

THE ELEPAIO

Journal of the
Hawaii Audubon Society



For the Better Protection
of Wildlife in Hawaii

VOLUME 30, NUMBER 2

AUGUST 1969

NATIVE TREES OF HAWAII* By Elbert L. Little, Jr.

The native trees of the Hawaiian Islands, mostly unnoticed by tourists, are unique, different from those everywhere else in the world. Many species are rare and endangered, needing protection, while a few are already extinct. All reveal a fascinating history.

Common street trees in Honolulu were introduced from other tropical lands and are widely planted around the world. Monkeypod, the large shade tree with very broad crown, is a native of tropical America. Banyan with numerous air roots forming trunks and supporting nearly horizontal branches, came from India, and many related kinds of figs are from various parts of tropical Asia. Nearly all of Hawaii's palms were imported. The first Hawaiians probably brought the coconut with them from Polynesia about 1,000 years ago. Plumeria, the popular ornamental with fragrant waxy white, yellow, pink or red flowers everywhere made into leis for tourists, was introduced from Mexico!

Colonel L.W. Bryan's lists of Hawaiian big trees published in this issue show the relative importance of native and introduced trees there. Of the 201 champion trees, 161 are introduced or exotic, four times the number of native species (40). However, most of the exotics would not qualify for the Social Register in the continental United States as naturalized forest trees, that is, spreading in several localities and propagating from seeds as though wild.

Hawaii does produce giant trees, some larger than those of the same species grown in subtropical continental United States. Only one tree species is native to both areas, wingleaf soapberry, or a'e (Sapindus saponaria), of tropical America north to southern Florida. When discovered far away, Hawaii's trees seemed different and were named as new.

Two other species, introduced into Hawaii, attain larger size than in their native homes in continental United States--red mangrove (Rhizophora mangle) of Florida and Monterey cypress (Cupressus macrocarpa) of California. And, of a few listed species introduced in both areas, Hawaii's champions are larger than their continental counterparts.

The strange animals and plants of islands have long attracted naturalists. Isolated islands far from continents have relatively fewer species, and these are different from those of other lands, often taking odd forms and sizes. These organisms, their adaptations to their surroundings, food relationships, and

*Reprinted from the February 1969 issue of AMERICAN FORESTS by special permission.

competition, are less complex and can be observed more easily....

The Hawaiian Islands are among the most isolated in the world, near the middle of the largest ocean and farthest from the continents. North America, the nearest, is 2,400 miles away at California and slightly more at southern Alaska. Japan is 3,400 miles beyond. However, scattered atolls and volcanoes dot the southwest Pacific, the closest within 500 miles.

A chain of eight main volcanic islands spread over nearly 400 miles forms the fiftieth state. Total area is only 6,415 square miles,...and nearly half is classed as forest land. These relatively young islands originated as submerged volcanoes along a huge crack at the bottom of the Pacific Ocean extending 1,600 miles from Midway on the northwest to Hawaii on the southeast, the oldest to youngest in the same order....

Though the tropics are noted for their richness of plant and animal life, Hawaii is relatively poor in variety, having only about 250 species of native trees grouped into ^{about} 73 genera and 41 plant families. About one half belong to the seven ^{largest} families, including one eighth each in the rue and madder families. In contrast, Puerto Rico has more than 500 native tree species, or twice as many. Some familiar tropical groups are absent from Hawaii, for example, the mahogany, bombax, and bignonia families. There are no native conifers, figs, or mangroves. Other groups are poorly represented, palms by only one genus, the laurel family by a single tree species, and the legume family by four...

However, the uniqueness more than compensates for the lack of variety. About 95 percent of the native species of trees (and other seed plants) are restricted to the Hawaiian Islands and are said to be endemic there. The most isolated islands in the world have the highest percentage of endemic species. How did this limited assortment of peculiar tree species originate?

New Hawaiian volcanoes arising from the sea were composed of barren lava and Plantless. Seeds of the ancestral trees all had to be transported accidentally across long expanses of ocean. Some could float, if lightweight and resistant to salt water, or ride driftwood along ocean currents. (Tidal waves could wash the seeds inland from the beach.) Minute seeds, like spores of ferns, mosses, and fungi, could be carried long distances by the wind, especially storms and hurricanes, suspended in the air at high altitudes. Others could hitchhike on birds, seeds of water plants on muddy feet, sticky or hooked seeds clinging to feathers, and hard seeds eaten in fleshy fruits. After arrival, the seeds had to germinate, the seedlings grow to maturity, the trees bear flowers, the flowers be pollinated and form seeds, and the immigrant species multiply and spread.

Animals had difficulties in reaching these islands too. Hawaii has no native land mammals, snakes or other reptiles, or fresh-water fishes, and relatively few kinds of land birds. The native plants developed in the absence of grazing animals and were especially susceptible to destruction by the large introduced mammals such as hogs, goats, sheep, cattle and deer. Exotic grazing mammals probably have exterminated several species of native plants in Hawaii.

It is possible to trace the origin and evolution of the Hawaiian flora by comparison with the closest relatives in other lands. One species also growing wild elsewhere migrated from that direction and is the original immigrant from which closely related Hawaiian endemics evolved. Several similar endemic species of a genus probably were derived from one extinct ancestor and could be linked to others on a continent. For example, the native Hawaiian palms (more than 30 named minor species) are all in the genus Pritchardia and came from one immigrant of Indo-Pacific affinities.

Some plant groups have changed so much after arrival that they are classified as distinct or endemic genera. The number of endemic genera of seed plants in the Hawaiian Islands, according to a recent review by Benjamin C. Stone (1967), is about 33 out of more than 200, of which about 15 (in 11 families) contain tree

species. Several have changed so much that their affinities are obscure. Among the most interesting are two genera of small trees in the mallow family, each with four rare species in part extinct. Hibiscadelphus was derived from Hibiscus, while Kokia is related to cotton (Gossypium). A few genera essentially Hawaiian extend to other islands, for example, Pelea with 68 named species in Hawaii and two others in Marquesas Islands.

Hawaii's native tree species can be arranged in groups, each apparently descended from one original immigrant. These 250 species (several more if recently named segregates are accepted) evolved from about 78 species of original immigrants, an average of about four from each. However, several genera have 10 or more native tree species or also additional shrub species, all from the same ancestor.

One successful arrival and establishment of a species every 20,000 to 30,000 years would account for the present flora of seed plants and ferns of the Hawaiian Islands, according to an estimate by F. Raymond Fosberg (1948), based on the archipelago's age as five to ten million years. The smaller number of tree species could have been derived in the same time if one successful ancestor landed at intervals of roughly 60,000 to 120,000 years! That is ample time for trees to come accidentally from all directions and produce a forest cover.

The 78 original immigrants and groups of related Hawaiian tree species can be arranged according to their geographic affinities or regions where their closest relatives are found. These regions and approximate numbers of original immigrants are: Indo-Pacific, or Indonesia, or southeast Asia and Pacific, west and southwest of Hawaii, 45 (more than one-half); Austral, or south Pacific, from Australia to Patagonia, 16 (one-fifth); American, 7 (almost one-tenth); Pantropic, or wide tropical or cosmopolitan, 2; and obscure, 8 (one-tenth). Thus the relationships are strongly Indo-Pacific, more than half the original immigrants having come from the west and southwest and others from the south. However, the small American element is noteworthy.

Most of Hawaii's native tree species are small trees. Probably fewer than 40 native species commonly attain sufficient size to produce sawlogs and lumber. At any rate, only about 40 species have recorded maximum trunk diameters of $1\frac{1}{2}$ feet or more, and average mature sizes are smaller. In Colonel Bryan's list of native trees, only 24 champions exceed $1\frac{1}{2}$ feet in trunk diameter and only 10 surpass three feet.

The native tree with largest trunk, nominated in 1967, is a koa (Acacia koa) 8 feet 9 inches in diameter (measured at 10 feet high, above a swell), 98 feet in height, and 105 feet in crown spread. It is preserved on the Bishop Estate on the Island of Hawaii.

The tallest native champion is a wingleaf soapberry or a'e (Sapindus saponaria), 106 feet high, 84 feet in spread, and 3 feet 2 inches in trunk diameter (5-6 feet recorded earlier in this species). This giant and a former champion koa are preserved at Kipuka Puauulu in Hawaii Volcanoes National Park. An earlier registered koa was tallest, 122 feet.

Next in size is the largest 'ohi'a-lehua (Metrosideros collina), 5 feet 8 inches in trunk diameter, 84 feet high, and 78 feet in spread, on privately owned land also on the island of Hawaii. Heights of native champions are relatively low. Only 4 of the 40 exceeded 70 feet and only 16 more than 50 feet, while 17 were small trees under 40 feet high.

Relatively few, perhaps less than 10 of the 250 native Hawaiian tree species, would be classed as common. Fewer than 20 native tree species (or groups of related species) were common enough to be tallied separately on plots in the forest survey of Hawaii's timber resource in 1961.

Most native tree species are distributed over only a small part of the archipelago and have a rather restricted range over relatively few square miles, the

individuals scattered in a mixed forest of several species. Though a few tree species are widespread in most of the eight islands, about one-half grow wild in only one island. Each island, with the possible exception of Kauai, probably has fewer than 100 native tree species.

Rare and endangered tree species should be sought among those recorded from only one locality, such as a valley or mountain on a single island. According to a rough compilation, about 14 of 28 tree species confined to the island of Hawaii were recorded from only one locality and may be classed as rare, 15 of 37 restricted to Kauai, 12 of 26 limited to Oahu, 9 of 15 known only from Maui, 3 of 5 from Molokai, and 1 of 2 from Lanai. The total is about 54 rare species out of 113 confined to one island. Three others on two or more islands were listed as rare.

Trees of several rare species are under protection in Hawaii Volcanoes National Park on the island of Hawaii, and specimens of a few other rare species in Haleakala National Park on Maui. Others grow within the large state forest preserves.

More information about the native trees of the state of Hawaii would be desirable. A new botanical survey would show for each species the distribution including islands, areas, and abundance. Also, which are now rare and endangered or possibly extinct, and land ownership of the rare species. On public lands these areas could be designated and preserved. Privately owned tracts of very rare species might be purchased by conservation organizations. Land owners would be encouraged to protect the forests surrounding rare trees. Fenced plots might be needed to prevent injury by grazing animals.

Seeds of all native tree species should be collected for tropical botanical gardens and arboreta around the world. At one or more localities in Hawaii, several individuals of each species could be grown, to perpetuate the species against possible extinction, to serve for display, and to maintain a germ plasm bank for future research studies: including evolution and hybridization. The proposed U.S. National Tropical Botanical Garden in Hawaii should maintain a large representation.

...Another reason for finding uses for Hawaiian trees is their possible resistance to diseases and insect pests in forest plantations elsewhere. In a distant country there would be no closely related trees already supporting destructive fungi and insects, which would attack the exotics. Even in their own home, young endemic genera might have fewer parasites because of the shorter time for evolution.

Odd growth forms have developed in Hawaii as in other islands. Tree and shrub genera of lobelias in the bell-flower family, with irregular curved tubular flowers, are good examples. Lobelias in the United States are low herbs, but related genera in the Andes are shrubby. Transplanted to Hawaii, the lobelias multiplied into five endemic genera and many species and spread to various forest sites including high mountains. The endemic genus Clermontia has evolved into 42 named species, mostly shrubs, though about 15 become small trees 15 to 20 feet high and 4 to 5 inches in trunk diameter. The related genus Cyanea is even larger, with 65 named species, three attaining tree size, the largest 40 feet. These tree lobelias have few stout branches bearing terminal crowns of many long, narrow, strap-shaped leaves as much as one foot (sometimes two feet) long. A few are unbranched and palmlike. At the same time, birds of the endemic family of honey creepers evolved, some with long, slender, curved beaks and long, narrow tongues shaped to fit these large lobelia flowers and feed on the nectar and small insects within, and to pollinate.

Five of the most important native Hawaiian tree species deserve mention.... 'Ohi'a-lehua (Metrosideros coleina) of the myrtle family, is the most common native tree, and is the official flower of the island of Hawaii. This large evergreen is widespread and dominant in moist forest throughout these islands, from 1,000 to 9,000 feet. It is common at Hawaii Volcanoes National Park, forms the most extensive forest on the island of Hawaii, and is very variable and locally a low shrub. The paired leaves 1 to 3 inches long are oblong, shiny, and stiff. Flowers about 1½

inches broad with many threadlike stamens are borne in showy salmon, yellow, or white. The dark reddish brown, hard, durable wood is used for flooring, interiors, and furniture.

Koa (Acacia koa), of the legume family, is the second most common native tree, also the native tree of largest size and perhaps the most valuable, widespread throughout the islands from 1,000 to 5,000 feet altitude. The leaves, except on small plants or young twigs, are modified into large sickle-shaped flattened, yellowish evergreen petioles 4 to 8 inches long. Numerous tiny whitish yellow flowers are borne in balls $\frac{3}{8}$ inch in diameter. The attractive golden or reddish brown hard wood is used for manufacture of art objects, furniture, musical instruments, cabinetwork, veneer, and construction.

Sandalwood or 'ili-ahi (Santalum freycinetianum and related species), of the sandalwood family, formerly was Hawaii's most valuable timber. This small to medium-sized evergreen tree is a partial parasite on roots of other trees. The paired leaves $1\frac{1}{2}$ to 4 inches long are ovate, shiny, and thin. Small bell-shaped reddish green flowers are $\frac{3}{8}$ inch long. The valuable, fragrant, yellow-brown wood was Hawaii's first profitable export trade. Quantities were shipped to China during the years 1791 to 1840, when the trees became very scarce. Principal uses were for temple incense, furniture, chests and boxes, and the essential oil for medicine and perfume.

Candlenut or kukui (Aleurites moluccana), of the spurge family, is the state tree of Hawaii. This medium- to large-sized evergreen tree is common on lower mountain slopes and probably was introduced by the Hawaiians from South Pacific islands. It is recognized from a distance by the whitish green leaves, which are large and often with 3 to 7 short-pointed lobes. Many small whitish male and female flowers produce large crops of rounded brown fruits two inches across. The large oily seeds served as candles, and the oil was extracted commercially for varnish or burned in lamps. The soft wood is not durable.

Hawaiian treefern or hapu'u-'i'i (Cibotium menziesii), of the treefern family, is a small evergreen tree which grows up to 30 feet high, with unbranched trunk covered by fibrous masses of air roots and with a crown of several giant fern leaves 10 feet or more in length. It is common as understory in wet forests at 2,000 to 6,000 feet altitude through the islands and is not endangered. The trunks with air roots are sawed into slabs as planter poles, a base for growing orchids and other plants, and are processed into fern fiber. Brown silky scales or "pulu" at the leaf bases of this and other treeferns formerly served for stuffing pillows.

Distinctive names in the Hawaiian language for most native trees show that the first settlers were good naturalists. The Hawaiians mentioned trees in songs and legends and did not destroy their forest resources. Surely the modern inhabitants will take the necessary steps to save the rare and endangered trees from extinction and thus preserve their legacy.

AMERICAN FORESTS, December 1967, Vol 73, No 12, pp 18-21: TREES OF HAWAII by Stanley M. Jepsen

...AFA declared it the National Champion koa. The tree is being preserved for posterity.

Recently native woodcutters on the Bishop Estate found an unusually large specimen. It measured 31 feet 8 inches in circumference at breast height but had a butt swell extending up the trunk for several feet. This tree is growing at an elevation of 6,000 feet near Keauhou, Kau, Island of Hawaii, about six miles north of the Headquarters of the Hawaii Volcanoes National Park....

Re-examination revealed this koa to be 27 feet 5 inches in circumference at a point 10 feet above the ground, 98 feet tall, and 105 feet across the crown.

AMERICAN FORESTS, January 1968, Vol 74, No 1, pp 36-37, 50, 52: LETTER FROM HAWAII by Kenneth B. Pomeroy

...L.W. Bishop, retired deputy State Forester of Hawaii, took several members to see an exceedingly large Moreton Bay Fig, Ficus macrophylla, Desf. This naturalized tree, a native of Australia, was planted at Holauloa, North Kona, Hawaii, in 1897 by the Queen Dowager Kapiolani and Mrs. Mary K. Atcherly. It now has a circumference at breast height of 31 feet, a spread of 120 feet, a height of 60 feet, and is being recognized as National Champion in the Social Register of Big Trees. Now being defaced by unthinking vandals, this monarch should be protected in a park. Such a park could provide public access to a nice ocean beach as the tree stands on a vacant lot between the highway and the nearby sea....

On completion of the Kona Coast visit, several AFA members voiced a feeling that the area faced some very large problems in resource planning, water development, sanitation, transportation, and housing as a result of a super boom in resort development. Presently some of the big resorts are interspersed with mediocre homes, all crowded into a narrow strip between a two-lane highway and the ocean. In places the activities of man obscure natural beauty....

On Molokai, the "Friendly Isle," AFA enjoyed an informal historical tour, interspersed with interesting legends. The Kapuiwa grove of 1,000 coconut palms planted in the 1860's by King Kamehameha V surrounds a spring said to be inhabited by a beautiful mermaid who leaves her watery home at midnight to entice some helpless husband away from his loving wife....

AMERICAN FORESTS, February 1969, Vol 75, No 2, pp 12-15, 59-63: HAWAII FIRST by Lorna C. Littlecott

Armed with a machete to clear his path, camera to record his discoveries, and "campaign" hat to shade his eyes, L.W. "Bill" Bryan set out on his trusty mule one year ago to find the really "Big Ones" in the forests of Hawaii. He succeeded, and today the State of Hawaii claims 201 Champion Big Trees! Unlike Champions in other states, the Champions of Hawaii include native species and introduced species that have not become naturalized.

This monumental contribution to science began following AFA's 1967 post convention tour to Hawaii when Chief Forester Kenneth B. Pomeroy visited the Bishop Estate where Colonel Bryan is the Consulting Forester. The search was launched, and with the aid of a few friends, Colonel Bryan started a list to "be added to as time goes on and...be topped by new Champions in the future." That's quite an order. We commend Colonel Bryan for a task unsurpassed by anyone....

Hawaii had changed considerably since Bryan arrived 48 years ago. Over 10 million trees have been planted; several nurseries built; fruit orchards containing 500 different varieties of trees have been tested; arboreta established with over 1,000 different species of plants given trial....Trees planted during the early years are now being harvested....

The biggest of all tree species, the redwood (Sequoia gigantea) was introduced successfully, and is doing well on the slopes of Mauna Kea.

The geographic location of Hawaii makes its native and naturalized trees distinctive from the other 49 States. For this reason, AFA decided to keep the Hawaiian list separate from the original Social Register. So Hawaii has its very own Social Register....

Editor's note: The register gives the circumference, height, spread, and location of each tree. The native and exotic species are listed separately in alphabetical order by standardized scientific names, followed by local common names.

Any comments or information to share with other members? Please write to Kojima, 725-A 8th Avenue, Honolulu, Hawaii 96816.

BOOK REVIEWS:

Ornithology of the Marshall and Gilbert Islands by A. Binion Amerson, Jr. fills Atoll Research Bulletin No. 127, 348 pages, May 28, 1969. This is paper 43 of the Smithsonian Institution's Pacific Ocean Biological Survey Program, which collected 585 of the 1,133 specimens, all but one of 44 species known to have been collected in these two groups of atolls.

This not only discusses 29 species of birds, but also gives a map and summary of each of 50 atolls in these two groups of islands, including size, shape, soil, vegetation, climate, human population, scientific visits, and a detailed check list of the bird life. Summing up the island details is a listing of all of the 37 species of seabirds and 42 of land and fresh-water birds with notes on their status, where the seabirds feed, specialized distribution of species, and an essay on ecological relationships, especially with regard to food and predation by man and other animals. Bird banding returns, a tabulation of native bird names, and a lengthy bibliography round out a very valuable publication.

E. H. Bryan, Jr.

Amerson, A. Binion Ornithology of the Marshall and Gilbert Islands.
(Atoll Research Bulletin, No. 127, 1969. Smithsonian Institution. 348 p.)

This study is most useful in its ornithological and biogeographical information, for it gives for each of the 50 atolls which it comprises, the location, shape and size, soil, vegetation, climate, human population, history of previous visits, the list of birds present and notes as to other records of their presence, scientific and popular names, a map with islets named, followed by summaries for the Marshall and Gilbert groups. A final summary covers avifaunal distribution of seabirds, land and waterbirds, and influencing factors.

Other areas of the Pacific are now given opportunity to check their own bird lists against this, and know definitely what is in this large area of the Pacific.

The work will also be extremely valuable as an up-to-date gazetteer of the two regions that are due for increased attention in the near future yet still difficult to find data for on these subjects.

Margaret Titcomb

Field Notes from Ronald L. Walker, 1958 to 1962: Hawaiian Hawk

In the interests of further documenting sightings of Hawaiian Hawks on the Island of Hawaii and in view of recent articles by Morrison (THE ELEPAIO, Volume 29, No. 9, pp. 75 to 78, April 1969) and Baldwin (THE ELEPAIO, Volume 29, No. 11, pp. 95 to 98, May 1969) the following field notes are offered:

April 7-10, 1958-----Three hawks dark phase, seen separately during annual game census of Mauna Kea, Hawaii, between elevations of 7,000 and 9,000 feet.

May 8, 1959-----Single hawk seen flying across the Saddle Road from the direction of the Kulani Prison towards Puu Oo Ranch, 19 miles from Hilo.

May 25, 1961-----Harry Fergerstrom, Game Management Assistant with the State Fish and Game Division reported seeing two hawks below the Kahinahina Cabin on Mauna Kea, below the fence line in Parker Ranch (Elevation approximately 6,000 feet). He also reported seeing a nest with a single light blue egg in a Mamani (Sophora chrysophylla) tree in the same vicinity.

January 29, 1962-----A Mr. Stanley Kubo, who resided near the Kaumana Cave in Kaumana above Hilo, reported Hawaiian Hawk depredations on his domestic ducklings and young kittens. This report was never confirmed, however.

July 23, 1962-----A single hawk seen near Carvalho Park, across from the County jail in Hilo, Hawaii.

October 16, 1962-----Three Hawaiian hawks in a group seen circling towards Mauna Loa on the saddle road, 23 miles from Hilo.

Field Notes from Ruth R. Rockafellow: Plover

On April 25, about 5 p.m., I sighted two flocks of Pacific Golden Plovers headed Ewa in migratory formation; one flock of about 25, the other some 18 or 19....It was a great thrill.... (From Apartment 1602, 1541 Kalakaua Avenue, Honolulu, Hawaii)

On May 28 an owl flew from one side of the Pali Highway to the other at Kawainui Swamp....

 From Unoyo Kojima, July 4, 1969: American Golden Plover

On July 4 three birders headed for Hickam Harbor to see the stilt, and other seabirds flying around the buoy, but--no stilt, no seabirds. The shoreline was quiet except for the splashing of the waves. After listening to the linnets and the N.A. cardinals for about five minutes we decided to move on, but at the edge of the road we spotted a Brazilian cardinal pecking at a yellow object tenaciously held by its thin toes. What is so delicious that this bird will not fly away when we were only a yard away? Kiawe bean! Yes, the sweet pod was too delicious to let go! After watching the bird feeding on the kiawe for awhile, we reluctantly started to roll on, then in front of us stood a bird that no words can describe. Its striking beauty--a black belly and a golden back with a white band running over the forehead and down the sides of the neck to the chest--showed a golden plover in nuptial plumage. The bird was alerted, so we froze; but unfortunately, a car came by and the bird flew out into the wide Pacific. A plover in July! Is it coming or going? No matter, we were thankful for the experiences and with enthusiastic contentment and tranquility we headed home.

 From William W. Prange, Jr., July 21, 1969: Fairy Tern

Wonderful news--Two fairy terns were seen fluttering among the ironwood trees (Casuarina equisetifolia L.) near the old band stand at Kapiolani Park.

Field Trip to Koko Head, June 8, 1969: Fairy Tern

Since Mr. Kaigler was not able to lead the June Audubon hike, he asked me to lead the group to see the fairy terns on Koko Head. We both made several trips out earlier to determine if the fairy terns were on Koko Head yet or at all. On June 3, I did find two fairy terns, so Mr. Kaigler decided that the long hike up Koko Head for the Audubon group just to see fairy terns would be worth the effort and would go on as scheduled.

On Sunday, June 8, 17 members and guests walked the steep road on Koko Head thinking that after the long walk up, nothing may be seen. Nothing was seen from the top, but the group trusted me and followed me all the way down to the surprise I had for them, one fairy tern and one egg. The egg was in the same nest site where last year's chick was found. The interesting thing about this egg, besides being the only one found this side of the leeward islands, is that the fairy terns build no nest. Another interesting thing about fairy terns is that they will fly right up to a person to investigate who is intruding, then give their impressive but hard to imitate calls of barks and squeaks. Unfortunately, the tern was quiet today and did not fly up to the waiting people, but it did fly up and around giving everyone a good view of its all-white body and seemingly big black eyes. Some of the group continued to the point, but only a few sooties and noddies could be seen. No frigate birds at all. But to make it up, some members found a family of six cordon bleu; one positively identified as a male. This is the first record of cordon bleu from Koko Head. American cardinals, mejiros, house finches and Brazilian cardinals completed the day, which was beautiful weatherwise.

Henry Yuen

Field Notes from Henry Yuen, June 11, 1969: Black-crowned Night Heron

What are black-crowned night herons doing on Manana Island? I was out on the beach one morning and three herons flew off the island together, I thought these

birds were loners. There was a fourth which flew off alone, and all four of them landed in the hills behind Sea Life Park. May be they are not as unusual as I thought, as Walter Donaghho told me later that one was seen on the island during last years field trip there.

READERS' NOTES:

Following is a news release from American Motors Conservation Awards from Detroit, Michigan:

"Nineteen men and two women are winners of /1969/ American Motors Conservation Awards....The awards are presented each year to 10 professional and 10 non-professional conservationists for dedicated efforts in the field of renewable natural resources.... /One of the winners is/ Ah Fat Lee of Kamuela, Hawaii, nene propagation assistant for Hawaii's Department of Land and Natural Resources. Lee was cited for his efforts in bringing the nene, or Hawaiian goose, back from the brink of extinction. He began a program of rearing nene in captivity at Pohakuloa in 1955 and has released some 500 birds into the wilds of the islands since that time. When he undertook the project, Hawaii's known nene populations had dwindled to only a few dozen birds...."

Newsletter No. 51, Winter 1968-69, from Cornell University, Laboratory of Ornithology at Ithaca, New York, page 3: A Population Control Study in Pigeons.

"A basic problem in man's future concerns food and space for the geometrically increasing human population....City governments worry about the increase in the numbers of starlings and pigeons from a health standpoint. Pigeons may carry the virus causing psittacosis, or parrot fever, a disease that occasionally infects humans, producing pneumonia-like symptoms. Most people contract the disease by actually handling birds, but as pigeons increase around urban areas the chances of indirect infection also increase. Recognizing these problems, the University of Illinois Health Service sought help in finding some means of curbing the population of pigeons on the campus.

"A recent issue of the ILLINOIS NATURAL HISTORY SURVEY REPORTS No. 54 indicates some progress toward solving the problem: Dr. /Richard R./Graber /a Survey Wildlife Biologist/ learned that in laboratory studies at the University of Missouri certain antifertility compounds, particularly hypocholesterolemic agents, had shown great promise in blocking reproduction in pigeons, although these materials had not been tested in natural situations with free-living birds....Preliminary to the actual testing of the antifertility compounds, it was essential to learn the areas of activity, of individual birds and to determine where the birds nested in relation to where they fed....He found that the area of activity of these pigeons was very restricted. If food (corn) was kept available on the hospital roof, the birds spent 85 percent of their time within half a block of the hospital. Their night roosts and their nests were on the hospital itself. The situation was thus ideal for testing the antifertility compound....The birds nested normally, laid at least some eggs, and incubated the nest for about 2½ weeks. However, no young were produced by the hospital pigeon population during the 1966 breeding season. These observations provided grounds for optimism that urban pigeon populations can be controlled by an intensive use of this method....Before the method can be widely used, however, it will be necessary to work out precautions that must be observed to safeguard humans, livestock, and pets."

COLONY OF GOLDEN PLOVERS THRIVES AT FLORIDA COLLEGE - (Ethel Matheson's contribution)

Gainesville, Fla. (AP)--A colony of 10 golden plovers, Arctic birds, is thriving on the semi-tropical University of Florida campus, where they are helping to solve the mystery of bird migration and celestial navigation.

Young golden plovers can find their way up to 8,000 miles from the Arctic to a winter home in the Hawaiian Islands and the South Pacific the first time they fly the route. Research has revealed that they navigate by the sun and stars.

The plovers were raised from hatchlings in his laboratories at the school by a

zoologist, Dr. Franz Sauer, who is a specialist in animal behavior and bird migration.

Excerpts from the minutes, Hawaii Audubon Society General Meeting, 2 June 1969:

A special meeting...was held this evening at the Bishop Museum Conference Room.

Vice President Jack Throp introduced our speaker, Dr. Glen McBride, Head of the Animal Behaviour Unit of the University of Queensland, Brisbane, Australia. Dr. McBride is enroute to Brisbane from Washington, D.C., where he attended a Smithsonian Institution symposium on man and animal behavior.

After summarizing the main features of the symposium, Dr. McBride presented a stimulating and most informative discussion on the annual breeding cycle of feral chickens on Northwest Island, a small island on the Tropic of Capricorn near Heron Island off Queensland.

Present at the meeting tonight were Mr. & Mrs. H.R. McKenzie of New Zealand....

Excerpts from Executive Board meeting, Hawaii Audubon Society, 9 June 1969:

...Mr. Throp reported the nesting and egg laying of his female Puaiohi (Phaeornis palmeri) with a male Clarino, the Grey-back solitaire from Mexico. Dean Amadon believes that the Puaiohi is descended from this Mexican bird....

Miss Kojima noted the apparent absence or near-absence of Leiothrix calls heard recently on Oahu. The possibility of a recently introduced parasite or disease was discussed....

HELP WANTED

The Society is over 200 strong, but its continuance is maintained by less than a dozen active members. If you do care, please become an active member by becoming involved in one of the following activities:

1. Serve as an officer of this Society.
2. Serve as a field trip leader.
3. Serve as a program chairman.
4. Serve as an editor for THE ELEPAIO
5. Serve as an education chairman.

If you can help, please write to Kojima, 725-A 8th Avenue, Honolulu, Hawaii 96816 about the area you are interested in and the hours you are able to give to the Society.

. MAHALO

ALOHA to new members:

Mrs. Bertrand Fox, 18 Edgewood Road, Lexington, Mass. 02173.

Mr. & Mrs. Thomas E. Gibbs, 1634 Makiki St, Apt 205, Honolulu, Hawaii 96822.

HAWAII'S BIRDS, a field guide, available for \$2.00. Send in your orders to: Book Order Committee, Hawaii Audubon Society, P.O. Box 5032, Honolulu, Hawaii 96814.

AUGUST ACTIVITIES:

August 10 - Field trip to Manana to study seabirds. Trip will be limited to Society members. Boat fare is estimated at \$3.00. Bring lunch, water, and if possible your car. Transportation cost (50¢) to be paid to the drivers. Meet at the Library of Hawaii at 8:00 a.m. Leader: William W. Prange, Jr., telephone: 239-7187.

August 11 - Board meeting at the Zoo entrance bldg at 7:30 p.m. Members welcome.

August 18 - General meeting at the Waikiki Aquarium Auditorium at 7:30 p.m.

Speaker: Ted R. Green, Director of Parks and Recreation

Topic: Hawaii and Her Parks

HAWAII AUDUBON SOCIETY EXECUTIVE BOARD: Address: P.O. Box 5032, Hon., Haw. 96814

President-Miss Margaret Titcomb, Vice Presidents-Charles G. Kaigler & Jack L. Throp
Secretary-Mrs. Virginia Cone, Treasurer-William W. Prange, Jr.

Board Members: Dr. Robert L. Pyle & Gerald E. Swedberg

THE ELEPAIO: Editors-Miss Charlotta Hoskins & Miss Unoyo Kojima
DUES: Regular-\$3.00 per annum, Regular out of State-\$2.00 per annum, Junior (18 years and under)-\$1.00 per annum, Organization-\$2.00 per annum, Life-\$50.00