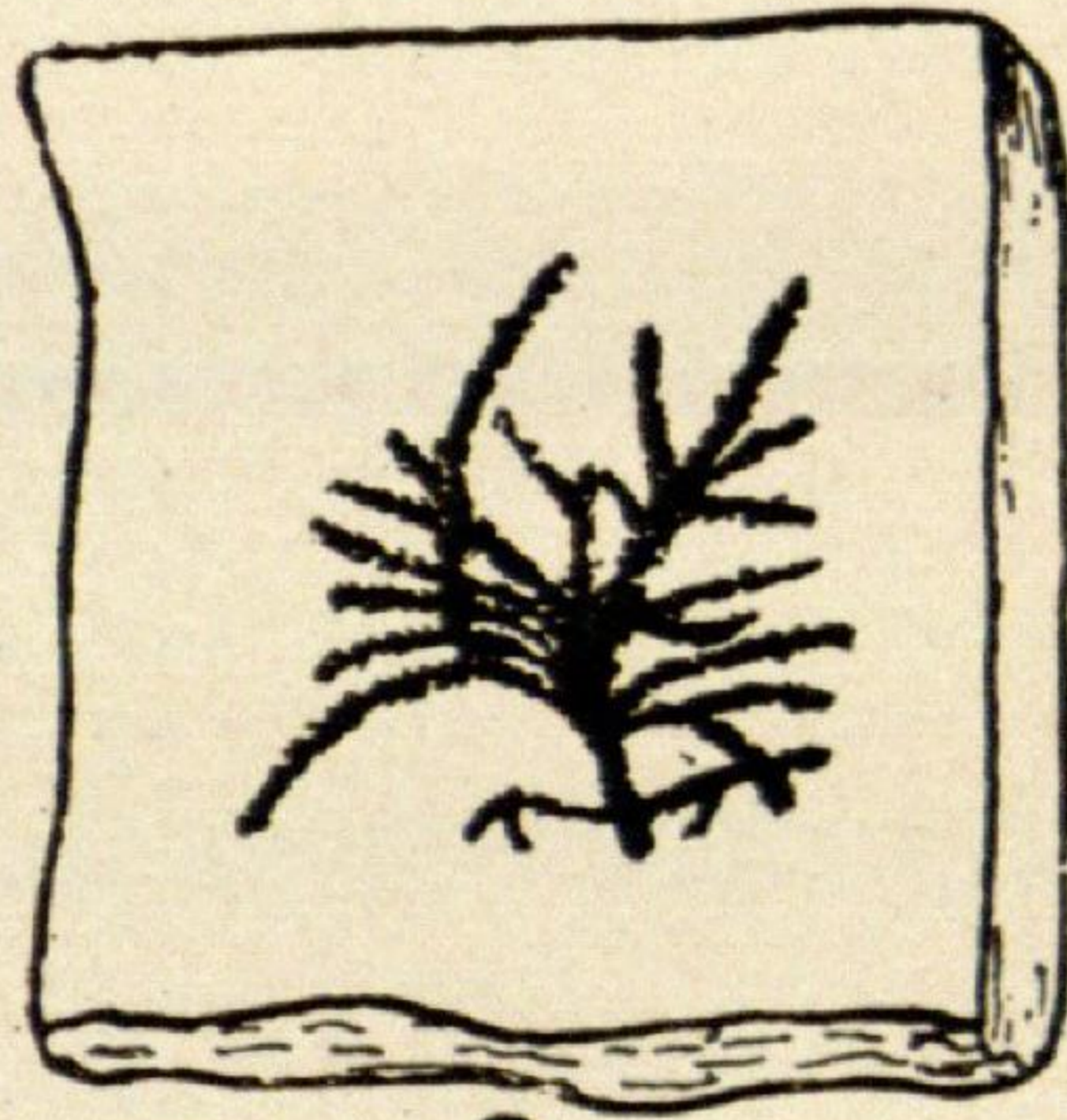


1a



2

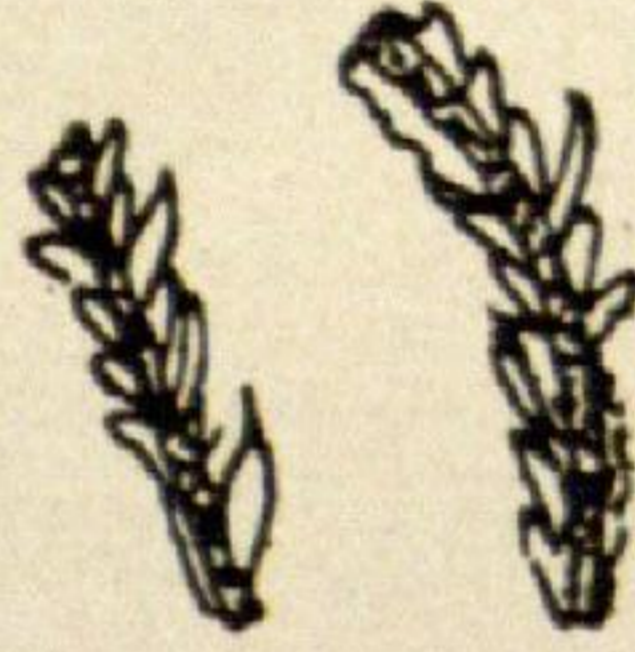
2a



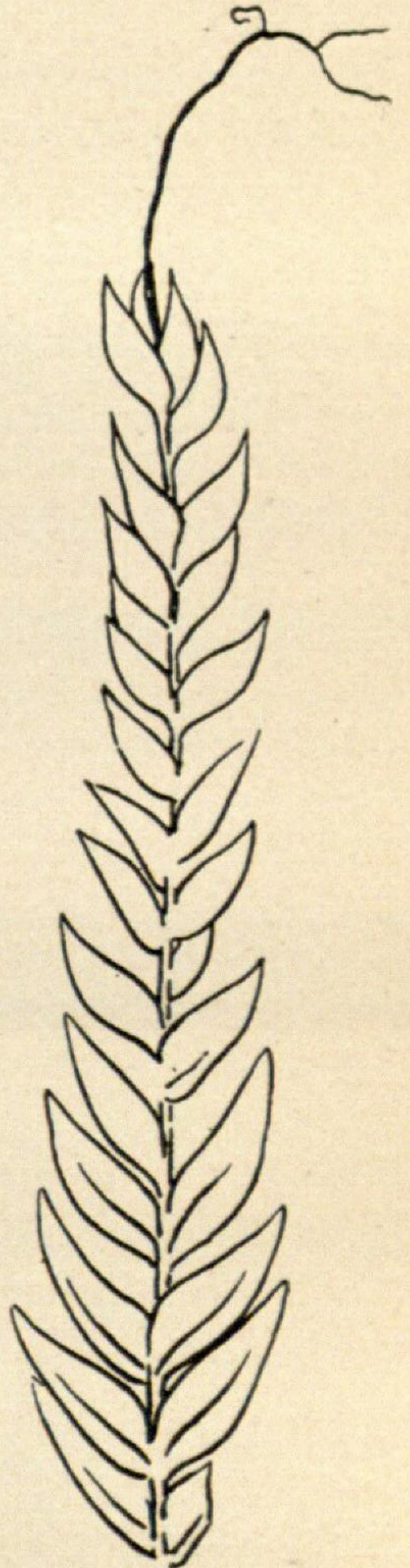
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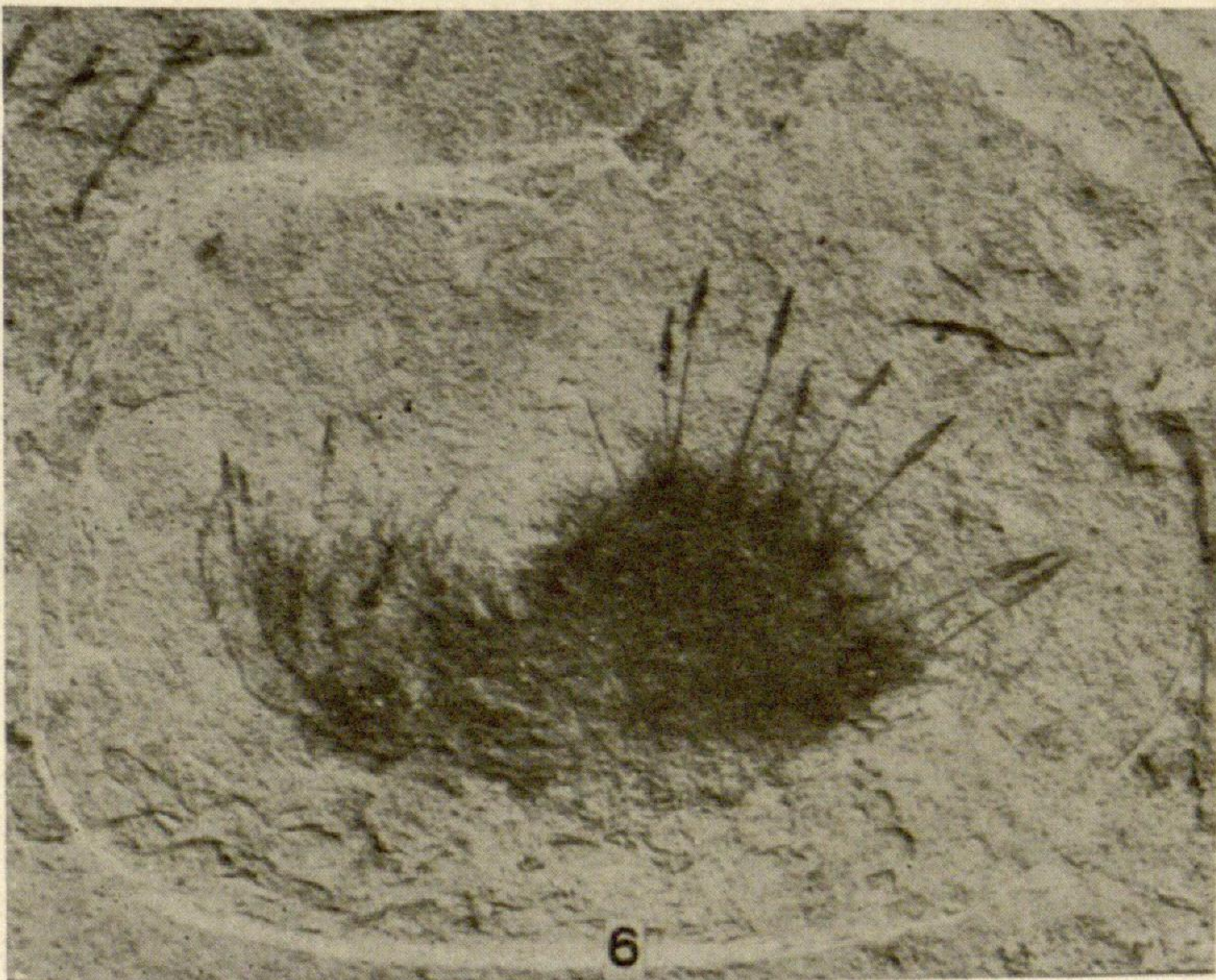
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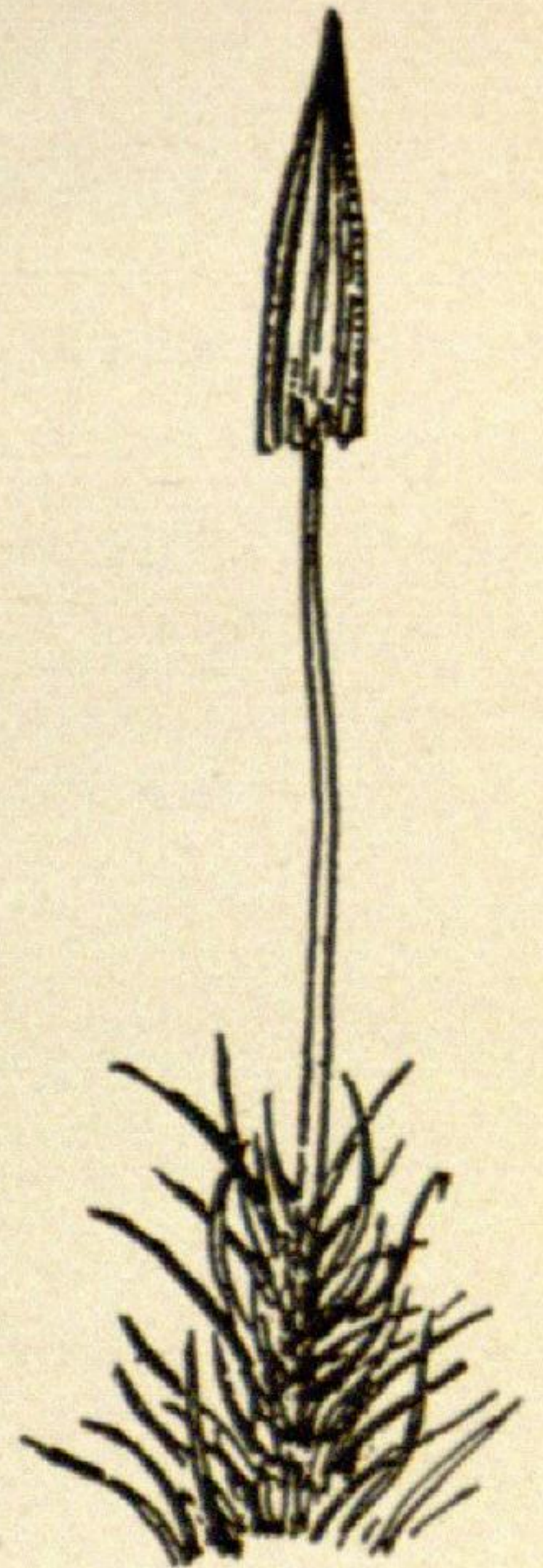
3a



5



6



6a

AMERICAN FOSSIL MOSSES