A POPULAR DESCRIPTION OF THE COMMON OREGON FERNS

A Contribution from the Herbarium of the University of Oregon

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GRAPE FERN. (Botrychium virginianum)

GRAPE FERN. (Botrychium siltolifolium)
A Popular Description of the Common Oregon Ferns

FOREWORD.

The systematic descriptions are taken largely from a thesis presented in 1910 for the degree of Bachelor of Arts by Hannah Maude Kenworthy.

The pen and ink drawings were done by Ruth M. Howell, assistant in the Department of Botany, University of Oregon.

The planning and editing and the making of the photographs were the work of Albert Raddin Sweetser, the head of the Botanical Department.

DESCRIPTION.

While the plan is to produce a popular bulletin and scientific terms will be sparingly used, yet it will be necessary to employ a few in the descriptions.

The parts of the fern are the leaf or frond; the leaf-stalk or stipe; the underground portion, the stem or rhizome, and the fine fiber-like roots. In our ferns all the part above ground is frond and stipe, although in some cases these attain great size.

If the frond is divided into distinct portions, each is called a pinna. When the pinnae occur in two rows, one on each side of the continuation of the stipe, such an arrangement is called pinnate and the continuation of the stipe rachis. Example: the Sword Fern.

Should the divisions not extend to the rachis, although they may approximate very closely to it, such a condition would be designated as pinnatifid.

If the pinnae are again completely divided each division is called a pinnule and the frond is said to be twice pinnately compound. Example: Athyrium, Lady Fern.

When the pinnules are completely divided the frond is said to be thrice pinnate or ternate. Example: Pteris, or Common Brake.

Various combinations may occur; e. g., a frond may be once pinnate but the pinnae only partly divided or pinnatifid.

The maidenhair presents a peculiar case of division by equal forking, two or more times, repeated but the ultimate pinnules have a pinnate arrangement.

NON-SEXUAL REPRODUCTION.

On the back of the frond, or on specially modified fronds, at certain seasons may be found the fruit dots or sori. If a sorus is examined with a hand magnifying glass it will be found to consist of a cluster of small sacks (sporangia) containing spores. The spores serve something the purpose of the seeds of the higher plants but are markedly different in structure.

The sorus may be destitute of any covering or may be provided with an indusium. This usually covers the sorus, though in some cases it is beneath it. The peculiarities of the indusium are made use of in classifying the ferns.

A concrete example will make all the points clearer. Plate I, Fig. A, shows the back of the tip of our common brake or pteris. On open poor ground it is often less than a foot in height while in damp woods with rich soil the leaves are often twelve to fourteen feet. If we imagine a section cut across the leaf in the direction (ab) and examined on end with the low power of a microscope it would appear as in Fig. B.
We should notice the mid rib (m), the indusium formed by the curling over of the margin of the leaf, and under the indusium the sporangia.

Fig. C is a drawing of a sporangium enlarged. It consists of a stalk (s), carrying at its end a sort of sack whose covering is a single layer of plate-like cells. On one edge is a row of cells with thick walls, annulus (an). On the opposite edge a few thin walled cells which separate easily, forming an opening (m), the mouth. Within the sporangium are the spores. As the sporangium dries, contraction takes place and the point (m) being weakest a break takes place opening the mouth. At the same time the annulus straightens with more or less of a snap, scattering the spores to some distance.

If the spores meet with favorable conditions they germinate. Plate II illustrates a number of stages of this growth. At first the spore sends out a little root (r) and a short chain of cells (p). These continue to differentiate, becoming flat and leaf-like, Fig. F. This leaf-like form is known as a prothallus and often is a quarter of an inch or more across. The spore disappears, the prothallus becomes attached by little root-like outgrowths and on its under side develops bottle-shaped egg cases containing a single egg each, and spherical sperm cases containing numerous sperms which have the power of locomotion by means of vibrating threads attached to one end. When the eggs and sperms are ripe a single sperm passes down to the egg in its case. The egg and the sperm each contains a still more microscopic portion called the nucleus in which, it is believed, reside hereditary characteristics. The union of the sperm
with the egg brings about a mingling of these characteristics, and is called fertilization.

From this fertilized egg the new fern grows.

ANALYTICAL KEY.

It is customary to divide the plant kingdom into four groups:
1. The Spermatophytes or Seed Plants;
2. The Pteridophytes or Fern Plants;
3. The Bryophytes or Moss Plants;
4. The Thallophytes or the remaining lower forms.

Sometimes the first group is spoken of as Phenogam, meaning evident marriage, because the method of reproduction is clearly seen. The last three would be called Cryptogams or hidden marriage, because by the earlier botanist the reproduction was not well understood, although it is now perfectly clear.

Pteridophyte is a compound of two Greek words meaning fern and plant. This group includes a number of plants beside the true ferns such as the Horsetail Rushes, the Club Mosses and others, but this Bulletin will concern itself only with the common true ferns of Oregon. Species not herein described will be appreciated so that they may be included at another time. Send a specimen to the Herbarium of the University.

The use of the key is based on a series of choices and eliminations. The drawings in the key are intended to make clear the possible selections. The alternative is always between things of the same order; e.g., the first choice is between A and AA, then B or BB, and so on.

Nearly all the technical words are explained in the preceding description. If not, a glossary of terms is to be found, just before the index.
ANALYTICAL KEY.

A. Fronds distinctly of two kinds.
   B. Sporangia borne in clusters or spikes.
      b. Frond simple.

   *Ophioglossum*
   Page 11

   bb. Frond pennately divided or compound.

   *Botrychium*
   Page 11

   BB. Sporangia borne on back of modified frond.
      b. Frond once pinnate or pinnatifid.

   *Struthiopteris*
   Page 11
bb. Frond twice or three times pinnate.  
"Cryptogramma"  
Page 11

AA. Fronds all alike, sporangia borne on back or margin of frond.  
B. Sori covered with indusia.  
C. Sori marginal, covered with reflexed portion of margin of frond.  
d. Indusium continuous.  
e. Fronds usually clustered.  
f. Fronds smooth.  
"Pellaea"  
Page 11  

ff. Fronds wooly.  
"Cheilanthes"  
Page 13  
ee. Fronds usually solitary.  
"Pteris"  
Page 13  
d. Indusium discontinuous.  
"Adiantum"  
Page 13  

CC. Sporangia provided with special indusia.  
d. Indusia roundish.  
e. Indusia heart-shaped.  
"Dryopteris"  
Page 13
**A POPULAR DESCRIPTION OF**

ee. Indusium shield-shaped, centrally attached.
*Polystichum*  
Page 15

eee. Indusium convex, attached by broad vase partly under sorus.
*Filix*  
Page 15

eeee. Indusium inferior, stellate.
*Woodsia*  
Page 15

dd. Sori linear.  
e. Sori parallel to midrib.  
*Woodwardia*  
Page 15

ee. Sori oblique to midrib.  
f. Fronds pinnate, sori oblong.  
*Asplenium*  
Page 15
ff. Fronds bipinnate, sori curved.

*Athyrium*

Page 17

BB. Sori naked.

C. Sori roundish; not usually more than twice as long as broad.

d. Fronds bi-tripinnatifid or ternate.

*Phegopteris*

Page 17

dd. Fronds once pinnatifid.

*Polypodium*

Page 17

CC. Sori linear.

*Cerapteris*

Page 17
A POPULAR DESCRIPTION OF

DEER FERN.  
(Struthiopteris spicant)

PARSLEY FERN—ROCK BRAKE
(Cryptogramma acrostichoides)
OPHIOGLOSSUM. Adder Tongue.

Sporangia naked and borne in a simple or compound spike, when ripe opening by a transverse slit. The sterile frond simple.

(The scientific name is composed of two Greek words, snake and tongue, referring to the simple spike of sporangia.)

Ophioglossum vulgatum L. Found in Washington and California but not as yet reported in Oregon. Probably present.

BOTRYCHIUM. Grape Fern. Moonwort.

Sporangia same as in ophioglossum but the sterile frond divided or compound.

(From a Greek word meaning grapes, because of grape-like cluster of sporangia.)

Sporangia naked and borne in a simple or compound spike, when ripe opening by a transverse slit. The sterile frond simple.

BOTRYCHIUM. Grape Fern. Moonwort.

Sporangia same as in ophioglossum but the sterile frond divided or compound.

(From a Greek word meaning grapes, because of grape-like cluster of sporangia.)

Sterile and fertile frond united for a considerable distance. As yet only reported from high altitudes in Eastern Oregon.

B. virginianum (L.) Swartz.

STRUTHIOPTERIS. Ostrich Fern. Deer Fern.

Fronds of two kinds but the fertile evidently composed of contracted pinnules with typical sporangia on the under side. Sterile frond narrow, pinnate and shorter than the fertile.

(From the Greek struthos, an ostrich and pteris, a fern.)

Struthiopteris spicant (L.) Weiss.

Sterile and fertile frond distinct from the base. Common in marshes and wet ground.

B. silaifolium Presl.

Sterile and fertile frond united for a considerable distance. As yet only reported from high altitudes in Eastern Oregon.

B. virginianum (L.) Swartz.

CRYPTOGRAMMA. Rock Brake. Parsley Fern.

Fronds of two kinds, the fertile frond of evident pinnules whose in-rolled margins form the indusium. Sterile frond twice or three times pinnate.

(From Greek cryptos, hidden, grammata, a line, referring to the arrangement of the sporangia in lines which are hidden by the indusium.)

Found growing in clefts of rocks.

PELLAEO. Cliff Brake.

Fronds once pinnate, pinnae short-stalked 6-12 pairs. High mountains.

P. breweri D. C. Eaton

Fronds twice pinnate. Stipes purplish-brown. Pinnae several pairs, pinnules numerous. As yet only reported from Southern Oregon.

P. brachyptera (Moore) Baker

Fronds thrice pinnate. Stipes densely placed, wiry, dark chestnut-brown. Sometimes a few sterile fronds are present.

P. densa Hook. Oregon Cliff Brake
CLIFF BRAKE. (Pellaea breweri)
PTERIS. Brake. Bracken.

Fronds thrice pinnate. Sori on the edge of pinnules forming an unbroken line. Indusium continuous and formed by the incurled margin of frond. Usually solitary; at least not in dense clusters.

(From Greek _pteros_, a wing, which became to mean a fern from the wing-like structure of frond of fern.)

P. _aquilina_ L. The Eagle Brake

This with its varieties is widely distributed throughout North America and the Old World, in Oregon often becoming a troublesome weed in the fields.

ADIANTUM. Maidenhair.

Frond forking by twos. Sori on margin covered by a discontinuous indusium formed by the inrolled edge of frond.

(From the Greek meaning _not to moisten_. Referring to the difficulty of wetting the fronds. This can be prettily shown by dipping a frond beneath clear water and noting the silvery appearance due to air on the frond shut in by the water.)

A. _pedatum_ Rich moist forests everywhere in the state.

CHEILANTHES. Lip Fern. Lace Fern.

Sori near the ends of veins, roundish at first but running somewhat together in age. Indusium of reflexed margin of sorus discontinuous or continuous. Under side of frond in our species densely covered with a thick, wooly, rust-colored mat of hairs.

(From Greek _cheilos_, a lip, and _anthos_, a flower, alluding to the lip-like indusium.)

C. _gracillima_ D. C. Eaton Lace Fern

D. _filix-mas_ (L.) Scott. Male fern

High mountains.

DRYOPTERIS. Shield Fern.

Sori round, mostly on the back of veins. Indusium heart-shaped with a crease or depression on one edge by which it is attached to the frond.

(From Greek _dryas_, a tree, especially an oak tree because most of these thrive best in the woods.)

The pinnules or ultimate leaflets all deeply divided or pinnatifid, the margins usually spiny. Fronds more or less triangular, broadest at base. Common in shady, moist woods, especially at sea level. Edges of indusium with or without gland-like hairs.

D. _spinulosa_ dilatata (L.) Ktz. Wood Fern

The ultimate pinnules not deeply divided or at least only the lower ones.

The indusium with minute gland-like hairs on upper side. Pinnules often doubly saw-toothed and spiny. Texture less delicate than the preceding. Common in Western Oregon.

D. _rigida_ (Hoffm.) Und.

The indusium without gland-like hairs. Margin of pinnules often but slightly toothed and usually not as spiny. Sori nearer midvein than the margin. Common.

D. _filix-mas_ (L.) Scott. Male fern
A POPULAR DESCRIPTION OF

BRAKE. (Pteris aquilina)

MAIDEN HAIR. (Adiantum pedatum)
POLYSTICHUM.  Sword Fern.

Evergreen ferns growing in clusters. Sori round generally borne on the back of the veins. Indusium shield-shaped and fixed at the center only.

(From Greek poly, many, and stikes, a row. Some species have sori in more than one row.)

Fronds once pinnate.

Leaf-stalk long. Under favorable conditions the frond reaches a height of four feet or more. The pinnae are curved like a sword and have a single large tooth on the upper edge of each pinna near the midrib. The margins of the pinnae are beset with bristle-pointed teeth. One of our most common forms.  P. munitum (Kaulf.) Presl.

Leaf-stalk short. Much resembling the former but not as tall. Pinnae more closely placed. More common in Eastern Oregon.  P. lonchitis (L.) Roth.  Holly Fern

Fronds once pinnate but pinnae pinately lobed at base. Mountains.  P. scopulinum (Eaton) Maxon

FILIX.  Bladder Fern.

Sori roundish, on the back of free veins which are not parallel to the midrib. Indusium inconspicuous, hooded, attached partly under the sorus, soon withering away.

Common throughout the state.  F. fragilis (L.) Und.

WOODSIA.

Sori round, produced on free, simple forking veins. Indusium attached wholly under the sorus, breaking and becoming star-like and soon hidden beneath the sporangia and disappearing.

(Named after Woods, an English botanist.)

We have two species in Oregon which are difficult to separate. Under side of frond, midrib and stipe covered with soft flattened hairs.  W. scouplina D. C. Eaton. Rocky Mountain Woodsia.

Frond, midrib and stipe smooth. Divisions of the indusium finer than the preceding and consisting of few beaded hairs.  W. oregana D. C. Eaton. Oregon Woodsia

WOODWARDIA.  Chain Fern.

Sori oblong, in chain-like rows, on veins parallel to width of pinnae.

(Named for Woodward, an English botanist.)

The Oregon form is found mostly in the Southern part of the state and is one of the most magnificent of North American ferns.  W. radicans (L.) Sm.

ASPLENIUM.  Spleenwort.

Fronds once pinnate. Sori linear, oblong, oblique to midrib of pinna, straight and attached to the upper side of a vein.

Rachis or midrib brown. Fronds linear, evergreen. Sori oblong, commonly three on each side of the midvein. Moist rocks and shaded cliffs.  A. trichomanes L. Maiden-hair spleenwort

Rachis or midrib green. Only rarely seen and at high altitudes.  A. viride Hudson

W.
A POPULAR DESCRIPTION OF

WOOD FERN. (Dryopteris filix-mas)

LACE FERN. (Cheilanthes gracillima)
Athyrium.
Fronds bi-pinnate, usually tapering in both directions and widest at middle. Sori oblong and oblique to midvein.
In moist ground, becomes dwarfed at high altitudes.
A. cyclosorum Rupe. Western Lady-fern

Phegopteris. Beech Fern.
Sori always without indusia, round. Frond twice or thrice pinnate or pinnatifid, or tenate.
(From the Greek phagus, an oak or beech, and pteris, a fern.)
Fronds twice pinnate, pinnules pinnatifid. Cliffs at high elevations.
P. alpestris (Hoppe) Mott. Alpine Beech Fern
Fronds thrice divided, each division pinnate and the pinnae pinnatifid. Pinnae on the lower side the larger. Common in damp woods.
P. dryopteris (L.) Fee. Oak Fern

Polypodium. The Polypod.
Sori always naked, roundish. Fronds of our species once pinnate or pinnatifid.
(From Greek poly, many, podos, foot, referring to its numerous underground stems.)
Fronds thick, leathery and broad, divisions extend almost to midrib. At the coast on decaying logs or living trees. Rootstock creeping.
P. scouleri Hook. Leather-leaf Polypod
Division of frond longer and more or less acute. Rootstock creeping. Very common and varied. Often found on maple trees.
P. occidentalis (Hook) Maxon. Licorice Fern
Divisions of frond short and blunt. Sori large, nearly covering the under side of pinnae. Prefers the rocks of mountains.
P. hesperium Maxon. Mountain Polypod

Ceripteris.
Indusium wanting, sori elongated, following course of the veinlets, often branched.
(From Greek ceros, meaning wax, and pteris, a fern.)
Fronds pinnate, lower pinnae bi-pinnatifid. Under surface covered with a yellowish dust passing to white. Sporangia borne in long lines breaking through the powder when ripe. On rocky hillsides.
C. triangularis (Kauf.) Und. Golden-back Fern. Triangularis is in reference to the triangular-shaped leaf.
SHIELD FERN. (Dryopteris rigidia)

SWORD FERN. (Polystichum munitum)
SYNONYMS.

The fern names used in this bulletin appear in black face type. Some have been described under other names, which appear in italic.

**Botrychium virginianum.** (L.) Sw. Schrad.  
*Osmunda virginiana*—L. Sp. Pl. 2.

**Botrychium silaffolium.**  

**Cerapteris triangularis.** (Kaulf.)  
*Gymnogramme triangularis*—(Kaulf.)  
*Gymnopteris triangularis*—Underwood.

**Dryopteris spinulosa.** (Hoffm.) Underw. Native ferns.  
*Polypodium dilatum*—(Hoffm.) Deutsch.  
*Aspidium spinulosum*—(Hook.) Brit.

**Dryopteris filix-mas.** (L.) Schott.  
*Polypodium filix-mas*—L. Sp.  
*Aspidium filix-mas*—Sw. Schrad.

**Felix fragilis.** Underwood.  
*Polypodium fragile*—L. Sp.  
*Cystoheris fragilis*—Bernh. Schrad.

**Pellala densa.** (Brack.) Hook. Sp.  
*Onychium densum*—Brack.

**Phegopteris dryopteris.** (L.) Fée.  
*Polypodium dryopteris*—L. Sp.

**Phegopteris alpestris.** (Hoppe.) Mett.  
*Polypodium alpestre*—Hoppe.

**Polypodium occidentale.** (Hook.) Maxon.  
*Polypodium ulgare occidentale*—Hook.  
*Polypodium falcatum*—Kellog.

**Polypodium scouleri.** Hook. & Grev.  
*Polypodium pachyphyllum*—D. C. Eaton

**Polystichum lonchitis.** (L.) Roth.  
*Aspidium lonchitis*—Sw. Schrad.

**Polystichum scopulinum.** (Eaton.), Maxon.  
*Aspium aculeatum scopulinum*—Eaton.

**Polystichum munitum.** (Kaulf.)  
*Aspidium munitum*—Kaulf. Enum.

**Struthiopteris spicant.** (L.) Weiss.  
*Osmunda spicant*—L. Sp.  
*Lomaria spicant*—Desv. Mag.  
*Blechnum doodioches*—Hook.

**Woodsia oregana.** Eaton.  
*Woodsia obtusa lyali*—Hook.
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POPULAR DESCRIPTION OF BLADDER FERN. (Filix fragilis)

ROCKY MOUNTAIN WOODSIA. (Woodsia scopulina)

BLADDER FERN. (Filix fragilis)
GLOSSARY.

Fertile—Bearing spores.
Frond—Leaf of a fern.
Gland—A cell, usually a hair, that yields a secretion.
Habit—General appearance of a plant.
Habitat—The locality in which a plant grows; also its distribution.
Indusium—The thin membrane covering a fruit dot.
Inferior—Attached below; said of an indusium below the sporangia.
Linear—Long and narrow, with parallel margins.
Pinna—First division of a pinnate frond.
Pinnate—Divided into leaflets along a common stalk.
Pinnatifid—When the divisions do not extend to the rachis or midrib.
Rachis—The continuation of the stipe through a compound frond.
Reflexed—Abruptly bent or turned backward.
Rhizome—Underground stem.
Simple—Not lobed or forked.
Sorus—A fruit dot.
Sporangium—A spore case.
Sterile—Not bearing spores.
Stellate—Star-shaped.
Stipe—Stem of a frond.
Superior—Higher, applied to indusia that are attached above the sorus.
Ternate—Having three main segments.
MAIDEN HAIR—SPLEENWORT
(Asplenium trichomanes)

CHAIN FERN.
(Woodwardia radicans)
LADY FERN. (Athyrium cyclosum)

ALPINE BEECH FERN. (Phegopteris alpestris)
A POPULAR DESCRIPTION OF

LEATHER-LEAF POLYPOD. (Polypodium scouleri)

OAK FERN. (Phegopteris dryopteris)
GOLD-BACKED FERN. (Ceratopteris triungulata)

LICORICE FERN. (Polypodium commutatum)
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