ately lobed, with deeply cordate sinuses and long (exceeding 1 m) petioles. It resembles *G. insignis* (Oerst.) A. DC. from Costa Rica and Panama somewhat, and *G. kilipiana* very closely.

Further comparison of both types and material from the type locality of *G. mexicana* as well as additional material from central Chiapas and southwestern Guatemala shows great similarity in leaf surface features and inflorescence characters. Pubescence on the leaf surface is very similar to the above and much denser than that of the two other Central American species, *G. insignis* and *G. talamancana* Weber & Mora. Inflorescence characters, particularly in the thickness of the branches and the position, size and shape of their subtending bracts are also quite similar and consistent with synonymy.

I can find no real differences between material from the type locality for *G. mexicana* and Lundell's type. Lundell's description is a very good description of the Veracruz material. Since there can no longer be any conflict between Brandegee's and Lundell's short (58 and 28 word) descriptions, I can see no other alternative than to call them one species.

Even though Brandegee's description is based on fragmentary material and thus misleads, it is the earlier, and has priority, so *G. kilipiana* must be reduced to synonymy.

Material Studied: MEXICO: Veracruz: Sierra Chiconquiaco above Misantla, 26 Dec 1971, *Barrington 416a, 416b 417, 439* (GH); 18 Sep 1973, *Palkovic 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780* (GH); Jul 1912, *Purpus 8568* (UC holotype of *G. mexicana,* GH isotopes). Chiapas: Volcán Tacaná, 23 Mar 1939, *Matuda 2763* (GH, type of *G. kilipiana*).

This study represents a by-product of a dissertation completed at Harvard University under the supervision of Rolla M. Tryon with the support of NSF grants GB 27911 and GB 39866. I would also like to thank Drs. Richard M. Straw and Kenneth Wilson for their helpful reviews and comments.—Lawrence A. Palkovic, Department of Biology, California State University, Los Angeles, 90032.

Ferns of the New York Mountains, California, with Biogeographic Comments.—Several chains of mountain ranges in the eastern Mojavo Desert are of particular biogeographic interest. The southernmost chain extends from the Granite Mountains through the Providence, Mid Hills, and New York Mountains to the northeast. North of the eastern part of this chain is another chain, comprising the Ivanpah, Mescal, and Clark Mountains. Still farther north is the Kingston Range, and finally, in adjacent Nevada, the very high Spring Mountains form the north end of this assemblage.

These mountains share several important features. They are high enough at their crests nearly or quite to emerge from the desert zone of the region. They regularly receive winter snow, and importantly, they generally intercept significant precipitation from the frequent late summer invasions of moist air from the Gulf of Mexico. This invests them with two rainy seasons, much like climatic regimens to the east. These ranges exhibit great tectonic complexity, and the array of exposed geological formations provides both chemical and physical edaphic diversity. Collectively, these ranges lie equidistant from ranges with comparable elevations to the east in Arizona (Cerbat and Hualapai Mountains) and to the southwest in California (Transverse Ranges).

These features favor a token intrusion of numerous biotic elements not otherwise a part of the fauna and flora of California. Particularly, plants and animals with ranges principally in the Arizona Uplands (Shreve, Publ. Carnegie Inst. Wash. 591:42–43, map 1. 1951) of the Sonoran Desert may reach California here. Also, some organisms with southern Rocky Mountain affinities and ranges across boreal Arizona form a part of this southeast California assemblage. This has been noted

briefly, without emphasis, for vertebrates by Johnson et al. (Univ. Cal. Publ. Zool. 48:248. 1948), for higher plants by Parish (Ecology 11:498. 1930) and most recently by Henrickson and Prigge (Madroño 23:164–168. 1975). There are a number of examples of similar distribution patterns known for invertebrates, chiefly insects, especially in the better known orders such as Lepidoptera (Emmel and Emmel, Los Angeles County Mus. Sci. Ser. 26:22–23, 46, 58, 60, 78, 84, 89. 1973; Ferguson, Moths of America North of Mexico 20.2A:133. 1971; MacNeill, unpubl.).

Recent collections of ferns from a section of the New York Mountains (California, San Bernardino Co.) reflect well the biogeographic patterns suggested by other segments of the flora and fauna. These collections have provided new records for the state and several additional records for this mountain range. Our observations further reaffirm that substrate strongly influences fern micro-distributions. Following is an annotated list of the species of ferns now known from the New York Mountains. Eight of the nine species of ferns recorded for the New York Mountains are rare or very uncommon in California as a whole and can be regarded as intrusive elements into California from the east (even though one, *Notholaena jonesii,* does extend westward to coastal counties). All eight occur in Arizona and generally southward or eastward, often much more commonly than in California.

Unless otherwise stated, collections are from the New York Mountains. Geological determinations have been provided through the kindess of B. C. Burchfiel, Rice University, and Pierina Nicholson, The Oakland Museum (here abbreviated OM).

Polypodium hesperium Maxon. 550 m NNE of New York Mt. Peak, 2130 m, *MacNeill and Brophy 097510D11* (OM, UC), in shaded granite fissures and crevices; $2n = 74$ II (voucher UC). Previously known in California from only a few collections in the Transverse Ranges. Records for *P. hesperium* from Placer Co. in the Sierra Nevada (Howell and Long, Four Seasons 3:8. 1970) and also northern California (see map in Lang, Madroño 20:58. 1969) require re-examination since Lang (Madroño 20:53–60. 1969; Madroño 21:235–254. 1971) and Lloyd (Fremontia 3:18–21. 1975) seem to imply that the diploid cytotype (*P. amorphum* Suksdorf) and the tetraploid cytotype (*P. hesperium*) are allopatric or nearly so south of British Columbia. *Polypodium amorphum* ranges south along the Cascade-Sierran axis to the central Sierra Nevada, where it is rare (Howell and Long, loc. cit.; reported as *P. montense* Lang). *Polypodium hesperium* evidently occurs along the intermountain face of the northern Cascades and extends south to Mexico along the Rocky Mountain system. It ranges west through Arizona and, unaccountably until now, is known from two stations in the Transverse Ranges of California. Our collection from the New York Mountains is tetraploid and lacks paraphyses and is thus not *P. amorphum*. The New York Mountain locality bridges the distributional gap between Arizona collections and those from western San Bernardino and Riverside Counties.

Notholaena jonesii Maxon. Keystone Basin, 1750 m, *MacNeill and Smith s.n.* (OM, UC), crevices of blue-gray limestone cliffs and boulders; $2n = 54$ II (voucher UC). First collection from the New York Mountains. Previously known from scattered localities in southern California (including Providence and Clark Mts.), Utah, and Arizona. In Keystone Basin, this species was found associated only with the bluish-gray limestones of the Pennsylvanian Bird Spring Formation, most abundantly on a south-facing slope. On Clark Mountain we found this fern only upon a similar-appearing blue-gray limestone.

Notholaena limitanea Maxon var. *limitanea*. Keystone Basin, 1800 m, *MacNeill 097512A2* (OM), *s.n.* (UC), 20 plants found in crevices of north-facing bluish-gray limestone of the Bird Spring Formation. First collections from California; previously recorded from southern Utah, Arizona, southern New Mexico, west Texas, Chihuahua, and Sonora, with an additional variety from southeastern Arizona and adjacent New Mexico to Hidalgo (Tryon, Contr. Gray Herb. 179:86. 1956).

Cheilanthes feei T. Moore. Keystone Basin, *MacNeill s.n.* (OM, UC), widespread throughout Keystone Basin from 1700 m to 2000 m in crevices of often north-facing limestone cliffs and boulders. Associated with both the bluish-gray and the white limestones of the Pennsylvanian Bird Spring Formation, but seemingly absent from a Triassic metamorphosed sandy limestone formation. A single plant was found on granite. Known from Texas to Iowa and west to Arizona, Nevada, British Columbia, Washington, and transmontane California in the Providence, New York, Clark, Panamint, and Inyo-White Mountains.

Cheilanthes wootonii Maxon. Keystone Basin, 1900 m, *MacNeill s.n.* (OM), bases of granitic outcrops under oaks. Found only among granitic rocks above 1825 m in Keystone Basin. Reported by Munz (op. cit.) from New York, Panamint, Inyo-White, and Providence Mountains in California, but we have seen specimens only from the two first-named ranges: New York Mts., Fourth of July Canyon, *Alexand and Kellogg 1411, 1412* (UC); Panamint Mts., *Munz 12571* (UC). Lloyd and Mitchell (A Flora of the White Mountains, California and Nevada. 1973) recorded it only as "to be expected" in the White Mountains. Otherwise known from Baja California, Sonora, Chihuahua, Arizona to Texas and north to Colorado and Oklahoma.

Woodsia plummerae Lemmon. Known from California only from a single ravine in Keystone Basin (Smith, Madroño 22:378. 1974); additional collections have now been made from the same locality (*Smith 673,* UC; *MacNeill s.n.,* UC). The species is found at 1900 m in soil at the base of north-facing granitic cliffs and boulders, often under the canopy of *Quercus chrysolepis.* Many of these plants show the characteristic forking or cresting og the blade apex mentioned for the species by Brown (Beih. Nova Hedwigia 6:106. 1964).

Woodsia oregana D. C. Eaton. Keystone Basin, 1900 m, *MacNeill s.n.* (OM), *097510D9* (UC), in soil at the base of granitic cliffs and boulders, generally well-shaded. Widespread throughout the higher elevations on intruded granite pluton that forms the crest of the range. In Keystone Canyon it grows with *W. plummerae* and in many other places on north-facing granitic slopes. The species ranges from British Columbia to Vermont in the north, south to New Mexico, Arizona and southern California. Nearly all records in California are transmontane. Howell and Long (op. cit., p. 9) cited only a single certain collection of this species from the southern Sierra Nevada.

Pellaea truncata Goodding (*P. longimucronata* of California and Arizona references; an illegitimate name, see Cronquist et al., Intermountain Flora 1:202, 1972). Keystone Basin, 1700 m, *MacNeill s.n.* (OM), mainly among granitic boulders and fissures in granite cliffs, but also frequent in a Jurassic formation of sheared volcanic and metamorphosed sedimentary rocks, and remarkably, the dominant fern (the only species found) throughout a formation of metamorphosed sandy limestone that may be Triassic. This latter formation seems not to support any of the several "limestone" ferns of the region. In the Keystone Basin area it ranges, on appropriate substrates, from 1600 m to 2150 m. It is rare on the Bird Spring limestones. Known with certainty in California only from the New York Mountains (also *Ferris and Bacigalupi 8076*, UC, *Alexander and Kellogg 1323a*, UC) and Providence Mountains (Pray, Amer. Fern J. 57:52–58. 1967). Its range beyond this part of California extends from Nevada to Colorado and Texas, Sonora, Arizona, and Baja California (Tryon, Ann. Missouri Bot. Gard. 44:155. 1957).

Pellaea mucronata D. C. Eaton. Fourth of July Canyon, *Alexander and Kellogg 1323,* pt. (UC). The locality cited is to the southwest of the region we sampled and is not far from a station in the Mid Hills (*Smith 682,* UC). This fern is also known from the Providence Mountains. It is very closely related to the preceding and, according to Pray (op. cit.), the two species hybridize in the eastern Mojave. *Pellaea mucronata* is one of several species that are much more prominent nearer the western margins of the desert regions. Indeed, this species is largely cismontane.

but does reach the desert, extending eastward barely into Nevada; it is not known from Arizona. *Pellaea mucronata* is here considered to be one of several "Californian" elements (discussed below) that extend eastward to meet elements from

Several additional ferns may ultimately be found in the New York Mountains. These fall into two categories: *1*) those with distributions primarily to the south and east (Sonoran element); and 2) those with distributions in the eastern Mojave and Colorado Deserts and westward (Californian element). There are three such ferns in the first category:

Notholaena cochisensis Goodding occurs in limestone in the Providence Mountains and on a bluish limestone (much like that in Keystone Canyon) on Clark Mountain. It is to be expected on limestone in the New York Mountains but at elevations somewhat lower than the floor of Keystone Basin. Hevly (J. Ariz. Acad. Sci. 3:205–208. 1965) recognized this as a species separate from *N. sinuata* (Lag. ex Swartz) Kaulf., a distinction we support on morphological, geographical, and ecological grounds.

Asplenium resiliens Kunze has been reported recently in the Spring Mountains of Nevada (Fisher, Madroño 23:72. 1975), where it occurs on Navajo sandstone. The species may occur on shaded limestone or limey sandstone cliffs in other ranges of the eastern Mojave Desert at elevations somewhat below those of Keystone Basin.

Cheilanthes fendleri Hook. was reported from southern California by Cronquist et al. (Intermountain Flora 1:205. 1972), but Cronquist indicates (in litt.) that the inclusion of California was based on misidentified collections. Still, it is another Sonoran element that may occur in the eastern Mojave.

There are four ferns of the second category that may eventually be found in the New York Mountains. *Notholaena californica* D. C. Eaton and *Cheilanthes viscida* Davenport have not yet been recorded for the eastern Mojave ranges; they might be expected in the Granite Mountains. *Notholaena parryi* D. C. Eaton, a widespread fern of moderate elevations in the deserts, can be expected anywhere in the eastern Mojave ranges below 1550 m. We have seen specimens from the Providence Mountains (Bonanza Mine, *Opler s.n.,* OM). *Cheilanthes covillei* Maxon has been collected in the Providence Mountains (*Wolf 10688,* UC) and may be present in the New York Mountains. This species is very closely related to *C. wootonii.* We expect all four species to be most prominent near the westernmost parts of the eastern Mojave ranges.—C. Don MacNeill, The Oakland Museum, Oakland, CA 94607, William Brophy, Chabot College, Hayward, CA 94545, and Alan R. Smith, University Herbarium, Department of Botany, University of California, Berkeley, CA 94720.

Diploid Claytonia perfoliata from Southern Mexico.—Prior studies of *Claytonia perfoliata* Willd. [*Montia perfoliata* (Willd.) T. Howell] (Miller, Syst. Bot. 1:20–34. 1976; Fellows, Madroño 23:296–297. 1976; Swanson, Ph.D. Dissertation, Univ. California, Berkeley, 1964) revealed two morphologically different diploids ($2n = 12$), which were called "Channel Islands" or "Coastal" (referable to *C. perfoliata* ssp. *perfoliata*) and "Montane" [= *C. rubra* (T. Howell) Tidestrom]. These diploid species are easily distinguishable morphologically. The former is characterized by petals 3 to 4 mm long, linear juvenile basal leaves, deltoid mature basal leaves (with mucronate tips), green herbage, and a perfoliate to only slightly cleft cauline leaf disc. *Claytonia rubra* has petals similar in length to those of *C. perfoliata* ssp. *perfoliata;* and deltoid mature basal leaves. However, the juvenile leaves are never linear but instead are rhombic, and the cauline leaves are free or are united on only one side of the scape. As the name implies, *C. rubra* is characterized by livid beet-red foliage coloration, particularly on the abaxial leaf surfaces, although green-leaved morphs may be encountered in some populations.