

The Status of Steller's Albatross

OLIVER L. AUSTIN, JR.¹

THE SHORT-TAILED ALBATROSS or Steller's Albatross, *Diomedea albatrus*, the largest and handsomest of the three North Pacific albatrosses, was abundant at the turn of the present century, but has become so rare during the past two decades that it may soon be extinct, if it is not already so. Because it seems unlikely that we will ever learn more about it at first hand, this paper attempts to clarify our knowledge of the species by examining and evaluating all the known written record. For a bird that so recently was relatively common, accurate data are remarkably scarce in literature. Much of the most pertinent and illuminating information about it is written in Japanese. As these writings have never before been translated or summarized, the data they contain have heretofore been unavailable to western scientists.

Steller's Albatross was discovered by the famous German naturalist whose name it bears, during his travels with Commander Bering in Kamchatka and the Bering Sea in the 1740's. It was described and named in 1780 by P. S. Pallas, in his *Spicilegia Zoologica*, from a specimen taken off Kamchatka. Since then ornithologists, other than the Japanese, have been able to do little more than describe the physical features of the scanty specimen material available—most of it taken at sea during the non-breeding season—and to delineate its former habitat from the data on the labels of these specimens, and from bones found in prehistoric shell-heaps and kitchen middens in Oregon and California. Dur-

ing the non-breeding season the species apparently ranged widely over the North Pacific, from the China coast northward to Kamchatka and the Bering Sea (northernmost record, Norton Sound, Alaska), and down the Pacific coast of North America to lower California.

We now know, as will be shown in detail later, that the breeding range of Steller's Albatross was limited to isolated oceanic islets south of Japan. It bred, definitely, in the southern Izu, northern Bonins, and southern Ryukyus, and perhaps, though confirmatory specimen evidence is lacking, in the Pescadores and Daito Islands as well. All western accounts to date, however, list the species as breeding only in the Bonins and, erroneously, on Wake Island.

The inclusion of Wake in the breeding range of the species is apparently based on the writings of Titian R. Peale, who visited Wake in 1841 as naturalist on the United States exploring expeditions which cruised Pacific and Antarctic waters from 1838 to 1842 under Lt. Charles L. Wilkes. Peale quarreled with Wilkes shortly after the expedition's return and the latter accordingly refused to allow him to publish his findings. His notes were eventually incorporated by John Cassin in his report on the expedition's specimen material published 15 years later, in 1858. Peale's and Cassin's identification of the birds on Wake has been accepted without question and has been quoted widely ever since. On careful re-examination of the evidence, however, it becomes quite apparent that Peale's notes on the Wake Island albatrosses refer not to *D. albatrus*, but to the Laysan Albatross, *D. immutabilis*, which was not recognized as a distinct species until 1893, half a century later.

¹ Head, Wildlife Branch, Natural Resources Section, General Headquarters, Supreme Commander for the Allied Powers. Published with permission of Lt. Col. H. G. Schenck, Chief, Natural Resources Section. Abstract read at Pacific Science Congress, Auckland, N.Z., February 21, 1949. Manuscript received March 23, 1949.

No specimens are available today to verify the identification of the albatrosses Peale found nesting on Wake. If Peale collected any specimens there Cassin does not mention the fact, and no other naturalist visited the colony before it was wiped out by feather hunters later in the 19th century. Peale mentions finding both light and dark colored albatrosses on Wake, but he believed the dark birds (ostensibly the Black-footed Albatross, *D. nigripes*) to be the immature form of the light colored bird, which Cassin lists as *D. brachyura* (a synonym of *D. albatrus*), and which he states was the only albatross species encountered by the expedition in the North Pacific. Most significant, however, are Peale's measurements of the albatross eggs he found on Wake, which Cassin gives as 4.2 x 2.6 inches. These are smaller than those of typical *D. albatrus* from the Bonins and Torishima, but well within the range of those of *D. immutabilis* from Laysan.

Had Steller's Albatross ever bred on Wake, it is difficult to account for its absence on the Marcus Island rookery, which was visited and reported on by both American and Japanese naturalists before it, too, succumbed to the attentions of the feather hunters in the early 20th century. Marcus Island lies almost midway between Wake and the nearest verified breeding grounds of *D. albatrus* in the Bonins, and is the only spot of land in that 1,700-mile expanse of sea. Both Bryan (1903: 77-116) and Namiye (1905: 219) report *D. immutabilis* and *D. nigripes* as having bred on Marcus, but no record exists of *D. albatrus* ever having occurred there. Hence, it is unlikely that Steller's Albatross ever bred eastward of the Bonin-Izu Island chain.

The first unquestionable record of the nesting of Steller's Albatross is the five eggs in the Pryer Collection, which Seebohm (1890: 105) says "are labelled as having come from the Bonin Islands." These eggs apparently were collected by P. A. Holst, who probably collected at the same time the 12 eggs from the Bonins that are in the British Museum. Holst himself never

wrote a word of his experiences in the Bonins, and no one knows on which of the islands he collected the eggs. Bent (1922: 7) gives the average measurements of 43 eggs in various museums in America and Europe, but he gives egg collection dates only for the Bonins and adds, "I can not find any description of the downy young and doubt if they have ever been collected."

Nothing, other than Peale's brief and misapplied account, has ever been written in western literature of the species' breeding habits. No occidental ornithologist other than Holst has ever, to our knowledge, been on its breeding grounds. At least, if anyone has, he has left no written record of his experiences. La Touche (1895: 327) encountered Steller's Albatrosses in the Pescadores and says that on February 10, 1894, "they absolutely swarmed" about his ship when it was anchored off Fisher Island.² But he found no sign of the bird when he went ashore there, and in writing of the species 40 years later (1935: 429), he lists it as breeding only in the Bonins.

The *Hand-List of Japanese Birds* for 1932 and 1942 add the following breeding localities, but without further elaboration or substantiation: Torishima in the southern Izu, Kitano-shima and Nishinoshima in the Bonins, Kobisho and Agincourt in the southern Ryukyus, and the Pescadores. Referring back to the original Japanese papers for the evidence on which these statements are based, we find some of them to be vague and inadequately documented. These papers contain, nevertheless, information which adds greatly to our knowledge of the species, as the following sections show.

In Japanese, incidentally, albatrosses in general are known as "aho-dori" or "baka-dori," both of which mean "fool-bird." These appellations, which date back to medieval times and have become integral, autochthonous parts of the language, were undoubtedly engendered by the birds' manifest stupidity and tameness, par-

² Byo-o-to, 23° 36' x 119° 30', one of the larger islands in the center of the group.

ticularly on their breeding grounds. Modern usage by contemporary Japanese ornithologists restricts the common name "aho-dori" to Steller's Albatross. The Laysan Albatross is now referred to specifically as the "Ko-aho-dori" (small albatross), while for the Black-footed Albatross, its English name has been borrowed and translated as "Kuro-ashi-aho-dori."

TORISHIMA

The largest and most famous colony of Steller's Albatross ever known flourished on Torishima (literally "Bird Island"),³ the southernmost of the Seven Islands of Izu, an isolated islet about 300 miles due south of Tokyo. Torishima is actually the conical top of a volcano, almost circular, and about $1\frac{1}{2}$ miles in diameter, projecting about 1,150 feet above the sea surface. Its shore line is rimmed with cliffs that make landing difficult except during the calmest weather. It was uninhabited and was visited only by the few fishermen and whalers who happened to pass that way, until the opening of the feather trade in the 1880's made living there economically desirable.

The island has been known to the Japanese since about 1700. The coastal whalers and fishermen who passed by it in those early days apparently bothered the swarms of birds very little. However, old Tokugawa legends say that the whalers occasionally brought albatrosses into Edo City (now Tokyo), where the meat was sold under the name of "Okino-tsuru" (off-shore crane) or "Nadano-tsuru" (rough-sea crane). The first settlement of the island was made by about 50 Japanese who arrived there in November, 1887, to collect feathers. They killed albatrosses steadily each year throughout the breeding season from October to May, and when not so engaged, eked out their living with a little desultory farming and fishing.

The first authentic account of the island was written by a Japanese named Toru Hattori, about whom biographical details are lacking.

³ Lat. 30° 29' N, Long. 140° 19' E; also called Ponafidin or St. Peters Island.

Although not primarily an ornithologist (this is his only known paper), he was obviously an educated man and something of a scientist. Hattori made a 2-year survey trip, apparently for the Japanese Government, through the Izu and Bonin Islands, during which he spent more than 100 days from April to July, 1889, on Torishima. Soon after his return to Tokyo he wrote and published in the *Zoological Magazine* (Hattori, 1889) what still remains the best available description of the island's bird colony. His account is worth quoting in some detail, for it furnishes many hitherto unknown facts about Steller's Albatross:

Though the island lacks drinking water, it has hot springs and good earth, but no trees. Instead, the whole island is covered everywhere by thick reeds, or "Mukasa" in the local Hachijo dialect, which provide good resorts for the albatrosses. There are three or four large concentrations of the birds, which are called "Torihara" or "Torippara" [literally "bird field"]. The largest one, which is on top of the island, covers almost 25 acres and is covered with innumerable birds. The people call it the "Umi gachobara" [sea goose field]. The other concentrations are smaller, covering from 7 to 12 acres each. At a distance the albatrosses on them might be mistaken for fallen snow. When they fly up in the sky, they resemble a swarm of mosquitoes and they float in the air like white breaking waves, truly a sight more than wonderful!

... The two species of albatrosses here, which both belong to the genus *Diomedea*, are known locally as the "Shirabu" [white pattern] and "Kurobu" [black pattern] from the color of their plumage, but they are often confused. The one commonest on our island is the "Shirabu," which . . . is very rich in fat, each bird yielding over a pint. They are especially fatty from September to November, but lose much of it during the period of feeding the young. The feathers smell badly, but not as badly as the meat

We experienced here some most astonishing and intolerable things, particularly the peculiar smell which enveloped us continually, the birds' cries which continued without ceasing throughout the night, and a kind of tick which attacked us freely. We became accustomed to the smell in a few days, but the never-ceasing night cries

broke our sleep and assaulted our ears from all sides, even above the pounding of the sea. The ticks roamed everywhere on the island. . . . When we arose from our beds in the morning, we found them on the floor filled with our blood from their night feeding. They particularly attacked our feet, causing them to swell greatly. They also appeared to attack the bird's feet to suck blood. The birds also have a kind of feather louse and a few other external parasites, one of which is a small beetle which has a very offensive smell and also attacks man.

. . . The albatrosses fly in large flocks 10 or 12 miles from the island, but are more numerous within 5 to 8 miles. They are most plentiful on the sea on fine, calm days. Few are seen during rough weather . . .

When suddenly alarmed, a bird which has come back from the sea vomits an evil smelling substance, which on examination proved to be a kind of shrimp. None of them was complete enough, however, for myself or even the fishermen to determine the species. The next food in abundance was a squid (*Ommastrephes sloani pacificus*), most familiar to us in Honshu. At times half digested miscellaneous fish meat and bones were found, and occasionally quite a large fish is vomited. The fact that all these foods are plentiful in the vicinity probably makes the island particularly attractive to the albatrosses.

They begin to appear on the island in September and by the latter part of October they cover the whole island. From where they come, where they copulate, or which is the male and which the female are hard to tell. The black colored young birds do not come back after they have left the island, but the smaller individuals with the black spotted plumage which appear the following autumn may be one-year-old birds.

In September and October they build concave nests of earth, about two feet in diameter. The site selected is an open place, with low, soft grasses, the reed fields being avoided. Each bird lays only a single egg, about $6\frac{1}{2}$ inches long and $2\frac{3}{4}$ inches thick. The shell is white and thin, very fragile and very smelly. The contents are less albuminous than a hen's egg, and not as good eating. The incubation is done very faithfully, the birds not taking any food during it. At the approach of men, they only clack their bills with anger but never leave the nest. We could not make them quit their nests

even by lighting a fire in the nearby grasses and they remained even though their plumage took fire.

The hatching period begins in January. When born the chicks are covered with pale black down, thinner on the head, and with black feet and bills. The parents now become very busy, carrying food in their crops from the nearby waters. They feed the young, bill to bill, with a yellow, bad smelling liquid. During this vomiting operation the parent appears to be in great agony, but the structure of their bills is well adapted for this method of feeding. Whether this liquid is a nourishing substance produced in the bird's crop, or nothing but rotten fish juice is not clear. The young birds vomit this yellow substance when frightened.

The death rate of the chicks is high, the main causes being starvation after losing their parents, death from parasitic insects, and, worst of all, the attacks of crows, which are very abundant on the island. Two or three crows will attack a chick, picking at its hip until they kill it, and then devour it. Almost one-third of the chicks perish from these causes. Not only the chicks but also well-fledged young birds and even adults often die, being unable to fly out of bushy places where they alight. We found the carcasses and bones of many such birds scattered over the island.

By early June young birds are grown almost to adult size. The head is the last to acquire true feathers. They are fed by the adults until the parents leave the island in the middle or end of June. Then the young birds begin to leave the island, taking advantage of favorable winds, most often during the night when the sea is calm. Early mornings during this period the black young birds cover nearly the whole sea surface near the island. They remain and feed freely near the shore for the first week or so. But after the first windy night with rough seas, you will not find a single bird remaining the next morning. Thus the whole island is entirely cleaned out of albatrosses by mid-July.

The so-called "doyonami" [mid-summer big waves], which visit the Pacific coast of Honshu at this season, are often accompanied by many young black albatrosses, which are frequently mistaken for the other species, the "Kurobu." This latter bird is smaller than the foregoing. It is more gentle by nature and never mixes with the "Shirabu" colony but nests and rears its young near the shore. Its breeding season is later than the "Shirabu". . . .

The feathers are sold as a substitute for cotton, or for ornamental use. Its fat is used for food and manufacturing, and the dried meat makes fertilizer. Forty men and women came here and began to slaughter albatrosses last year. To catch the birds, they approach them in parties of four to prevent the bird from flying up. They can only run with outstretched wings until they come to a slope or get a favorable gust of wind; so they are chased upward from below. Thus the birds in the reeds have to be surrounded, but the incubating birds are very easily approached. They are killed by striking them on the head with a club, and it is not difficult for a man to kill between 100 and 200 birds daily.

When I left the island in July, the decrease of birds was not yet perceptible. Likewise, they were as tame as they were early in the season. After staying on this unique southern island with the albatrosses as my friends, I have felt an intimate feeling of attachment for them, with which feeling I have written this paper.

The Japanese settlement on Torishima, which gained its living almost entirely by killing albatrosses, increased steadily as the feather trade continued to grow through the 1890's, and by 1900 it boasted a population of at least 300. The immensity of their scale of operations is suggested by the hand-railway they built to carry feathers from the top of the island to the shore, where a cableway to the roadstead in Chitose Bay facilitated loading the spoils. Yamashina (1942: 244) estimates that they had slaughtered at least 5,000,000 albatrosses by August, 1903, when the island's volcano erupted and stopped the feather gathering temporarily by killing all the Japanese inhabitants. As the eruption occurred during the non-breeding season (of the albatrosses) its only effect on the birds was to destroy part of the former nesting territory.

Very little information is available about conditions on Torishima between 1903 and 1930. The Japanese resettled the island a few years after the eruption, and began their feather harvesting again, but nothing further was written about the island and its birds until Viscount Yamashina landed there on February 15, 1930. He was able to spend only a few hours on the

island, but after returning to Tokyo he wrote (1931: 5-10):

Torishima is no longer as it used to be, although it is probably still the most important breeding place of this bird. . . .

When we climbed to the top of the crater wall we saw a *Haliaetus pelagicus* fly away. The flat bottom of the huge crater, 350 yards wide and 900 yards long, was filled with damp spots or pools caused by the rain. Here we found about 20 Steller's Albatrosses, which, according to the villagers accompanying us, are unable to fly out from the bottom of the crater and remain there to become the victims, one by one, of the eagle we saw.

The top of the crater wall was pebbly. At the east end of it we found a colony of about 400 *Diomedea albatrus*. No unhatched eggs remained but we found about 30 chicks, grown to the size of a cat. . . . Walking further along the edge of the crater we found a sandy plain extending from the east end, one corner of which was occupied by about 1,000 Steller's Albatrosses. This constitutes the main breeding colony on the island. Even taking into consideration the eggs stolen by the natives, we get some idea of the low rate of reproduction of this species from the fact there were less than 100 chicks among the birds.

The south side of the crater wall was covered with reeds, but in bare spots here and there we found smaller colonies from 20 to 100 birds each. In one of these I saw with my own eyes the terrific slaughter which I could hardly bear to witness. Only the word "slaughter" can express the sight. This called to my mind the paragraph in Hornaday's "The Tragedy of the Laysan Albatross" (p. 242). "Schlemmer, the slaughterer, bought a cheap vessel, hired 23 phlegmatic and cold-blooded Japanese laborers and organized a raid on Laysan." I hope to prevent any further such unpleasant occurrences in Japan.

Yamashina was as good as his word, and, largely as a result of his efforts, Torishima was declared a "Kinryoku" (no hunting area) in 1933 for a period of 10 years. We will never know whether this designation would have saved the colony, for the inhabitants of the island, in anticipation of the impending legislation, wiped out the birds before official word of

it could reach them. Unable to return in person, Yamashina had sent his assistant, Mr. Nobuo Yamada, there in 1932 and 1933 to observe conditions for him. Yamashina writes of those last days as follows (1942: 244):

On this remote island the policy of protecting the albatross was not strong enough to prevent the collecting of their feathers, which continued undiminished. When I visited the island in February 1929 there were only about 2,000 albatrosses there. When Yamada went there in April 1932, he observed only a few hundred. On his visit in April 1933, he counted less than 100. This may have been partly the result of pasturing cattle on the breeding grounds after 1932, but the fatal cause was the last great massacre perpetrated by the inhabitants in December 1932. None of the inhabitants ever refer to this slaughter but attribute the disappearance of birds to a storm in November 1932. But Mr. Fujisawa, the elementary school-teacher on the island, told Yamada in April 1933 that in December 1932 and January 1933 over 3,000 albatrosses were killed. This last great slaughter was undoubtedly perpetrated by the inhabitants in anticipation of the island's soon becoming a bird sanctuary.

To determine the status of the species at sea, Yamashina asked the Japanese Marine Laboratories and the boats of the Yaizu Fishing Company to collect albatrosses for him on the open ocean between 1933 and 1936. He noted (1942: 248) that the only Steller's Albatross they found was an immature bird taken near Morell, Hawaii, on February 28, 1936. On recent examination of this specimen, however, it proves to be a mature *Diomedea nigripes*.

Torishima also had small colonies of Black-footed and Laysan Albatrosses. According to Yamashina the Black-footed Albatross was always far less numerous on the island than Steller's. He states (1942: 246), "It owes its survival until recent years to the relative unattractiveness of its plumage, and to its nesting sites, which were on the grassy spots on the inaccessible cliffs on the island. Yamada found a colony of about 200 in April 1932, but could find only a few birds in April 1933." Concerning

the Laysan Albatross, the same authority (loc. cit.) says, "This species seems to have become a resident of Torishima comparatively recently. The inhabitants told me in 1930 that it first appeared on the island about a dozen years previously. In 1930, the population reached 50, but had decreased to only a couple of birds in 1933."

During Yamada's visit to Torishima in 1932 he banded 22 Steller's Albatrosses on April 9. Eleven of these birds were reported to the Tokyo Government from the same place in November, 1932, and five more on June 30, 1933. Although no details are available, it is assumed these returns were from birds killed by the inhabitants. This is the last unquestionable evidence we have of Steller's Albatross existing in the flesh.

Whether any Steller's Albatrosses ever returned to Torishima after 1933 is not known. If they did, and were not slaughtered by the settlers, who then had to turn from feathers to fish for their livelihood, the island was soon to be made even more untenable for them by another catastrophe. The volcano erupted again in 1939, even more violently than in 1903. The inhabitants were able to escape, but extensive flows buried the birds' former breeding grounds under 30 to 100 feet of fresh lava making them uninhabitable for any albatross which might have survived the massacre.

The main crater overflowed again in 1941. One river of lava flowed down over the cliff into Chitose Bay, the little cove on the northwest corner, which was formerly the island's only anchorage and which gave protection in the old days to the ships as they loaded feathers. This flow filled the little cove completely and the partly sheltered landing place it once afforded is now a forbidding, jagged rampart of black, volcanic rock. Thus Torishima is now more difficult of access than ever before. Except in the calmest weather, the perpetual ocean swells break entirely around its unbroken shore line, regardless of the wind direction.

During World War II, the Japanese maintained on the island an observation and aircraft

warning outpost which was removed immediately after the surrender. The small garrison left behind a legacy of several pairs of house cats, which, at last report, were still managing to survive but were "very wild."

In 1946, at the request of Occupation authorities, the Japanese Government established on Torishima a meteorological observatory, manned by 14 men. It is a lonely and unpopular post, to which supplies and relief personnel are brought by vessel only once every 6 months. Frequently the supply ship has to heave-to off shore and wait for days for the weather to abate sufficiently to allow a landing to be made. Technicians of this weather station report they have observed no albatrosses on the island since their arrival in 1946. However, they state that the slopes now teem with Fork-tailed Petrels (*Oceanodroma markhami owstoni*), millions of which breed in holes under the lava. As is normal with petrels, these birds come to the island only after dark. The weather station personnel, noting the birds' tendency to fly to a bright light at night, tell how delicious meals of roast bird can be obtained simply by building a big bonfire after dark and letting the petrels fly into it of their own accord.

I have tried to visit Torishima to look for Steller's Albatross and to judge conditions there for myself ever since my arrival in Japan 3 years ago. However, available transportation never coincided with freedom from other duties during the breeding season until the spring of 1949, when I was able to accompany a whaling catcher on a short trip to the Bonin Island whaling grounds. On our voyage out we passed Torishima after dark. On our return on April 9, however, we reached the south side of the island in mid-morning. But the weather was so rough that the high seas breaking all around the island's 7½-mile perimeter made landing out of the question. Our schedule did not allow us to wait for the wind to abate, so I had to be content with making what observations were possible as we sailed around the island just outside the line of breakers several hundred

yards off shore. These observations were sufficient, however, to verify the verbal reports of the weather station personnel that no albatrosses are present on the island.

The only part of Torishima not affected by the recent volcanic activity is the steep northwest slopes where the low buildings occupied by the weather station staff are huddled. Elsewhere, except on the forbidding vertical cliffs, the entire surface of the island is now covered with stark, lifeless, black-gray lava. Where the flow thins out on the northwest slopes, a few dead, white sticks are mute remnants of the brush growth that formerly covered the island. Also on these slopes some sparse grassy vegetation is visible, but there is no sign of those thick reeds, or "makusa," which formerly sheltered the albatross colonies. The main crater is still smoking and fumes issue from cracks and fissures all over the summit of the island.

We saw no albatrosses whatever on or near the island, and very few other birds. On the sheer southern cliffs a few spots of white guano betrayed the scattered roosts of lonesome cormorants. A few solitary gulls scavenged over the surf along the shore. Otherwise, for all we could see, the island was birdless. It will probably be many years before Black-footed and Laysan Albatrosses are able to establish themselves there again, and its once fabulous colony of Steller's Albatrosses may be considered to have vanished forever.

BONIN ISLANDS

Next to Torishima, the best-known colonies of Steller's Albatross were those in the Bonin Islands. Here, it will be remembered, most if not all the eggs in western collections were taken. Apparently these colonies were never as large as the Torishima rookery, or if they were, they had dwindled markedly from the attentions of the feather hunters before any accounts of them were written. The first mention in Japanese literature of Steller's Albatross in the Bonins is S. Yoshiwara's statement (1901: 310) that "Albatrosses are reported as comparatively rare

in the Bonins, but I heard that some come regularly to the Muko-jima Islands. However, it is impossible to hunt them there for feather gathering."

The species may have bred on other of the Bonin Islands, but there is definite evidence for its having nested on only two of them. The first of these is Kita-no-shima, the northernmost islet of the Parry Group,⁴ where five eggs in the Yamashina collection were taken in February, 1928. Toku-Taru Momiyama, who spent most of 1924 and 1925 collecting birds in the Bonins, has four eggs from Kita-no-shima given him by local fishermen, three of them taken in early November, 1922, and the other on November 23, 1924. Momiyama was never able to land on this islet during his stay in the Bonins, being prevented from doing so by rough seas every time he tried. He informs me, however, that when he sailed close to it in 1924, he saw only about 30 adult birds on its slopes. Kita-no-shima was designated by the Japanese Government as a "no hunting area" in April, 1926, but the protection, as in all other cases, was never effective, for itinerant fishermen in the neighborhood apparently continued to raid it at will.

The Bonin fishermen also gave Momiyama an egg taken December 1, 1924, and an adult bird taken October 20, 1924, on Nishi-no-shima.⁵ Momiyama landed on this isolated islet in April, 1925, but he tells me there were no eggs or young in evidence, and the fishermen with him clubbed the five or six albatrosses they found there the moment they got ashore, before he could stop them, and before he could make any observations.

Kobayashi and Ishizawa (1942: 33) state that the bird bred also on Yome-shima and Muko-shima Islands.⁶ No specimen evidence exists to back this claim, and Momiyama recalls

seeing no birds on either island during his stay there. However, H. Okabe (1930: 272) gives the following information by one of the residents of Muko-shima, a certain Mr. Iwasaki:

Two kinds of albatrosses, black ones and white ones, occur on the island. The white one comes in late October, the black one in mid-November. The white one weighs about 7.5 kilograms, the black ones about 5.6 kilograms. The date of egg laying is uncertain, but the egg of the white one weighs 375 grams, that of the black one from 260–300 grams. The white bird builds its nest up in a cone about 15 centimeters high, but the black one only gathers a few dried grasses together to lay its eggs on. The hatching time varies, but I think incubation takes about 7 weeks. The adult birds leave the island in May, and the young leave in June.

I spent several days in late March and early April, 1949, on a whaling catcher boat operating in the vicinity of the northern Bonins. During this time I was able to inspect closely every one of the islands in the group, though the seas were so rough and the winds so high during the entire period that I was able to land only on Muko-shima. We cruised for two days in the Parry Group, sailing around all its islets as closely as possible. With the exception of Muko-shima, all these islands are so small that their entire area is visible from the sea. These islands are now uninhabited, but during World War II, Muko-shima was occupied by a small garrison of about two or three hundred Japanese troops. When the troops were evacuated after the surrender, their barracks were razed, but evidences of occupation still remain in the form of the cement foundations of the barracks, old anti-aircraft gun-pits and machine-gun nests enfiling the possible landing places. The most deplorable evidence of the recent Japanese occupation is the scarcity of bird life on the island. Two endemic Bonin Island land birds, *Zosterops palpebrosa alani* and *Apalopteron familiare familiare*, were formerly abundant on Muko-shima. I hunted for them assiduously during my 4 hours on the island, but could find no trace of either species. They were undoubt-

⁴ Muko-jima Retto of the Japanese; Kita-no-shima is located at 27° 43' N, 142° 06' E.

⁵ This islet was formerly known as Rosario Island and lies in 27° 15' N, 140° 53' E, about 80 miles southwest of the Parry Group.

⁶ These are larger islands of the Parry Group. Muko-shima is 3 miles, and Yome-shima 15 miles, south of Kita-no-shima.

edly wiped out by the Japanese garrison who probably caught them in mist-nets for food. The only birds on the island were a few scattered pairs of Red-bellied Rock-Thrushes, a wide-ranging species which has undoubtedly returned there since the departure of the Japanese. No albatrosses of any species breed today in the Parry Group.

We spent one day sailing around Nishi-shima, but again were unable to land because of the rough seas. This low island is only about 700 feet long and the seas were so rough and the winds so high that spray was blowing completely over it. I saw large flocks of Salvin's Shearwaters, a few Bulwer's Petrels, Black-footed and Laysan Albatrosses, and a single Spectacled Tern feeding in the tide rips just north of the island. It was obvious, however, that no albatrosses now breed on Nishi-shima.

PESCADORES AND SOUTHERN RYUKYUS

We know from the observations of La Touche (1895), Seeböhm, and other early writers that Steller's Albatross was a common winter bird in the waters from China to Formosa and the Ryukyus. But the statements in the *Hand-List of Japanese Birds* (1932 and 1942) that the species breeds in the Pescadores Islands, on Agincourt Island off the northern coast of Formosa, and on Kobisho Island in the southern Ryukyus are backed by indisputable specimen evidence only for the latter locality.

The earliest reference to Steller's Albatross on Kobisho⁷ is Kuroda's (1925: 148) remark that "Dr. Tsuneto told me that the bird was very abundant on Kobisho in Senkaku Retto and also on Rasa Island." Kuroda notes that no specimens have been taken at either locality, and makes no mention of the species' breeding. Kobayashi (1930: 371) states, however, "One egg, 118.0 x 77.5 millimeters, of *Diomedea albatrus* from Kobashima [Kobisho], Senkaku Retto, was given me by Mr. Takuya Iwasaki."

⁷ Lat. 25° 56' N, Long. 123° 42' E, the northernmost island in the Senkaku Archipelago, a little group of islets about 250 miles southwest of Okinawa and 100 miles northwest of Formosa.

The former occurrence of a breeding colony on Agincourt Island,⁸ while probable, lacks specimen substantiation. Dr. Kuroda tells me a picture of the rookery on this island, showing clearly identifiable adults and young birds, was published in a brochure on Formosa issued by the Japanese Government of Taiwan about 1895. His copy was lost when his library was destroyed in 1945, and a search through other Tokyo libraries has failed to unearth a duplicate. The only other mention of the species on Agincourt is in the memoirs of Kaju Enomoto, a civil servant formerly employed by the Ministry of Agriculture and Commerce. Enomoto writes (1936: 29) that on April 28, 1901

I saw Agincourt Island far on the horizon, but our ship did not approach within 4 miles of it, so I could not identify any of the birds on the island. The Captain, who was an experienced man in those waters, told me "Numerous albatrosses live on this island, but you can't find many of them now because it is not the breeding season."

The same Enomoto is apparently the only authority for the statement that Steller's Albatross bred in the Pescadores. In the continuation of his memoirs (1937: 8) he relates

I once stayed in the Pescadores for about one year when birds were still plentiful. During my stay I had the chance to observe albatrosses. While my observations may not be satisfactory, I regard them as valuable because wild birds have decreased so tremendously in recent Japan, and you can observe albatrosses now in Japan only on far-away Torishima.

It was the last of February in 1902 when I saw the most albatrosses. The weather being calm, I had an opportunity to make a trip on the patrol ship of the local Pescadores government. During the voyage I saw albatrosses crowding on Byo-sho.⁹ The hatching season was almost over, and it was the season when the parent birds do not stay on land in the daytime. Nevertheless numerous birds were seen, and I was delighted with the opportunity. But as the

⁸ Hoka-sho of the Japanese, 25° 38' N, 122° 04' E, about 45 miles due north of Formosa.

⁹ A small islet in the extreme southwest of the Pescadores group, 23° 19' N, 119° 8' E. [Author's note.]

government officers had no business on this uninhabited island, the ship did not stay long, and I could not land on the island to collect eggs and chicks. It was hard enough to get specimens of adults.

It is also likely that the species may once have nested on other isolated islands south of Japan, from which it was extirpated before authentic record could be made of its presence. Certainly it should have bred on one or more of the Daito Islands¹⁰ where Kuroda (loc. cit.) was told it was "very abundant on Rasa Island."

THE FEATHER TRADE

The decline and probable extermination of Steller's Albatross were caused entirely by human persecution on its breeding grounds, which started about 1885 when the value of its feathers was first realized. The white body feathers of Steller's Albatross were particularly valued by the plume hunters, because they brought the top prices when marketed as "swansdown" for quilts and pillow stuffing. The wing and tail feathers were sold as "eagle feathers" for quill pens, and for millinery and other ornamental purposes. Each albatross yielded about $\frac{1}{4}$ pound of feathers, worth in those days about 5 sen per pound. This seems little enough, but harvesting them was a profitable business because the birds were so plentiful and labor so cheap.

The revolting details of the nefarious feather trade never have been and probably never will be written in full. It was conducted mostly by illiterate hunters and fishermen and was supervised in its hey-day by close-mouthed business interests concerned only with immediate profits. The first feather hunting was done by casual fishermen, but as the trade proved more and more remunerative, it was taken over by big business. Most of the Japanese feather hunting was supervised by the South Seas Trading Company, which is now defunct. Its records of the feather trade, if they ever existed, and the men connected with it are no longer traceable.

The trade was abolished by law in America 50 years ago, but not before our egrets and terns were almost wiped out. Protection reached the Hawaiian archipelago just in time to save the famous Laysan colonies, to which the plume hunters were then turning their attention. Yamashina states (1942: 244) that the Japanese Government prohibited the killing of albatrosses in 1907, but the statutes show them to have been legal game birds until the amendments of 1947, and the *Annual Hunting Statistics* published by the Ministry of Agriculture list from 500 to 4,000 "albatrosses" killed each year from 1930 to 1942, the last year for which figures are available. These data, however, are neither accurate nor specific, and undoubtedly refer to the other two species of North Pacific albatrosses. The only protection ever afforded Steller's Albatross by the Japanese was their designation of Torishima and Kita-no-shima as "no hunting areas," and apparently they made no effort to enforce the law on these outlying islands. In both cases the designation was for a 10-year period only, which was not renewed at its expiration.

Japan has never had a law prohibiting traffic in or possession of protected birds or parts thereof, and the import-export trade in feathers flourished in Yokohama as long as birds were available to supply the demand. The accompanying graph shows, from the only figures available, the total exports of feathers from Japan. All sorts of wild birds contributed to this total, which is impossible to break down by species, but feathers from the Pacific sea bird colonies constituted the major portion, and Steller's Albatross, as long as it survived, was one of the most sought sources of supply. Although we hear little about it nowadays, the trade has not died out entirely. A demand for feathers of all sorts still exists, Paris being the main market, but the export center is reported to have shifted some years ago from Japan to Shanghai, China.

VALEDICTUM

We are loath to regard any species as extinct

¹⁰ Lat. 24° 28' N, Long. 131° 11' E, midway between the Bonins and the Ryukyus.

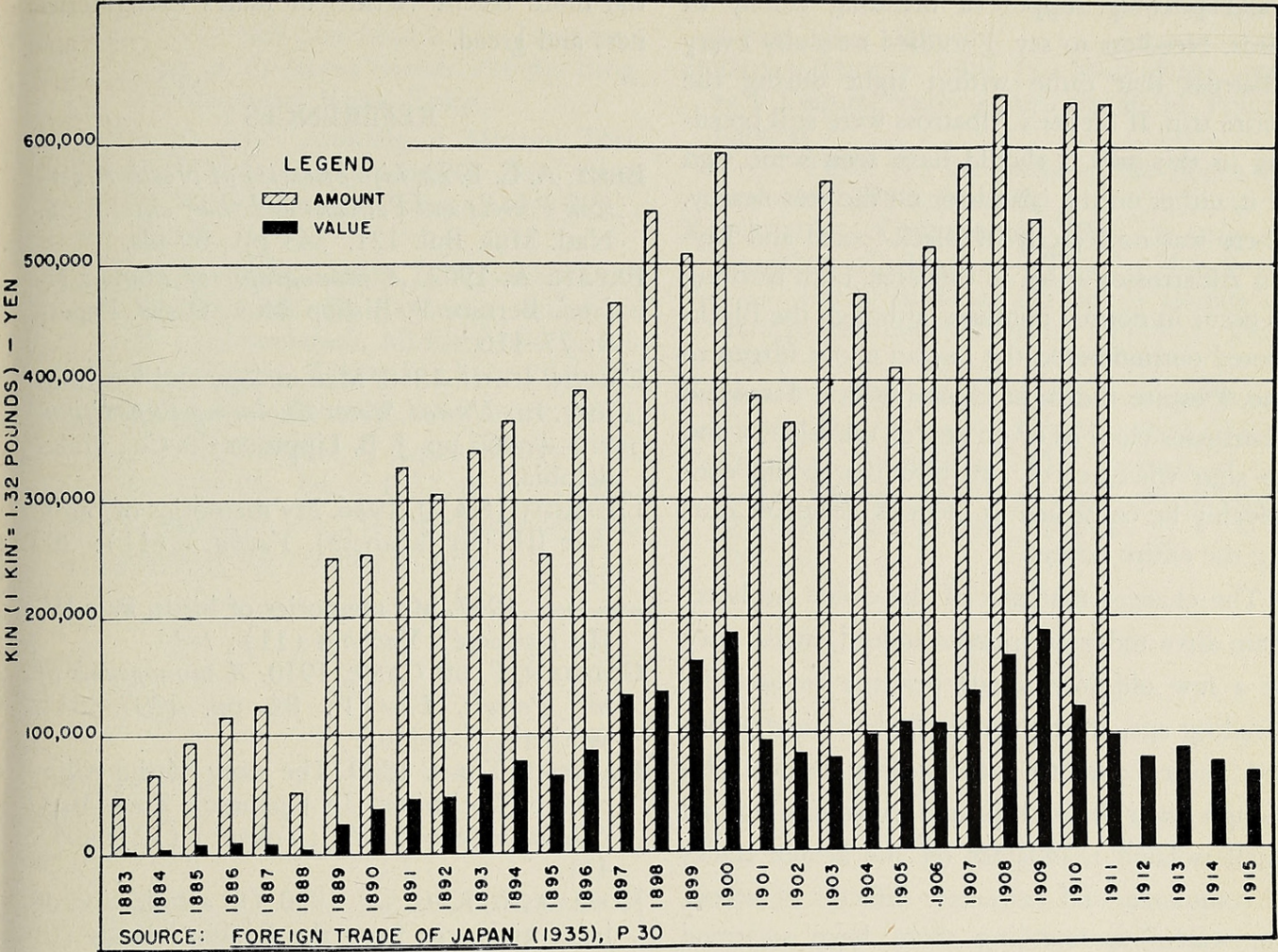


FIG. 1. Export of feathers from Japan.

until every possibility of its survival has been investigated and exhausted. Even then the negative evidence is unsatisfactory, and the hope always remains that in some overlooked corner of the globe the species will once more be found, even as *Notornis* was so recently re-discovered in the mountain fastnesses of South Island, New Zealand.

It is to be noted that Steller's Albatross has been reported several times since 1933, most recently in 1944 and 1945, as having been seen at sea in Alaskan and Aleutian waters on the species' summering grounds. As the species is reputedly a shy bird which seldom follows or comes close to ships, it is difficult to observe except on or near its breeding grounds, and it must be remembered that the species may be confused easily at a distance with the other two North Pacific albatrosses. Adults resemble the

Laysan Albatross, but lack its black back; immatures resemble the Black-footed Albatross, but have a flesh-colored instead of a black bill. Hence, sight records made at sea, even by the most careful and reliable observers, must be regarded as doubtful unless amply substantiated.

As mentioned previously, in March and April, 1949, I cruised for 10 days in the southern Izus and the northern Bonin Islands, the best known former breeding grounds of Steller's Albatross. In its normal life cycle we know that this species did not leave the breeding grounds until late May and June, so at the time of my visit any surviving individuals should have been in the vicinity attending their fairly well grown young. I was able to sail within close inspecting distance of every island in this chain on which Steller's Albatross is known to have bred. I also visited every other island in the area which

could possibly support a breeding colony of birds. Needless to say, I studied carefully every albatross that came within sight during the entire trip. If Steller's Albatross were still breeding in this area, I should have seen some sign of it, either on the islands or on the seas nearby. There was no scarcity of Black-footed and Laysan Albatrosses at sea in this area, both seeming to occur in normal numbers, although the Black-footed outnumbered the Laysan about fifteen to one. Despite the most careful watch, I saw no albatrosses close to or on any of the islands, and no sign whatever of any bird that could conceivably be construed as Steller's Albatross during the entire voyage.

The chances that any of these fine birds remain alive today are remote indeed, unless they be a few old individuals perhaps beyond the breeding age, which spend all their time at sea and never come to the breeding islands. Although their known former rookeries are all small isolated islands far off the beaten tracks of commerce, and extremely difficult of access, the waters surrounding them have swarmed with Japanese, Chinese, and Okinawan fishermen for the last 50 years, except for a brief period late in and immediately after World War II. No person interested in birds or able to differentiate between the three North Pacific albatrosses has visited any of the known breeding grounds of Steller's Albatross in the southern Ryukyus and off Formosa. But it is hard to believe that any islet exists in this area which has not been visited many times by Oriental fishing boats in the 16 years since the last known Steller's Albatross was killed. It is equally unlikely that any of these craft would pass by an out-of-the-way island with a bird on it without its crew attempting to land and kill the bird. Policing these islands to prevent such depredations is well nigh impossible, both politically and economically. Although there is always the possibility that a few pairs may remain on some isolated, as yet unvisited islet, it seems only too likely that Steller's Albatross has become one of

the more recent victims of man's thoughtlessness and greed.

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