VOLUME 1, NUMBER 5

DECEMBER 1974

Fiddlehead Forum

Bulletin of The American Fern Society

THE FALL FERN GARDEN

Two hard freezes have halted growth for this season and the oak leaves have followed the red maples in tucking the ferns to bed for the winter. The male fern, marginal shield fern, and crested wood fern are as green as ever, but in the autumn breeze the maidenhair waves farewell to us with its fading yellow-green fingers. The more fragile interrupted fern, lady fern, and netted chain fern are curled and crisp and brown while the stalked grape clusters of the sensitive fern's fertile fronds stand stoically at attention against the early threatening blasts of winter. The royal fern still displays its golden oval segments, while the halberd mother fern, planted outside in the summer, remains green beneath the brown leaves, awaiting its fatal destiny in the month to come.

QUESTION BOX

Q: Can you tell me whether there is a species of red fern which grows natively in the United States? We have a folklore story about an Indian, apparently in the Tennessee-Kentucky Appalachian area, who was given the task of finding a red fern before he would be permitted by the tribe to marry the maiden he loved. After many perilous adventures, he found the fern, returned to the tribe, and, of course, married the girl. Is there really such a fern? Incidentally, I recently saw an ad for a movie entitled "Where the Red Fern Grows."

A: There are two groups of ferns, the genera Adiantum (maidenhair ferns) and Blechnum, which usually have pink fronds in their juvenile stages. The color ranges from salmon to red or maroon, making some species exceptionally beautiful. In every case, however, the green of the mature leaf eventually dominates. The widespread maidenhair fern, Adiantum pedatum, of North America is not the most brilliantly colored species, but it does illustrate the condition. Perhaps this was the Indian's solution.

FRONDLY FERN FUN

Kenneth DeNault of Cedar Falls, Iowa sends us the following:

An indoor gardener whose eagerness exceeded his skill was continually disappointed by the sickly state of his ferns which, with the best intentions, he overfed, overwatered, and overcultivated. However, following his absence on a short vacation, he returned to find his fern trays full and vigorous. Puzzled, he sought the reason for the change from a more successful horticulturist. The knowledgeable grower, aware of his friend's tendency to kill plants with kindness, only replied, "absence makes the frond grow heartier."

ASPLENIUM PLATYNEURON FORMA HORTONAE IN CONNECTICUT

You rarely expect to turn up something new on a routine field trip of your state Botanical Society. To be sure, as leader for the September field trip of the Connecticut Botanical Society, I had made a preliminary reconnaissance of the area in the northwest corner of the state in the village of Lime Rock and found enough variety of plant material to suggest that the trip would be rewarding. Two large trees of Magnolia acuminata, the cucumber tree, though not completely new for the state, would probably be new to many of the members.

We laid out a route which would cover a considerable variety of terrain from the limy banks of the Salmon Creek to dry schist ledges. In all of the various sites there were ferns of interest from the bulblet bladder fern along the creek to obtuse woodsia on the dry ledges, the latter in a form closely approaching the rusty woodsia. On the same dry ledge area beneath oak and red cedar were numerous plants of the ebony spleenwort.

On the day of the field trip we spent some time inspecting the woodsias and spleenworts and the associated Selaginella rupestris. As we were advancing from there to a higher ledge for a long view of the Taconic Range to the northwest, one of our members, who had wandered a little way off on his own, called me over to inspect a fern growing in among a group of Asplenium platyneuron. It was obviously, because of its carriage with erect fronds in the center and decumbent fronds at the base, a member of this species but the texture and cutting of all the fronds was entirely different. The erect fronds were thin in texture, of a pale green color, with the pinnae deeply cut to the midvein and even these divisions incised. The basal fronds were also lacily cut with dense overlapping pinnae. The erect fronds though tall and lusty, were sterile.

A reference to the eighth edition of Gray's Manual revealed the rare existence of forma hortonae with characters rather similar to, but not identical with, our specimen.

At a later date an erect and decumbent frond of the plant were compared with two specimens of f. hortonae in the herbarium of The New York Botanical Garden and with the description and plate in the issue of Rhodora in which the form was first described and named. Our plant would clearly fall under this designation but might be thought of as an extreme example of the forma. Two fronds from the plant have been deposited in the New York Botanical Garden herbarium.

The plant itself has been collected from the wild and is being carefully grown in the hope of being able to propagate it vegetatively. I am indebted to Dr. Armand Oppenheimer of Lime Rock, Connecticut, on whose property the plant was growing, for his kind permission to dig the specimen with the promise that if there is success in propagation he will have for his garden the first of the propagations.

The fact that this sterile form has appeared spontaneously in widely separated locations and over a considerable time span, rare as its occurence may be, raises some interesting speculations about the genetic makeup of the species and its variants.--H.L. Foster, Falls Village, CT 06031.

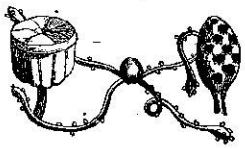
LESSONS IN PTERIDOLOGY V. HORSETAILS

by Richard L. Hauke

One group of plants included with the ferns under the heading of Pteridophytes is the horsetails. They are called "fern allies" because, like the ferns, they are vascular cryptogams, vascular plants but with hidden sexual reproduction. The reproductive structures are actually not hidden. If one knows where and when to look for them. The horsetails have a life cycle similar to that of ferns, with spores growing into gametophyte plants. The green, free-living gametophyte or prothallus produces the sex organs, which produce the gametes, egg and sperm. These in turn fuse to form a zygote and eventually a sporophyte. However, there are many differences in the form and structure of sporophyte, spores, and gametophyte between ferns and horsetails, and apparently these indicate that the horsetails and ferns represent different lines of evolution. The idea of "fern allies" should be used with caution.

The living members of the horsetail group all belong to a single genus, Equisetum. There are 15 species in the world, as well as numerous hybrids, some very widespread and common. The most characteristic feature of this genus is the presence of small leaves in a whorled arrangement. This means there are several leaves attached at one point or node on the stem, and in Equisetum they are fused into nodal sheaths. Branches develop between leaves, another unique feature, but in some species the branch buds remain dormant and so they appear unbranched, unless injury or old age forces the buds to grow. Generally speaking, the branched species are called horsetails, and the unbranched ones scouring rushes. Other names, such as "pipes" or "snake grass", may be used for certain species. Both stem and branches are marked with longitudinal ridges and grooves. The ridges continue into the leaves at the nodes, and often have silica (glassy) projections along them. The grooves have stomates, in lines or bands, sunken or superficial, and these differences help to identify the species. The internal tissue arrangement is related to these ridges and grooves, and also may differ among species and be useful in identification.

Underground, the genus Equisetum has a rhizome system, usually very extensive and of several layers of horizontal rhizomes connected by vertical rhizomes. Roots grow from the nodes of the rhizome, in the same positions as branches from the aerial stem. In some species special branches of the rhizome develop as thick, starch-filled, structures like tubers. The rhizome system, and tubers when present, aid in vegetative propagation from pieces of rhizome hauled in with the road fill.

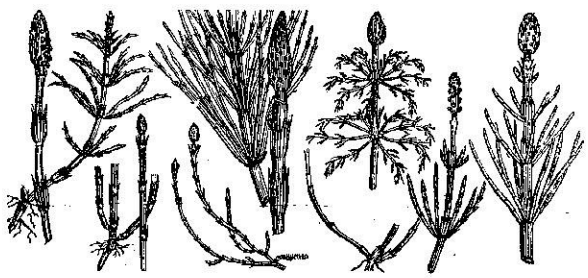


Sexual reproduction in Equisetum is from spores. Unlike fern spores, Equisetum spores are green, unmarked, and not resistant or dormant structures. This makes it difficult to grow Equisetum from spores, since any spores more than a week old will not grow, and the spores cannot be "banked". The spores are also unique in having elators, strap-like appendages which wrap around the spores when it is wet, and unwrap when dry. These are apparently related to spore dispersal. Spores are produced in sporangia located on the underside of a table-like structure, called a peltate sporophyll. The sporophylls are collected into a cone which terminates the main stem or sometimes branches. In viewing the cone one sees only the tops of the table-like sporophylls and therefore doesn't see the sporangia or spores. Some species, like the common field horsetail, Equisetum arvense, have a cone-bearing stem different from the photosynthetic stem. It is unbranched, non-green, and lasts only a week or so. In this species it comes up in April, and by the end of April has shed its spores and died down.

When the spores germinate, they grow into small, green structures, gametophytes or prothalli, with numerous upright plates of cells borne upon a basal mass of cells. They are between 1 mm and 1 cm in diameter, and have been described as small pincushions. The gametophytes are rarely found growing wild. When found, they are usually on moist, sandy soil in partial shade.

The horsetails and scouring rushes are primarily plants of northern regions. Whereas in Maine, Michigan, and Minnesota there are nine species, in Florida, Louisiana, and Arizona there are only one to three species. Eight species are found both in North America and in northern Eurasia. Three species are found only in Central and South America, one is found only in the Himalayan Mountains and adjacent parts of China, one only in North America, one in Europe, Africa, and across southern Asia, and the last species has a disjunct distribution, being in Europe and around the Mediterranean, and also along the Pacific coast of North America. Australia, New Zealand, and Antartica are the only large land masses without a single species of Equisetum.

The horsetails and scouring rushes are not commonly found in cultivation, although at least some of them will grow readily. Equisetum scirpoides, which is the smallest scouring rush, not only grows easily in pots, but also has an attractive dark green color, tolerates relatively low light intensities, and does not spread as extensively as most species. It should be prized by terrarium gardeners. Equisetum arvense, the common field horse tail can be cultivated from rhizome pieces, but must be kept constantly moist. If it dries out for only a short time, the plant dies. The wood horsetail, E. sylvaticum, is much more handsome in appearance, but I have not tried to grow it. It should grow well also in pot culture. Transplanting horsetails into a garden situation would be unwise since if the rhizomes become established the plant will spread beyond where des red, and be difficult to eradicate once established.



MISSING ISSUES

Due to peculiar environmental conditions, certain mailing labels for Fiddlehead Forum have been illegible, thus preventing a few copies to be delivered. If you have missed any issues in the past year, please let the FF editor know immediately so we can rectify the situation.

SUSTAINING MEMBERS

The Society is proud to have 16 more sustaining members this year (total of 47) than a year ago. Sustaining members are those who choose to pay ten dollars in annual dues rather than the standard five dollars. Their generosity adds substantially to the resources of the Society and is greatly appreciated.

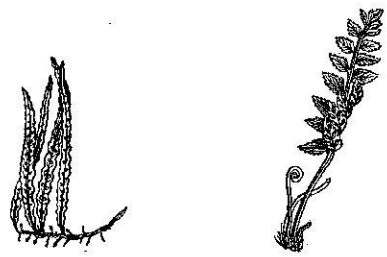
NEW CHAPTERS PROPOSED

Two more areas have willing organizers. Please contact them if you are interested in getting together to exchange ideas and see or grow ferns. Remember, a chapter need not be a large formal group. We would be happy to call any sized group a chapter. Activities are at your own discretion--meetings, field trips, visits to greenhouses, growing ferns, showing slides, etc. The main idea is to increase communication and fern fellowship.

Eastern Pennsylvania, Maryland, Delaware: Mr. Ron Goldstein, Old Newport Pike, Cochranville, PA 19330

Connecticut, Southern Massachusetts: Dr. Terry Webster, Biological Sciences Group, Univ. of Connecticut, Storrs, CT 06268

If anyone else is interested in starting a chapter, we can supply you with the addresses of AFS members in your area if you tell us the ZIP areas to be covered.



NEW YORK CHAPTER

The New York Chapter has finished another active season of field trips and has now brought its activities indoors for the winter. The Chapter President for the coming year is Mrs. Ethelyn Williams.

During the good weather they made trips to northern New Jersey (including Gordon Foster's fern garden), Westmoreland Sanctuary in Westchester Co., NY, the NY Botanical Garden's Cary Arboretum 75 miles north of NYC, Longwood Gardens near Philadelphia, and a one-week foray to Costa Rica.

Last July 14-21 seventeen fern freaks from the greater New York area flew to Costa Rica to marvel at the wide diversity of tropical ferns and fern allies. After a day of general orientation and a tour of the world's largest commercial producer of Impatiens seeds, they spent the next four days exploring rich areas within easy driving distance of San Jose. These included a rich middle elevation wet forest of Tapantí, Volcán Poás with its smoking crater and old Isoetes-laden crater lake, Angel Falls dripping with ferns, including an undescribed species of Dennstaedtia, the lower elevation region of Turrialba with a tour of the agriculture station and a muggy walk through large Adiantums to the Río Reventazón, and finally the high, cold reaches of the Cerro de la Muerte with its cloudy oak forests dripping with filmy ferns, Andean paramos with Jamesonias and Lycopodiums, and forests of tree Blechnums. One day was left free for sight-seeing, travel to the coast, or more ferning. In spite of the rainy season the weather was magnificent, raining only when we were on the bus or indoors for lunch; it is spring-like all year round with cool nights and warm (not hot) days. In the few days we were there they saw over 300 species of ferns and fern allies. Another tropical foray is being considered for sometime next year.

The Chapter's indoor meetings feature talks on botanical and horticultural aspects of ferns, exercises in fern propagation, a fern disease clinic, a plant raffle, slide shows, and tours of the NY Botanical Garden's greenhouses. Chapter expenses are covered largely by its plant raffle, so no dues are required. If you live in the NYC area and would like to be added to the mailing list, contact John Mickel.

UPPER OHIO VALLEY CHAPTER ACTIVITIES

Our first Fern Foray-Seminar was held on April 20. At that time Mr. Hedden presented a slide presentation on Ferns of Ohio as seen in their crosier stage. He was followed by Mr. Engster who gave a talk on the cultivation of ferns from spores. This was followed by an afternoon field trip led by Mr. Vickers in Mill Creek Park in Youngstown, Ohio in which ferns in their fiddlehead stage were sought out. Twenty-two taxa were found.

The second Fern Foray was held August 3 at the Holden Arboretum near Cleveland, Ohio and was co-hosted by Dr. McKenzie and Mr. L. Sturm. In addition to the many varieties of flowering and arborescent plants, thirty-two taxa of ferns and their allies were found.

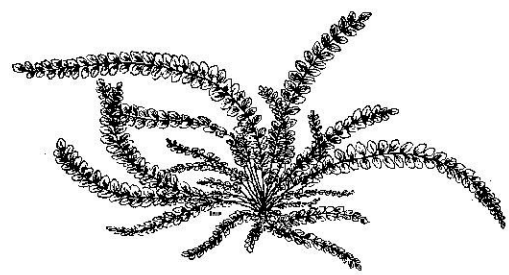
The third Foray of the year was held on September 14 in Lutzville, Pennsylvania and the tour leaders were Dr. Buker and Dr. Henry. Although only twenty-five taxa were seen, eight were those normally associated with limestone cliffs.

All in all, a pretty good year.--Carl F. Chuey, Executive Secretary, Upper Ohio Valley Chapter (Dept of Biological Sciences, Youngstown State Univ, Youngstown, OH 44503)

DRY LAND FERNS

I am an amateur pteridologist interested in what I call "dry land ferns." The classes of plants my study deals with are Pellaea, Notholaena, and Cheilanthes. Often other classes are represented, like Adiantum, Phanerophlebia and Asplenium. I am spore-growing most of my plants because they are too rare or uncommon for me to collect or buy. I'm working with the Rare Plant Center in connection with the University of Texas at Austin in making a live collection. My area is the Southwest, including Texas, New Mexico, Arizona, Oklahoma and Chihuahua.

I am interested in contacting others interested in the same area and exchanging plants and spores. If any readers have similar interests, please write to me.--Nancy Shields, 437 Brady Lane, Austin, Texas 78746



BOOKS FOR SALE

The following extra books are for sale from the AFS library at 20% or more discount from list price.

BIRKS, H.J.B. 1973. Past and Present Vegetation of the Isle of Skye: A Paleoecological Study. $31.60 hardbound.

BRITISH FERN GAZETTE. 1949--1971. Volume VII no. 10 through vol. X no. 4, complete. $35.00.

JERMY, A.C., et al., eds. 1973. The Phylogeny and Classification of the Ferns. $10.00 hardbound; rear cover and pages damaged at one corner.

KERSHAW, K.A. 1974. Quantitative and Dynamic Plant Ecology, 2nd ed. $6.80 paperback.

SHOSTECK, R. 1974. Flowers and Plants: An International Lexicon with Biographical Notes. $7.95 hardbound.

First come, first served! Send a note or your check (payable to the American Fern Society) to D. B. Lellinger, U.S. National Herbarium, Smithsonian Institution, Washington D.C. 20560

SPORE BANK CHANGES ADDRESS

Our Director of the Spore Exchange, Mr. Neill Hall, has moved a few blocks away in Seattle and would appreciate your noting his change of address, which is now:

Mr. Neill D. Hall
1230 N.E. 88th Street
Seattle, Washington 98115

REPORT OF THE 1974 FERN FORAY

The 1974 Fern Foray was held in the Flagstaff area in connection with the AIBS meetings at Tempe, Arizona. Although northern Arizona is not rich in ferns, it is exceptionally scenic and geologically interesting. We were unfortunate in arriving in the midst of a severe drought and heat wave. It had not rained in Flagstaff since March; consequently the National Forests were closed to public use due to the extreme fire danger. As to heat, those arriving via Phoenix were greeted with 115°. Flagstaff, being higher, was a bit cooler.

Friday evening, June 14, we met with the foray leaders: Dr. Richard Hevly (Northern Arizona U.), Dr. Ardia Johnson (Northern Arizona U.), and Dr. Tom Nash (Arizona State). The Fern Society and the Bryological Society met and field-tripped together, making a group of about 60 people. We heard an interesting discussion of the areas to be visited, saw some excellent slides, were warned about the fire hazard (among other things), and were served some cooling refreshments.

Saturday was devoted to Oak Creek Canyon (West Fork). This is a deep, narrow canyon south of Flagstaff, with some fine scenery as well as interesting plants. Although the canyon walls are red (Supai) and white (Coconino and Toroweap) sandstone, many of the plants in the canyon are calciphiles, because water must first percolate through the Kaibab Limestone. This hard limestone resists erosion and allows formation of deep, steep-sided canyons where streams have cut through it into the underlying sandstones. Oak Creek and Grand Canyon are both capped by this formation. The canyon is quite narrow, hence moisture relations are more favorable than might be expected. Each ferner (or bryologist) went as far up the 12-mile canyon as he wished, but it was easy going for everyone to get in far enough to appreciate the scenery and see some of the interesting plants. Thirteen ferns were counted: three species of Equisetum greeted us at the mouth of the canyon, E. arvense, E. hyemale, and E. laevigatum. Pteridium aquilinum (no field trip is complete without it) was abundant; this was the western var. pubescens. Among the calciphiles seen were Cystopteris bulbifera and Adiantum capillus-veneris, both on red sandstone walls but watered with lime water. Cystopteris fragilis was rare on the canyon walls also. Adiantum pedatum and Polypodium vulgare were near the entrance; Dryopteris filix-mas was common farther up the canyon. Selaginella underwoodii was seen by some on rocks near the entrance. One of the more ambitious members, Chris Haufler, found Polystichum lonchitis in the upper canyon, and one of the bryologists reported Pellaea atropurpurea.

We emerged dry and hot, but some still had enough energy to visit Montezuma Castle (Indian ruins) and Montezuma Well (a lime sink filled with water). At the latter we added Cheilanthes feei on the sink walls (very dry) and saw lush Adiantum capillus-veneris along the outlet stream. We returned to Sedona, a picturesque town, for dinner together.

Sunday we traveled north to the San Francisco Peaks area. Those with enough ambition (and air) hiked to the tundra on the top (12,000+ ft.), the rest botanized in the forest above the closed ski lodge. Several interesting flowering plants were blooming, and bryologists found plenty to keep them busy, but only three ferns were found: Polypodium vulgare, Cystopteris fragilis, and (you guessed it) Pteridium aquilinum. Again, the scenery was superb.

The leaders are to be commended for organizing an interesting foray, providing transportation, lunches, and lists of plants, and especially for abundant information about the geology and natural history of the areas. They also arranged for us to get into otherwise closed forest areas. In spite of seeing only 14 ferns, all of us enjoyed the foray.

The 19 Fern Society participants were from 12 states: Mr. Glen Fleming (Fla.), Mr. Clark Franz (Ill.), Mr. Pierre Genelle (Fla.), Mrs. Dale Hagenah (Mich.), Mr. & Mrs. Neill Hall (Wash.), Mr. Chris Haufler (Ind.), Dr. Richard Hevly (leader for the Fern Society)(Ariz.), Dr. & Mrs. Tak Hoshizaki (Calif.), Dr. Dutch Huttleston (Penna.), Dr. & Mrs. Bob Lommasson (Neb.), Dr. Lloyd Mogenson (Ariz.), Dr. Jim Montgomery (N.J.), Dr. & Mrs. Rolla Tryon (Mass.), Dr. Florence Wagner (Mich.), and Miss Laurell Woodley (Calif.). --James D. Montgomery, Absecon, N.J.

Dr. John T. Mickel
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Bronx, New York 10458

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