monly have two or three small, obtuse teeth (Fig. 185, *D*). Conard (1908) speaks of the lobes as being crenate. It is true that the teeth are obtuse but they do not seem to be crenate. There is a midrib or costule in each pinnule and a main vein in each pinnule lobe. From this main vein in the lobe, oblique veins run towards the margin (in the teeth) but end before the margin is reached. These free oblique veins may be unforked or they may be forked once. The sori have definite relations to the teeth of the pinnule lobes and to the oblique veins. Each sorus is marginally placed at the end of the unbranched, oblique vein which goes to the more apical tooth of each pinnule lobe, *i. e.*, to the tooth of the side of the lobe towards the apex of the pinnule. The sorus is surrounded by a white (brownish when old), membranous, cup-shaped indusium, inferior in position, and persistent (Fig. 185, *F*). Part of this indusium is formed by the reflected tooth of the lobe. The margin of the cup is usually entire but it is sometimes divided into three small mound-like lobes separated by very shallow notches. The largest of these lobes is the one formed by the reflexed tooth of the pinnule lobe. The other two lobes (sometimes there is only one) are separated by a very small median notch. Originally the sorus was entirely covered by the indusium. Then a transverse terminal slit appeared separating the indusium into two lobes. In a mature indusium, no indication of these lobes may remain, or a very small notch may persist on each side. The lobe opposite the tooth-portion of the indusium may remain a shallow lobe or it may develop a small median notch to separate it into two very shallow lobes. Some few indusia have additional shallow notches so that their margin may appear very shallowly crenated but many indusia have entire margins. Sori appear to be about 1/75 inch in diameter with the indusial cup being about as wide as long. Sori have five to eight sporangia each, with eight probably being most common. Sporangia mature during the summer and in the fall of the year, producing spores which are yellowish-brown in color.

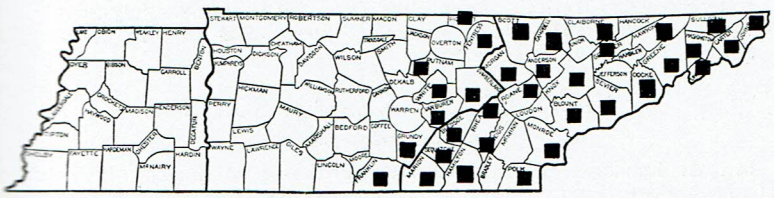

Fig. 186*A*. The known county distribution of the hayscentedfern in Tennessee. Solid squares, the collections of Shaver; solid circles, the collections of others.

The hayscentedfern in Tennessee is limited to the part of the state usually included in East Tennessee (Fig. 186*A*). Its distribution in general is given by Broun (1938, p. 59) as ". . . Nova Scotia to Minnesota, south to Georgia and Missouri, also isolated in Logan Co., Arkansas."

Bibliography

Anderson, W. A., Jr. 1931. A list of Tennessee ferns. *Amer. Fern Jour.*, 21(1) : 11-20. Jan.-Mar. On page 11, he lists this fern from Blount, Greene, Monroe, Polk, Rhea, and Sevier counties, Tennessee.

Bartoo, D. R. 1937. All in a day's trip—Tennessee. *Amer. Fern Jour.*, 27(1) : 6-10. Jan.-Mar. Found *D. punctilobula* in Putnam Co., Tenn.

Britton, N. L., and Hon. Addison Brown. 1936. *An illustrated flora of the northern United States, Canada, and the British possessions.* Vol. 1. Pp. i-xxix, 1-680. The New York Botanical Garden, New York, N. Y.

Broun, Maurice. 1938. *Index to North American ferns.* Pp. 1-217. Published by the author, R.F.D. 2, Kempton, Penna.

Conard, Henry S. 1908. The structure and life-history of the hay-scented fern. *Carnegie Institution of Washington,* Publ. 94.

Gattinger, Augustin. 1887. *The Tennessee flora with special reference to the flora of Nashville.* Published by the author, Nashville, Tenn.

Gattinger, Augustin. 1901. *The flora of Tennessee and a philosophy of botany.* Pp. 1-296. Tenn. State Bur. of Agr., Nashville.

Graves, E. W. 1930. A visit to Sand Mountain, Alabama. *Amer. Fern Jour.,* 20(1) : 22-25. Jan.-Mar. He found the hayscentedfern in Grundy Co., Tenn.

Graves, E. W. 1934. A visit to the southern Appalachians. *Amer. Fern Jour.,* 24(2) : 33-36. Apr.-May. Found *Dennstaedtia punctilobula* near Monteagle, Tenn., probably in Grundy Co.

Jennison, H. M. 1939. Flora of the Great Smokies. *Jour. Tenn. Acad Sci.,* 14(3) : 266-298. July, 1938. Found in the Smokies.

McGill, J. T. 1917. Ferns found in the vicinity of Sewanee [Tennessee]. *Trans. Tenn. Acad. Sci.,* 2 : 66-68. This fern found.

Ogden, Edith B. 1948. The ferns of Maine. *Univ. of Maine Studies, Second Series,* No. 62. Pp. 1-128 plus map in pocket.

Robinson, B. L., and M. L. Fernald. 1908. *Gray's New manual of botany.* 7th ed. Pp. 1-926. Amer. Book Co., New York, N. Y.

Shaver, Jesse M. 1937. Vacationing among Tennessee ferns. *Amer. Fern Jour.,* 27(3) : 73-90. July-Sept. He found the hayscentedfern in Blount, Carter, Cumberland, Fentress, Grundy, Monroe, Polk, Rhea, Sevier and Unicoi counties, Tenn.

Small, J. K. 1938. *Ferns of the southeastern states.* Pp. 1-517. The Science Press, Lancaster, Penna.

Svenson, Henry K. 1941. Notes on the Tennessee flora. *Jour. Tenn. Acad. Sci.,* 16(1) : 111-160. Jan. Reported the hayscentedfern in Grundy and Marion counties, Tenn.

Weatherby, C. A. 1936. A list of the varieties and forms of the ferns of eastern North America. *Amer. Fern Jour.,* 26(3) : 94-99. July-Sept.

Wherry, E. T. 1942. *Guide to eastern ferns.* 2nd ed. Pp. 1-252. The Science Press, Lancaster, Penna.

NEWS OF TENNESSEE SCIENCE

(Continued from page 111)

Mr. A. Randolph Shields, Associate Professor of Biology in Emory & Henry College, Emory, Virginia, with associates from the Tennessee State Game and Fish Commission, has completed a report on the survey of trout streams and recommendations for stocking in East Tennessee.

Dr. C. S. Shoup, Biologist, U. S. Atomic Energy Commission, gave a seminar talk at the Biology Division, ORNL, on January 11, and at the Department of Zoology, University of Tennessee, on February 6. On January 25, he addressed the East Tennessee Section, American Society of Mechanical Engineers.

Recent visitors to the Biology Division. ORNL, as announced in the laboratory bulletin for January 22, are: Dr. James H. Gregg, Dept. of Biology, Vanderbilt University; Dr. Robert Lagemann, Dept. of Physics, Emory University; Dr. Marion F. Clark, Dept. of Chemistry, Emory University; Dr. A. Douglas McLaren, Polytechnical Institute of Brooklyn, and Dr. Vincent J. Senn, University of Florida, Gainesville.

Also at the Biology Division, ORNL, recent seminary speakers are: Dr. George Wald, Harvard University, on "The Chemistry of Rod Vision," February 15, and Dr. J. L. Bollman, University of Michigan, on "The Physiologic factors affecting lymph formation," on February 22.

Dr. E. W. Goodpasture, Professor of Pathology in Vanderbilt University School of Medicine, and Vice-Chairman of the Advisory Committee on Biology and Medicine, U. S. AEC., left for a special study in Japan on December 14.

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