1980

The Illinois Ferns of Coles, Clark, and Cumberland Counties

Bill N. McKnight
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THE ILLINOIS FERNS OF COLES, CLARK, AND CUMBERLAND COUNTIES

(TITLE)

BY

Bill N. McKnight

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF

Master of Science

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY
CHARLESTON, ILLINOIS

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YEAR

I HEREBY RECOMMEND THIS THESIS BE ACCEPTED AS FULFILLING
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THE ILLINOIS FERNS OF COLES, CLARK, AND CUMBERLAND COUNTIES

BY

BILL N. McKNIGHT

B. S. in Botany, Eastern Illinois University

ABSTRACT OF A THESIS

Submitted in partial fulfillment of the requirements of the degree of Master of Science in Botany at the Graduate School of Eastern Illinois University

Charleston, Illinois

1980

A study of the ferns in East Central Illinois was conducted between the spring of 1976 and the spring of 1980. The counties surveyed were Coles, Clark, and Cumberland. The majority of the field investigation was conducted near the moraines and waterways which dissect the area.

Keys are provided for the families, genera, and species. There are also descriptions and illustrations for each species considered. The description covers the gross external morphology and any variations that occur. Also included are habitat preference and local distribution data. In addition, there are ethnic comments dealing with the derivation of both folk and scientific names, economic importances, folk history, and horticultural potential.

As a result of extensive field and herbarium work the number of species credited to the region is now thirty-three. Two new species were discovered in the study area (Lycopodium flabelliforme (Fern.) Blanch. and Dryopteris goldiana (Hook.) Gray). There were also several county records not previously reported. The new species include five from Cumberland county (Lycopodium flabelliforme (Fern.) Blanch., Botrychium dissectum Spreng. var. dissectum, Ophioglossum vulgatum L. var. pseudopodum (Blake) Farw., Equisetum laevigatum A. Br., and Asplenium rhizophyllum L.), six from Clark county (Botrychium dissectum Spreng. var. dissectum, Ophioglossum vulgatum L. var. pseudopodum (Blake) Farw., Pteridium aquilinum (L.) Kuhn var. latiusculum (Devs.) Underw., Athyrium pycnocarpon (Spreng.) Tidestrom, Dryopteris carthusiana (Villars) H. P. Fuchs, and Dryopteris goldiana (Hook.) Gray), and two from Coles county (Dryopteris carthusiana (Villars) H. P. Fuchs and Dryopteris goldiana (Hook.) Gray). Most of the specimens are housed in the Stoner Herbarium at Eastern Illinois University, Charleston, Illinois.

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INTRODUCTION

This study represents a taxonomic and ethnobotanical survey of the ferns of three East Central Illinois counties (see Map 1). The investigation was conducted between the spring of 1976 and the spring of 1980.

Ferns as treated in this work, include the families Lycopodiaceae (Clubmosses), Selaginellaceae (Spikemosses), Equisetaceae (Horsetails), Ophioglossaceae (Adder's-Tongues), Osmundaceae (Royal Ferns), Polypodiaceae (True Ferns), and the Marsileaceae (Waterclovers).

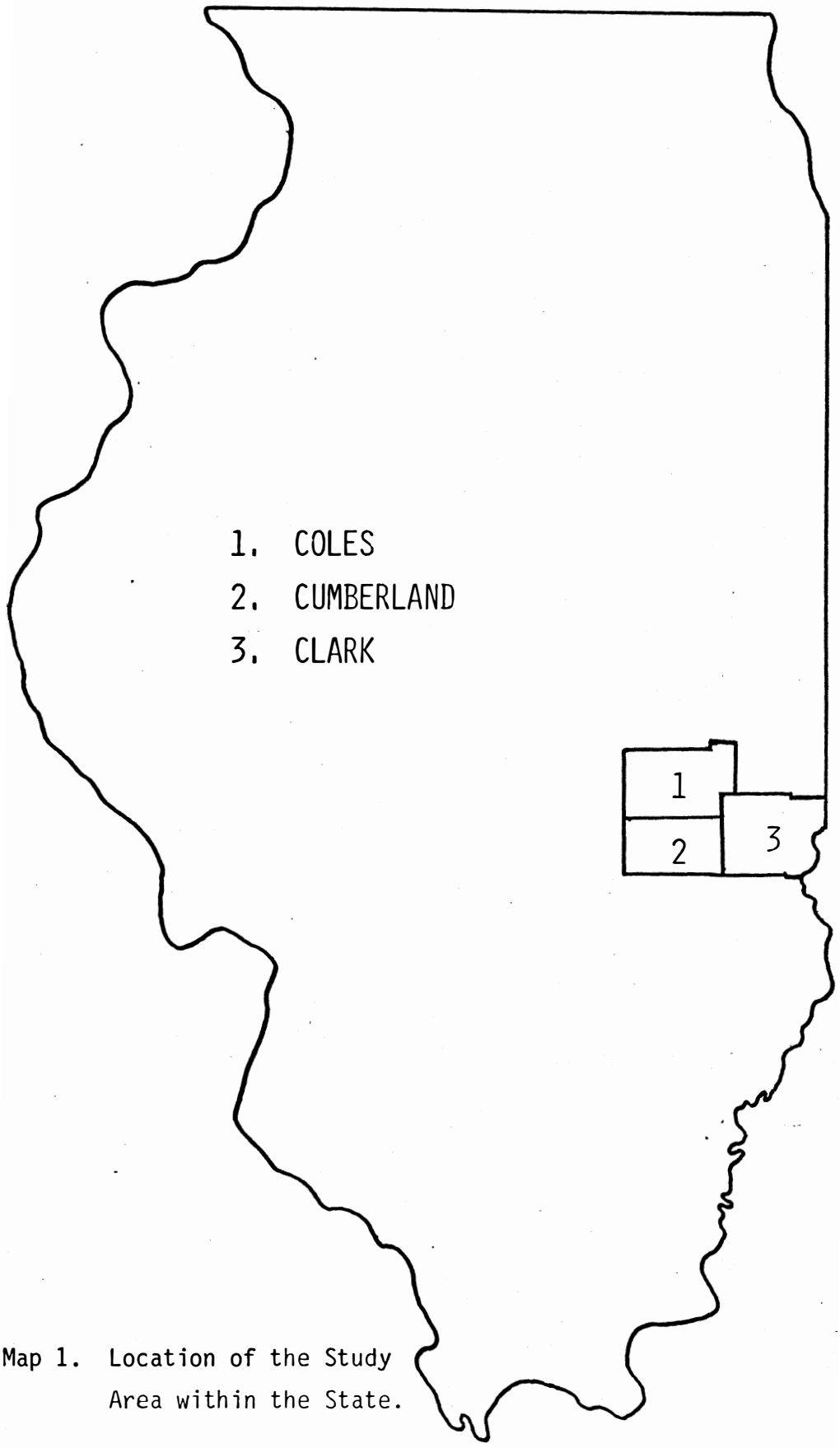
The area under consideration included Coles, Clark, and Cumberland counties. They are bordered to the north by Douglas and Edgar counties, to the east by Vigo county in Indiana and the Wabash River, to the south by Crawford, Jasper, and Effingham counties, and to the west by Shelby and Moultrie counties. The area has a maximum northern latitude of 39^{o} $41'$ while 39^{o} $9'$ is the southern most extension. The western boundary is 88^{o} $28'$ with 87^{0} $32'$ serving as the eastern border. The total area within the three counties is approximately 2,300 square kilometers (1380 square miles). The maximum elevation is 238 meters (780 feet), at locations about three miles south of Mattoon in Coles and on the middle crest of the Westfield moraine just west of Westfield on the border separating Coles and Clark. The lowest place, 134 meters (440 feet) is along the Wabash River in the southeastern corner of Clark county. This gives a relief of approximately 104 meters (340 feet). The approximate mean elevation for the area is 201 meters (660 feet). The average elevation of the till plain north of the Paris moraine for Coles county is 203 meters (665 feet). The average elevation of the hilly section comprising the various moraines is 212 meters (695 feet), while the outwash area south of the moraines has an average elevation of 189 meters (620 feet).

The average low and high temperatures for the area are 3.1°C (26.5°F) and 28.5°C (83.5°F) respectively. The average yearly precipitation is estimated at around 99 centimeters (39 inches).

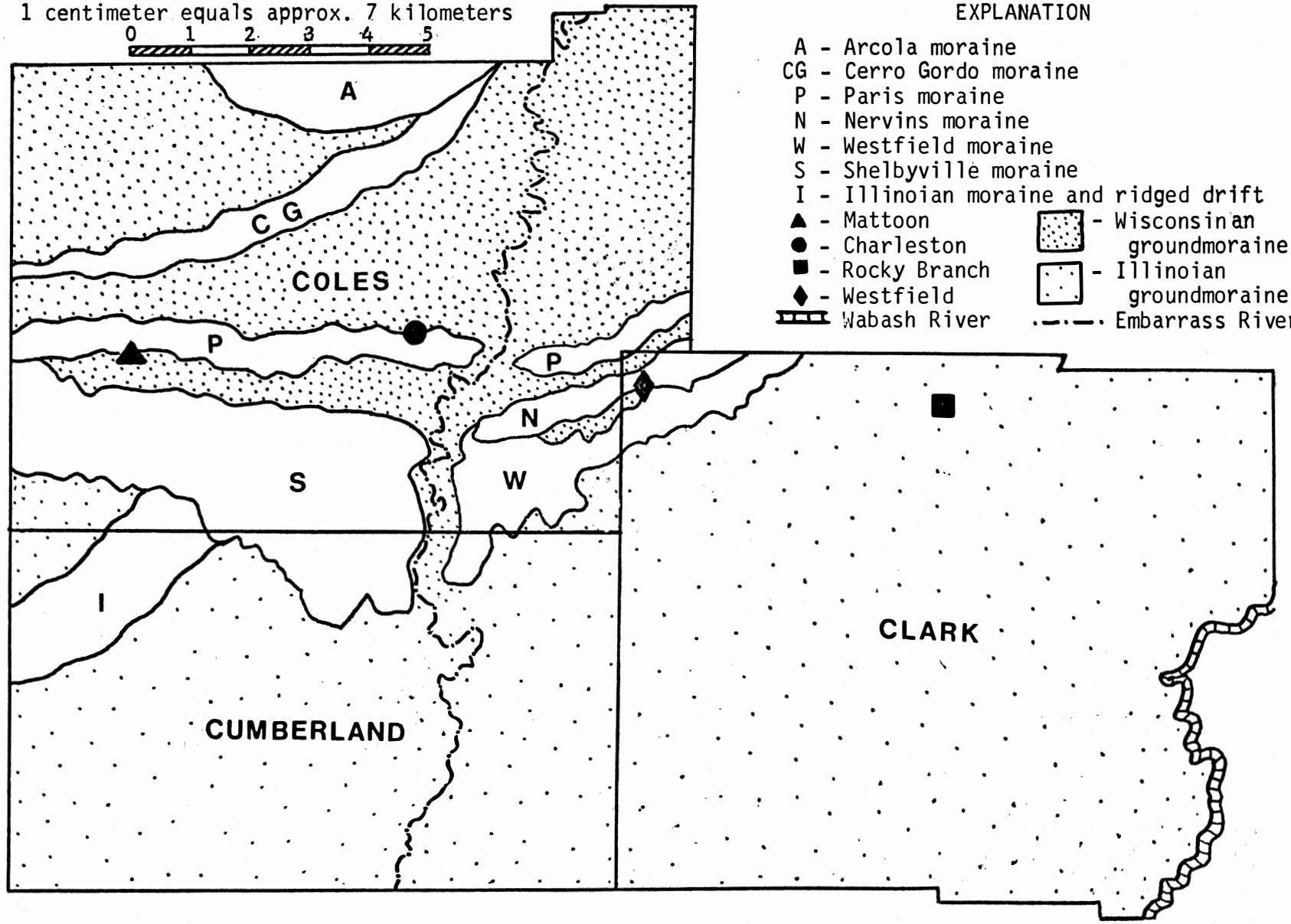
The region is divided into more or less distinct flat and hilly areas. The variation is mostly a result of the scouring, depositing, and erosional activity of the Wisconsin and Illinoian glaciers. The scoured area comprising the northern one half of Coles county is referred to as till plain and is a result of the more recent Wisconsin glaciation. The majority of the relief in this region is due to erosion attributed to the south flowing Embarrass River, which dissects Coles and Cumberland counties. Practically no natural areas exist in this section because of the extensive agricultural activity. The flat regions of Clark and Cumberland counties are the result of scouring by the Illinoian glacier and deposition from the Wisconsin glacier. This area is referred to as outwash.

There are sections of seven different moraines dissecting the area (see Map 2). Six of these are Wisconsinan. The one located in the northwestern corner of Cumberland county is Illinoian. Generally speaking, they are oriented in an east to west direction. The majority of the field investigation was conducted on and south of the Paris, Shelbyville, and Westfield moraines and along the large rivers and creeks. There are many excellent natural areas throughout this region.

Most of the bedrock in the study area is Pennsylvanian Livingston Limestone, although there are extensive sandstone outcroppings in and around some of the streams and creeks. This is particularly true of Clark county, where some sandstone walls approach fifty feet in height.



Map 1. Location of the Study Area within the State.



Map 2. Map of Study Area.

LITERATURE REVIEW

The first floristic survey in Illinois was conducted by Michaux in the latter part of the eighteenth century. Since his pioneer investigation many papers and books have been written dealing with the flora of the state. Some of these works have dealt with the analysis of the fern flora. The list of people who published articles in the 1800's and early 1900's which considered vascular cryptogams includes Mead, Vasey, Eggert, Patterson, Brendel, Engelmann, Steagall, Lapham, and Hill. However, none of these authors reported on the ferns of Coles, Clark, or Cumberland counties. The earliest published account of the fern flora in this region was by Stover (1930), who reported a total of eleven ferns for Rocky Branch in Clark county. Jones (1947) credited the area with twelve species. The only addition to the list compiled by Stover was Selaginella apoda (L.) Fern., from Coles county. He reported eleven species from Clark, seven from Coles, but did not mention Cumberland. In (1955) Jones and Fuller increased the number of species in the area to nineteen. The individual county breakdown was fourteen for Coles, fourteen for Clark, and five for Cumberland. This was the first report on the fern flora flora of Cumberland county.

The next account of the ferns in this region was by Winterringer and Evers (1960). They increased the total species count for the area to twenty and the individual county figures to fifteen in Coles, sixteen for Clark, and six in Cumberland.

The state survey by Mohlenbrock (1967) listed seventeen ferns for Coles, sixteen for Clark, nine for Cumberland, and the total species count for the area to twenty-one. Ebinger (1967) reported on the recent additions of ferns and fern allies in Coles county. His study

raised the total for Coles from seventeen to twenty-five and the area count to twenty-five. In the same year (1967) Wunderle published an account of the ferns for Cumberland county. His report of seven new species increased the county count for Cumberland to sixteen and the total for the area to twenty-nine. The most recent work dealing with the ferns of this area was by Mohlenbrock and Ladd (1978). They compiled new and old data in an effort to present an updated distributional report for all the counties in the state. Their results show Coles with twenty-six species, Clark with nineteen, Cumberland with twenty-one, and a total species count in the area of thirty-one.

METHODS AND MATERIALS

Fieldwork was conducted between the spring of 1976 and the spring of 1980. The various species of ferns were collected, identified, and placed in the Ernest L. Stover Herbarium at Eastern Illinois University, Charleston, Illinois. However, if the plants were rare or endangered, no collections were made.

The taxonomic keys used in the determination of specimens were: Ferns: The Illustrated Flora of Illinois by Mohlenbrock (1967), Gray's Manual of Botany by Fernald (1950), and An Illustrated Flora of the Northern United States and Canada by Britton and Brown (1970).

Each species description begins with a list of the folk names. Following this is a description of the external morphology. Any variability is discussed immediately after the description. Habitats are given for each species. There is also a general statement regarding the composition and pH of the soil in which the specimens were found. Determination of pH was made by using a model PH-3 pH tester manufactured by J &M Instruments Corporation, Farmingdale, New York. The procedure involved inserting two metal electrodes into the soil at various locations around the plant being checked. Water was added to specimens in dry areas, as the instrument works best in moist soil. Approximately sixty seconds after the electrodes were placed in the soil the pH measurement was recorded. Three measures were recorded for each plant. All tested spots were within one foot of the plant. The pH preference given is an average of all readings taken. The following terms were used to describe the pH data: acidic, for readings below 6; subacidic, for those from 6 to 7; circumneutral, for those from 6.5 to 7.5; subalkaline, for those from 7 to 8; and, alkaline, for anything with a pH more than 8.

A section dealing with the distribution of the species follows the habitat description. There is also a description of the frequency or number of localities for each species. Exact locations are given for species with less than five known localities or when an area has an abundance of an uncommon fern. The next section deals with the various ethnic features for each species. Included in this is the name derivation for both scientific and folk nomenclature. In addition, the folk history, economic importances, and horticultural aspects are considered.

A pen and ink illustration has been made for each species. Most of these illustrations were done from herbarium material without the aid of a drawing machine. A dissecting microscope was used for study of the microscopic characteristics. All measurements represent the average of several readings.

The species names and phylogenetic order are treated following Mohlenbrock (1973). When nomenclature is different than Jones (1963), the synonomy is given. The most often used folk name is listed first. The remaining names are in no specific order.

KEY TO THE FERN FAMILIES IN EAST CENTRAL ILLINOIS

1 - Leaves quadrifoliate; sporangia borne in stalked basal sporocarps . . . . . Marsileaceae (p. 159)

1 - Leaves and sporangia not as above 2

2 - Sporangia borne in a strobilus or occasionally in the axils of ordinary leaves; leaves subulate or linear or oval, simple. 3

2 - Sporangia borne in sori; leaves usually broad 5

3 - Leaves whorled, united to form toothed sheaths at nodes; stem hollow and jointed . . . . . Equisetaceae (p. 28)

3 - Leaves and stems not as above 4

4 - Plants creeping with prostrate branches; leaves ligulate . . . . . Selaginellaceae (p. 23)

4 - Plants creeping with erect branches; leaves without ligules . . . . . Lycopodiaceae (p. 12)

5 - Sporangia large, sessile opening by a transverse slit, borne in terminal spikes or panicles on a branch arising from the sterile leaf . . . . . Ophioglossaceae (p. 50)

5 - Sporangia not as above 6

6 - Sporangia borne in sori, located ventrally or marginal on leaves, or the whole leaf fertile (Onoclea); annulus present . . . . . Polypodiaceae (p. 73)

6 - Sporangia borne in terminal or lateral clusters, or the whole leaf fertile; no annulus . . . . . Osmundaceae (p. 67)

KEY TO THE FERN GENERA IN EAST CENTRAL ILLINOIS

1 - Leaves quadrifoliate; sporangia borne in stalked basal sporocarps . . . . . Marsilea (p. 159)

1 - Leaves and sporangia not as above 2

2 - Sporangia borne in a strobilus or occasionally in the axils of ordinary leaves 3

2 - Sporangia borne in sori 5

3 - Leaves whorled, united to form toothed sheaths at nodes; stem hollow and jointed . . . . . Equisetum (p. 28)

3 - Leaves and stems not as above 4

4 - Plants creeping with branches prostrate; leaves ligulate . . . . . Selaginella (p. 23)

4 - Plants creeping with branches erect; leaves without ligules . . . . . Lycopodium (p. 12)

5 - Sporangia borne dorsal or marginal on leaves 6

5 - Sporangia not as above 16

6 - Sori borne at margins of leaves, covered by a recurved outgrowth of the leaf 7

6 - Sori usually not marginal, not covered by recurved leaf margin 9

7 - Leaves distinctly hairy or glandular . . . Cheilanthes (p. 89)

7 - Leaves glabrous 8

8 - Sori continuous along margins; leaves trifid . . . . . Pteridium (p. 76)

8 - Sori several, distinct; leaves bifid . . Adiantum (p. 83)

9 - Sori elongate 10

9 - Sori rounded 11

10 - Leaves generally less than 3 dm; individual sori usually straight, rarely recurved . . . . . Asplenium (p. 122)

10 - Leaves generally more than 3 dm; sori often curved . . . . . Athyrium (p. 138)

11 - Leaves pinnatifid . . . . . Polypodium (p. 93)

11 - Leaves divided into distinct pinnae or pinnules 12

12 - Leaves only once-pinnate . . . . . Polystichum (p. 98)

12 - Leaves bipinnatifid to tripinnatifid 13

13 - Indusium reniform, or lacking, attached centrally to sorus. 14

13 - Indusium hoodlike, attached laterally 15

14 - Indusiate; petiole scaly . . . . . Dryopteris (p. 111)

14 - Indusium absent; petioles glabrous . Thelypteris (p. 107)

15 - Indusium separating into shreds; petioles densely chaffy . . . . . Woodsia (p. 151)

15 - Indusium hoodlike, not separating into shreds; petioles glabrous . . . . . Cystopteris (p. 155)

16 - Sporangia borne on branch arising from sterile leaf . . 17

16 - Sporangia borne in terminal or lateral clusters, or on separate modified fertile leaves 18

17 - Leaves simple, entire, with reticulate venation; sporangia sessile . . . . . Ophioglossum (p. 62)

17 - Leaves pinnately compound or simple and deeply lobed, with free venation; sporangia stalked . . . . . Botrychium (p. 50)

18 - Sterile leaves pinnatifid; sporangia borne terminally on separate fertile leaf; annulus present . Onoclea (p. 103)

18 - Sterile leaves bipinnate to tripinnatifid; sporangia borne on stalk with sterile pinnae; no annulus . Osmunda (p. 67)

LYCOPODIACEAE - CLUBMOSS FAMILY

Generally low terrestrial or epiphytic plants, somewhat mosslike in appearance, varying greatly in habitat; stems slender, much-branched, trailing, erect, or ascending, the branching basically dichotomous; leaves numerous, evergreen, small, lanceolate to linear or scalelike, sometimes oblong or rounded, borne opposite, whorled or spiraled, often imbricate; sporangia axillary or aggregrated in terminal cones (strobili) which are sessile or peduncled; spores abundant, minute, yellow, papillate or reticulate; vegetative reproduction by gemmae in many species.

The family comprises from one to four genera, depending upon the interpretation. As treated here it contains only one genus.

Lycopodium [Dill.] L.

type species: Lycopodium clavatum L.

The genus comprises over 450 species of wide geographic distribution. The majority are found in the Andes of South America and in the Himalayas. The tropical species are often epiphytic, while those of temperate or arctic regions are terrestrial. All the members are perennial with evergreen leaves. There are approximately 15 species native to North America. However, only 2 species have been reported from East Central Illinois.

KEY TO THE SPECIES OF Lycopodium

1 - Sporangia axillary along the stem; gemmae frequently present in the axils of the upper leaves . . . . . 1. L. lucidulum

1 - Sporangia aggregrated in terminal cones (strobili); gemmae absent . . . . . 2. L. flabelliforme

Lycopodium lucidulum Michx. var. lucidulum Plate 1.

FOLK NAMES: Shining Clubmoss, Trailing Evergreen, Common Clubmoss, Ground Pine, Swamp Evergreen, Wolf's Claws, Fox-tial, Lamb's Tail Moon-fruit Pine, Staghorn Moss, Hemlock Clubmoss, Vegetable Sulphur, Clubmoss, Indian Vervine

DESCRIPTION: Evergreen stems rising to 25 cm, 1-3 times dichotomous, rooting from the prostrate portion; leaves dark green, coriaceous, shiny, wide-spreading, erect to reflexed, acute, denticulate above, broadest above the middle, tapering to a narrower base, arranged in alternating zones of longer and shorter leaves, to 15 mm, the shorter leaves often bearing sporangia in their axes, sometimes entire; sporangia bright yellow, axillary, flattened, coriaceous, usually reniform, situated a short distance from the stem apex; gemmae frequent in axils of upper leaves; spores sulphur colored, papillate.
—— Specimens with only entire leaves have been described as the variety tryonii.

HABITAT: Moist, shaded woodlands, sandstone outcroppings, wooded stream banks, and swamp margins; the soil rich in humus and usually acidic.

DISTRIBUTION: Rare. Coles, Clark, Cumberland. This interesting plant was formerly more frequent. However, land use practices, such as the grazing of prime habitats, have drastically reduced its numbers.
Sec. 18 T.12N., R.10E.; Sec. 29 & 30 T.12N., R.12W.; Sec. 27 T.11N., R.9E.; Sec. 27 T.12N., R.12W.; Sec. 11 T.11N., R.13W.; Sec. 17 T.12N., R.10E.

ETHNIC COMMENTS: The genus, Lycopodium, is derived from two Latin words, lycos, wolf, and pous, foot. The reason for its application to these

plants is either a fancied resemblance to a wolf's foot or possibly due to the fact that they often grow in wild and inhospitable places, where only the footprint of the wolf is likely to be found. The species, lucidulum, is Latin, meaning somewhat shining. It is descriptive of the glossy, dark green stems and leaves of this plant.

Early botanists lumped many plants together. Such was the case with the clubmosses. In those days lycopods were thought to be mosses. However, it was noticed that at least in some cases their spores were borne in club-shaped spikes. They were therefore called clubmosses to distinguish them from the true mosses, which bear their spores in capsules. Clute (1905) reported that this species is sometimes called the Hemlock Clubmoss, because of the resemblance of its shiny leaves to those of the Hemlock Tree, Tsuga canadensis. The folk name, Moon-fruit Pine, is in reference to the bright yellow, kidney-shaped, spore producing structures present on this small evergreen. Some people mistake it for a pine seedling, thus the name Ground Pine.

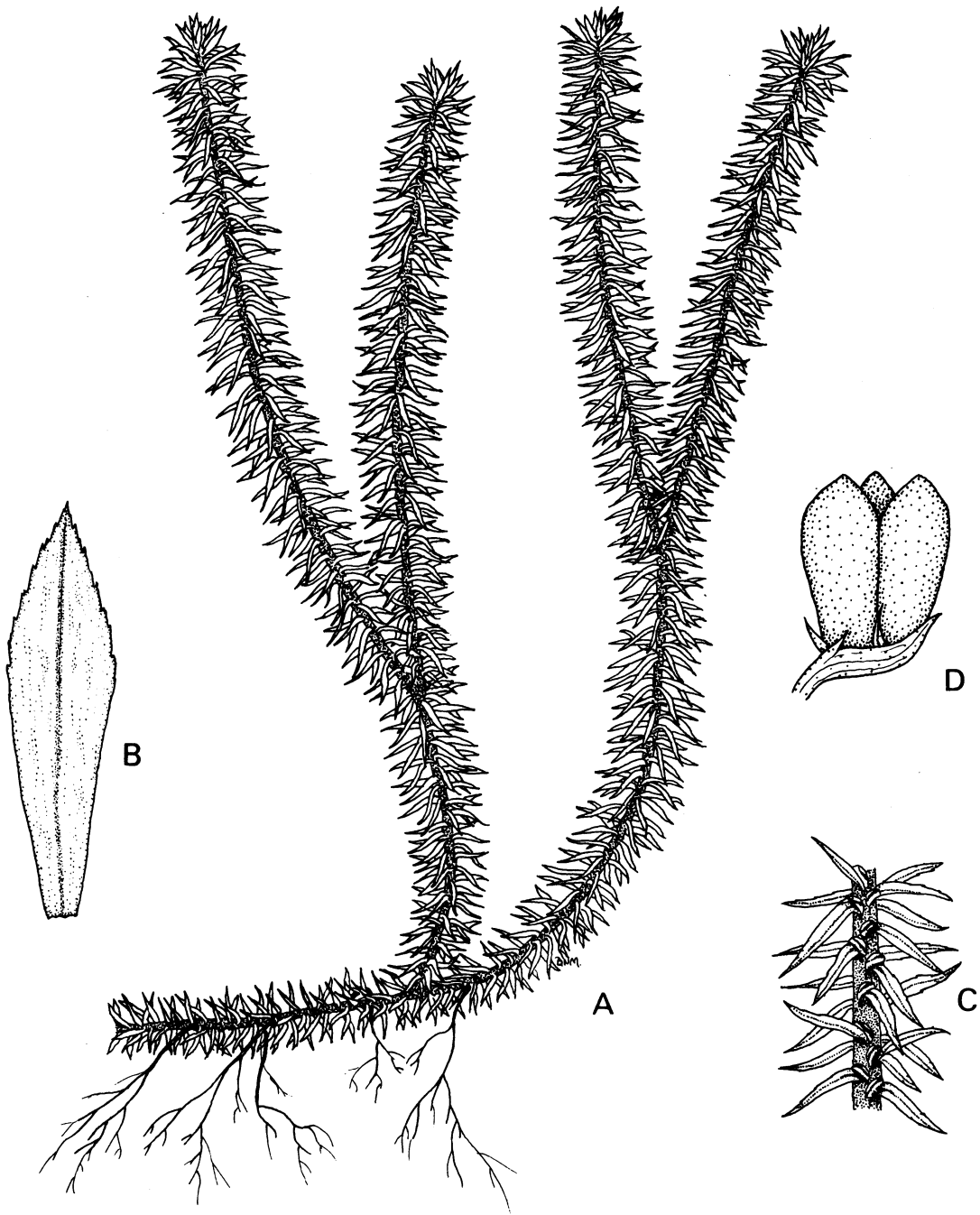
The clubmosses have had many ethnic uses due to their evergreen nature and flammable spores. However, because of the relatively small amount of sporogenous material produced by this species, it has not been used as much as those species with copious spore production. It has also been used as decoration during the Christmas season.

Although most clubmosses are difficult to transplant, this species takes readily to cultivation. Its hardiness is attested to by Clute (1905). He states that it will continue to grow for a year or more if placed in a vessel of water in the house. However, once transplanted out-of-doors, care should be taken to place it in a shaded location. And, the soil should be kept constantly moist until it has had time to become acclimated to the site. It helps to gather some soil with the

plant when it is collected. As an added precaution, Wherry (1931) suggests that the air around the aerial portion of the plant should also be kept moist until new roots have formed. This generally takes about one year, and is best accomplished by covering the specimen with transparent plastic. The plant may also be propagated by removing the gemmae from the upper leaf axes, and placing them on moist, cool humus until they sprout. The collection of the gemmae should be done early as they are usually shed by midsummer. However, once shed, a careful search of the ground surrounding the plant may result in the discovery of these reproductive structures.

This is a low, slow-growing plant, which is constantly being covered with leaves, branches, and soil particles. Clute (1905) states that the new and spreading growth emerging from the midst of the erect stems marks the plant with regular zones of spreading and appressed leaves, by which the age of the stem may be told.

Plate 1. Lycopodium lucidulum var. lucidulum. Figs. A. Habit, x1; B. Leaf, x6; Section of stem, showing leaves with axillary sporangia, x2; D. Gemma, x8.



Lycopodium lucidulum var. *lucidulum*

Lycopodium flabelliforme (Fern.) Blanch. Plate 2.

FOLK NAMES: Ground Pine, Clubmoss, American Ground Pine, American Clubmoss, Trailing Christmas Green, Running Pine, Ground Cedar, Festoon Ground Pine, Creeping Jenny, Hog's Bed, Liberty Bed, Princess Pine, Crowfoot Clubmoss, Vegetable Sulphur, Vegetable Brimestone, Stag's Horn, Trailing Vine, Staghorn Moss, Christmas Green

DESCRIPTION: Creeping evergreen with ascending or erect, flattened, 2-3 times dichotomously branched sterile stems to 25 cm; leaves minute, 4-ranked, often subulate, entire; sporangia borne in peduncled terminal cones (strobili), peduncles slender, to 12 cm, bracteate, usually once or twice dichotomous, each branch terminating in 3-4 slender cones, to 5 cm; sporophylls yellowish, much reduced, ovate, broadest at the base, acuminate; gemmae absent; spores copious, sulphur colored, reticulate.

HABITAT: Moist, shaded woodlands, thickets, grassy slopes, and clearings; the soil rich in humus, acidic, often sandy.

DISTRIBUTION: Rare. Cumberland. This plant seems to be encroaching from the south, possibly from the soil surrounding transplanted evergreens. Sec. 4 T.9N., R.10E.

ETHNIC COMMENTS: The species name of this lycopod, flabelliforme, is Latin meaning fan-shaped, in reference to the branching pattern of the stems.

Clubmoss spores are the source of lycopodium powder. This powder is obtained by cutting off the strobili when they are nearly mature. The spores are then shaken out and sifted. These spores, produced in moderate amounts in L. flabelliforme, were, according to Millspaugh (1892), long used as a dusting agent to prevent pills and lozenges from adhering and to disguise

their taste. They have also been used for suppositories. A tincture of the spores has been prescribed for irritated bladders. According to Grieve (1931), the astringent property attributed to the spores accounts for their use in treating diarrhea, dysentery, and as an emetic. However, their action was far too violent and resulted in their discontinued use. Weiner (1972) states that the Blackfoot and Potawatomi tribes used the spores in dyeing and inhaled them to stop nosebleeding. Millspaugh (1892) reported that the spores were used to suppress the flow of urine, as a nervine for hydrophobia, as an aperient for gout and scurvy, and as an aphrodisiac. They were offically listed in the U.S. Pharmacopoeia from 1863 to 1947. Their usefulness was listed as an absorbant for fluids from injured tissues.

The spores contain about 50% of a bland, fixed oil called lycopodin, which, according to Kadans (1970), has been used to relieve rheumatism and epilepsy. He also reports that the spores have been used for diseases of the lungs. But, he contradicts Millspaugh's assertion by stating that they increase the flow of urine, thus being useful for treating kidney problems. The spores have been used as an internal remedy when mixed with lactose in the proportion of one part spore powder to nine parts lactose. A decoction is made by boiling approximately an ounce of the mixture with a pint of water for about fifteen minutes. The prescribed dosage is a tablespoon taken three times daily or 10-60 grains of the raw spores daily. It has been reported vaulable for cases of congestion of the liver and as a means for nervous people to increase their appetite. It also supposedly assists in the healing of injured mucous membranes. Because of this, it has been utilized in the healing of aneurisms.

The oil present in the spores is highly flammable. Hill (1952) reported that they were utilized by industries for making pattern molds, flares, fireworks, tracer bullets, and in the making of theatrical ex-

plosives for lighting stages. The folk names Vegetable Sulphur and Vegetable Brimestone refer to the flammability of the spores. The spores will not ignite until they are mixed with air. This is usually accomplished by dispersing the spores over a flame. A practice of many Indian tribes which has been exploited heavily by the entertainment industry.

The spores have a strong repulsion for water because they contain about one half oil. This can be tested by liberally coating the surface of a vessel containing water. Once done, any object submersed in the fluid can be withdrawn without becoming wet. This property resulted in its widespread use as a dusting powder to prevent chafing. It has also been found valuable in relieving itching of the anus.

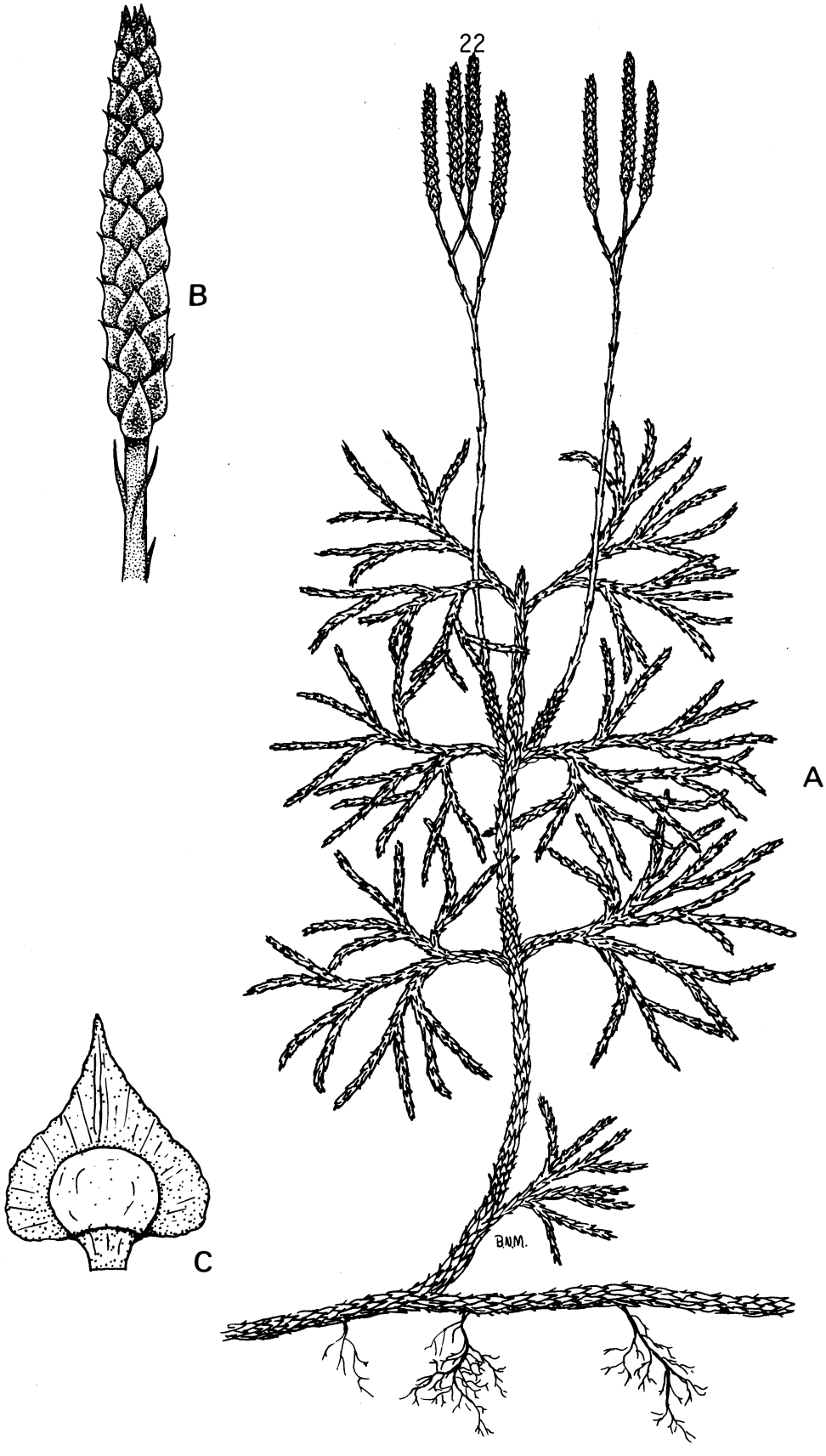
The vegetative portion also has ethnobotanical value. Millspaugh (1892) states that the stems and leaves were considered a powerful diuretic useful in promoting the removal of obstructions from the liver or spleen. A decoction of this lycopod, combined with Dandelion and Agrimony, is highly recommended as a herbal remedy for juandice, rheumatism, and other chronic diseases. An infusion can be made by adding one teaspoon of the dried and powdered plant to a cup of boiling water. The daily dosage is a large mouthful of the cold tincture every five to twenty minutes until one cupful has been consumed. Raffauf (1970) lists ninety-five different alkaloids which occur in this genus. Schauenberg and Paris (1977) report that three of these are toxic (lycopodine, clavatine, and clavotoxine). They also state that only the vegetative portion contains these toxins. The spores are non-toxic.

This species has been used in great quanity for Christmas decorations. It is reported by Clute (1905) that the trade in Christmas greens began in New Jersey more than 150 years ago. The price was about 75 dollars a ton in 1900. When demand became too great, other sources of supply had

to be found. Additional material was imported from Russia, Germany, Switzerland, and Sweden. The spores as well as the vegetative structures were imported. This resulted in some problems because the practice of diluting the spores with groundup Cattail, Hemlock pollen, starch, talc, gypsum, and chalk became quite a common occurrence. A considerable amount of this plant is now being produced in Maine. Uphoff(1968) records that in some parts of Sweden the stems are used for weaving mats.

It is a desirable cultured plant but is not readily transplanted. When collecting the plant, care should be taken to make sure that the growing tip of the creeping stem is collected unharmed. It is also advisable to take some soil along with the stem. According to Wherry (1931), the transplanted parts require special attention similiar to that given cuttings. The air around the stem as well as the soil should be kept moist and shaded until new roots have formed. This generally takes about one year. In favorable locations the plant practically carpets the ground. An ideal place to plant this fern is under evergreens.

Plate 2. Lycopodium flabelliforme. Figs. A. Habit, x2/3; B. Strobilus, x2; C. Sporophyll with sporangium, x6.



Lycopodium flabelliforme

SELAGINELLACEAE - SPIKEMOSS FAMILY

A monogeneric family of terrestrial, annual, or perennial, mosslike plants, of small or moderate size; stems branching, tufted, creeping, pendent, erect, or occasionally climbing; leaves small, scalelike, uniform and several-ranked, or of 2 types, spreading in 2 planes; heterosporous; sporanges borne in leaf axils; cones (strobili) formed in all species, loosely arranged or much condensed, terminal, usually 4-sided and sharply angled, each strobilus containing both mega- and microsporangia, the megasporangia usually greenish-white, producing 4 large megaspores, the microsporangia usually orange-red, producing several hundred minute microspores, the arrangement of sporophylls is variable, but most commonly the megasporophylls are along the lower half of the strobilus; vegetative reproduction by bulbils, fragmentation, or tip rooting.

Selaginella Beauv.

type species: *Selaginella selaginoides* (L.) Link.

The genus comprises about 700 species, widely distributed in both hemispheres, but mostly tropical. In the tropics, their size and abundance render them a conspicuous part of the undergrowth in woods and on moist banks. However, in the temperate regions they are usually so small and mosslike as to be easily overlooked. Habitats for the many species vary from xeric to hydrophytic. There are about eight species native to North America, of which only one is found in East Central Illinois, it being a lover of moisture.

Selaginella apoda (L.) Fern. Plate 3.

FOLK NAMES: Small Spikemoss, Creeping Selaginella, Selaginella, Meadow Spikemoss, Little Spikemoss, Creeping Moss

DESCRIPTION: Small, light green, creeping perennial, with prostrate, much-branched stems; leaves minute, membraneous, of two kinds, 4-ranked, spreading in two planes, the larger ones more or less ovate, acute, to 2 mm, ciliolate on the margins, ligulate, the smaller ones narrower and appressed; cones (strobili) sessile, to 18 mm; sporangia axillary, sporophylls oblong, similiar to the spreading leaves; megaspores white, reticulate, more abundant towards the base of the strobilus; microspores orange.

HABITAT: Moist, low-lying, shaded areas, particularly around springs and seepage areas; the soil circumneutral to acidic.

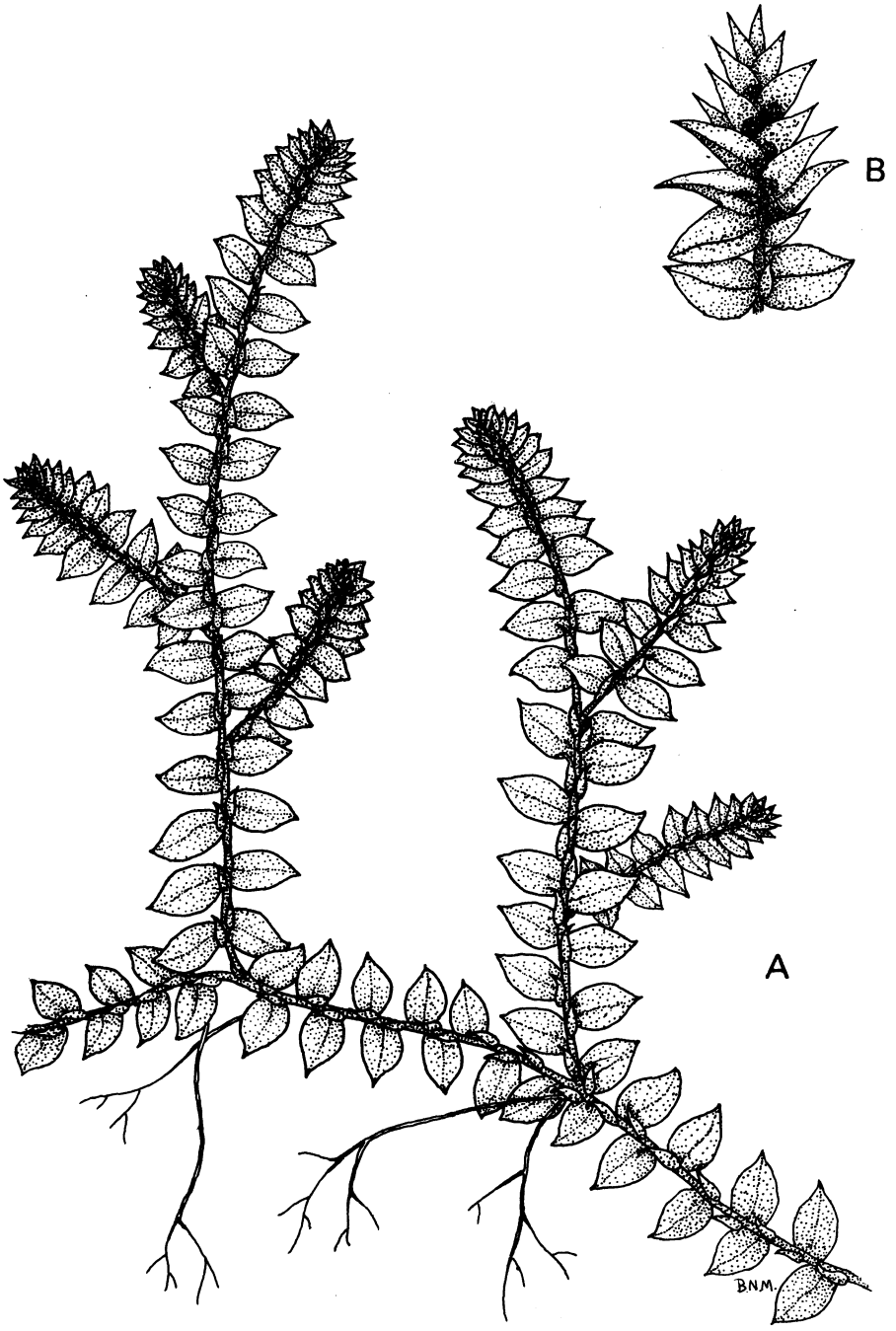
DISTRIBUTION: Rare. Coles. Its infrequency is probably due to its small inconspicuous nature and the fact that it is often confused with mosses (especially the genus Mnium) and hepatics, which occupy similiar habitats. Sec. 4 T.12N., R.10E.; Sec. 17 T.12N., R.10E.

ETHNIC COMMENTS: The genus, Selaginella, is derived from two Latin words, selago, and ella, small. It refers to the resemblance between this group of plants and Selago, an ancient name given to a Lycopodium. The species name, apoda, is from two Latin words, a, without, and poda, feet. It denotes the sessile strobili which reminded the author, Linnaeus, of a swallow which roosts with its feet hidden.

There are no reported uses for this delicate little fern other than as and ornamental. Even then its small size and sensitivity to environmental changes makes it an unlikely plant for cultivation. However, if provided

a moist, shaded site, it forms small light green mats that make a unique addition to a rock garden. Care should be taken to make sure that only untreated water is used.

Plate 3. Selaginella apoda. Figs. A. Habit, x6; B. Strobilus,x7.



Selaginella apoda

EQUISETACEAE - HORSETAIL FAMILY

A monogeneric family of large or small terrestrial plants, rushlike in appearance; rhizome perennial, branched, with whorled, felted roots; aerial stems annual or perennial, erect, often roughened by a coating of silica, cylindrical or sometimes angled, usually grooved longitudinally, hollow except at the nodes, characterized by a usually large central cavity (centrum) surrounded by a number of medium-sized cavities (vallecular), each embedded in the outer tissue and under the external grooves, connected by stomata, conspicuously jointed, simple or bearing whorls of branches at the nodes, distinct fertile and sterile stems in some species, the sterile leaves reduced to toothed sheaths surrounding the nodes, the teeth deciduous or persistent; sporophylls scalelike, stalked, forming a terminal cone (strobilus); sporangia clustered on the inner surface of the sporophylls, dehiscence by longitudinal slits; homosporous, spores, minute, numerous, chlorophyllous, each encircled by 4 tiny straps (elaters) which aid in dissemination.

These plants were most abundant during the Carboniferous Peroid. Most of these fossil species were members of the genus Calamites, with many of them attaining the dimensions of present day trees. It is interesting to note that fossil records reveal that the ancestors of the extant horsetails were heterosporous.

Equisetum [Tourn.] L.

type species: Equisetum fluviatile L.

The genus occurs throughout the world, except for Australia and New Zealand, and comprises about 25 species. The majority are located in the tropics and subtropics. There are about 12 species scattered over North

America, primarly in wet areas. They are often found growing in colonies. This is due to the extensively creeping rhizomes. Five members of the genus are present in East Central Illinois.

KEY TO THE SPECIES OF Equisetum

1 - Aerial stems annual, flexible, dimorphic, the sterile stems profusely branched . . . . . 1. E. arvense

1 - Aerial stems perennial, rigid, monomorphic, usually unbranched 2

2 - Central cavity (centrum) up to two-thirds the diameter of the stem; stem 5- to 10-angled . . . . . 2. E. variegatum

2 - Central cavity more than two-thirds the diameter of the stem; stem 10- to 50-angled 3

3 - Sheaths entirely gray; teeth of the sheath persistent . . . . . 3. E. hyemale

3 - Sheaths green above; teeth of the sheath early deciduous 4

4 - Stems smooth; central cavity three-fourths the diameter of the stem . . . . . 4. E. laevigatum

4 - Stems slightly rough; central cavity four-fifths the diameter of the stem . . . . . 5. E. x ferrissi

Equisetum arvense L. Plate 4.

FOLK NAMES: Common Horsetail, Field Horsetail, Cornfield Horsetail, Horsetail, Bottlebrush, Horse-pipes, Snake-pipes. Toad-pipes, Tad-pipe, Cat's Tail, Mare's Tail, Colt's Tail Fox-tail, Pine-top, Pine-grass, Meadow Pine, Paddock-pipes, Jointed Rush, Snake-grass, Smoke Rush, Devil's-guts, Horsetail Grass, Tinweed, False Horsetail, Horse-piping, Watergrass, Joint Weed, Jointed Fern, Leafless Fern

DESCRIPTION: Erect annual from extensively creeping, slender rhizomes; dimorphic; fertile stems brown, appearing in early spring, soon withering, to 25 cm, unbranched, with several whitish sheaths, each with 8-12 teeth which are brown, accuminate, and free or basally connate; strobilus to 30 cm, pedunculate, subcylindric, rounded at the apex; sterile stems green, slender, regularly branched, appearing in late spring, persisting, to 75 cm, with 4-14 ridges, central cavity less than one half the diameter of the stem, branches usually simple, 3-4 angled, solid, spreading to ascending, sheaths of the branches 4-toothed; spores green.
—— This is a very highly variable plant with minor and intergrading forms which are very difficult to distinguish.

HABITAT: Roadsides, fields, moist disturbed ground, shores, and stream banks; the soil usually sandy and slightly subacidic; very adaptive.

DISTRIBUTION: Very common. Coles, Clark, Cumberland.

ETHNIC COMMENTS: The generic name, Equisetum, is Latin for horsetial (equus, horse and seta, bristle), in allusion to the copious branching of this species. The species, arvense, is also Latin meaning of cultivated fields. Equisetum is the only living genus of a vanishing group

of plants which were formerly very abundant. The Field Horsetail looks like a minature version of the giant horsetails of prehistoric times. These extinct plants often attained a diameter of one foot and a height of sixty feet.

The stems of this plant contains silicic acid. They also harbor some silica that is sometimes used as a scouring agent. The green shoots can be collected from May until late summer. To make the best use of the herbal properties, only the sterile stems should be used, cut off just at the rhizome after the fertile stem has died down. The plant is used either fresh or dried, but it is said to be more effective when fresh. It is recommended that the plants be collected from fields rather than from near water.

This plant has been used therapeutically since at least the sixteenth century. According to Grieve (1931), it has been used in folk medicine to stop nasal and internal bleeding. This is due to its antiseptic and astringent qualities. A tea can be made from the stems which has been utilized for strengthening and toning skin and for improving hair and nails. As a cosmetic, it has been used to reduce swelling of the eyelids. To prepare this herbal, a teaspoonful of the dried, ground stem should be soaked in rain water for several hours. It should then be boiled in the soaking water for from 10-15 minutes, then strained. The dosage is from one to two cold cupfuls of the mixture daily, a large mouthful at a time. It is reported that this decoction is very useful for treating obesity, due to the minerals it contains. A drahm of the dried, powdered herb will, as stated by Grieve (1931), when taken three to four times a day, stop the spitting of blood. A decoction of this plant is reported by Schauenberg and Paris (1977) to have been utilized for treating pulmonary tuberculosis, systitis, and anuresis. In folk

medicine, a tincture of this plant was often used as a gargle for mouth infections.

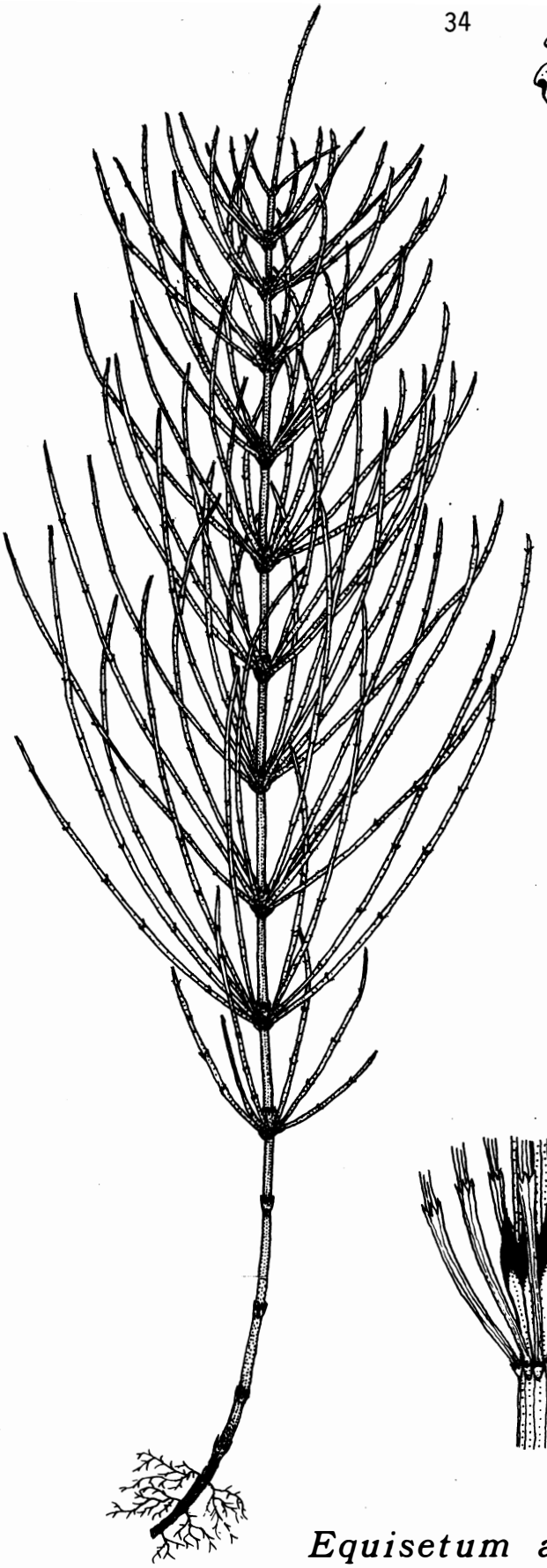
The members of the Equisetaceae have had limited use in American medicine. However, Evers and Link (1972) reported that the Field Horsetail contains equisetic acid, a potent heart and nerve sedative that is dangerous when taken in large amounts. Other members of the family destroy thiaminase and possess equisetine which can cause poisoning in livestock, but rarely death. Raffauf (1970) recorded five different alkaloids that occur in this genus including nicotine.

It is sought as food by many people in the early spring. The tender young shoots are eaten like asparagus. The stems of the reproductive shoots are peeled and eaten raw. Uphoff (1968) states that the Kiowa Indians of Mexico used this plant for food. He also notes that in Japan the strobili are boiled and eaten.

Other uses for this plant include a remedy for dropsy. Grieve (1931) reports that the ashes of the dried and burned plant, when administered in doses of from three to ten grains, are considered very valuable for treating sore mouths, acidity of the stomach, and dyspepsia. Uphoff (1968) lists Herba Equisetii as a decoction of this plant which is used in many countries for gout and disease of the kidney or bladder. As a diuretic it increases the normal urine discharge by 30 percent.

This weed is so widely distributed that cultivation is seldom necessary. It can adapt to a wide variety of situations and is often found where few other plants can exist. A piece of the rhizome planted almost anywhere will soon produce new plants. One example points out a stem that was thrown into a six foot deep grave. The next year it was found growing out of the mounded soil. The emerging fertile stems, one of the first signs of spring, are a most welcome sight.

Plate 4. Equisetum arvense. Figs. A. Sterile stem, x2/3; B. Sheath and branches at node of sterile stem, x3; C. Fertile stem and strobilus, x1; D. Side view of a sporangiophore with extended sporangia, x7.



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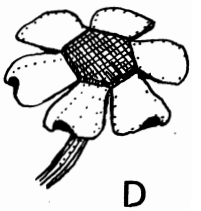

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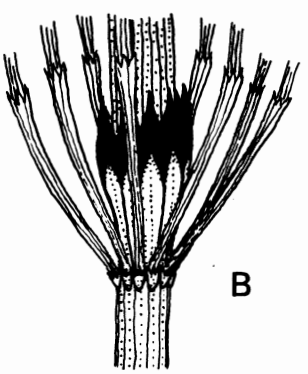

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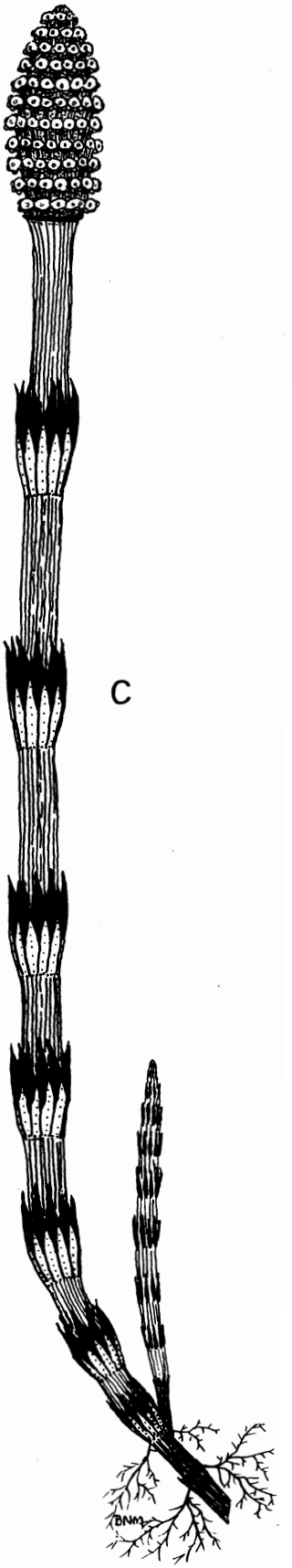


C

Equisetum arvense

Equisetum variegatum Schleicher Plate 5.

FOLK NAMES: Variegated Scouring Rush, Variegated Horsetail, Variegated Equisetum, Horsetial, Mottled Scouring Rush, Leafless Fern, Jointed Fern, Water Grass, Joint Weed

DESCRIPTION: Erect evergreen from dark, slender, creeping rhizomes; stems slender, with few or numerous basal branches, mostly simple above and more or less tufted, rough, uneven in length, to 50 cm, 5-10-furrowed, the ridges 2-angled, central cavity one third to two thirds the diameter of the stem or rarely absent; sheaths funnelform, distinctly 4-keeled, variegated, green below and black above, with 5-10 broad teeth, black with white borders or occasionally entirely white, tipped with a deciduous bristle; strobili elipsoid, to 1 cm, apiculate; spores green.

HABITAT: Shores, moist ditches, and marshes; soil circumneutral.

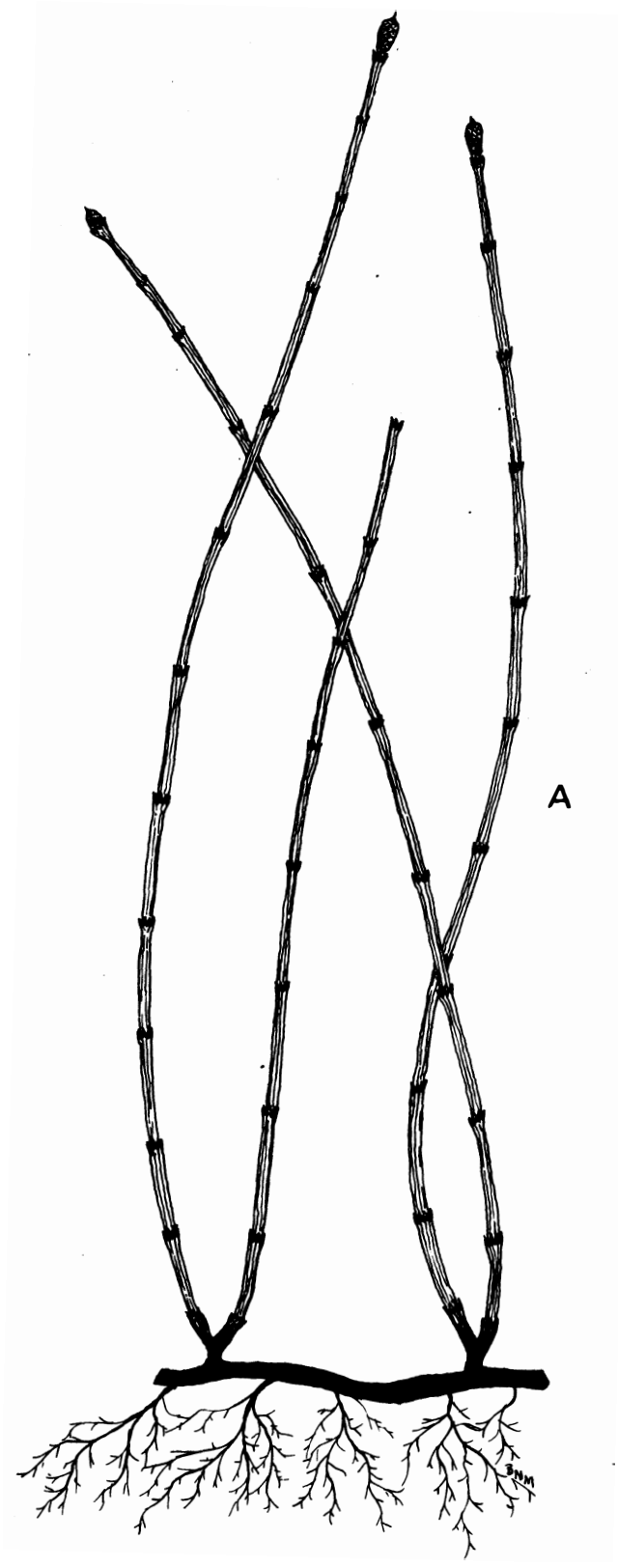
DISTRIBUTION: Rare. Coles. Sec. 10 T. 12N., R.8E.

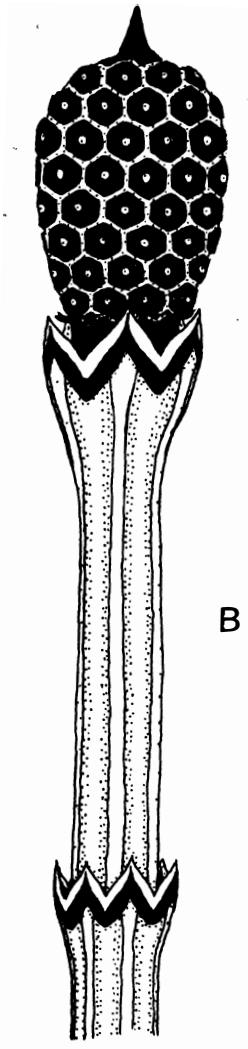
ETHNIC COMMENTS: The specific name, variegatum, refers to the variegated stem produced by the black and white sheaths.

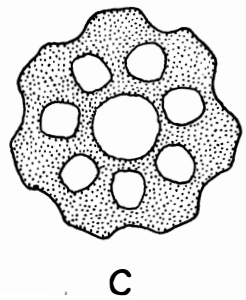
This plant is often confused with a small specimen of E. laevigatum and is probably used in similiar ways. The roughened stems make an excellent abrasive for scouring and polishing.

This plant is best suited for culture in a cool, moist garden spot.

Plate 5. Equisetum variegatum. Figs. A. Habit, x3/4; B. Upper portion of stem, showing strobilus and sheaths, x7; C. Cross-section of stem, x20.







Equisetum variegatum

Equisetum hyemale L. var. affine (Engelm.) A. A. Eaton Plate 6.

FOLK NAMES: Scouring Rush, Common Scouring Rush, Rough Horsetail, Winter Horsetail, Polishing Rush, Joint Rush, Snake Rush, Mountain Rush, Winter Rush, Dutch Rush, Joint Weed, Smoke Weed, Shave Weed, Bamboo, Pewperwort, Horse-pipe, Mare's-tail, Fox's-tail, Shave Grass, Scrub Grass, Joint Grass, Gunbright, Naked Horsetail, Frog's Fishing Pole, Horsetail, Tinweed, Scrubbing Rush, Dishwashings, Rush, Leafless Fern, Jointed Fern, Water Grass

DESCRIPTION: Erect perennial evergreen to one meter or more, from creeping, dark rhizomes, usually unbranched above the base with up to 40 rows of longitudinally oriented, rounded ridges with two distinct lines of tubercles, the central cavity more than two thirds the diameter of the stem; sheaths at first green, turning gray, cylindrical, tight or slightly expanded, marked with one or two black girdles, the basally connate teeth persistent or occasionally deciduous; strobilus variable in size, short pedunculate, apiculate; spores green.

—— This is a highly variable plant. The stems occasionally branches which are usually short and infrequently fertile.

HABITAT: Shores, embankments, roadsides, and open woods, usually somewhat shaded; the soil moist, sandy, and circumneutral.

DISTRIBUTION: Very common. Coles, Clark, Cumberland. It often forms large, very dense, colonies.

ETHNIC COMMENTS: The species, hyemale, is Latin meaning of winter. It alludes to the fact that this plant is evergreen. The varietal name, affine, is Latin for allied in reference to the highly variable nature of this species.

This plant was used in many ways by the Indians of North America. Weiner (1972) states that the stems were broken and boiled by the Indians of Washington state. The resulting decoction was employed as a hair wash to eliminate various parasites. The reproductive heads were eaten by the Makah tribe to cure diarrhea. Teit (1928) reported several uses the Thompson Indians had for this plant. They burned the stems and used the ashes as a remedy for burns. The ashes were sprinkled thickly over the burn and kept in place with a bandage. The ashes were also mixed with animal grease or oils and smeared over burns. The Quinault boiled the stems with willow leaves and gave this infusion to girls whose menstral periods were irregular. The Quileute swimmers rubbed themselves with the stem in order that they might feel stronger. Clute (1905) reported that the juice of this plant was once thought to be useful in stopping nose-bleeds and as an application to wounds due to its astringent qualities.

Gunther (1945) stated that the Quileute Indians of Washington state considered the Common Scouring Rush good fodder. The Quinault called it "horses eat it." It has also been used as a food for humans in early spring when the green shoots are young and tender. The conelike tops of the older stems were dried and mixed with other foods. According to Billington (1952), if cows were fed this plant their teeth would drop out and they would also become afflicted with diarrhea which was often bloody. Millspaugh (1892) states that a tincture of the dried ground stems combined with alcohol will result in the following symptoms when 50-150 drops are taken internally. The appetite will be greatly increased as well as frequent burning urination, soreness in the testicles, and pain in the lower back and abdomen. Evers and Link (1972) report that this plant is poisonous to both humans and livestock. It should also be noted that cattle will instinctively avoid eating this plant.

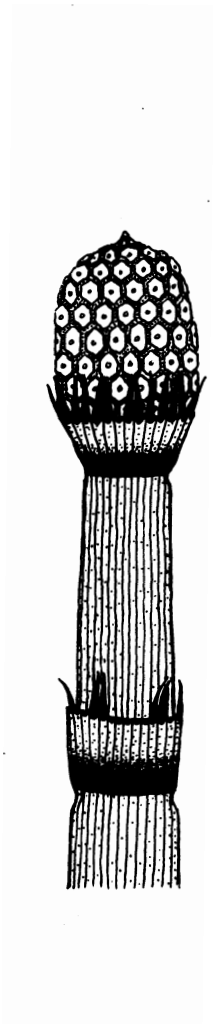
This fern ally has also been used ceremonially. The hollow stem was used by young girls to hold lice as they picked them from their heads during the ceremonies that were connected with reaching puberty. Children have often amused themselves by pressing sharply on the fresh stem and listening for the sudden report caused by the air in the central cavity bursting through the wall of the stem. The juice contained in the stem will also cause it to explode when thrown into a fire. The medicine men of various Indian tribes made use of them in this way, in order that the popping might stimulate their patients to renewed vigor. The hollow joints of the stem can be made into a rude sort of pan-pipe similiar to those made from cane. Clute (1905) stated that whistles of this type were made by the Indians of the Missouri Valley region. It is reported by Millspaugh (1892) that the Missouri Indians used the stems to make mats.

The epidermis of the stem contains so much silica that it has long been used as an abrasive. Before sandpaper and scouring or polishing materials were generally available, it was used in Europe for polishing furniture and wooden floors. Teit (1928) reported that the stems were also used for scouring and sharpening arrows, bone, and mussel shells. At the time of its use as a scouring agent it was imported from Holland to England in large quantities and so called Dutch Rush. Early settlers in America also used this plant as a scouring agent for their cooking utensils.

A study done by D. E. Brussell, at Eastern Illinois University in 1975, showed that E. hyemale has the ability to remove gold from the soil and incorporate it in the rhizomes and stems.

Although this plant is rather striking in appearance and quite easily grown, it is generally considered too weedy for cultivation. However, Clute (1905) reported that it is often planted on dykes in Holland to control erosion.

Plate 6. Equisetum hyemale var. affine. Figs. A. Habit, x1/5; B. Upper portion of stem, showing strobilus and sheaths, x1 1/2; C. Nodal region, x3; D. Cross-section of stem, x3.



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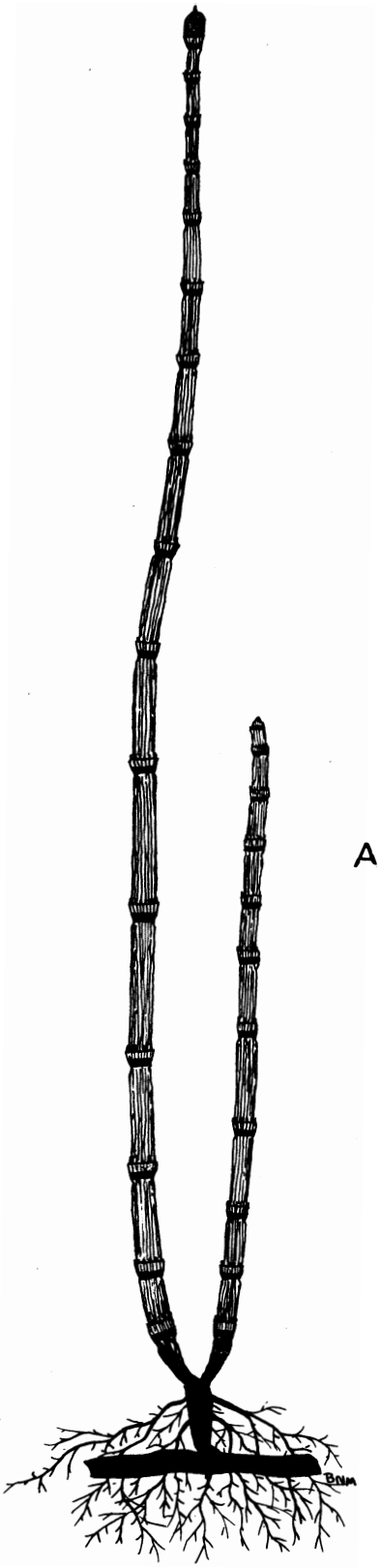

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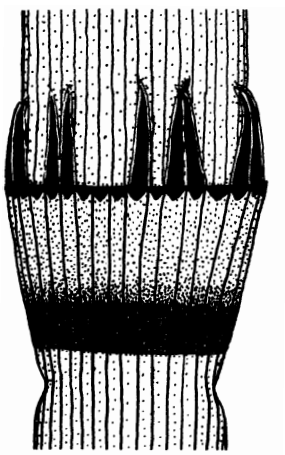

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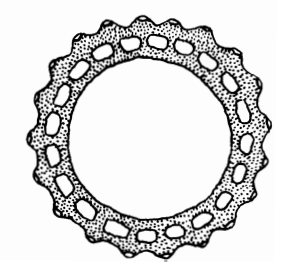


D

Equisetum hyemale var. *affine*

Equisetum laevigatum A. Br. Plate 7.

FOLK NAMES: Smooth Scouring Rush, Smooth Horsetail, Summer Scouring Rush, Horsetail, Intermediate Scouring Rush, Water Grass, Joint Weed, Jointed Fern, Leafless Fern

DESCRIPTION: Erect deciduous annual or perennial from dark, creeping rhizomes; stems pale green, rarely branched above the base, to one meter, more or less smooth, with 14-30 ridges, central cavity more than one half the diameter of the stem; sheaths elongated and expanded at the top, rarely with a black girdle at their base, the ridges with a faint central keel and sometimes with a faint short, lateral keel; strobilus variable in size, short pedunculate, apiculate or rounded.

—— Highly variable; often given as E. kansanum Schaffner which differs in that it has a blunt cone.

HABITAT: Moist, open areas, often along waterways and rail road tracks; soil sandy and circumneutral to subacidic.

DISTRIBUTION: Occasional. Coles, Clark, Cumberland. Sec. 30 T.12N., R.12W.; Sec. 12 T.12N., R.9E.; Sec. 10 T.12N., R.8E.; Sec. 31 T.13N., R.14W.

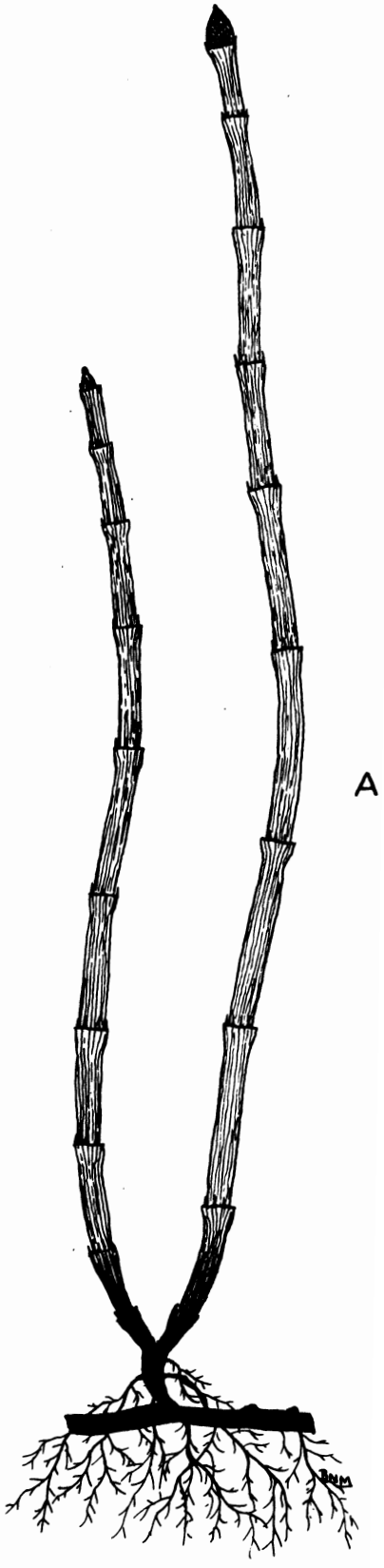
ETHNIC COMMENTS: The species, laevigatum, is Latin meaning smooth, in reference to the nearly smooth nature of the stem.

Weiner (1972) reported that the Hopi Indians mixed the dried ground stems of this horsetail with cornmeal and consumed as mush or baked as bread. In emergencies it might be considered as a survival food. But only in early spring when the young tender stems are available. Billington (1952) states that it is commonly used as forage in the Middle West. However, some authorities consider it to be poisonous. For this reason,

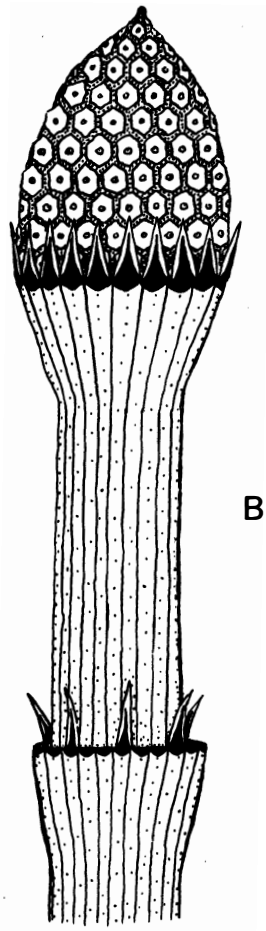
it is suggested that only the young tender plants be used and then only after having been boiled for twenty minutes in each of three to four waters. Teit (1928) reported that the Thompson tribe of British Columbia applied this fern to burns. Animal fats were sometimes mixed with the ashes to prepare a burn ointment. It undoubtedly shared many of the same uses of the similiar appearing horsetails.

Although quite easily grown, it is generally not considered a good addition to the formal garden because of its capacity to spread rapidly.

Plate 7. Equisetum laevigatum. Figs. A. Habit, x1/3; B. Upper portion of stem, showing strobilus and sheaths, x3; C. Cross-section of stem, x4.



A



B

C

Equisetum laevigatum

Equisetum x ferrissi Clute Plate 8.

FOLK NAMES: Intermediate Scouring Rush, Slender Scouring Rush, Smooth Scouring Rush, Horsetail, Water Grass, Joint Weed, Jointed Fern, Leafless Fern

DESCRIPTION: Erect evergreen from slender, dark, creeping rhizomes; stems slender, pale green with few grooves, unbranched above the base, to nearly one meter, slightly rough epidermis, central cavity more than one half, (usually four fifths) the diameter of the stem; sheaths (at least the upper) green, flaring, with a faint black basal band, the basally connate teeth, narrow, blackish, early deciduous; excedingly long distance between joints; strobilus short pedunculate, apiculate.
—— The spores are reported to be abortive.

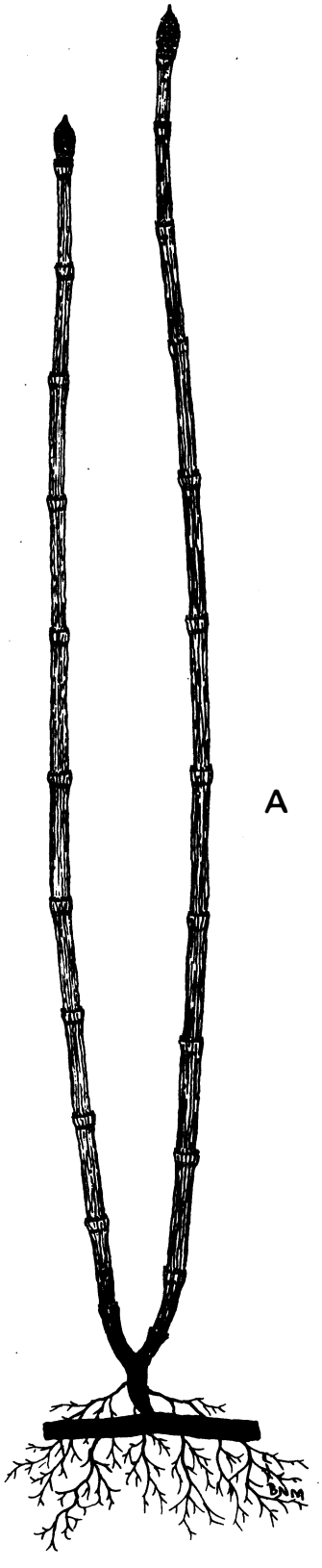
HABITAT: Shores, embankments, and roadsides; soil clayey to sandy.

DISTRIBUTION: Rare. Coles. Report by Mohlenbrock and Ladd (1978). However, specimens were not found during the course of this study.

ETHNIC COMMENTS: This horsetail is a hybrid (x) between E. hyemale and E. laevigatum. It was first discovered by W. N. Clute near Joliet, Illinois. The hybrid name, ferrissi, is in honor of J. H. Ferriss.

This plant is found only in North America, most commonly in the Middle West where it is sometimes used for forage. Because of its close resemblance to the above mentioned species, it probably has many of the same folk names and uses. And, like them, it is easily grown but seldom utilized.

Plate 8. Equisetum x ferrissi. Figs. A. Habit, x1/4; B. Upper portion of stem, showing strobilus and sheaths, x3 1/2; C. Cross-section of stem, x5.



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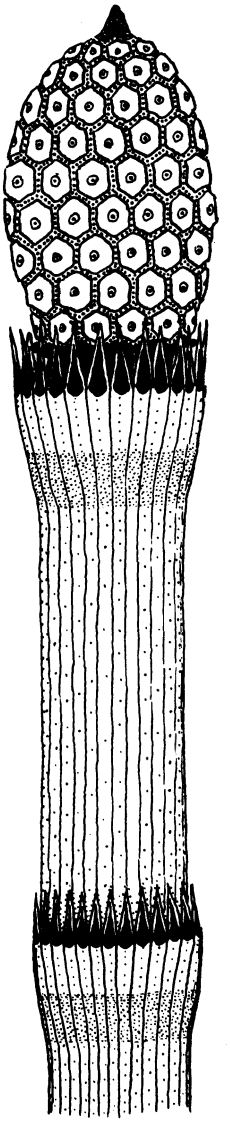

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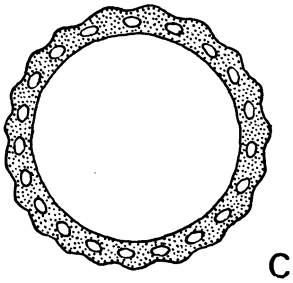


C

Equisetum x ferrissi

OPHIOGLOSSACEAE - ADDER'S-TONGUE FAMILY

Terrestrial or epiphytic, succulent plants; rhizome short, fleshy, bearing one or several erect leaves; one leaf usually produced each season, composed of two distinctly different branches, the fertile, which appear to be a continuation of the petiole, and rising nearly lateral to it, the sterile, which is entire or more or less divided and dissected; sporophylls erect or drooping, simple and solitary or clustered, or paniculately branched; sporangia large globular, borne in two rows on the divisions of the fertile branch and formed of its main tissue, naked, sessile, without an annulus, dehiscing by a transverse slit, producing many thick-walled, yellowish spores.

There are five genera in this family. Two of these are present in East Central Illinois.

KEY TO THE GENERA OF THE OPHIOGLOSSACEAE

1 - Sterile branch divided, with free venation; sporangia in spikes or panicles . . . . . 1. Botrychium

1 - Sterile branch simple, with reticulate venation; sporangia in a simple 2-ranked spike . . . . . 2. Ophioglossum

Botrychium Sw.

type species: *Botrychium lunaria* (L.) Sw.

This genus, which contains approximately 40 species, is considered to be the most primitive in this family. Though considered a cosmopolitan genus, it is most abundant in the temperate regions. There are 11 species native to North America. There are two species native to East Central Illinois. One of these is represented by two varieties.

KEY TO THE SPECIES OF *Botrychium*

1 - Sterile portion of leaf sessile or with a very short stalk, attached near the middle of the plant; deciduous . . . . . 1. *B. virginianum*

1 - Sterile portion of leaf with a stalk at least 3 cm long, attached near the base of the plant; evergreen 2

2 - Sterile portion of the leaf finely divided . . . . . 2. *B. dissectum* var. *dissectum*

2 - Sterile portion of the leaf shallowly divided . . . . . 3. *B. dissectum* var. *obliquum*

Botrychium virginianum (L.) Sw. Plate 9.

FOLK NAMES: Rattlesnake Fern, Grape Fern, Virginia Grape Fern, Hemlock-leaved Moonwort, Indicator Fern, Virginia Moonwort, Sang Sign Fern, Adder's-Tongue Fern, Adder's-Tongue

DESCRIPTION: Deciduous perennial to one meter from much reduced, fleshy rhizomes; leaves glabrous, divided into a sterile and a fertile portion, often with a bud for the next years growth located near the base and sheathed by the common petiole, sessile, spreading, suberect, deltoid in outline, membraneous, ternately compound, pinnate to bipinnate, the pinnules dissected or toothed, acute or subacute; fertile spike erect or nearly so, pinnately compound; sporangia borne terminally on the segments, globoid, clustered, to one mm in diameter; spores copious, yellowish. —— There is considerable variability in the height of this plant. Fertile specimens were collected ranging from 13 cm to more than one meter.

HABITAT: Moist, shaded woodlands and thickets; the soil rich and subacidic.

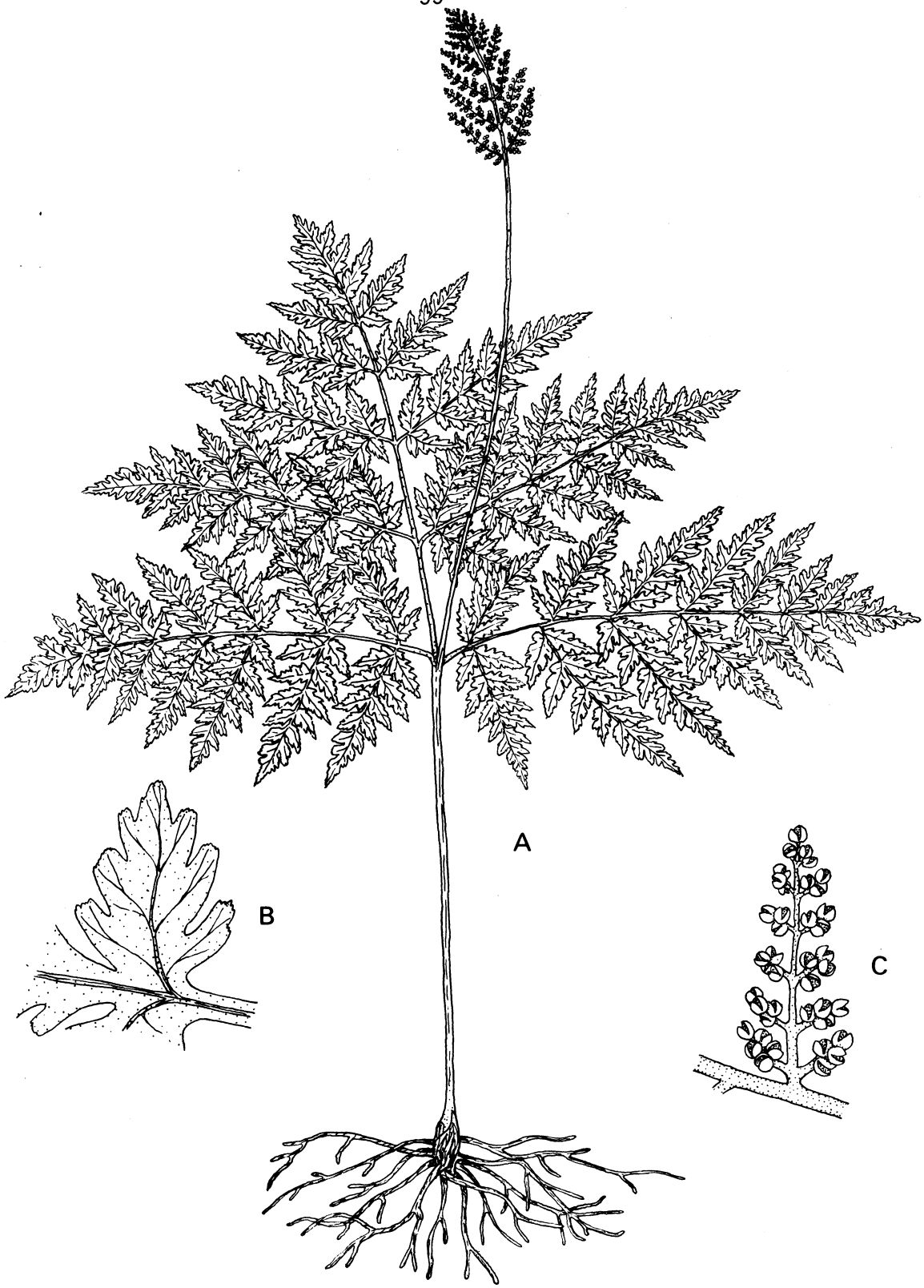
DISTRIBUTION: Very common. Coles, Clark, Cumberland.

ETHNIC COMMENTS: The genus, Botrychium, is derived from the Greek word botrys, a cluster of grapes, in reference to the appearance of the clustered sporangia. The species, virginianum, is Latin meaning from Virginia. The folk name Rattlesnake Fern is probably a holdover from an old superstition that suggested the similiarities between the fertile spikes and the rattles of the serpent. Clute (1905) states that the name Indicator Fern is used for this plant because it is often found in association with the much sought after Ginseng (Panax quinquefolia) and Golden Seal (Hydrastis canadensis). It is also known as Sang Sign Fern in parts of the

southern U.S. because it is believed that the tip of the frond always points toward a Ginseng plant.

This is a highly recommended oranmental plant that is easily cultured. It does best when provided with a moist site that has diffuse light, and fertile, subacidic soil. If left undisturbed, it often attains a larger size than in the wild. However, protection should be provided from snails, slugs, and rodents. This plant emerges form the soil in early spring and produces its numerous, yellowish spores soon afterwards. Like all plants in this family, it is difficult to cultivate from spores due to the presence of a mycorrhizal relationship. It is for this reason that a large amount of soil should be gathered with the plant when transplanting.

Plate 9. Botrychium virginianum. Figs. A. Habit, x1/2; B. Pinnulet, x3; C. Fertile portion of leaf, x4.



Botrychium virginianum

Botrychium dissectum Spreng. var. dissectum Plate 10.

FOLK NAMES: Cut-leaved Grape Fern, Bronze Fern, Dissected Grape Fern, Lance-leaf Grape Fern, Grape Fern, Ternate Grape Fern, Lace-leaf Grape Fern, Rattlesnake Fern, Adder's-Tongue Fern, Adder's-Tongue

DESCRIPTION: Evergreen perennial to 40 cm, from fleshy, reduced rhizomes; leaves turning bronze in the fall, glabrous, divided into a sterile and fertile portion, the sterile suberect, stalked, borne near the base of the plant, deltoid in outline, ternately compound, pinnules elongated, finely dissected, entire or crenulate, acute or subacute; fertile spike erect, produced in late summer, bi- or tripinnate; sporangia terminally borne, globoid, to one mm in diameter; spores copious, yellowish. —— Due to the infrequency of this plant it was long considered a variant of the more common, shallowly lobed B. dissectum var. obliquum, when actually the opposite is true.

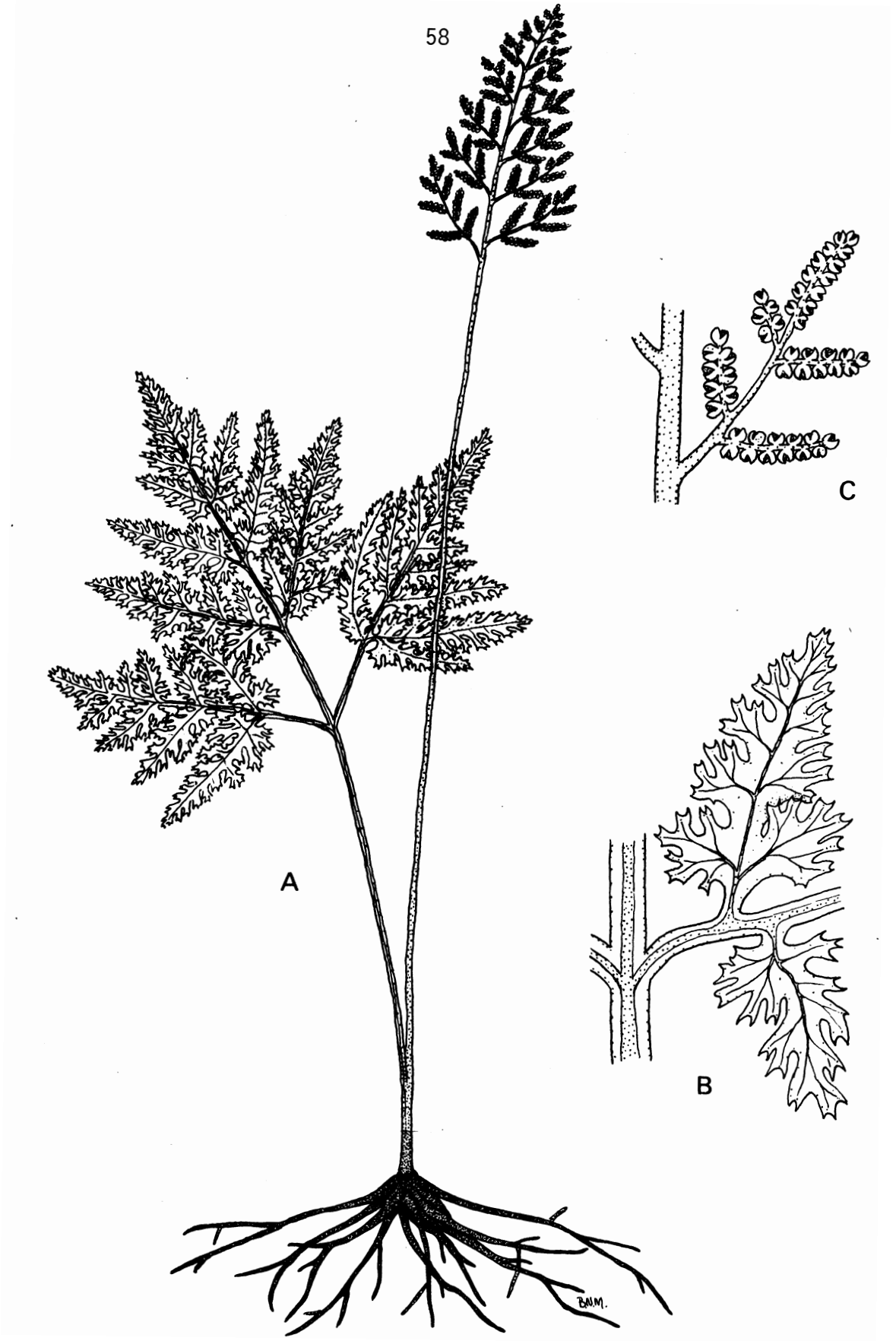
HABITAT: Moist, shaded woods, thickets, fields, and especially near stands of pines; soil subacidic.

DISTRIBUTION: Rare to occasional. Coles, Clark, Cumberland. Sec. 13 T.12N., R.9E.; Sec. 15 T.11N., R.9E.; Sec. 12 T.11N., R.9E.; Sec. 27 T.11N., R.9E.; Sec. 29 & 30 T.12N., R.12W.

ETHNIC COMMENTS: The specific and varietal names of this fern, dissectum, is Latin meaning dissected, referring to the finely divided leaves.

There are no recorded for this fern as either a medicinal or edible. This late-fruiting species is evergreen with the leaves usually turning bronze when the weather becomes cooler. It can be grown in a moist, shaded woodland garden, though it is frequently damaged by snails, slugs, and rodents if not protected. Plenty of soil should be removed with the plant.

Plate 10. Botrychium dissectum var. dissectum. Figs. A. Habit, x2/3; B. Pinnules, x6; C. Fertile portion of leaf, x4.



Botrychium dissectum var. *dissectum*

Botrychium dissectum Spreng. var. obliquum (Muhl.) Clute Plate 11.

FOLK NAMES: Common Grape Fern, Bronze Fern, Grape Fern, Oblique Grape Fern, Coarse-lobed Grape Fern, Rattlesnake Fern, Adder's-Tongue Fern, Adder's-Tongue

DESCRIPTION: Evergreen perennial to 40 cm from short, fleshy rhizomes; leaves turning bronze in the fall, glabrous, divided into a sterile and fertile portion, the sterile blade suberect, stalked, borne near the base of the plant, deltoid in outline, ternately compound, pinnules elongated, shallowly divided, entire or crenulate, acute or subacute; fertile spike erect, produced in late summer, bi- or tripinnate; sporangia terminally borne, globoid, to one mm in diameter; spores copious, yellowish. —— Usually found growing with B. dissectum var. dissectum.

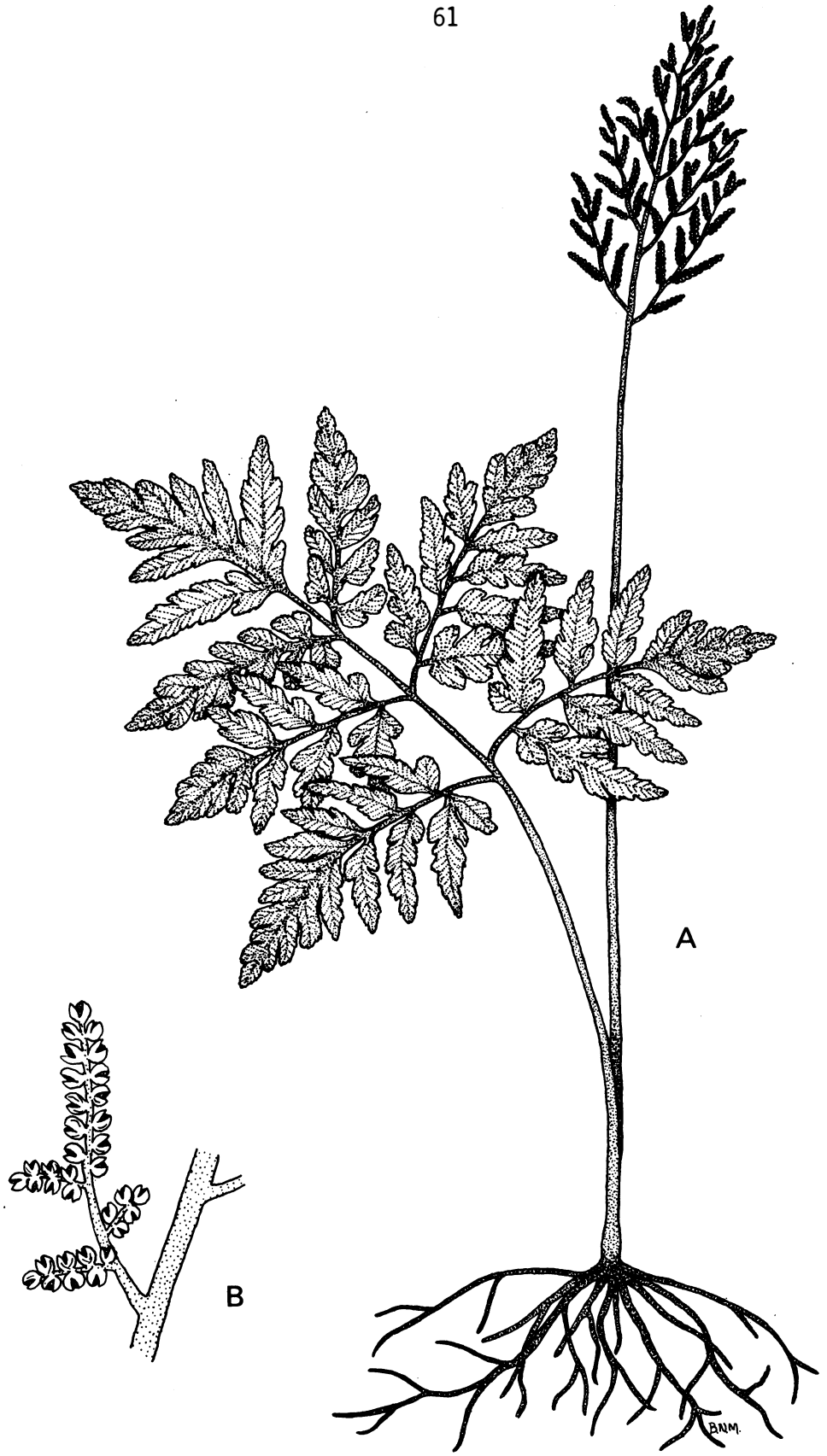
HABITAT: Moist, shaded woods, thickets, fields, and especially near stands of pines; soil rich to clayey and subacidic.

DISTRIBUTION: Occasional. Coles, Clark, Cumberland. Sec. 13 T.12N., R.9E.

ETHNIC COMMENTS: The species name, dissectum, is Latin and refers to the leaves which are only slightly dissected in this plant. The varietal name, obliquum, is Latin meaning oblique, in reference to the unequally sided or slanting of the segments of the blade. The folk name Grape Fern is in allusion to the fancied resemblance of the fertile portion to a bunch of grapes.

The uses and culture are the same as those for B. dissectum var. dissectum. After replanting it should be left undisturbed.

Plate 11. Botrychium dissectum var. obliquum. Figs. A. Habit, x2/3; B. Fertile portion of leaf, x4.



Botrychium dissectum var. *obliquum*

Ophioglossum [Tour.] L.

type species: Ophioglossum vulgatum L.

This genus contains approximately 40 species which are well-dispersed in all temperate and tropical regions. There are 7 species indigenous to North America, but only one of these is native to East Central Illinois.

Ophioglossum vulgatum L. var. pseudopodum (Blake) Farw. Plate 12.

FOLK NAMES: Adder's-Tongue, Adder's-Tongue Fern, Common Adder's-Tongue, Adder's-Fern, Adder's-Spit, Adder's-Spear. Serpent's-Tongue, Snake's-Fern, Christ's Spear, Cock's-Comb, Dragons, Edder's-Tongue

DESCRIPTION: Small, fleshy, deciduous perennial to 30 cm from fleshy, reduced rhizomes; divided into a sterile and fertile portion, sterile blade pale green, entire, elliptic to ovate, rounded or subacute at the apex, tapering to a nearly sessile or short-stalked base, attached halfway up the common stalk, glabrous, the venation reticulate, midvein indistinct; fertile spike borne terminally on a slender, erect, elongated stalk, to 4 cm long, apiculate, green when inmature, brown at maturity; sporangia embedded, round, beadlike, 2-ranked, up to 30 located on each side of the rachis; spores copious, yellowish.

—— Interestingly, the haploid chromosome number (n) of this fern ally is reported by Manton (1950) to be 250-260.

HABITAT: Moist, shaded woods, thickets, swamps, slopes, near sandstone ledges, and especially near stands of pines; soil rich to clayey and circumneutral.

DISTRIBUTION: Occasional. Coles, Clark, Cumberland. It is probably more

frequent, but due to its small size and because it grows among other plants with similiar leaves, it is often overlooked. Sec. 13 T.12N., R.9E.; Sec. 15 T.11N., R.9E.; Sec. 12 T.11N., R.9E.

ETHNIC COMMENTS: The genus, Ophioglossum, is from two Greek words, ophis, a serpent, and glossa, tongue. The species, vulgatum, is Latin meaning common, in reference to its distribution. The varietal name, pseudopodum, is from two Latin words, pseudo, false, and podum, foot. It is in allusion to the shape and attachment of the sterile blade. The folk name, Adder's-Tongue is older than the scientific name and a good example of the Doctrine of Signatures. In accordance with the ancient ideas about diseases and their cure, it was evident that this plant was intended by Nature as a specific remedy for snake bites. Drayton alludes to its use in these lines:

> "For them that are with newts or snakes or adder's stung
> He seeketh out a herb that's called adder's-tongue,
> As Nature it ordained its own like hurts to cure,
> And sportive, did herself to niceties inure."

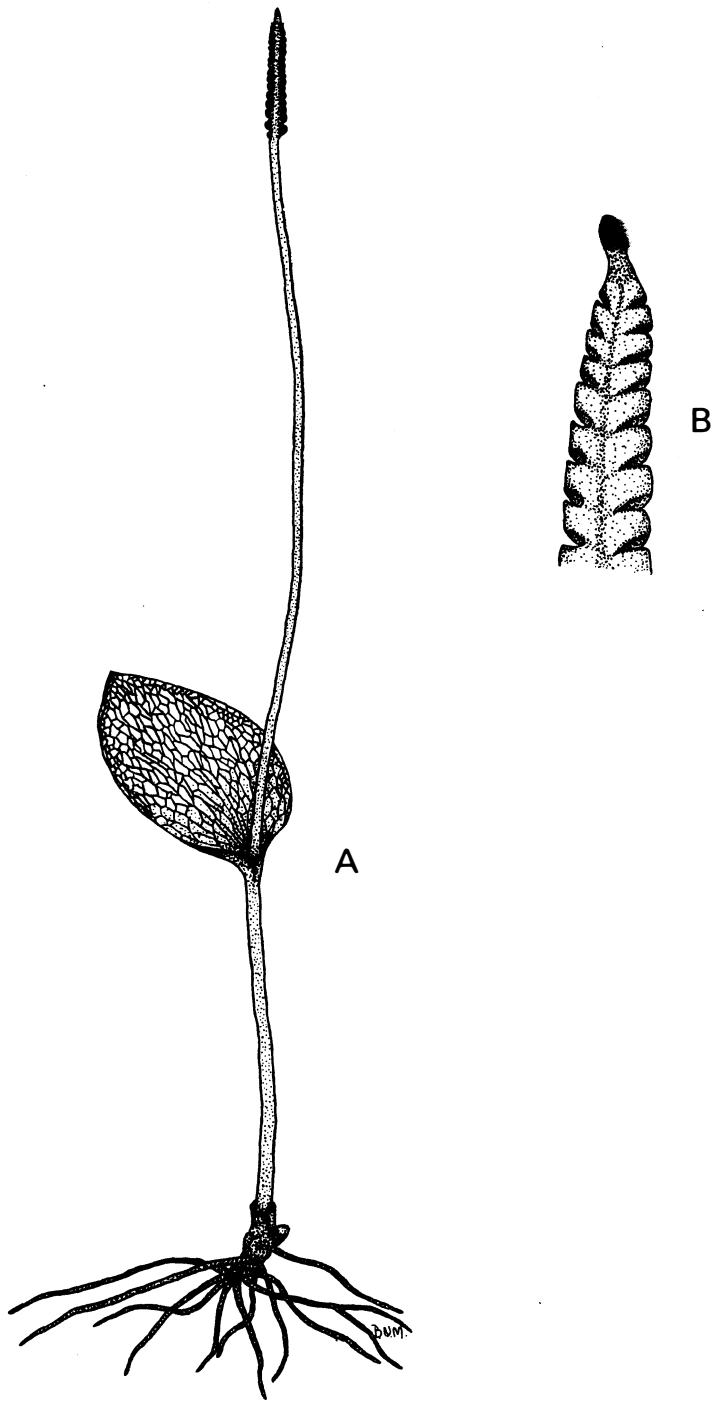
The herbalists called it a fine cooling herb. The extracted juice of the leaves was either drunk alone or mixed with distilled water of horsetail. According to Grieve (1931) this preparation was used for internal wounds, bruises, for bleeding of the mouth and nose, and for sore eyes. An ancient recipe for an ointment used for wounds is as follows: two pounds of finely chopped leaves in one half pint of oil and one and one half pounds of suet melted together; then boil the whole till the herb is crisp, then strain from the leaves. Clute (1901) states that a vulneary called either Adder's-spear Ointment or Green Oil of Charity, can be made by boiling fresh fronds with unslated butter.

This plant was formerly believed to have poisonous qualities, which

not only harmed the cattle that fed upon it, but also destroyed the grass in which it grew. Uphoff (1968) states that it was considered useful for treating dropsy, vomiting, and hiccoughs. The fresh leaves have been employed as a poultice for ulcers and tumors.

This beautiful little plant does not lend itself to cultivation because it is very suscepible to attack from fungi, slugs, rodents, and other organisms. However, if cultivation is attempted, one should remove a considerable amount of the soil with the plant to insure the presence of the fungus with which it establishes a mycorrhizal relationship. It is not uncommon for the plant to go a season or two without appearing above ground. The ideal location for transplanting this little fern is under evergreens.

Plate 12. Ophioglossum vulagtum var. pseudopodum. Figs. A. Habit, x1; B. Fertile portion of leaf, x5.



Ophioglossum vulgatum var. *pseudopodum*

OSMUNDACEAE - ROYAL FERN FAMILY

Large perennial, terrestrial or subaquatic plants; rhizomes creeping, fibrous; leaves erect to somewhat spreading, pinnate to tripinnatifid, uniform or dimorphic (in Osmunda), the petiole scaleless, winged at the base; sporophylls occupying an entire leaf or combined with sterile pinnae; sporangia large, naked, globose, reticulated, mostly stalked, borne on modified contracted pinnae and nearly covering them, or (in 2 Old World Genera) borne in clusters on the lower surface of the pinnules, bivavular, dehiscence by a longitudinal slit, annulus lacking or rudimentary; spores green, numerous.

This is a primitive family with three extant genera; Osmunda in the New World, Todea and Leptopteris in the Old World.

Osmunda [Tourn.] L.

type species: Osmunda regalis L.

The genus contains 12 species distributed in the temperate and tropical regions. Four species are found in North America. Only one of these has been reported from East Central Illinois.

Osmunda claytoniana L. Plate 13.

FOLK NAMES: Interrupted Fern, Clayton's Fern, Interrupted Flowering Fern, Clayton's Flowering Fern, Hog Brakes, Snake Brakes, Brakes, Royal Fern, Flowering Fern

DESCRIPTION: Erect to suberect, deciduous perennial from creeping, fibrous rhizomes; leaves to one meter or more, green, winged at the base, dimorphic, once pinnate, tomentose early, nearly glabrous at maturity; outer series of leaves sterile, spreading, broadest near the middle, oblong in outline, pinnae many lobed, margins usually entire; inner series of leaves often with 1-6 pairs of fertile pinnae borne near the middle of the leaf; sporangia numerous, clustered, globoid, sessile or nearly so, green, becoming dark brown, fragile and withering with age; spores numerous, green.

—— If only sterile leaves are present this plant may be mistaken for O. cinnamomea (Cinnamon Fern) which is more markedly pubescent.

HABITAT: Low, moist woods, meadows, swamps, shaded ravines, and in depressions along sandstone ledges; soil rich, circumneutral to subacidic.

DISTRIBUTION: Occasional. Coles, Clark, Cumberland. Sec. 25 T.12N., R.9E.; Sec. 12 T.10N., R.13W.; Sec. 27 T.12N., R.12W.; Sec. 29 & 30 T.12N., R.12W.; Sec. 27 T.11N., R.9E.; Sec. 30, 31, & 32 T.11N., R.12W.

ETHNIC COMMENTS: The genus name, Osmunda, is reportedly from Osmunder, the Saxon equivalent of the god Thor. However, it is also thought to have originated from Osmund, The Waterman of Loch Tyne, who is reported to have hidden from the Danes on an island covered with this fern. Nodules of iron ore were known as Osmonds during the Middle Ages, Since

these frequently contained fossil impressions of this fern, it has been suggested that the name may have refered to these carbonized remains. Others have traced the derivation from os, a bone, and mundare, to cleanse. This is in reference to one of the medicinal uses for the plant. The species name, claytoniana, is in honor of John Clayton, a pioneer Virginian botanist who discovered this fern. The folk name Interrupted Fern refers to the small, clustered sporangia which wither away early, leaving the frond "interrupted." It is occasionally called Snake Brakes, popular opinion ever associating ferns with serpents. The fact that birds often select this plant as a nesting site shows how unfounded the name is.

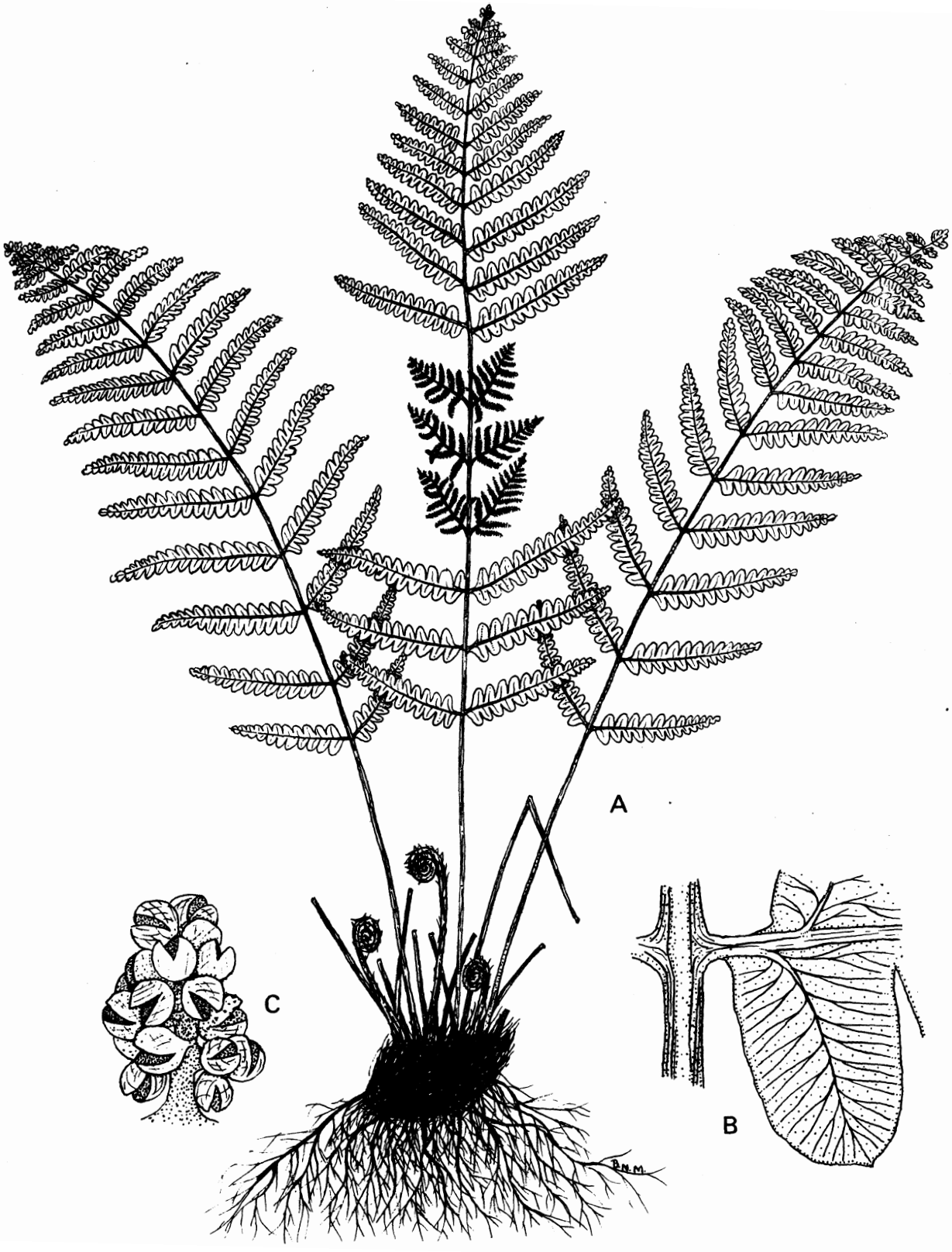
Uphoff (1968) reported that in the Old World it was believed that by biting the first fronds seen one would be insured against toothache for one year. Unfortunately, our species seems to lack this desirable property. The rhizomes are sometimes used as an adulterant for the Male Fern (Dryopteris filix-mas). The central portion of the large, tufted rootstalk of this genus is known as the "heart of Osmund." It is a tender, crispy edible which tastes somewhat like raw cabbage. This vegetable is obtained by pulling up a clump of half-developed fronds. However, this is not advisable because it destroys the plant. The croziers are reportedly used as a vegetable and for thickening soups.

According to Billington (1952), the tufted, fibrous roots and rhizomes from the members of this genus are used as a medium in which orchids, bromeliads, and other epiphytes are grown. It makes an ideal potting mixture because it does not readily become softened or compact and it is very durable. This medium is called either Osmundine or Orchid Peat. The state of Lousiana is the leading producer.

This magnificent fern is easily cultured and widely used for foundation plantings. The best location is a moist, partially shaded area with sub-

acidic soil. The optimum time for collecting this plant for transplanting is late summer or early fall. If the fertile fronds are cut out as soon as they appear the remaining leaves will grow much larger. The brilliant golden color of the fronds in the fall is a truly magnificient sight.

Plate 13. Osmunda claytoniana. Figs. A. Habit, x1/5; B. Sterile pinnule, x4; C. Fertile pinnule, x6.



Osmunda claytoniana

POLYPODIACEAE - TRUE FERN FAMILY

Plants of very diverse habit; rhizome elongate, horizontal and creeping, or short and erect; vegetative characteristics very variable, leaves usually monomorphic, but in some genera dimorphic, veins usually forking, open or reticulate; sporangia usually in sori, the sori mostly dorsal or marginal, indusium (when present) inferior or superior, sporangia of various degrees of development within each sorus, thin-walled, long-stalked to sessile, the annulus incomplete, vertical, interrupted by the stalk, transversely dehiscent.

This is the largest family of ferns and, as treated here, comprises about 170 genera and 7225 species. There is wide geographic distribution within the family, with the majority being tropical. It is generally agreed that the Polypodiaceae, as defined by Diels and Christensen, is not a natural family. Reclassification has recently been undertaken but no general agreement has been reached as to what constitutes a family or as to the proper phylogenetic arrangement.

There are 12 genera represented in East Central Illinois.

KEY TO THE GENERA OF THE POLYPODIACEAE

1 - Sporangia borne in clustered, globose, dark brown, pinnules on highly modified fertile leaves . . . . . Onoclea (p. 103)

1 - Sporangia borne on the back or margin of pinnae; fertile leaves similiar to sterile leaves 2

2 - Sori borne at margins of leaves, covered by recurved leaf margin 3

2 - Sori not marginal or, if so, not covered by recurved leaf margin 5

3 - Leaves distinctly hairy; generally less than 3 dm tall . . . . . Cheilanthes (p. 89)

3 - Leaves more or less glabrous; generally more than 3 dm tall . . 4

4 - Sori distinct; leaves fan-shaped, thin . . Adiantum (p. 83)

4 - Sori apparently continuous; leaves three-parted, coarse . . . . . Pteridium (p. 76)

5 - Sori linear or elongate, sometimes recurved 6

5 - Sori round 7

6 - Leaves usually evergreen, less than 3 dm tall; sori usually straight, rarely recurved . . . . . Asplenium (p. 122)

6 - Leaves not evergreen, more than 3 dm tall; sori often recurved . . . . . Athyrium (p. 138)

7 - Indusia absent 8

7 - Indusia present 9

8 - Leaves deciduous, triangular in outline, more or less membraneous, pinnate-pinnatifid . . . . . Thelypteris (p. 107)

8 - Leaves evergreen, oblong in outline, more or less leathery, usually pinnatifid to once-pinnate . . . Polypodium (p. 93)

9 - Indusium attached at the center of the sorus; leaves usually evergreen, more than 3 dm tall 10

9 - Indusium attached beneath the sorus (it may appear to be attached laterally in Cystopteris); leaves deciduous, less than 3 dm tall 11

10 - Indusia peltate; fertile pinnae apical, smaller than sterile pinnae . . . . . Polystichum (p. 98)

10 - Indusia reniform; fertile and sterile pinnae similiar . . . . . Dryopteris (p. 111)

11 - Indusia cuplike, round at first, later separating into shreds, often stellate; petiole scaly or chaffy . . . . Woodsia (p. 151)

11 - Indusia hoodlike, often withered later, not separating into shreds; petiole glabrous . . . . . Cystopteris (p. 155)

Pteridium Gled.

type species: Pteridium aquilinum (L.) Kuhn.

A monotypic genus, which is cosmopolitan in distribution, with many varieties. One of the varieties is present in East Central Illinois.

Pteridium aquilinum (L.) Kuhn. var. latiusculum (Desv.) Underw. Plate 14.

FOLK NAMES: Bracken, Eagle Fern, Earn Fern, Erne Fern, Oak Fern, Upland Fern, Umbrella Fern, Turkey Foot Fern, Lady Bracken, Lady Fern, Adder-spit, Pasture Brake, Western Brake Fern, Western Bracken, Hog-brake, Common Bracken, Brake, Pasture Fern, Female Fern, King Charles in the Oak, Fern of Gold, Brachen, Bracon, Brak, Brakin, Brecken, Breckon, Farn, Poor man's Soap, Royal Bracken, Female Fern

DESCRIPTION: Erect deciduous perennial from thick, black, creeping rhizomes; petioles stout, erect, glabrous, or darkening and pubescent near the base; leaves large, to one meter or more, deltoid in outline, ternately compound, bipinnate-pinnatifid, coriaceous, margins entire, pubescent; sori marginal, continuous, covered by the reflexed leaf margin; spores light brown.

—— This a highly variable plant.

HABITAT: Open woods, fields, fencerows, and thickets, particularly in burned clearings; the soil sandy and subacidic.

DISTRIBUTION: Rare. Coles, Clark. Sec. 12 T.10N., R.13W.; Sec. 21 T.11N., R.9E.; Sec. 20 T.12N., R.9E.

ETHNIC COMMENTS: The genus, Pteridium, is a diminutive of the Greek word

pteris, fern, a very old genus in which this plant was formerly placed. The species name, aquilinum, is also Greek meaning eagle. It refers either to the wing-shaped fronds or the clawlike croziers. The variety, latiusculum, is Latin and means somewhat broad in allusion to the size and shape of the blade. The name Brake is from and old Saxon word for fallow or clearing, It is applicable to this fern because it is often the first plant to spring up in burned over places.

A cross section of the stem of this fern has an arrangement of vascular tissues which some have likened to the letter C. Accordingly, Clute (1905) reported that it was supposed to be good for protecting one against evils because it bore the initial of Christ. Conversely, there were those who saw in this the mark of the devil's hoof. The arrangement has also been fancied to resemble an oak tree and is sometimes called King Charles in the Oak.

The Bracken is the plant originally known as the Female Fern. It was reputed to bear the mystic fern seed on St. John's Eve (June 24). According to the legend, fern seed could be obtained from this plant at dusk. This production was preceded by the formation of a small blue flower which was soon replaced by the shiny, fiery seed which supposedly ripened at midnight. If the seed fell from the stem of its own accord and was caught in a white napkin, it was reported to confer upon its possessor the power to become invisible. This prompted Shakespeare to write: "We have the receipt for fern-seed; We walk invisible." Those who observed the rules and waited for the small blue flower no doubt came home disappointed. "Watching the fern," as this practice was called, had too much black art in it to suit the church so it was soon condemned. Clute (1905) describes this activity as follows:

"But on St. John's mysterious night,

Sacred to many a wizard spell,
The time when first to human sight
Confest, the mystic fern seed fell:
. . . . . .
I'll seek the shaggy, fern-clad hill
Where time was delved a dreary dell
Befitting bet a hermits cell;
And watch ' mid murmurs muttering stern
The seed departing from the fern
Ere watchful demons can convey
The wonder-working charm away,
And tempt the blows from arms unseen
Should thoughts unholly intervene."

In England, it has long been believed that burning the Bracken will bring rain and drive away witches. Grieve (1931) quotes Parkinson concerning the virtues of this fern burning and the resulting smoke:

> "The fume of ferne being burned, driveth away serpents, gnats and other noisome creatures. . .the sent of it is very grateful to the braine."

This is one of the most utilized species of ferns. Billington (1952) reported that it is used as a packing material for fruits, vegetables, and meats to help prevent mildew and decay. The fresh plant contains tannic acid and has been used in the tanning of leather. It has also been burned while young and the resulting ashes made into balls for use as a soap substitute. The ashes of the burned mature plants have been used in the making of glass. A common practice in many parts of the world is to burn the plant and collect the ashes for use as a fertilizer. This utilization is due to the high nitrogen and potash content. Also, the young croziers that emerged from the burned over areas, serve as a lure for game such as deer and elk. Another use for this often large leaved fern is as a thatching material, or for bedding for livestock. The fibers in the rhizomes have been used for making string.

The Braken was the fern most often used by the Indians of North America. Weiner (1972) states that the rhizomes were often peeled and the mealy center eaten as a starch source. The following is a description from Curtis (1913).

> "Extending through the center of these roots is a core of white, tough pith. When the rather stringy edible portion had been eaten, the women gathered the pieces of root and extracted the pithy cores, fashioned them into long braids, and hung them on the wall to dry for weeks or months. The pith was then parched for a day or more over a hot fire until it was perfectly dry and quite brittle, and by means of a mortar and pestle it was reduced to a flour."

Another method for using this fern as food involved grinding the dried rhizomes, with the resulting flour being used in bread or in brewing beer. Norton (1980) states that Bracken flour and paste are still produced by the Japanese. Gunther (1945) reported that the rhizomes were usually dug after the weather turned cold. They were then stored in baskets for future use. However, it should be noted that only the rhizomes that oozed juice were selected. The Indians of western Washington state used the leaves to lay fish on while cleaning them. They also wiped the fish with the fronds as an antiseptic curative procedure. Certain tribes boiled the young coiled fiddleheads in water to obtain an oil and starch. Some outdoor cookbooks recommend that the young croziers should be boiled in salty water for thirty minutes or until they are tender. If the water becomes bitter, it should be changed. They croziers are especially tasty with pepper, lemon juice, and melted butter. Another way to prepare this plant is to bake the rhizome until it becomes soft. This pulp can then be eaten or stored. Besides serving as a food stuff, Uphoff (1968) recommends it as a taenifuge and as a means to relieve stomach cramps. A tea made from this plant has been

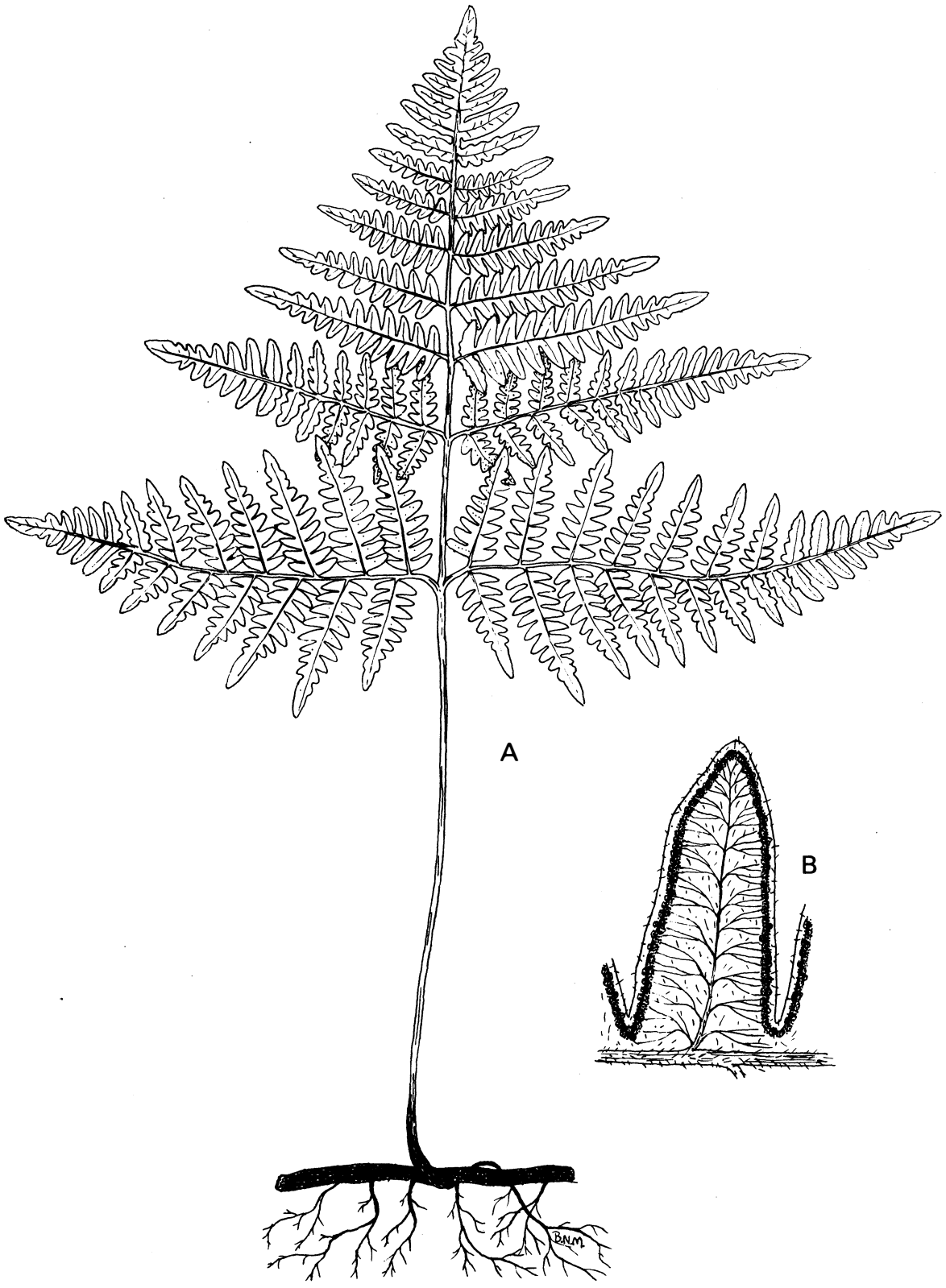
reported useful for treating women with caked breasts.

The Braken is considered an excellent survival food. However, both the croziers and mature plant are somewhat toxic. The full-grown plants are terrible tasting and have been responsible for the poisoning of grazing cattle. Evers and Link (1972) reported that this plant destroys thiamine and effects blood clotting. Fortunately, Pohl (1955) reports that the poisonous property seems to be destroyed by cooking the plant about one half hour in salted water. There are unsubstantiated reports circulating that link the ingestion of this plant with cancer of the mouth.

This is a very difficult fern to transplant. When attempting to relocate this plant, one should do so in the early spring with plenty of soil. If successful, the plant will produce luxuriant fronds within two months and will continue to send up new fronds throughout the summer. When the fronds become tattered and brown, new growth can be initiated by simply cutting these old leaves off at ground level. Once established, it spreads rapidly and is difficult to eradicate. It will grow in very hot and sunny areas. Norton (1980) states that this fern will actually force its way through several inches of sun warmed asphalt with great rapidity. However, it is very susceptible to frost.

Durand (1928) reported gigantic specimens from South America that were thirteen feet tall, and dwarfed specimens from the far north that were only two to three inches tall at maturity.

Plate 14. Pteridium aquilinum var. latiusculum. Figs. A. Habit, x1/5; B. Underside of fertile pinnule, x2.



Pteridium aquilinum var. *latiusculum*

Adiantum L.

type species: Adiantum capillus-veneris L.

This genus contains about 225 spceies in tropical and temperate areas, especially the American tropics. There are at least five species found in the continental U.S. Only one species is present in East Central Illinois.

Adiantum pedatum [Tourn.] L. Plate 15.

FOLK NAMES: Maidenhair Fern, Maidenhair, American Maidenhair Fern, Foot-shaped Canadian Maidenhair, Northern Maidenhair Fern, Northern Maidenhair, Maiden Fern, Lockhair Fern, Sweet Fern, Rock Fern, Virgin's Fern, Frejya's Hair, Hair Fern, Hair Medicine, Dry Fern, Hair Bigger

DESCRIPTION: Delicate deciduous perennial from slender, creeping rhizomes with brown scales; leaves dull green, to 75 cm, petiole long, shiny, reddish brown to black, glabrous above, often with brown basal scales, forking at the apex into several widely divergent branches giving the entire blade a fan-shaped appearance, pinnules alternate, glabrous, short petiolate, flabellate to reniform, lower margin entire, upper margin cleft or lobed; sporangia yellow-green at first, brown at maturity, linear to reniform, borne marginally, distinct, covered by the light colored, reflexed lobes of the upper leaf margin; spores yellowish. —— Considerable variability exists in the size and shape of the leaf.

HABITAT: Rich, moist, shaded woodlands, and stream banks, thickets, and slopes; the soil subacidic.

DISTRIBUTION: Common. Coles, Clark, Cumberland.

ETHNIC COMMENTS: The genus, Adiantum, is from two Greek words, a, without, and diaino, wet. It refers to the fact that the pinnae of most species are so smooth that water runs off without wetting them. The species name, pedatum, is Latin meaning palmate forking. It describes the overall fan-shaped appearance of the leaf of this fern. The name Maidenhair Fern was originally applied to the more southern Adiantum capillus-veneris, in reference to the slender black petioles, which bear a striking resemblance to a strand of a maiden's black hair.

This lovely woodland fern has been used as a medicinal since the time of Dioscorides. According to Grieve (1931), its chief use has been as a remedy for respiratory problems. This is a result of its reputed virtue as a bitter, stimulating expectorant and demulcent. In France, a syrup called Sirop de Capillaire, was made from the fronds and rhizomes. Honey and orange flowers were generally added to this syrup. Clute (1901) records this recipe:

Maidenhair Leaves 5 oz.
Liquorice Root peeled 2 oz.
Boiling Water 5 pints

let stand six hours and then add:

Loaf Sugar 13 lbs.
Orange Water 1 pint

Meyer (1918) states that this plant is useful for treating nasal congestion, hoarseness, and bronchial ailments. He reports this preparation and dosage:

"A teaspoonful of the herb to a cup of boiling water. Drink cold 1 or 2 cupfuls a day a large mouthful at a time; of the tincture, ½ to 1 fluid dram."

Culpepper (1826) discusses the usefulness of this fern in the treatment of juandice and pleurisy due to its gentle diuretic properties.

He also states that only young plants should be used and always in conjunction with other ingredients, which he did not list. Another use for this fern is in the preparation of the Elixir de Garus, which is valued as an emmenagogue. It was administered as a sweet infusion of 1 ounce to a pint of boiling water.

The Indians of North America made use of Maidenhair Fern in several ways. One utilization was as a tea concocted from the leaves. It served in the treating of coughs and colds. Weiner (1972) noted that during war expeditions, the fronds were chewed and then applied to wounds to stop bleeding. It has been used by the Cherokee Indians as an antihelmintic and by other tribes as a treatment for dysmenorrhea. Harris (1972) cites it as a febrifuge for treating rheumatic pains. According to the Indians who used it in this manner, its medicinal properties were related to its habitat preference.

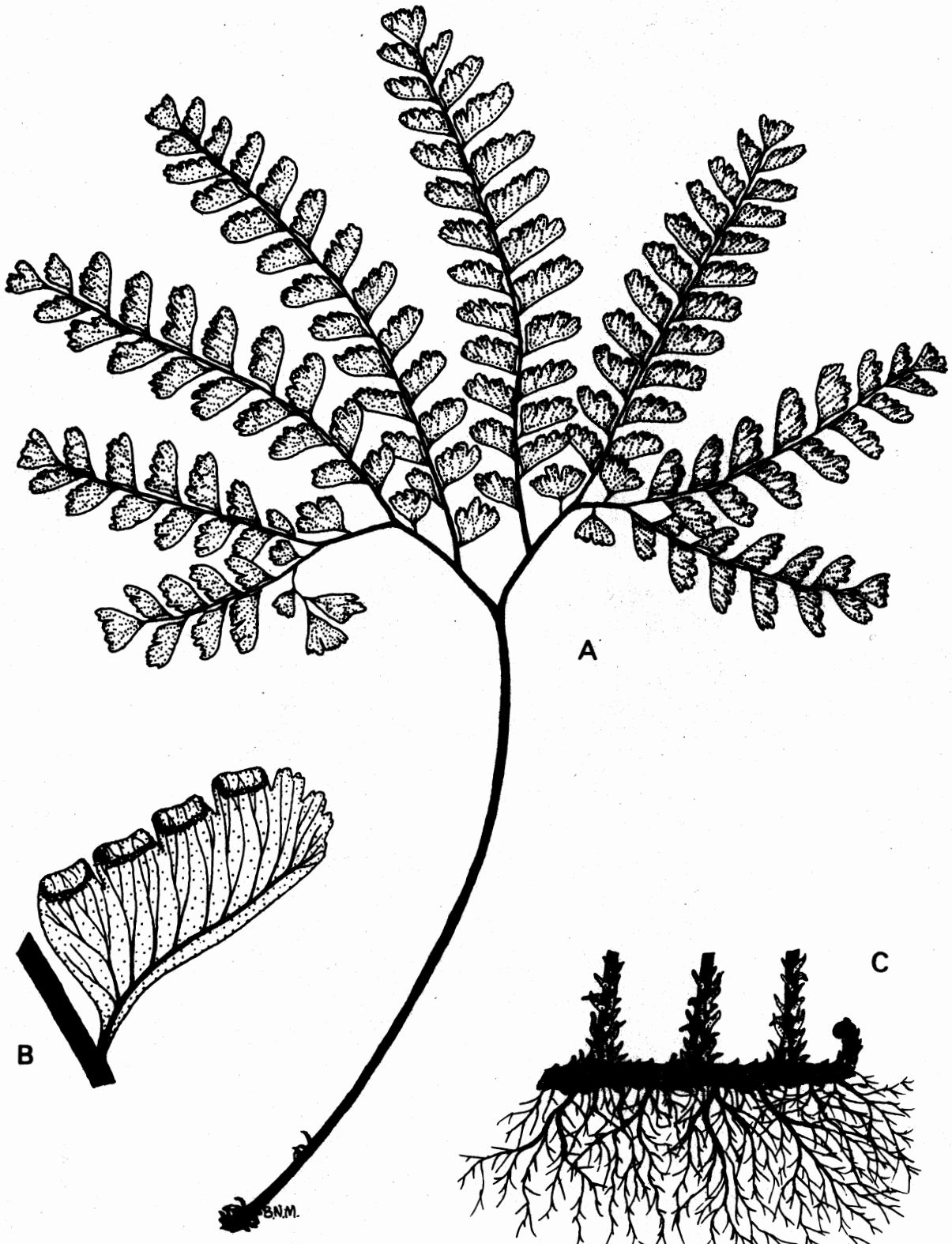
About 200 years ago, preparations of Maidenhair Fern were much in vogue for the treatment of hair and scalp problems. This practice was particularly common in Europe. However, several northwestern Indian tribes used this fern in the same way. Gunther (1945) states that the leaves were soaked in water and applied to the hair in order to achieve long, shiny, black hair. Another method involved burning the leaves and rubbing the ashes on the hair. These uses resulted in the name "Hair Bigger." Harris (1972) reports that the ashes were mixed with olive oil and herb vinegar and applied as a local application for alopecia. Gunther (1945) also mentions that the petioles were used to weave baskets.

This magnificent, delicately foliated fern is not difficult to cultivate, if provided with sufficient shade and moisture. The branches of the rhizomes will, once seperated and shallowly planted, reproduce quite rapidly. The slender croziers appear above ground in the early spring

and reach full maturity by the first of July. The fronds are very sensitive to frost and die down rather early in the fall.

According to Wherry (1961), the application of magnesium to the soil surrounding this fern will result in the production of fronds with fewer pinnae and a bluish hue to the blade.

Plate 15. Adiantum pedatum. Figs. A. Habit, x1/3; B. Underside of fertile pinnule, x2; C. Rhizome, roots, and basal region of petioles, x1.



Adiantum pedatum

Cheilanthes Sw.

type species: Cheilanthes micropteris Sw.

This genus contains approximately 180 species of mostly xerophytes which are scattered throughout the temperate and tropical regions. There are more than a dozen species within the continental U.S. However, only one species is found in East Central Illinois.

Cheilanthes lanosa (Michx.) D.C. Eaton Plate 16.

FOLK NAMES: Hairy Lip Fern, Woolly Lip Fern, Clothed Lip Fern

DESCRIPTION: Erect evergreen form short, creeping rhizomes with pale brown scales; leaves to 30 cm, sparsely hairy above, densely hairy beneath, bipinnate-pinnatifid, the pinnae widely spaced below, petiole and rachis somewhat pubescent; sori marginal, dark brown, covered by recurved leaf margin; no indusium

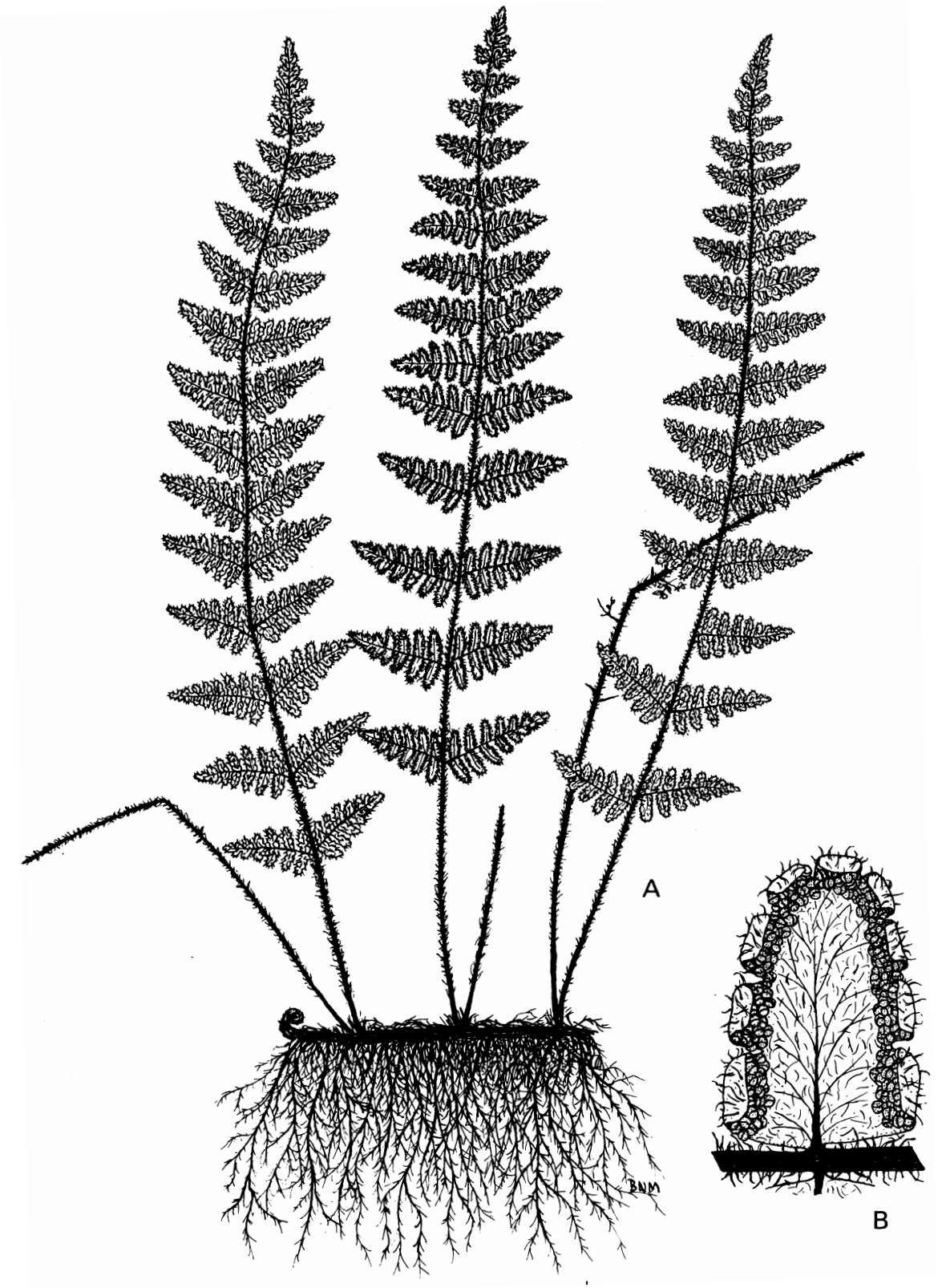
HABITAT: Dry exposed sandstone cliffs.

DISTRIBUTION: Cumberland. Sec. 27 T.11N., R. 9E. Reported by Wunderle (1967); however, several attempts to relocate the species at the recorded collection site proved futile.

ETHNIC COMMENTS: The genus, Cheilanthes, is from the Greek words cheilos, margin, and anthos, flower. It alludes to the marginal position of the sori on the pinnae. The species, lanosa, is Latin meaning woolly in reference to the tomentose nature of this plant.

There are no reported uses for this plant other than as an ornamental. It is an easily cultured, very attractive fern which loves dry exposed situations. During drought the leaves curl, but they are rapidly revived by rain.

Plate 16. Cheilanthes lanosa. Figs. A. Habit, x3/4; B. Underside of fertile pinnule, x8.



Cheilanthes lanosa

Polypodium [Tourn.] L.

type species: Polypodium vulgare L.

This genus, which contains approximately 1125 species, is widely distributed in the tropical and semitropical regions. There are only a few species found in the continental U.S. and one of them is present in East Central Illinois.

Polypodium vulgare L. var. virginianum (L.) Eaton Plate 17.

FOLK NAMES: Common Polypody, Polypody, Virginia Polypody, Golden Polypody, Male Polypody, Western Polypody, Golden Locks, Golden Maidenhair, Rock Brake, Stone Brake, Wood Fern, Male Fern, Sweet Fern, Snake Fern, Licorice Fern, Wall Fern, Stone Fern, Moss Fern, Adder's Fern, Addler's Fern, Rock-cap Fern, Oak Fern, Fern Root, Root Polypod, Female Fern, Everfern, Liverwort, Maiden's Hair, Polypod, Polypody of the Oaks, Brake Root, Brake of the Walls, Brake

DESCRIPTION: Erect evergreen, from scaly, extensively creeping rhizomes; leaves dark green above, lighter below, to 30 cm, ovate-oblong in outline, divided nearly to the rachis, pinnae linear-oblong, obtuse or acute, entire or undulate, coriaceous, glabrous, petiole green, slender, glabrous, one third to two thirds the length of the blade; sori borne submarginally in two rows, distinct, often scattered, yellow brown, round, large; no indusium; spores brown.

—— The shape and margin of the pinnae are subject to considerable variation.

HABITAT: Shaded sandstone boulders and ledges, occasionally on trees; soil often scant, infertile, rich in humus, and subacidic.

DISTRIBUTION: Rare. Clark. Sec. 27 T.12N., R.12W.; Sec. 12 T.10N., R.13W.

ETHNIC COMMENTS: The genus, Polypodium, is derived from the Greek polys, many, and pous, foot, in reference to the branching rhizome. However, Shaver (1954) suggests that the name characterizes the small, projecting stubs that remain on the rhizome after the leaves fall off. The species, vulgare, is Latin meaning common. The varietal name, virginianum, is Latin for Virginian. It alludes to the differences between this plant and the European Polypody.

Gunther (1945) states that the Indians of the Pacific Northwest used this fern for several purposes. The Makah peel and chew the roasted rhizome. The juice obtained from this mastification was slowly swallowed to stop coughs. The Cowlitz crush the rhizome, mix it with young fir needles, boil this mixture in water and drink the resulting infusion to aleviate measles. Clute (1901) reported that it was once considered valuable as a pectoral and as a remedy for whooping cough when boiled in sugar water. An infusion of the rhizome and fronds was a favorite cure for melancholia and for preventing nightmares.

According to Grieve (1931), this is the Oak Fern of the ancient herbalists. It was so named because of the fact that it often grew on the roots of the Oak trees. The powers attributed to this plant were derived in a fashion very similiar to the esteem the Druids had for the Mistletoe. The ancients used the leaves and rhizomes of this fern as a tonic, demulcent, expectorant, and purgative. They prepared an infusion of one half ounce of the crushed rhizome to a pint of sweetened boiling water. This preparation, when taken a cupful at a time, was valuable in treating the early stages of consumption. Other maladies

that this plant help aleviate included; swollen joints, rheumatic fever, juandice, dropsy, scurvy, and, when combined with Mallow (Malva spp.), hardened spleens and colic. However, it should be noted that the infusion mentioned above sometimes produces a rash. It was formerly listed in several materia medica and even the U.S. Pharmacoepia. Little, if any use is made of it today. When burned, the leaves produce large amounts of potash.

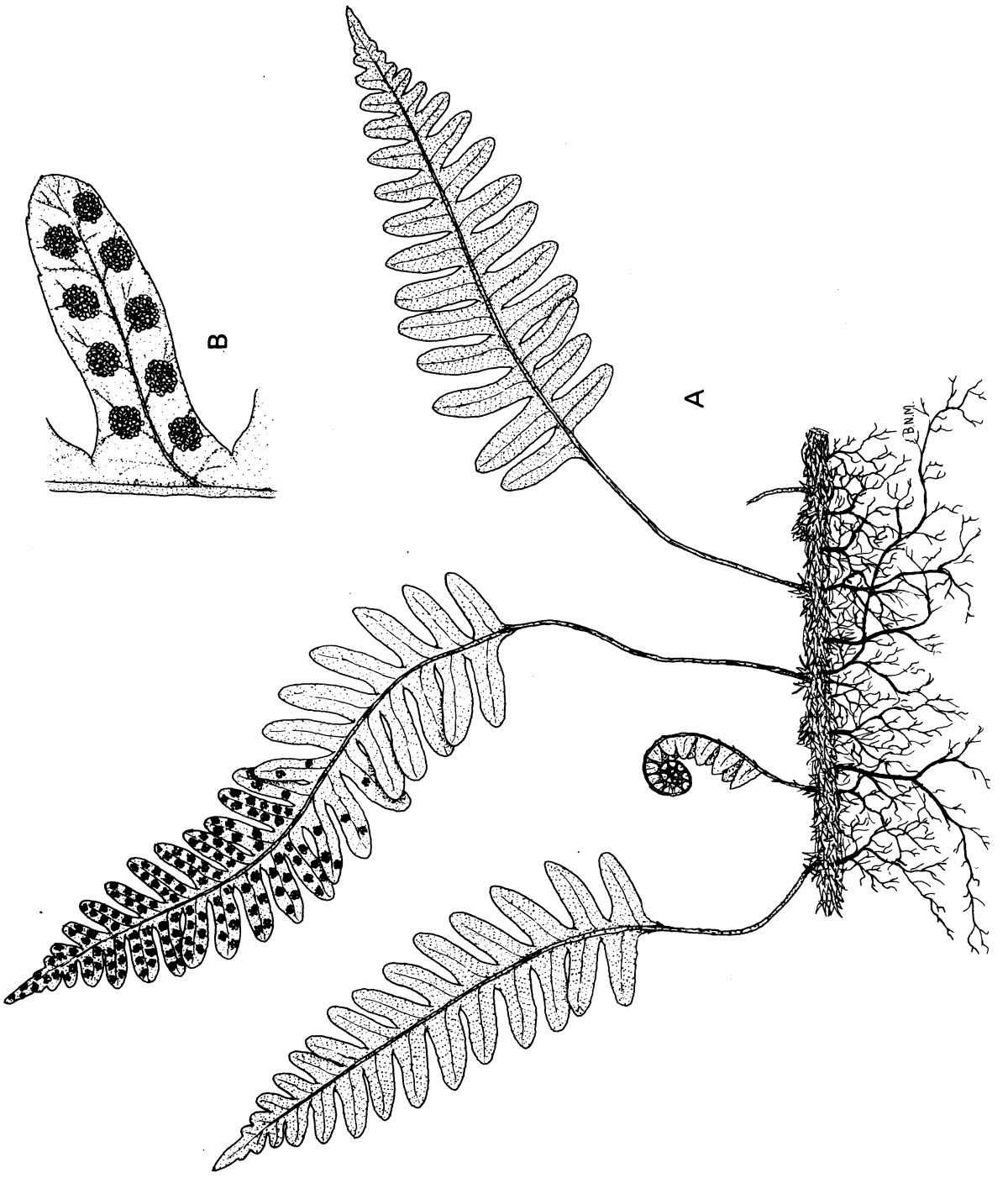
This fern was the subject for many pages of Thoreau's writings. The following lines are an example:

> " It is very pleasant and cheerful nowadays, when the brown and withered leaves strew the ground and almost every plant is fallen withered, to come upon a patch of polypody . . . on some rocky hill-side in the woods, where, in the midst of dry rustling leaves, defying frost, it stands so freshly green and full of life. The mere greenness, which was remarkable in the summer, is positively interesting now. My thoughts are with the polypody a long time after my body has passed. . . . Why is not this form copied by our sculptors instead of the foreign acanthus leaves and bays? How fit for a tuft about a base of a column! The sight of this unwithering green leaf excites me like red at some seasons. Are not woodfrogs the philosophers who frequent these groves? Methinks I imbibe a cool, composed, froglike philosophy when I behold them. The form of the polypody is strangely interesting, it is even outlandish. Some forms, though common in our midst, are thus perennially foreign as the growth of other latitudes. . . . The bare outline of the polypody thrills me strangely. It perplexes me. Simple as it is, it is as strange as an oriental character . . ."

This quaint, little creeping evergreen makes a nice addition to any rock garden. It is difficult to establish, so care must be taken to provide the optimum conditions. Although it sometimes is placed in hollow

logs, it does best when draped over humus-covered boulders or at the base of trees. It should be kept mosit and shaded. When collecting this plant for transplantation, it is advisable to gather the ends of the rhizomes or, preferably, start the plants from spores.

Plate 17. Polypodium vulgare var. virginianum. Figs. A. Habit, x1/2; B. Underside of fertile pinna, x2.



Polypodium vulgare var. *virginianum*

Polystichum Roth

type species: Polystichum lonchitis (L.) Roth

A large genus containing approximately 225 species. They are most abundant in the tropical mountains and other cool areas. There are several species found within the continental U.S. However, only one species is present in East Central Illinois.

Polystichum acrostichoides (Michx.) Schott Plate 18.

FOLK NAMES: Christmas Fern, Christmas-shield Fern, Dagger Fern, Canker Fern, Buckler Fern, Shield Fern, Winterfern

DESCRIPTION: Clustered, stout, evergreen perennial from thick, scaly rhizomes covered by the bases of old petioles: leaves dark green above, lighter below, to one meter, lanceolate in outline, dimorphic, fertile leaves larger than sterile, petiole greenish, with brown base, densely chaffy, pinnae usually alternate, coriaceous, glabrous and shining above, short petiolate, lanceolate to oblong, obtuse to acute, with a basal auricle, minutely or coarsely serrate, teeth bristle-tipped, lower most pinnae sterile and larger than the upper fertile ones; under surface of fertile pinnae with 2-4 rows of round, distinct or confluent sori; indusium centrally attached, peltate, persistent; spores yellowish. —— Variable forms with deeply toothed, incised or pinnatifid pinnae have been described. The forma incisum is sometimes found in East Central Illinois.

HABITAT: Shaded woodlands and hillsides, particularly on north facing slopes; soil subacidic.

DISTRIBUTION: Very common. Coles, Clark, Cumberland.

ETHNIC COMMENTS: The genus, Polystichum, is derived from two Greek words, polys, many, and stichos, rows. It refers to the arrangement of the sori on the pinnae. The species, acrostichoides, is Latin and denotes the similarities between this fern and Acrostichum (Elk's Horn Fern). Some people attribute the most commonly used folkname for this fern, Christmas Fern, to the fact that the pinnae resemble Christmas stockings. However, Clute (1901) suggests that the name is due to its evergreen nature and resulting use as a Christmas decoration.

This fern, with its firm, dark green, highly polished fronds, needs only a mixture of red berries to become a close rival to Holly in floral displays. Its use and nature are best described in the following lines:

"When frost has clad the dripping cliffs
With fluted columns, crystal clear,
And million-flaked the feathery snow
Has shrouded close the dying year;
Beside the rock, wher'er we turn,
Behold, there waves the Christmas fern.

No shivering frond that shuns the blast
Sways on its slender chaffy stem;
Full-veined and lusty green it stands,
Of all the wintry woods the gem.
Our spirits rise when we discern
The pennons of the Christmas fern.

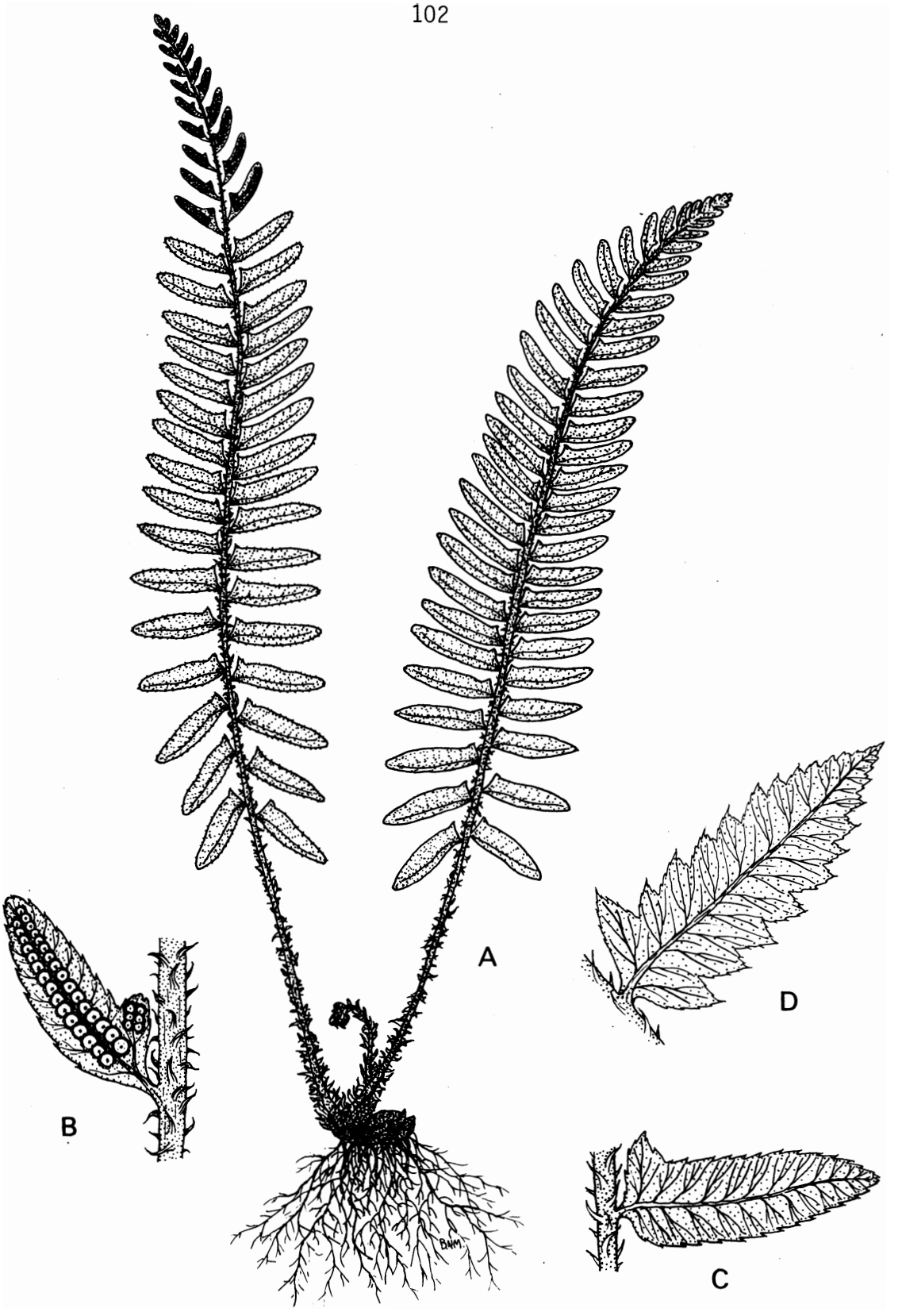
With holly and the running pine
Then let its fronds in winter appear,
'Tis summer's fairest tribute given,
To grace our mercy Yuletide cheer.
Ah, who can fear the winter stern
While still there grows the Christmas fern."

The fiddleheads of this fern are considered an excellent survival food. Though they are very abundant early in the spring, they soon become too tough to eat.

This hardy evergreen, which is often confused with the Boston Fern, is a good species for cultivation. It does best when planted in shaded, infertile soil. When place in a sunny location its growth will be stunted. And, according to Wherry (1931), if planted in rich loam, it becomes limp, less evergreen, and short-lived. It is sometimes planted on barren slopes to retard erosion and to help rebuild the soil.

The overwintered fronds fall down around the crown in the spring when the contrasting light green croziers appear. The leaves reach maturity by the first of June. This fern requires no special care and will continue to thrive for many years. And, because it does not spread rapidly, it is often sought for the rock garden.

Plate 18. Polystichum acrostichoides. Figs. A. Habit, x1/3; B. Underside of fertile pinna, x2; C. Sterile pinna, x1 1/4; D. Sterile pinna of forma incisum, x1 1/2.



Polystichum acrostichoides

Onoclea L.

type species: Onoclea sensibilis L.

This monotypic genus is found in eastern North America and eastern Asia. It is also present in East Central Illinois.

Onoclea sensibilis L. Plate 19.

FOLK NAMES: Sensitive Fern, Bead Fern, Oak Fern, Oak-leaved Fern, Dragon's Bridges

DESCRIPTION: Erect deciduous perennial from shallow, creeping, branching rhizome; leaves dimorphic, the sterile ones to over one meter, broadly triangular in outline, deeply pinnatifid, margins undulate or occasionally lobed, the petiole dark at base, green to light brown above, grooved throughout, the rachis winged, veins forming a regular series of narrow elongate aeroles, pinna to 20 cm, broadest near the middle; the fertile leaves persisting over winter, to 7 dm, bipinnate, green at first turning dark brown at maturity, forming a narrow panicle towards the apex, the pinnules tightly rolled to enclose the sporangia, globoid, hard, eventually cracking to liberate the brown spores.

—— A varietal intermediate between the sterile and fertile fronds may be found in situations where the fern has suffered some injury or deprivation.

HABITAT: Moist, shaded woodlands or low, open ground; soil subacidic.

DISTRIBUTION: Occasional. Coles, Clark, Cumberland. Sec. 12 T.10N., R.8E.; Sec. 4 T.9N., R.12W.; Sec. 4 T.12N., R.10E.

ETHNIC COMMENTS: The genus, Onoclea, is an ancient Greek name used by Dioscorides, but not originally applied to this plant. Is is derived from

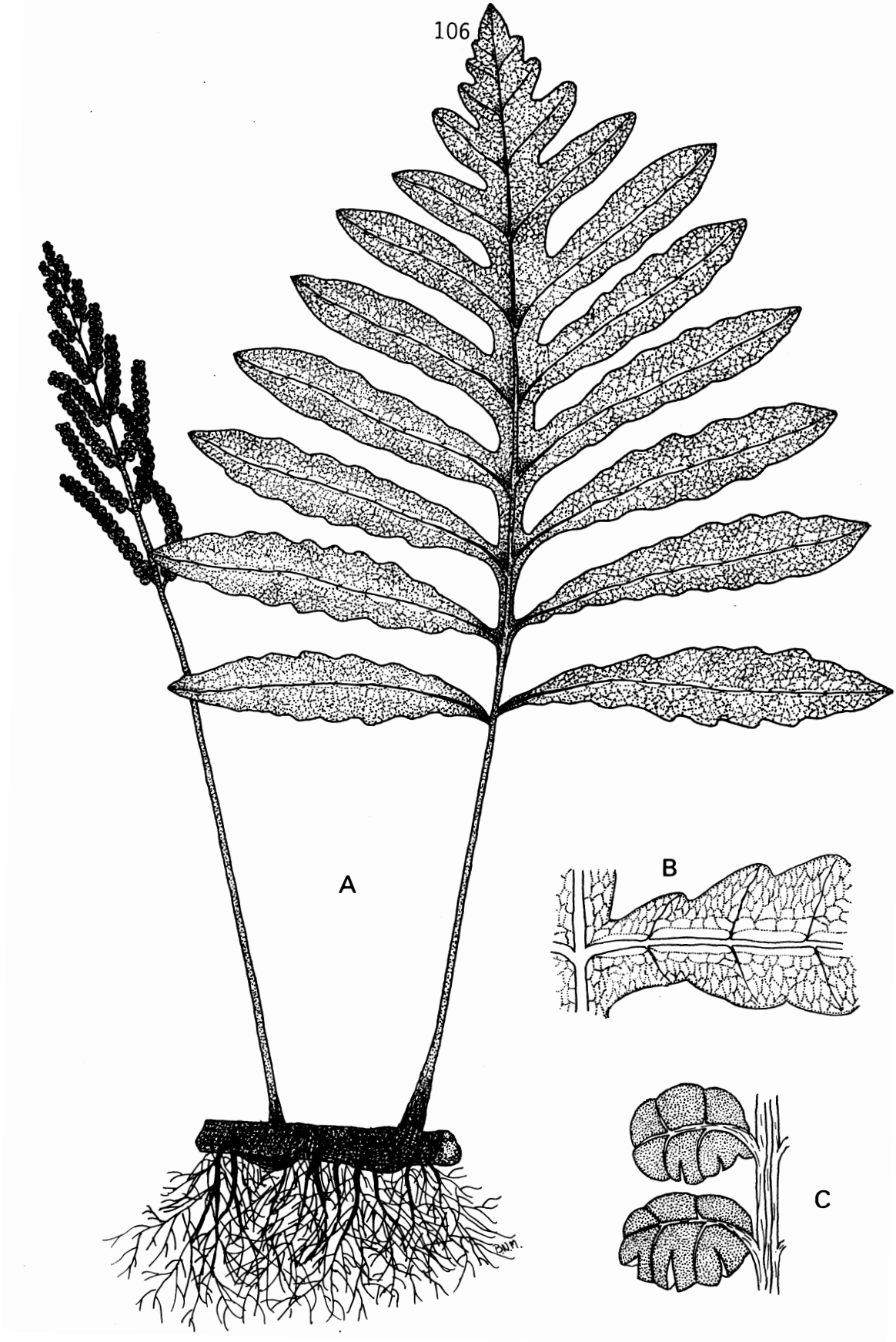
two words, meaning a vessel that closes or is closed, in reference to the berrylike fertile pinnules. The species name, sensibilis, is Latin meaning sensitive. It denotes the fact that the fronds wither when exposed to cold weather. Clute (1901) suggests that the name implies that the fronds wither when touched or cut. Bead Fern is actually a more appropriate name for this non-sensitive looking fern.

Shaver (1954) states that this is possibly the oldest living fern. It was represented in Eocene time by O. sensibilis var. fossilis Newberry, which differs very little from our present day plant.

Weiner (1972) reported that the Iroquois utilized the rhizomes as a food source during times of scarcity. One commercial recipe calls for removing the outer layer of the rhizomes and then stewing them in water. Practically any young, unopened frond can be used as a survival food. They have been sold as delicacies in the eastern U.S. where they were treated like asparagus. This fern is often used as an indicator for Ginseng (Panax quinquefolia).

Although easy to culture, it is not recommended for the wild flower garden because it tends to spread rapidly thus choking out more delicate plants. When attempting to start the plant from a piece of rhizome, care should be taken to plant it shallowly in rich soil that is kept constantly moist. Once established it forms a rather thick colony. The emerging reddish fiddleheads make for a most unusual sight in the early spring. The fertile leaves are occasionally used in dried floral displays.

Plate 19. Onoclea sensibilis. Figs. A. Habit, x1/4; B. Portion of sterile pinna, x1; C. Fertile pinnules, x5.



Onoclea sensibilis

Thelypteris Schmidel

type species: Thelypteris phegopteris (L.) Slosson

The plants in this genus are often combined with those in the genus Dryopteris. Thelypteris, which contains approximately 5 species, is considered to be cosmopolitan in distribution in the temperate and semi-tropical regions. All five species occur within the boundries of the continental U.S. There is one species present in East Central Illinois.

Thelypteris hexagonoptera (Michx.) Weatherby Plate 20.
= (Dryopteris hexagonoptera (Michx.) C.)

FOLK NAMES: Broad Beech Fern, Southern Beech Fern, Triangle Fern, Hexagon Beech Fern, Six-angled Polypody, Winged Beech Fern, Beech Fern, Ground Fern, Lady Fern

DESCRIPTION: Erect deciduous perennial from branching, creeping, scaly rhizome; leaves broadly triangular in outline, to 50 cm, bipinnatifid, petiole slender, smooth and straw-colored above, dark and scaly below, pinnae pubescent to glandular beneath, connected throughout by a winged, green rachis with white scales, margins of the pinnules crenate to entire; sori round, small, borne near the margins, indusium absent; spores brown. —— This fern exhibits considerable variation.

HABITAT: Moist, shaded, woodlands and slopes; soil rich, acidic to subacidic.

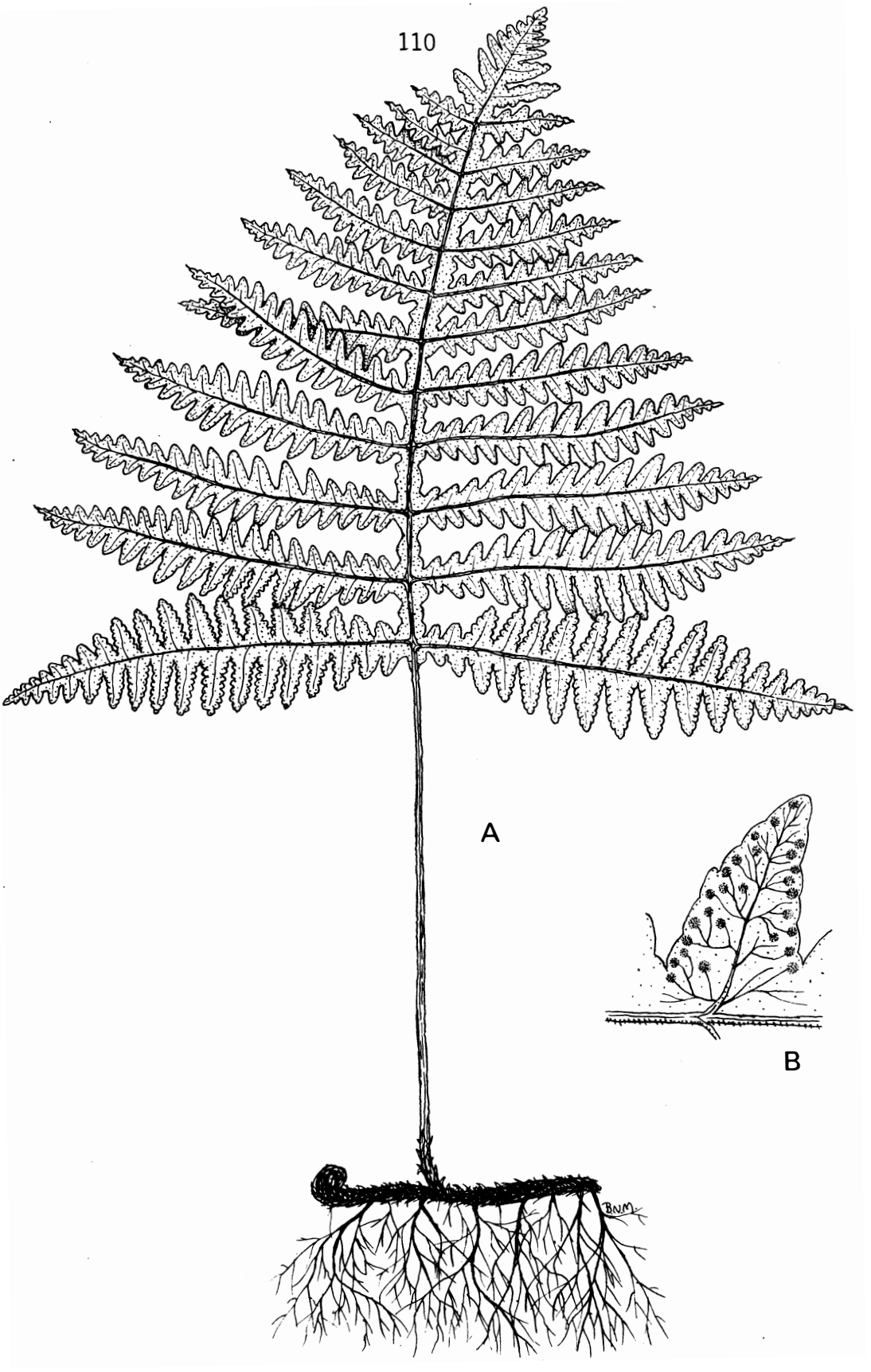
DISTRIBUTION: Occasional to common. Coles, Clark, Cumberland.

ETHNIC COMMENTS: The genus, Thelypteris, is from two Latin words thely, female, and pteris, fern; although the true Female Fern belongs in the genus Athyrium. The species, hexagonoptera, is derived from two Greek

words, hexagon, six-sided, and ptera, winged. It alludes to the shape and winged rachis of this fern. The crushed fronds emit a peculiar odor.

This fern is of no economic importance except as an ornamental. It is readily grown in a woodland situation if shallowly planted in rich soil that is kept moist and partially shaded. It sometimes is used as a seasonal potted plant. The rhizomes spread rapidly, so the need for additional space should be anticipated. Plants that grow in dense shade will generally have wide pinnae and a deep green color. Plants grown in sunlight are apt to be smaller, with narrower pinnae, and a yellow green color. Though it is usually killed by the first heavy frost, plants which survive turn a beautiful shade of gold. Because of its habitat preference, this plant is often used as indicator for Ginseng (Panax quinquefolia).

Plate 20. Thelypteris hexagonoptera. Figs. A. Habit, x1/2; B. Underside of portion of fertile pinna, x3.



Thelypteris hexagonoptera

Dryopteris Adans.

type species: Dryopteris filix-mas (L.) Schott

There are approximately 1215 species in this genus. The plants in this family are widely distributed but are most common in wooded areas. There are about a dozen species in the continental U.S. Three species are present in East Central Illinois.

KEY TO THE SPECIES OF Dryopteris

1 - Leaves bipinnate to tripinnate, the margins spinulose . . . . . 1. D. carthusiana

1 - Leaves once-pinnate, or rarely bipinnate, the margins scarsely or not at all spinulose 2

2 - Leaves coriaceous, crenate to entire, sori marginal . . . . . 2. D. marginalis

2 - Leaves membraneous to subcoriaceous, crenate to serrate, sori not marginal . . . . . 3. D. goldiana

Dryopteris carthusiana (Villars) H. P. Fuchs. Plate 21.

= (Dryopteris spinulosa (O. F. Muell.) Watt)

FOLK NAMES: Spinulose Wood Fern, Toothed Wood Fern, Spinulose Shield Fern, Shield Fern, Wood Fern, Common Wood Fern, Fancy Fern, Florist's Fern, Narrow Prickly-toothed Fern, Broad Buckler Fern, Lady Fern

DESCRIPTION: Erect, usually evergreen, perennial from stout, scaly, somewhat exposed, dark rhizomes; leaves to 75 cm, ovate-lanceolate to oblong in outline, bipinnate to tripinnate, petiole firm, brown to black at

base, green above, with brown scales throughout, rachis scaly towards the bottom, pinnae usually slanting upwards, elongate triangular, membraneous, margins spinulose, lower most pinnule of each pinnaethe longest; sori round, small, borne submarginally; indusium attached at center of sorus, reniform, smooth; spores dark brown

—— This is a highly variable plant that often presents problems for even the more skilled taxonomists. The difficulty is compounded due to the fact that the many varieties often crossbreed.

HABITAT: Moist, shaded woodlands and slopes, often associated with rock outcroppings; soil rich and subacidic.

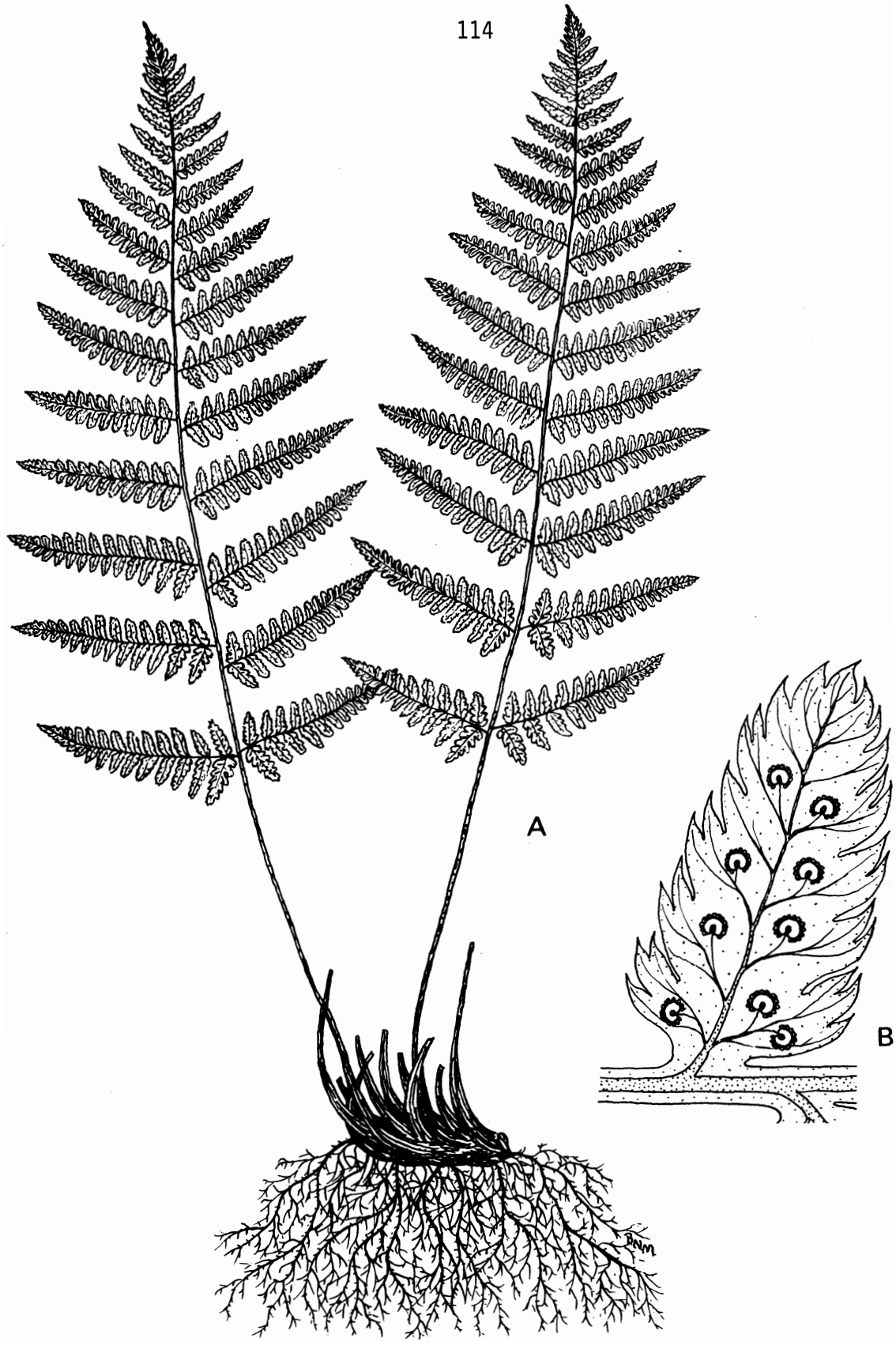
DISTRIBUTION: Occasional. Coles, Clark, Cumberland. Sec. 29 & 30 T.12N., R.12W.; Sec. 23 T.12N., R.9E.; Sec. 27 T.11N., R.9E.; Sec. 30, 31, & 32 T.11N., R.12W.

ETHNIC COMMENTS: The genus, Dryopteris, is from two Greek words, dryo, oak, and pteris, fern. The species name, carthusiana, is probably in honor of someone.

Grieve (1931) states that although this fern has no medicianl importance, it has been a filler in shipments of the Male Fern (Dryopteris filix-mas), a much used antihelmintic. Cobb (1956) reports that this fern is the greenery so commonly used by florists. Because of this use it is often called the Fancy Fern or Florist's Fern.

Like many ferns in this genus, the Spinulose Wood Fern is frequently used as an ornamental. However, it is less attractive than its relatives, primarily due to its thin, easily damaged leaves. When attempting to transplant this fern, care should be taken to ensure that the crown formed by the bases of the old petioles is not covered with soil. The site choosen should be at least partially shaded, moist, and protected.

Plate 21. Dryopteris carthusiana. Figs. A. Habit, x1/2; B. Underside of fertile pinnule, x7.



Dryopteris carthusiana

Dryopteris marginalis (L.) Gray Plate 22.

FOLK NAMES: Marginal Shield Fern, Marginal Fern, Marginal Wood Fern, Evergreen Wood Fern, Leather Fern, Leather Wood Fern, Shield Fern, Rock Fern

DESCRIPTION: Erect or ascending evergreen, from dark, stout rhizomes; leaves clumped, to one meter,ovate-lanceolate to oblong in outline, pinnate to bipinnate, petioles arising from a slightly elevated rootstock, brittle, grooved, brownish green with golden scales above, dark brown, densely scaly, and swollen at base, pinnae glabrous, coriaceous, dark green above, light green beneath, usually alternate, lanceolate, entire, serrate, or pinnatifid; sori round, large, borne marginally or nearly so; indusium attached at the center of the sorus, reniform, smooth; spores dark brown

—— This is a rather variable plant, with several named varieties.

HABITAT: Moist, shaded woods, and rocky streams, often at the base of trees; soil subacidic.

DISTRIBUTION: Occasional. Coles, Clark, Cumberland. Sec. 12 T.12N., R.13W.; Sec. 18 T.12N., R.10E.; Sec. 24 T.12N., R.13W.; Sec. 19 T.12N., R.12W.; Sec. 11 T.11N., R.13W.; Sec. 30, 31, & 32 T.11N., R.12W.; Sec. 29 & 30 T.12N., R.12W.

ETHNIC COMMENTS: The species, marginalis, is Latin meaning placed upon or attached to the edge, in reference to the position of the sori.

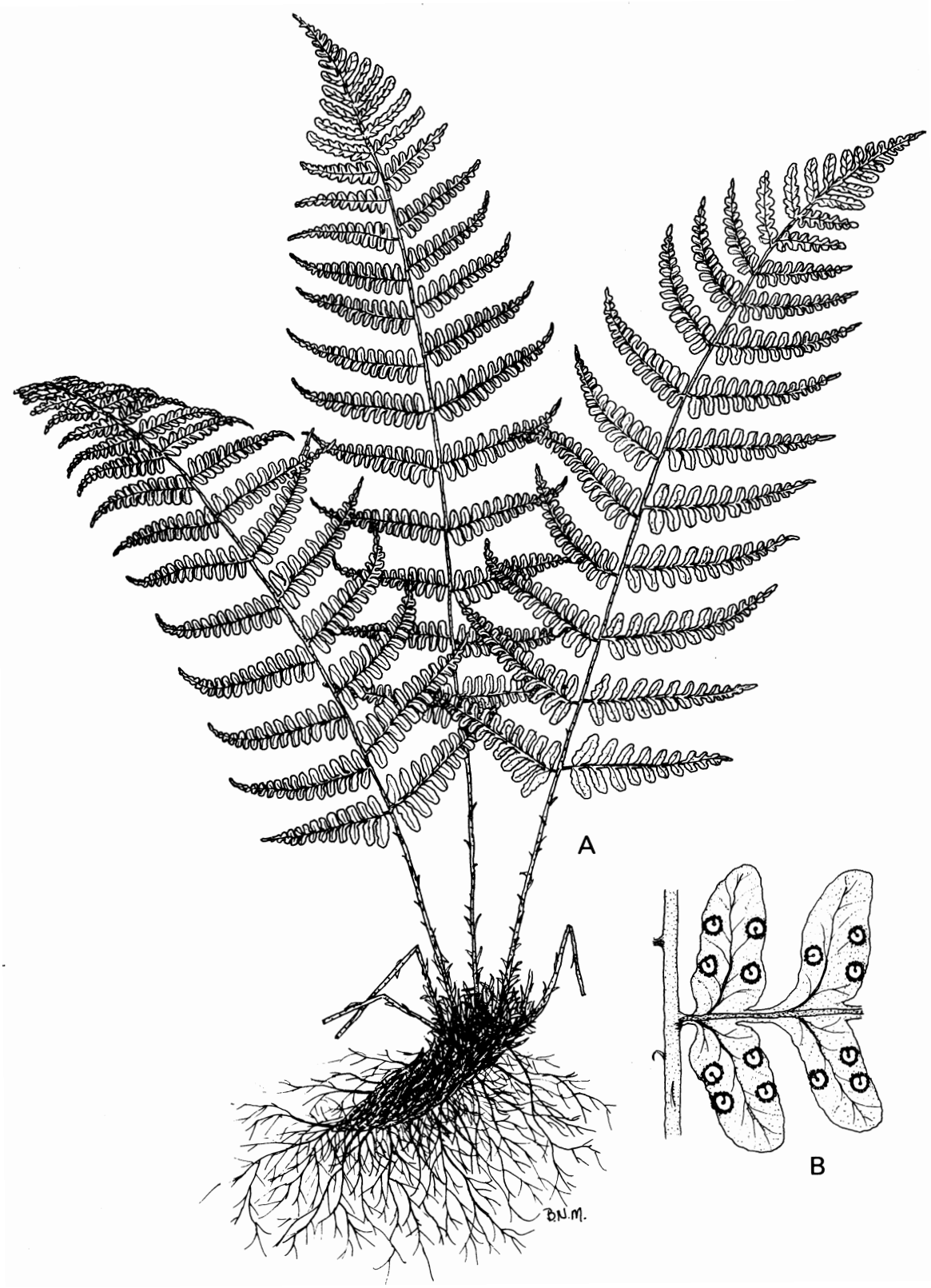
The rhizomes and petioles of this fern, according to Billington (1952), contain an oleoresin which has been used as a taenifuge. Because of the leathery, evergreen nature of the fronds of this fern, they have frequently been used in dried floral displays.

Thoreau says of this majestic evergreen:

> " . . . what means this persistent vitality? Why were these spared when the brakes and Osmandas were stricken down? They stay as if to keep up the spirits of the cold-blooded frogs which have not yet gone into the mud, that summer may die with decent and graceful moderation. Is not the water of the spring improved by their presence? They fall back and droop, here and there, like the plumes of departing summer, of the departing year. Even in them I feel an argument for immortality . . . Greenness at the end of the year, after the fall of the leaf, a hale old age. To my eye they are tall and noble as palm-groves, and always some forest nobleness seems to have its haunt under their umbrage. What virtue is theirs that enables them to resist the frost? How dear they must be to the chick-adee and the rabbit."

This evergreen fern is very easily grown. The best setting is a moist, shaded, well-drained woodland garden, The vertical rootstocks, which are composed of old petioles, remind one of a tree fern. In the late autumn, the leaves usually fall to the ground but retain their color and attachment to the rhizome. The new fronds appear the following spring from inside the circle delimited by the petioles of the fallen leaves. These croziers are densely hairy. This fern has been used to prevent or control erosion on slopes.

Plate 22. Dryopteris marginalis. Figs. A. Habit, x1/5; B. Underside of fertile pinnule, x2.



Dryopteris marginalis

Dryopteris goldiana (Hook.) Gray Plate 23.

FOLK NAMES: Goldie's Fern, Goldie's Wood Fern, Goldie's Shield Fern, Shield Fern, Wood Fern, Giant Wood Fern

DESCRIPTION: Erect evergreen, from stout, scaly, dark, short-creeping rhizome; leaves dark green, to one meter or more, ovate in outline, once-pinnate to bipinnate, petiole pale brown above, with light brown scales, scales darker, larger and more numerous below, pinnae usually opposite, broadly lanceolate, deeply pinnatifid, membraneous to subcoriaceous, crenate to serrate; sori round, to two mm in diameter, borne near the midvein; indusium attached at center of the sorus, reniform, smooth; spores dark brown.

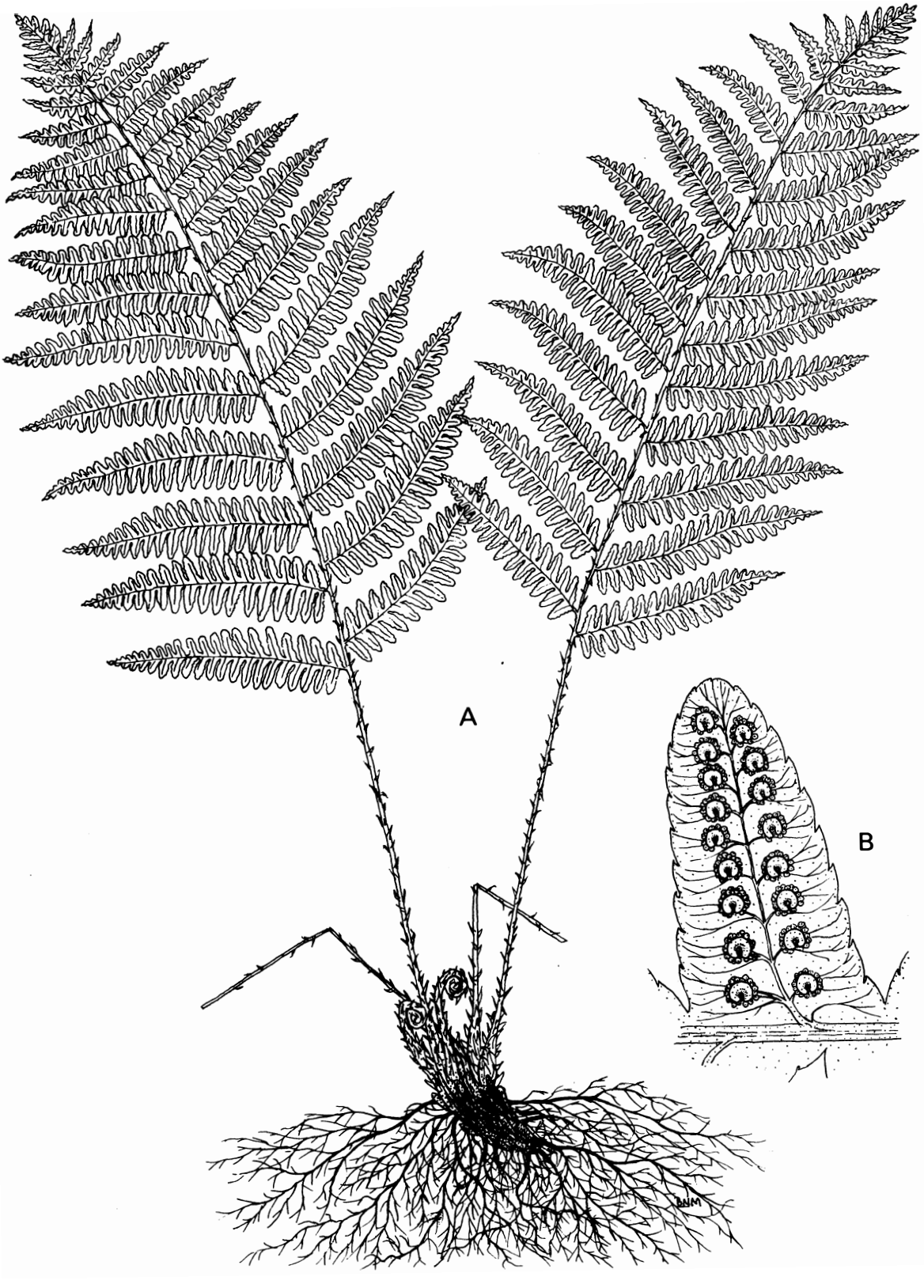
HABITAT: Moist, shaded woods, slopes, and stream banks; soil rich and subacidic.

DISTRIBUTION: Rare. Coles, Clark, Cumberland. Sec. 27 T.11N., R.9E.; Sec. 22 & 27 T.11N., R.9E.; Sec. 29 T.12N., R.12W.

ETHNIC COMMENTS: The species name of this large Wood Fern, goldiana, is in honor of John Goldie, an early American fern student.

There are no reported uses for this fern other than as an ornamental. This stately fern is easily cultured and makes a nice addition to any garden. In the optimum situation, its erect, dark green, fronds may reach nearly six feet high and over one foot broad. It does best in a moist, cool, shaded location with plenty of humus in the soil. When transplanting Goldie's Fern, care should be taken to avoid covering the crown formed by the old petiole bases with soil.

Plate 23. Dryopteris goldiana. Figs. A. Habit, x1/5; B. Underside of fertile pinnule, x 5.



Dryopteris goldiana

Asplenium L.

type species: Asplenium trichomanes L.

There are approximately 665 species in this genus. They have a very wide geographic distribution. There are about a dozen species within the continental U.S., four of these are reported from East Cental Illinois.

KEY TO THE SPECIES OF Asplenium

1 - Leaves simple, unlobed (rarely a single pair of lobelike auricles at the base); veins reticulate . . . . . 1. A. rhizophyllum

1 - Leaves pinnatifid to bipinnate-pinnatifid; veins free 2

2 - Rachis green throughout; leaves long attenuating, upper half lobed or undulatory, pinnatifid or barely pinnate at base . . . . . 2. A. pinnatifidum

2 - Rachis partly or entirely brown or black; leaves not long attenuating, usually pinnate throughout 3

3 - Leaves dimorphic, fertile ones erect, sterile ones smaller and spreading; pinnae auricled at base . . . . . 3. A. platyneuron

3 - Leaves uniform, usually spreading; pinnae usually not auricled . . . . . 4. A. trichomanes

Asplenium rhizophyllum L. Plate 24.

= (Camptosorus rhizophyllus (L.) Link.)

FOLK NAMES: Walking Fern, Walking Leaf, Wall Link Spleenwort

DESCRIPTION: Spreading evergreen, from short, slender, scaly rhizome; leaves to 30 cm, lanceolate, simple, entire or undulate, occasionally auriculate at the base, subcoriaceous, glabrous, apex long attenuating, often rooting at the apex or occasionally from basal auricles, veins near the margin are free, elsewhere reticulate, petiole dark brown and scaly at base, green and glabrous above; sori oblong or linear, mostly on the broad basal portion, scattered; indusium thin, laterally attached; spores brown.

—— There is a great deal of variation in the size and shape of this fern.

HABITAT: Shaded, moist andstone or limestone, rarely on earth or tree bases; soil circumneutral.

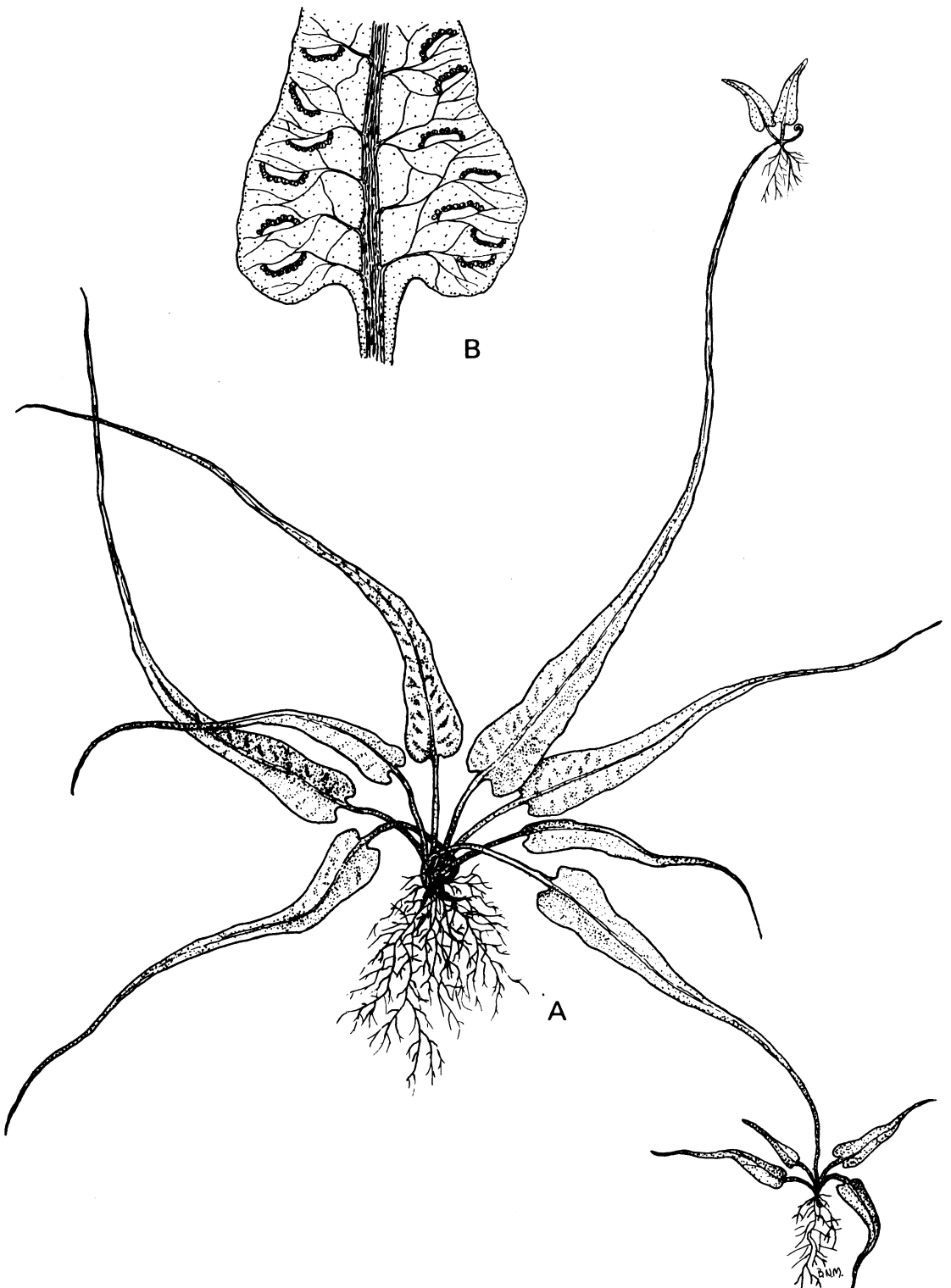
DISTRIBUTION: Rare to occasional. Coles, Clark, Cumberland. The collection is several years old. Repeated attempts to relocate it at this site have been unsuccessful. Sec. 27 T.11N., R.9E.; Sec. 29 T.12N., R.12W.; Sec. 30 & 31 T.11N., R.12W.; Sec. 5 T.9N., R.12W.; Sec. 14 T.11N., R.13W.; Sec. 27 T.12N., R.12W.; Sec. 19 T.12N., R.12W.; Sec. 18 T.12N., R.10E.

ETHNIC COMMENTS: The genus name, Asplenium, is from the Greek Asplenon, a name used by Dioscorides for a fern used to cure diseases of the spleen. This refers to the idea that herds which fed upon this plant were without spleens. Grieve (1931) quotes Gerard; "If the asse be opressed with melancholy he eats of the herbe and so eases himself of the swelling of the

spleen." The species name, rhizophyllum, is Latin meaning rooting (rhizo) leaf (phyllum). The folk name, Walking Fern, is in allusion to its habit of rooting at the tip of the leaves, thus giving it the appearance of "walking." Three or four generations are often connected in this manner.

This interesting plant, with its unique means of reproduction, makes a nice addition to the rock garden. However, it is very difficult to transplant. It does best in the chinks of moist, shaded limestone rocks and must be protected from slugs. It is suggested that the growing tips be used to start new plants. This is best done by removing a sod of the plants from an established colony and placing it in a rocky crevice which has been filled with humus and soil. It should be kept moist and shaded at all times.

Plate 24. Asplenium rhizophyllum. Figs. A. Habit, x1; B. Underside of fertile leaf, x3.



Asplenium rhizophyllum

Asplenium pinnatifidum Nutt. Plate 25.

FOLK NAMES: Pinnatifid Spleenwort, Lobed Spleenwort, Spleenwort, Walking Fern, Walking Leaf

DESCRIPTION: Ascending or spreading evergreen, from slender creeping rhizome; leaves to 25 cm, lanceolate in outline, glabrous, subcoriaceous, pinnatifid, graduating to merely undulate above, rarely with the lowest pair of pinnae distinct, lobes entire or crenulate, apex long attenuating, rarely rooting, petiole brown above, green below, glabrous throughout; sori elongate, often confluent; indusium laterally attached; spores brown. —— The leaves of this plant are highly variable. Specimens with lesser amounts of lobing are often confused with A. rhizophyllum but differ in having the veins free throughout. If more than the lowest pinnae is distinct, then the plant in question is probably another species. For a further treatment of this genus see Mohlenbrock (1967).

HABITAT: Crevices of sandstone cliffs.

DISTRIBUTION: Cumberland. Reported by Wunderle (1967), however, several attempts to relocate the species at the recorded location proved futile. Sec. 27 T.11N., R.9E.

ETHNIC COMMENTS: The species name, pinnatifidum, is Latin and refers to the degree of lobing exhibited by the leaves of this fern.

There are no recorded uses for this fern other than as an ornamental. It is very slow growing and difficult to transplant; however, once established it is no hard to maintain. The optimum conditions are very difficult to produce artifically. For this reason, along with its rarity, the plant should be left undisturbed or an attempt can be made to culture it from spores.

Plate 25. Asplenium pinnatifidum. Figs. A. Habit, x1; B. Underside of fertile pinna, x3.

Asplenium pinnatifidum

Asplenium platyneuron (L.) Oakes Plate 26.

FOLK NAMES: Ebony Spleenwort, Brown-stem Spleenwort, Stiff Spleenwort, Stiff Fern, Screw Fern, Spleenwort

DESCRIPTION: Erect or spreading evergreen, from short, thick rhizome; leaves once-pinnate, dimorphic, petiole and rachis purple brown, shining, glabrous; sterile leaves basal, prostrate and spreading, to 20 cm, oblong to lanceolate in outline, the fertile leaves erect, to 50 cm, lanceolate in outline, pinnae mostly alternate, subcoriaceous, glabrous, acute, serrate, with auriculate bases which overlap the rachis; sori numerous, usually borne near the midvein, elongated, often confluent; indusium laterally attached, whitish, usually covered by the massed sporanges; spores brown. —— There is much hybridization within this genus and species. Several plants with deeply incised or pinnatifid leaves and varied soral placement have been described. Young or small infertile plants of this species are often mistaken for the Maidenhair Spleenwort (A. trichomanes), which differs in that it lacks auricled pinnae.

HABITAT: Semi-shaded, dry woodlands, slopes, and thickets, often invading masonry; soil subacidic.

DISTRIBUTION: Very common. Coles, Clark, Cumberland.

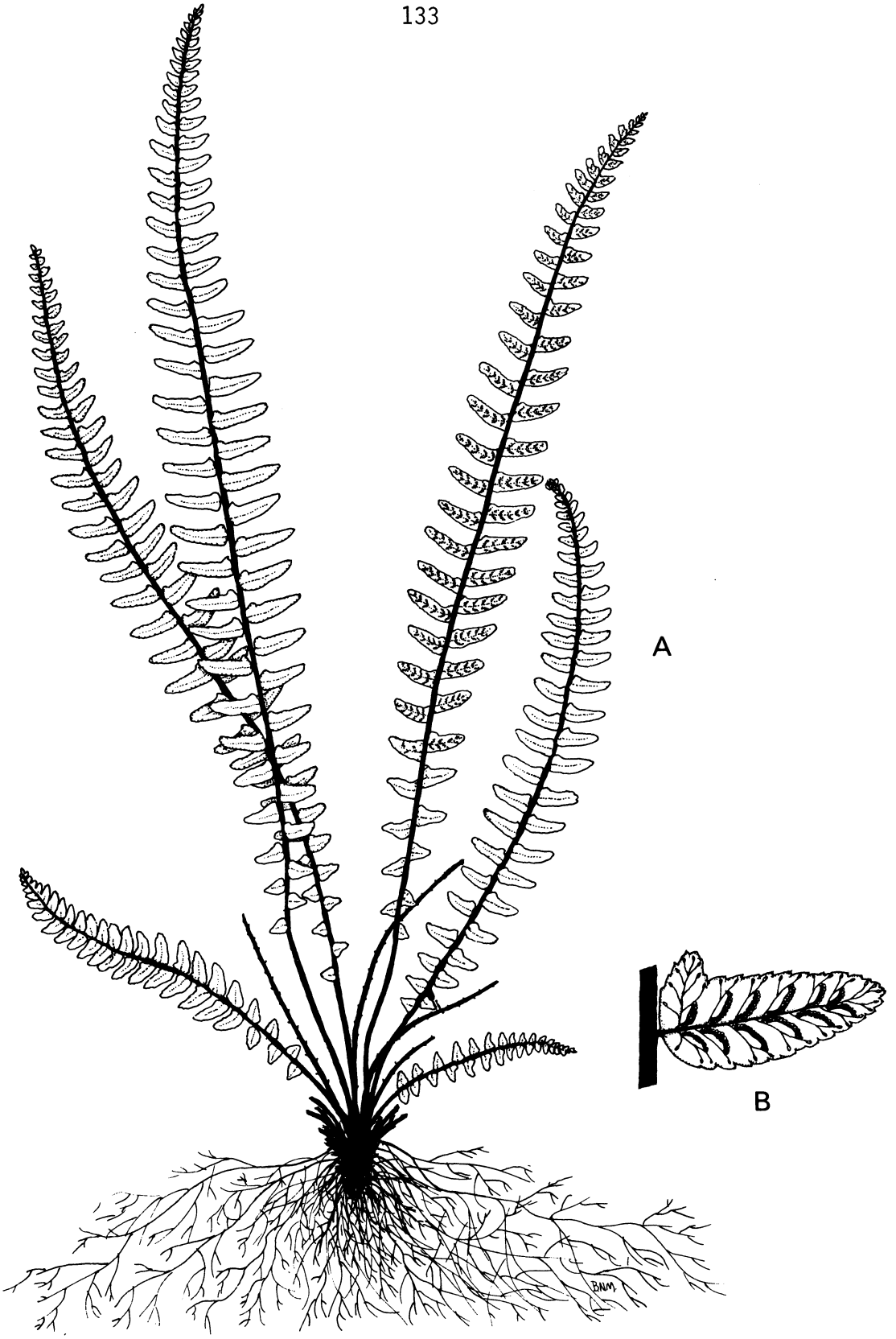
ETHNIC COMMENTS: The species name, platyneuron, is derived form two Latin words, platy, broad, and neuron, nerved, in reference to its supposedly broad rachis. This description is inappropriate because it was based on an old figure with an exaggeratedly broad rachis. The folk name Ebony Spleenwort alludes to the shiny dark rachis of this fern.

According to Clute (1901), this species, like the Maidenhair Spleenwort

(Asplenium trichomanes), is often sweet scented when drying. The odor seems to come from the roots or rhizome and often remains for some time.

Even though this is a fair-sized and common fern, there are no reported uses for it except as an ornamental. It is easy to culture, if not crowded by other plants. It occasionally roots from its apex. The best environment for growing this fern is well-drained, semi-shaded, rich in humus and free of fertilizer. The fronds usually face the sun even if it necessitates the twisting of its blade, thus the folk name Screw Fern.

Plate 26. Asplenium platyneuron. Figs. A. Habit, x1/2; B. Underside of fertile pinna, x3.



Asplenium platyneuron

Asplenium trichomanes L. Plate 27.

FOLK NAMES: Maidenhair Spleenwort, Wall Spleenwort, Rock Spleenwort, Maidenhair, Maidenhair Fern, Dwarf Spleenwort, Water Fern, Baby Fern, Common Maidenhair, English Maidenhair, Black-stemmed Spleenwort, Waterwort Fern, Waterwort, Bristle Fern, Black Maidenhair, Venus's Golden Locks

DESCRIPTION: Prostrate or erect evergreen, from slender, scaly rhizome; leaves to 25 cm, linear in outline, once-pinnate, petiole black to brown, glabrous, occasionally with basal scales, pinnae mostly opposite, subcoriaceous, nearly round, short petiolate, glabrous, margins crenate, rarely lobed, bases asymetrical, without auricles; sori few, elongated, indusium attached laterally; spores brown.

—— This fern is sometimes mistaken for the Black Spleenwort (A. resiliens) or young sterile specimens of the Ebony Spleenwort (A. platyneuron) from which it is distinguished by the absence of basally auriculate pinnae.

HABITAT: Moist, shaded crevices in cliffs, rarely on earth or tree bases,

DISTRIBUTION: Cumberland. Reported by Wunderle (1967); however, several attempts to relocate the species at the reported location proved futile. Sec. 27 T.11N., R.9E.

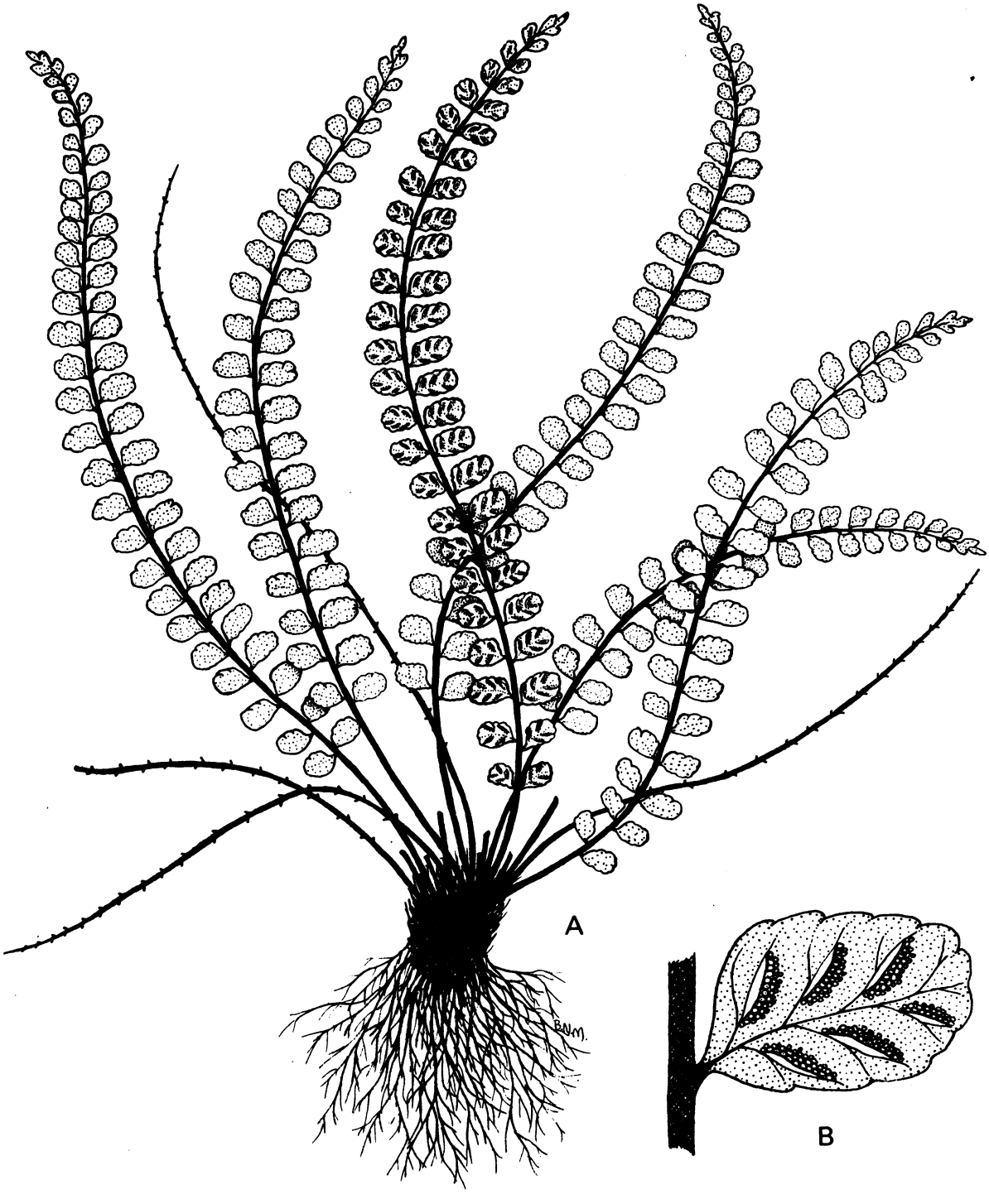
ETHNIC COMMENTS: The species, trichomanes, is an old Greek name for a group of ferns to which this plant was formerly thought to be related.

Grieve (1931) states that a tea made from the young leaves of this fern served as a demulcent and sweet-tasting expectorant. It is also reported to be useful as a laxative and for promoting the growth of hair. Clute (1901) reported that a potted specimen of this plant, when taken

from shade into sunlight, will make rapid motions back and forth in a direction at right angles to the plane of the frond. Only the fronds bearing sori were found to behave in this manner and these reacted for no more than a few minutes.

Although this delicate little rosette-forming fern is not hard to maintain, it is very difficult to remove for transplanting without damaging the fragile stems and leaves. It achieves maximum growth when placed in a rock crevice that is shaded and moist. When provided with these conditions, it is not unusual to find specimens with more than twenty fronds per clump. The pinnae remain green during the winter but fall in late spring. Interestingly, the rachises are not deciduous and can nearly always be found standing naked amidst the new growth.

Plate 27. Asplenium trichomanes. Figs. A. Habit, x1 1/2; B. Underside of fertile pinna, x6.



Asplenium trichomanes

Athyrium Roth

type species: *Athyrium felix-femina* (L.) Roth

There are approximately 180 species reported for this genus. They are mostly tropical in distribution, although some are common in the temperate regions. There are three species found in East Central Illinois.

KEY TO THE SPECIES OF *Athyrium*

1 - Leaves once-pinnate; pinnae entire . . . . . 1. *A. pycnocarpon*

1 - Leaves pinnate-pinnatifid to tripinnate; pinnae pinnatifid . . 2

2 - Leaves pinnate-pinnatifid; indusium light brown at maturity, parallel to the veins, sori straight or nearly so . . . . . 2. *A. thelypteroides*

2 - Leaves at least bipibnate; indusium dark brown at maturity, often crossing the veins, sori more or less curved . . . . . 3. *A. filix-femina*

Athyrium pycnocarpon (Spreng.) Tidestrom Plate 28.

FOLK NAMES: Glade Fern, Narrow-leaved Spleenwort, Narrow-leaved Asplenium, Swamp Spleenwort, Kidney Fern, Dagger Fern, Narrow-leaved Athyrium

DESCRIPTION: Erect, deciduous perennial from stout, scaly, creeping, dark brown rhizome; leaves light green, to one meter, lanceolate to elliptic-lanceolate, petiole green above, slightly scaly and dark at base, leaves once-pinnate, glabrous, dimorphic with entire margins; sterile leaves broad and delicate, fertile leaves narrower and firm, more erect than sterile and with a longer petiole; sori elongated, straight, borne in two rows, dark brown at maturity; indusium attached laterally; spores dark brown.

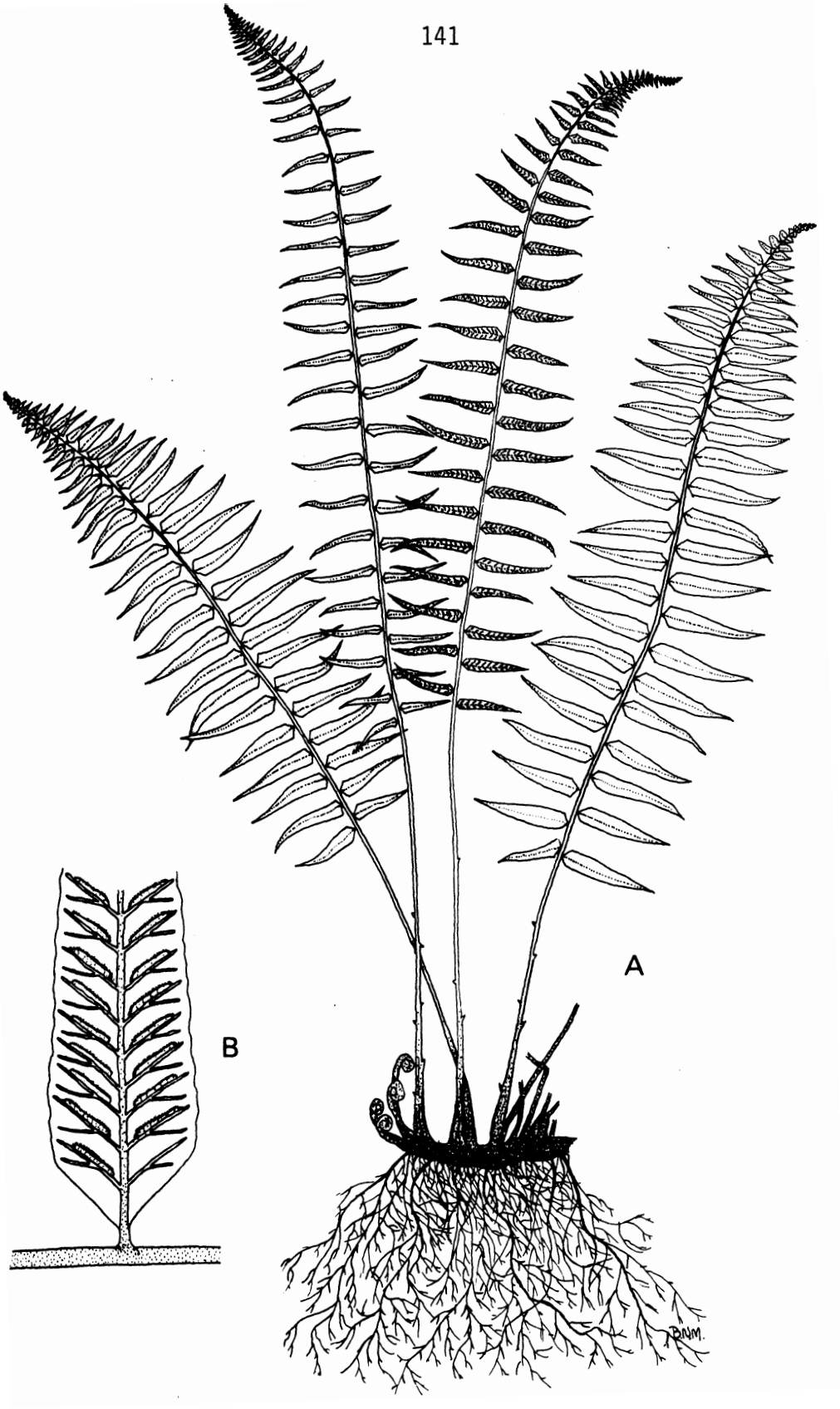
HABITAT: Moist, shaded woodlands and ravines; soil rich and subacidic.

DISTRIBUTION: Rare to occasional. Coles, Clark, Cumberland.
Sec. 20 T.12N., R.10E.; Sec. 13 T.13N., R.9E.; Sec. 12 T.10N., R.13W.; Sec. 27 T.11N., R.9E.

ETHNIC COMMENTS: The genus, Athyrium, is from the Greek words, a, without, and thureos, shield. It is in reference to the fact that the sporangia do not force back the outer margin of the indusia until quite late. The species, pycnocarpon, is derived from two Greek words, pycno, thick, and carpo, fruit. It is in allusion to the closely set or crowded sori. Several of the folk names indicate a close affiliation with the spleenworts (Asplenium spp.). This is due to a similiar soral arrangement, which has often resulted in their being classified together in the same genus.

The only recorded use for this fern is as an ornamental. It is easy to grow, if given a moist, rich, shaded location. Because it spreads slowly, it is an ideal foundation plant, though it is prone to damage from storms, frost, and a rust that discolors the leaves.

Plate 28. Athyrium pycnocarpon. Figs. A. Habit, x1/5; B. Portion of the underside of fertile pinna, x3.



Athyrium pycnocarpon

Athyrium thelypteroides (Michx.) Desv. Plate 29.

FOLK NAMES: Silvery Spleenwort, Silvery Glade Fern, Silver Fern, Silvery Athyrium, Silvery-stripe Fern

DESCRIPTION: Erect, deciduous perennial from slender, scaly, creeping, dark, rhizome; leaves to one meter, lanceolate to oblong-lanceolate in outline, pinnate-pinnatifid, petiole green and hairy above, dark and scaly below, the pinnae long tapering, glabrous except at the midvein, entire or denticulate; sori borne in two rows, elongated, straight or slightly curved; indusium silvery at first, turning light brown at maturity, laterally attached; spores dark brown.

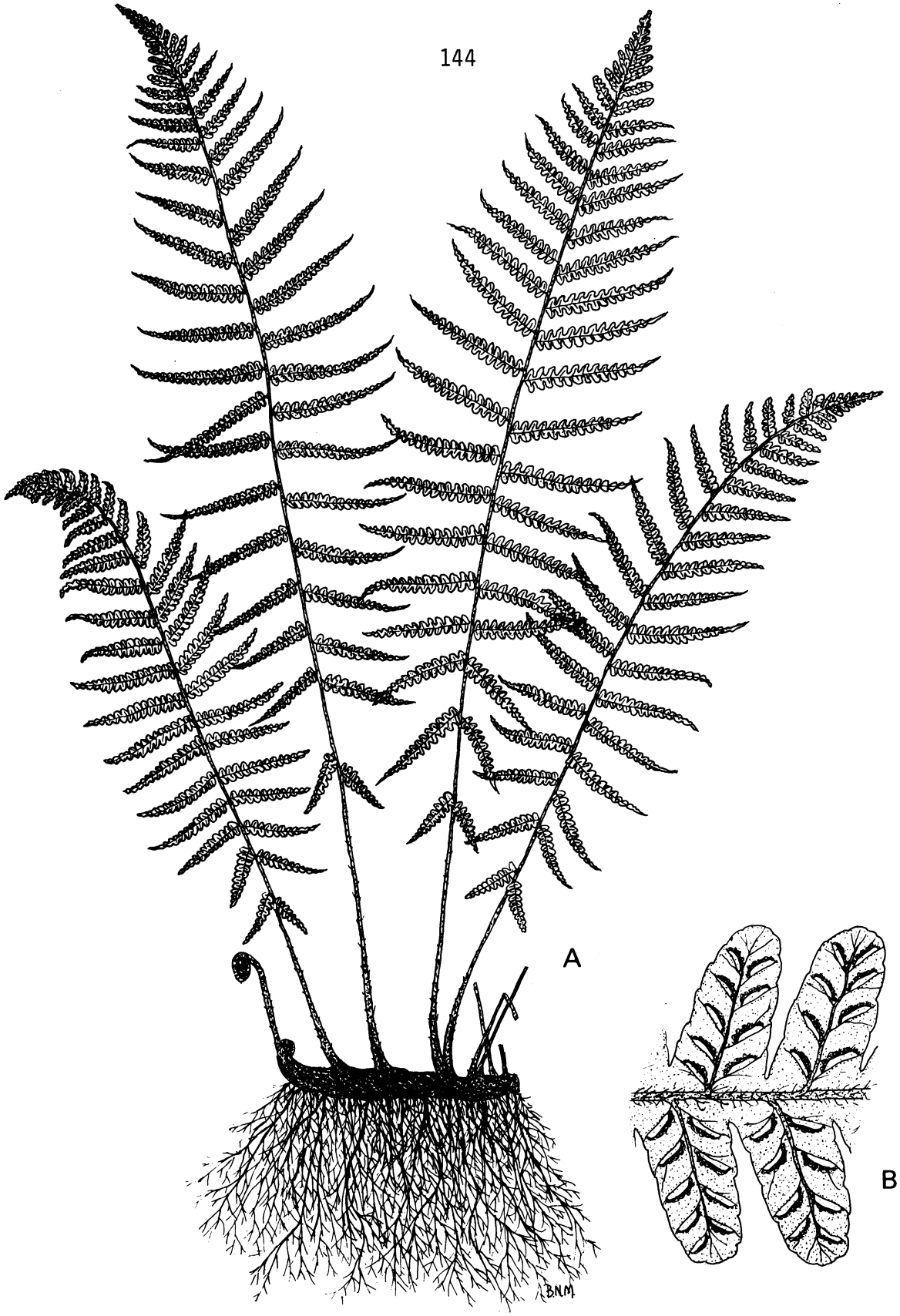
HABITAT: Moist, shaded woodlands, ravines, stream banks, rocky slopes, and occasionally in open thickets; soil rich and subacidic to acidic.

DISTRIBUTION: Occasional. Coles, Clark, Cumberland. Sec. 27 T.11N., R.9E.; Sec. 30 T12N., R.10E.; Sec. 8 T.9N., R.12E.; Sec. 29 & 30 T.12N., R.12W.; Sec. 13 T.11N. R.9E.; Sec. 30, 31 & 32 T.11N., R.12W.

ETHNIC COMMENTS: The species name, thelypteroides, is from two Greek words which indicate the resemblance between this plant and the Marsh Fern (Thelypteris palustris); thelypter, genus for the Marsh Fern, and oid, like. Most of the folk names refer to the color of the immature indusium.

The only recorded use for this fern is as an ornamental. It does well in any rich, shaded, moist location, if the rhizomes are not planted too deep. Unfortunately, it spreads rapidly. It does particularly well along stream banks in alluvial soil. When the plant is exposed to sunlight, the fronds tend to become thicker, narrower, more erect, yellow green, and produces more fertile pinnae.

Plate 29. Athyrium thelypteroides. Figs. A. Habit, x1/5; B. Underside of fertile pinnules, x3.



Athyrium thelypteroides

Athyrium filix-femina (L.) Roth var. rubellum Gilb. Plate 30.

FOLK NAMES: Lady Fern, Female Fern, Northern Lady Fern, Northeastern Lady Fern, Upland Fern, Backache Brake, Brake, Queen of Ferns

DESCRIPTION: Erect deciduous perennial, from stout, short, scaly, dark, creeping rhizome; leaves to 1.5 meters, oblong-ovate to oblong-lanceolate in outline, bipinnate to tripinnate, petiole slender, reddish, scaly near base, glabrous to glandular above, the pinnae broadest near the base, membraneous, pinnules shallowly lobed or serrulate; sori elongated, curved, distinct or confluent; indusium ciliate, attached laterally, dark brown at maturity; spores yellow-brown, papillate or smooth.
—— A highly variable plant with nearly 200 varieties reported; at least 40 variations have been reported in North America. This variety has a reddish tinted petiole and rachis, and the fourth or fifth pair of pinnae from the base the largest. Sterile plant are often confused with the Spinulose Wood Fern (Dryopteris carthusiana).

HABITAT: Moist, shaded or open woods, banks, slopes, thickets, and low lying areas; soil rich and subacidic.

DISTRIBUTION: Occasional. Coles, Clark, Cumberland. Sec. 30 T.11N., R.12W.; Sec. 29 & 30 T.12N., R.12W.; Sec. 27 T.11N., R.9E.

ETHNIC COMMENTS: The species name of this Athyrium, filix-femina, is a combination of two Latin words, filix, fern, and femina, female. The varietal name, rubellum, is Latin meaning somewhat red, in reference to the fact that the petiole, rachis, and sometimes the fronds are a reddish or purple color.

This fern has been a favorite of the poets, even though it is far surpassed in beauty by many other species. Parsons (1899) reports this

rather descriptive account of the haunts this fern favors. It was originally written by Edwin Lees.

"When in splendor and beauty all nature is crown'd,
The fern is seen curling half hid in the ground,
But of all the green brackens that rise by the burn,
Command me alone to the sweet Lady Fern.

Polypodium indented stands stiff on the rock,
With his sori exposed to tempest's rough shock;
On the wide, chilly heath Aquilina stands stern,
Not once to be named with the sweet Lady Fern.

Filix-mas in a circle lifts up his green fronds
And the Heath Fern delights by the bogs and the ponds;
Through their shadowy tufts though with pleasure I turn,
The palm must still rest with the fair Lady Fern.

By the fountain I see her just spring into sight,
Her texture as frail as though shivering with fright;
To the water she shrinks - I can scarsely discern
In the deep humid shadows the soft Lady Fern.

Where the water is pouring forever she sits,
And beside her the Ouzel, the Kingfisher flits;
There, supreme in her beauty, beside the full urn,
In the shade of the rock stands the tall Lady Fern.

Noon burns up the mountains; but here by the fall
The Lady Fern flourishes graceful and tall.
Hours speed as thoughts rise, without any concern,
And float like the spray gliding past the green Fern."

The following lines by Thoreau seem suited for this fragile, finely divided fern. "Nature made ferns for pure leaves to show what she could do in that line."

The name of Lady Fern is very ancient. It dates from the time when

several ferns were said to produce the mystic fern seed, so valued for its reputed ability to render its possessor invisible. This fern is also called Female Fern, though the name originally belonged to the Bracken (Pteridium). It likewise has many of the miraculous powers originally ascribed to the Bracken. Clute (1901) reported several interesting stories relating the wondorous properties of this fern and the seed it supposedly yielded. In one, a man passing through the woods got some seed in his shoes thus rendering him invisible. When he finally arrived home he entered but his presence was not noticed. When he spoke, his family was startled at the sound of the voice and suspected he was hiding. However, after hearing him walking about the room, they thought of the fern seed, and called to him to remove his shoes. Once he did the fern seed was lost and so was his invisibility.

In Russia, the fern seed was supposed to confer second sight. Clute tells of a man who went out to search for his cattle and got some fern seed in his shoes. He at once knew where his cattle were and discovered a buried treasure as well. Unfortunately, upon returning home to get a shovel with which to dig his find, his wife induced him to change his shoes. When he did, the fern seed fell out and was lost along with all all knowledge of the treasure. In parts of Africa it was believed that fern seed brought by the devil near midnight would enable one man to do the work of thirty.

Grieve (1931) recorded that it has been used as an antihelmintic with moderate success. The part utilized is the rhizome, from which an oil is obtained. Warning is given against taking to large a dosage as it can be injurious to the eyesight. Only the old rhizomes should be used; collected in the fall. Gunther (1945) states that the Cowlitz tribe of Washington state prepared a tea from the rhizomes which they drank to

ease body pains. The Makah used a decoction obtained from the stem to reduce or ease the efforts of women in labor with birth. The rhizomes and young croziers were used as food after being roasted and peeled. The Quinault ate this fern mixed with dried salmon eggs.

This highly variable fern is easy to culture. It does best in a moist, shaded woodland area with plenty of room to spread. Because of it delicate nature care should be taken to protect it from damage by weather and animals. When provided with optimum conditions it may get to be over six feet high. However, if grown in a deprived situation such as on a rocky ledge, the specimens may be less than one foot tall.

Plate 29. Athyrium filix-femina var. rubellum. Figs. A. Habit, x1/5; B. Underside of fertile pinnule, x6.

Athyrium filix-femina var. *rubellum*

Woodsia R. Br.

type species: Woodsia ilvensis (L.) R. Br.

There are 40 species listed for this genus. Most of these are located in temperate and alpine regions. There are about a dozen species found within the continental U.S. Only one species is present in East Central Illinois.

Woodsia obtusa (Spreng.) Torr. Plate 31.

FOLK NAMES: Common Woodsia, Blunt-lobed Woodsia, Obtuse Woodsia, Blunt-lobed Cliff Fern, Cliff Fern, Large Woodsia

DESCRIPTION: Erect perennial, occasionally evergreen, from short, creeping rhizome; leaves to 40 cm, oblong to ovate in outline, bipinnate to bipinnate-pinnatifid, petiole light brown, chaffy, glandular above, the pinnae glandular, mostly opposite, the ultimate divisions obtusely lobed; sori round, submarginal; indusium attached beneath the sorus, at first enclosing the sporanges, eventually splitting into several broad, denticulate segments; spores light brown.

—— This fern is often mistaken for the more common Fragile Fern (Cystopteris fragilis) from which it can be distinguished by its broad blunt pinnae and pinnules, and chaffy petiole.

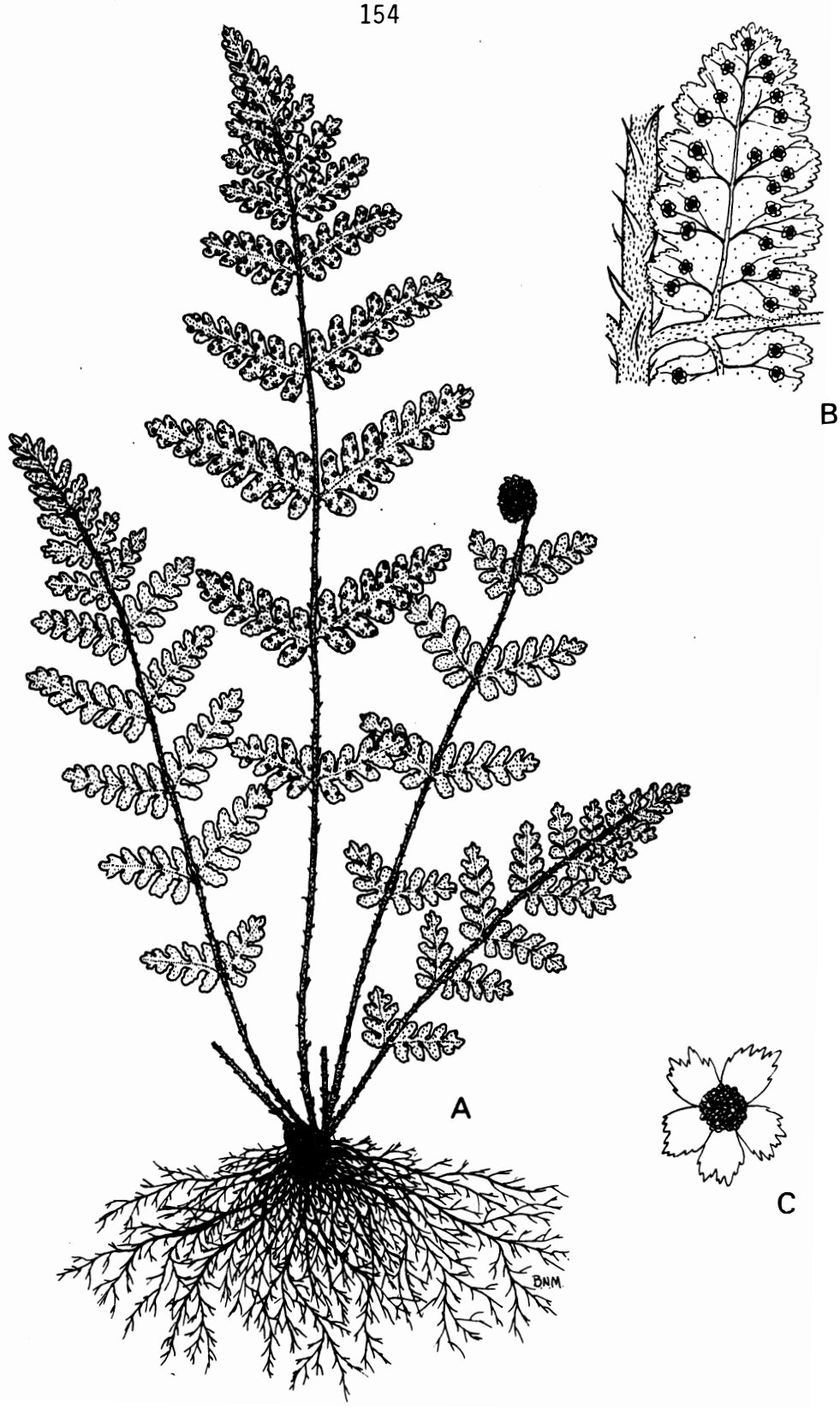
HABITAT: Shaded crevices in rocky woods, often on exposed sandstone ledges, occasionally invading masonry; soil, when present, subacidic.

DISTRIBUTION: Occasional. Coles, Clark, Cumberland. Sec. 18 T.12N., R.10E.; Sec. 27 T.11N., R.9E.; all along Big Creek and Mill Creek in Clark county.

ETHNIC COMMENTS: The genus, Woodsia, is Latin in dedication of Joseph Woods, an early English botanist. The species, obtusa, is from the Latin word obtus, dull or blunt, in reference to the blunt or rounded tips of the pinnae and pinnules.

There are no recorded uses for this fern except as an ornamental. It is readily grown in a rock garden and will flourish if kept shaded and moist.

Plate 31. Woodsia obtusa. Figs. A. Habit, x1; B. Underside of fertile pinnule, x6; C. Expanded stellate indusium, x20.



Woodsia obtusa

Cystopteris Bernh.

type species: Cystopteris bulbifera L. (Bernh.)

This genus contains about 18 species which are scattered throughout the temperate and tropical regions. There is one species found in East Central Illinois.

Cystopteris fragilis (L.) Bernh. var. protrusa Weatherby Plate 32.

FOLK NAMES: Fragile Fern, Brittle Fern, Brittle Bladder Fern, Bladder Fern, Bottle Fern, Fragile Bottle Fern, Common Bladder Fern, Cup Fern, White Oak Fern, Lowland Brittle Fern, Oak Fern

DESCRIPTION: Erect deciduous perennial, from elongate, creeping rhizome; leaves to 50 cm, bipinnatifid to bipinnate-pinnatifid, elliptic-lanceolate in outline, petiole slender, light brown, occasionally reddish brown at base, glabrous, pinnae membraneous, with scattered glandular hairs, margins denticulate; sori round, dark brown at maturity, scattered; indusium whitish, attached beneath the sorus, but to one side, round-ovate, entire, truncate, or shallowly divided at the apex, early withering; spores spiny, brown.

—— This is a very highly variable that often confuses the most skilled taxonomists. It is often mistaken for the less common Woodsia (Woodsia obtusa), which has broad blunt pinnae and pinnules and scaly to chaffy petioles.

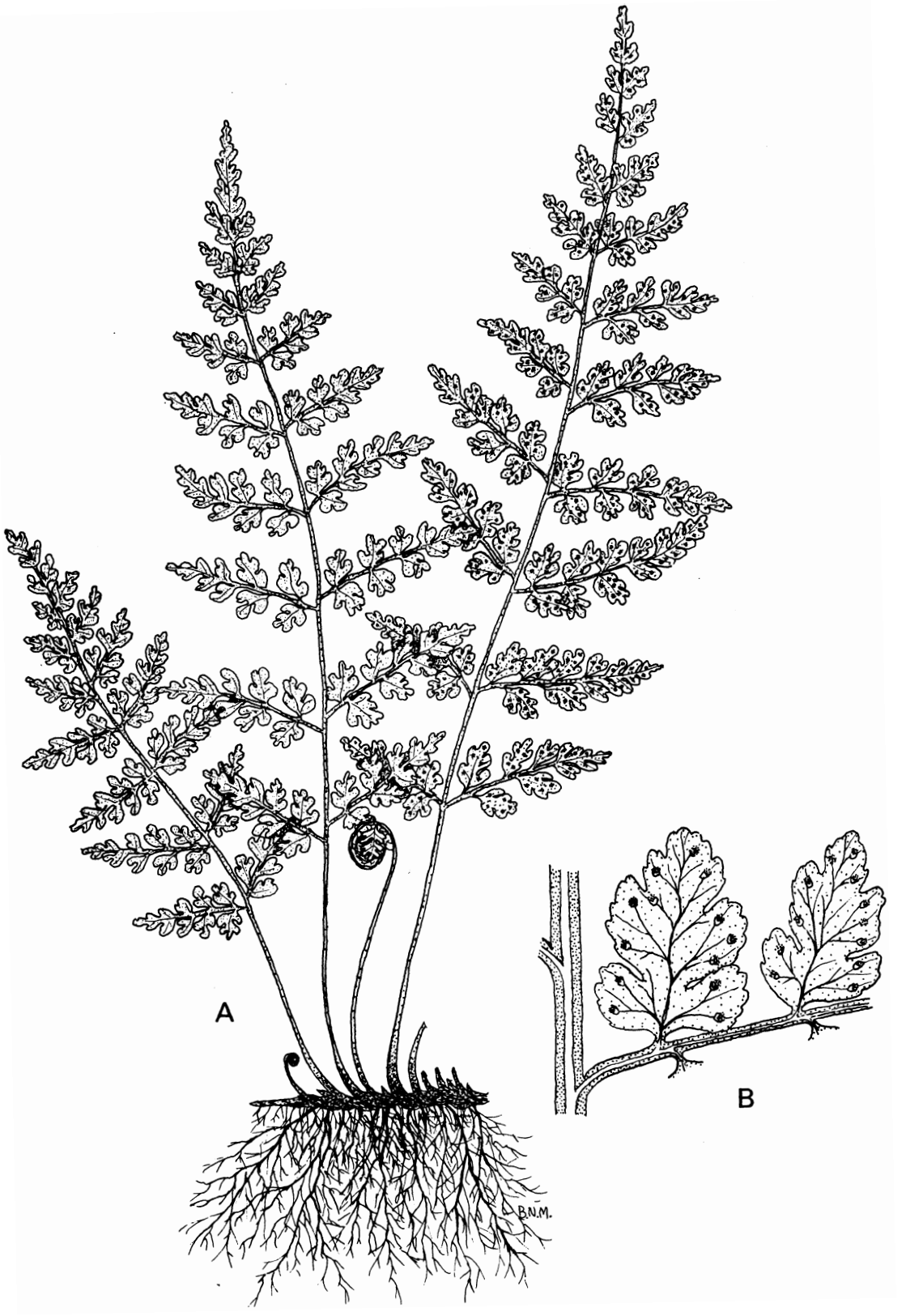
HABITAT: Moist, shaded woodlands; soil circumneutral to subacidic.

DISTRIBUTION: Very common. Coles, Clark, Cumberland. This is, without a doubt, our most common fern.

ETHNIC COMMENTS: The genus, Cystopteris, is from the Greek words cystis, a bladder, and pteris, fern, in reference to the inflated indusium. The species name, fragilis, is Latin meaning fragile. It denotes the small, delicate nature of this fern. The varietal name, protrusa, is Latin meaning thrust out or extended. It describes the rhizome which is prolonged beyond beyond the point where the fronds are attached.

There are no recorded uses for this very common fern except as an ornamental. It is easily cultured in either a garden or terrarium. though it must be kept moist and shaded or it will shrivel and die. This is one of the first plants to appear in the spring. However, the fronds tend to become dilapidated by summer, hence the name Fragile Fern.

Plate 32. Cystopteris fragilis var. protrusa. Figs. A. Habit, x1/2; B. Underside of fertile pinnules, x4.



Cystopteris fragilis var. *protusa*

MARSILEACEAE - WATERCLOVER FAMILY

Perennial aquatic or marsh plants with slender creeping rhizomes, rooting in mud and usually partly submerged, with slender, often elongate branching roots; leaves erect, spreading, or floating, simple or with 2-4 pinnae, fan-shaped; monoecious, heterosporous; sporocarps hard, bean-shaped, borne laterally or at the base of the petioles, stalked, solitary or numerous; sporocarp actually a modified leaf folded together, containing 2 rows of indusiated sori.

A family of wide geographic distribution. It contains three genera, of which only one is found in East Central Illinois.

Marsilea L.

type species: Marsilea quadrifolia L.

This genus, with more than 65 species, is most common in temperate and tropical areas. One species is found in East Central Illinois. It is an introduced plant that has persisted.

Marsilea quadrifolia L. Plate 33.

FOLK NAMES: Waterclover, Pepperwort, European Marsilea, Water Shamrock, Rhizocarps

DESCRIPTION: Perennial from submersed, slender, creeping rhizomes; petioles to 30 cm or more, slender, glabrous; leaves quadrifoliate, glabrous or nearly so; sporocarps ellipsoid, punctate, usually 2-3, long-stalked, stalk arising from near the base of the petiole, yellow brown and hairy when young, becoming glabrous and dark purple when mature.

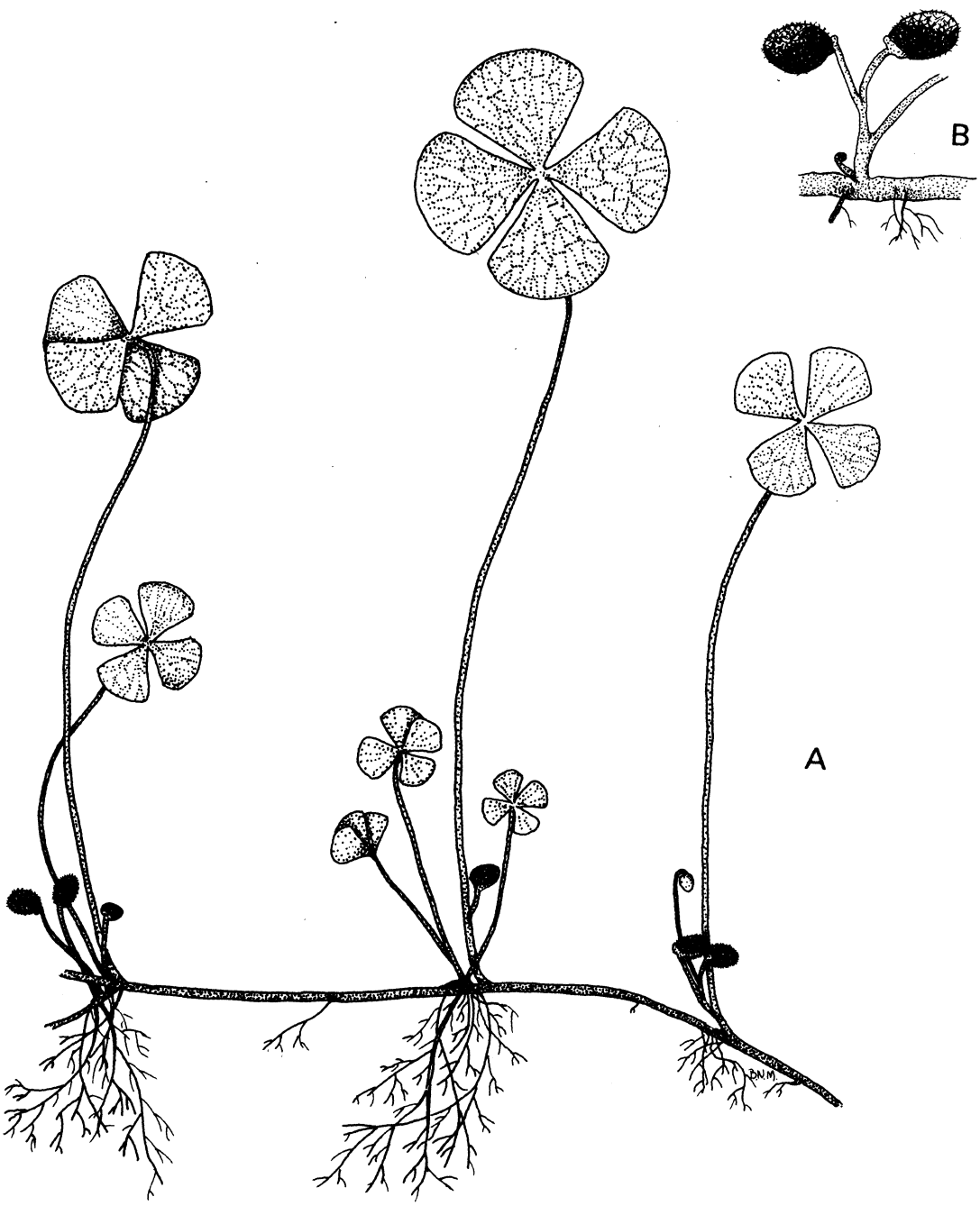
HABITAT: Still bodies of water.

DISTRIBUTION: Very Rare. Coles. Introduced into pond at Eastern Illinois University. Persisting and spreading to nearby lakes and ponds. Sec. 22 T.12N., R.9E.; Sec. 30 T.12N., R.10E.

ETHNIC COMMENTS: The genus, Marsilea, is in honor of Luigi Fernando Conte Marsigli, an Italian naturalist, The species, quadrifolia, is from two Latin words, quadri, four, and folia, leaves. It is descriptive of the fourparted leaves which resemble the leaves of Clover and Wood Sorrel.

Uphoff (1968) reported that the sporocarps and leaves are occasionally consumed as food. It is also used as a novelty for aquaria and pools. It is easily grown in still water, rapidly spreading once established.

Plate 33. Marsilea quadrifolia. Figs. A. Habit, x1; B. Stalked, paired sporocarps, x2.



Marsilea quadrifolia

SUMMARY

As a result of extensive field and herbarium investigations the total number of ferns reported from the Illinois counties of Coles, Clark, and Cumberland is now thirty-three. This is two more than recorded by Mohlenbrock and Ladd (1978). The newly reported species are Lycopodium flabelliforme (Fern.) Blanch. and Dryopteris goldiana (Hook.) Gray. Lycopodium flabelliforme was found at the edge of a wooded area just west of Casey, in Cumberland; while Dryopteris goldiana was found along Big Creek, north of Rocky Branch in Clark and in a wooded ravine along the Embarrass eight miles south of Charleston in Coles county.

There were new localities for several species already reported from the region. These increase the species count of all three counties (see Table 1). The number of new species reported was two from Coles (Dryopteris goldiana (Hook.) Gray and Dryopteris carthusiana (Villars) H. P. Fuchs), six from Clark (Dryopteris goldiana (Hook.) Gray, Dryopteris carthusiana (Villars) H. P. Fuchs, Pteridium aquilinum (L.) Kuhn. var. latiusculum (Desv.) Underw., Athyrium pycnocarpon (Spreng.) Tidestrom, Botrychium dissectum Spreng. var. dissectum, and Ophioglossum vulgatum L. var. pseudopodum (Blake) Farw.), and five from Cumberland (Lycopodium flabelliforme (Fern.) Blanch., Botrychium dissectum Spreng. var. dissectum, Ophioglossum vulgatum L. var. pseudopodum (Blake) Farw., Equisetum laevigatum A. Br., and Asplenium rhizophyllum L.). In addition, there were new localities recorded for several already reported species. Unfortunately, some plants previously reported from the region were not found after extensive searching.

The areas best suited for fern growth are usually undisturbed, shaded, and moist. For this reason and because large sections of this

region are subject to heavy agricultural activity, the majority of the specimens were found in wooded ravines, and on rock walls or soil banks associated with creeks and rivers. Most of these plants would not have suitable environmental conditions for development without the relief provided by the erosion induced by the streams and moraines which dissect this region. About the only ferns found on the till plain north of the Paris moraine were the common weedy species such as: Equisetum arvense L., Equisetum hyemale L. var. affine (Engelm.) A. A. Eaton, Botrych ium virginianum L. (Sw.), Adiantum pedatum (Tourn.) L., Cystopteris fragilis (L.) Bernh. var. protrusa Weatherby, Asplenium platyneuron (L.) Oakes, and Polystichum acrostichoides (Michx.) Schott.

Unreported ferns which are possibly present in the region include: Osmunda regalis L. var. spectabilis (Willd.) Gray, Cystopteris bulbifera (L.) Bernh., Thelypteris palustris Schott var. pubescens (Laws.) Fern., other members of the genus Dryopteris, and varieties of Cystopteris fragilis besides protrusa, and Cystopteris x tennesseensis Shaver.

A few words should be spent relating the extreme degree of variability in both size and shape exhibited by many of the species discussed in this paper. Among the most notable were Cystopteris fragilis (L.) Bernh., Equisetum hyemale L., and Botrychium virginianum (L.) Sw.

A part of this study involved a compilation of the various folk or common names. These lists are by no means complete but they do give one an idea of the amount of potential confusion which could result by not using scientific names to describe the plants. For example, if the name Lady Fern were given, it could indicate any one of seven ferns treated in this study.

Table 1. Summary of the Distribution of Ferns in Coles, Clark, and Cumberland Counties in Illinois.

	Co	Cl	Cu
Lycopodium lucidulum var. lucidulum	X	X	X
Lycopodium flabelliforme			X
Selaginella apoda	X		
Equisetum arvense	X	X	X
Equisetum variegatum	X		
Equisetum hyemale var. affine.	X	X	X
Equisetum laevigatum	X	X	X
Equisetum x ferrissi	X		
Botrychium virginianum	X	X	X
Botrychium dissectum var. dissectum	X	X	X
Botrychium dissectum var. obliquum	X	X	X
Ophioglossum vulgatum var. pseudopodum	X	X	X
Osmunda claytoniana	X	X	X
Pteridium aquilinum var. latiusculum	X	X	
Adiantum pedatum	X	X	X
Cheilanthes lanosa			X
Polypodium vulgare var. virginianum		X	
Polystichum acrostichoides	X	X	X
Onoclea sensibilis	X	X	X
Thelypteris hexagonoptera	X	X	X
Dryopteris carthusiana	X	X	X
Dryopteris marginalis	X	X	X
Dryopteris goldiana	X	X	
Asplenium rhizophyllum	X	X	X
Asplenium pinnatifidum			X

	Co	Cl	Cu
Asplenium platyneuron	X	X	X
Asplenium trichomanes			X
Athyrium pycnocarpon	X	X	X
Athyrium thelypteroides	X	X	X
Athyrium filix-femina var. rubellum	X	X	X
Woodsia obtusa	X	X	X
Cystopteris fragilis var. protrusa	X	X	X
Marsilea quadrifolia	X		
TOTAL	28	25	26

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