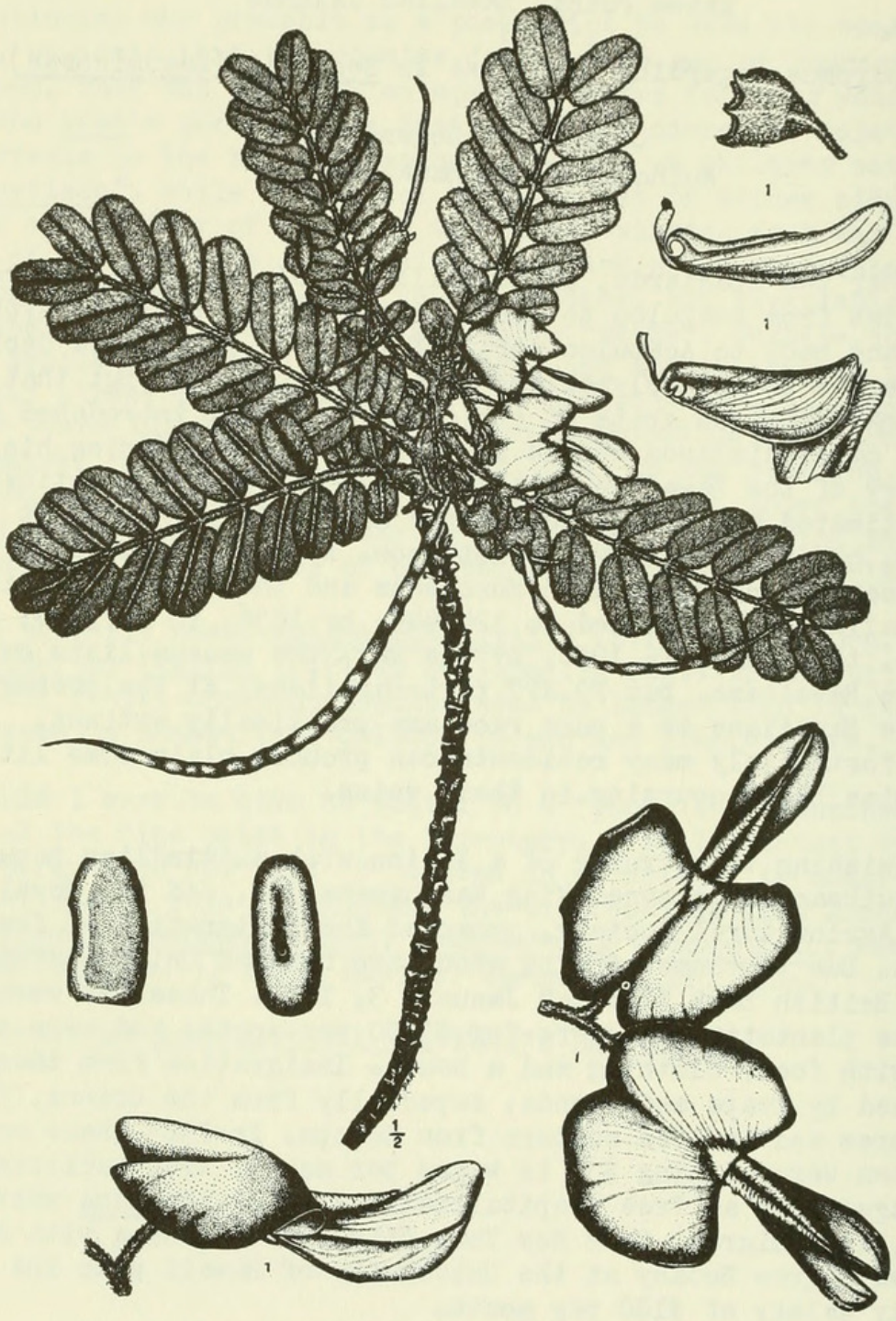
Kaena Point, Hawaiian Islands
and
A Prodromus Regarding Some Taxa In Sesbania (Leguminosae)

Otto & Isa Degener
Authors, Flora Hawaiiensis

Whether the Spaniards, while sailing their galleons before the trades from Acapulco to Manila south of the Hawaiian Archipelago and back to Acapulco north of it, ever introduced decimating diseases to the Polynesians is a moot question. But that Captain Cook later, in spite of strict precautions, introduced soial and other diseases to the susceptible natives during his rediscovery of the Hawaiian Islands in 1778 is well authenticated. Cook estimated the population of the Archipelago in 1778 at 400,000, how accurately we do not know. By 1932, because of this and subsequent contacts with Europeans and their "civilization," the Hawaiians had dwindled to 124,449; by 1836, to 107,954; and by 1850, to 86,593! In 1950, by the way, the census lists only 162 pure Hawaiians, but 73,277 part-Hawaiians. At the present time the Hawaiians as a pure race are practically extinct, though fortunately many residents can proudly claim some little Polynesian blood coursing in their veins.

Not wishing to be ruler of a Nation with a dwindling population Kauikeaouli, crowned King Kamehameha III, and the Royal Hawaiian Agricultural Society, promoted the immigration of foreigners. Due to these efforts about two hundred Chinese arrived on the British bark "Thetis" January 3, 1852. These men were engaged as plantation laborers for $3.00 per month; and were supplied with food, clothing and a house. Immigration from then on continued by leaps and bounds, especially from the Orient, from the Azores and in less numbers from Europe. In 1925 these hordes of men were earning $30 in wages per month, with additional advantages such as free hospitalization; while the kane writer (O.D.), an immigrant from New York City, was teaching with an advanced degree Botany at the University of Hawaii with the princely salary of $180 per month.

The above preamble shows why so many of Hawaii's older citizens and their older offspring now prominent in business, the professions and in the Legislature are hard workers, thrifty, "practical" and eminently ambitious. They are a splendid lot as a whole in spite of rather elementary training limited to the Three Rs taught in poor plantation village schools, when not interrupted by the practice of child labor. Their background too



SESBANIA TOMENTOSA Hook & Arn.

(Flora Hawaiiensis)

often convinced them that if a plant no matter how scientifically or intellectually valuable or stimulating might be could not be used for fuel, medicine or food for man or beast it was worthless "grass," the Pidgin English word for "weed." Thus to most of these influential, immigrant old-timers the endemic plants, and the endemic animals that depend upon them for food and shelter, are today expendable unless they can be made into wood chips for selling to the paper industry in the Orient or can be transformed via the vegetarian food chain into exotic axis and blacktailed deer, goats, sheep, pronghorn and other herbivores available for hunters. Fortunately an increasing number of biologists more recently schooled on the Mainland and biologically akamai (clever, smart) sons and daughters of these old-timers are determined with almost missionary zeal to teach the grandchildren to appreciate "scientific and historical information" of the northwest end of Oahu, State of Hawaii. They realize that "grass," like the small sundew, has greater intellectual value than a 300 foot tall eucalyptus. They intend to end the wholesale errors of their elders. They are beginning to retard the present ghastly slaughter of endemic plants and animals, the destruction of unique geological features, and evidence of ancient Hawaiian culture under the crunch of the bulldozer. The King of Beasts (cf., "The Wizard of Oz") is certainly not Felis leo, but Homo sapiens!

One outstanding younger teaching group centers its activity at the University of Hawaii under the Sea Grant/ Marine Advisory Program and the Hawaii Committee for the Humanities. Teacher Edward Arrigoni, author; and Marine Advisory Specialist Raymond Tabata, editor, published "A Nature Walk to Ka'ena, O'ahu" February 1977 in an edition of about 1,000 copies. This field book of 112 pages, on legal size paper, is cheaply printed by photo-offset and, at the time of writing this review, free to those who write to the University for a copy. It concentrates on a limited area of northwest Oahu jutting out toward Kauai. Slanted primarily for the use of teachers, Scout leaders and hiking groups as well as individuals, this work should gain many more than 10,000 proselytes for the appreciation and conservation of Nature.

Besides a map of the area involved, four plates and four figures, this guidebook for the six mile coastal excursion includes 56 figures of plants besides one plate and one figure of fishes. Some of the illustrations are poor due to the poor quality of paper and printing, but all are clear enough for identifying the specimens in the field. Of the 57 plants involved, 26 are naturalized and mostly weedy, about 14 are native to the Hawaiian Islands and elsewhere, and about 16 are endemic (or peculiar) to the Hawaiian Islands. Botany, in the hitherto neglected Hawaiian Islands,

is progressing rapidly thanks largely to monographers. Unfortunately Arrigoni uses for the endemic beach spurge the archaic generic name Euphorbia, when Chamaesyce must be used. Similarly, the popolo of the Hawaiians must no longer be known as Solanum nigrum L.; but according to Henderson in September 1974 (Contr. Queensland Herb. p. 33) as S. nodiflorum subsp. nutans R.J.F. Henderson. We, however, choosing to consider the taxon a variety rather than a subspecies, prefer a slightly different trinomial which may be a slight improvement or the opposite.

The lovliest plant described and figured in our only plate is the ohai, Sesbania tomentosa H. & A., s.s. (Bot. Beech. Voy. 286. 1836.), a member of the Leguminosae. It is actually a spreading tree usually only up to 3 dm., tall, a true bonsai. Its silvery, silky-pubescent leaves overshadow its greenish yellow and salmon-pink flowers. It was common in the '20s when first collected by the kane writer, but now on the verge of extinction. He knows it only from the north shore of the study area and, fearing its extermination due to cattle pastured there, scattered its seeds in the '30s about the former S.N. Castle property at the opposite end of the island at Waimanalo about forty miles distant.

As little has been published about endemic taxa of Sesbania occurring in the Hawaiian Islands, we here indulge in a mélange of scientific facts and pure speculation:

Though the hard seeds sink in ocean water, the dry legumes carrying them may float for a considerable length of time. Not only xerophytes but halophytes as well, we speculate the original sesbanias, or ohai of the Hawaiians, during the past millions of years established themselves on most if not all of the scattered large and small islands of our slender archipelago. Mingling between islands was rare enough to interfere greatly with isolation-induced speciation. We are pretty well convinced that if our many islands from Hawaii to Midway and beyond were thoroughly combed for ohai, well over a score of distinct species and strong varieties would be discovered.

Lest Vaughn MacCaughey's early obervation go unnoticed, we here quote it: "A brilliant sea-shore shrub is the ohai (Sesbania tomentosa). This is a much-branching legume, six to twelve feet high; the leaves have eight to eighteen pairs of pinnae, and the large scarlet flowers are in loose axillary racemes. The natives are fond of the bright flowers, and the bush is often to be found in the vicinity of the little beach settlements, particularly along the arid leeward shores, where vegetation is scanty." (The Wild Flowers of Hawaii. Amer. Bot. 22:100.1916.) We doubt the accuracy in all cases of the specific name.

A truly definitive monograph of the Sesbania of the Hawaiian Archipelago awaits the thorough collecting of material (perhaps with the aid of the Coast Guard, the Fish and Wildlife Service and a monetary grant to visit isolated islets), discovering historical material scattered in herbaria of the World and becoming familiar with it, and growing from seeds diverse material under controlled conditions. Thereafter would follow the usual studies of gross morphology augmented by the newer ones involving chromosomes and pollen. Presently greatly handicapped, we here present our prodromus arranged by island rather than by taxon. A fully illustrated description of two pages for each species awaits publication in the Flora Hawaiiensis.

Necker: Christopherson, E., & Caum, E.L. Bull. Bishop Mus. 81: 7. 1931, record "A few plants, low and widespread along the flat top of the main part of the island; most of these less than 2 feet high, but spreading as much as 6 to 10 feet in diameter; much favored as nesting site by boobies and frigate birds."
Niihau: C.N. Forbes enumerates S. tomentosa, a determination we question, for this island in Occas. Pap. Bishop Mus. 5(3):22. 1913. Christopherson & Caum (ibid., p. 6. 1931.) report a taxon as being "Distributed all over the island but nowhere in dense stands."
Kauai: J.F. Rock, Leg. Plants Haw., on page 155, 1920 discussing the ohai, states that "on Kauai, near Mana, it is a branching erect shrub several feet in height." We suspect it extinct unless some dormant seeds should spring to life and escape straying cattle there.
Oahu: Mann, H., Flora Hawaiian Islands on page 54, 1867, states: "Hab. Waianae, Oahu, and perhaps in other parts. Puna, Hawaii, Niihau." The kane writer, residing not far from Waianae, knew about forty plants growing along the coast between Kawaihapai and Kaena Point. He kept the taxon under observation for about a decade before publishing an illustrated description of it as Sesbania tomentosa Hook. & Arn., in his Flora Hawaiiensis May 11, 1937. This is the species covered by the present field book, a plant on the verge of extinction. It is beautiful with its leaves so densely silky pubescent that the veins and veinlets of the crowded leaflets are obscure.
Molokai: Rock, discussing the ohai in his book mentioned above, reports its occurrence "on the sand dunes at Moomomi in the dry west end of that island. It forms dense mats over the white coral sands, covering quite an area." At the Bailey Hortorium, Ithaca, New York, is his specimen with an illegible date on his label that appears to be March 1909. There, also with an illegible label - we try to guard against this loss by using India ink - is Forbes' No. 604 collected at Moomomi March 24, 1915. On April 25, 1928 the kane writer collected No. 17,954, noting on the label "Flowers narrow, crimson, arid sand dune, Moomomi, Isl. Molokai." It was on the verge of extinction. As the Chilean mesquite(Prosopis) does not grow there but rather further to the lea, the voraceous

Indian deer which fatten on its abundant, juicy, sweetish pods had bypassed a few plants of the ohai with its unpalatable, dry pods. This probably accounts for its survival. It is certainly a species deserving protection from extermination. Preoccupied with other matters, No. 17,954 was set aside until described with a colleague as Sesbania tomentosa var. molokaiensis Deg. & Sherff in Am. Journ. Bot. 36:502. 1949. After Mr. Allan B. Bush(1881-1960), Supt. of Grounds & Structures, University of Hawaii, raised seeds on the Campus to flowering, this antiquated disposition of the taxon proved too conservative. We therefore here rename it Sesbania molokaiensis (Deg. & Sherff) Deg. & Deg.

A second taxon of Sesbania has come to our personal attention. Please note the observations and comparisons Mr. Noah Pekelo, Jr., then of the Dept. of Agri. & Conservation at Kaunakakai (K'kai) made for us in his letter of March 19, 1961: "I have taken a keen interest in the legume Sesbania, for although this small tree is not common here, it is utilized for feed by both deer and cattle and has the ability to withstand grazing. Most of the Sesbania which I am familiar with are found growing on semi-arid ridges of central Molokai at Moomomi. The plant is growing prostrate within a patch of beach grass, the seeds and flowers of this plant are entirely different from that of the trees growing along the ridges, the seed pods are as long as the mountain plant's pod but is curved; the flowers of the beach plant appear narrower and are a deep crimson in comparison to the mountain plant. If possible I would like to receive all information possible on these plants. Should you require specimens I would be happy to collect what you may need for identification."

The Moomomi taxon we recognized to be S. molokaiensis; but we were unsure about the other and asked if we could "see it some day." We arrived on Molokai the latter part of June, whereupon Mr. Pekelo drove us east mauka (mountainward) of "K'kai" to his find. We noted the endemic, glaucous pricklepoppy (Argemone) with its white flowers and the endemic nehe (Lipochaeta) with its yellow heads, but failed to note the ohai we had come to study (Fig. 1)! Suddenly we noticed the plants thinly scattered about us. With age, most were almost invisible trees about five meters tall with slender, virgate trunks and slender, subhorizontal branches bearing a few scant tufts of leaves from which a few flowers and pods were hanging. The flowers had a pale green calyx. The standard was greenish yellow without but with faint radiating salmon streaks diffusing together particularly toward the margin; it was salmon with a dull greenish tinge within. Wings without were pale rose ending with a darker tip, with a whitish streak extending from broad base 1 mm. along lower margin to peter out two thirds from the base; it was yellowish rose within. The keel was paler rose without and had a 2 mm. wide lower margin extending half way toward the tip. The stramineous pods were arcuate, commonly 20 cm. long, 5 mm. wide and 2 mm. thick. These contained

Fig. 1. Noah Pekelo, Jr., inspecting S. ARBOREA (Rock) Deg.& Deg.

about 25 closely packed chocolate brown seeds 5 mm. long. The collection is Degeners & Pekelo No. 32,430. "Makakupaia Ridge, East Molokai. Arid slope with endemic Chenopodium pekeloi, Lipochaeta, Chamaesyce, Argemone etc. June 30, 1961." This ghost-like species, rarely a bit less etherial, had been described and named by Rock "Sesbania tomentosa var. arborea Rock n.v.", on his Bishop Museum herbarium sheet collected February 1919 at "Mauna Loa, Molokai."

Perhaps questioning the validity of his trinomial, Rock refers to his plant more fully in his Leg. Pl. Haw. 155,156. 1920. His plate, incidentally, is not of S. tomentosa Nutt., s.s. He states that "Recently the arborescent type of Sesbania tomentosa has been discovered by Mrs. L.M. Dunbar on the slopes near Mahana on the west end of Molokai. She reports it as a tree 12 to 15 feet in height. The leaves are longer, the leaflets smaller and more nuerous than the creeping variety [S. molokaiensis] on the same island at the beach sands of Moomomi. It is, however, identical

with it with the exception of being arborescent; it may be designated as Sesbania tomentosa forma arborea Rock f.n.". Rock states likewise that the species itself is on Kauai, Oahu, Molokai and Hawaii. With this statement we agree as to S. tomentosa being on Oahu only. Whether Rock's Mauna Loa plant is identical with Mrs. Dunbar's find or with our No. 32,430 is immaterial. The February 1919 specimen is the type to which Rock's trivial name belongs. We here modernize this archaic name to its proper status as Sesbania arborea (Rock) Deg. & Deg.

Lanai: While house guests of engineer Adolph Desha and his amateur botanist wife Edean, we met the talented schoolboy Robert Hobdy, now State Forester. Answering our query regarding strange plants, he lead us August 21, 1957 to the ohai which we distributed as Degener et al., No. 24,187 (Fig. 2). The label reads: "West of Kuahua Gulch at 750 ft. elev., Lanai. On arid pili-Sida-Argemone-Lipochaeta slope; about 10 S., trees remaining among some larger dead ones. No other trees of any other kind in vicinity. (1 ft. high tree with a few slender horizontal 3-5 ft. long branches; flowers pale red to orange tinged; outer surface of standard, however, greenish yellow; lower part of keel whitish; fl. fading yellowish.)" Inspection of specimens in the Bishop Museum revealed the G.C. Munro's No. 395 collected at 300 feet elevation at Kamoku was the same. Kaohai specimens, on the contrary, collected by him May 25, 1914 and again March 1915 are too coarse to be the same. We believe this latter taxon extinct. Grateful paying guests of the Dole Pineapple Company under Manager Aldridge and in part aided by the National Science Foundation we returned to Lanai to botanize from July 1963 through January 1964. We found no other ohai stand except that represented by No. 24,187, the type of the taxon here newly described and deposited in New York as:

SESBANIA HOBDYI Deg. & Deg., sp. nov. Arbor 1 m. alta; foliola tomentosa; calyce 13 mm. longo, lobis acuminatis; vexillo 32 mm. longo; alis 31 mm. longis; carina 32 mm. longa, 9 mm. lata.

This taxon, with the type No. 24,187 deposited in NY, is a miniature twiggy xerophytic dwarf tree of inland Lanai up to about 1 meter tall with some few horizontal branches extending 3 to rarely 15 dm. It superficially resembles the similarly small but more graceful halophytic S. tomentosa of coastal Oahu. Less silky pubescent, the former taxon shows the veins and veinlets of the under side of its leaves more prominently. Floral parts and coloring differ in their proportions in the two taxa, but hardly enough to excite us. Regarding the calyx, that of the Lanai plant is larger and proportionately wider, and is not gibbous at its upper back as is the Oahu plant. Both have deltoid lobes. As to corolla, the standard of the Lanai taxon is a trifle narrower, though in the distal part both are similarly orbicular. Wings and keel are a bit longer and narrower in the former. Seeds are similarly

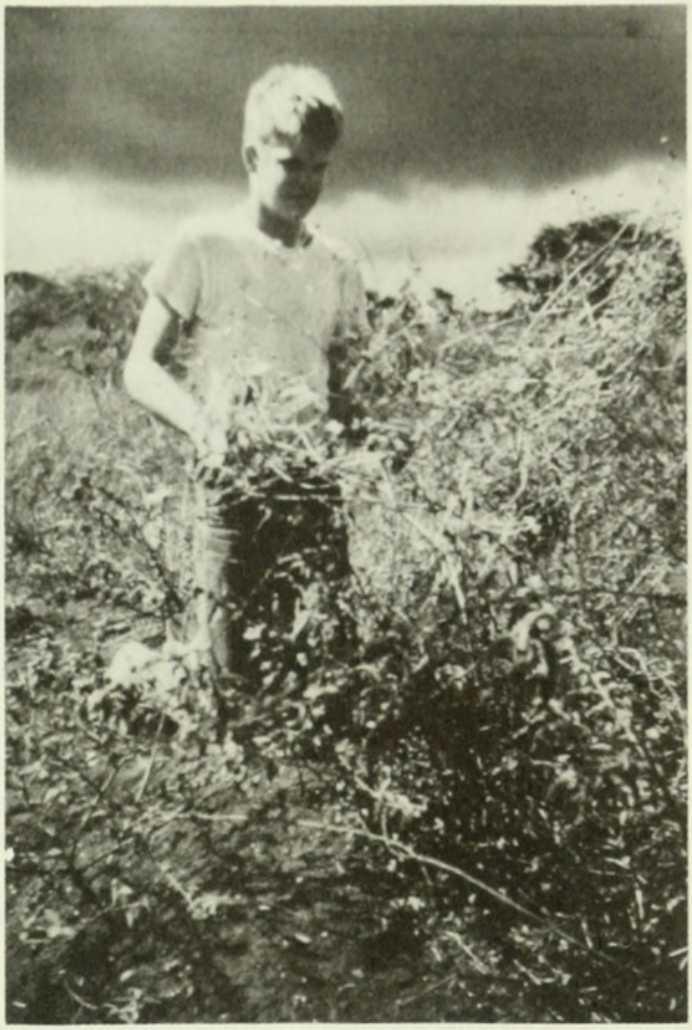


Fig. 2. Robert Hobdy inspecting S. HOBDYI Deg. & Deg.

olive green. With the name briefly validated so this taxon can be officially listed as an endangered species, if not now exterminated, we have time for the preparation of a carefully executed illustrated description to accompany that of S. tomentosa when funds are avaiable. The flowers are more colorful, reminiscent of those of S. molokaiensis.

KAhoolawe: One of us saw a specimen almost reduced to cigaret beetle frasse by zoologist Ball's sealing the local museum's wooden herbarium cabinets with putty against the entrance of insects in 1922. This sheet had been collected by C.N. Forbes et al., between February 10 and March 10, 1913. This shows that this island did harbor some Sesbania. Possibly long-viable ohai seeds still in the soil might reestablish the taxon on this island were officials prodded to practice biological control to kill off the scourge of feral goats which prefer endemic to exotic plant fare. As the island is properly "off limits" to humans and has been freed of beef cattle, we facetiously (?) suggest rotating, without supplimentary food the State's

prides of zoological park lions on the island. It would not only reestablish its former dry forest but save it from further wind erosion. The cost of such vacations for these genial, giant pussycats would be trivial as only a helicopter and a tranquilizer gun would be necessary to end it.

Maui: This single island, in the geologic past, consisted of two. Now, however, it is connected by a massive sandy isthmus replete until recently with endemics now largely exterminated by the sprawling community of Wailuku. It seemed truly anomalous that no one had discovered a taxon or two of ohai on East and on West Maui. So it was not surprising to receive a letter dated July 8, 1977 from Mr. Rene D. Sylva, Superintendent of a State park, with the following paragraph: "You may be interested to hear that I found an ohai (Sesbania sp.) on Maui in the Kahakuloa area, 100 yards west of Nakalele Point lighthouse. The plant had been run over by a jeep which had broken off the stem. This stem was at least two inches in diameter and the plant is prostrate on the ground in a very dry and windy location; also it is in a dying condition. Fortunately there was a part of the plant still in fairly good condition with two flowers and two seed pods on it. I managed to rescue two small seedlings and they are growing in good condition at our small Botanical Garden." Should Mr. Sylva manage to collect good material for serious study, will this coastal Maui taxon prove to be like Oahu's S. tomentosa? Seeds of both are somewhat alike in color. Or will the Maui plant, due to long isolation, be yet another novelty on the verge of extinction?

Hawaii: Kalae, the most southerly point of the archipelago, is covered by yellow Pahala ash from an enormous explosive eruption in the geologic past of Mauna Loa. The area, due to some fresh and barely potable brackish springs and to prime fishing because of rich, upwelling ocean currents, was heavily populated by the Hawaiians in spite of the arid climate. Stone salt pans (Fig. 3), some papamu (native checkerboard) and house sites are scattered about. Ka Heiau o Kalalea (Fig. 4) is near the tip. It is a heiau ho'oulu, constructed to induce the gods to increase the reproduction of three species of fishes: ahi (tuna), malolo (flyingfish) and opelu (mackerel). This temple still has a crude altar. Fishermen, of course, no longer believe in the gods of their ancestors - well, on second thought, the fish might bite just a bit better with a can or two of beer left on the altar. Today we notice mostly Kirin and Schlitz brands. After the rediscovery of the Islands by Captain Cook in 1778, a stone wall was constructed enclosing a strip of the western part of Kalae almost half a mile long and 75 feet wide. Protected from timid feral goats day and night by the presence of fishermen and from pastured cattle by the stone fence, this area was outstanding by harboring a dense forest of dwarf trees, reminiscent of some famed dwarf willow forests in Scandinavia.

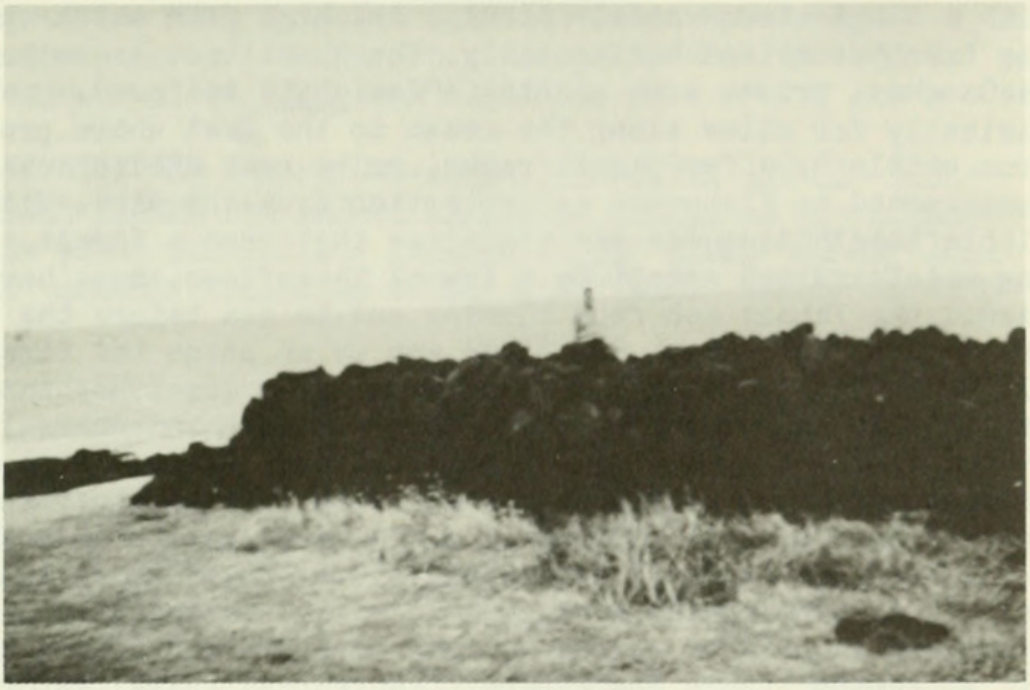


Fig. 4. Ka Heiau o Kalalea or temple.

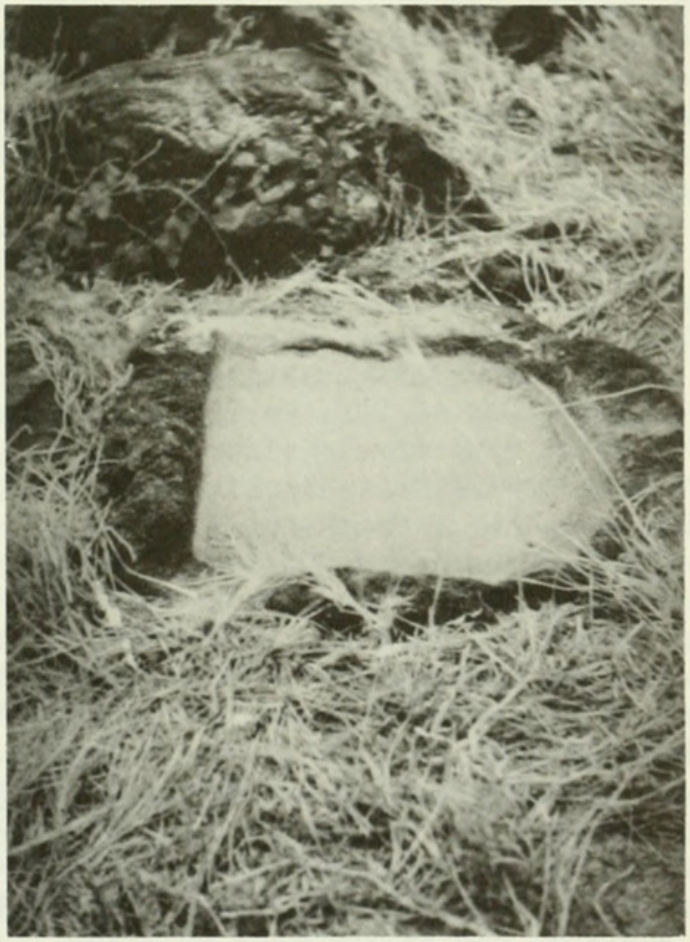


Fig. 3. Ancient stone salt pan for evaporating sea water.

The dwarf forest at Kalae consisted of an undescribed ohai with a single trunk mostly about 1 dm. high from which spreading branches extend horizontally. The Hawaiians, as we know from MacCaughey, prized such plants. A few ohai, we found, grew sporadically for miles along the coast to the East where protected from cattle by a few jagged rocks, or by rock shelters hastily constructed by fishermen as protection from the wind. With a little imagination one can visualize that such a forest, stretching uninterrupted except by a few aa lava flows, must have retarded the Pahala ash from blowing out to sea before the introduction of herbivores. Our finds are by no means the first. Lt. Oliver S. Picher, in his letter of December 10, 1938, was quite explicit and eloquent in describing the taxon and where it grew at "South Cape. - - - The flowers were more safron- than salmon-colored and so startling that even a ham like me stopped and examined them. If what I gathered would be of any interest to you, I will send it to you." According to G.O. Fagerlund & A.L. Mitcell (Nat. Hist. Bull. 9:41. 1944.) of the National Park their specimens came "from a dense colony at Apua Point." Ranger Donald W. Reeser in his memorandum of November 5, 1971 reports that "The only colony of this plant in the Park is near Apua Point. Seeds germinate easily. - - -. This is an important plant to try to get established at various parts of the coast."

About a year ago Mr. Reeser discovered an ohai in the Park at several thousand feet elevation inland. The material was too fragmentary for us to be certain whether differences between it and the coastal taxon were ecologic or genetic. Comparison a few years hence of plants grown side by side from seed at the Park greenhouse should solve the puzzle.

Impressed at the time by C. Brewer & Company's little museum at Punaluu catering to tourists visiting their attractive dining room near a black sand beach, and the promise of elaborate landscaping; we described this coastal taxon in manuscript as S. tomentosa var breweri Deg. & Deg. We prematurely distributed type (NY) and cotypes extensively with the following on the label: "Degeners & Piccos 32,425. Ubiquitous & thriving only near shark [sic] heiau, Kalae or South Point, Kau Desert, Hawaii. Halophyte growing on Pahala ash 100 feet from ocean. Feb. 23, 1968." We later resolved to change this trinomial because of our shock in noting the bulldozing of large tracts of rare and endangered endemics for replacement with pretty uninteresting exotics quite out of place for tourists interested in matters authentic Hawaiian. To make matters worse, the attractive and instructive museum was destroyed by the tsunami of November 29, 1975. After biology teacher John Obata kindly raised our Kalae seeds to flowering in his Honolulu garden next to Oahu's S. tomentosa we were convinced the Island of Hawaii taxon to be a distinct species. Had it occurred on several islands of

our group, we would name it S. sandwicensis.Convinced it is restricted to the "Big Island," with its yellow seeds approaching the color of Pahala ash, we briefly describe and name it for convenient "Red Book" listing:

SESBANIA HAWAIIENSIS Deg. & Deg., sp. nov. Arbor 1-2 dm. alta; foliola supra glabra sed subtus glabrata; calyce 15 mm. longo, 8 mm. alto, lobis acuminatis; vexillo 31 mm. longo, 23 mm. lato; alis 32 mm. longis; carina 32 longa, 9 mm. lata. Semina flavo-brunnea.

Low spreading leafy tree rarely 2 dm. tall, with glabrate branches yellowish and somewhat silky tomentose when young. Leaves up to 17 cm. long and 5 cm. wide; petiole and rachis somewhat silky tomentose; leaflets not crowded and overlapping, with veins and veinlets evident on both surfaces, glabrous above, glabrate below. Calyx 15 mm. long, 8 mm. high, gibbous at upper base, with lobes acuminate. Corolla with standard 31 mm. long, 23 mm. wide, with distal part ovate and retuse; wings 32 mm. long, 6 mm. wide; keel 32 mm. long, 9 mm. wide. Seeds more or less orange brown.

A more recent visit to *Kalae to photograph the area for this article was shocking. The stone wall enclosing shrine and dwarf ohai forest had been breached in two places. This vandalism allowed hungry Hereford cattle, ranging over the Pahala ash covered with bitterly poisonous Portulaca cyanosperma Egler and sparse grasses to defile the shrine and to annihilate the forest. In this half mile stretch not even a plant remained fit for an herbarium specimen, though the yellow ash was fortunately sprinkled with its viable, orange brown seeds. It is so inconsistent that today part-Hawaiians, even at the loss of life, are making such a notorious hullabaloo about political niceties regarding the Island of Kahoolawe used by the United States Navy to prepare us against aggression, yet ignore Kalae sacred to their Polynesian forebears and the home of a genus of plants cherished by them. It seems an embarrassingly ridiculous paradox that this vandalism is tolerated, of all groups, by the Hawaiian Homes Commissioners, custodians we were told, of this outstanding area! Perhaps in this age of enlightened young men, a cattle proof fence with turnstile will be constructed for the protection of ten acres about the heiau, and the area established as a State Monument or Park with an attendant. Thanks to the viable ohai seeds lying in and on the ash, the bonsai forest would spring up and begin to flourish within five years. The area would cater to residents as well as to tourists and to military personnel like Lt. Picher. As these strangers will be the major source of income for our State in the future, from a purely mundane standpoint if not from an intellectual one, why not add one more worthy place of interest for them to visit?

The above discussion, stimulated by the Arrigoni field book here reviewed shows, as in the genus Hibiscus (Phytologia 35(6): 459-470. 1977.), how little is known about most phanerogams native to the Hawaiian Archipelago. Our knowledge of most lower groups is still more conspicuous by its superficiality. Fortunately some younger residents such as Arrigoni, Hobdy, Obata, Sylva and Tabata are helping educate our youth to retard the extermination at least of some of our Islands' unique Creations. Perhaps blinded by the old fable that the grass is greener on the other side of the fence, it is high time older residents realized that stone-dead mars and moon do not compare intellectually, scientifically and economically in importance with the Hawaiian Archipelago with its rapidly evolving endemic biota. Let us all strive to maintain it.

- -

*For nonbotanical information consult the Bishop Museum's Pacific Anthropological Records 6-9:1-126. 1969.

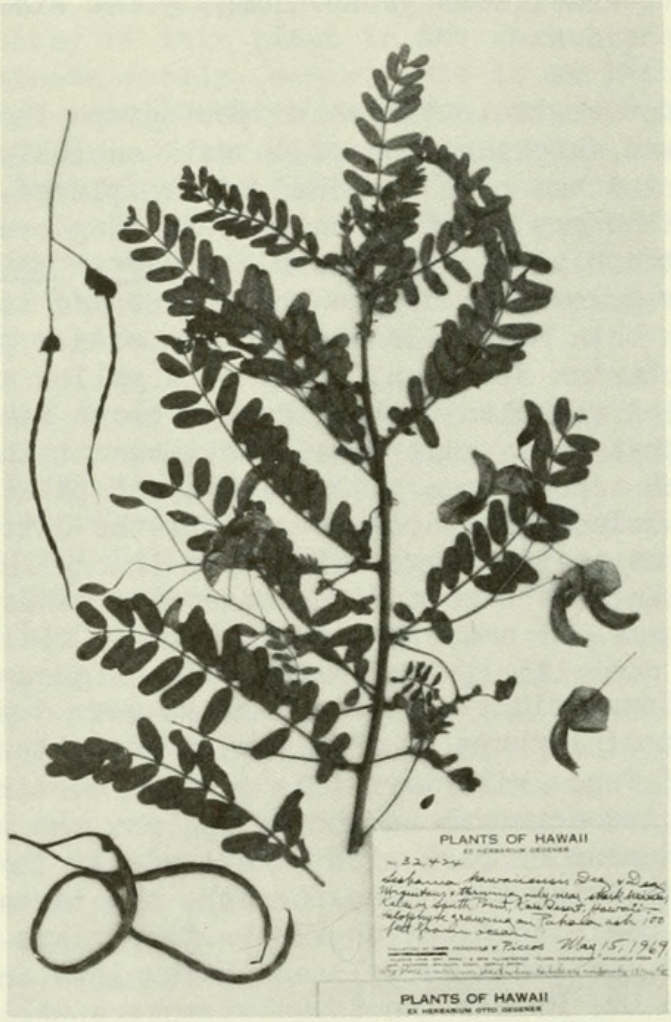


Fig. 5. S. HAWAIIENSIS Deg. & Deg.