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ATTEMPTS TO SAVE THE SHORESIDE AND DRYLAND PLANTS OF HAWAII

By George C. Munro

It was the opinion of Dr. R. C. L. Perkins, who studied the forests of the Hawaiian Islands probably more than anyone else, that before the arrival of human beings to Hawaii the forests extended in most places to the shoreline on all islands. A very interesting xerophytic or dryland flora had a place on all the islands. It composed all the vegetation on Niihau and Kahoolawe and covered most of the island of Lanai. It was evolved during centuries of isolation and many of the plants are endemic to Hawaii. For a long period these plants had only such adverse natural forces to contend with as existed at the time and worked out among themselves a harmonious balance of nature. The arrival of man changed this and was the first threat to their existence. To live comfortably he had to cultivate the soil and to do so it was necessary to destroy some of the native vegetation. He no doubt used fire to some extent and in a dry season fire would sometimes get beyond control and sweep large areas of country. I saw unmistakable evidences of this on Lanai. This would reduce the number of plants though it would not likely exterminate any. The arrival of the white man with his herbivorous live stock, plow and house building operations added their menace to the most vulnerable of these plants and many have no doubt been exterminated entirely.

Mr. Francis Gay took a deep interest in nature and made a spatter work collection of native plants. Among them was a plant named "Pokalakala", which Dr. Joseph Rock failed to identify with any Hawaiian plant known to botanists. He described the pokalakala as "a plant with a 5-6 palmatisect leaf with petioles of 4.5 inches". Between 1892 and 1899 while riding over the open ranch country of Makaweli, Kauai, now covered by cane fields, I was struck with the remarkable appearance of a tree in a scattered grove in a slight depression in the "kula" (open land). It was about fifteen feet high with three or four divided, woolly leaves crowded on the stubby ends of the branches. The single thick flower stem with closely packed berries hung straight down from close to the leaves. Many years afterwards I described the tree to Mr. Charles N. Forbes, then botanist at the Bishop Museum. He knew of no tree like it. Years after that he had just returned from a collecting trip to Kauai. He showed me some of his specimens and among them were the leaves and flower-stem of my tree. The picture, with his printed description of the inflorescence and leaves on the blunt end of the branch, is exactly as I saw it. Probably the name was originally "Pookalakala" (rough head) which well describes the tree with its smooth grey bark and rough leaves and flower-stem. Mr. Gay's spatter work collection, which now cannot be found, saved

the Hawaiian name of Tetraplasandra racemosa Forbes, one of our rarest and most remarkable trees. Dr. Otto Degener recently searched in vain for the tree where Forbes found the type specimen. Seeds of it would be most welcome for the Diamond Head collection.

The earliest attempt that I know of to save forms of these interesting dry-land trees and plants was made in 1918 by Messrs. Harry and Frank Baldwin at my suggestion at Kanepuu, Lanai. Dr. R. C. L. Perkins gave the opinion that the Kanepuu forest was unique and should be preserved as an example of Hawaiian dry-land vegetation. It was fenced from stock in that year and kept so by the Baldwins until 1923 and by the Hawaiian Pineapple Company from then until 1935. Heavy cattle then had the run of it till 1950. I had collected seed of rare plants in my rounds of the ranch and scattered them on the borders of this forest. At least five of them took hold and were producing seed plentifully when cattle obtained access in 1935. One of these species was new to science and also another whose natural habitat was in that forest and has so far been found nowhere else. On this last visit I failed to find either of these but found two other interesting forms for which I searched fruitlessly in 1948. I was fortunately able to bring some small plants of these to the Diamond Head collection where they are showing exceptional drought resisting qualities. My friends on Lanai will keep a watch for the missing ones and for seed from the larger plants of these. It is hoped that they will be successful.

The next record I have is from a clipping taken from the Honolulu Advertiser of January 21, 1952: "HISTORY FROM OUR FILES THIRTY YEARS AGO. 1922. A. L. C. Atkinson, Chairman of the Board of Agriculture and Forestry and C. S. Judd, Territorial Forester, leave today for the island of Kapapa which lies in Kaneohe Bay to plant a number of forest trees on its barren slopes."

In the Board of Agriculture and Forestry publication, "The Forester and Agriculturist", of October and November 1929, Mr. Charles S. Judd, Executive Officer and Chief Forester, made the following record, captioned "Kapapa Island". "A special trip was made to Kapapa Island on October 24, 1929, and 60 ironwoods, 5 coconut, 5 Portuguese cypress, 6 hala and 4 milo trees planted to augment the dozen coconut trees and few ironwoods that were set out on this exposed island in Kaneohe Bay about five years ago." In the "Forester and Agriculturist" of October and December 1931, captioned "Kapapa Island", it is stated: "Suppressed trees of blackbutt in a ten year old planted grove at Waiahole were thinned to improve the remaining stand and cut into six foot posts which were taken to Kapapa Island in Kaneohe Bay for use in constructing an artificial windbreak with discarded iron roofing so that a living windbreak of ironwood trees would be established. In the lee of this it is planned to set out and carry on in this safe and protected place plants of ohia [should be ohai, GCM] (Sesbania tomentosa), the kou (Cordia subcordata) and other rare and vanishing plants."

On June 28, 1938 I visited Kapapa Island. There were six well established groves of ironwood trees forming the windbreak. They were about fifteen feet high at the west end and shrubby plants at the east end and some of the iron sheets were still there. There were a few Tournefortia trees in good condition at each end of the windbreak. On September 26, 1948 there were four coconut trees and one hala,

also a wind bedraggled hau growing in the rocks at the landing. A note taken May 23, 1948 said it had many flowers.

My next visit to the island was in October 1945 when I started banding wedge-tailed shearwaters there and from then on till September 1947 I visited the island frequently. In June 1946 I decided to try to carry on Mr. Judd's idea. I planted seed of alaweo (Chenopodium sanwichense), kamani (Calophallum inophyllum), kou (Cordia subcordata), kolokolokahakai (Vitex trifolium), hulu, native cotton (Gossiphium tomentosum), milo (Thespisia populnea), and auhola (Tephrosia odorata), and some shoreside beans over the island. A maiapilo plant (Capparis sandwichiana) from Popoia Island, planted July 7, 1946, was growing nicely in October 1946 but the extra high seas of January 4, 1947, killed it. On September 26, 1948, I sowed much seed of this spectacular plant over and amongst the outcrop of coral rock running up the middle of the south side flat of the island. I do not know if any of these grew there. The alaweo succeeded well and a shearwater nested under a thick bunch in 1947. On September 18, 1947, three kamani, one about a foot high, and about ten milo trees were growing nicely. This was my last visit and I did not see any maiapilo growing.

When I was banding shearwaters off the coast of Oahu from 1937 to 1941, I tried to introduce native shoreside plants to Popoia Island, near Kailua and Lanikai. Amongst others I planted seed of ohai from Mokulua Islands and a plant of ihimakole (Portulaca sclerocarpa) from Kaohikaipu Island and two plants of the Nihoa palm (Prichardia remota), seed of which I had secured on Niihau in 1939. Seed had been brought from Nihoa Island in the late 1880s by Mr. George Gay and planted on Niihau where one had grown into a tall tree. One of those I planted on Popoia disappeared and the other was growing finely but it was pulled out of the ground and found lying dead at the site. That was surely bad luck. The war put a stop to this project and I was unable to renew it. The tidal wave of April 1, 1946 damaged the island growth considerably but it has greatly recovered. Popoia could be made a much more interesting island by the introduction of more of our shoreside plants. It is easy to keep exotics out as the coral formation is suitable to few of them.

When the Kamehameha Girls' School was under construction, Mr. Albert Judd, one of the Board of Trustees of the Kamehameha Schools, who took a great interest in all things Hawaiian, started what he called the Kamehameha Schools Hawaiian Forest. He took me through it on April 11, 1933. Some of the trees and plants were natural there. Water was available for the plants raised in the Schools' nursery, nearby. He was able to make a collection of about sixty native trees and plants. The forest has been carefully tended and a number of trees are growing nicely, but the shrubs are nearly all gone, probably from the continual weeding and failure to add young plants to take the places of old ones dying.

I have a list of the trees and plants of that forest. But the names of two rare plants - of which I am sure that I gave Judd seed for planting there - are not recorded. Probably they were planted after the list was made. I am sure one of them grew and flowered there as Mr. Judd sent me a copy of a letter he sent to the Bishop Museum telling the Hawaiian name of the plant (Abutilon menziesii). When I gave him the seed I was unable to give him the native name (ko'oloa 'ula) but

Mr. Judd was showing a native woman through the grove and she put a flower of it in her hair. When she went home a woman from Hawaii recognized the flower and gave her the name which she passed on to Judd and he passed it on to several whom he knew were interested. Unfortunately I can fine no trace of this plant in the grove or of Abutilon eremitopetalum, the new Abutilon I found on Lanai which was named by Mr. Caum. The latter plant may also have produced seed but young plants were apparently not raised to take the places of the original ones and they have died out and been lost. This is most unfortunate as my plants were killed out in the Kanepuu forest by cattle after I left Lanai. So far the plant has not been located again on Lanai and I would very much like to get seed of both these and have so far failed to do so.

Another attempt was made by the Board of Agriculture and Forestry in cooperation with the University of Hawaii when a native garden on Government land at 1000 feet elevation on Waahila ridge above St. Louis College was started in April 1932. In 1933 I went to see it with Mr. Charles S. Judd. I gave him plants of Acranthes splendens from Lanai, Cordyline banksii, a relative of the Hawaiian ti plant from New Zealand, and an uncommon species of yucca from an old garden in Wailuku, Maui. On April 18, 1933, I went there and planted Acranthes splendens and a rare form of Canavalia galeata from Lanai. I gave Mr. Judd seed of the two species of Abutilon for this collection. My next visit was on June 1, 1951, eighteen years after. I was anxious to find if I could get seed of any of the plants there for the Leahi Native Garden but on that and two later visits I could not locate the spot. The ironwoods had grown and spread to such an extent that the place was not recognizable in any way.

There had been planted in the grove, according to the list given me by Charles Judd, 6670 native trees, 5159 of them koas, many of which can be seen there now. In the list were Abutilon menziesii 6, Abutilon inclusipetalum 4, alii 112, wiliwili 68, Kokia drynoides 296, naio 326, hala 430, ohai (Sesbania tomentosa) 168 and ileau (Wilkesia gyanoxiphium) 24. I could find none of these.

Due to changes in the personnel of the Board of Agriculture and Forestry and the University of Hawaii, this grove has been lost; no one seems to know where it is. I thought I could go right to it but in three tries I failed to find anything of it except koa and there was plenty of that. I found walahee and ulei growing among the other trees. There were twenty-three species in the list Charles Judd gave me, but I am sure there were more than that. It is hoped that it still may be found. Charles Judd died in 1939 after a two years' illness, so it would be in 1937 when he relinquished care of the Waahila plantation, four years after my visit to it.

All these partial failures demonstrate the need of some system by which attempts like these can be made continuous. It is my earnest hope that "Na Laau Hawaii" (The Growing Things of Hawaii), the foundation of which is now being laid on the fourth ridge from Makalei on the west side of Diamond Head, will be a continuous source of interest to the Hawaii Audubon Society. The location is ideal for an exclusively Hawaiian dryland forest. It is almost isolated by the Army trail at the bottom, and gulches on each side, converging to an extremely narrow topped ridge at about 300 or 400 feet before it runs very steeply up to join the

main ridge running down to Makalei. Below the narrow piece it is possible gradually to eliminate the foreign plants and trees with little danger of more of their seed drifting onto the reserve from outside.

I class these attempts as partial failures as they failed or nearly failed to save plants from extinction. Had there been continuous interest by persons knowing the plants this would not have happened. It is extremely easy for a plant formerly very numerous to be lost, as for instance, the akoko of Lanai, a variety of Euphorbia lorifolia. Within the memory of three persons living in the early 1900s this tree, in an unbroken forest, covered thousands of acres of land now devoted to pineapple culture on Lanai. Three small trees were all that remained of the forest in 1911. Seed from these produced a little grove at Kanepuu in the early 1930s. There is only a slim chance that the variety may survive today. How can this be remedied? I would suggest that if the Diamond Head venture shows sufficient promise of success the Hawaii Audubon Society open a fund for its upkeep and perpetuation to which anyone sufficiently interested might contribute. Perhaps something might be also obtained from the McInerny Foundation to help support it. This would help to make it obligatory to the institution handling it to carry it on.

The elimination of the foreign growth should be gradual as the native trees grow to take their place. The earliest expense would be a short half inch pipeline from the city water supply. Also a small building, eight feet by ten would be sufficient, to hold tools and other necessities. It is my intention to carry on as long as circumstances permit. I work almost wholly with seed, as young plants raised in a nursery need water for a time and there is no close supply and little time to use it if it were available. I can, however, lay a good foundation for the forest and gather much information on these little known plants.

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INDEX to "Elepaio", Volume 12, will reach subscribers shortly. It has been compiled by Miss Janet E. Bell of the staff of the University of Hawaii Library. "Elepaio" editors are very grateful to her for this large contribution of her time and effort. In compiling the index to Volume 12, Miss Bell picked up an error in the index to Volume 11, to which she calls our attention. The entry for Donaggho, Walter: Journal of ornithological work during the summer of 1937, is correct instead of ... 1947, as printed.

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ADVERTISEMENT: Who would like to purchase Volume 5 of Audubon's Birds of America? This is the quarto edition (Philadelphia, 1842), said to be in fine condition. Contains dove, turkey, partridge, rail, crane, plover, turnstone, tatler, snipe, etc. Call 78584.

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THE BIRDS OF MT. FUJI (cont'd)

(As related by Keisuke Kobayashi to C. M. Fennell)

A squirrel was observed leisurely climbing the trunk of a large Cryptomeria tree, anxiously pursued and attacked every inch of its way by a pair of varied Tits, which, apparently had a nest somewhere in the vicinity and were doing their utmost to discourage the advance of the four-footed potential thief. However, in spite of all the birds' efforts, the sly one continued his progress with mischief twinkling in his eye and seemed to pay them not the slightest bit of attention.

Around nine o'clock we returned to the hotel for a belated breakfast and afterwards, in spite of a light rain, proceeded out in a northerly direction from Subashiri to explore a slightly different area. It wasn't long before we sighted a Japanese Buzzard Hawk soaring high overhead in the sky and we thought it quite probably the same individual which we had observed nesting in this locality just a year ago. At that time, a nest was found in a fir tree, some fifteen feet above the ground and contained two young, approximately ten days of age. To our deep regret, during the night of the very day we made its discovery, extensive Army maneuvers were conducted in the immediate neighborhood and a machine gun was stationed directly below the nest. Constant firing throughout the night caused the parent birds to desert the young and left them totally exposed to a heavy downpour of rain. Upon our return the following morning, both young birds were found dead.

After climbing a long, steep slope, we reached the edge of a sparse coniferous forest and sat down to rest and catch our breath a bit. Dr. Masauzi Hachisuka, one of the foremost ornithologists in Japan, a one-time student of ornithology at Cambridge University, and a member of several expeditions to Iceland, North Africa and the Philippines, had come up from his home in Atami the evening before to join us and now shared our company. As we sat talking of birdlife and birding experiences in general, a small sized bird of prey suddenly flew past us, which we at once recognized as the Asiatic Sparrowhawk. Ordinarily, in such a location, this species builds its nest in the highest coniferous tree in the vicinity, and sure enough, as we approached a tall fir tree nearby an adult flushed from among its branches. Mr. Takada lost no time in removing his boots and started up the tree. The nest was located on the second branch above the ground and was constructed entirely of dead branches of coniferous trees. It was unlined with green leaves, as is so often the case of nests of other birds of prey in Japan, and contained three apparently fresh eggs of pale gray ground color blotched with light brown. It measured 29 x 32 cm. across the top from outside rim to outside rim, 12 x 13 cm. across the incubation bed, 19 cm. in total height, and 4.3 cm. in depth. During the whole time Mr. Takada was at the nest taking measurements, both birds continued to dive at his head and screeched their threatening protests but never once actually touched him at any time.

Little by little the rain increased in volume and drove us in retreat to the hotel where we arrived at approximately 13:30 hours, soaked and dripping. Since there was apparently no hope of let-up for the rest of the day, and realizing that the seasonal monsoon period for this part of the country was close at hand, we were

content to clean up with a good hot bath, pack our bags and head for the railroad station. Another season's record of this famous mountain sanctuary was chalked up and our hearts and minds once again refreshed and purified by its multifarious beauties and interests.

[This is the conclusion of the text of this very interesting article sent by Mr. Kobayashi through the courtesy of Chester Fennell. Space in this number does not permit our printing the list of species observed, which Mr. Kobayashi appended. It will appear in toto in the next issue. We very much regret that we cannot reproduce the fine photographs of Mt. Fuji, of the nest and eggs of Latham's snipe, and of the nest and eggs of the Japanese jay which accompanied the article. Editor].

SMITH, J. Donald. The Hawaiian goose (Nene) restoration program. Journal of Wildlife Management. 16 (1) 1-9, January 1952.

Mr. Smith is employed at the Division of Fish and Game, Board of Agriculture and Forestry, Honolulu.

This paper deals with the near extinction of the Nene, the population of which was placed at less than 50 geese in 1944, existing in a range reduced from 2,925 square miles on Maui and Hawaii to 1,150 square miles only on the island of Hawaii. Today the Hawaiian goose population is even less than it was when field studies were made in 1944 and 1947. Time for the Nene seems to be running out. Within the last 3 years they have failed to return to certain locations that were apparently highly preferred parts of their habitat.

Despite an active publicity campaign to acquaint the people of the Territory with the scarcity of the Nene and the need for protecting it, sight reports have dropped off to only 1 or 2 a year. While it is true that no systematic count has been made, the population of wild Nene today can hardly exceed 30 birds. The startling drop in its number during the past few years probably is an indication that unless something is done to aid the geese, the existence of the species in a wild state will soon be only a memory.

Attempting to save the Nene from extinction is a worthy cause both from the sentimental standpoint of preserving an irreplaceable creation of nature and from the practical basis of preserving something of "Old Hawaii" for the education of tourists and local residents alike. It is doubtful that the Nene will ever be hunted as game again and to justify restoration attempts with that objective would be misleading in the extreme.

The degree of effort made in the past to restore the Nene was surprisingly great and is unknown to many. Artificial propagation of the Hawaiian Goose has been conducted continuously to some degree for over 100 years in several widely separated countries and is continuing today. In 1823 Nene were first brought to Europe and successfully raised at Lord Derby's estate in Knowsley, England, and after this the geese were distributed to zoos and private collections and became fairly common in Europe. After 1900 they became scarce again. The last European specimen vanished

from Cleres at the time of the German invasion of France in 1940, thus ending over 100 years' experience of Nene propagation in Europe.

SUMMARY: The wild Nene population in Hawaii has continued to shrink, bringing the present number to an estimated 30 birds. This estimate is based upon desertion of habitat found to be occupied in 1944 and by a reduction in frequency of Nene observations. Three projects of raising Hawaiian Geese under wire are in operation now with the objective of saving the Nene from extinction. Two of these are located in Hawaii and the third in England. Attempts to raise Nene under artificial conditions have been made in the past. The European efforts have been mentioned. The T. H. Board of Agriculture and Forestry began raising Nene in 1927. Its flock grew to 47 birds but was broken up in 1935 and the geese distributed to various persons in the islands. All but one Nene had vanished by 1949 when the Board's second project was begun. This bird, a gander, was transferred to the new project for use as a breeder. At present there are 24 Nene in captivity in addition to the estimated 30 wild geese.

The artificial propagation projects should not be considered adequate to the task of restoring the Nene because of the lack of a certain basic stability. This deficiency is amply illustrated by the fate of previous projects begun with sincerity of purpose but proving to be only temporary and poorly directed. The effort likely to produce the most valuable and lasting results is that placed in an ecological survey of the Nene in the wild. Such a study is being initiated by the Board of Agriculture and Forestry but is limited in scope. Its chief value appears to be that it is a beginning and may lead to a more intensive ecological study.

An ideal Nene conservation program is one embodying the ecological study, the artificial propagation projects, and a management program of restocked Nene habitats. Apparently this type of program is slowly being established in Hawaii and within the next few years some progress may be made toward increasing Nene in the wild.

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WINDWARD OAHU OBSERVER writes: "In the June Elepaio I read "First Encounter...", by Charles Hartshorne. It is readily seen he is an enthusiastic and careful observer, but not having seen the Chinese Thrush he has learned of it largely by hearsay and seems confused.

The first Chinese Thrush I saw was in the Kau forest where I sat alone in a car while the P. H. Nurse visited an isolated house, and heard the "whisper song" (the russet-back thrush is given to whisper-singing, too) for at least 1/4 hour, I think longer, as we watched each other, he from a branch of Norfolk Pine about 15' above me, a little to the side of the car. I could see the thrush the whole while. He had confidence in me.

There seems no similarity between its whisper song as I remember it and the songs I've been hearing and can definitely ascribe to the Chinese Thrush. The Pekin Nightingale has no sharp contrasts - the C. Thrush has, not in pitch but in delivery, variety and expression. Its songs are largely staccato, sometimes explosive. There is no "sugary sweetness" about the C. Thrush's songs, but exhilaration, at times invective, all more entrancing to me than the sweetness of the Pekin Nightingale.

The Chinese Thrush is very syllabic in its songs, does not have a whistling quality. It approaches harshness at times, which is expressive, and tartly sweet. When I first heard it I said, "Why, it sings with a Japanese accent!" If people ask me to imitate the song of the Cardinal, for instance, I ask, "Which one of its songs?" It has many.

I've heard the Chinese Thrush often enough to realize its many songs vary but have something in quality that is the same throughout. I hope I can hear them again. I realize that at a distance, in a group, they have a mystifying effect. I'd like to listen to see if they have imitative ability. I'll try to call them to me if I can when there are no players about."

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JULY BIRD WALK: July 13th. Meet at Library of Hawaii at 8:00 a.m. Destination to be determined by weather conditions.

JULY MEETING: July 21st. Meet at 7:30 p.m. at Bishop Museum Library. Use entrance from Kalihi Street.

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