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NENE RESTORATION PROJECT REPORT*
Division of Fish and Game
Department of Land and Natural Resources
Honolulu, Hawaii 96813

HISTORY

The Nene, or Hawaiian Goose (*Branta sandwicensis*), is believed to have evolved from Canada goose stock. Migrant flocks of this species remained in the Hawaiian Islands and gradually evolved into a distinct species. This species is identified by the reduced webbing of the foot, and a comparatively short wing. The former adaptation is eminently suitable for the barren lava slopes inhabited by Nene.

Mr. Paul H. Baldwin studied the Nene when he was employed at the Hawaii National Park. His article, "The Hawaiian Goose, Its Distribution and Reduction in Numbers," which was published in 1945, did much to bring the plight of the Nene to the attention of biologists and ornithologists. He estimated a population of less than 50 Nene in 1944. Their range, by this time, had been drastically reduced from 3,000 square miles on the islands of Hawaii and Maui, to only 1,200 square miles on Hawaii. His studies indicated that an estimated population of as many as 25,000 Nene may have been present on both islands before their decline.

In 1949, Charles and Elizabeth Schwartz compiled a report on the game birds of Hawaii after a year of field studies. They stated that the Nene was the next Hawaiian species facing extinction, and urged action to prevent this. During the 1940's the Nene was considered to be one of the world's rarest birds.

It is generally agreed that the major decimating factors were the hunting of Nene during the Fall, which was their breeding season, and the introduction of a number of new predators. The mongoose, and feral cats and dogs wreaked havoc on nesting and flightless Nene.

INCEPTION OF THE NENE RESTORATION PROJECT

The Nene Restoration Project actually began in 1949 when Mr. Herbert Shipman, a rancher on the island of Hawaii, loaned the Board of Agriculture and Forestry a pair of Nene with which to start a propagation project. At that time Mr. Shipman had the only captive flock of Nene in existence.

Initially this program was financed by a \$6,000 legislative appropriation from the Territory of Hawaii. The program was designed to study Nene in the wild and to rear them in captivity for eventual release. At that time, however, the ecological study portion was not approved by the Board of Agriculture and Forestry. In 1956, Dr. William Elder from the University of Missouri received special grants to undertake an ecological investigation of the wild Nene. The results of his findings and the achievements of the Pohakuloa Propagation Project since 1949 prompted the introduction of a bill in the U.S. Congress to authorize the U.S. Fish and Wildlife Service to spend \$15,000 a year for a period of five years,

*Ronald L. Walker's contribution.

to carry out a program of research and management to insure the preservation and re-establishment of the Nene in its former known habitat. This bill was strongly endorsed by the top conservation organizations in the United States and was passed by the 85th Congress as Act 891. These funds were made available in November of 1958. After the initial five-year period ended, \$15,000 annually was made available from the Bureau to continue the project and this sum was increased to \$25,000 per year since fiscal year 1968.

With the availability of federal funds, Mr. Richard E. Griffith, Chief of the Wildlife Division, Region 1, U.S. Fish and Wildlife Service, came to Hawaii to survey the program and formulate plans for future work. His initial visit resulted in two men being assigned to the program. A biologist was designated overall Project Leader whose principal duty was to conduct the ecological phase of the project as well as supervise the entire program. Mr. Ah Fat Lee was assigned as propagationist in charge of the rearing project at Pohakuloa, Hawaii.

Assignment of a full-time staff added to the information obtained in regard to the ecology of the Nene. It was learned that:

1. The Nene was restricted to the uplands of the island of Hawaii, primarily between 5,000 to 7,000 feet in elevation.
2. The breeding season extended from November through March.
3. Sexual maturity may not be reached until three years of age in many birds.
4. The average clutch size was almost four eggs per clutch.
5. During the flightless period, the young and adults were extremely vulnerable to terrestrial predators, which include the mongoose, feral dogs, cats, and pigs.

Dr. Elder's preliminary ecological study revealed the nesting ground of the wild Nene where a substantial number of young birds were reared, and the summer range of practically all of the wild Nene on Hawaii. This nesting ground of some 8,100 acres of Keauhou Ranch, was set aside as a Sanctuary through the negotiation of a cooperative agreement with C. Brewer and Company, and the Bishop Estate.

During the summer months there is an active Nene flyway which crosses Saddle Road between the 17 and 21 mile markers. These Nene spend the day on the lava-covered slopes of Mauna Loa, then fly across Saddle Road to the slopes of Mauna Kea to "roost" at night. The relative number seen each year along this flyway has been used to estimate the increase in this wild Nene population.

Ecological survey work is greatly hampered by the ruggedness of the lava flows and the vastness of this Nene habitat which can only be traversed on foot.

PROPAGATION OF NENE AT POHAKULOA

The Pohakuloa Propagation Project was plagued by the problem of very low fertility and hatchability, as compared to wild Nene. In order to pinpoint the difficulty and to find a solution, studies were continued on the mechanics of hatching and rearing to determine the primary limiting factor. Mr. Wesley M. Batterson, biologist with the Oregon State Game Commission, was asked to come to Hawaii to review all aspects of the propagation phase during the 1960-1961 breeding season. It was felt that his success in breeding other extremely difficult-to-rear waterfowl, would enable us to develop better techniques to improve production.

A pair of wild Nene and one young bird were captured in the Keauhou area during March of 1960, and taken to Pohakuloa for breeding purposes. This infusion of new blood was eminently successful in increasing the fertility and hatchability of Nene at Pohakuloa.

The use of silky bantam chickens as broody hens and foster mothers was discontinued in 1964. They were effective in increasing hatchability, however, very few bantams were broody and available for hatching Nene eggs during the Nene breeding season, which occurs during the winter.

Efforts were continued to find better techniques for improving fertility and hatchability. The best results were being obtained from natural incubation. As an experiment two pairs were selected during the 1965-1966 breeding season to determine whether captive Nene would reneest. When their first clutch was hatched, the goslings

were immediately removed to an indoor brooder and the nest destroyed. Both of these pairs renested in eight weeks. To further test this technique, nine pairs were selected for testing during the 1966-1967 season. Eight of these nine pairs renested in eight weeks. Fertility and hatchability for this technique was very high, enabling the production of 84 Nene during the season, the highest production ever. The entire flock has been subjected to this technique since the 1967-1968 breeding season. The production at Pohakuloa is summarized in Table I and reflects the value of this method of propagation.

RELEASES OF NENE REARED IN CAPTIVITY

The exclusive use of Nene to incubate all eggs has the added advantage of eliminating the need for maintaining a flock of birds to serve as incubators. Considerable savings have been made in both time and money and the ever present risk of a disease outbreak has been reduced.

The current breeding flock at Pohakuloa is comprised of 30 pairs of birds.

The first release of pen-reared Nene was made on March 17, 1960, at the Keauhou Sanctuary. It was felt that a release in this area would permit an intermingling with this breeding population of wild Nene. All of the Nene for release are color-banded, permitting identification of individual birds. This enables the determination of survivability, movements and mating with wild birds. Twenty Nene were placed in the one-acre release pen, with the primaries of one wing plucked. These birds would remain in the open-topped pen long enough to become acclimatized and learn to eat the natural foods found in the sanctuary. The plan worked extremely well with a few birds leaving the pen as their flight feathers grew out, but returning to eat and rest within the pen. Gradually, the entire flock left the pen and established themselves in the general vicinity of the release site.

Our studies showed that the scheme of gently releasing pen-reared birds into wild habitat to mingle and mate with wild Nene is working out ideally. Since the initial release was so successful, additional releases were made at the Keauhou Sanctuary, and other areas. An area in North Kona, lands of Keauhou II, was selected as a release site. The habitat was suitable, and it was known to be a nesting area a few years ago. An agreement was made with W.H. Greenwell, Ltd., and the Bishop Estate, and a second Nene Sanctuary was created. The first release of twenty pen-reared Nene was made here on May 23, 1961.

Additional releases of pen-reared birds, all from the Pohakuloa Propagation Project, were made in both of these sanctuaries.

A third Nene Sanctuary and release site was established through a cooperative agreement with the Damon Estate for an area in the Kau District on Kahuku Ranch. A total of 75 Nene were released immediately after the cooperative agreement was approved, in May of 1967.

Pen-reared Nene were also released in Haleakala Crater on the island of Maui. Birds for release in this area were reared primarily in England at the Severn Wildfowl Trust. A total of 150 Nene have been released on Maui.

Table I, the Nene Restoration Project from 1949 through 1967, lists the annual production at Pohakuloa and the releases made to date.

The former range of the Nene included the Island of Maui, especially on Haleakala. A survey of the existing habitat on Maui was made in June of 1960. It was determined that there were some 9,000 acres of excellent Nene habitat and 30,000 acres of poor to good, mostly seasonal, habitat available.

When a proposal was made to send Nene reared in England to Hawaii for release, it was decided that these birds could best be used to attempt the re-establishment of the species on Maui.

ORIGIN OF THE RELEASED BIRDS

Thirty of the Nene released on Maui were produced at the Wildfowl Trust at Severn, England. These were derived from a stock of three Nene presented to the Trust by Mr. Herbert Shipman of Hilo, Hawaii in 1949 and 1950. Ten of the 30 birds were juveniles when released; seven were one-year old; ten were two-years

old; two were three-years old; and one was four-years old. The sex of these birds is 17 females and 13 males.

The other five birds released are all juvenile females produced at the State's Pohakuloa propagation project on Hawaii. These birds are mixtures of the same "Shipman strain" and wild caught strain Nene.

TRANSPORTING THE BIRDS

The birds from England were air-freighted to New York and taken directly to the U.S. Federal Quarantine Station at Clinton, New Jersey. After a 21-day quarantine period they were shipped on to Honolulu via air freight.

In Honolulu they were housed at the Honolulu Zoo for three days for resting and also to allow time for banding them all with individually distinctive plastic leg bands. On July 26 they were shipped by air to Kahului, Maui, where they were joined by the five Hawaii birds.

The trip up to the rim of Haleakala Crater was made by truck. Here the birds, which were in light-weight cardboard boxes were loaded on pack boards. A group of 23 volunteer Boy Scouts carried the birds the 8.5 miles down into the Crater and across to the other side to the release pen located near Paliku.

THE RELEASE SITE

After considerable survey of the available habitats and suitable release locations, it was decided to locate the release pen near the Paliku ranger cabin within Haleakala National Park. The reasons for this choice are as follows:

1. This area, which lies at the upper end of the Kaupo Gap is excellent Nene habitat and contains year-round feed.
2. The remoteness of the area will insure a minimum of disturbance to the birds and pen.
3. The excellent accommodations available at the Paliku ranger cabin for personnel caring for the birds. The cabin was made available to project personnel by the National Park Service.

The pen is situated at the edge of an ancient 'a'a lava flow. It encompasses about an acre of good grass cover, mostly mesquite grass (Holcus lanatus) and Mountain pili (Panicum tenuifolium), plus sheep sorrel (Rumex acetocella) and gosmore (Hypochaeris radicata). There are also small amounts of Kukaenene (Coprosma ernodeoides) and Pukiawe (Styphelia tameiameia) within the pen. All of these plants are good Nene foods and are very abundant in the general vicinity.

The pen was constructed of one-inch poultry wire, six feet high supported by steel posts. An additional three foot piece of one-inch wire was clipped to the bottom, buried one foot and turned out for a foot or more and covered with earth. All of the materials were hauled some 12 miles on mules furnished by the National Park Service.

Prior to placing the Nene in the pen, the perimeter and immediate vicinity were heavily baited with poisoned meat. This was done to eliminate any mongooses, feral cats or dogs which might be in the area.

HOLDING THE BIRDS IN THE RELEASE PEN

As the Nene were removed from the boxes used to transport them into the Crater, each was examined and the clipped primaries were extracted. This was done so that the new feathers would commence growing in immediately. They were released in the pen in the late afternoon of the 26th of July. They were given constant care and were supplied with native berries and scratch feed daily. There was much pecking and other signs of social adjustment among the flock for the first week or so, but they soon settled down and appeared to get on well.

While in the pen they were treated for coccidiosis and caecal worms with sulmet and peperazine, since an examination of the fecal droppings of the flock indicated that these parasites were present in the birds.

The birds began making short flights within the pen during early September and the first flights out of the pen occurred on the 12th when two of the Hawaii birds

pioneered the way. On the 17th the first England bird made it out of the pen and on the next day the remainder of the Hawaii birds were observed outside the pen. The Nene would fly a few hundred yards out and would return at dusk. On the 19th, two of the Hawaii birds made a long flight out toward the Kaupo Gap and did not return to the pen until the 20th and 21st respectively. By the end of the month of September, 27 of the 35 Nene were flying in and out of the pen.

It soon became apparent that the wing development in five of the birds was not progressing satisfactorily. A male suffered a broken wing from an unknown cause and the flight feathers were badly damaged. The remaining four birds had damaged primaries probably incurred when the replacing primaries were brushed against the sides of the pen, rocks, or brush as the "pecking order" was being established. The damaged primaries numbering, three, five, six, and seven were pulled the second time, and these birds were able to fly by January, 1963.

LOSSES

On December 27, two females were found dead in the pen and these were shipped to Honolulu for autopsy. Sharp puncture wounds found on both birds caused probably by mongoose were suspected to be the cause of their deaths. On January 17, the male with the broken wing was caught and sent to the Nene project in Hilo. In August, 1963, a yellow-green band was found about ten feet from the pen and a few patches of Nene body contour feathers were in the immediate vicinity. No other evidence of the Nene could be found, but it is surmised to be the remains of a female from the Pohakuloa birds.

BREEDING

On October 22, two 3-year old birds from England began pairing. Subsequent sightings revealed this to be a very good pair until January 17 when the female left the release area. Two weeks later, the male paired up with a two-year old. A two-year old male paired with a two-year old from October 29 to April 1, to mark the strongest evidence of mating. The urge to pair extended over a long period as the last pairing was noted at the end of February. The only five-year old bird, a male, paired with a year old Pohakuloa bird on January 10, and this pairing remained up to the end of February. This was the only case of pairing noticed between the English and Hawaii birds. An extensive search of the area was made for nests, however, none were found. No broods were seen or reported and it is assumed that since no non-banded Nene have been seen or reported, that reproduction did not occur the first year.

MOVEMENTS

On January 28, a male was caught by a retired rancher at Kokomo, about 15 miles in a straight line from the release site. This bird had not been seen at Paliku since October 1. Various reports, however, have come in of Nene sightings in the general area extending from Haiku to Pukalani and including the Kokomo and Makawao areas. A female last seen on October 1st returned to Paliku on January 28, and was noticed paired the following week. Another female last seen on October 1st did not appear at Paliku until July 31, 1963, for an absence period of seven months. Because of the long absences and the subsequent returns, it is possible that all of the birds not definitely known to be casualties may still be attempting to locate a habitat more suitable than Paliku.

THE 1963 RELEASE

The July 30, 1963, release was composed of 19 Nene from England, 5 from Mr. Dillon Ripley in Connecticut, and 5 from Pohakuloa. The birds were crated and packed into the release site on a timetable and manner nearly identical to the previous release. Again, the operation was done without casualties. Fresh water and scratch grain were provided during the first day and the water was treated for coccidiosis beginning the second day.

RETURN OF THE 1962 RELEASE

Feeding and watering of the 1962 release was discontinued on April 1, 1963, and with this discontinuation and the lush growth of mesquite grass the Nene began moving out of the area for longer and longer periods. On June 26, four were seen at the release site, and two others in the Kaupo Gap, about 4 miles distant. On the 1963 release date, only two were seen at Paliku. Three days later, another arrived; this being followed by slow additions so that by the 18th of August, seven Nene were at the release site. The returning birds were two males and five females. On one occasion, a male flew into the pen but he was immediately chased by another bird and had to leave.

ADAPTATION

The new birds immediately began to feed on the mesquite grass (seeds and leaves) and the gosmore (leaves, stems, and flower heads). The gosmore flowers were completely gone within two weeks and the birds fed readily on them when picked and offered. It took about two weeks before the scratch grain was even moderately used, and some of the birds seemed indifferent to it even after a month.

Pecking and chasing was almost non-existent except when the birds began feeding on scratch grain. The release followed a pattern very similar to the 1962 release, and that an equally successful attempt at establishing the birds was accomplished.

On the outside the Nene were observed feeding on mesquite grass seeds and leaves, gosmore leaves and on Kukaenene berries.

The Hawaii and English birds, though remaining in rather distinct flocks while in the pen, have been observed to mix very well when outside of the pen. Pecking and chasing is non-existent outside of the pen.

SUBSEQUENT RELEASES ON MAUI

Table I presents a listing of all of the releases to date which have been made on Maui. All releases were accomplished in the manner described above and in the Paliku Area of Haleakala National Park. Considerable nesting activity occurred during the 1967-68 breeding season and although six eggs were believed to have hatched, no young birds were observed. It is planned to continue release of Nene in the Haleakala Area for several more years.

SUMMARY OF ECOLOGICAL INVESTIGATIONS

Reproduction of Nene in the wild has been steadily increasing, as is evident from the increasing number of nests and broods observed each year. During the 1966-1967 breeding season a record number of 15 nests and broods were recorded, with a total production of 22 goslings. The pen-reared birds have been integrated in the wild Nene population, and pairs composed of wild and pen-reared Nene have produced broods at the Keauhou and Keauhou II Sanctuaries.

Fertility and hatchability of wild birds continue to be higher than that experienced at the Pohakuloa Project. Mortality of broods is obvious, however, there is insufficient data to determine the extent of this loss to the Nene population.

There is a marked homing instinct exhibited by the Nene observed. Paired Nene commonly return to the same area to nest each year.

There is a need for more information on dispersal, movement, survivability, and mortality of young Nene in the wild. With the increase in sanctuary area and Nene releases, this information can be obtained only with additional manpower.

Revised 11/26/69

TABLE I. NENE RESTORATION PROJECT RECORD - 1949 to 1969

Nene Reared at Pohakuloa		Year Released	Nene Released Island of Hawaii				Nene Released Island of Maui				Total Nene Released
Year	Number		Keau- hou	Keau- hou 2	Kahuku	Total	From Eng- land	From Poha- kuloa	From Conn.	Total	
1949-1950	2										
1950-1951	3										
1951-1952	2										
1952-1953	1										
1953-1954	4										
1954-1955	4										
1955-1956	8										
1956-1957	12										
1957-1958	3										
1958-1959*	15										
1959-1960	17	1960	20	-	-	20	-	-	-	-	20
1960-1961	32	1961	11	20	-	31	-	-	-	-	31
1961-1962	45	1962	-	35	-	35	30	5	-	35	70
1962-1963	54	1963	-	42	-	42	19	5	5	29	71
1963-1964	38	1964	-	-	-	-	19	8	-	27	27
1964-1965	41	1965	30	18	-	48	24	8	2	34	82
1965-1966	69	1966	-	-	-	-	-	25	-	25	25
1966-1967	84	1967	-	-	75	75	-	-	-	-	75
1967-1968	123	1968	-	-	85	85	-	20	-	20	105
1968-1969	156	1969	-	33	129	162	50	22	-	72	234
TOTALS	713		61	148	289	498	142	93	7	242	740

* Inception of Federal Project.

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Current news from HONOLULU STAR-BULLETIN, 14 May 1970, page A-5: Nene Population Now Tops 500, Thanks to State Effort by Keith Haugen, Maui Bureau Chief, Kahului, Maui.

Hawaii's project to restore to its natural habitat the nearly extinct nene is progressing satisfactorily, but no one is sure how long the project must continue. There appears to be no way of determining at what point the Hawaiian goose can live entirely on its own, freeing the State Division of Fish and Game of its responsibility.

Although earlier attempts at restoring the rare bird in sufficient numbers failed, David Woodside, a State biologist, said yesterday that the current project is considered a success and there are now more than 500 of the birds living in the wilds of Hawaii--mostly on the Big Island.

Woodside, in an address to the first Hawaii Wildlife Symposium being held here by the Hawaii chapter of the Wildlife Society, said a total of 829 nene have been produced in captivity since 1950.

He said an earlier project, started before World War II, had failed and that in 1949, only one gander from that flock still lived. It was in the Honolulu Zoo. In that year the territorial government revived the project with that gander and birds from a privately owned flock. They planned to release 50 birds each year to live in their natural wild habitat, Woodside said.

Pens were built in Pohakuloa and State biologists set about the very slow process of trying to save the species, he said.

Woodside said the fertility was very low--probably due to the inbreeding in a very small flock--and only two goslings were produced in the first year.

In 1957, however, the department succeeded in locating and bringing in two adults and one young bird, he said. As they discovered a wild population of about 25 nene living on the slopes of Mauna Loa.

REPORT OF THE HAWAII AUDUBON SOCIETY, 1959-1969

By Margaret Titcomb

A report of the last ten years of the Hawaii Audubon Society has been requested by the Demon Editor, and the task is very difficult. It amounts to a review of THE ELEPAIO, wherein is our chief record. THE ELEPAIO is a great gathering of our multifarious interests. It is good reading, too. It brings back memories of our precious friends, many of whom have moved elsewhere from the shifting population of Hawaii. But a true report could be an abstract of the whole ten volumes! Luckily the indexes of Janet Bell are at hand and have been wonderfully useful always. That shortens this task and is far more satisfying for readers to use.

The list of men and women who have contributed articles to THE ELEPAIO is impressive and includes: Grenville Hatch, Joseph E. King, Frank Richardson, John Bowles, Klaus Immelman, George C. Munro, Richard E. Warner, Roger T. Peterson, Miklos Udvardy, Paul Breese, E.H. Bryan, Jr., four members of the Hubert Frings family, Alan Thistle, W. Michael Ord, William V. Ward, Helen Shiras Baldwin, William W. Dunmire, Peter Scott, Ruth R. Rockafellow, Robert L. Pyle, Gerald E. Swedberg, Winston Banko, Andrew Berger, Chester M. Fennell, F. Raymond Fosberg and Dean Amadon.

These articles have had to do chiefly with Hawaii's birds, but some have treated of wider subjects in conservation and pest control. Some articles have to do with other areas of the Pacific, as the Galapagos, Samoa and Guam. We welcome all contributions, and are grateful for them.

Thanks to the generosity of Spencer Tinker, Director of the Aquarium, we have been able to hold our meetings--"Third Mondays" at the Honolulu Aquarium. And "Second Sunday" walks have been held unfailingly. Thanks to our vigorous Editor, Unoyo Kojima, THE ELEPAIO has appeared without fail each month. Each of these endeavors is important to our life. To the Christmas Count endeavor we have been faithful.

Membership has increased and is now over 200. Like all other human factors in Hawaii, the membership changes; we lose old friends, and find new ones. Many of our friends keep up their interest, though wide stretches of water prevent their coming to meetings. We cannot thank sufficiently the faithful and kindly service of Janet Bell for indexing, and Charlotta Hoskins, co-editor, ever ready to help on scientific points; she is "appealable."

We have continued to agitate as to refuges for birds, and the present turn toward appreciation and knowledge of ecology has been of great advantage as to hope for sanctuaries. Those most needed are for shore birds, though the forest birds that remain are in precarious situation also. Paiko Lagoon is now assured for a sanctuary, also Waiau, part of the shore of Pearl Harbor. A section of Kawainui swamp is planned for bird subdivision, and Munro's Ke Kua'aina, on Diamond Head, was taken over by the State as a bird sanctuary, and dry-land-plants park. Alaka'i Swamp is extremely important to the birds of Kauai. After finding that all the birds that were ever on Kauai (Richardson, 1964) are still there, up in the fastness of the Alaka'i Swamp, it would be a shocking pity to let them go without protection. Yet the threat is there.

The NENE are faring well, some having been moved to the "green" end of Haleakala, Paliku, and given their approval of the area. The actual count is with the Fish and Game Division.

One of our loveliest surprises has been the self-introduction of the fairy tern. Mike Ord spotted it, and all of us have seen it now, of course, there in the greenery near Hanauma Bay.

Bob Pyle gave us occasionally some interesting details of findings in the central Pacific as range of frigatebirds, etc., but he and Billie and their children

had to decamp to Washington in 1969. In 1959, we lost, unhappily, Joe King, also to Washington. Winston Banko, working in the depths of the forests of the island of Hawaii, does not have a chance to see Honolulu very often, or we to see him, unfortunately. Eugene Kridler and Dave Olsen are nearer, and share with us news of the seabirds of the Hawaiian Chain. Mike Ord was wonderful president and trail leader, but he had to shift domicile and work to Guam. One great pleasure was the visit of Roger Tory Peterson, in September, 1960. The tern at Manana thrilled him. He said he had never seen so many in one spot before. The National Audubon Society had a trip here in 1966, which Michael Ord reported in *THE ELEPAIO*. To my knowledge, they did not send us a report of their Hawaiian visit, but we trust they were expressive.

One outstanding effort has been the publication of a bird guide. In 1959, Grenville Hatch composed *HAWAIIAN BIRDS*, though she refused to take credit for it. It answered very well and we were most grateful for all the careful work that Grenville did to make it trustworthy, and appealing. It ran out of print and Mike Ord undertook to compose another guide, *HAWAII'S BIRDS*, with colored plates. It took him three years to catch the birds with his camera, but the work is fine. It has been very popular and it too will go out of print before long. We shall do our best to get another edition off the press. Mike too was shy of signing his name, except to his pictures. Why are the most authoritative people shy? Mike Ord is now in Guam indefinitely and we miss him greatly. We have missed Grenville for a greater length of time.

The saddest happening was the loss of George C. Munro. He died 4 December 1963 in his 97th year. His intimate knowledge of Hawaii, its land, its birds, its indigenous plants, his eagerness and complete selflessness as to time spent in observation of natural conditions and events, his friendliness to all, his helpfulness to students, all his fine qualities endeared him to countless friends and acquaintances. He left a diary of his stay on Lanai, which his daughter Ruby is now studying, to see what she can add. We hope it will reach print some time this year, for it contains reflections of life on Lanai that are historical, never to be duplicated.

This "report" is incomplete, but we hope it may revive memories of small and large events of the past decade. What we would do without our Editor, we do not know! Unoyo took the job, because there was no one else to follow Grenville Hatch. She has gathered the news superbly, edited, typed, addressed envelopes, mailed—done the job completely. The rest of us blithely accept her great and eminently successful endeavor. How can we thank her!

EXHIBIT OF BIRDS AT STATE CAPITOL By Margaret Titcomb

In April the Office of the Lieutenant Governor requested Margaret Titcomb to put up an exhibit on Hawaiian birds in the anteroom of that Office. It was doubtless inspired by the exhibit at *Ecology Circus*. Other conservation exhibits are in that Office, too, chiefly on land use and abuse.

Six large panels were allowed and the expense of enlarging some color photographs were paid by Lt. Governor Gill.

After some consultation, the pictures were gathered from various sources, many small ones from Michael Ord's book again. Each panel was titled, as "Migratory Birds", "Introduced Birds", "Hawaii's State Birds", etc. Two beautiful black and white enlargements of the nene in its own country were the work of Norman Carlson. A Japanese print of a cousin of our plover (from Japan), and a lithograph of a mamo were added to the other large pictures. The jungle fowl was included, because it was the only bird introduced by the Hawaiians; the introduced *Leiothrix* because it is now puzzling us by its disappearance from its old haunts. Refuges we desire were stressed, one picture of nene country: lehua trees in the high mountain mist, another of Opae-ula pond with stilt flying across.

Legends on cards stress the need for refuges, and little red labels point out

the endangered species.

It was gratifying to procure two small maps from books: one showing migration routes of our familiar plover, sanderling, turnstone and wandering tattler, the other is an indication of probable sources, anciently, of Hawaiian birds.

The exhibit is visited by classes from schools. It will be in the beautiful anteroom (top floor, Lt. Governor's Office, Capitol Building) for several months, possibly until the end of the year.

Do visit it, and give us your criticisms.

Have you seen the following good news?: HONOLULU STAR-BULLETIN, 8 May 1970, page 2: Bird Sanctuary.

The Navy has set aside 24.5 acres of Waiawa Peninsula, adjoining Middle Loch at Pearl Harbor, for a wildlife sanctuary for the Hawaiian stilt and other shore birds threatened with extinction.

The area contains a pond and marshy area. It borders the Navy's sanitary landfill site near Pearl City and was originally intended for similar use.

The Waiawa Peninsula sanctuary is included in a long-range wildlife management plan for Pearl Harbor.

Other Navy areas at West Loch and on the Waipio Peninsula are being studied by the Navy, State Fish and Game Division, and federal Bureau of Sport Fisheries and Wildlife for possible future inclusion in a sanctuary.

ALOHA to new members:

Janet M. Callender, 3027 Pualei Circle, Apt 204, Honolulu, Hawaii 96815.

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.

JULY ACTIVITIES:

12 July - To Lyon's Arboretum to look for the Indian hill mynah. Usually a half-a-day trip. If possible bring your car. Transportation cost (50¢) to be paid to the drivers. Meet at the State Library on Punchbowl Street at 8:00 a.m.
Leader: William P. Mull, telephone 988-6798.

13 July - No Board Meeting.

20 July - General meeting at the Waikiki Aquarium Auditorium at 7:30 p.m.
Program for the evening:

1. Topic: Nene
Speaker: David H. Woodside, one of the members of the Kohala Mountains Scientific Expedition, was unable to return in time for the June meeting.
2. Showing of FLORA PACIFICA (color slides)

HAWAII AUDUBON SOCIETY EXECUTIVE BOARD:

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