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A POPULAR DESCRIPTION OF THE COMMON OREGON FERNS

A Contribution from the Herbarium of the
University of Oregon



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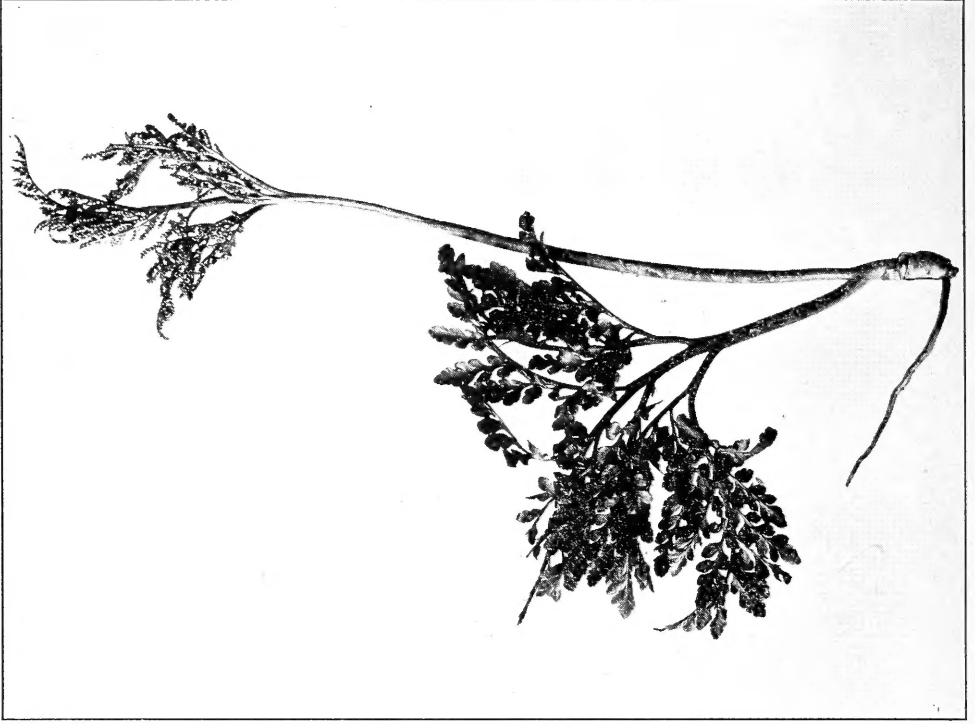
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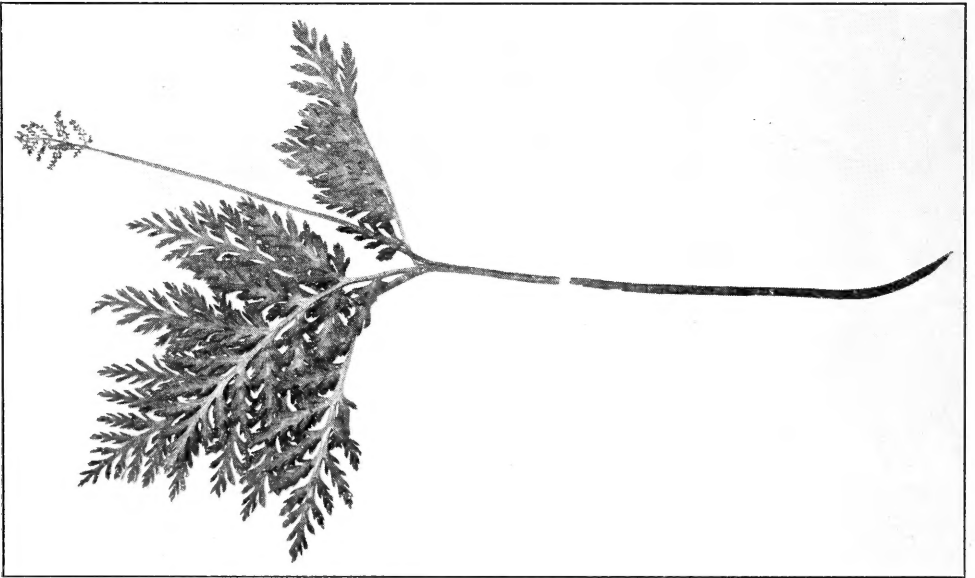


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GRAPE FERN. (*Botrychium silaefolium*)



GRAPE FERN. (*Botrychium virginianum*)

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.

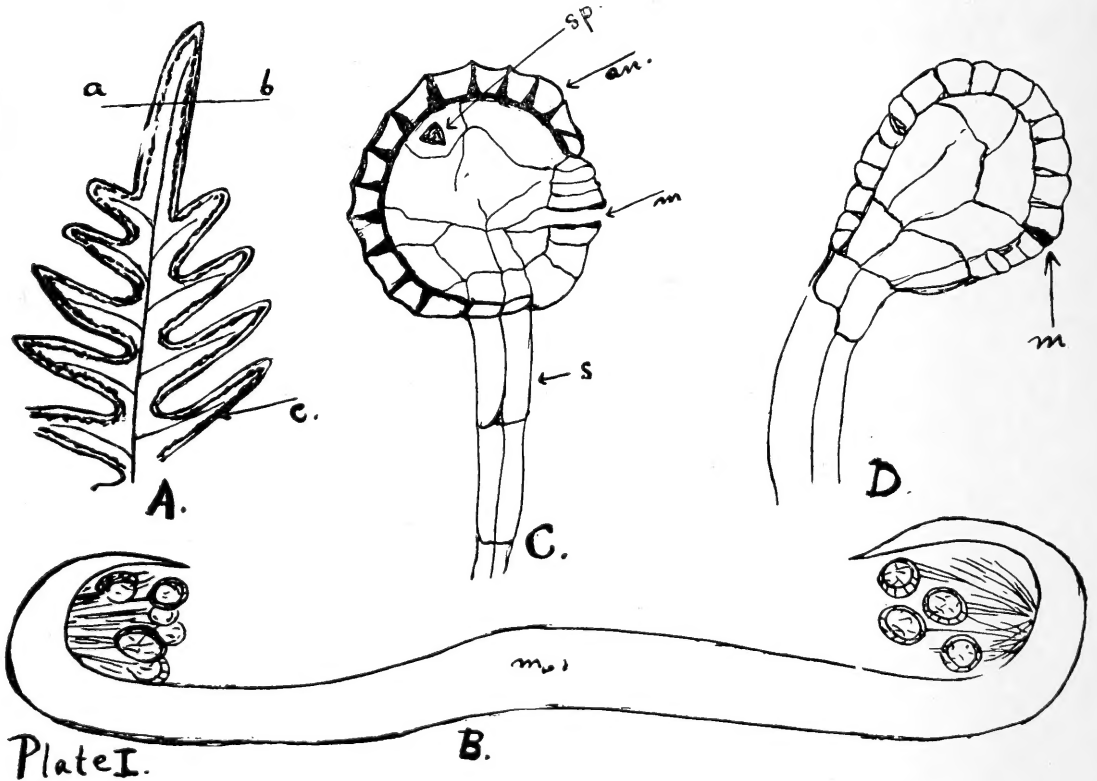
The sorus may be destitute of any covering or may be provided with an *indusium*. This usually covers the sorus, though in some cases it is beneath it. The peculiarities of the indusium are made use of in classifying the ferns.

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.

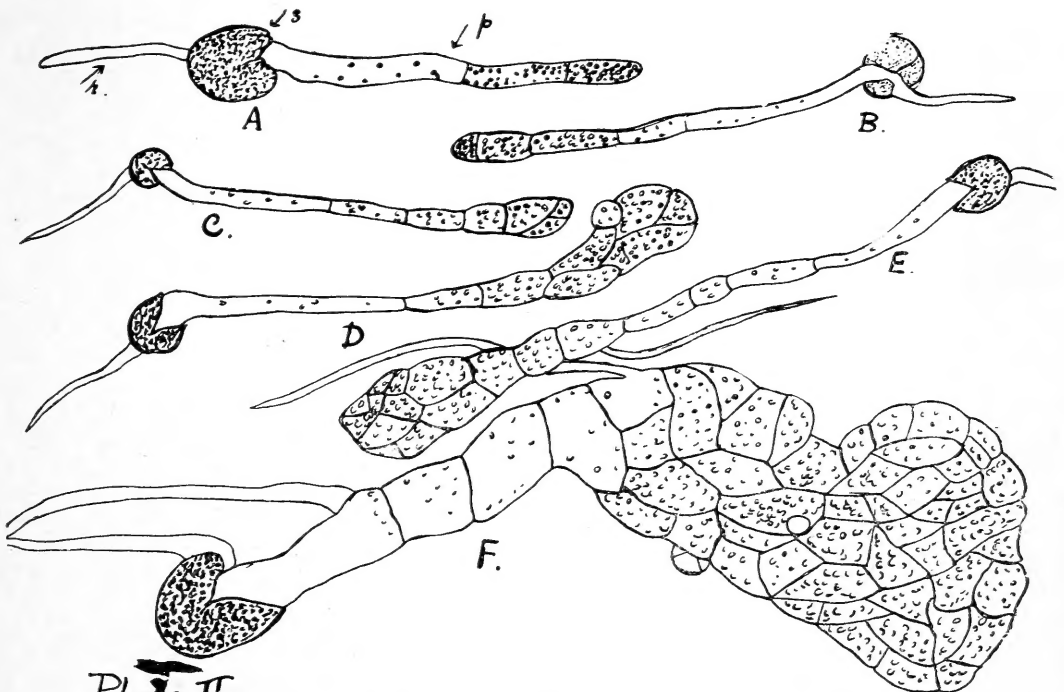


Plate II.

ANALYTICAL KEY.

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

Ophioglossum
 Page 11



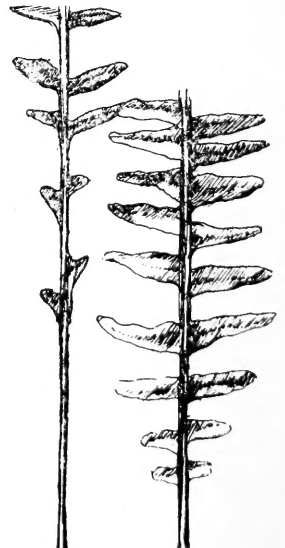
- bb. Frond pennately divided or compound.

Botrychium
 Page 11



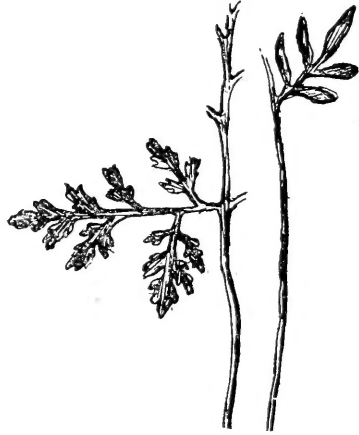
- BB. Sporangia borne on back of modified frond.
 b. Frond once pinnate or pinnatifid.

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.

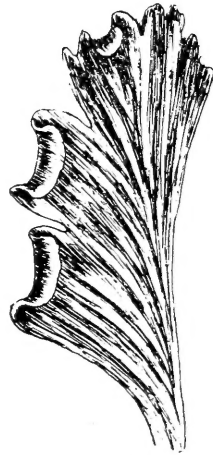


- e. Fronds usually clustered.
- f. Fronds smooth.

Pellaea
Page 11

- ff. Fronds wooly.

Cheilanthes
Page 13



- ee. Fronds usually solitary.

Pteris
Page 13

- d. Indusium discontinuous.

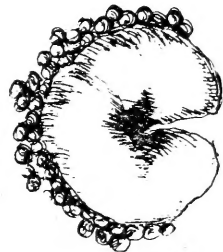
Adiantum
Page 13

- CC. Sporangia provided with special indusia.

- d. Indusia roundish.

- e. Indusia heart-shaped.

Dryopteris
Page 13



- ee. Indusium shield-shaped,
centrally attached.

Polystichum

Page 15



- eee. Indusium convex, attached
by broad base 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.

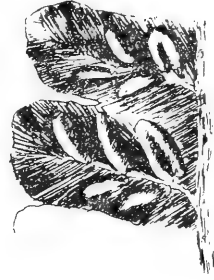
Asplenium

Page 15



ff. Fronds bipinnate,
sori curved.

Athyrium
Page 17

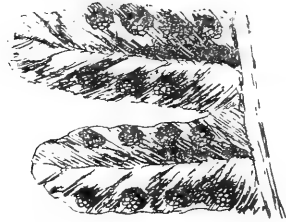


BB. Sori naked.

C. Sori roundish; not usual-
ly more than twice as
long as broad.

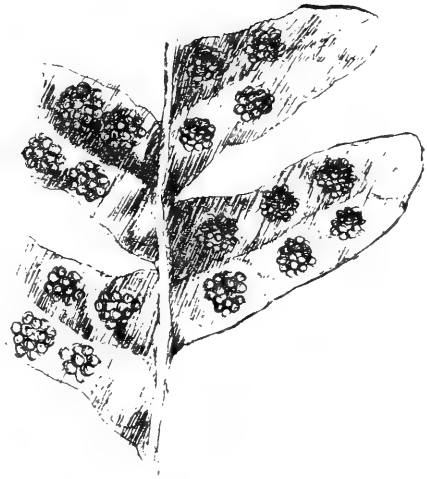
d. Fronds bi-tripinnatifid
or ternate.

Phegopteris
Page 17



dd. Fronds once
pinnatifid.

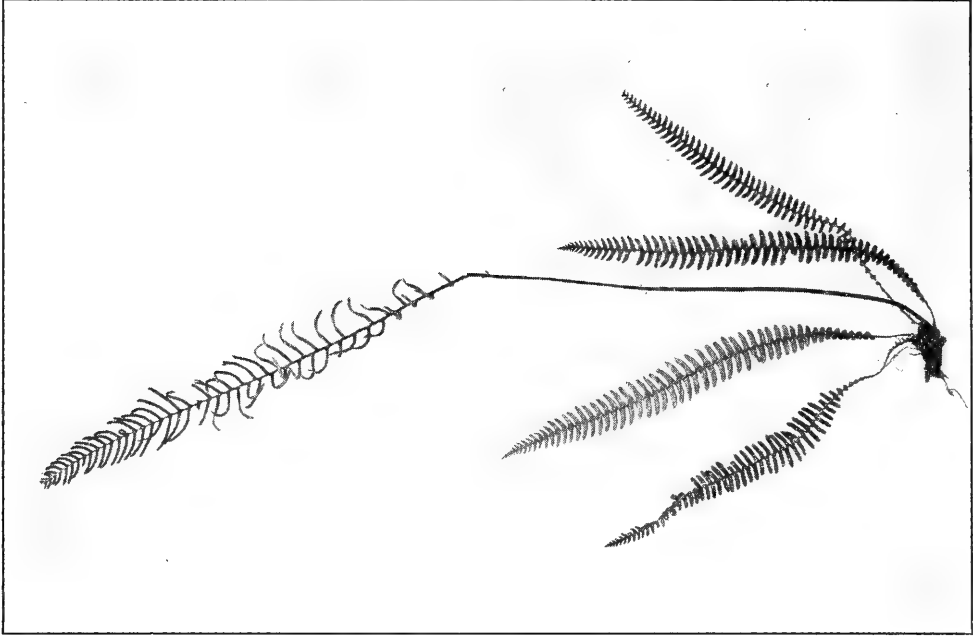
Polypodium
Page 17



CC. Sori linear.

Ceropteris
Page 17





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.)

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.

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.

Abundant on the coast and in the mountains. Occasionally found in other parts of the state.

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, *gramma*, a line, referring to the arrangement of the sporangia in lines which are hidden by the indusium.)

Found growing in clefts of rocks.

C. acrostichoides

PELLAEA. Cliff Brake.

Sori at the tips of veins, when mature forming a marginal line; covered by an indusium formed of the reflexed margin of the frond. Clustered, growing on rocks and cliffs.

(From Greek *pellos*, meaning dusky or dark and referring to the dark color of the stipe.)

Fronds *once* pinnate, pinnae short-stalked 6-12 pairs. High mountains. *P. breweri* D. C. Eaton

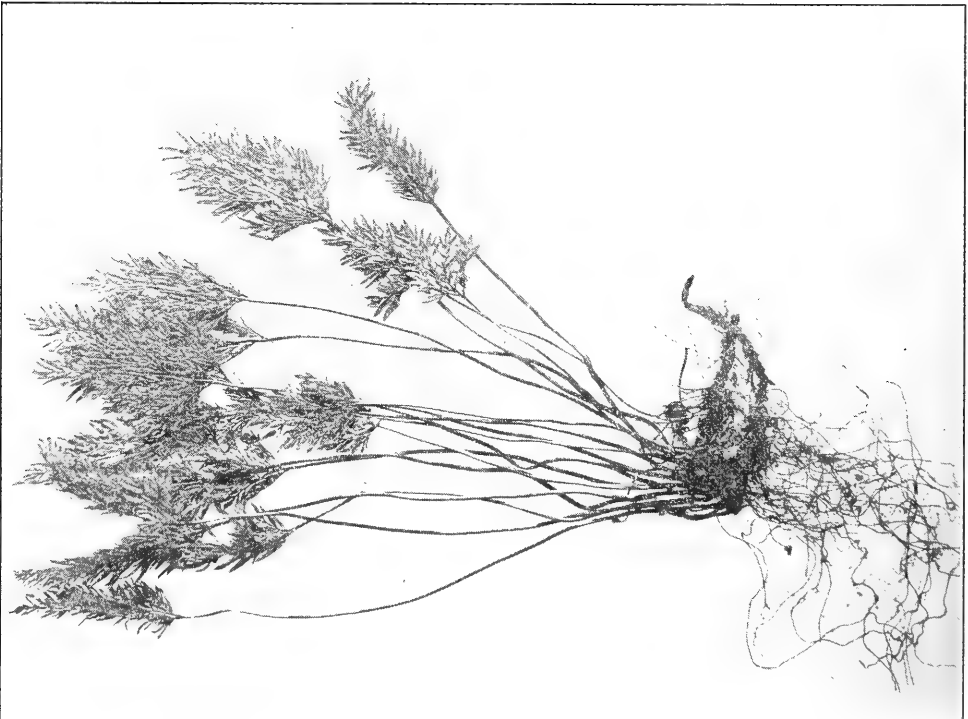
Fronds *twice* pinnate. Stipes purplish-brown. Pinnae several pairs, pinnules numerous. As yet only reported from Southern Oregon. *P. brachyptera* (Moore) Baker

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 densa.*)



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

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.

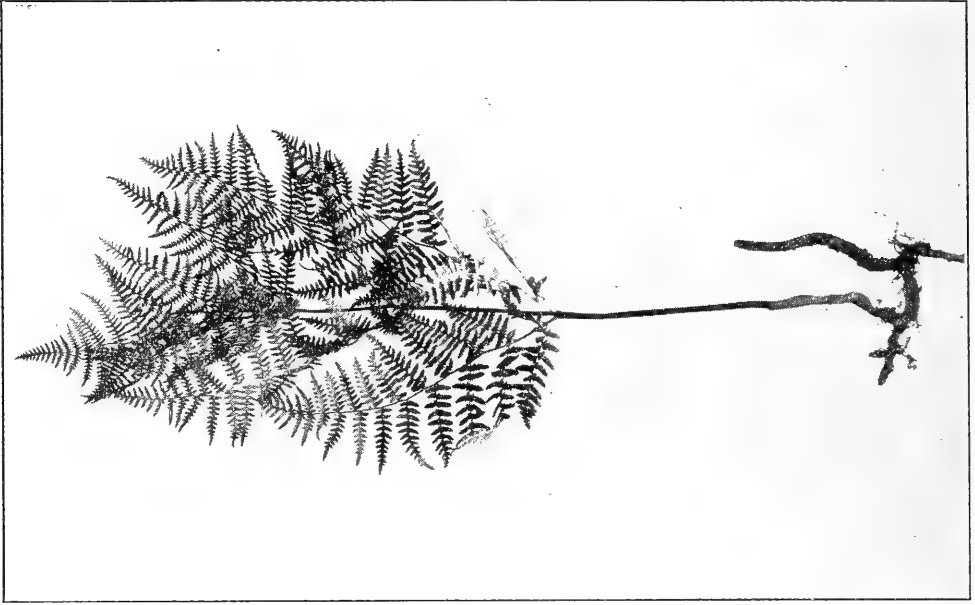
The indusium with minute gland-like hairs on upper side.

Pinnules often doubly saw-toothed and spiny. Texture less delicate than the preceding. Common in Western Oregon.

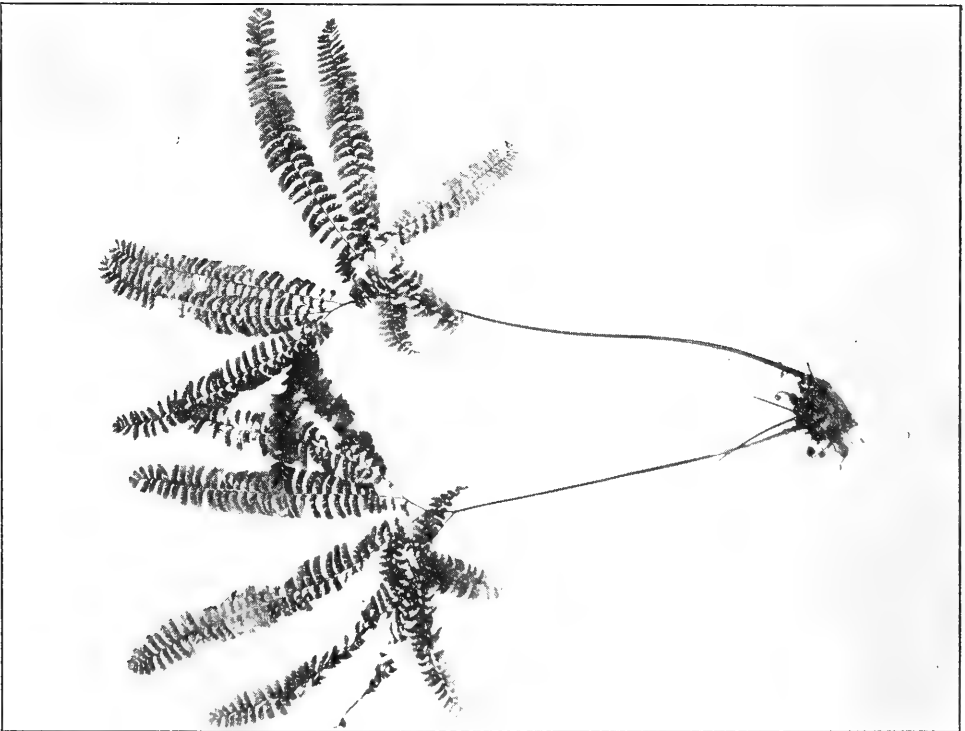
D. rigida (Hoffm.) Und.

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



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.)

Fronde 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

Fronde 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.

Fronde, 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.

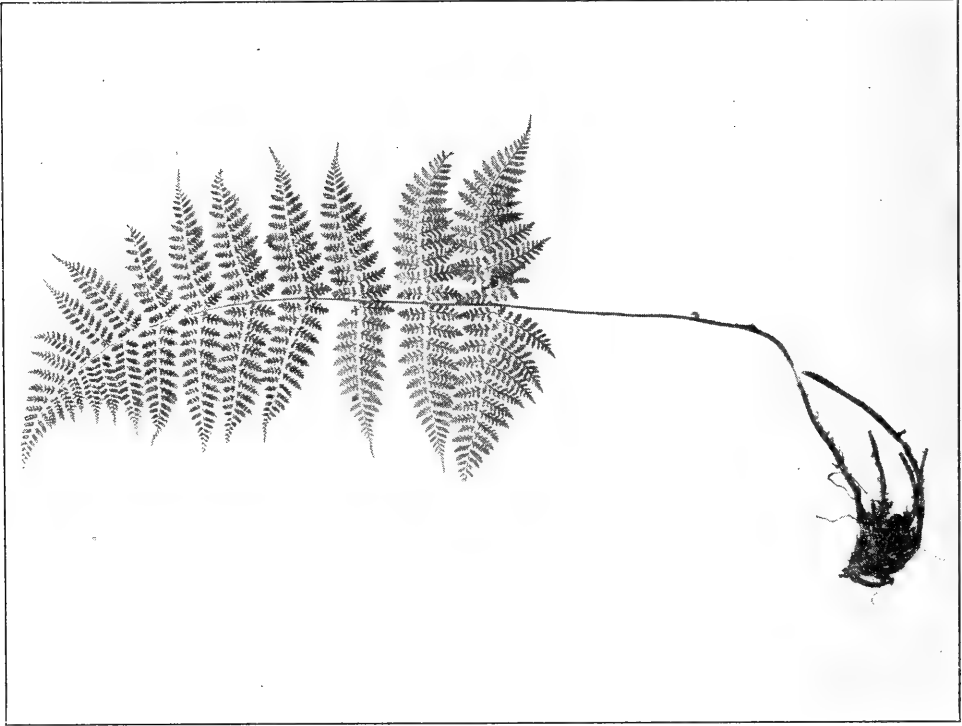
W. radicans (L.) Sm.

ASPLENIUM. Spleenwort.

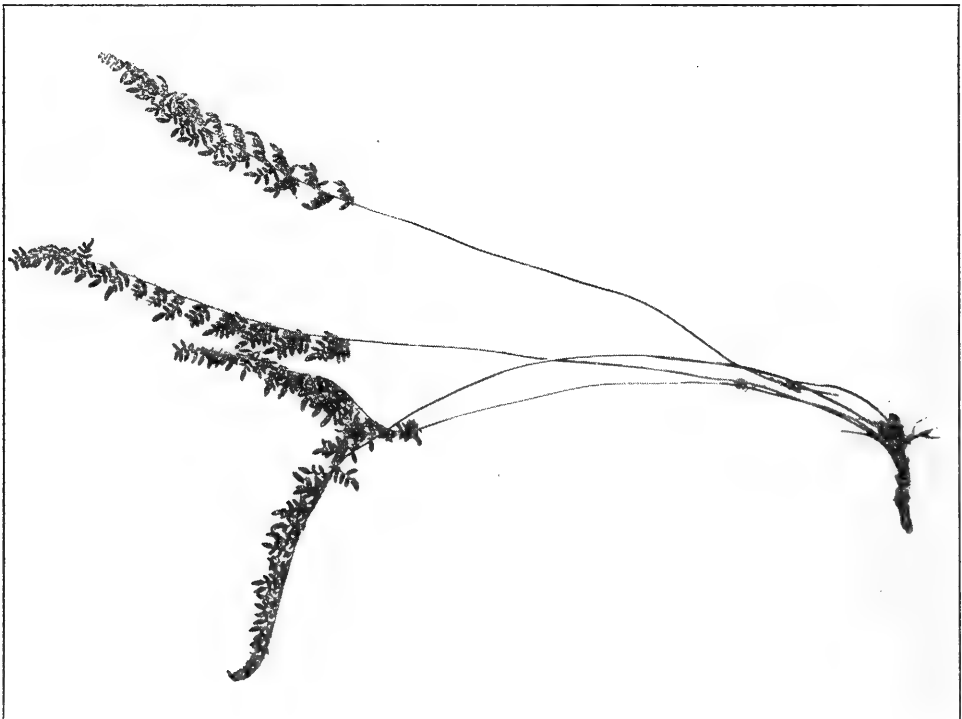
Fronde once pinnate. Sori linear, oblong, oblique to midrib of pinna, straight and attached to the upper side of a vein.

Rachis or midrib brown. Fronde 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



WOOD FERN. (*Dryopteris spinulosa*)



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 Rupr. 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 *pterus*, 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. scoleri* Hook. Leather-leaf Polypod

Division of frond longer and more or less acute. Rootstock creeping. Very common and varied. Often found on maple trees. *R. 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

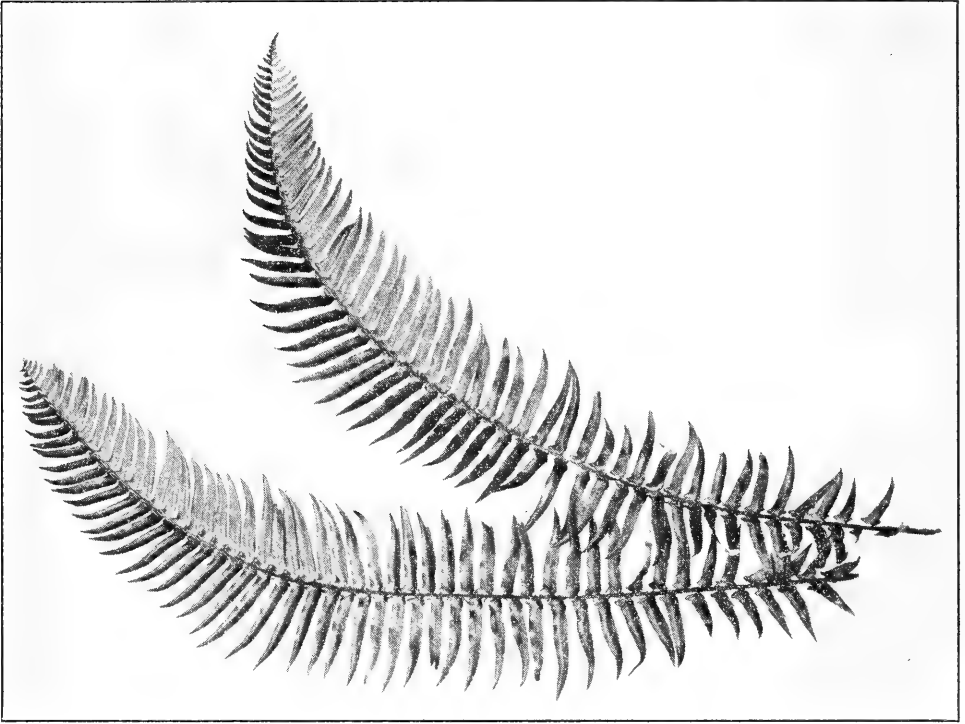
CEROPTERIS.

Indusium wanting, sori elongated, following course of the veinlets, often branched.

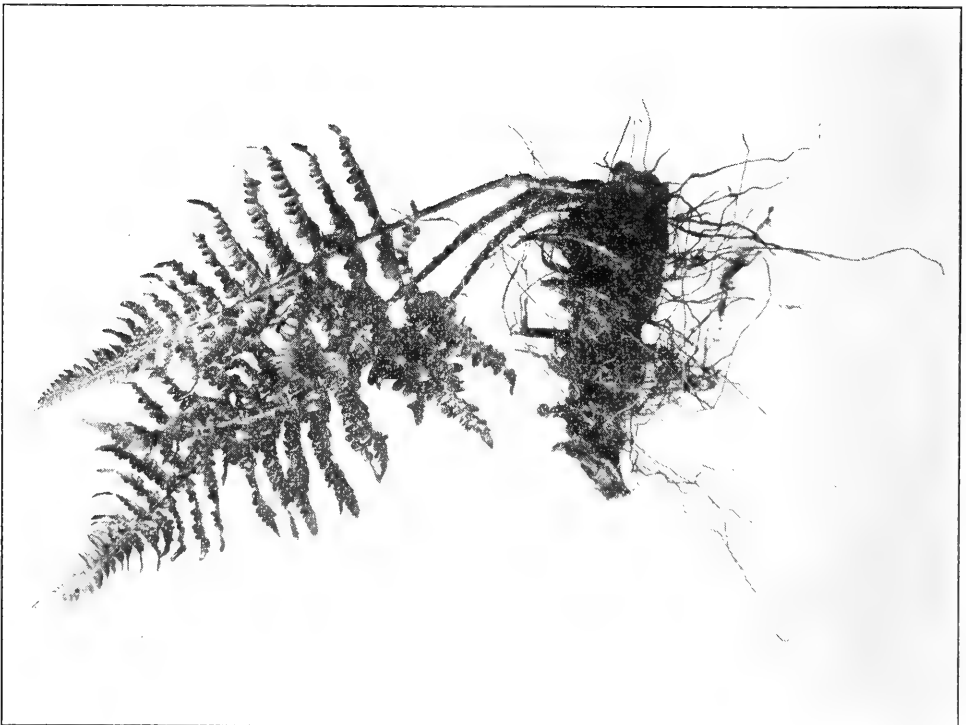
(From Greek *ceros*, meaning wax, and *pterus*, a fern.)

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 (Kaulf.) Und. Golden-back Fern. *Triangularis* is in reference to the triangular-shaped leaf.



SWORD FERN. (*Polystichum munitum*)



SHIELD FERN. (*Dryopteris rigida*)

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 silaifolium.

Botrychium occidentale—Underw. Bull. Torr.

Ceropteris triangularis. (Kaulf.)

Gymnogramme triangularis—(Kaulf.)

Gymnopteris triangularis—Underwood.

Dryopteris spinulosa. (Hoffm.) Underw. Native ferns.

Polypodium dilatatum—(Hoffm.) Deutsch.

Aspidium spinulosum—(Hook.) Brit.

Dryopteris filix-mas. (L.) Schott.

Polypodium filix-mas—L. Sp.

Aspidium filix-mas—Sw. Schrad.

Filix fragilis. Underwood.

Polypodium fragile—L. Sp.

Cystopteris 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.

Aspidium aculeatum scopulinum—Eaton.

Polystichum munitum. (Kaulf.)

Aspidium munitum—Kaulf. Enum.

Struthiopteris spicant. (L.) Weiss.

Osmunda spicant—L. Sp.

Lomaria spicant—Desv. Mag.

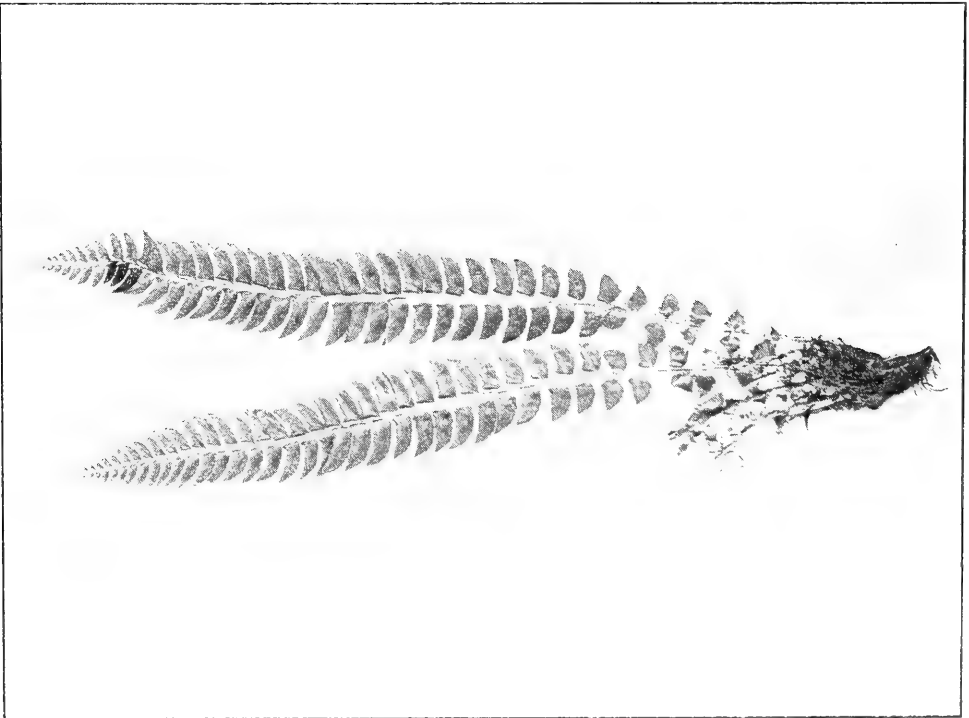
Blechnum doodiodes—Hook.

Woodsia oregana. Eaton.

Woodsia obtusa lyalii—Hook.



POLYSTICHUM SCOPULINUM



HOLLY FERN. (*Polystichum lonchitis*)

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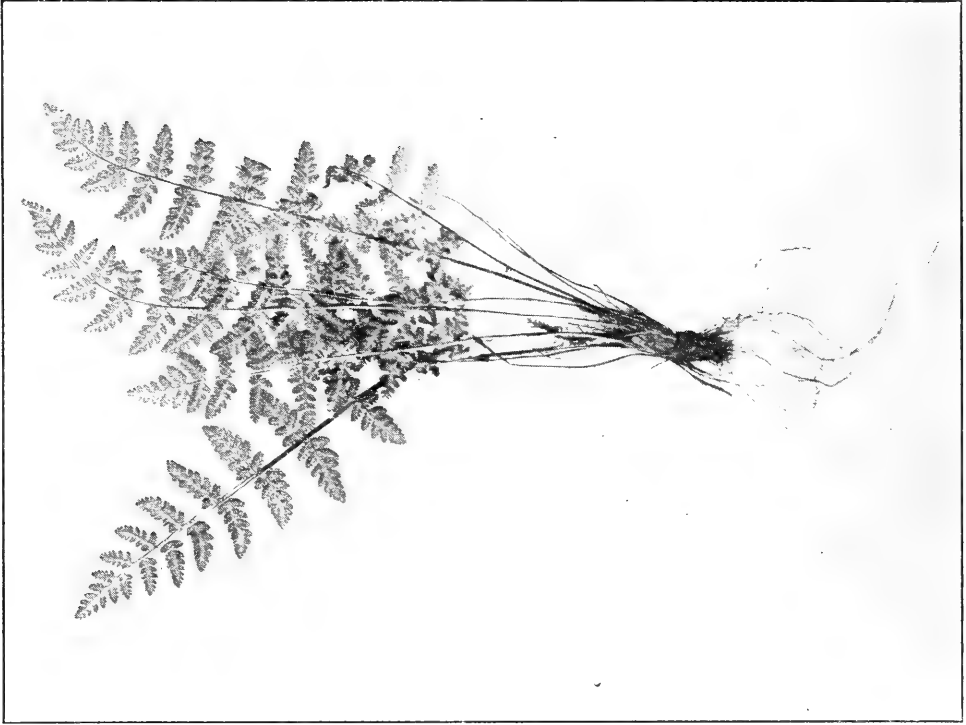
Underwood—Our Native Ferns.

Piper—Check-list of Flora of the State of Washington.

Clute—Fern Bulletin.

Britton and Brown—Flora of Northern States.

Waters—Ferns.



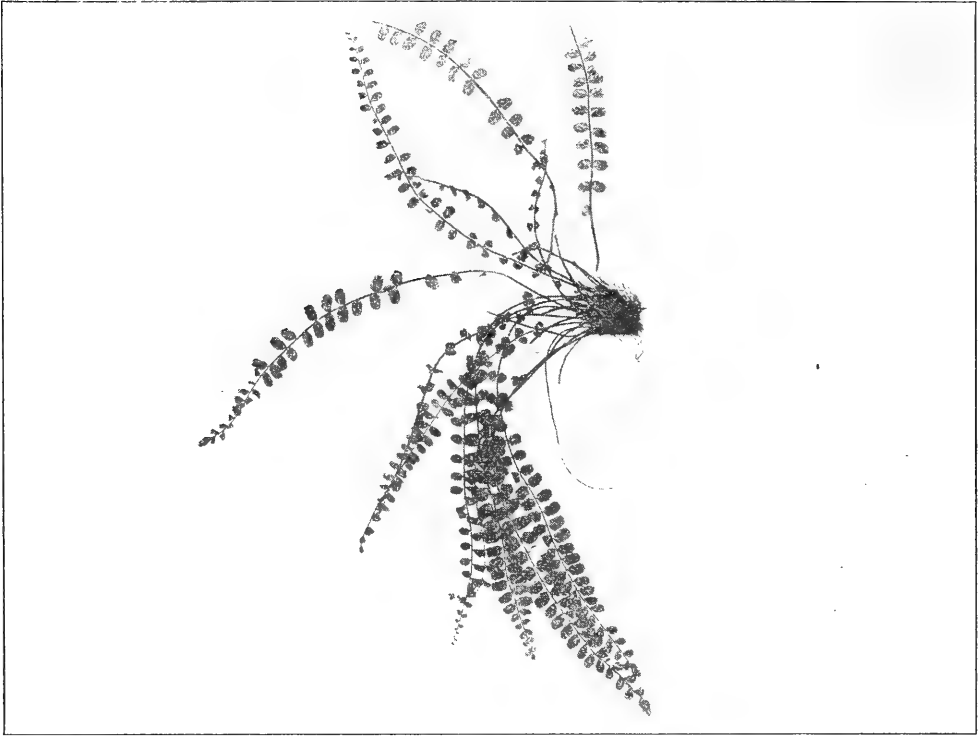
ROCKY MOUNTAIN WOODSIA. (*Woodsia scopulina*)



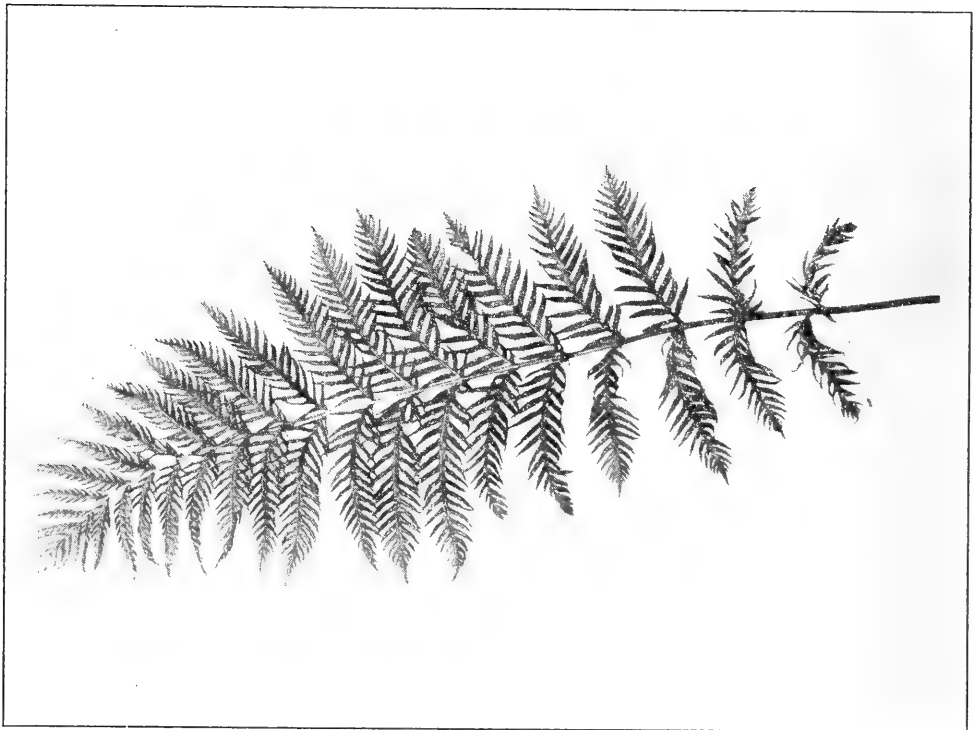
BLADDER FERN. (*Fritia fragilis*)

GLOSSARY.

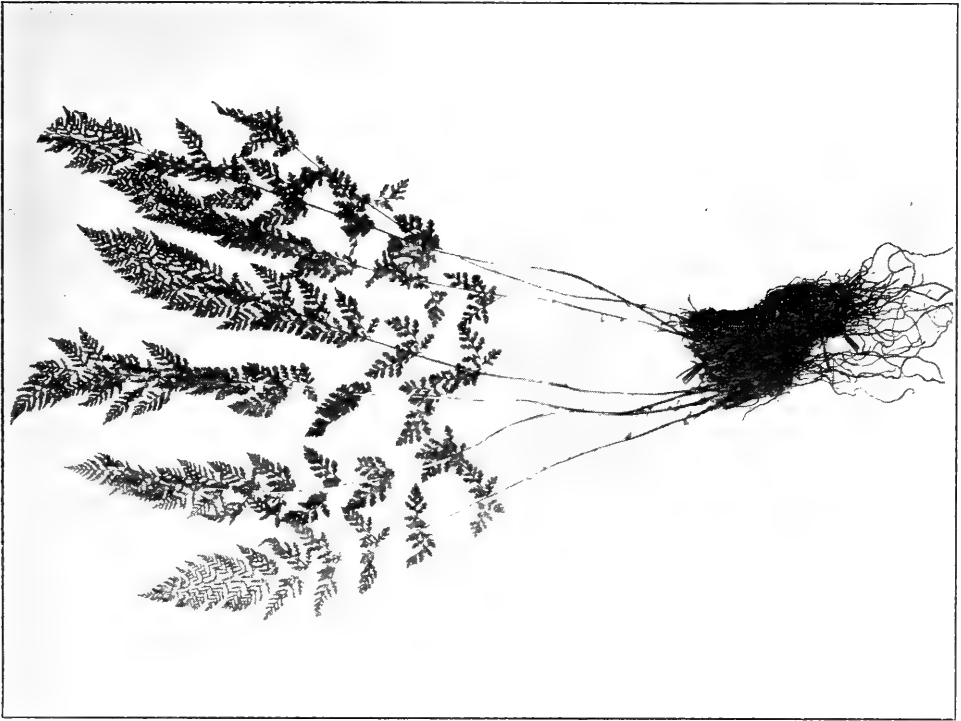
- Fertile*—Bearing spores.
- Fronde*—Leaf of a fern.
- Gland*—A cell, usually a hair, that yields a secretion.
- Habit*—General appearance of a plant.
- Habitat*—The locality in which a plant grows; also its distribution.
- Indusium*—The thin membrane covering a fruit dot.
- Inferior*—Attached below; 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.



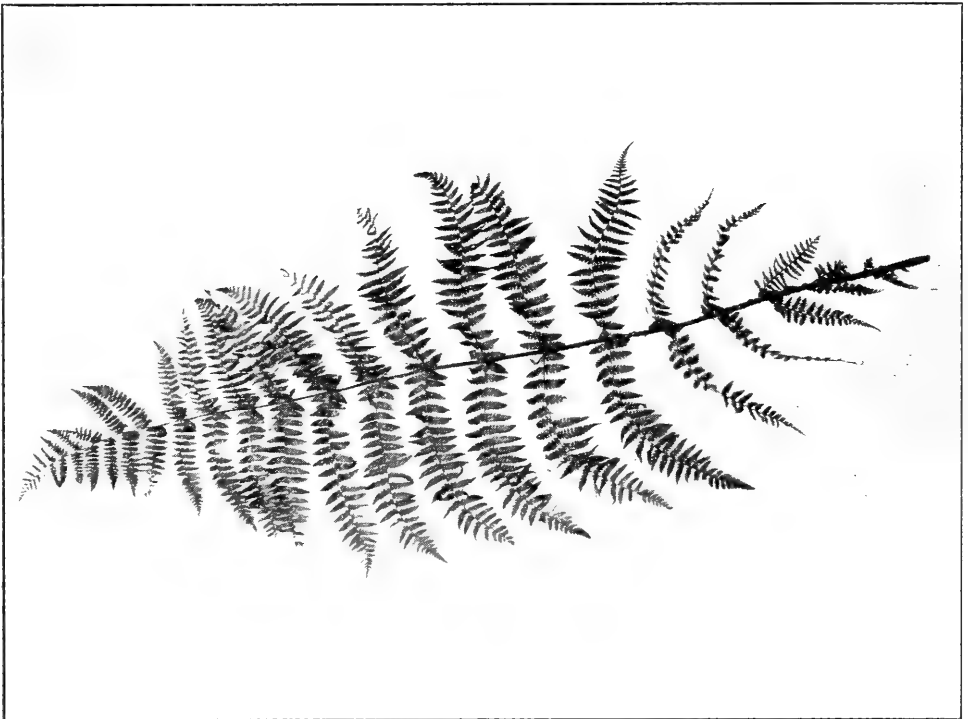
MAIDEN HAIR—SPLEENWORT
(*Asplenium trichomanes*)



CHAIN FERN. (*Woodwardia radicans*)



ALPINE BEECH FERN. (*Phegopteris alpestris*)



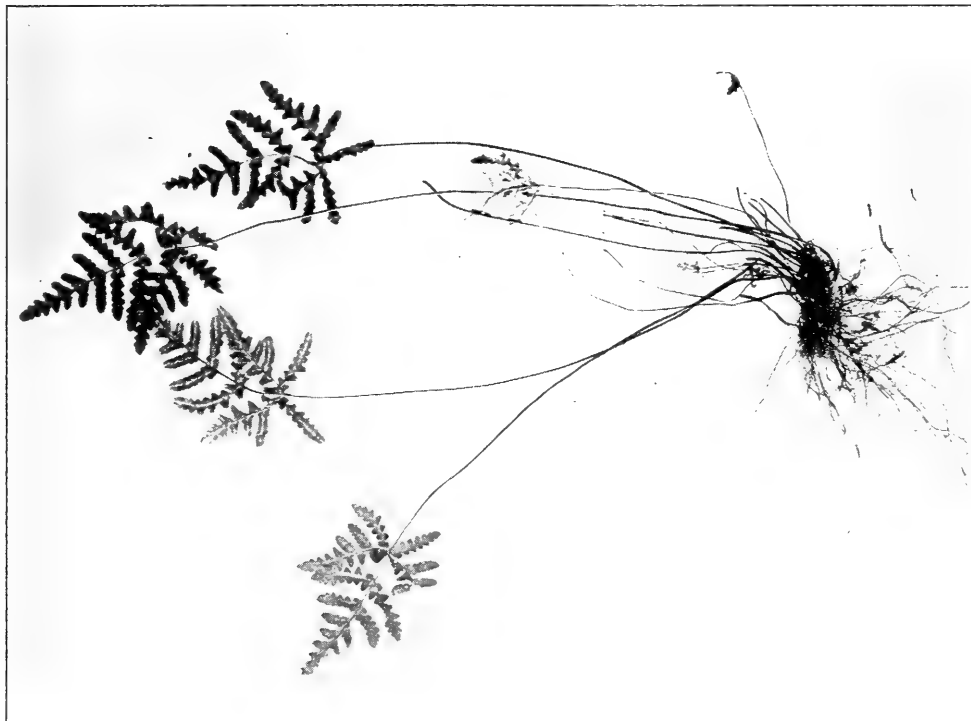
LADY FERN. (*Athyrum cyclosporium*)



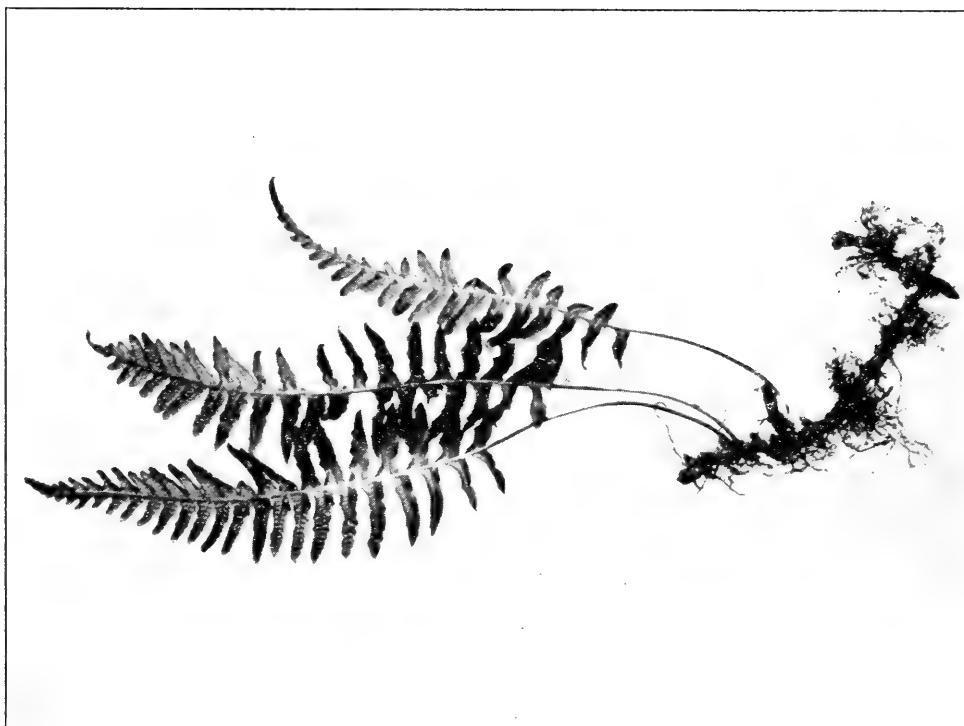
LEATHER-LEAF POLYPOD. (*Polypodium scolopendri*)



OAK FERN. (*Phegopteris dryopteris*)



GOLD-BACKED FERN. (*Ceropteris triangularis*)



LICORICE FERN. (*Polypodium occidentale*)

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