

advanced quickly from instructor to assistant professor, to associate professor, and to professor. Since 1948, he has been professor of physics and chairman of the department of physics at the University of Chattanooga. Dr. McCay has done special work in the Applied Physics Laboratory (OSRD) of Johns Hopkins University and last summer (1953) as physicist, Special Training Division, Oak Ridge Institute of Nuclear Studies.

His research interests are wide including work in spectroscopy, thermocouple stability, viscosimeter construction and calibration, atmospheric potentials, aerodynamics, and solar energy. He is a member of Sigma Xi, Phi Beta Kappa, Sigma Pi Sigma (physics), American Physical Society, American Association of Physics Teachers, American Institute of Physics, Southeastern Section of American Physical Society, and other organizations.

On June 11, 1935, Dr. McCay married Miss Lessie Belle Peeler, Athens, Georgia. There are two children: Stanley, age 15, and Ann, age 11.

THE GRAPEFERNS IN TENNESSEE

JESSE M. SHAVER

George Peabody College for Teachers, Nashville, Tennessee

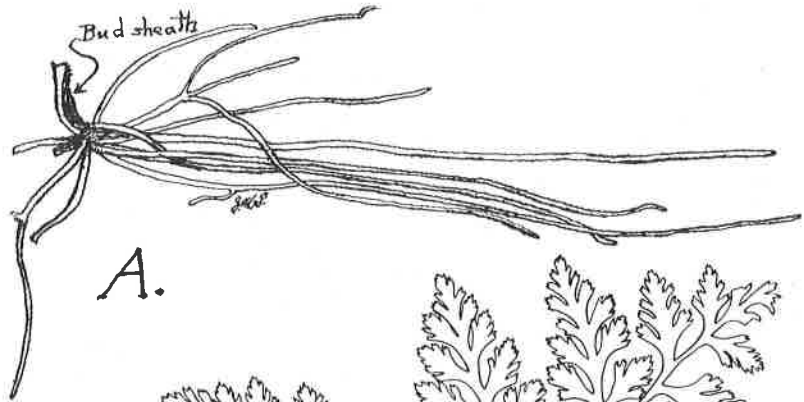
RATTLESNAKEFERN

Botrychium virginianum (L.) Sw.

(Continued from the October, 1953, Number)

In some cases, the veins appear to end just before reaching the tooth margin, but usually the vein only seems to end. It really continues in a much

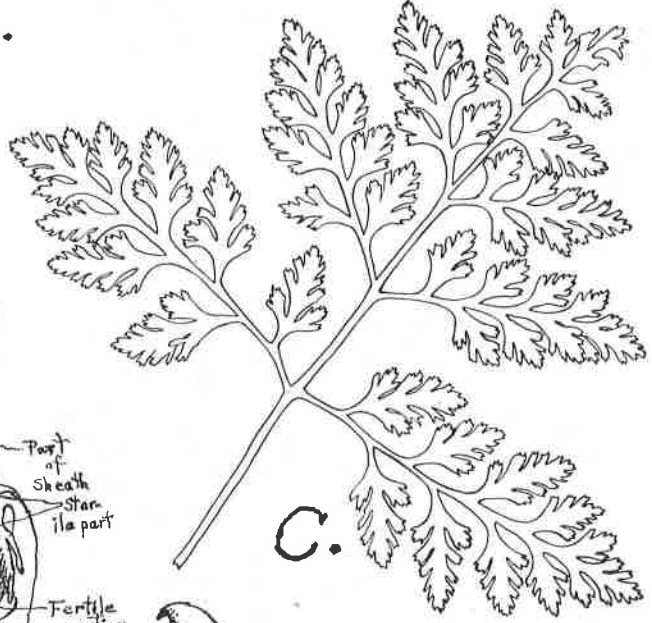
Fig. 239. (Opposite page.) Details of *Botrychium virginianum*. A. Long roots on an otherwise typical plant, no. 4173, X 0.5. B. One side of an opened sporangium, no. 9212, X 15.0. C. A very open and prominently cut sterile blade, no. 10560, X 0.5. D. Leaf bud showing (above) the folded over sterile blade and (below) the fertile spike, no. 4449, X 1.0. E. Opened sporangium showing the opposite side from that shown in B, no. 9212, X 15.0. F. Unopened sporangium showing beak and above it the suture representing the future split of the sporangium in opening and (below the beak) the modified elliptic region, no. 9125, X 15.0. G. Side view of an unopened sporangium, no. 9125, X 15.0. H. Basal leaflet of a sterile leaf with very sharp teeth, no. 2261, X 0.5. I. Basal leaflet with wide pinnules and segments, and with acute or obtuse teeth, no. 2997, X 0.5.



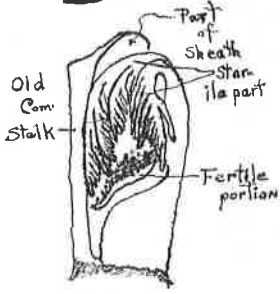
A.



B.



C.



D.



E.



F.



G.



H.



I.

attenuated condition to the very tip of the tooth. A few white or brownish hairs occur occasionally on the rachis and costae and these appear very similar to the hairs on the bud.

The fertile branch arises from the common stalk at the base of the sterile blade. It is long and usually single, the forked condition, shown in figure 238, *F*, being unusual. The fertile stalk varies from $2\frac{3}{8}$ inches (no. 2918C) to $9\frac{3}{4}$ inches (no. 2274) in length with an average length of about 5 inches (based on 53 fertile branches). At the end of the fertile stalk is the two to three times compound fertile spike (Fig. 238, *F*), which averages about $2\frac{7}{8}$ inches in length, with extremes of 1 inch (no. 9915B) and $7\frac{3}{4}$ inches (no. 10245). Occasional hairs occur on the spike. The sporangia are $1/32$ to $1/25$ inch in diameter and each opens by a transverse slit into approximately equal valves to expose the numerous white or yellow spores (Fig. 238, *D*). However, many sporangia smaller than the size given are often present. The mature sporangium is almost globular, glabrous, and yellow. There seems to be a more or less prominent beak on one side of the sporangium and below the beak an elliptical area which may be the place of attachment of the sporangium to the stalk and may be of some use in opening the valves of the sporangium. The transverse suture represents the future split. It ends near the beak on one side and near the base of the sporangium on the opposite side (Fig. 239, *B, E, F*). Shortly after shedding the spores, the sporangia turn a rich brown. Fully opened sporangia may have their valves greatly turned back. Butters (1917) states that the sporangial valves open and close with changes in atmospheric moisture. Later in the season, the old sporangia turn black and eventually fall off.

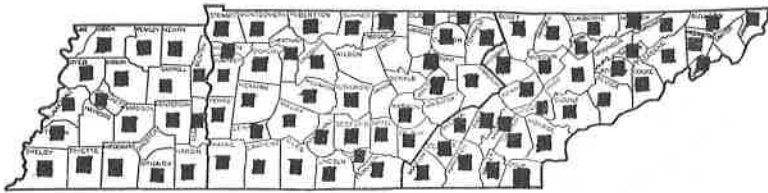


Fig. 240. The distribution of *Botrychium virginianum* in Tennessee by counties, based on the collection of Shaver.

Botrychium virginianum is a fern of fairly open damp woodlands such as are found in wooded ravines, wooded hillsides, and the wooded margins of swamps. One often finds this fern in less damp situations than the areas where the forms of *Botrychium dissectum* occur.

The distribution of the rattlesnakefern in Tennessee, so far as known to the author, is given on the map (Fig. 240). For the country as a whole, this fern may be found in suitable habitats throughout most of the United States, being found from New Brunswick to British Columbia and south to central Florida and California.

BIBLIOGRAPHY

- Anderson, W. A., Jr. 1931. A list of Tennessee ferns. *Amer. Fern Jour.*, 21(2): 64-71. Jan.-Mar.
- Bartoo, D. R. 1937. All in a day's trip—Tennessee. *Amer. Fern Jour.*, 27(1): 6-10. Jan.-Mar.
- Butters, F. K. 1917. Studies in North American ferns. I. Athyrium and ferns allied to *A. Filix-femina*. II. *Botrychium virginianum* and its American varieties. *Rhodora*, 19 (Sept.):169-216 (II is pp. 207-216).
- Chrysler, M. A. 1926. Abnormalities in *Botrychium* and certain other ferns. *Bull. Tor. Bot. Club*, 53:279-288. May.
- Clausen, R. T. 1938. A monograph of the Ophioglossaceae. *Mem. Torr. Bot. Club*, 19(2):1-177.

- Clute, W. N. 1908. On changes in function in dimorphic fronds. *Fern Bull.* 16(3):65-68. July.
- Eyles, Don E., and Mary Stipes Eyles. 1943. A local flora of the Reelfoot Lake region. *Jour. Tenn. Acad. Sci.*, 18(1):108-136. Jan. Has *B. virginianum* from this region, probably from Obion Co.
- Frick, T. A. 1939. Slope vegetation near Nashville, Tennessee. *Jour. Tenn. Acad. Sci.*, 14(4):342-420. Oct. He has this fern from Davidson Co.
- Furness, W. E. 1938. "Vegetation of a wooded north slope and an old field [Davidson Co., Tenn.]" Unpublished master's thesis, George Peabody College for Teachers, Nashville, Tenn. He found this fern.
- McGill, J. T. 1917. Ferns found in the vicinity of Sewanee [Tennessee.] *Trans. Tenn. Acad. Sci.*, 2:66-68.
- Mouseley, Henry. 1925. Unusual fern finds. *Amer. Fern Jour.*, 15(3):87-90. July-Sept.
- Shaver, Jesse M. 1937. Vacationing among Tennessee ferns. *Amer. Fern Jour.*, 27(3):73-90. July-Sept.
- Small, J. K. 1938. *Ferns of the southeastern states*. Pp. 1-517. Sci. Press, Lancaster, Penna.
- Weatherby, C. A. 1935. A list of varieties and forms of the ferns of eastern North America. *Amer. Fern Jour.*, 25(3):95-100. July-Sept.
- Wheeler, L. A. 1926. A few more fern finds. *Amer. Fern Jour.*, 16(2):50-54. Apr.-June.

NEWS OF TENNESSEE SCIENCE

The Bausch and Lomb Optical Company has released a twenty minute movie in color and sound on "The Compound Microscope" for use by colleges, hospitals and medical schools. A 48 page student manual accompanies the film as an aid to the student in understanding and using a microscope. The film may be obtained without charge by writing the Film Distribution Service, Bausch & Lomb Optical Company, Rochester 2, N. Y.

The General Electric Company will award fifty all expense fellowships to high school physics teachers of Tennessee and eleven other states for a six weeks program of study at Case Institute of Technology, June 20 to July 30, 1954. The fellowships will provide funds to cover travelling expenses to and from Cleveland, living expenses while on the Case campus, books, tuition and fees. Three courses will be offered, designed to provide teachers a review of recent developments in the physical sciences and a greater emphasis on the fundamental concepts of physics. Application forms may be obtained from Dean Elmer Hutchisson, Case Institute of Technology, 10900 Euclid Avenue, Cleveland 6, Ohio.

Dr. Robert M. Boarts has been given a one year leave of absence by the University of Tennessee to take part in the DuPont Company's "year in industry" program for engineering educators. He will visit all of the company's engineering organizations and study their operating phases during his twelve month leave.

Dr. Lee Lorch, professor of Mathematics at Fisk University, has received a grant of \$1100 from the Research Corporation in support of his continuing research program at the University.

Dr. Douglas A. Ross, M. D., Harvard University, has been appointed assistant professor of physiology at the University of Tennessee Medical Units in Memphis.

Dr. Conley Hall Sanford, 60, for many years chief of the Division of Medicine at the University of Tennessee College of Medicine, died November 16, 1953.

RECENT PUBLICATIONS BY TENNESSEE SCIENTISTS

- Atwood, K. C., and Frank Mukai (ORNL). 1953. Indispensable gene functions in neurospora. *Proc. Natnl. Acad. Sci. U. S.*, 39:1027.
- Baker, William K., and Elizabeth Von Halle (ORNL). 1954. The production of dominant lethals in *Drosophila* by fast neutrons from cyclotron irradiation and nuclear detonations. *Science*, 119:46-49.

(Continued on page 106)