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A Supplement to the Floras of Santa Catalina and San Clemente Islands, Los Angeles County, California

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A SUPPLEMENT TO THE FLORAS OF SANTA
CATALINA AND SAN CLEMENTE ISLANDS,
LOS ANGELES COUNTY, CALIFORNIA

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SANTA CATALINA ISLAND

Since the preparation of my flora of Santa Catalina Island in early 1967, I have made several collecting trips to the island. This continued exploration plus some reidentifications and the usual changes in nomenclature published since the flora went to press have created enough additions and corrections to the flora of the island that it seems desirable to bring them together here. Because the available supplies of the separates printed of the flora are largely, if not entirely, exhausted, it is evident that we seriously underestimated public interest in the natural history of our best known California island.

The location, topography, geology, climate, soils, vegetation, history, botanical collecting, biological spectrum, and relationships of the flora are described in some detail in my flora (1967). Therefore, I shall include here only the necessary additions and emendations. In the following list, the species are listed in the order in which they did or should occur in the flora, i.e., alphabetically by families within subclasses and by genera within families. Those taxa preceded by a double asterisk are new additions to the flora; those preceded by a single asterisk are rediscovered species which had not been collected in recent years. The other taxa listed are rare or infrequent enough to warrant listing of additional collection stations. All the collection numbers cited are my own unless otherwise specified. The first set of specimens is deposited in the herbarium of the Rancho Santa Ana Botanic Garden. Additional sets have been deposited at the Santa Barbara Botanic Garden, San Diego Natural History Museum, and other institutions interested in the California islands. Dates mostly are not given since they can be gleaned from the following list of my recent visits to the island, accompanied in each instance by Mr. Douglas Propst, Ranch Superintendent for the Santa Catalina Island Company, and by the additional persons listed:

Collectors	Collection Dates	Collection Numbers	Total No. of Collections
R. F. Thorne & D. Propst with:			
R. N. Philbrick, T. Mortenson	May 18-20, 1967	36856-36909	54
M. Z. and L. A. Thorne, T. Mortenson	Feb. 24-25, 1968	37910-37918	9
	May 27-29, 1968	37622-37706	85
Grand Total			148

LIST OF ADDITIONS

ASPIDOTIS CALIFORNICA Nutt. ex Copel. The Lace Fern can now also be listed for the Salta Verde, on boulder on shaded slope of Wild Boar Gully, 550 ft, 36873, 37672.

RHUS INTEGRIFOLIA (Nutt.) Benth. & Hook. ex Rothr. An unusual specimen, a large mound-shaped shrub with many leaves trifoliate, was examined at the head of Sweet-water Canyon, 1500 ft, 36886, where associated with *Eriodictyon traskiae* Eastw. and *Salvia mellifera* Greene.

RHUS OVATA S. Wats. The Sugarbush is frequent, rather than infrequent, on SE quarter of island, especially on Salta Verde, 1400 ft, S-facing slope, 37670.

TOXICODENDRON RADICANS L. subsp. *DIVERSILOBUM* (Torr. & Gray) Thorne. For obvious reasons the Poison-oak is seldom collected. It was taken, however, recently from middle Bulrush Canyon, R. N. Philbrick & R. F. Thorne B67-207, May 18, 1967.

SANICULA ARGUTA Greene ex Coult. & Rose. The synonymy of this species for the flora should read *S. laciniata* of Millsp. & Nutt., not *S. laciniata* H. & A.

**ERIGERON DISCOIDEUS* Kell. Found on rich alluvium of delta above second (lower) reservoir in upper Bulrush Canyon, 37679, with *E. bonariensis* L., *Gnaphalium* spp., and *Madia sativa* Mol.

ERIOPHYLLUM NEVINII A. Gray. Observed in some abundance on the Channel sea-bluffs at Blue Cavern Point.

GNAPHALIUM CALIFORNICUM DC. Common, rather than infrequent, perennial, observed or collected on Salta Verde, in Bulrush, Cape, and Descanso Canyons, and Middle Canyon, dry bank along roadway, 150 ft, 37631.

GNAPHALIUM LUTEO-ALBUM L. Infrequent, rather than rare, introduced annual, an additional station being rich alluvium of delta above second reservoir in upper Bulrush Canyon, 37680, with *G. purpureum* L., *Madia sativa*, and *Erigeron* spp.

**HAPLOPAPPUS PALMERI* A. Gray subsp. *PACHYLEPIS* Hall. This perennial is locally abundant in Skull Canyon, between Cape and Middle Canyons, 37622, in coastal sage scrub with *Salvia* spp., *Artemisia californica* Less., and *Rhus* spp., where originally discovered by Douglas Propst.

**HELENIUM PUBERULUM* DC. An immature plant of this species was found in the dry bed of Hermit Gulch off Avalon Canyon, 300 ft, 37704, with *Euphorbia pepus* L., *Rubus ursinus* Cham. & Schlecht., *Keckiella cordifolia* (Benth.) Straw, and *Lonicera hispidula vacillans* A. Gray.

CARDAMINE CALIFORNICA (Nutt.) Greene. A second station for this rare species of moist, shaded places was found on a N-facing slope in 4th of July Cove, 37910.

**SISYMBRIUM OFFICINALE* (L.) Scop. A weed in moist ground along small stream in central part of Bulrush Canyon, 37664, with other introduced species such as *Plantago coronopus* L., *Torilis nodosa* (L.) Gaertn., and *Catapodium rigidum* (L.) C. E. Hubbard.

**CALLITRICHE MARGINATA* Torr. Representing a new family for the island, this tiny aquatic was locally abundant on the wet, sandy-mud margin of the S end of Haypress Reservoir, 1325 ft, 37697, May 29, 1968, with *Crassula aquatic* (L.) Berger, *Plantago coronopus*, *Eleocharis macrostachya* Britt., and *Juncus bufonius* L.

**LONICERA SUBSPICATA* H. & A. var. *JOHNSTONII* Keck. Vine with yellowish flowers climbing over *Quercus dumosa* Nutt. and other shrubs along dry bed of small stream in upper Skull Canyon, 1000 ft, 37623, with *L. hispidula vacillans*, a vine with pinkish flowers.

CHENOPODIUM BERLANDIERI Moq. var. *SINUATUM* (J. Murr.) H. A. Wahl, not subsp. *zschakei* (J. Murr.) Zobel as listed in the Flora. According to Dr. Wahl (pers. comm.), all our island specimens of *C. berlandieri* belong to this variety.

***CRASSULA AQUATICA* (L.) Berger. This tiny aquatic was found in some abundance on wet, sandy-mud margin of S end of Haypress Reservoir, 1325 ft, 37696, with *Callitriche marginata* and associated species listed above.

DUDLEYA VIRENS (Rose) Moran. According to Dr. Moran (pers. comm.), this species rather than *D. hassei* (Rose) Moran, occurs on Guadalupe Island. Thus *D. hassei* becomes an additional Santa Catalina Island endemic.

ARCTOSTAPHYLOS CATALINAE Wells, rather than *A. subcordata* Eastw. *vel af.* Dr. Wells has recently published (1968) this species, thus adding one more taxon to the list of Santa Catalina Island endemics. An additional collection is: small trees ca. 6 m tall and 1/3 m DBH from upper N-facing slope of Bulrush Canyon, 1350 ft, 37669.

XYLOCOCCLUS BICOLOR Nutt. Not restricted to NW third of island but seen E of Isthmus and collected in lower Middle Canyon, small shrubs on rocky slopes above small stream, 37636, with *Galium catalinense* A. Gray and *Phacelia lyonii* A. Gray; and N-facing slope of Wild Boar Gully N of Black Ridge, 37671, in chaparral with *Cercocarpus traskiae* Eastw., *Quercus dumosa*, *Heteromeles arbutifolia* (Lindl.) M. Roem., *Rhus integrifolia*, *Salvia mellifera*, etc.

ASTRAGALUS LEUCOPSIS (T. & G.) Torr., according to Barneby (1964), is included in *A. trichopodus* (Nutt.) A. Gray as the var. *lonchus* (Jones) Barneby. Because of the morphological and geographic distinctness of the two taxa, I think it is preferable to treat them as distinct subspecies: *A. trichopodus* subsp. *trichopodus* and *A. trichopodus* subsp. *leucopsis* (T. & G.) n. comb. (based on *Phaca leucopsis* T. & G., Fl. N. Am. 1: 694. 1840). Similarly the mainland *A. antisellii* Gray, treated by Barneby (1964) as *A. trichopodus* var. *phoxus* (Jones) Barneby, appears to deserve subspecific rank and can retain also its well-known epithet as *A. trichopodus* subsp. *antisellii* (Gray) n. comb. (based on *A. antiselli* Gray in Brewer & Wats., Bot. Calif. 1: 152. 1876). *A. trichopodus* subsp. *trichopodus* on Santa Catalina Island is restricted to rocky bluffs between Avalon and Pebbly Beach; whereas, *A. trichopodus* subsp. *leucopsis* is abundant over the island.

EUPHORBIA SERPYLLIFOLIA Pers. This weedy annual is infrequent, rather than rare: clayey bank of roadway in Cape Canyon, 800 ft, 37685.

LOTUS GRANDIFLORUS (Benth.) Greene. A third collection of this rare and showy species was taken from the west end of the island by Mr. Douglas Propst.

***LUPINUS BICOLOR* Lindl. subsp. *PIPERSMITHII* (Heller) D. Dunn. Dr. Dunn redetermined a specimen I had listed under subsp. *microphyllus* (S. Wats.) D. Dunn as this taxon: from the margin of Buffalo Springs Reservoir, 1430 ft, 35911, Apr. 6, 1966.

***LUPINUS AGARDHIANUS* Heller. Dr. Dunn segregates this species from *L. concinnus* Agardh, and places here specimens from: dry slopes near Haypress Reservoir, 1350 ft, 36191, Apr. 28, 1966; Black Jack Mt. near road to White's Landing, 1350 ft, 35800, Apr. 5, 1966.

MENTHA CITRATA Ehrh. The sterile material reported as *Mentha* $\times$ *piperita* L. in the Flora is actually this species, the Bergamot Mint. This error was called to my attention by Dr. Ralph Philbrick (pers. comm.).

ONAGRACEAE. The name for the Evening-primrose family was inadvertently omitted from the Flora. The name should be inserted on p. 56 after *Mirabilis* of the Nyctaginaceae and before *Clarkia*. The Thorne system of classification does not even contemplate submerging Onagraceae in Nyctaginaceae.

***LIMONIUM SINUATUM* (L.) Mill. This introduced showy perennial is heavily established in the grassy area S of the riding stables by the Avalon golf course, 50 ft, 37705.

**CHORIZANTHE STATICOIDES* Benth. Locally abundant on dry, clayey, W-facing bank in central part of Cape Canyon, 1000 ft, 37686, with *Chlorogalum pomeridianum* (DC.) Kunth, *Salvia apiana* Jeps., *Delphinium parryi parryi*, *Calochortus splendens* Dougl. ex Benth., etc., where originally noticed by Mr. Douglas Propst.

ERIOGONUM GRANDE Greene, rather than *E. latifolium* Sm. subsp. *grande* (Greene) S. Stokes, is the treatment favored by Reveal in Munz (1968). This taxon, whether subspecies or species, is apparently restricted to Santa Cruz, Anacapa, Santa Catalina, and San Clemente Islands.

**RUMEX CONGLOMERATUS* Murr. Found in lower Middle Canyon along small stream, 37633, with *R. salicifolius* Weinm., *Mimulus cardinalis* Dougl. ex Benth., *Juncus* spp., *Equisetum* spp., etc.

RANUNCULUS HEBECARPUS H. & A. This annual is frequent, rather than infrequent: middle Bulrush Canyon on shaded bank, 36856, with *Torilis nodosa*, *Thysanocarpus laciniatus* Nutt. ex T. & G., etc.

CERCOCARPUS BETULOIDES Nutt. ex T. & G. var. *BLANCHEAE* (C. K. Schneid.) Little. On Salta Verde in Wild Boar Gully one tree looks as if it is possibly introgressed by *C. traskiae*; it grows, 36875, only a few feet below the lowest specimen of *C. traskiae* in the gully. On the N slope of Black Jack Mt. at the upper end of Swain's Canyon toward Echo Lake, 1300 ft, a tree of *C. betuloides blanchaeae*, 37693, measured 6-7 m tall and more than 1/3 m DBH.

CERCOCARPUS TRASKIAE Eastw. Additional collections of this rare endemic tree are 36870, 36872, 36877, 36900, and 37674, all from Wild Boar Gully, 550-650 ft, with several trees of *C. betuloides blanchaeae*, one of which as mentioned above appears to show some introgression from *C. traskiae*.

HOLODISCUS DISCOLOR (Pursh) Maxim. var. *FRANCISCANUS* (Rydb.) Jeps. This rare shrub, 1-2 m tall, has been found along dry stream bed in Descanso Canyon about ¼ distance down from head of canyon at Airport Road to mouth of canyon, where at 750 ft elevation it forms a thicket, 36905, with *Mimulus puniceus* (Nutt.) Steud., *Marah*, *Toxicodendron*, *Heteromeles*, *Crossosoma*, *Rhamnus*, *Cercocarpus*, *Prunus*, etc.

LYONOTHAMNUS FLORIBUNDUS A. Gray subsp. *FLORIBUNDUS*. The first seedling of this plant observed in the wild was found near the upper end of Swain's Canyon toward Echo Lake, 1250 ft.

JEPSONIA MALVIFOLIA (Greene) Small. This species in February appears to be rather frequent on N-facing, rather moist slopes: Cherry Valley, 37913; 4th of July Valley; Blue Cavern Point, 37918.

GALVESIA SPECIOSA (Nutt.) A. Gray. This showy shrub is more frequent than we had supposed, having now been found at such additional locations as the Isthmus, Blue Cavern Point, and N-facing bank of road from Fisherman's Cove, 37916.

KECKIELLA CORDIFOLIA (Benth.) Straw, rather than *Penstemon cordifolius* Benth. This common red-flowered vine is much favored by the resident Allen's hummingbirds, as in Bulrush Canyon, 37667.

SOLANUM WALLACEI (A. Gray) Parish subsp. *WALLACEI*. A seedling of this relatively common island endemic was collected in upper Bulrush Canyon, 37678. After having examined flowering and fruiting material of the Guadalupe Island population of this species, I believe that the populations on Guadalupe, Santa Catalina, and Santa Cruz and Santa Rosa Islands represent three different subspecies. Thus I now believe that the Santa Cruz and Santa Rosa Island material is better treated as *S. wallacei* subsp. *clokeyi* (Munz) n. comb. (based upon *S. clokeyi* Munz, Bul. S. Calif. Acad. Sci. 31:69. 1932). The Guadalupe Island population will also need a new subspecific name. The three island subspecies probably are derived from the mainland *S. xanti* A. Gray. The whole complex deserves thorough investigation.

CAREX PRAEGRACILIS W. Boott, in place of *C. tumulicola* Mack. My doubts about the determination of my specimens from the small stream running into the low Buffalo Springs Reservoir were justified, for J. T. Howell redetermined the material as *C. praegracilis*.

ELEOCHARIS MACROSTACHYA Britt. in Small, rather than *E. palustris* and *E. mamillata* of Am. authors. This Spike-rush is locally abundant on reservoir and pond margins about the island: Haypress Reservoir, 37699, and Summit Reservoir.

JUNCUS BALTICUS Willd. The Wire Rush is apparently relatively rare, rather than frequent, on the island. A study of available material turned up only the following: salina behind Little Harbor, 15 ft, 36446, May 31, 1966; muddy creek bed below Eagle's Nest, lower Middle Canyon, 100 m, *F. R. Fosberg* S4619, Apr. 15, 1931.

JUNCUS BUFONIUS L. Apparently a rather frequent, rather than infrequent, annual along streams and on reservoir margins: Summit Reservoir, 37700; Bulrush Canyon; and Haypress Reservoir.

**JUNCUS MEXICANUS Willd. This species is probably the most frequent of the perennial rushes in the island interior: moist places along small stream in central part of Bulrush Canyon, 37666, with *Rorippa nasturtium-aquaticum* (L.) Schinz & Thell., *Juncus bufonius*, etc.; near pond above dam in Cottonwood Canyon, 150 ft, 34650, May 11, 1965; Number 2 Reservoir, upper Middle Canyon, 1000 ft, 34967, June 23, 1965.

**JUNCUS TEXTILIS Buch. As with the preceding, overlooked in my flora. Apparently rather rare but locally very abundant, as in upper Bulrush Canyon, where it, rather than *J. acutus sphaerocarpus* Engelm., is certainly the source of the canyon's name: forming extensive stands below lower reservoir, 950 ft, 37684; lower Middle Canyon in pool of water under bridge, 500 ft, 34962, June 23, 1965.

ALLIUM PRAECOX Bdg. The great difficulty I had in distinguishing both *A. peninsulare* Lemmon and *A. praecox* on the islands has been resolved. Dr. Marion Ownbey has examined all of our island specimens of the complex, and assures me (pers. comm.) that all the island material is *A. praecox*. Thus, *A. peninsulare* must be deleted from our island flora.

*BROMUS CARINATUS H. & A. This perennial grass is infrequent, rather than rare: *Opuntia* clump on upper N-facing slope of Bulrush Canyon, 37668; upper Cape Canyon below reservoir, 1000 ft, 37689.

BROMUS MARGINATUS Nees. This inland and upland species must be deleted from the island flora. The specimen cited in the Flora, *Fosberg* S4484 from above Pebbly Beach near rock crusher, when restudied, proved to be *B. carinatus*.

FESTUCA ARUNDINACEA Schreb., rather than *F. pratensis* Huds. As pointed out by Terrell (1968), *F. arundinacea* and *F. pratensis* are now considered distinct species in recent European floras. Our fescue, obviously a recent introduction, is the taller, more robust "Tall Fescue" *F. arundinacea*. The Santa Catalina Island material has the scabrous lemmas, ciliate auricles, and persistent basal leaf sheaths characteristic of that species.

POA ANNUA L. This annual weedy grass is infrequent, rather than rare: along roadside, middle Bulrush Canyon, 36859.

POLYPOGON SEMIVERTICILLATA (Forsk.) Hyl., rather than *P. semiverticillata*, for the gender of *Polypogon* is masculine.

RUPPIA MARITIMA L. *R. spiralis* L. ex Dum., which according to Gamarro (1968) should be called *R. cirrhosa* (Petag.) Grande, should not be listed as a synonym of our island species, which lacks the characteristic spiraled peduncle of *R. cirrhosa*. Although both taxa are highly variable, they do appear to be specifically distinct. In California *R. cirrhosa* tends to occur mainly in the interior and along the northern coast. *R. maritima*, on the other hand, seems to be entirely maritime and more southern in distribution, though the two species certainly overlap in the Bay Region.

TYPHA DOMINGENSIS Pers. Both island species of cattails are locally abundant in a cattail marsh at the upper end of Thompson's Reservoir at Middle Ranch in Middle Canyon, 650 ft, *T. domingensis*, 37625, and *T. latifolia* L., 37626.

ZOSTERA MARINA L. The Eelgrass, according to Robert R. Given and Dennis Lees (pers. comm.), has now been found growing in relatively deep water off the Palisades and in the quiet, shallower water of Emerald Cove, as well as in Catalina Harbor.

SUMMARY FOR SANTA CATALINA ISLAND

Eight additional species and subspecies, with one of them representing a new genus and family for the island, are listed. Eight species, not reported as collected on the island since 1953, 1931, 1920, or earlier, are listed from recent collections. Name changes are made for nine taxa, and two species are deleted from the flora. Three new combinations are made at the subspecific level. With these additions and emendations the Santa Catalina Island flora now totals 563 species in 316 genera and 82 families, with 396 species apparently indigenous and 167 species introduced. Forty-three indigenous and 17 introduced species not collected in the last 25 or 30 years still remain to be rediscovered. The total number of endemic taxa believed to be restricted to Santa Catalina Island are seven, four species and three subspecies, as follows: *Dudleya hassei* (Rose) Moran, *Arctostaphylos catalinae* Wells, *Eriogonum giganteum giganteum*, *Cercocarpus traskiae* Eastw., *Lyonothamnus floribundus floribundus*, *Mimulus traskiae* A. L. Grant, *Solanum wallacei wallacei*.

SAN CLEMENTE ISLAND

Since Raven (1963) published his excellent flora of San Clemente Island, I have been able to make one profitable collecting trip about that island in April 1966 with Profs. William A. Weber of the University of Colorado, R. Santesson of the University of Uppsala, Sweden, Arthur S. Boughey of the University of California at Irvine, and Herbert G. Baker of the University of California at Berkeley. This trip was made in part to enable Profs. Weber and Santesson to collect lichens on the island and partly to round out our knowledge of the flora of Santa Catalina Island through comparison with that of this neighboring but more isolated island to the south. On that trip we managed to add several species to the known flora of the island and to rediscover several others not recently collected on the island. Also since 1963, a number of re-identifications, an over-looked specimen, and newly published species and name changes make desirable a brief supplement to the earlier flora of San Clemente Island.

Prof. Raven's thorough coverage of environmental factors, history of collecting, and relationships of the flora of the island makes it possible to restrict the following treatment to a list of the new collections and new information about selected species and the more interesting plants associated in the field with them. The double asterisk indicates those taxa not previously recorded from San Clemente Island, and the single asterisk those rediscovered species not found during Dr. Raven's intensive survey. The collection numbers cited are my own, and are all deposited in the herbarium of the Rancho Santa Ana Botanic Garden. Duplicates will be distributed to the Santa Barbara Botanic Garden, San Diego Natural History Museum, and other herbaria interested in our California islands. Collection dates are not given since all my collection numbers, 35989 through 36145, were taken from April 15-17, 1966. Taxa are listed in the Englerian order in which they did or would occur in Raven's flora (1963).

LIST OF ADDITIONS

***PHYLLOSPADIX SCOULERI* Hook. Attached to rocks in intertidal pools and seaward in great abundance, mixed with the less common *P. torreyi* S. Wats., 36047, and many different algae, about ½–1 mile SSE of Eel Point, SW side of island, 36012, 36040, and 36046. Possibly in volume and wet weight this Surf-grass is the most abundant vascular plant in the island flora, and certainly the dominant marine phanerogam in shallow water around the island. *Zostera marina* L. should be sought by skin divers in waters up to 30 or 40 feet in quiet coves.

***DESCHAMPSIA DANTHONIODES* (Trin.) Monro ex Benth. This grass was abundant in high grassland near reservoirs between Boulder and Horton, 1600 ft, 36077, with various species of *Bromus*, *Festuca*, *Avena*, and *Stipa*, and such forbs as *Brodiaea kinkiensis* Niehaus, *Delphinium variegatum* T. & G. subsp. *thornei* Munz, *Linanthus pygmaeus* (Brand) J. T. Howell subsp. *pygmaeus*, *Trifolium palmeri* S. Wats., *T. gracilentum* T. & G., *T. amplexens* T. & G. var. *amplexens*, *Lupinus bicolor* Lindl. subsp. *umbellatus* (Greene) D. Dunn, *Cryptantha intermedia* (A. Gray) Greene, *Erodium botrys* (Cav.) Bertol., *Phalaris lemmonii* Vasey, *Microseris linearifolia* (Nutt.) Sch.-Bip., *M. heterocarpa* (Nutt.) K. Chamb., and *Plantago erecta* Morris. We found it also by a desiccated vernal pool on top of the island just NW of Thirst, 1800 ft, 36097, with the following associates: *Calandrinia ciliata* (R. & P.) DC. var. *menziesii* (Hook.) MacBr., *Lupinus bicolor umbellatus*, *Gilia nevini* A. Gray, *Pectocarya linearis* DC. var. *ferocula* I. M. Johnst., *Plagiobothrys canescens* Benth., *P. californicus* (A. Gray) Greene var. *gracilis* I. M. Johnst., *Spergularia bocconeae* (Scheele) A. & G., *Microseris douglasii* (DC.) Sch.-Bip. subsp. *platycarpa* (A. Gray) K. Chamb., *Linaria canadensis* (L.) Dum.-Cours subsp. *texasensis* (Scheele) Pennell, *Filago arizonica* A. Gray, *F. californica* Nutt., and other annuals.

***FESTUCA MYUROS* L. This presumably introduced annual fescue was collected on the upper grassy slopes of Box Canyon, NW of Horse Canyon, SW of Thirst, 900 ft, 36129b, mixed with the closely related *F. bromioides* L., *F. pacifica* Piper, and *F. megalura* Nutt., and growing with *Linanthus bicolor* (Nutt.) Greene subsp. *bicolor*, *Trifolium amplexens amplexens*, *Microseris* spp., *Cryptantha intermedia*, *Pectocarya linearis ferocula*, *Caulanthus lasiophyllus* (H. & A.) Payson, *Avena* spp., *Capsella bursa-pastoris* (L.) Medic., *Eschscholzia ramosa* (Greene) Greene, and *Filago californica*.

**ELEOCHARIS MACROSTACHYA* Britt. in Small. This perennial spike-rush is probably rare on the island because of the paucity of favorable habitats. I found it on the muddy margin of a small reservoir between Boulder and Horton, 1600 ft, NE side of island, 36084, with *Callitriche marginata* Torr., *Psilocarphus tenellus* Nutt. var. *tenellus*, and *Gnaphalium palustre* Nutt. The names of the Eurasian species, *E. palustris* (L.) R. & S. and *E. mamillata* Lindb. f., are often misapplied to this native spike-rush.

ALLIUM PRAECOX Brandeg. As mentioned under this species in the Santa Catalina Island list, Dr. Marion Ownbey of Washington State University, after examining all our material from the islands, has found (pers. comm.) that *A. peninsulare* Lemmon does not occur on any of the islands and that all our island material listed under the two names are actually *A. praecox*, as 36033, from rocky sunny slope near top of canyon between Seal Cove and Eel Point, SW side of island, 300 ft; and 36059, from grassy, rocky, steep slope of canyon below Lemon Tank near dump, S of Nanny, NE side of island, 600–700 ft. *A. peninsulare*, therefore, must be deleted from the flora of San Clemente Island.

***BRODIAEA KINKIENSIS* Niehaus. This species was formerly included in *B. filifolia* S. Wats., which occurs in similar habitats on the mainland, but has recently been described by Niehaus (1966) as a distinct species endemic on San Clemente Island. Apparently my collection is from south of the type locality, grassland on top of the island, 1600 ft, near reservoirs between Boulder and Horton, NE side of island, 36089. Its associated species are listed above under *Deschampsia danthonioides*.

TRITELEIA CLEMENTINA Hoover. Though listed as "rare" on canyonsides by Raven (1963), we found this species not at all uncommon on canyon slopes, as near the bottom of canyon S of Lemon Tank, 500 ft, 36030; canyon below Lemon Tank near dump, S of Nanny, 600–700 ft, 36056; and near bottom of Box Canyon NW of Horse

Canyon, SW of Thirst, 700 ft, 36122. Frequently found associated with this lily were the related *Dichelostemma pulchellum* (Salisb.) Heller and *Allium praecox*; and, as in the Lemon Tank canyons, a few perennials like *Lathyrus laetiflorus* Greene subsp. *barbarae* (White) C. L. Hitchc., *Viola pedunculata* T. & G., *Sanicula arguta* Greene ex C. & R., *Galium catalinense* A. Gray, and *Stipa pulchra* Hitchc.; numerous annuals like *Calandrinia ciliata menziesii*, *Trifolium palmeri*, *T. tridentatum* Lindl., *Gilia nevinii*, *Linanthus bicolor bicolor*, *Pholistoma auritum* (Lindl. ex Lindl.) Lilja, *Cryptantha intermedia*, *Microseris heterocarpa*; and many species of introduced annual grasses of the genera *Avena*, *Bromus*, and *Hordeum*.

**CALANDRINIA MARITIMA* Nutt. was abundant on one rocky slope above a pebbly beach $\frac{1}{2}$ mile SSE of Eel Point, SW side of island, 5–50 ft, 36043, among the shrubby *Euphorbia misera* Benth., *Lycium californicum* Nutt. ex A. Gray, *Bergerocactus emoryi* (Engelm.) B. & R., and such annuals as *Festuca octoflora* Walt. var. *hirtella* Piper, *Hordeum pusillum* Nutt., *Aphanisma blitoides* Nutt. ex Moq., *Eschscholzia ramosa*, *Oligomeris linifolia* (Vahl) MacBr., *Phacelia lyonii* A. Gray, *Cryptantha maritima* Greene var. *maritima*, and *Microseris heterocarpa*.

**SPERGULARIA VILLOSA* (Pers.) Camb. This prostrate perennial was found once with annual grasses in dry grassland on top of the mesa S of Lemon Tank, S of Nanny, on NE side of island, 1000 ft, 36031.

**DELPHINIUM KINKIENSE* MUNZ. This larkspur has been published as a new species in a separate paper in this issue of *Aliso* on page 69. It thus adds another endemic species to the already considerable list from San Clemente Island.

**DELPHINIUM VARIEGATUM* T. & G. subsp. *THORNEI* MUNZ, is also described in some detail in the paper mentioned above as another new subspecies for the San Clemente Island flora. The type locality, grassland on top of the island, NE side, ca. 1600 ft, between Boulder and Horton is south of the type locality for *Brodiaea kinkiensis* Niehaus and is the station for several species listed in this paper as new for the island, as *Deschampsia danthonioides*, *Erodium botrys*, and *Callitriche marginata*.

JEPSONIA MALVIFOLIA (Greene) Small. This island endemic is probably much commoner than the few collections would indicate because it is so easily overlooked. Several sterile plants were found on one moist, steep, rocky face of Box Canyon, NW of Horse Canyon, SW of Thirst, 600 ft, 36124. Some of the more interesting species found nearby in the canyon are listed below under *Lonicera hispidula* (Lindl.) Dougl. ex T. & G. and *Munzothamnus blairii* (Munz & Johnst.) Raven.

**ERODIUM BOTRYS* (Cav.) Bertol. is apparently much less common on the island than *E. cicutarium* (L.) L'Hér. and *E. moschatum* (L.) L'Hér. It was fairly abundant in grassland near reservoirs between Boulder and Horton, NE side of island, 1600 ft, 36083, where first spotted by Dr. Herbert Baker. Its associated species are listed above under *Deschampsia danthonioides* and *Delphinium variegatum thornei*.

CNEORIDIUM DUMOSUM (Nutt.) Hook. f. was reported from the island by Roderick (1967). It seemed such an unlikely discovery for the island I requested material from the University of California Botanic Garden. Mr. Roderick kindly sent living material which proved to be the very common *Lycium californicum*. *Cneoridium*, which does occur on the coastal bluffs of Orange County but has apparently never been reported from any of the other islands, thus must not be added to the island flora.

**EUPHORBIA MISERA* Benth. This low, spreading shrub was abundant on a sloping sea-bluff from sea level to about 150 feet, about $\frac{1}{2}$ mile SSE of Eel Point, SW side of island, 36018, where closely associated with *Lycium californicum*, *Bergerocactus emoryi*, *Frankenia grandifolia* Cham. & Schlecht., *Spergularia macrotheca* (Hornem. ex Cham. & Schlecht.) Heynh., and such annuals as *Calandrinia maritima*, *Eschscholzia ramosa*, *Aphanisma blitoides*, *Trifolium palmeri*, *Phacelia lyonii*, and *Malacothrix foliosa* A. Gray. At the top of the sea-bluff, however, the plant community consisted chiefly of *Eriophyllum nevinii* A. Gray, *Lotus argophyllus* (A. Gray) Greene subsp. *ornithopus* (Greene) Raven, *Perityle emoryi* Torr., as well as the *Bergerocactus* and *Lycium*.

**CALLITRICHE MARGINATA* Torr. was collected on the muddy margin of a small reservoir in grassland between Boulder and Horton, NE side of island, 1600 ft, 36088, where associated with *Eleocharis macrostachya*, *Gnaphalium palustre*, and *Psilocarphus*

tenellus tenellus. I suspect that this species is not really distinct from the *C. longipedunculata* Morong., collected in Middle Ranch Canyon by Raven (1963). They are probably seasonal stages of one species.

**OPUNTIA ORICOLA* Philbrick, has been reported by its author (pers. comm.) as definitely occurring on San Clemente Island although he cited no specific localities.

**LOMATIUM INSULARE* (Eastw.) Munz, which Raven reported as endemic to San Nicholas and Guadalupe Islands but absent from San Clemente Island (1963), has indeed been collected on San Clemente Island by Dr. Barton W. Evermann, Mar. 25, 1918. I found his collection in the herbarium of the California Academy of Science while checking for Santa Catalina Island collections. This is an important addition for it seemed rather improbable that a species would be endemic to Guadalupe and San Nicholas Islands but absent from the intermediate San Clemente Island.

EUCRYPTA CHRYSANTHEMIFOLIA (Benth.) Greene var. *CHRYSANTHEMIFOLIA* listed as rare by Raven (1963), was collected on a steep canyon slope near bottom of Box Canyon NW of Horse Canyon, SW of Thirst, 700 ft, 36111, with such associates as *Melica imperfecta* Trin., *Juncus bufonius* L., *J. patens* E. Mey., *Dichelostemma pulchellum*, *Triteleia clementina*, *Parietaria floridana* Nutt., *Pterostegia drymarioides* Fisch. & Mey., *Chenopodium californicum* (S. Wats.) S. Wats., *Claytonia perfoliata* Donn ex Willd., *Cerastium glomeratum* Thuill., *Caulanthus lasiophyllus*, *Crassula erecta* (H. & A.) Berger, *Lotus strigosus* (Nutt.) Greene, *Bowlesia incana* Ruiz & Pav., *Phacelia floribunda* Greene, *Pholistoma auritum auritum*, *Calystegia macrostegia* (Greene) Brummitt, *Salvia columbariae* Benth., *Zauschneria californica* Presl subsp. *mexicana* (Presl.) Raven, *Antirrhinum nuttallianum* Benth., *Mimulus guttatus* Fisch. ex DC., *Marah macrocarpus* (Greene) Greene, *Rafinesquia californica* Nutt., and *Sonchus oleraceus* L.

PLANTAGO FASTIGIATA Morris is apparently the correct name for *P. insularis* Eastw., according to Bassett and Crompton (1967). I found it to be abundant on the sandy bank of an old raised beach 2/3 mile SSE of Eel Point and N of Seal Cove, SW side of island, 100 ft, 36037, associated with a fascinating mixture of island endemics, as *Astragalus miguelensis* Greene, *A. nevinii* A. Gray, *Camissonia guadalupensis* (S. Wats.) Raven subsp. *clementina* (Raven) Raven, *Cryptantha traskiae* I. M. Johnst., and other non-endemics common on the islands like *Hordeum leporinum* Link, *Atriplex watsonii* A. Nels., *Abronia umbellata* Lam., *Lepidium lasiocarpum* Nutt. var. *lasiocarpum*, *Lupinus succulentus* Dougl. ex K. Koch, *Phacelia distans* Benth., and *Amblyopappus pusillus* H. & A.

LONICERA HISPIDULA (Lindl.) Dougl. ex T. & G. was a rare species observed on an inaccessible, steep, rocky face of Box Canyon, NW of Horse Canyon, SW of Thirst, 600 ft, with such other rarities as *Toxicodendron radicans* L. subsp. *diversilobum* (T. & G.) Thorne, *Castilleja grisea* Dunkle, *Keckiella cordifolia* (Benth.) Straw, *Galium catalinense*, and *Eriogonum giganteum* S. Wats. subsp. *formosum* (K. Brandegee) Raven.

**GNAPHALIUM PALUSTRE* Nutt. was reported by Raven (1963) as rare, with specimen lost in press (which is all too easy to do with such tiny annuals). I found it on the muddy margin of a shallow reservoir between Horton and Boulder, 1600 ft, 36093, where accompanied by *Psilocarphus tenellus tenellus*, *Eleocharis macrostachya*, and *Callitriche marginata*.

HEMIZONIA CLEMENTINA Brandegee $\times$ *H. FASCICULATA* (DC.) T. & G. Both of these species, the former an endemic island perennial subshrub and the latter a wide-ranging annual, are common on San Clemente Island. Near the Duty Office at Wilson's Cove, 100 ft, we observed a specimen that seemed intermediate between the two species. Dr. Herbert Baker took a specimen back to Berkeley. I thought I had also collected a specimen, but mine, 36095, seems to fall within the range of variability of *H. clementina*.

MICROSERIS HETEROCARPA (Nutt.) K. Chamb., listed as "rare" by Raven (1963), was rather common over the island, and was collected as follows: on rocky slope above pebbly beach about 1/2 mile SSE of Eel Point, 5-50 ft, 36053; on grassy, rocky, steep slope of canyon below Lemon Tank near dump, S of Nanny, 600-700 ft, 36061; in grasslands near reservoirs between Boulder and Horton, 1600 ft, 36092; and on grassy slopes of Box Canyon, NW of Horse Canyon, SW of Thirst, 900 ft, 36142.

MUNZOTHAMNUS BLAIRII (Munz & Johnst.) Raven. This composite subshrub is the most distinctive endemic on the island and is relatively common on vertical walls of canyons, as the canyon S of Lemon Tank, S of Nanny, 500 ft, 36029; and Box Canyon NW of Horse Canyon, SW of Thirst, 600 ft, 36123. Its associates at this latter station included the usual *Senecio lyonii* A. Gray, *Galvezia speciosa* (Nutt.) A. Gray, *Eriophyllum confertiflorum* (DC.) A. Gray, *Dudleya virens* (Rose) Moran, and *Polypodium californicum* Kaulf., plus the much less common canyon-wall occupants listed above with *Lonicera hispidula*. This species is not frost-resistant for our cultivated specimens at the Rancho were badly frosted, though apparently not killed, Dec. 21, 1968, when the temperature fell to 23° F.

SUMMARY FOR SAN CLEMENTE ISLAND

Eleven taxa are listed that are to be added to the flora of San Clemente Island, as recorded by Raven (1963, 1965). Three of these, two species and one subspecies, have been described as new subsequent to Raven's papers. One species, *Allium peninsulare*, must be deleted from the flora. Recent collections have been made of three additional species previously found on the island but not picked up during Raven's survey. With these changes the total known flora for San Clemente Island is 239 indigenous species and subspecies and 69 naturalized species, 308 taxa in all. Since the three new taxa recently described are endemic to the island, the total of island endemics for San Clemente has been raised to 13, as compared with 7 for the larger but less isolated Santa Catalina Island to the north and 32 for the more distantly isolated Guadalupe Island to the south.

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