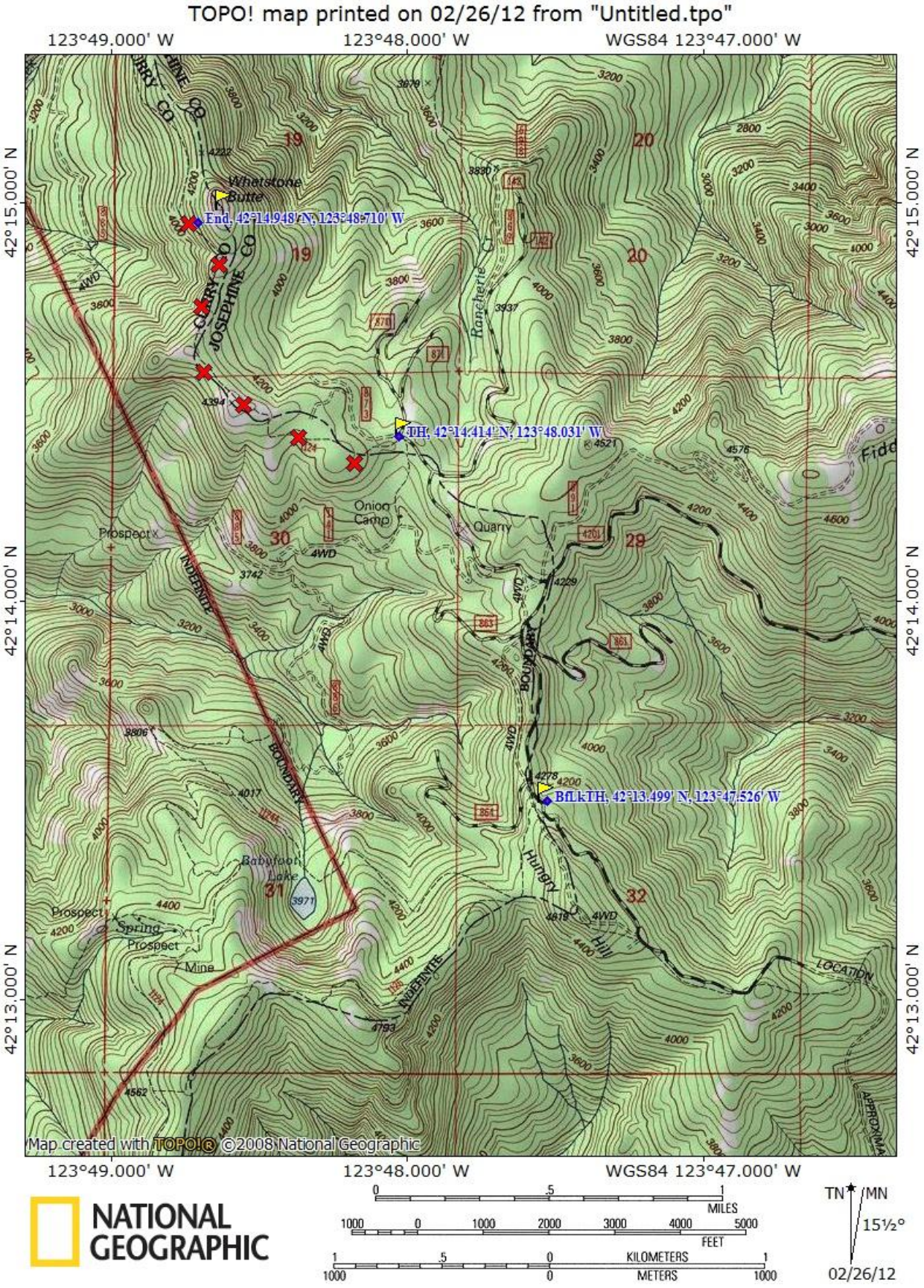
Babyfoot Lake (SW corner of map)



Plant list for Days Gulch Fen and Babyfoot Lake Botanic Area (With Selected Taxa from the Road Up) Josephine County, Oregon--missing 2008 updates!

List compiled by Linda Ann Vorobik & Veva Stansell
with reference to previous lists of many fellow botanists

Note: Order is alphabetical by scientific name under the following major groups:
I. Ferns, II. Gymnosperms, III. Dicots, IV. Monocots;

Family				Scientific Name	Common Name
DG = Days Gulch	**BF = Babyfoot Lake**	**RU = Road en route**			
I. FERNS AND FERN ALLIES - Reproduction by spores; JM Key to Families, Group 2, p. 62					
Dennstaedtiaceae					
		RU		☐ *Pteridium aquilinum*	Braken Fern
Dryopteridaceae					
			BF	☐ *Cystopteris fragilis*	Fragile Fern
DG	**RU**		**BF**	☐ *Polystichum imbricans*	Imbricated Sword Fern
Polypodiaceae					
			BF	☐ *Polypodium glycyrrhiza*	Licorice Fern
Pteridaceae					
		RU		☐ *Adiantum aleuticum*	Maidenhair Fern
DG	**RU**		**BF**	☐ *Aspidotis densa*	Indian Dream
	RU		**BF**	☐ *Cheilanthes gracillima*	Lace Fern
			BF	☐ *Cryptogramma acrosticoides*	Parsley Fern
			BF	☐ *Pellaea brachyptera*	
Selaginellaceae					
				☐ *Selaginella* spp.	Little Clubmoss
Thelypteridaceae					
			BF	☐ *Thelypteris* sp.	
II. GYMNOSPERMS - Seeds not enclosed in ovaries; JM Key to Group 7, p.68					
Cupressaceae - leaves scale-like, opposite or whorled, cones woody or with fleshy covering, cone scales fused to bracts					
DG	**RU**		**BF**	☐ *Calocedrus decurrens*	Insence Cedar
DG				☐ *Cupressus lawsoniana/alaskensis*	Port Orford Cedar
			BF	☐ *Juniperus communis*	Juniper
Pinaceae - leaves needles, alternate or whorled, seeds in woody cones, cone-scales with subtending bracts free					
			BF	☐ *Abies amabilis? (tangerine smell)*	
		RU	**BF**	☐ *A. concolor var.*	White Fir
			BF	☐ *A. magnifica* var. *shastensis*	Red Fir
			BF	☐ *Picea breweriana*	Brewer's Spruce
DG	**RU**		**BF**	☐ *Pinus jeffreyi*	Jeffrey Pine
	RU		**BF**	☐ *P. lambertiana*	Sugar Pine
DG	**RU**		**BF**	☐ *P. monticola*	Western White Pine

DG	**RU**	**BF**	☐ *Pseudotsuga menziesii*	Douglas Fir
		BF	☐ *Tsuga mertensiana*	Mountain Hemlock

Taxaceae

		BF	☐ *Taxus brevifolia*	Western Yew

II. Dicots

ANGIOSPERMS: DICOTS - Plants with ovules in ovaries, 2 cotyledons, pinnate or palmate primary leaf veins, flower parts in multiples of (3's) 4's and 5's

Aceraceae - K 4-5 C 4-5 A 4-10 G 2, ovary superior, fruit = samara, leaves opposite, usually simple and palmately lobed, stipules lacking. Z. lumps Acereaceae w/Hippocastinaceae = Sapindaceae, p.153-160.

	RU		☐ *A. macrophyllum*	Bigleaf Maple
		BF	☐ *A. glabrum*	Douglas Maple

Anacardiaceae - K 5 C 5 A 10 G 3: sup ovary, fr = drupe, lvs alt, oft. pinn. comp., oft succulent, poisonous! Z. p.150-153.

	RU		☐ *Toxicodendron diversilobum*	Poison Oak

Apiaceae (Umbelliferae) - K 0 (5) C 5 A 5 G 2 , inferior ovary, fruit a schizocarp w/stylopodium and oil glands, pls w/ (freq. deeply divided to compound) leaves with sheathing stipules. Z. p.193-198**.**

		BF	☐ *Lomatium nudicaule*	Pestle Parsnip
		BF	☐ *Lomatium triternatum*	
DG			☐ *Perideridia* sp.	
		BF	☐ *Sanicula* sp.	

Apocynaceae-

		BF	☐ *Apocynum androsaceum*	Dogbane

Aristolochiaceae-

	RU		☐ *Asarum marmoratum*	Wild Ginger

Asteraceae - ray and disk fls or ligulate fls, +/- chaff, fls in heads w/involucre bracts, K=pappus (absent or) of bristles, scales, etc. fr = achene), florets 5-merous, w/inferior, 2-carpellate ovary; style branches various. Z. 203-211.

DG	**RU**	**BF**	☐ *Achillea millefolium*	Yarrow
		BF	☐ *Antennaria rosea*	
		BF	☐ *A. sufftrutescens*	
		BF	☐ *Arnica spp.*	
DG	**RU**	**BF**	☐ *Arnica cernua*	
		BF	☐ *Arnica spathulata*	
DG			☐ *Balsamorhiza deltoidea*	Balsamroot
DG			☐ *Balsamorhiza sericea*	
		BF	☐ *Blepharipappus* sp.	
		BF	☐ *Cacaliopsis nardosmia*	
	RU		☐ *Cirsium occidentale*	
		BF	☐ *Erigeron (cervinus)*	
		BF	☐ *Erigeron foliosus*	Erigeron
		BF	☐ *Erigeron perigrinus*	Erigeron
DG	**RU**	**BF**	☐ *Eriophyllum lanatum*	Oregon Sunshine
DG			☐ *Helenium bigelovii/H. puberula*	
DG	**RU**	**BF**	☐ *Hieracium albiflorum*	White-flowered Hawkweed
	RU		☐ *Hieracium* ?*scouleri* (yellow heads)	Hawkweed

	BF	☐ *Luina hypoleuca*	Silverleaf
RU		☐ *Senecio macounii*	Groundsel
RU		☐ *S. hesperius*	Groundsel
RU		☐ *S. integerrimus*	Groundsel
DG		☐ *Wyethia* sp.	Mule's ears

Berberidaceae - K 3 + 3 C 3 + 3 A 4 - 18 G 2-3, ovary superior, unicarpellate, unilocular, fr=berry, anthers dehiscing by flaps; *Berberis* spp., mahonia, barberry (and *Achlys,* vanilla leaf, and *Vancouveria*, insideout flower).

	BF	☐ *Achlys triphylla* ssp. *triphylla*	Vanilla Leaf
	BF	☐ *Berberis nervosa*	Oregon Grape
	BF	☐ *B. repens*	Oregon Grape

Betulaceae - plants monoecious, flowers reduced to catkins, fruit a nut or samara, leaves alternate, simple, stipulate. Z. p.176-179.

RU		☐ *Alnus rhombifolia*	White Alder

Boraginaceae - K 5 C 5 A 5 G 2 ,ovary superior, fr = nutlet, 4/flower, mainly herbs

		☐ *Cryptantha* spp.	
RU		☐ *Lithospermum ruderale*	

Brassicaceae - K 4 C 4 A 4+2 G 2 ,ovary superior, fr = silicle or silique, mainly herbs, many weeds

DG	**RU**	☐ *Arabis aculeolata*	
	RU **BF**	☐ *Arabis koehleri* ssp. *koehleri*	
	BF	☐ *Cardamine* spp.	
	BF	☐ *Streptanthus tortuosus*	

Campanulaceae - K 5 C 5 (z) A 5 G 3 (2, 5), fr = capsule, dehiscing at tip by pores or short valves.

Caprifoliaceae - K 5 C 5 A 5 G 1-5 , ovary inferior, fr = berry, drupe, or capsule, herbs and shrubs w/ opposite lvs. Z. p.198-203.Z. p.211-213.

	BF	☐ *Linnaea borealis*	
	BF	☐ *Lonicera ciliosa*	
	BF	☐ *Symphoricarpos albus*	Snowberry

Caryophyllaceae - K 5 C 5 A 10 G 2-5 , ovary superior, free-central placentation, fr = capsule, petals often notched or lobed, herbs w/ opposite lvs and swollen nodes. Z. p.54-56.

	BF	☐ *Moerhingia macrophylla*	Bigleaf Sandleaf

Convolvulaceae - K 5 C 5 A 5 G 2 superior ovary, vines with alternate, hastate leaves. Z. p.215-7.
Calystegia soldanella, beach morning glory

Crassulaceae - leaf succulents w/ 5-merous flowers, K 5 C 5 A 10 G 5 , ovary superior, fr = follicle.
Dudleya farinosa, live-forever
Sedum spp., stonecrop

	BF	☐ *Sedum laxum*	Stonecrop
	BF	☐ *S. spathulifolium*	

Ericaceae - K 5 C 5 A 10 G 3-5, ovary sup or inf., fr = berry or capsule. mainly shrubs or woody perennials (often w/ leathery leaves), (saprophytes), micorhizal associations, anthers w/porricidal dehiscence and appendages. Z. p.77-81.

	RU		☐ *Arbutus menziesii*	Madrone
	RU	**BF**	☐ *Arctostaphylos nevadensis*	Pine Mat
	RU	**BF**	☐ *A. patula*	Greenleaf Manzanita
DG	**RU**		☐ *A. viscida*	
		BF	☐ *Chimophila menziesii*	Little Prince's Pine
		BF	☐ *C. umbellata*	Prince's Pine
		BF	☐ *Gaultheria ovatifolia*	
		BF	☐ *G. shallon*	Salal
DG			☐ *Ledum glandulosum*	Labrodor Tea
		BF	☐ *Orthila secunda*	
		BF	☐ *Pyrola asarifolia*	
		BF	☐ *P. picta*	
		BF	☐ *Rhododendron macrophyllum*	Wesern Rhododendron
DG	**RU**		☐ *R. occidentale*	Western Azalea
		BF	☐ *Sarcodes sanquineum*	Snow Plant
		BF	☐ *Vaccinium myrtillus*	
		BF	☐ *V. parvifolium*	Huckleberry
		BF	☐ *V. scoparium?*	Huckleberry

Fabaceae - K 5z C 5z A 9+1 G 1, ovary sup, fr = legume or loment, lvs w/stipules, oft compound, nitrogen fixers, (Papilionoideae, Caesalpinoideae, Mimosoideae). Z. p.160-166.

RU		☐ *Lotus crassifolius*	
RU		☐ *L. purshianus*	
	BF	☐ *Lupinus sp.*	Lupine
	BF	☐ *Thermopsis macrophyllum*	

Fagaceae- plants monoecious, flowers minute, female flowers in leaf axils, male flowers in catkins, fruit a nut, leaves simple, alternate, stipulate. Z. p.179-181.

RU	**BF**	☐ *Chrysolepis chrysophylla*	Chinquapin
RU	**BF**	☐ *Lithocarpus densiflorus*	Tanoak
RU	**BF**	☐ *Quercus chrysolepis*	Canyon Live Oak
	BF	☐ *Q. sadleriana*	Deer Oak
RU	**BF**	☐ *Q. vaccinifolia*	Huckleberry Oak

Fumariaceae: see Papaveraceae

Garryaceae- Shrubs with male and female catkins and thick, elliptic to ovate, leathery leaves

	DG	☐ *Garrya buxifolia*	Garrya, Silk-Tassel Bush
	BF	☐ *G. fremontii*	Fremont's Silk-Tassel Bush

Gentianaceae - opposite leaves, 4- or 5-merous.

	DG	☐ *Gentiana setigera*	

Geraniaceae - K 5 C 5 A 10 G 5 , ovary superior, fr = schizocarp w/ "drill seeds", often palmately lobed to compoud leaves (*Erodium* spp.*, Geranium* spp.). Z. p.139-141.

Grossulariaceae - K 5 C 5 A 5 G 2, ovary inf, fr = berry. sepals more showy than petals, lvs palm lobed, berries spiny (gooseberries) or not (currants)

RU	**BF**	☐ *Ribes roezlii* var. *cruentum*	Currant
RU		☐ *Ribes sanguineum*	Currant

Hydrophyllaceae - K 5 C 5 A 5 G 2 , ovary superior, fr = capsule. herbs w/exerted stamens, parietal placentation, alt or basal lvs (often lobed - compound), scorpiod cymes.

Phacelia, Hydrophyllum spp., various habitats including alpine

	RU	☐ *Eriodictyon californicum*	
DG	**RU**	☐ *Phacelia corymbosa*	
	BF	☐ *Romanzoffia sp.*	

Lamiaceae - K 5z C 5z (4z) A 4(2) G 2 , ovary sup w/ gynobasic style, fr = nutlet (4/fl), opposite lvs, aromatic foliage. Z. p.265-270.

DG	☐ *Monardella* spp.	
DG	☐ *Prunella vulgaris*	

Lauraceae- simple, alternate, aromatic leaves, small, yellow-green, bisexual flowers in umbels, fruit a drupe. Z. p.35-37.

RU	**BF**	☐ *Umbellularia californica*	Oregon Myrtle, California Bay

Lentibulariaceae-similar to Scroph.

DG	☐ *Pinguicula macroseris*	

Linaceae-regular 5-merous blue flowers

DG	☐ *Linum* sp.	

Malvaceae - K 5 C 5 A num G 1-num , ovary superior, fr = schizocarpous capsule, filament tube, stellate hrs, lvs stipulate, often palmately lobed (to compound!). Z. p.90-94.

DG	☐ *Sidalcea malvaeflora* ssp. *asprella*	

Onagraceae - K 4 C 4 A 8 G 4 , ovary inferior (hypanthium), fr = capsule, bery or small nut, seeds commose. Z. p.229-232.

DG	☐ *Epilobium minutum*	

Orobanchaceae - floral formula like that of Scrophulariaceae, but plants non-photosynthetic

BF	☐ *Orobanche uniflora*	Broomrape

Papaveraceae - K fused C 4 A num G 1 , ovary superior, fr = capsule. Z. p.45-49.

BF	☐ *Dicentra formosa* var. *formosa*	Bleeding Heart
RU	☐ *D. formosa* var. *oregana*	

Plantaginaceae - flowers 4-merous, brown, in scapose spikes; leaves all basal

RU	☐ *Plantago lanceolata.*	Plantain

Philadelphaceae

BF	☐ *Whipplea modesta*	Modesty, Yerba de Selva

Polemoniaceae - K 5 C 5 A 5 (i) G 3 , ovary superior w/3 style branches, fr = capsule, placentation axile. herbs w/salverform flowers, various pollination schemes. lvs usually simple, alternate, w/o stipules. Z. p.220-222.

RU	☐ *Gilia capitata*	
BF	☐ *Microseris gracilis?*	
RU	☐ *Phlox speciosa*	Phlox

Polygalaceae

RU	☐ *Polygala californica*	

Polygonaceae - P 3-6 A 6-9 G 2-4 , ovary sup, fr = achene, nut; papery, sheathing stipules (ochrea). Z. p.86-87.

RU		☐ *Eriogonum compositum*	
RU		☐ *E. nudum*	
	BF	☐ *E. ternatum*	

Portulacaceae - K 2 C 5 (10, num) A 5 G 3 , ovary superior, fr = capsule, free central placentation. 2-sepalaceae, herbs. Z. p.56-58.

	BF	☐ *Calyptridium umbellatum*	Pussypaws
	BF	☐ *Lewisia cotyledon*	
	BF	☐ *Montia parvifolia*	

Primulaceae - K 5 C 5 A 5 G 1 , ovary superior, fr = capsule, stamens opp. petals! herbs

	BF	☐ *Dodecatheon ?jeffreyi*	Shooting Stars
DG	**BF**	☐ *Trientalis latifolia*	Starflower

Ranunculaceae - K 5 to num C 5 to num A num G num, pistils simple, fr = achene, berry, follicle. herbs w/alternate lvs, fls actinomorphic or zygomorphic, perfect or unisexual. Z. p.42-45.

DG		☐ *Caltha* sp.	Marsh Marigold
		☐ *Delphinium (nuttallianum)*	
DG		☐ *Ranunculus occidentalis*	Western Buttercup

Rhamnaceae - K 5 C 5 A 5 G 3 , ovary sup, fr = capsule, berry, petals clawed, stamens opposite petals; lvs entire, nitrogen fixers. Z. p.105-107.

FM		☐ *Ceanothus cordulatus/C. cuneatus*	
	RU	☐ *Ceanothus integerrimus*	Deer Brush
DG		☐ *C. prostratus*	
DG		☐ *C. pumilus*	Dwarf Ceanothus
	RU	☐ *C. velutinus*	
DG		☐ *Rhamnus californicus* ssp. *occidentalis*	
		☐ *R. purshiana*	Cascara

Rosaceae - five-merous flowers with hypanthium and numerous stamen, lvs alternate with stipules. Z. p.181-185.

Rosoideae: K 5 C 5 A num G num, a, ovaries sup, fr = achene, drupelets, hip. ex: *Rosa*
Prunoideae: K 5 C 5 A num G 1 (2), ovary sup, fr = drupe. Ex:*Prunus*
Spiroideae: K 5 C 5 A num G 5a, ovary sup, fr = follicle. Ex: *Spiranthes*
Maloideae: K 5 C 5 A num G 5, ovary inf, fr = pome. Ex: *Malus*

DG	**BF**	☐ *Amelanchier* spp.	Service Berry
	BF	☐ *Fragaria vesca*	Wild Strawberry
	BF	☐ *Holodiscus discolor*	Ocean Spray
DG		☐ *Horkelia congesta/sericea*	
	BF	☐ *Potentilla (glandulosa)*	Sticky Cinquefoil
	BF	☐ *Rosa gymnocarpa*	Wild Rose
	RU	☐ *Rubus parviflorus*	Thimbleberry
	BF	☐ *R. ursinus*	Blackberry
DG		☐ *Sanguisorba* (*officinale*?)	
	BF	☐ *Sorbus sitchensis*	Mountain Ash

Rubiaceae - ours dioecious 4-merous herbs with inferior ovaries and whorled leaves

		☐ *Galium* spp.	Bedstraw

Salicaceae- alternate, simple, stipulate leaves, plants dioecious, flowers in catkins, fruit a capsule, seeds comose. Z. p.114-116.

	RU	☐ *Salix* spp.	Willow

Sarraceniaceae - Pitcher Plants!

DG	**RU**		☐ *Darlingtonia californica*	California Pitcher Plant

Saxifragaceae - (lab only) K (4) 5 C (4) 5, A (4) 5, 10 G 2 (3) fr = caps or berry, ex. *Tellima,* herbaceous often woodland plants with palmately lobed (compound) leaves.

	RU		☐ *Heuchera (micrantha)*	Alumroot
		BF	☐ *Mitella pentandra*	Mitre's cup
DG			☐ *Parnassia palustris*	
		BF	☐ *Saxifraga ferruginea*	
		BF	☐ *S. howellii*	
		BF	☐ *S. mertensiana*	

Scrophulariaceae - K 5 (4) z C 5 (4) z A 4 (5 or 2) G 2 , ovary superior, fr = capsule or berry, axile placentation, herbs or shrubs w/ alt or opp lvs, stamens often didynimous. Z. p.250-254.

DG			☐ *Castilleja brevilobata*	Indian Paintbrush
DG			☐ *C. miniata* ssp. *elata*	Indian Paintbrush
	RU		☐ *C. pruinosa*	
DG	**RU**		☐ *Collinsia (linearis)*	
DG			☐ *Mimulus guttatus*	Monkeyflower
DG			☐ *Orthocarpus bracteata*	
DG	**RU**	**BF**	☐ *Penstemon azureus/parvulus*	
		BF	☐ *P. davidsonii*	
		BF	☐ *P. rupicola*	

Solanaceae - K 5 C 5 A 2-5 G 2, ovary sup, fr = berry or capsule, axile placentation. pls w/exstipulate, alt, simple lvs. Z. p.213-315.

Violaceae - K 5 C 5z A 5z G 3, fr = caps, plac. parietal, *Viola* only. Z. p.112-114.

		BF	☐ *Viola cuneata*	
		BF	☐ *V. hallii*	Hall's Violet
		BF	☐ *V. sempervirens*	

IV. ANGIOSPERMS: MONOCOTS - Plants with ovules in ovaries, 1 cotyledon, primary leaf veins mostly parallel, flower parts in multiples of 3's (4's)

Cyperaceae - lvs 3-ranked and stems (mostly) triangular, stems solid, nodes not swollen, bracts single below fl, infl of 1-sev. spikes (spikelets), preianth parts bristle-like or sac-like (perigynium), fr = achene, mostly aquatic or semiaquatic herbs. "graminoid". Z. p.347-350.

DG		**BF**	☐ *Carex* (*mendocinenesis*)	Sedge
DG			☐ *Eriophorum* sp.	

Iridaceae - P 3+3 A 3 G 3, ovary inferior, fr = capsule or berry. Z. p.273, 276-280.

	RU		☐ *Iris* (*bracteata-short tube*)	Iris
DG			☐ *Iris (inominata-long tube)*	Iris
DG			☐ *Sisyrinchium bellum*	Blue-eyed Grass

Juncaceae - P 3+3 A 3 OR 6 G 3 , ovary superior, fls minute, green or brown, fr = capsule, lvs 2-ranked, sheaths not obvious, lvs often round and stem-like, stems round, mostly solid, nodes not swollen, infl a panicle or cymose, pls usually aquatic to semiaquatic. "graminoid". Z. p.345-347.

DG			☐ *Juncus (reigelii)*	
		BF	☐ *Luzula comosa*	Woodrush

Liliaceae - P 3+3 A 6 G 3 , ovary superior (inferior in Agave), fr = capsule or berry, mostly herbs or leaf succulents. Z. p.270-273.

	DG?			*Allium amplectens*	
	DG			*A. falcifolium*	Onion
FM			**BF**	*A. siskiyouense*	
	DG			*Camasia howellii*	Camas
			BF	*Clintonia uniflora*	Queen's cup
	DG	**RU**		*Hastingia bracteosa*	
			BF	*Lilium (columbianum)*	Lily
			BF	*Lilium (pardilinum?)*	Lily
	DG			*Narthecium californicum*	
			BF	*Smilacina racemosa*	False Solomon's Seal
			BF	*Stenanthium occidentale*	Brown's Bells
	DG			*Tofieldia glutinosa*	
			BF	*Trillium ovatum*	
	DG			*Tritelaea hyacinthina*	White Brodiaea
			BF	*Xerophyllum tenax*	Bear Grass
	DG		**BF**	*Zygadenus venenosus (Z. micranthus)*	Death Camas

Orchidaceae - P 3 + 3 z A pollinia G column, herbs w/specialized flowers (lip, pollinia, column). Z. p.293-297.

			BF	*Calypso bulbosa*	Fairyslipper Orchid
			BF	*Cephalanthera austineae*	Phantum Orchid
			BF	*Corallorhiza (maculata*)	Coralroot Orchid
FM				*C. mertensiana*	Coralroot Orchid
	DG?			*Cypripedium californicum*	
FM				*Disporum hookeri*	
			BF	*Goodyera oblongifolia*	Rattlesnake Plantain
			BF	*Listera caurina*	Twayblade
			BF	*(L. cordata)*	
FM				*Piperia unalaskensis*	
	DG			*Platanthera sparsiflora*	

Poaceae - leaves 2-ranked, stems round, hollow except at swollen nodes, infl of numerous specialized bracts (glumes, lemmas, paleas) arranged in spike or panicle, perianth inconspicuous (lodicules), fr = grain, mostly ubiquitous (grow in many environments) herbs. Z. p.350-356.

	DG			*Agrostis/Calamagrostis*	
	DG			*Aira caryophylla*	
	DG			*Danthonia californica*	
		RU		*D. (intermedia)*	
	DG			*Deschampsia cespitosa*	
		RU		*Elymus glaucus*	
FM		**RU**		*E. elymoides*	Squirrel Tail
			BF	*Festuca* sp.	
	DG	**RU**		*Festuca californica*	
	DG	**RU**		*F. idahoensis*	
	DG			*Melica (geyeri)*	
	DG			*Nassella lemmonii*	
	DG			*Panicum capillare*	
	DG	**RU**		*Poa sp.*	

Final disclaimer: draft copy - list to be edited and improved as needed.

USDA Rogue River-Siskiyou National Forest

United States Department of Agriculture
Forest Service • Pacific Northwest Region

The TJ Howell Botanical Drive

A 7.5-mile Interpretive Drive

The TJ Howell Botanical Drive

Named for Thomas Jefferson Howell, an early botanical explorer of Oregon, this drive has been designed to share some of the natural wonders of the Siskiyou Mountains. You can learn about plants and explore habitats influenced by serpentine geology, visit the Wild and Scenic Illinois River, and see some of the effects of the 2002 Biscuit Fire.

Approximately 7.5 miles of the Eight Dollar Road is designated as The TJ Howell Botanical Drive. The drive passes predominately through the Josephine Ophiolite, a large chunk of upper mantle and oceanic crust that has been shoved up above sea level, exposing ultramafic serpentine and its parent rock, peridotite. Part of the Klamath-Siskiyou Mountains, this location is one of the largest serpentine areas in North America.

Only plant species that can tolerate extreme conditions grow here. Thin soils, heavy metals (magnesium, nickel, chromium, iron), and nutrient stress (low amounts of calcium and nitrogen) make these serpentine soils inhospitable to most plants. Many unusual, rare, or endemic species have evolved under these conditions, while other plants have special adaptations for survival, or exist in stunted form.

Learn more about the Klamath-Siskiyou Serpentines:
Visit the US Forest Service *Celebrating Wildflowers* site:
www.fs.fed.us/wildflowers/communities/serpentines/index.shtml

For more information about the area, please contact the Rogue River-Siskiyou National Forest, Wild Rivers Ranger District at (541) 592-4000. A local plant list is available at: www.fs.fed.us/r6/rogue-siskiyou/publications/

Drive Directions and Safety: From Hwy. 199 turn west onto Eight Dollar Road and travel for one mile. Set your odometer to zero at the parking area. All mileage is listed from this point. Drive carefully; the road is narrow, and gravel portions are rough and washboarded. Beware of falling tree limbs on windy days, and keep an eye out for rattlesnakes and poison oak.

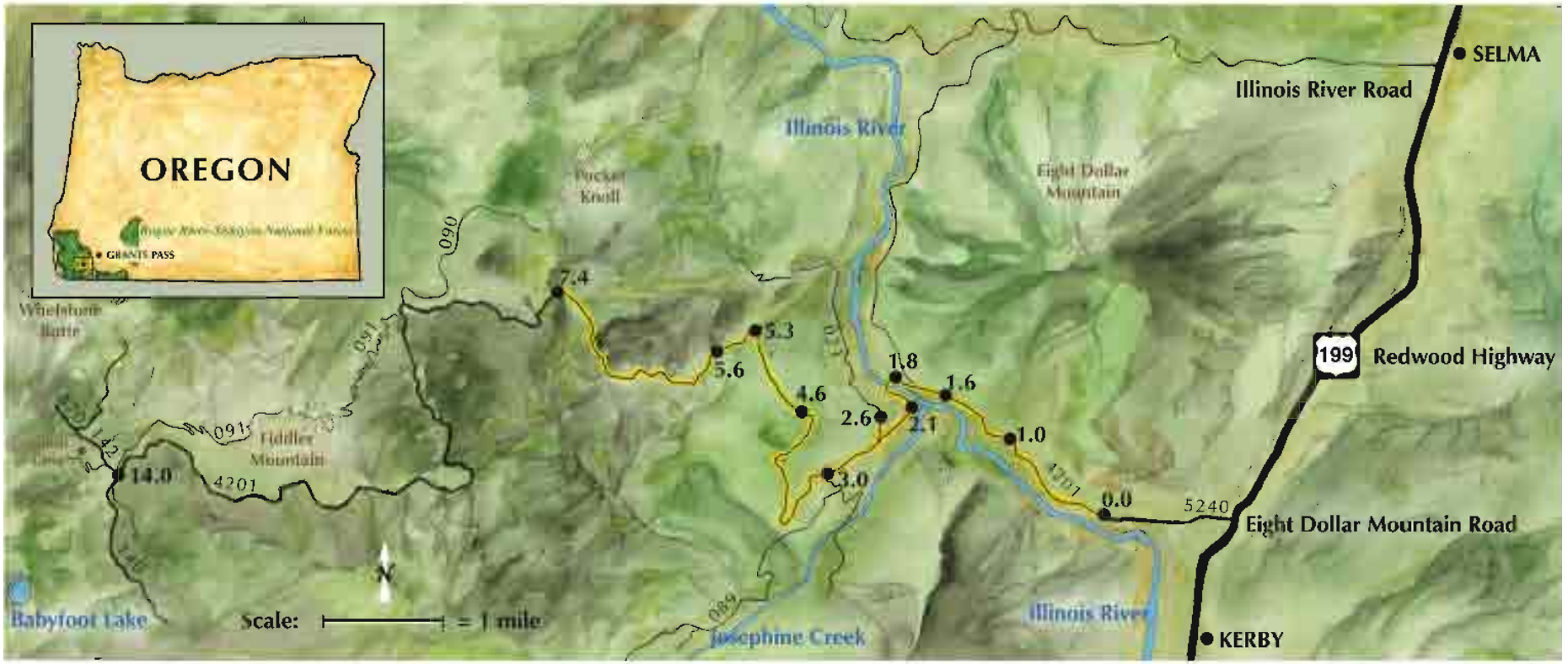
Who was TJ Howell?

Thomas Jefferson Howell (1842-1912) was Oregon's earliest pioneer botanist and created the first species guidebook to regional flora for the Pacific Northwest. Howell was very determined, botanizing extensively despite being poor and only semi-literate.

A Flora of Northwest America was self-published in seven fascicles (1897-1903) and consisted of 3,150 species, 89 of which were newly described by Howell. He collected over 500 specimens from Josephine County, including 46 type specimens! A type specimen is a pressed herbarium specimen upon which the original plant description is based - important in the science of plant taxonomy. Howell also collected tens of thousands of plant specimens from Washington and Oregon and donated approximately 10,000 specimens to the University of Oregon.

Thos. Howell

Location Map



Suggestions for your visit:

Half-hour visit:
- Eight Dollar Mountain Botanical Wayside

One-hour visit:
- Eight Dollar Mountain Botanical Wayside and Interpretive Signs at Eight Dollar Bridge

Two-hour visit:
One-hour visit plus one of the following:
- Little Falls Trail Hike
- The TJ Howell Botanical Drive (no hikes)

Four-hour visit or repeat visit:
Two-hour visit plus one of the following:
- Jeffrey Pine Loop Hike *
- Little Falls Trail Hike
- Contact Trail Hike

The TJ Howell Botanical Drive

0.0 The TJ Howell Botanical Drive Welcome Sign. Park in the large lot on the left-hand side of the road. The welcome sign features an overview of the drive and a map. Copies of this brochure are also available.

The Eight Dollar Mountain Botanical Wayside. The boardwalk trail is a short distance up the paved road on the right. May is a good month to see wild azaleas in bloom.

A few handicap parking sites are available past the gate and up the paved road approximately 500 ft. This area can also be used for drop-off and pick-up, if needed.

View and learn about the insectivorous California pitcher plant, *Darlingtonia californica*, its wet serpentine habitat, and the drier surrounding slopes. Factors that make the Klamath-Siskiyou Mountains so unique are described.

* Back at the parking area, the Jeffrey Pine Loop Trail is scheduled to be completed and will traverse downslope to near the Illinois River and connect to Little Falls Trail.

1.0 Little Falls Trail. Adjacent to the three-site campground, the trailhead marked "Illinois River" is the start of a wonderful one-mile loop. This hike, through serpentine habitats, passes along a historic mining ditch, near a fen and Port Orford cedar, and parallels the Illinois River.

Look for wildflowers blooming in early spring. Little Falls can be a good place to view migrating salmon in the fall.

1.6 Josephine Creek. Use the pull-out on the left to enjoy the view of Josephine Creek converging with the Illinois River. The first gold claim in Oregon was made in 1851 on this creek by Lloyd Rollins. Both the creek and the county were later named for his daughter.

1.8 Interpretive Signs at Eight Dollar Bridge provide information about the Illinois River, Eight Dollar Mountain and Days Gulch Botanical Areas, and identify a few of the early botanists that explored the Siskiyou Mountains.

2.1 Josephine Camp. In spring, interesting plant species, including Howell's saxifrage *(Saxifraga howellii)*, grow on the right road bank preceding the camp. For plant enthusiasts wanting a closer look, park at Josephine Camp and walk back. Be careful to watch for traffic.

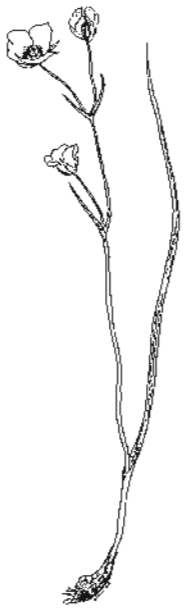
2.5 Parking for Days Gulch Botanical Area. Turn right on FS Rd. #023 and go 0.1 mile to the parking area.

2.6 Days Gulch Botanical Area. For a short stroll to see what is blooming, duck under the fence that was constructed to keep this area off-limits to vehicular traffic.

Discover and explore! Wander by foot in the meadow or walk along the vehicle tracks to the left (south) that follow the edge of the savannah ecotone.

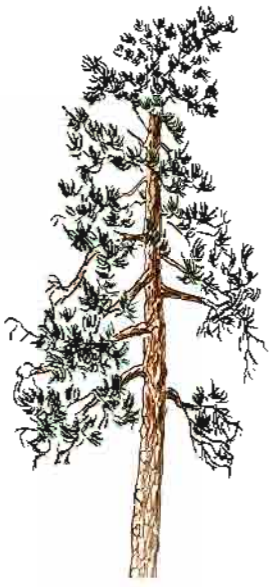
The Howell's mariposa-lily that grows here was first collected by TJ Howell in 1884 at nearby Waldo, a historic mining town just southeast of Cave Junction.

Days Gulch Botanical Area is the location of a long-term study of the Howell's mariposa lily. Population characteristics were first studied from 1983-1991, (Fredericks, Oregon State University) and fifteen years later, predictions are being reviewed (Meinke, Oregon Department of Agriculture).



Monitoring trends suggest the population remains stable, although concerns remain over potential mining and off-road vehicle damage.

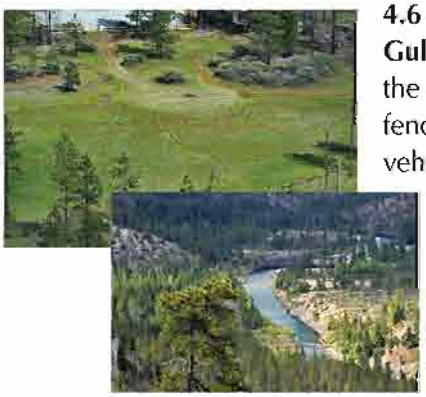
2.7 Return to Main Road - #4201. Days Gulch Botanical Area continues behind fencing constructed by crews from The Job Council and Josephine County Corrections. The fence has been effective in protecting this habitat.



Various fires have burned in this area, beginning at this point on the drive. On the left, a small wildfire burned in 2008 but was quickly extinguished. Remains of dead manzanita are visible near the road.

Two prescribed burns were conducted at Days Gulch Botanical Area in the 1990s. Fire scars remain on the Jeffrey pine trees.

3.0 Pass FS Rd. #029 and begin a steeper climb up the mountain. Look for the first signs of the Biscuit Fire, which occurred in 2002.



4.6 Viewpoint of Days Gulch Botanical Area and the Illinois River. Before fences were constructed, vehicles going off the road damaged the fragile meadow in the distance. These tire tracks are still visible.

5.3 Vista of Eight Dollar Mountain and Eight Dollar Bridge crossing the Illinois River.

5.6 Viewpoint: Mike's Gulch Geologic Contact Zone.

Park 30 feet past the rock pile on side shoulder, and walk back to the opening in the trees for a view across the drainage. The naturally open area down-slope is serpentine. The upper forested slope is Galice meta-sedimentary soil and, although thinned by the Biscuit Fire, the deeper soils grow Douglas fir, sugar pine, tanoak, and Pacific madrone abundantly.

White bleeding heart *(Dicentra formosa spp. oregana)* found along mile 6.

7.4 End of The TJ Howell Botanical Drive. Landing and open area for turning around.

View of Eight Dollar Mountain and the effects of the Biscuit Fire. Thought to be Oregon's largest wildfire in recorded history, at 499,965 acres, the Biscuit Fire began as several small fires on July 13, 2002 after a widespread lightning event. It burned for 120 days.

Most of the fire effects seen from The TJ Howell Botanical Drive are a combination of both the wildfire and effects from fire deliberately set to slow the Biscuit Fire which was rapidly burning up and over Fiddler Mountain to the west and north. Throughout the Biscuit burn area, 44% of the area burned very hot, with more than 75% of the vegetation killed.

Noxious and non-native species are potential concerns throughout disturbed areas. This site was infested with diffuse knapweed before the Biscuit Fire and there was concern over increased spread after the burn. Repeated pulling efforts and monitoring has resulted in a reduction from about 3,000 plants to fewer than 25 plants each year since 2005.

The **Contact Trail** is 1.8 miles round trip and passes through the two geologic zones seen from afar at mile 5.7. The trail follows the edge of an older clearcut harvest unit, then passes within a mixed conifer hardwood forest and provides a contrast with the end of the trail - open rocky serpentine substrate with nice landscape views. This trail is "more difficult" and sporadically maintained.

Potential extensions

These extensions require considerably more time and preparedness. Roads may not be snow-free until June.

Drive to the end of FS Rd. #4201 for grand vistas of the Kalmiopsis Wilderness and view some of the hottest areas burned within the Biscuit Wildfire of 2002.

14.0 Jct. #140 - Babyfoot Lake Trailhead. Travel straight on FS Rd. #140 for 0.7 mile. The 1.5-mile trail leads to a small glacial cirque lake within the Kalmiopsis Wilderness and the Babyfoot Lake Botanical Area.

Brewer's spruce: a few remaining spruce are within easy access of Rd. #140. Drive or walk 0.25 mile past Babyfoot Lake Trailhead and look for the tree with drooping branches and prickly needles.

14.0 Jct. #142 - Kalmiopsis Rim Trailhead. Turn right on FS Rd. #142, and stay left onto FS Rd. #870, for 0.5 mile. Two trailheads for hiking:

- Onion Camp Trail (0.3 mile).
- Whetstone Butte (1 mile) and Chetco Pass (4 miles).

Reference. *Thomas Jefferson Howell and the First Pacific Northwest Flora*, Robert Ornduff, Kalmiopsis Journal of the Native Plant Society of Oregon, Volume 15, 2008.

Historic Howell photo courtesy of Hunt Institute for Botanical Documentation, Carnegie Mellon University, Pittsburgh, PA.

Photos: Lee Webb, Norman Jensen, and Paula Golightly
Artwork: Mary Paetzel, Nancy Wylie, and Lisa Wolf
Illustrations: *Threatened & Endangered Vascular Plants of Oregon* 1982

Thomas Jefferson Howell and the First Pacific Northwest Flora

Robert Ornduff
University of California, Berkeley

Edited for publication by Rhoda M. Love, Cindy Roché and Art Kruckeberg
(Adapted from an essay that will appear in Plant Hunters of the Pacific Northwest, edited by A. R. Kruckeberg and R. M. Love)

Howell's mariposa (*Calochortus howellii*) in the Illinois River Valley, Josephine County; there are brown hairs above the greenish gland. Photo by David McClurg.

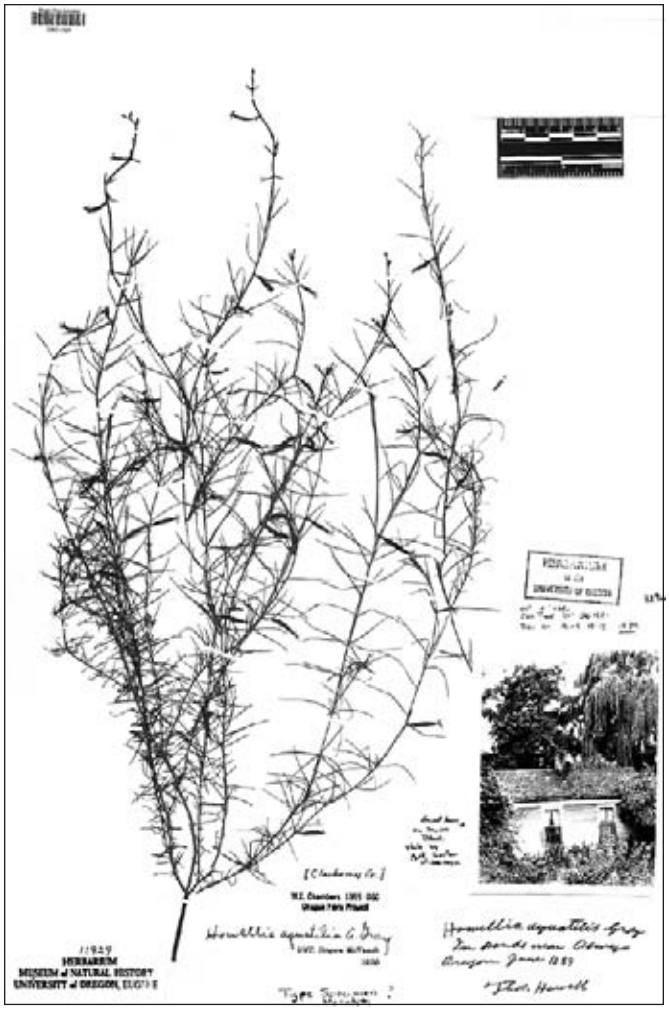
Thomas Jefferson Howell (1842-1912), Oregon's earliest pioneer botanist, was a man of great determination. Despite being desperately poor and only semi-literate, Howell created the first regional flora for the Pacific Northwest, self-published as a series of seven fascicles (Lange 1953). After years of gathering information for a compendium of the flora, he began writing in 1882 when he was 40 years old. The first fascicle appeared fifteen years later and the last was published in August 1903, nine years before Howell's death. The *Flora* consisted of 792 pages (plus a 24-page index) and described 3,150 species of which 89 were newly described by Howell. The seven-volume set was priced at five dollars and, although praised by fellow botanists, was a financial failure for its author.

Howell botanized extensively in Oregon and southern Washington, collecting tens of thousands of specimens, many of which he sent to Eastern herbaria (e.g., the Gray Herbarium at Harvard University) or sold to other botanists (later distributed to major herbaria of the US and Europe). As the last fascicle of his flora was being printed, Howell donated approximately 10,000 specimens from his personal collection (dating from 1875 to 1904) to the University of Oregon, and was paid $500 during the 1903-04 school year to curate his collection (Wagner 1994).

Having a keen botanical eye, Howell discovered numerous new species, including many from the Siskiyou Mountains of Curry and Josephine counties (Chambers 2002). Early in his botanical career Howell made two significant discoveries. The first of these (in 1878) was an aquatic annual he collected with his brother Joseph from a pond near the family farm on Sauvie's Island in the Columbia River west of Portland. It was described in 1879 as *Howellia aquatilis* (Campanulaceae) by Asa Gray, who dedicated this monotypic genus to its "discoverers who are assiduous collectors and acute observers and who have already much increased the knowledge of the botany of Oregon" (Gray 1879).

Thomas Howell's second major discovery was made in 1884, when he collected a new species of spruce along Happy Camp Trail in Siskiyou County, California. The following year this "most remarkable species...singularly different from... any other conifer" (Jepson 1909) was described by Sereno Watson, who named it *Picea breweriana,* after William Henry Brewer (1828-1910) with the California State Geological Survey, co-author with Watson of the *Botany of California* (1876-1880). Watson (1885) wrote that he named this conifer to "compliment" Brewer, who had an "especial interest in the trees of the coast." Ironically, in the fall of 1863 Brewer had visited Happy Camp and the surrounding region (Farquhar 1949), where he almost certainly encountered, but did not recognize as new, the spruce that was later to be named after him and not after its discoverer.[1]

[1]Other references (Sudworth 1908, Griffin and Critchfield 1976) indicate that the actual discoverer was Josiah Whitney who found the weeping spruce from near Castle Crags (California) in 1862 and gave a sample to Brewer, as recorded in Brewer's journal. The following year Brewer found the spruce near Mt. Shasta, and collected a branchlet. Because these collections lacked cones, Watson could not describe the new species. Perhaps the tree should have been named *Picea howelliana*, because Watson used Howell's specimen as the type for the species. On the other hand, a better name might have been *Picea pendula*, describing the distinctive drooping branches.



Herbarium sheet of *Howellia aquatilis* collected by T. J. Howell from the type site on Sauvie Island, with photo of the Howell family cabin on the island. (This house has since been demolished.) Courtesy of OSU Herbarium. Photo of Howell house by A. R. Sweetser, c. 1935.

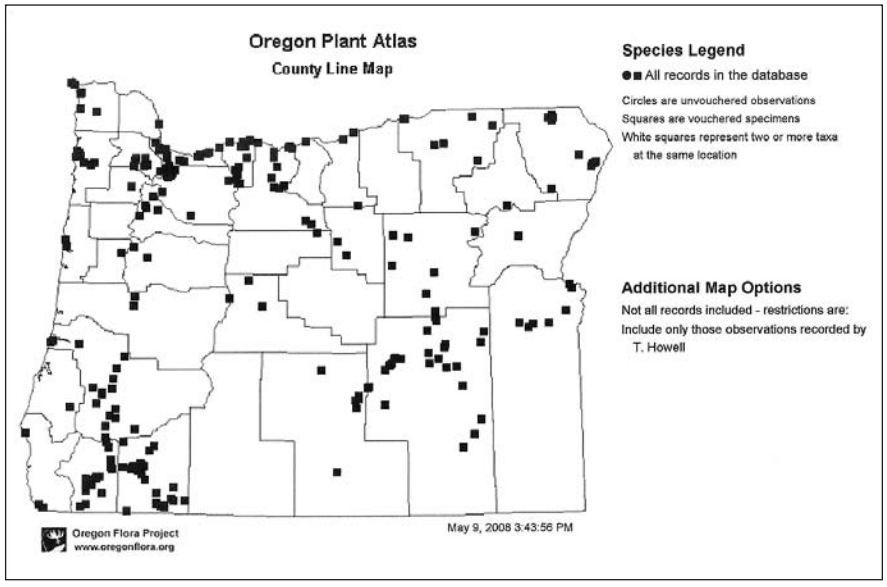
At least 27 taxa still bear Howell's name, although some are now varieties or subspecies (see side bar on page 40). The one genus named for him has only a single species, the federally threatened *Howellia aquatilis*. The range of this delicate annual extends inland from the northern Willamette Valley and the Pacific coast states to Idaho and Montana. In addition to the taxa named for him, Howell also named over 175 taxa, of which 57 are currently accepted by the Oregon Flora Project (pers. comm., Katie Mitchell, from the OFP database).

Three Months in School

Thomas Jefferson Howell was born in Cooper County, Missouri, on October 8, 1842, the youngest of five children of Benjamin and Elizabeth (Matthews) Howell: Joseph (b. 1829), John Benjamin (b. 1831), Sarah (b. 1833), Rebecca (b. 1839), and Thomas Jefferson. Benjamin's mother was Sarah Rittenhouse, a descendent of David Rittenhouse, colonial Pennsylvania mathematician and philosopher. Benjamin did not wish to live in a slave state, so in 1850 his family joined others in a small wagon train that left Missouri in April and arrived in Oregon in October. The family first settled at Hillsboro, then moved in 1851 to Sauvie's Island (the official name is Sauvie Island, but residents of the region refer to it as Sauvie's Island), where the Willamette River empties into the Columbia. Although Thomas's father was trained as a physician, he did not practice medicine, but instead assumed possession of a 240-acre land claim on the island in 1853, which he and his three sons further cleared and farmed. It was here that Thomas and his two older brothers, John and Joseph, lived for many years (Lange 1953, Vaughan 1974). John and Joseph lived on Sauvie Island for the rest of their lives, while Thomas later lived at various locations in and around Portland.

Thomas Howell's formal education consisted of only three months in 1855 at the first school built on the island. Otherwise, he and his brothers were self-taught via reading, with help from their father. As a youngster Thomas became interested in learn-

Brewer spruce *(Picea breweriana)* on Little Grayback Mountain between Happy Camp, California, and Cave Junction, Oregon. Photo by Timothy D. Ives, 2002.



Map of Howell's collection locations in Oregon. Howell collected multiple specimens at each site.

ing the names of plants that grew wild near his home on Sauvie's Island. As he began collecting and describing plants, he developed a strong interest in the science of botany (at the same time losing enthusiasm for farming). In 1877, at the age of 35, he published a 22-page *Catalogue of the Flora of Oregon, Washington, and Idaho*, a work that he later referred to as "an advertisement" because he was selling plants, both pressed and living. This was updated four years later and followed in 1883 by the *Catalogue of the Plants of N. Western America* and in 1887 by the 28-page *A Catalogue of the Known Plants (Phaenogamia and Pteridophyta) of Oregon, Washington, and Idaho* (price: 25 cents). According to the preface of the latter, it listed 2,152 species and 227 varieties (Lange 1953). Howell also learned from fellow botanists during collecting trips, as described in a 1929 letter from Louis F. Henderson to noted California botanist Willis L. Jepson:

> *"… We made many excursions in Oregon, going from the coast to the limit of vegetation in the mountains, and always friends. Though he read a great deal, owing to lack of early education, he was greatly handicapped. … He was especially ignorant, as you tell me you realize, of Latin or Greek. So I used to spend a good deal of the time as we traveled about in our wagon in going over with him the common rules of English grammar and conversation, and in trying to at least teach him the three genders of the common Latin adjectives. Even in this I did not succeed very well, as you and many others have realized from his improper endings"* (Lange 1966).

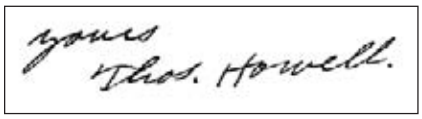
Although Howell's grasp of spelling common English words was deficient (as seen in letters below), he carefully taught himself to spell plant names and Latin descriptions.

Howell's Letters

Much of what we know of Howell comes from his correspondence with botanists who saved his letters, including E. L. Greene, Sereno Watson, W. N. Suksdorf, C. V. Piper, W. L. Jepson, George Vasey, and B. L. Robinson.

Howell corresponded with Greene (1843-1915) for nearly a decade and a half, starting when Greene headed the Botany Department at Berkeley. Approximately 90 letters from Howell to Greene are filed at Notre Dame. Greene was an important source of taxonomic information, identifications, financial assistance (as loans), and provided a journal for publishing some of Howell's articles. Greene was better educated and better situated academically than Howell, but on several occasions Howell's botanical opinions differed from Greene's, usually on matters of identification. Clearly, Howell was a keen observer of plants in the field and knew the flora of the Pacific Northwest intimately, whereas Greene did not. Throughout their voluminous correspondence, Howell addressed Greene as "Mr. Greene" and usually signed his letters "Thos. Howell." His letters seldom strayed from botanical matters, and since only one of Greene's letters to Howell apparently exists, one can only surmise from Howell's replies what Greene wrote to him. After leaving Berkeley in 1884, Greene went to the Catholic University of America in Washington, DC, then in 1915 (the year of his death) to the University of Notre Dame, which is where his correspondence is archived. The earliest letter from Howell preserved there is dated 10 December 1890, and was written from the National Hotel in Portland ("terms, $1.00 per day").

In April 1897, Howell wrote concerning the names of various lupines. He was apparently responding to Greene's comments on Howell's lupine manuscript. Howell admits his own errors, agrees that Greene is correct about some misidentifications, but also disputes Greene on some issues. A bit of Howell's taxonomic philosophy is inserted: "As I do not beleave [*sic*] in varieties I will leave No. 1918 to you." He concludes with "If you could put in one season here among the Lupines, I think you would find, as I have, that they are in grate [*sic*] confusion." In his rejection of varieties, Howell may have been heavily influenced by Greene, whose religious beliefs led him to regard each kind of plant as a separate species created by God; to acknowledge variation was to accept Darwin's concept of evolution. In the final version of his Flora, Howell included over 50 varieties, even though he writes in his preface that he has "raised nearly all published varieties of the region embraced in this work to specific rank" (Howell 1897-1903).



Characteristic signature of Thomas Jefferson Howell.

Botanical Specimens for Sale

Howell traveled widely throughout the Pacific Northwest collecting plants, which he pressed, labeled and sold. Because he lacked references and herbarium specimens with which to identify his collections, Howell sent them to botanists elsewhere for identification. His coterie of identifiers included George Vasey (1822-1893) of the U.S. Department of Agriculture in Washington, DC (grasses), L. H. Bailey (1858-1954) at Cornell University (sedges), Asa Gray (1810-1888; Gamopetalae) and Sereno Watson (1826-1892; Polypetalae), both at Harvard University (Lange 1953).

By 1887 Howell had enough confidence in his knowledge of the Northwest flora to write a chiding letter to America's botanical leader, Professor Asa Gray of Harvard, pointing out problems with Grays' recent treatment of the genera *Lewisia* and *Calandrinia* in the family Portulacaceae (Gray Herbarium archives, Harvard).

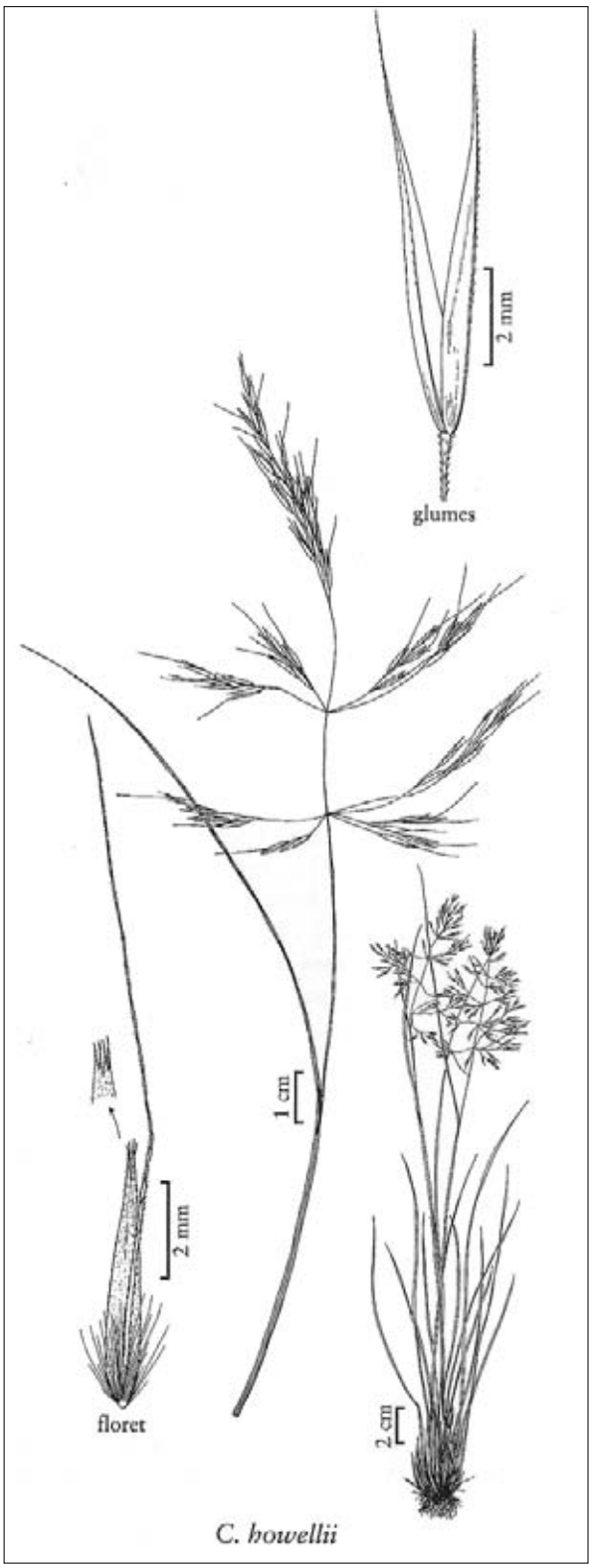

Photo of Thomas Jefferson Howell taken in the field standing in front of a giant Douglas fir log. The date, photographer and place are unknown, but the size of the log suggests a location near the Pacific coast. Photo courtesy of Hunt Institute for Botanical Documentation, Carnegie Mellon University, Pittsburgh, PA.

Modern botanists agree that Gray, who was only a year away from death at the time, was not "up to snuff" on these groups of plants (T. J. H. to A.G., March 28, 1887, Gray Herbarium, Harvard; K. Chambers to R. M. Love, October 2, 2007). Letters from Howell to Sereno Watson between 1884 and 1887 also take Watson to task for some of his identifications. By 1887 Howell had begun naming plants on his own: "I had these on hand and could not distribute them until they were named; and I have to sell all I can to pay the very heavy expense of collecting in this country" (Gray Herbarium archives, Harvard).

An important source of Howell's financial support, pressed specimens were offered for sale via a number of price lists that were sent to prospective customers. If relatively few specimens were ordered they were priced at 8 to 10 cents each, but larger orders reduced the prices to 4 to 8 cents per specimen. Howell's last price list was issued in 1896. If Howell kept field notebooks these have not survived (Lange 1953).

It is probable that Greene made Howell an offer to collect living plants for the new botanical garden of the University of California founded by Greene and W. L. Jepson in 1890. On April 11, 1892, Howell wrote:

> "*I cannot accept your offer to work exclusively for the University of Cal. I have always asked and received $5.00 per day and all expenses paid whenever I have done any of that work and I have done considerable of it; As none but dealers can afford to pay that price as a rule, and if they find I have worked for you at a low rate it will interfere with business. But I will make you this offer as I will be near Waldo* [Josephine County, Oregon] *during the latter part of this month I will collect and ship to you all the perennial plants and shrubs that I think will do to ship this spring and note the localities of others so that I can get them next fall. For this I will charge you 10 cents each for all that I send that is 10 cents for each plant and will send as many of each species as you want...I will also make you as many herbarium specimens as you want of anything that grows there at $4.00 per hundred.*"



Howell collected the type for cliff reedgrass (*Calamagrostis howellii*) at Hood River the year before Henderson wrote during their 1882 botanical exploration that they "discovered on the rocks that peculiar, light-colored grass, known as *Calamagrostis howellii*, and named by Vasey." Illustration by Cindy Talbott Roché and Annaliese Miller, copyrighted by Utah State University, reprinted with permission.

In a letter of June 28, 1892, Howell asked if Greene wanted living bulbs of species of *Erythronium*, *Camassia*, *Calochortus*, *Hastingsia*, *Lilium* and "anything else I can get." (There is no record of Howell having actually done this work for Greene.) Apparently, Greene persisted in his efforts to employ Howell for collecting herbarium specimens. On 22 March 1893 Howell responded:

> "*I have never been able to work for you because I did not think that you wanted to pay me what I could afford to take. As you know, traveling expenses are high in Oregon, and my time is worth something so if I worked for you I would not make ordinary wages unless you could pay me five dollars per day. Or I could work for you at two dollars per day and all expenses paid. ...for either of these prices I would go to any part of the Pacific coast States and collect anything that I could that you would want; and make as copious field notes as you would like...If you want me at the above price I will be at your service whenever you want me to go, but I would like to know what you think of it as soon as convenient.*"

(Because replies from Greene to Howell have not survived, we do not know if Greene contracted with Howell to collect plants.)

"Thus is the Breed of Botanists Recognized"

Fellow pioneer botanist, Louis F. Henderson (1853-1942), who at that time taught in the Portland public schools, described Howell as a "great friend of mine," and visited him frequently (Love 2001). In 1882 they traveled together by horse and wagon to Tillamook Bay, then to Mt. Adams. At Tillamook Bay, Henderson (1932) recalled they rowed out to the spit: "*Here we lived for 2 days, literally combing the dunes, tide-lands, and even shallows*

Thomas Jefferson Howell as a young man. Courtesy of Oregon Historical Society, #OHS54432.

for specimens. Most of the plants we gathered were already known to the books, but a few were new species, as we afterwards found out. Among these were the grasses Poa macrantha *and* Poa confinis*, both named by Vasey, and* Sanicula howellii*, of Coulter and Rose.*" [*Poa macrantha* was based on a later 1887 collection by Howell at the mouth of the Columbia River, but *P. confinis* was based on a collection made during the visit to Tillamook Bay. *Sanicula howellii* is now referred to *S. arctopoides* Hook. & Arn.] On their way up the slopes of Mt. Adams, fallen trees and dense brush impeded their progress until, as Henderson (1932) later recalled:

> *"Howell himself made a most surprising proposition. It was that we both get out and walk, he driving the team and I catching hold of a wheel and helping team and wagon over the logs!...Thus, by very exhaustive work, we were able to reach the snow line and a most beautiful camping spot by night. And the glory of those subalpine and alpine slopes.... Stock, especially sheep, had not ruined the native pasture at that time, and there were succulent bunch and other grasses up to your knees....Probably the most beautiful and succulent of these grasses is* Festuca viridula*, then a new species and found by us for the first time on Mt. Adams, though Suksdorf, who was up there at the same time with a band of sheep, first sent it to Vasey.* [*F. viridula* Vasey, however, is based on a California collection made by H. N. Bolander.] *This grass and some of the other bunch-fescues were then so abundant on the open slopes, that a horse when picketed amongst them by a 40-foot rope would eat his fill and lie down without finishing his forage within the radius of his rope. Now one has often to travel miles before he will see a stalk of these grasses and then only when protected by rocks or brush. On this same trip we found the then unpublished prickly Gooseberry, named* Ribes ambiguum *by Watson, but later changed to* Ribes watsonianum [by Koehne, since *R. ambiguum* had been pre-empted]*."*

It is probable that Henderson induced Howell to assign field numbers to the collections made on this trip, since the holotype of *Sanicula howellii* Coult. & Rose is Howell no. 16.

In 1895 Howell spent two months collecting along the southern coast of Alaska with his friend, Portland amateur botanist Martin W. Gorman (Bornholdt 2006). Seven years later, Gorman visited W. L. Jepson in Berkeley, describing for the latter some of their adventures. In his own field-book entry for 20 January 1902, Jepson noted that Howell used his

> *"… knowledge of engine-running in his trip to Alaska with Mr. Gorman. The two went in a little steamer. They anchored one day in a little inlet and went off to a mountain top which they saw in the distance to botanize. They returned at night to find that the 24 ft. tide had run out with such velocity that the anchor had (luckily) dragged and carried the steamer out into deep water where they managed to get aboard of her and resume their journeying. Mr. Gorman crossed the path of Tarleton who was collecting in Alaska. Some prospectors coming down the Yukon one day shouted to him 'Say, there's a fellow like you up the river!' Thus is the breed of botanists recognized. Gorman is a man of 50 or 55, gray hair, more or less bald, rather prominent features, blue eyes, clean decisive way of speaking and evidently a first-rate observer ."* [John Berry Tarleton (1849-1921), botanical collector in the Yukon, 1898-99. Tarleton's Yukon collections are housed at the New York Botanical Garden.]

Publishing his Finds

Howell sent his manuscripts to two western journals: *Erythea*, published by E. L. Greene and W. L. Jepson at the University of California, Berkeley, and *Mazama*, published by the Portland mountaineering club (The Mazamas). Howell's article in the first issue of *Mazama* on the flora of Mount Hood above 2,000 feet listed 272 species and was for decades the only published account of the flora of that peak (Lange 1953). Howell also published articles in the early numbers of *Erythea*. In a letter from Clackamas on January 2, 1895, Howell wrote to Jepson, accompanying a manuscript for *Erythea* describing some new species:

> "*My library is small, and some of the names I have suggested may be ocupied [sic] without my being able to find it out; if so that you know of please suggest others in their stead and publish without further advise [sic]. With this I send you type specimens of the new species described, for the University herbarium, but I see on packing them that* Mitella Hallii *is missing, and my herbarium is about 20 miles from here, so it is not possable [sic] to send it now, but will do so later.*"

On October 16, 1895, Howell responded in detail to Jepson's questions about *Darlingtonia*: "The geological formation there is a peculiar kind of serpentine and much of the lower parts of the mountain is well supplied with springs that run clear water all

the year round." Thus Howell went on record as one of the first western botanists to recognize the importance of edaphic factors in plant distribution.

"Never Saw a Man with So Much Fortitude"

Howell supported himself in various ways. During his early years he helped farm the property on Sauvie Island. From early 1873 until mid-1876 he served as postmaster of the Willamette Slough post office on Sauvie Island. This post office was later changed to Arthur, a name that appears as the place of publication of his early catalogues. After 1895 the catalogues and price lists were issued from Clackamas, Oregon. From early 1904 to early 1906 Howell was postmaster at the Creighton (later Oak Grove) post office. At other times he ran small grocery stores in Clackamas, Milwaukie, and Portland.

On November 12, 1893, when Howell was 51, he married Mrs. Effie McIlwane (née Hudson) who was a widow with one daughter. Howell and Effie had two sons: Dorsey Richard Howell, born October 28, 1894, and Benjamin Allen Howell, born May 29, 1904. Effie verified that the family moved frequently. She listed the following living places: Oregon City, Willamette Falls, Oak Grove, Hood Street, and Woodstock ("about an hour's ride from Portland") (A. R. Sweetser files, UO Archives and Special Collections.)

In the field-book entry mentioned above, Jepson wrote further of Gorman's visit to Berkeley:

Thomas Jefferson Howell and his older son, Dorsey Richard Howell, near the falls of the Willamette River in 1900. Courtesy of Oregon Historical Society, # OrHi88298.

Howell in 1910, proudly displaying a bound copy of his ground-breaking A *Flora of North America*. The photo was taken in Howell's small grocery store in Portland by Huron H. Smith of the Chicago Field Museum. Smith traveled west specifically to congratulate Howell on his remarkable achievement. AR. Sweetser papers, Ax75 Special Collections and University Archives, University of Oregon Libraries.

> *"Gorman said that 'Howell is very poor but he never saw a man with so much fortitude.' He is very poor, having lost the money he received from the sale of his share of his father's estate in 'unfortunate' investments. He was really taken in and fleeced by Portland sharpers. One man promised him an income of 300 a year, 25 a month, if he would put in 3000. Mr. Howell felt that he could live on $25 a month in his simple way and work on his flora. But he never got back a cent either in interest or principal. Another man who was looking for suckers got him into a laundry business scheme and in addition got his signature to certain notes for machinery and then skipped out."*

Later, at the end of July 1906, after Howell's complete Flora had been published, Jepson paid him a visit in Oregon, making the following entry in his field-book:

> *"called on Thos. Howell. He is building a house for himself and family in the 'woods' or clearing near Oregon City. … Howell is a man below medium height, his hair brown & gray, shortish full beard. reddish face, blue eyes, slightly Roman nose. … He is very very lame now and walks with a cane. Yet each day's bread must be earned he says. He has a wife - not a bad-looking woman, in fact rather comely - a* [step-]*daughter*

of 17, etc. I did not ask about his family but so much I saw - a boy of 12, doubtless of the family. [Howell's younger son was 2 at this time.]… *It is too bad to see him so miserably poor. He came into Portland with me and [I] insisted on his taking lunch with me but he would allow only a few simple things to be ordered for him."*

Four years later, Huron H. Smith of the Field Museum in Chicago traveled to Portland in order to spend a day with Howell. At that time Howell operated a small grocery-candy store on Hood Street, Portland, where he also lived. Smith reported that Howell was living under very reduced financial circumstances and in his spare time manufactured teamsters' mittens on a sewing machine, for which he received seven cents per pair. In spite of this, Howell was "very cheerful at all times and betrayed no impatience with depressing external conditions" (Lange 1953). At this time Smith took the photograph of Howell holding his completed Flora.

"Throwing away life itself"

Howell's surviving correspondence with E. L. Greene gives us a hint of the heroic efforts involved in completing his magnum opus, *A Flora of Northwestern America* (1897-1903). On 6 May 1896 (a year before his first fascicle appeared in print), he wrote:

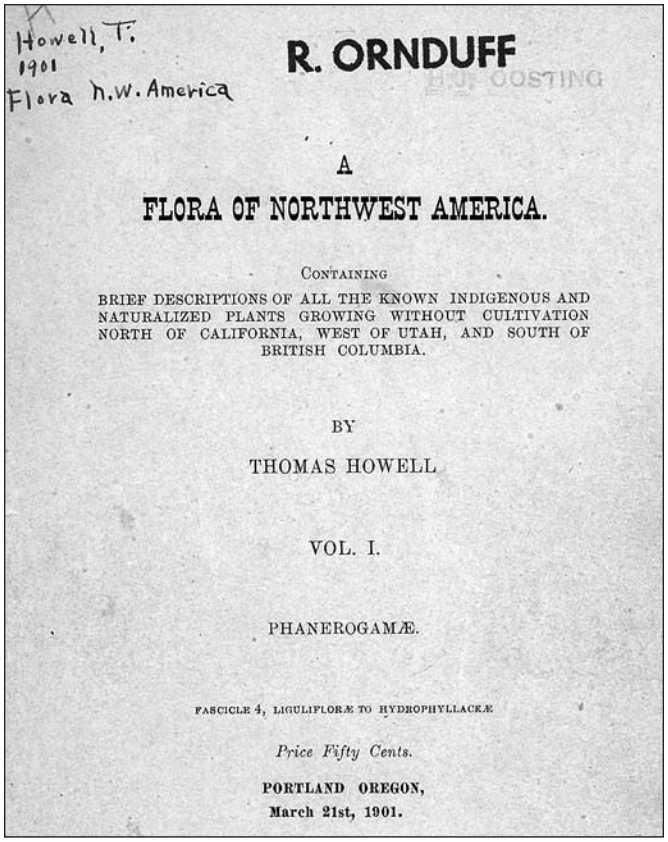
"*Your somewhat surprising though highly prized letter of April 30th has just come to hand and I hasten to answer it to disabuse your mind of any mistakes that you may labor under in regard to me and my work. … Nothing would please me more than to have you pass upon every page of my proposed Flora before it gose [sic]to press; can you point out the way that this can be done* [as?] *can you show me how I can get it published at all? There is no one here that can do the work except under my direct supervision and then they want double price for doing it, and want their pay in advance and this I am unable to meet for I have been reduced to poverty by some unfortunate investments. As to the pages already printed they will probably never be distributed in their present form, for the parties that undertook to* [do?] *the printing have just gone back on their contract, and refuse to do any more of it on any terms that I can meet. This leaves me on the verge of despair[sic] for the manuscript that I have represents ten years work of the best part of my life and to loose [sic]it now looks to me like throwing away life itself. I shall next try the American Book Co., but I fear in order to get them to publish it I shall have to alter it so much that it will not be satisfactory to me or any other botanist. If you can siggest [sic] any better plan than this it will please me greatly*" (Lange 1955).

And on 1 Oct 1896:

"I see you still have the impression that I intend to have illustrations in my proposed book, which I wish to assure you is not the case for I never had any intention of illustrations at all: the plates spoken of are book plates that is electroplates of the text and not illustration plates. There are two ways of making a smaller book of it. One is to condense the descriptions and thereby make them worthless. The other is to leave out a large part of the species and make an incomplete work. There are about 3500 species of plants in the teritory [sic] that I propose to cover, and nine tenths of them grow in Oregon so you see that it will not reduce the book much to reduce the teritory [sic]. I have made a careful estimate and find that I can have 1000 copies of 100 pages published here for $1000. I can do this so cheap because I have a pretty fair printing outfit of my own And I have orders on hand now to assure the sale of 1000 copies in less than two years at $2.50 per copy. With $500.00 I could get the book out next spring but I have no way of getting that amount now..." (E. L. Greene files, Notre Dame).

Portland printers apparently were unwilling to cope with the technical terminology of the flora and with Howell's often illegible handwriting, so Howell himself set the type at home in sets of eight pages, which he then took to a printer (Kruckeberg and Ornduff 2003). As noted earlier, Howell's scanty formal education was reflected by his idiosyncratic and inconsistent spellings of words; he was more accurate with technical terms than with ordinary English. Gorman assisted Howell by reading copy and correcting proofs, but numerous errors slipped by him. On March 15, 1897, the first paperbound fascicle of *A Flora of Northwest America* appeared, consisting of 112 pages and priced at 50 cents. As a reflection of Howell's difficulties with spelling and proof-reading, the title page read *A flora of northwhst [sic] America*, but this error was caught and quickly remedied and the phrase "Entered according to Act of Congress..." was added.

The only known surviving letter to Howell from Greene was the latter's May 17, 1897 reaction to the first published fascicle. Greene included a gift of forty dollars, but provided a long, harsh, and basically negative review. He pointed out a plethora of perceived


Howell, T.
1901
Flora N.W. America

R. ORNDUFF

H.N. OOSTING

A

FLORA OF NORTHWEST AMERICA.

CONTAINING

BRIEF DESCRIPTIONS OF ALL THE KNOWN INDIGENOUS AND NATURALIZED PLANTS GROWING WITHOUT CULTIVATION NORTH OF CALIFORNIA, WEST OF UTAH, AND SOUTH OF BRITISH COLUMBIA.

BY

THOMAS HOWELL

VOL. I.

PHANEROGAMÆ.

FASCICLE 4, LIGULIFLORÆ TO HYDROPHYLLACEÆ

Price Fifty Cents.

PORTLAND OREGON,
March 21st, 1901.

Cover of *A Flora of Northwest America* by Thomas Howell, Vol. 1, Fascicle 4. This fascicle was formerly in the libraries of botanists Henry Oosting of Duke University and Robert Ornduff of Berkeley.

errors which he stated were, "...born of your too great hurry [which] will tell against your book.... [These]...are so innumerable that I shall not be surprised if reviewers ... say that a great book was presumptuously undertaken by a man who could not spell... if they review it at all" (A. R. Sweetser Papers, University of Oregon Archives).

Jepson (1897) reviewed the first fasicle much more positively in *Erythea,* commenting editorially on a few matters, noting that the work was "cyclopedic rather than critical," and that Howell's "personal observations color the completed product." Otherwise, he was sympathetic to Howell and his work, stating that "What he [Howell] has done has been to bring together in a usable form, in the light of his field knowledge (and no other botanist knows so well the plants of these states) all that has been published concerning the flora of the region…The author has not spoken of difficulties, but difficulties must have been many in a region in which library and herbarium facilities are meager."

Darlingtonia in Thomas Jefferson Howell fen near Kerby, Illinois Valley, Oregon. Photo by AR Kruckeberg.

He concluded that "Mr. Howell, therefore, deserves no small meed of praise for the courage and resolution necessary in the face of such circumstances." The second fascicle was published about a year later, on the first of April 1898, the third fascicle on August 21, 1900. Subsequent fascicles appeared at irregular intervals, and the last one (#7) was published on August 10, 1903 (Stafleu and Cowan 1979). The print run was 1,000 copies; the few that remain are now collector's items. (Oregon State University and the University of Oregon own full bound sets.)

Howell's Legacy

On December 3, 1912, Thomas Howell died at the age of 70 at Woodstock, after a long illness. His older brother Joseph died two months before Thomas; both are buried in the family plot at Vancouver (Greene 1913). At the time of Howell's death his sons were 18 and 8 years old. Later his widow Effie remarried and moved to Filer, Idaho, becoming Effie M. Faust or Mrs. G. W. Faust. Apparently, troubles plagued the *Flora* even after Howell's death. In a letter to A. R. Sweetser in December 1935, Effie wrote:

> "*After Howell died I got an order for books from J. K. Gill at $5.00. The oldest boy and myself put them in book form and carried them to the binder. The rest we put in boxes and nailed them up. My health became so poorly that the doctor sent me to Tillamook. When I got back somebody broke into the house and destroyed all of them. Just think of it, five thousand dollars of books, so I had nothing left. It sure was a hard hit for me as I had to care for the two boys.*" (A. R. Sweetser Papers, University of Oregon Archives, copies in OSU Herbarium files.)

Where does Thomas Jefferson Howell fit in the pantheon of Western botanists? Per Axel Rydberg (1904), author of the *Rocky Mountain Flora*, highly commended Howell's *Flora*: "*Few can imagine what such an undertaking means, what difficulties are met with and what an amount of work is needed… Mr. Howell had to work far away from libraries with scarcely any other facilities than those afforded by his private library and collection [and thus] the excellence of the work is really surprising."*

After Howell's death, Greene wrote that Howell "accomplished the greatest amount of meritorious and valuable scientific work that was ever done by any man of any epoch, on so very rudimentary an education in letters." Jepson added that Howell had "organized diagnoses of genera and species scattered in the works of many writers into a pioneer flora which, considering the circumstances of its production, is balanced, judicious, and highly useful. Few men leaving so durable a contribution to American botany have led so obscure an existence as did Howell." The words of Louis F. Henderson, in a letter to Willis L. Jepson, give Howell high praise: "Had he a good college education, I think he might have been one of the great systematists of the United States" (Lange 1966). Although in subsequent years, state and regional floras were issued in the area covered by Howell's Flora, 60 years elapsed before it was fully superceded, by *Vascular Plants of the Pacific Northwest* (Hitchcock *et al*. 1955-1969).

Howell will thus be remembered as one who advanced the study of botany despite conditions of extreme hardship. Forever impoverished, barely able to support his family, he nevertheless made outstanding contributions to the botanical knowledge of the Northwest. Alice Eastwood (1898) summarized Howell's publication of his pioneering and encyclopedic *Flora of Northwest America*:

> "*The conscientious striving for truth which distinguishes the work of this botanist, his independence in asserting his own views, and his thorough, careful work, command our respect; while the enthusiasm and self-denial which have resulted in the publication of a work of this magnitude by an author comparatively poor in money, at his own expense, commands, again, our admiration."*

Acknowledgements

The editors thank Kenton L. Chambers for his close reading of the manuscript and many helpful suggestions. Susan Kephart and Frank Lang also contributed to the review.

T. J. Howell's itineraries in Oregon based on Oregon Flora Project records

Compiled by Rhoda Love

1875: Clackamas County, base of Mt. Hood.

1876-1880: Douglas, Columbia, Washington, Multnomah, Hood River, and Wasco counties.

1881-1885: heavy collecting throughout much of Oregon; Douglas, Curry, Jackson and Josephine in SW, most Willamette Valley counties, Deschutes, Wasco, Umatilla, Grant, Harney, Lake, Wheeler, and Jefferson counties in E. (including the long trips with Henderson to the Oregon coast and Mt. Adams in 1882).

1886-1890: Douglas, Jackson, Josephine, Willamette Valley counties, Umatilla, Grant, and Harney.

1891-1895: Douglas, Jackson, Josephine, northern Willamette Valley, Harney County; Columbia River near The Dalles.

1896-1900: Douglas, Jackson, Josephine, Multnomah, Clackamas and Umatilla counties.

1901-1903: Linn and Clackamas counties; in 1903 Howell deposited his personal herbarium at the University of Oregon.

1904-1912: single specimen of *Aster hallii* (now *Columbiadoria hallii*) from Marion County in 1905.

Known Publications of T. J. Howell

1873 "Howell's price list of plants"

1877 *Catalogue of the Flora of Oregon, Washington, and Idaho*

1881 Catalogue of the Flora of Oregon, Washington, and Idaho

1883 *Catalogue of the Plants of N. Western America*

1883 The geological distribution of North American forests. Popular Science Monthly 23:516-524.

1887 *A Catalogue of the Known Plants (Phaenogamia and Pteridophyta) of Oregon, Washington, and Idaho*.

1893 A rearrangement of American Portulaceae [*sic*]. Erythea 1:29.

1893 New Plants of Pacific Coast. Erythea 1:109.

1893 Note on *Sedum radiatum*. Erythea 1:144.

1895 New species of Pacific Coast plants. Erythea 3:32.

1895 Distribution of *Darlingtonia* in Oregon. Erythea 3:179.

1895 The flora of Mt. Hood. Mazama 1:28.

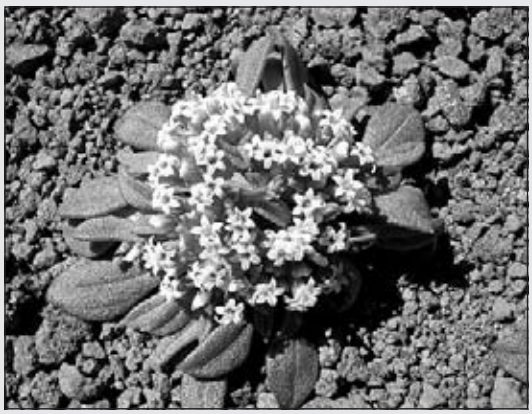
1895 The flora of Mt. Adams. Mazama 1:68. (Co-author, William N. Suksdorf)

1897-1903 A Flora of Northwest America. Portland, Oregon

Some plants named for Thomas Jefferson Howell

V: currently valid S: sunk in synonomy

Aconitum howellii A. Nelson & J. F. Macbr. – S
Agoseris howellii Greene – S
Agrostis howellii Scribn. – V
Allium howellii Eastw. – S
Alopecurus howellii Vasey -- S
Antennaria howellii Greene – V
Arabis howellii S. Watson – S
Arctostaphylos howellii Eastw. – S
Astragalus howellii A. Gray – V
Boechera howellii (S. Watson) Windham & Al-Shehbaz -- V
Brodiaea howellii S. Watson – S
Calamagrostis howellii Vasey – V
Caltha howellii Greene – S
Camassia howellii S. Watson – V
Dimeresia howellii A. Gray -- V
Draba howellii S. Watson – V
Erigeron howellii A. Gray – V
Erythronium howellii S. Watson – S
Festuca howellii Hack. ex Beal -- S
Haplopappus howellii A. Gray – S
Hieracium howellii Rydb. – S
Horkelia howellii (Greene) Rydb. – S
Howellia aquatilis A. Gray – V
Isoetes howellii Engelm. – V
Juncus howellii F. J. Herm. - V
Lewisia cotyledon var. *howellii* (S. Watson) Jeps. – V
Lilium howellii I. M. Johnst. – S
Limnanthes howelliana Abrams – S
Lomatium howellii (S. Watson) Jeps. – V
Microseris howellii A. Gray – V
Minuartia howellii (S. Watson) Mattf. -- V
Montia howellii S. Watson – V
Pedicularis howellii A. Gray – V
Perideridia howellii (J. M. Coult. & Rose) Mathias – V
Poa howellii Vasey & Scribn. – V
Polygonum howellii Greene – S
Ribes howellii Greene – V
Sanicula howellii (J. M. Coult. & Rose) -- S
Saxifraga howellii Greene – V
Senecio howellii Greene – V
Streptanthus howellii S. Watson – V
Tauschia howellii S. Watson – V
Thelypodium howellii S. Watson – V
Viola howellii S. Watson – V



Dimeresia howellii (Asteraceae) is a low annual up to about 2 inches across that grows on open slopes of fine gravel or sand in southeastern Oregon. Howell collected it on Steens Mountain on June 2, 1885. Photo from Devil's Garden in Klamath County by Ron Larson.

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Howell's letters to E. L. Greene are archived at the University of Notre Dame Library, Notre Dame, Indiana. The plant collections of E. L. Greene are in the university herbarium there. Howell's personal herbarium is now part of the Oregon State University Herbarium collection in Corvallis. Copies of Howell's papers (letters, publications, lists of plants for sale) are deposited in the A.R. Sweetser papers, Collection AX75, Box 3 Folders 7-10, University of Oregon Archives and Special Collections in the University of Oregon Knight Library, with a number of copies in the Oregon State University Herbarium biography files.

Robert Ornduff (1932-2000) was born in Portland, Oregon, and carried out his undergraduate studies at Reed College in that city. During the summer of 1952 Bob (along with Rhoda Moore Love and others) took part in the University of Washington's full summer field course under the tutelage of CL Hitchcock and AR Kruckeberg, botanizing at sites in eastern Washington, Oregon, and Idaho, as well as Arizona, Utah, and Colorado. Back at Reed, Bob worked with anthropologist David French and his wife Kay on the ethnobotany of the Warm Springs Indian Reservation in eastern Oregon. Young Ornduff provided most of the plant identifications for this project, receiving his BA in biology from Reed in 1953 based on this floristic work. Bob spent the year after graduation from Reed as a Fulbright Scholar in New Zealand where he collected material for his University of Washington MSc thesis on the systematics of a group of New Zealand *Senecio* species, under the directorship of Dr. Kruckeberg. In 1956, Bob entered the graduate program in Botany at the University of California at Berkeley, completed his PhD there in 1961, and taught biology for a year at Reed College and at Duke University, before returning to Berkeley in 1963. There, he assumed the faculty position of his retiring major professor, Herbert Mason. As a botany professor, Ornduff taught a popular course on California's flora for 30 years, based on which he published *An Introduction to California Plant Life* (UC Press 1974). While at Berkeley, he also held positions of Curator of Seed Plants, Director of the Botanic Garden, Director of the University Herbarium (1967-1982), Director of the Jepson Herbarium (1968 to 1982), and Chair of the Department of Botany (1986-1989). He retired in 1993 and died seven years later of melanoma at the age of 68. A more complete description of Bob Ornduff's life and accomplishments is posted at http://www.berkeley.edu/news/media/releases/2000/10/03_ornduff.html.

Thomas Jefferson Howell and the First Pacific Northwest Flora

Robert Ornduff
University of California, Berkeley

Edited for publication by Rhoda M. Love, Cindy Roché and Art Kruckeberg
(Adapted from an essay that will appear in Plant Hunters of the Pacific Northwest, edited by A. R. Kruckeberg and R. M. Love)

Howell's mariposa (*Calochortus howellii*) in the Illinois River Valley, Josephine County; there are brown hairs above the greenish gland. Photo by David McClurg.

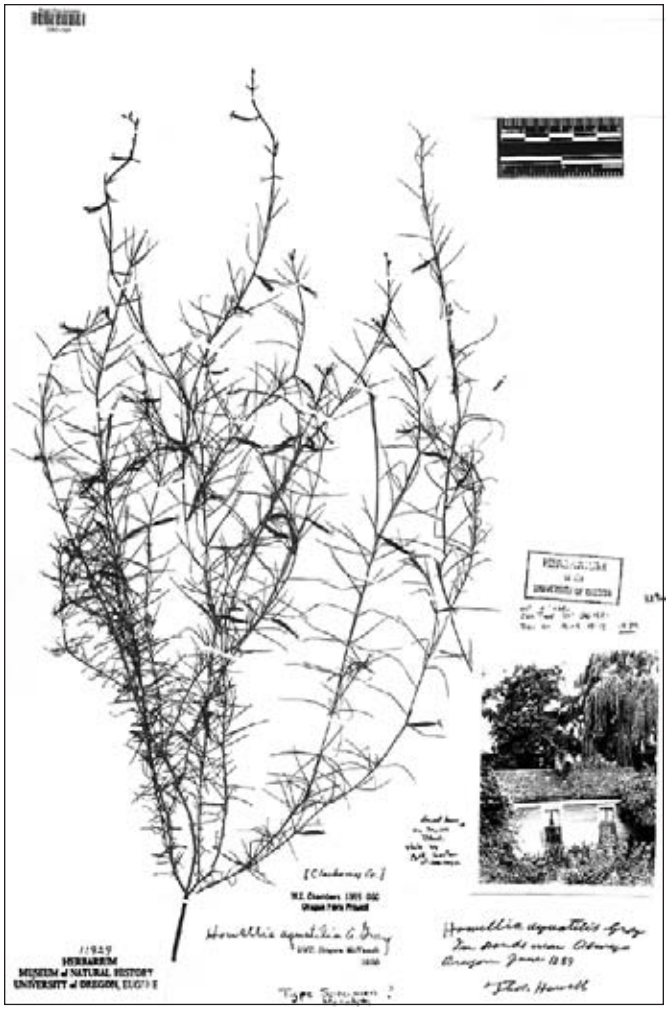
Thomas Jefferson Howell (1842-1912), Oregon's earliest pioneer botanist, was a man of great determination. Despite being desperately poor and only semi-literate, Howell created the first regional flora for the Pacific Northwest, self-published as a series of seven fascicles (Lange 1953). After years of gathering information for a compendium of the flora, he began writing in 1882 when he was 40 years old. The first fascicle appeared fifteen years later and the last was published in August 1903, nine years before Howell's death. The *Flora* consisted of 792 pages (plus a 24-page index) and described 3,150 species of which 89 were newly described by Howell. The seven-volume set was priced at five dollars and, although praised by fellow botanists, was a financial failure for its author.

Howell botanized extensively in Oregon and southern Washington, collecting tens of thousands of specimens, many of which he sent to Eastern herbaria (e.g., the Gray Herbarium at Harvard University) or sold to other botanists (later distributed to major herbaria of the US and Europe). As the last fascicle of his flora was being printed, Howell donated approximately 10,000 specimens from his personal collection (dating from 1875 to 1904) to the University of Oregon, and was paid $500 during the 1903-04 school year to curate his collection (Wagner 1994).

Having a keen botanical eye, Howell discovered numerous new species, including many from the Siskiyou Mountains of Curry and Josephine counties (Chambers 2002). Early in his botanical career Howell made two significant discoveries. The first of these (in 1878) was an aquatic annual he collected with his brother Joseph from a pond near the family farm on Sauvie's Island in the Columbia River west of Portland. It was described in 1879 as *Howellia aquatilis* (Campanulaceae) by Asa Gray, who dedicated this monotypic genus to its "discoverers who are assiduous collectors and acute observers and who have already much increased the knowledge of the botany of Oregon" (Gray 1879).

Thomas Howell's second major discovery was made in 1884, when he collected a new species of spruce along Happy Camp Trail in Siskiyou County, California. The following year this "most remarkable species...singularly different from... any other conifer" (Jepson 1909) was described by Sereno Watson, who named it *Picea breweriana,* after William Henry Brewer (1828-1910) with the California State Geological Survey, co-author with Watson of the *Botany of California* (1876-1880). Watson (1885) wrote that he named this conifer to "compliment" Brewer, who had an "especial interest in the trees of the coast." Ironically, in the fall of 1863 Brewer had visited Happy Camp and the surrounding region (Farquhar 1949), where he almost certainly encountered, but did not recognize as new, the spruce that was later to be named after him and not after its discoverer.[1]

[1]Other references (Sudworth 1908, Griffin and Critchfield 1976) indicate that the actual discoverer was Josiah Whitney who found the weeping spruce from near Castle Crags (California) in 1862 and gave a sample to Brewer, as recorded in Brewer's journal. The following year Brewer found the spruce near Mt. Shasta, and collected a branchlet. Because these collections lacked cones, Watson could not describe the new species. Perhaps the tree should have been named *Picea howelliana*, because Watson used Howell's specimen as the type for the species. On the other hand, a better name might have been *Picea pendula*, describing the distinctive drooping branches.



Herbarium sheet of *Howellia aquatilis* collected by T. J. Howell from the type site on Sauvie Island, with photo of the Howell family cabin on the island. (This house has since been demolished.) Courtesy of OSU Herbarium. Photo of Howell house by A. R. Sweetser, c. 1935.

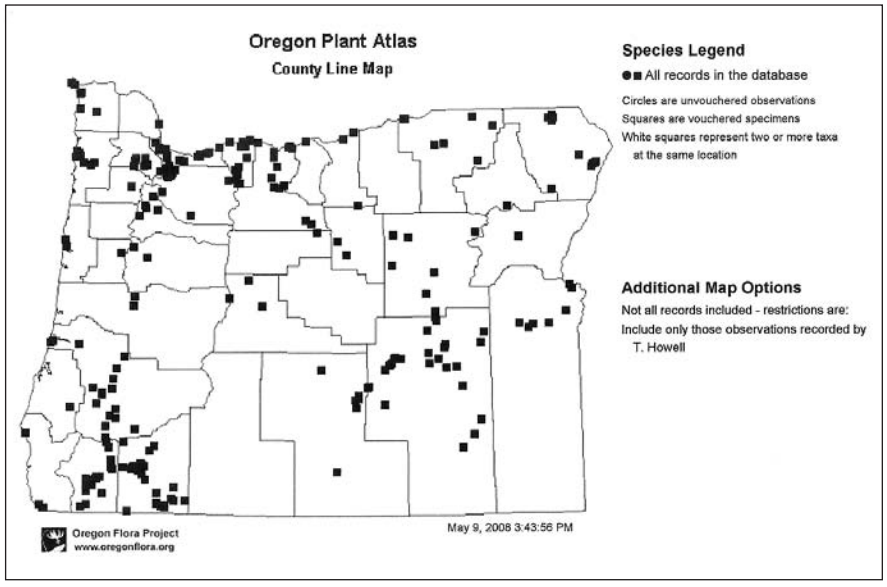
At least 27 taxa still bear Howell's name, although some are now varieties or subspecies (see side bar on page 40). The one genus named for him has only a single species, the federally threatened *Howellia aquatilis*. The range of this delicate annual extends inland from the northern Willamette Valley and the Pacific coast states to Idaho and Montana. In addition to the taxa named for him, Howell also named over 175 taxa, of which 57 are currently accepted by the Oregon Flora Project (pers. comm., Katie Mitchell, from the OFP database).

Three Months in School

Thomas Jefferson Howell was born in Cooper County, Missouri, on October 8, 1842, the youngest of five children of Benjamin and Elizabeth (Matthews) Howell: Joseph (b. 1829), John Benjamin (b. 1831), Sarah (b. 1833), Rebecca (b. 1839), and Thomas Jefferson. Benjamin's mother was Sarah Rittenhouse, a descendent of David Rittenhouse, colonial Pennsylvania mathematician and philosopher. Benjamin did not wish to live in a slave state, so in 1850 his family joined others in a small wagon train that left Missouri in April and arrived in Oregon in October. The family first settled at Hillsboro, then moved in 1851 to Sauvie's Island (the official name is Sauvie Island, but residents of the region refer to it as Sauvie's Island), where the Willamette River empties into the Columbia. Although Thomas's father was trained as a physician, he did not practice medicine, but instead assumed possession of a 240-acre land claim on the island in 1853, which he and his three sons further cleared and farmed. It was here that Thomas and his two older brothers, John and Joseph, lived for many years (Lange 1953, Vaughan 1974). John and Joseph lived on Sauvie Island for the rest of their lives, while Thomas later lived at various locations in and around Portland.

Thomas Howell's formal education consisted of only three months in 1855 at the first school built on the island. Otherwise, he and his brothers were self-taught via reading, with help from their father. As a youngster Thomas became interested in learn-

Brewer spruce *(Picea breweriana)* on Little Grayback Mountain between Happy Camp, California, and Cave Junction, Oregon. Photo by Timothy D. Ives, 2002.



Map of Howell's collection locations in Oregon. Howell collected multiple specimens at each site.

ing the names of plants that grew wild near his home on Sauvie's Island. As he began collecting and describing plants, he developed a strong interest in the science of botany (at the same time losing enthusiasm for farming). In 1877, at the age of 35, he published a 22-page *Catalogue of the Flora of Oregon, Washington, and Idaho*, a work that he later referred to as "an advertisement" because he was selling plants, both pressed and living. This was updated four years later and followed in 1883 by the *Catalogue of the Plants of N. Western America* and in 1887 by the 28-page *A Catalogue of the Known Plants (Phaenogamia and Pteridophyta) of Oregon, Washington, and Idaho* (price: 25 cents). According to the preface of the latter, it listed 2,152 species and 227 varieties (Lange 1953). Howell also learned from fellow botanists during collecting trips, as described in a 1929 letter from Louis F. Henderson to noted California botanist Willis L. Jepson:

> *"… We made many excursions in Oregon, going from the coast to the limit of vegetation in the mountains, and always friends. Though he read a great deal, owing to lack of early education, he was greatly handicapped. … He was especially ignorant, as you tell me you realize, of Latin or Greek. So I used to spend a good deal of the time as we traveled about in our wagon in going over with him the common rules of English grammar and conversation, and in trying to at least teach him the three genders of the common Latin adjectives. Even in this I did not succeed very well, as you and many others have realized from his improper endings"* (Lange 1966).

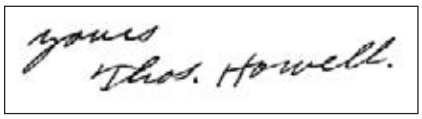
Although Howell's grasp of spelling common English words was deficient (as seen in letters below), he carefully taught himself to spell plant names and Latin descriptions.

Howell's Letters

Much of what we know of Howell comes from his correspondence with botanists who saved his letters, including E. L. Greene, Sereno Watson, W. N. Suksdorf, C. V. Piper, W. L. Jepson, George Vasey, and B. L. Robinson.

Howell corresponded with Greene (1843-1915) for nearly a decade and a half, starting when Greene headed the Botany Department at Berkeley. Approximately 90 letters from Howell to Greene are filed at Notre Dame. Greene was an important source of taxonomic information, identifications, financial assistance (as loans), and provided a journal for publishing some of Howell's articles. Greene was better educated and better situated academically than Howell, but on several occasions Howell's botanical opinions differed from Greene's, usually on matters of identification. Clearly, Howell was a keen observer of plants in the field and knew the flora of the Pacific Northwest intimately, whereas Greene did not. Throughout their voluminous correspondence, Howell addressed Greene as "Mr. Greene" and usually signed his letters "Thos. Howell." His letters seldom strayed from botanical matters, and since only one of Greene's letters to Howell apparently exists, one can only surmise from Howell's replies what Greene wrote to him. After leaving Berkeley in 1884, Greene went to the Catholic University of America in Washington, DC, then in 1915 (the year of his death) to the University of Notre Dame, which is where his correspondence is archived. The earliest letter from Howell preserved there is dated 10 December 1890, and was written from the National Hotel in Portland ("terms, $1.00 per day").

In April 1897, Howell wrote concerning the names of various lupines. He was apparently responding to Greene's comments on Howell's lupine manuscript. Howell admits his own errors, agrees that Greene is correct about some misidentifications, but also disputes Greene on some issues. A bit of Howell's taxonomic philosophy is inserted: "As I do not beleave [*sic*] in varieties I will leave No. 1918 to you." He concludes with "If you could put in one season here among the Lupines, I think you would find, as I have, that they are in grate [*sic*] confusion." In his rejection of varieties, Howell may have been heavily influenced by Greene, whose religious beliefs led him to regard each kind of plant as a separate species created by God; to acknowledge variation was to accept Darwin's concept of evolution. In the final version of his Flora, Howell included over 50 varieties, even though he writes in his preface that he has "raised nearly all published varieties of the region embraced in this work to specific rank" (Howell 1897-1903).



Characteristic signature of Thomas Jefferson Howell.

Botanical Specimens for Sale

Howell traveled widely throughout the Pacific Northwest collecting plants, which he pressed, labeled and sold. Because he lacked references and herbarium specimens with which to identify his collections, Howell sent them to botanists elsewhere for identification. His coterie of identifiers included George Vasey (1822-1893) of the U.S. Department of Agriculture in Washington, DC (grasses), L. H. Bailey (1858-1954) at Cornell University (sedges), Asa Gray (1810-1888; Gamopetalae) and Sereno Watson (1826-1892; Polypetalae), both at Harvard University (Lange 1953).

By 1887 Howell had enough confidence in his knowledge of the Northwest flora to write a chiding letter to America's botanical leader, Professor Asa Gray of Harvard, pointing out problems with Grays' recent treatment of the genera *Lewisia* and *Calandrinia* in the family Portulacaceae (Gray Herbarium archives, Harvard).

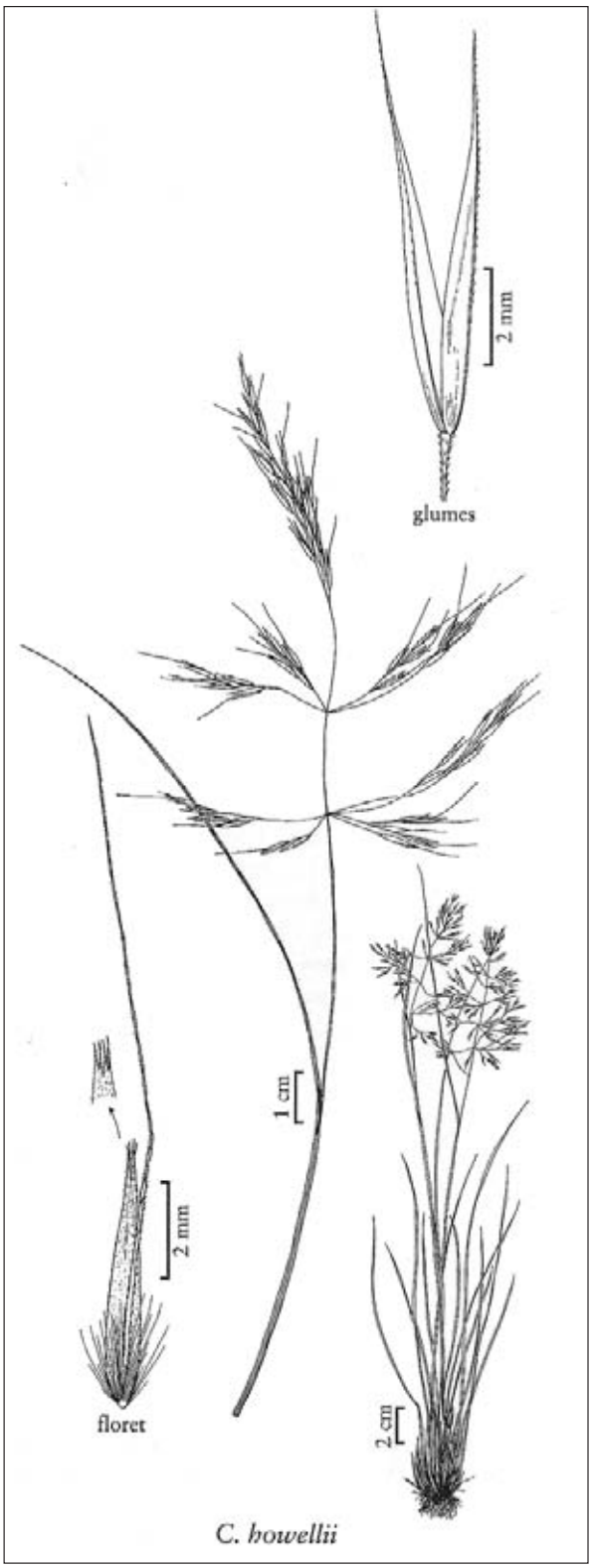

Photo of Thomas Jefferson Howell taken in the field standing in front of a giant Douglas fir log. The date, photographer and place are unknown, but the size of the log suggests a location near the Pacific coast. Photo courtesy of Hunt Institute for Botanical Documentation, Carnegie Mellon University, Pittsburgh, PA.

Modern botanists agree that Gray, who was only a year away from death at the time, was not "up to snuff" on these groups of plants (T. J. H. to A.G., March 28, 1887, Gray Herbarium, Harvard; K. Chambers to R. M. Love, October 2, 2007). Letters from Howell to Sereno Watson between 1884 and 1887 also take Watson to task for some of his identifications. By 1887 Howell had begun naming plants on his own: "I had these on hand and could not distribute them until they were named; and I have to sell all I can to pay the very heavy expense of collecting in this country" (Gray Herbarium archives, Harvard).

An important source of Howell's financial support, pressed specimens were offered for sale via a number of price lists that were sent to prospective customers. If relatively few specimens were ordered they were priced at 8 to 10 cents each, but larger orders reduced the prices to 4 to 8 cents per specimen. Howell's last price list was issued in 1896. If Howell kept field notebooks these have not survived (Lange 1953).

It is probable that Greene made Howell an offer to collect living plants for the new botanical garden of the University of California founded by Greene and W. L. Jepson in 1890. On April 11, 1892, Howell wrote:

> "*I cannot accept your offer to work exclusively for the University of Cal. I have always asked and received $5.00 per day and all expenses paid whenever I have done any of that work and I have done considerable of it; As none but dealers can afford to pay that price as a rule, and if they find I have worked for you at a low rate it will interfere with business. But I will make you this offer as I will be near Waldo* [Josephine County, Oregon] *during the latter part of this month I will collect and ship to you all the perennial plants and shrubs that I think will do to ship this spring and note the localities of others so that I can get them next fall. For this I will charge you 10 cents each for all that I send that is 10 cents for each plant and will send as many of each species as you want...I will also make you as many herbarium specimens as you want of anything that grows there at $4.00 per hundred.*"



Howell collected the type for cliff reedgrass (*Calamagrostis howellii*) at Hood River the year before Henderson wrote during their 1882 botanical exploration that they "discovered on the rocks that peculiar, light-colored grass, known as *Calamagrostis howellii*, and named by Vasey." Illustration by Cindy Talbott Roché and Annaliese Miller, copyrighted by Utah State University, reprinted with permission.

In a letter of June 28, 1892, Howell asked if Greene wanted living bulbs of species of *Erythronium*, *Camassia*, *Calochortus*, *Hastingsia*, *Lilium* and "anything else I can get." (There is no record of Howell having actually done this work for Greene.) Apparently, Greene persisted in his efforts to employ Howell for collecting herbarium specimens. On 22 March 1893 Howell responded:

> "*I have never been able to work for you because I did not think that you wanted to pay me what I could afford to take. As you know, traveling expenses are high in Oregon, and my time is worth something so if I worked for you I would not make ordinary wages unless you could pay me five dollars per day. Or I could work for you at two dollars per day and all expenses paid. ...for either of these prices I would go to any part of the Pacific coast States and collect anything that I could that you would want; and make as copious field notes as you would like...If you want me at the above price I will be at your service whenever you want me to go, but I would like to know what you think of it as soon as convenient.*"

(Because replies from Greene to Howell have not survived, we do not know if Greene contracted with Howell to collect plants.)

"Thus is the Breed of Botanists Recognized"

Fellow pioneer botanist, Louis F. Henderson (1853-1942), who at that time taught in the Portland public schools, described Howell as a "great friend of mine," and visited him frequently (Love 2001). In 1882 they traveled together by horse and wagon to Tillamook Bay, then to Mt. Adams. At Tillamook Bay, Henderson (1932) recalled they rowed out to the spit: "*Here we lived for 2 days, literally combing the dunes, tide-lands, and even shallows*

Thomas Jefferson Howell as a young man. Courtesy of Oregon Historical Society, #OHS54432.

for specimens. Most of the plants we gathered were already known to the books, but a few were new species, as we afterwards found out. Among these were the grasses Poa macrantha *and* Poa confinis*, both named by Vasey, and* Sanicula howellii*, of Coulter and Rose.*" [*Poa macrantha* was based on a later 1887 collection by Howell at the mouth of the Columbia River, but *P. confinis* was based on a collection made during the visit to Tillamook Bay. *Sanicula howellii* is now referred to *S. arctopoides* Hook. & Arn.] On their way up the slopes of Mt. Adams, fallen trees and dense brush impeded their progress until, as Henderson (1932) later recalled:

> *"Howell himself made a most surprising proposition. It was that we both get out and walk, he driving the team and I catching hold of a wheel and helping team and wagon over the logs!...Thus, by very exhaustive work, we were able to reach the snow line and a most beautiful camping spot by night. And the glory of those subalpine and alpine slopes.... Stock, especially sheep, had not ruined the native pasture at that time, and there were succulent bunch and other grasses up to your knees....Probably the most beautiful and succulent of these grasses is* Festuca viridula*, then a new species and found by us for the first time on Mt. Adams, though Suksdorf, who was up there at the same time with a band of sheep, first sent it to Vasey.* [*F. viridula* Vasey, however, is based on a California collection made by H. N. Bolander.] *This grass and some of the other bunch-fescues were then so abundant on the open slopes, that a horse when picketed amongst them by a 40-foot rope would eat his fill and lie down without finishing his forage within the radius of his rope. Now one has often to travel miles before he will see a stalk of these grasses and then only when protected by rocks or brush. On this same trip we found the then unpublished prickly Gooseberry, named* Ribes ambiguum *by Watson, but later changed to* Ribes watsonianum [by Koehne, since *R. ambiguum* had been pre-empted]*."*

It is probable that Henderson induced Howell to assign field numbers to the collections made on this trip, since the holotype of *Sanicula howellii* Coult. & Rose is Howell no. 16.

In 1895 Howell spent two months collecting along the southern coast of Alaska with his friend, Portland amateur botanist Martin W. Gorman (Bornholdt 2006). Seven years later, Gorman visited W. L. Jepson in Berkeley, describing for the latter some of their adventures. In his own field-book entry for 20 January 1902, Jepson noted that Howell used his

> *"… knowledge of engine-running in his trip to Alaska with Mr. Gorman. The two went in a little steamer. They anchored one day in a little inlet and went off to a mountain top which they saw in the distance to botanize. They returned at night to find that the 24 ft. tide had run out with such velocity that the anchor had (luckily) dragged and carried the steamer out into deep water where they managed to get aboard of her and resume their journeying. Mr. Gorman crossed the path of Tarleton who was collecting in Alaska. Some prospectors coming down the Yukon one day shouted to him 'Say, there's a fellow like you up the river!' Thus is the breed of botanists recognized. Gorman is a man of 50 or 55, gray hair, more or less bald, rather prominent features, blue eyes, clean decisive way of speaking and evidently a first-rate observer ."* [John Berry Tarleton (1849-1921), botanical collector in the Yukon, 1898-99. Tarleton's Yukon collections are housed at the New York Botanical Garden.]

Publishing his Finds

Howell sent his manuscripts to two western journals: *Erythea*, published by E. L. Greene and W. L. Jepson at the University of California, Berkeley, and *Mazama*, published by the Portland mountaineering club (The Mazamas). Howell's article in the first issue of *Mazama* on the flora of Mount Hood above 2,000 feet listed 272 species and was for decades the only published account of the flora of that peak (Lange 1953). Howell also published articles in the early numbers of *Erythea*. In a letter from Clackamas on January 2, 1895, Howell wrote to Jepson, accompanying a manuscript for *Erythea* describing some new species:

> "*My library is small, and some of the names I have suggested may be ocupied [sic] without my being able to find it out; if so that you know of please suggest others in their stead and publish without further advise [sic]. With this I send you type specimens of the new species described, for the University herbarium, but I see on packing them that* Mitella Hallii *is missing, and my herbarium is about 20 miles from here, so it is not possable [sic] to send it now, but will do so later.*"

On October 16, 1895, Howell responded in detail to Jepson's questions about *Darlingtonia*: "The geological formation there is a peculiar kind of serpentine and much of the lower parts of the mountain is well supplied with springs that run clear water all

the year round." Thus Howell went on record as one of the first western botanists to recognize the importance of edaphic factors in plant distribution.

"Never Saw a Man with So Much Fortitude"

Howell supported himself in various ways. During his early years he helped farm the property on Sauvie Island. From early 1873 until mid-1876 he served as postmaster of the Willamette Slough post office on Sauvie Island. This post office was later changed to Arthur, a name that appears as the place of publication of his early catalogues. After 1895 the catalogues and price lists were issued from Clackamas, Oregon. From early 1904 to early 1906 Howell was postmaster at the Creighton (later Oak Grove) post office. At other times he ran small grocery stores in Clackamas, Milwaukie, and Portland.

On November 12, 1893, when Howell was 51, he married Mrs. Effie McIlwane (née Hudson) who was a widow with one daughter. Howell and Effie had two sons: Dorsey Richard Howell, born October 28, 1894, and Benjamin Allen Howell, born May 29, 1904. Effie verified that the family moved frequently. She listed the following living places: Oregon City, Willamette Falls, Oak Grove, Hood Street, and Woodstock ("about an hour's ride from Portland") (A. R. Sweetser files, UO Archives and Special Collections.)

In the field-book entry mentioned above, Jepson wrote further of Gorman's visit to Berkeley:

Thomas Jefferson Howell and his older son, Dorsey Richard Howell, near the falls of the Willamette River in 1900. Courtesy of Oregon Historical Society, # OrHi88298.

Howell in 1910, proudly displaying a bound copy of his ground-breaking A *Flora of North America*. The photo was taken in Howell's small grocery store in Portland by Huron H. Smith of the Chicago Field Museum. Smith traveled west specifically to congratulate Howell on his remarkable achievement. AR. Sweetser papers, Ax75 Special Collections and University Archives, University of Oregon Libraries.

> *"Gorman said that 'Howell is very poor but he never saw a man with so much fortitude.' He is very poor, having lost the money he received from the sale of his share of his father's estate in 'unfortunate' investments. He was really taken in and fleeced by Portland sharpers. One man promised him an income of 300 a year, 25 a month, if he would put in 3000. Mr. Howell felt that he could live on $25 a month in his simple way and work on his flora. But he never got back a cent either in interest or principal. Another man who was looking for suckers got him into a laundry business scheme and in addition got his signature to certain notes for machinery and then skipped out."*

Later, at the end of July 1906, after Howell's complete Flora had been published, Jepson paid him a visit in Oregon, making the following entry in his field-book:

> *"called on Thos. Howell. He is building a house for himself and family in the 'woods' or clearing near Oregon City. … Howell is a man below medium height, his hair brown & gray, shortish full beard. reddish face, blue eyes, slightly Roman nose. … He is very very lame now and walks with a cane. Yet each day's bread must be earned he says. He has a wife - not a bad-looking woman, in fact rather comely - a* [step-]*daughter*

of 17, etc. I did not ask about his family but so much I saw - a boy of 12, doubtless of the family. [Howell's younger son was 2 at this time.]… *It is too bad to see him so miserably poor. He came into Portland with me and [I] insisted on his taking lunch with me but he would allow only a few simple things to be ordered for him."*

Four years later, Huron H. Smith of the Field Museum in Chicago traveled to Portland in order to spend a day with Howell. At that time Howell operated a small grocery-candy store on Hood Street, Portland, where he also lived. Smith reported that Howell was living under very reduced financial circumstances and in his spare time manufactured teamsters' mittens on a sewing machine, for which he received seven cents per pair. In spite of this, Howell was "very cheerful at all times and betrayed no impatience with depressing external conditions" (Lange 1953). At this time Smith took the photograph of Howell holding his completed Flora.

"Throwing away life itself"

Howell's surviving correspondence with E. L. Greene gives us a hint of the heroic efforts involved in completing his magnum opus, *A Flora of Northwestern America* (1897-1903). On 6 May 1896 (a year before his first fascicle appeared in print), he wrote:

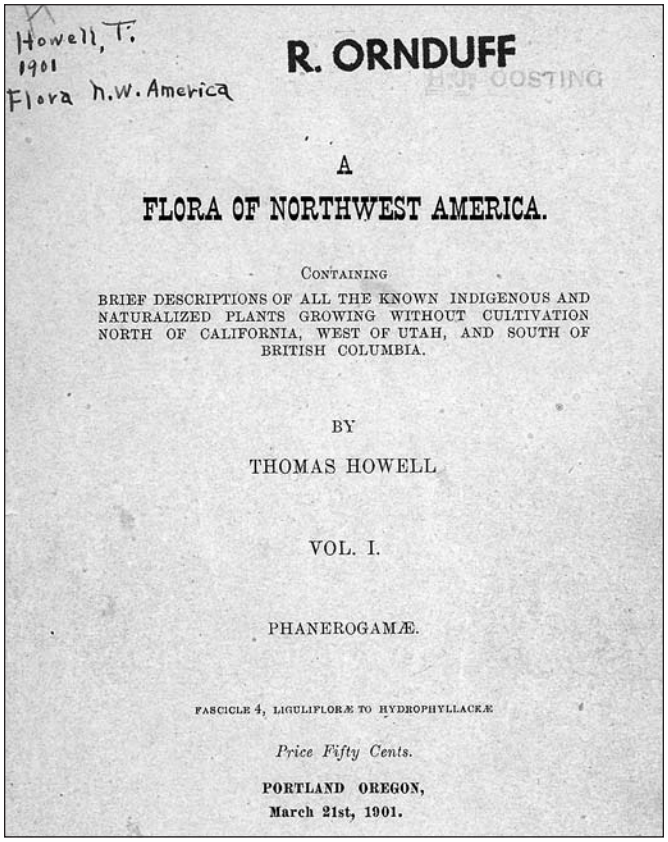
"*Your somewhat surprising though highly prized letter of April 30th has just come to hand and I hasten to answer it to disabuse your mind of any mistakes that you may labor under in regard to me and my work. … Nothing would please me more than to have you pass upon every page of my proposed Flora before it gose [sic]to press; can you point out the way that this can be done* [as?] *can you show me how I can get it published at all? There is no one here that can do the work except under my direct supervision and then they want double price for doing it, and want their pay in advance and this I am unable to meet for I have been reduced to poverty by some unfortunate investments. As to the pages already printed they will probably never be distributed in their present form, for the parties that undertook to* [do?] *the printing have just gone back on their contract, and refuse to do any more of it on any terms that I can meet. This leaves me on the verge of despair[sic] for the manuscript that I have represents ten years work of the best part of my life and to loose [sic]it now looks to me like throwing away life itself. I shall next try the American Book Co., but I fear in order to get them to publish it I shall have to alter it so much that it will not be satisfactory to me or any other botanist. If you can siggest [sic] any better plan than this it will please me greatly*" (Lange 1955).

And on 1 Oct 1896:

"I see you still have the impression that I intend to have illustrations in my proposed book, which I wish to assure you is not the case for I never had any intention of illustrations at all: the plates spoken of are book plates that is electroplates of the text and not illustration plates. There are two ways of making a smaller book of it. One is to condense the descriptions and thereby make them worthless. The other is to leave out a large part of the species and make an incomplete work. There are about 3500 species of plants in the teritory [sic] that I propose to cover, and nine tenths of them grow in Oregon so you see that it will not reduce the book much to reduce the teritory [sic]. I have made a careful estimate and find that I can have 1000 copies of 100 pages published here for $1000. I can do this so cheap because I have a pretty fair printing outfit of my own And I have orders on hand now to assure the sale of 1000 copies in less than two years at $2.50 per copy. With $500.00 I could get the book out next spring but I have no way of getting that amount now..." (E. L. Greene files, Notre Dame).

Portland printers apparently were unwilling to cope with the technical terminology of the flora and with Howell's often illegible handwriting, so Howell himself set the type at home in sets of eight pages, which he then took to a printer (Kruckeberg and Ornduff 2003). As noted earlier, Howell's scanty formal education was reflected by his idiosyncratic and inconsistent spellings of words; he was more accurate with technical terms than with ordinary English. Gorman assisted Howell by reading copy and correcting proofs, but numerous errors slipped by him. On March 15, 1897, the first paperbound fascicle of *A Flora of Northwest America* appeared, consisting of 112 pages and priced at 50 cents. As a reflection of Howell's difficulties with spelling and proof-reading, the title page read *A flora of northwhst [sic] America*, but this error was caught and quickly remedied and the phrase "Entered according to Act of Congress..." was added.

The only known surviving letter to Howell from Greene was the latter's May 17, 1897 reaction to the first published fascicle. Greene included a gift of forty dollars, but provided a long, harsh, and basically negative review. He pointed out a plethora of perceived


Howell, T.
1901
Flora N.W. America

R. ORNDUFF

H.N. OOSTING

A

FLORA OF NORTHWEST AMERICA.

CONTAINING

BRIEF DESCRIPTIONS OF ALL THE KNOWN INDIGENOUS AND NATURALIZED PLANTS GROWING WITHOUT CULTIVATION NORTH OF CALIFORNIA, WEST OF UTAH, AND SOUTH OF BRITISH COLUMBIA.

BY

THOMAS HOWELL

VOL. I.

PHANEROGAMÆ.

FASCICLE 4, LIGULIFLORÆ TO HYDROPHYLLACEÆ

Price Fifty Cents.

PORTLAND OREGON,
March 21st, 1901.

Cover of *A Flora of Northwest America* by Thomas Howell, Vol. 1, Fascicle 4. This fascicle was formerly in the libraries of botanists Henry Oosting of Duke University and Robert Ornduff of Berkeley.

errors which he stated were, "...born of your too great hurry [which] will tell against your book.... [These]...are so innumerable that I shall not be surprised if reviewers ... say that a great book was presumptuously undertaken by a man who could not spell... if they review it at all" (A. R. Sweetser Papers, University of Oregon Archives).

Jepson (1897) reviewed the first fasicle much more positively in *Erythea,* commenting editorially on a few matters, noting that the work was "cyclopedic rather than critical," and that Howell's "personal observations color the completed product." Otherwise, he was sympathetic to Howell and his work, stating that "What he [Howell] has done has been to bring together in a usable form, in the light of his field knowledge (and no other botanist knows so well the plants of these states) all that has been published concerning the flora of the region…The author has not spoken of difficulties, but difficulties must have been many in a region in which library and herbarium facilities are meager."

Darlingtonia in Thomas Jefferson Howell fen near Kerby, Illinois Valley, Oregon. Photo by AR Kruckeberg.

He concluded that "Mr. Howell, therefore, deserves no small meed of praise for the courage and resolution necessary in the face of such circumstances." The second fascicle was published about a year later, on the first of April 1898, the third fascicle on August 21, 1900. Subsequent fascicles appeared at irregular intervals, and the last one (#7) was published on August 10, 1903 (Stafleu and Cowan 1979). The print run was 1,000 copies; the few that remain are now collector's items. (Oregon State University and the University of Oregon own full bound sets.)

Howell's Legacy

On December 3, 1912, Thomas Howell died at the age of 70 at Woodstock, after a long illness. His older brother Joseph died two months before Thomas; both are buried in the family plot at Vancouver (Greene 1913). At the time of Howell's death his sons were 18 and 8 years old. Later his widow Effie remarried and moved to Filer, Idaho, becoming Effie M. Faust or Mrs. G. W. Faust. Apparently, troubles plagued the *Flora* even after Howell's death. In a letter to A. R. Sweetser in December 1935, Effie wrote:

> "*After Howell died I got an order for books from J. K. Gill at $5.00. The oldest boy and myself put them in book form and carried them to the binder. The rest we put in boxes and nailed them up. My health became so poorly that the doctor sent me to Tillamook. When I got back somebody broke into the house and destroyed all of them. Just think of it, five thousand dollars of books, so I had nothing left. It sure was a hard hit for me as I had to care for the two boys.*" (A. R. Sweetser Papers, University of Oregon Archives, copies in OSU Herbarium files.)

Where does Thomas Jefferson Howell fit in the pantheon of Western botanists? Per Axel Rydberg (1904), author of the *Rocky Mountain Flora*, highly commended Howell's *Flora*: "*Few can imagine what such an undertaking means, what difficulties are met with and what an amount of work is needed… Mr. Howell had to work far away from libraries with scarcely any other facilities than those afforded by his private library and collection [and thus] the excellence of the work is really surprising."*

After Howell's death, Greene wrote that Howell "accomplished the greatest amount of meritorious and valuable scientific work that was ever done by any man of any epoch, on so very rudimentary an education in letters." Jepson added that Howell had "organized diagnoses of genera and species scattered in the works of many writers into a pioneer flora which, considering the circumstances of its production, is balanced, judicious, and highly useful. Few men leaving so durable a contribution to American botany have led so obscure an existence as did Howell." The words of Louis F. Henderson, in a letter to Willis L. Jepson, give Howell high praise: "Had he a good college education, I think he might have been one of the great systematists of the United States" (Lange 1966). Although in subsequent years, state and regional floras were issued in the area covered by Howell's Flora, 60 years elapsed before it was fully superceded, by *Vascular Plants of the Pacific Northwest* (Hitchcock *et al*. 1955-1969).

Howell will thus be remembered as one who advanced the study of botany despite conditions of extreme hardship. Forever impoverished, barely able to support his family, he nevertheless made outstanding contributions to the botanical knowledge of the Northwest. Alice Eastwood (1898) summarized Howell's publication of his pioneering and encyclopedic *Flora of Northwest America*:

> "*The conscientious striving for truth which distinguishes the work of this botanist, his independence in asserting his own views, and his thorough, careful work, command our respect; while the enthusiasm and self-denial which have resulted in the publication of a work of this magnitude by an author comparatively poor in money, at his own expense, commands, again, our admiration."*

Acknowledgements

The editors thank Kenton L. Chambers for his close reading of the manuscript and many helpful suggestions. Susan Kephart and Frank Lang also contributed to the review.

T. J. Howell's itineraries in Oregon based on Oregon Flora Project records

Compiled by Rhoda Love

1875: Clackamas County, base of Mt. Hood.

1876-1880: Douglas, Columbia, Washington, Multnomah, Hood River, and Wasco counties.

1881-1885: heavy collecting throughout much of Oregon; Douglas, Curry, Jackson and Josephine in SW, most Willamette Valley counties, Deschutes, Wasco, Umatilla, Grant, Harney, Lake, Wheeler, and Jefferson counties in E. (including the long trips with Henderson to the Oregon coast and Mt. Adams in 1882).

1886-1890: Douglas, Jackson, Josephine, Willamette Valley counties, Umatilla, Grant, and Harney.

1891-1895: Douglas, Jackson, Josephine, northern Willamette Valley, Harney County; Columbia River near The Dalles.

1896-1900: Douglas, Jackson, Josephine, Multnomah, Clackamas and Umatilla counties.

1901-1903: Linn and Clackamas counties; in 1903 Howell deposited his personal herbarium at the University of Oregon.

1904-1912: single specimen of *Aster hallii* (now *Columbiadoria hallii*) from Marion County in 1905.

Known Publications of T. J. Howell

1873 "Howell's price list of plants"

1877 *Catalogue of the Flora of Oregon, Washington, and Idaho*

1881 Catalogue of the Flora of Oregon, Washington, and Idaho

1883 *Catalogue of the Plants of N. Western America*

1883 The geological distribution of North American forests. Popular Science Monthly 23:516-524.

1887 *A Catalogue of the Known Plants (Phaenogamia and Pteridophyta) of Oregon, Washington, and Idaho*.

1893 A rearrangement of American Portulaceae [*sic*]. Erythea 1:29.

1893 New Plants of Pacific Coast. Erythea 1:109.

1893 Note on *Sedum radiatum*. Erythea 1:144.

1895 New species of Pacific Coast plants. Erythea 3:32.

1895 Distribution of *Darlingtonia* in Oregon. Erythea 3:179.

1895 The flora of Mt. Hood. Mazama 1:28.

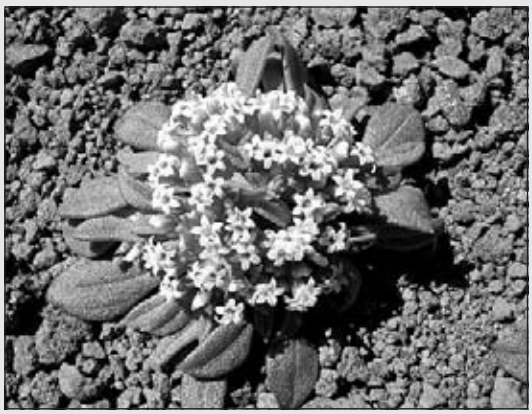
1895 The flora of Mt. Adams. Mazama 1:68. (Co-author, William N. Suksdorf)

1897-1903 A Flora of Northwest America. Portland, Oregon

Some plants named for Thomas Jefferson Howell

V: currently valid S: sunk in synonomy

Aconitum howellii A. Nelson & J. F. Macbr. – S
Agoseris howellii Greene – S
Agrostis howellii Scribn. – V
Allium howellii Eastw. – S
Alopecurus howellii Vasey -- S
Antennaria howellii Greene – V
Arabis howellii S. Watson – S
Arctostaphylos howellii Eastw. – S
Astragalus howellii A. Gray – V
Boechera howellii (S. Watson) Windham & Al-Shehbaz -- V
Brodiaea howellii S. Watson – S
Calamagrostis howellii Vasey – V
Caltha howellii Greene – S
Camassia howellii S. Watson – V
Dimeresia howellii A. Gray -- V
Draba howellii S. Watson – V
Erigeron howellii A. Gray – V
Erythronium howellii S. Watson – S
Festuca howellii Hack. ex Beal -- S
Haplopappus howellii A. Gray – S
Hieracium howellii Rydb. – S
Horkelia howellii (Greene) Rydb. – S
Howellia aquatilis A. Gray – V
Isoetes howellii Engelm. – V
Juncus howellii F. J. Herm. - V
Lewisia cotyledon var. *howellii* (S. Watson) Jeps. – V
Lilium howellii I. M. Johnst. – S
Limnanthes howelliana Abrams – S
Lomatium howellii (S. Watson) Jeps. – V
Microseris howellii A. Gray – V
Minuartia howellii (S. Watson) Mattf. -- V
Montia howellii S. Watson – V
Pedicularis howellii A. Gray – V
Perideridia howellii (J. M. Coult. & Rose) Mathias – V
Poa howellii Vasey & Scribn. – V
Polygonum howellii Greene – S
Ribes howellii Greene – V
Sanicula howellii (J. M. Coult. & Rose) -- S
Saxifraga howellii Greene – V
Senecio howellii Greene – V
Streptanthus howellii S. Watson – V
Tauschia howellii S. Watson – V
Thelypodium howellii S. Watson – V
Viola howellii S. Watson – V



Dimeresia howellii (Asteraceae) is a low annual up to about 2 inches across that grows on open slopes of fine gravel or sand in southeastern Oregon. Howell collected it on Steens Mountain on June 2, 1885. Photo from Devil's Garden in Klamath County by Ron Larson.

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Howell's letters to E. L. Greene are archived at the University of Notre Dame Library, Notre Dame, Indiana. The plant collections of E. L. Greene are in the university herbarium there. Howell's personal herbarium is now part of the Oregon State University Herbarium collection in Corvallis. Copies of Howell's papers (letters, publications, lists of plants for sale) are deposited in the A.R. Sweetser papers, Collection AX75, Box 3 Folders 7-10, University of Oregon Archives and Special Collections in the University of Oregon Knight Library, with a number of copies in the Oregon State University Herbarium biography files.

Robert Ornduff (1932-2000) was born in Portland, Oregon, and carried out his undergraduate studies at Reed College in that city. During the summer of 1952 Bob (along with Rhoda Moore Love and others) took part in the University of Washington's full summer field course under the tutelage of CL Hitchcock and AR Kruckeberg, botanizing at sites in eastern Washington, Oregon, and Idaho, as well as Arizona, Utah, and Colorado. Back at Reed, Bob worked with anthropologist David French and his wife Kay on the ethnobotany of the Warm Springs Indian Reservation in eastern Oregon. Young Ornduff provided most of the plant identifications for this project, receiving his BA in biology from Reed in 1953 based on this floristic work. Bob spent the year after graduation from Reed as a Fulbright Scholar in New Zealand where he collected material for his University of Washington MSc thesis on the systematics of a group of New Zealand *Senecio* species, under the directorship of Dr. Kruckeberg. In 1956, Bob entered the graduate program in Botany at the University of California at Berkeley, completed his PhD there in 1961, and taught biology for a year at Reed College and at Duke University, before returning to Berkeley in 1963. There, he assumed the faculty position of his retiring major professor, Herbert Mason. As a botany professor, Ornduff taught a popular course on California's flora for 30 years, based on which he published *An Introduction to California Plant Life* (UC Press 1974). While at Berkeley, he also held positions of Curator of Seed Plants, Director of the Botanic Garden, Director of the University Herbarium (1967-1982), Director of the Jepson Herbarium (1968 to 1982), and Chair of the Department of Botany (1986-1989). He retired in 1993 and died seven years later of melanoma at the age of 68. A more complete description of Bob Ornduff's life and accomplishments is posted at http://www.berkeley.edu/news/media/releases/2000/10/03_ornduff.html.
