

PLANTAE OCCIDENTALES.—I.*

JOHN THOMAS HOWELL

NOTES ON *CALOCHORTUS WEEDII* VAR. *VESTUS* PURDY. In the hills on either side of the Santa Ana Canyon, Orange County, California, there grows a rather beautiful and unusual form of *Calochortus weedii* that has been identified as *C. weedii* var. *vestus* Purdy. Since this variety is known in the literature only from localities about one hundred miles to the northwest, the plant has been studied and the following notes have been written together with a description of the plant taken from the field records of the writer.

Calochortus weedii var. *vestus* Purdy (Proc. Cal. Acad. Sci. ser. 3, 2: 133, 1901) was described as a geographic form occurring in the vicinity of Santa Barbara but no specimen was cited as type and no station was named. As proposed in the type description, *C. weedii* var. *vestus* marked a transition in color, shape, and size of petals, as well as in geographic distribution, from *C. weedii* var. *purpurascens* Wats. (*C. plummerae* Greene) to *C. weedii* var. *obispoensis* Purdy (*C. obispoensis* Lemmon). Compared with *C. weedii* var. *purpurascens*, var. *vestus* had petals "much more truncated and curiously fringed with brown hairs, while the color is reddish brown." In the Flora of California (1: 298, 1922), Jepson identifies a collection made in the Ojai Valley, Ventura County by Olive Thacher (Herb. Jepson) as *C. weedii* var. *vestus*. Taking this collection as typical *C. weedii* var. *vestus* in the absence of further data, a comparison has shown that the plant from the Santa Ana Canyon region is the same. This occurrence of the variety in the area between the ranges of *C. plummerae* on the north and typical *C. weedii* on the south will perhaps further elucidate the relation of *C. plummerae* to *C. weedii*. It is probable that the variety is a genetic strain more closely related to *C. plummerae* and *C. weedii* than to *C. obispoensis* although more extended and detailed field studies on the many forms of these species are necessary before they can be satisfactorily treated in taxonomy.

The following field notes on *C. weedii* var. *vestus* were taken from plants growing on sandstone outcrops in the southern Puente Hills, June 22, 1927 (J. T. Howell no. 2572) and on steep rocky slopes in Claymine Canyon, Santa Ana Mts., July 3, 1927 (J. T. Howell no. 2636):

Plants 1-3 ft. tall; basal leaf 1, nearly equalling to slightly exceeding the height of the plant; calyx yellow, tinted or finely mottled with purple, in the earlier flowers with a tuft of hairs at the base, in later flowers the hairs nearly or quite lacking; corolla-segments varying from nearly unmarked greenish-yellow to nearly solid purple, the intermediate color-forms with the upper margin of the petal purple passing by ever-thinning flecks and splashes of purple to yellowish base, the inner surface and erose margin of the corolla-segments conspicuously long hairy, the hairs yellow with purple tips, arising from

* All specimens cited in the following notes are deposited in the Herbarium of the California Academy of Sciences unless otherwise specified.—J. T. HOWELL.

purple bases; gland-surface not hairy, the tips of the hairs around the gland approximate over it; gland forming a marked convexity on the outer surface.

A YELLOW-FLOWERED SPECIES OF PURPUSIA. The receipt of an excellent flowering specimen of *Purpusia* from Mr. Frank W. Peirson collected in Arizona led to a study of the yellow-flowered form collected there on two earlier occasions by Miss Alice Eastwood and named by her in the herbarium, first as a variety of *P. saxosa* Brandegee and later as a species. A comparison of these specimens with the type collection of *P. saxosa* (Sheep Mts., Nevada, *Purpus* in 1898; *Herb. U. C.*) showed the Arizona plant to be specifically distinct. Miss Eastwood has kindly permitted me to publish the description of the species at this time.

Purpusia arizonica Eastwood, spec. nov. (*P. saxosa* var. *flava* Eastwood, in herb.) Stems 1-2 dm. tall, glandular-puberulent, arising from thickened caudex closely beset with old persistent leaf-bases; basal leaves odd-pinnate, glandular-hairy, 5-11 cm. long, with 3-5 pairs of leaflets; leaflets orbicular, 0.5-1 cm. long, palmately 5-10-lobed or -divided, the lobes oblong, obtuse, the lower leaflets petiolulate, the upper leaflets sessile; cauline leaves odd-pinnate with 1 or 2 pairs of leaflets, or simple and irregularly cleft or divided; stipules narrowly ovate or ovate-lanceolate, 4-8 mm. long, entire; inflorescence loosely cymose-paniculate, or racemose with solitary flowers in the axils of the lower cauline leaves; pedicels 1-3 cm. long; hypanthium campanulate, 2-4 mm. long, 2-4 mm. wide at upper end, the length equalling the width; sepals 2-4 mm. long, ovate to ovate-lanceolate; petals 3-4 mm. long, 1-2 mm. wide, yellow; stamens 5, opposite the sepals; pistils 7; achenes 1 or 2, 2-2.5 mm. long, oblong-reniform, the sides longitudinally ribbed; receptacle 1.5 mm. long, one-half to nearly as long as the hypanthium, long-hairy, conical, obtuse.

The following specimens, all from the Grand Canyon of the Colorado River, Arizona, have been examined and are in the Herbarium of the California Academy of Sciences: on the rim near Bright Angel, Eastwood no. 5662 (type, *Herb. Cal. Acad. Sci.* no. 75,599); edge of cliff at El Tovar, Eastwood no. 3778 (type of *Purpusia saxosa* var. *flava* Eastwood); growing along foot of cliff, Cliff Spring, 1 mile from Cape Royal, Peirson no. 7427.

This species is established on excellent characters of the hypanthium, achenes and receptacle. In *P. saxosa* the hypanthium is turbinate, the hypanthium-tube is constricted above the swollen, truncate base, and it is always longer than wide; in *P. arizonica* the hypanthium is truly campanulate, the tube is not constricted, the base is gradually rounded to the pedicel, and the length equals or is sometimes less than the width. The achenes of *P. saxosa* are smooth while in this species the sides of the achenes are longitudinally wrinkly-ribbed, the ribs converging on the inner angle. The remarkable, hairy receptacle which is so slender and long in *P. saxosa*, in *P. arizonica* is conic-columnar and shorter. In the former species the receptacle nearly equals or sometimes even exceeds the hypanthium in length, while in the latter it varies

from one-half to nearly as long as the hypanthium. And the yellow color of the petals in *P. arizonica* is an evident mark by which it can be readily distinguished from the white-flowered *P. saxosa*.

From a consideration of these characters it appears that *P. arizonica* is the species nearer *Potentilla* than is *P. saxosa*. *Purpusia*, a genus evidently derived from the *Potentilla* plexus, differs from *Potentilla* in lacking bractlets on the hypanthium and in having a highly specialized receptacle. The characters of the corolla, hypanthium, and receptacle in *Potentilla* resemble more closely the yellow petals, the campanulate hypanthium, and the less elongated receptacle in *P. arizonica* than the characters of these same structures in *P. saxosa*. In the latter species, the white corolla, the turbinate hypanthium, and the elongated receptacle appear to be more highly modified and to indicate an evolutionary advance beyond *P. arizonica*.

THE FRUIT OF *DIRCA OCCIDENTALIS* GRAY. On the shaded, northeast slope of Grizzly Peak in the Berkeley Hills, California, *Dirca occidentalis* Gray was collected in fruit on June 15, 1930 (J. T. Howell no. 5302). A review of the literature relating to the plant disclosed the fact that the character of the mature fruit has hitherto been unknown. At maturity the fruit is a smooth-skinned, obliquely pear-shaped drupe with thin mesocarp and large, thin-shelled stone. In color it is a light yellowish-green. When it is ripe and while it is still green and moist, the fruit falls to the ground at the slightest touch, there drying and becoming light brown. At the time the collection was made some fruits still remained on the bushes but most of them had fallen and were in all stages of drying.

OBSERVATIONS IN *ARCTOSTAPHYLOS*. Those fortunate enough to accompany the field excursion of the California Botanical Society to the Mt. St. Helena region, California, on March 23, 1930, were thrilled by a remarkable display of several species of *Arctostaphylos* at the height of bloom. The numerous shrubs laden with pink and white waxen flowers presented a truly glorious sight and in the presence of such a show it was difficult to refrain from remarking and believing that the manzanitas are surely to be counted among the loveliest of our native plants. On rocky slopes or in shallow soil overlaying the volcanic rocks of the region, five species were found growing together, *A. manzanita* Parry, *A. stanfordiana* Parry, *A. elegans* Jepson, *A. canescens* Eastwood, and *A. glandulosa* Eastwood, while *A. viscida* Parry, a sixth species, was seen later in the day on the road to Middletown.

Of all these species, *A. elegans* Jepson was by far the most interesting botanically, not only because it is one of the rarest of manzanitas but because a description of flowering specimens has never been written. In the "Revision of California Species of the Genus *Arctostaphylos*," Jepson states that *A. elegans* "is still known only by the original collection" from Mt. Konocti, Lake County, in 1892 (Madroño 1: 80,—1922). However, the occurrence of *A. elegans* on Mt. St. Helena has been known since September, 1918, when Alice Eastwood collected a suite of fruiting specimens (Eastwood nos. 7939, 7942, 7944, 7945, 7949, 7950). On May 9, 1923, on Mt. St. Helena, Miss

Eastwood collected the first flowering specimen (no. 11,764), as well as a specimen showing immature fruit (no. 11,760); and, in October, 1924, Mrs. B. R. Jackson made a collection of mature fruiting material on the mountain.

No further collections were made until March, 1930, when two additional stations for *A. elegans* were found on the field excursion described above. One of these was in the Crater Country southeast of Mt. St. Helena, Napa County, where excellent flowering specimens were collected (J. T. Howell no. 4561), and the other was on the Adams Springs road, 4 miles northeast of Middletown, Lake County, where immature fruit was obtained (J. T. Howell no. 4567). In the flowering specimen the sepals were somewhat ciliate, the corolla was pale pink (not as deep as in *A. stanfordiana*), and the ovary was densely stipitate-glandular, the glands being red. The flower in shape, color, and aspect resembled the flower of *A. manzanita* rather than that of *A. stanfordiana*. On July 13, 1930, fruiting material from the plants in the Crater Country was obtained (J. T. Howell nos. 5354, 5355), and although the fruit was well formed the pulp was green and still moist. The surface of the fruits was glandular-viscid and dried corollas and stamens adhered in nearly every case.

A second discovery on the earlier trip to the Crater Country was evidence of natural layering in four species, *A. elegans*, *A. stanfordiana*, *A. manzanita*, and *A. viscida*. In these species, branches which lie along the ground, root abundantly along the lower side where they are in contact with the ground. In several cases rejuvenation and increased girth was very decided in the stem above the layered part, in one the stem above the layered part having nearly two times the diameter of the stem below that part. In the erect forms, layering has only been reported in *A. pungens* H. B. K., a species closely related to the species named above (Jepson, *Man. Fl. Pl. Cal.*, 747,—1925).

TWO PHACELIAS NEW TO THE FLORA OF CALIFORNIA. *PHACELIA PAUCIFLORA* WATS., *Proc. Amer. Acad.* 24: 61, 1889; Brand in *Das Pflanzenreich* IV. 251: 112,—1913. Heretofore known only from Lower California, this *Phacelia* has now been found in extreme southern California at the foot of the Mountain Spring Grade, San Diego County, where it was collected in April, 1922, by Mr. F. W. Peirson (Peirson no. 2862). Brand, loc. cit., accredits the plant to California—"Kalifornien: Berge an der Los Angeles Bai (nach Watson)"—but the Los Angeles Bay referred to is the type locality of the species and is in Lower California. The plants collected by Mr. Peirson agree with the descriptions by Watson and Brand in all but a few details. The plants of this collection are smaller and are more slender, the stems being not over 15 cm. long, half as long as those described before. The sepals are not lanceolate as stated by Brand but are slender-ob lanceolate and these definitely exceed the corolla by 1.5 to 2 mm. Of the 8 ovules found in each capsule probably only 4 seeds develop and mature.

It has been pointed out by both Watson, loc. cit., and Brand, loc. cit., that this plant is very closely related to *P. hispida* Gray. *Phacelia*

hispida is placed in section *Euphacelia* of the genus *Phacelia*, the section characterized by 4 ovules to each capsule. *Phacelia pauciflora* is definitely placed in the section *Eutoca* on the character of 8 ovules to each capsule. However it is believed that the close relation of *P. pauciflora* to *P. hispida* as shown in characters of habit, foliage, and flower indicates that *P. pauciflora* is another species tending to break down the limits of these sections of *Phacelia* that are based solely on ovule number.

PHACELIA IVESIANA TORR. VAR. *GLANDULIFERA* (PIPER) NELSON & MACBRIDE, in Macbride, Contrib. Gray Herb. n. ser. no. 49: 40,—1917. (*P. glandulifera* Piper, Contrib. U. S. Nat. Herb. 11: 472,—1906. *P. ivesiana* f. *glandulifera* (Piper) Brand, Das Pflanzenreich IV. 251: 126,—1913.) According to Macbride, loc. cit., this variety, which is distinguished from typical *P. ivesiana* by the glandular calyx and the longer corolla, is restricted to Washington, Oregon, and Idaho, while the typical form is found from Wyoming to California. The variety may now be reported from eastern California where it has been collected in the Panamint Range, J. T. Howell no. 4037. There the plants grow in shallow soil of a rocky slope near the summit of the ridge between Surprise and Hall cañons at an elevation of 8500 feet. This station lies just under the lower edge of the Boreal Zone or the Limber Pine Belt. The plant belongs perhaps to the desert Transition Zone, but in the Panamint Range this zone has but a wavering and uncertain existence, the Piñon Pine and Juniper Belt extending up to the lower edge of the Limber Pine Belt. It is of interest to note here that typical *P. ivesiana*, with non-glandular calyx and small corolla, was collected in the same region by Coville in the Lower Sonoran Zone (Larrea Belt) in Panamint Valley near the Hot Springs at an elevation of 1200 feet, a few miles westward from the place where the variety has been found.

EUPATORIUM GLANDULOSUM H. B. K., ADVENTIVE. Most exotics introduced unbidden into our natural societies of native plants become at once vexing weeds without attraction. *Eupatorium glandulosum* H. B. K., which has become established at several stations in coastal central California and is not yet known in the floras of the region, is, on the contrary, a plant able to find a place in moist, brushy situations and to be equally attractive with its indigenous neighbors. At one station in a wet hollow on hills overlooking the Golden Gate from the north, this species simulates a native with its dense shrubby growth of three feet and its abundance of white bloom and green foliage (J. T. Howell no. 4293). Again, on the south slope of Strawberry Canyon, Berkeley Hills in a shaded thicket of *Ribes glutinosum*, *Rubus parviflorus*, *Rhus diversiloba*, and *Baccharis pilularis*, the *Eupatorium* has been found, this time tall and slender in habit, half-supported by surrounding shrubs, and bearing its flower-clusters ten to twelve feet above the ground (J. T. Howell no. 4714). Big Sur, Monterey County, on the coastal slope of the Santa Lucia Range, is a third locality where this attractive Mexican species is adventive (Elsie Burnell in 1930).

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