THE AUK

A QUARTERLY JOURNAL OF

ORNITHOLOGY

VOL. 64 OCTOBER, 1947 NO. 4

NOTES ON BEHAVIOR AND ABUNDANCE OF THE BLACK-FOOTED ALBATROSSES IN THE PACIFIC WATERS OFF THE CONTINENTAL NORTH AMERICAN SHORES

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Plate 17

INTRODUCTION

SEVERAL ornithologists, among them Miller (Condor, 38: 9–16, 1936; *op. cit.*, 42: 229–238, 1940; *op. cit.*, 44: 3–9, 1942), Anthony (Condor 26: 33, 1924), and Willett (Condor, 39: 226, 1937), have reported upon the Black-footed Albatross (*Diomedea nigripes*). Though many 'sea stories' mention the albatross, and though thousands of service men have seen this interesting bird follow transports and fighting ships during the recent war, few ornithologists seem to have had opportunity to study them at any length in the open sea. I had just such an opportunity when assigned for duty aboard a ship February 22, 1945. The nature of the duty was such that our ship remained in a given area for about twenty-five days before being relieved. Five trips in all were made while I was aboard, which included parts of seven months (Feb. 23, 1945, to Sept. 15, 1945).

Area studied.—Four different areas were visited; the centers of the areas and the dates of tour are as follows:

Area	*Location*	*Dates*
1	34° 40′ N.; 129° 50′ W. (400 nautical miles from San Francisco, Calif.)	April 10 to May 1 May 24 to June 15
2	34° N.; 131° 31′ W. (500 nautical miles from San Francisco, Calif.)	Feb. 24 to March 19

Area	*Location*	*Dates*
3	31° 40′ N.; 136° W. (800 nautical miles from San Francisco, Calif.)	July 22 to July 27
4	43° N.; 135° W. (465 nautical miles west of Cape Blenco, Oregon)	July 8 to July 19 Aug. 23 to Sept. 12

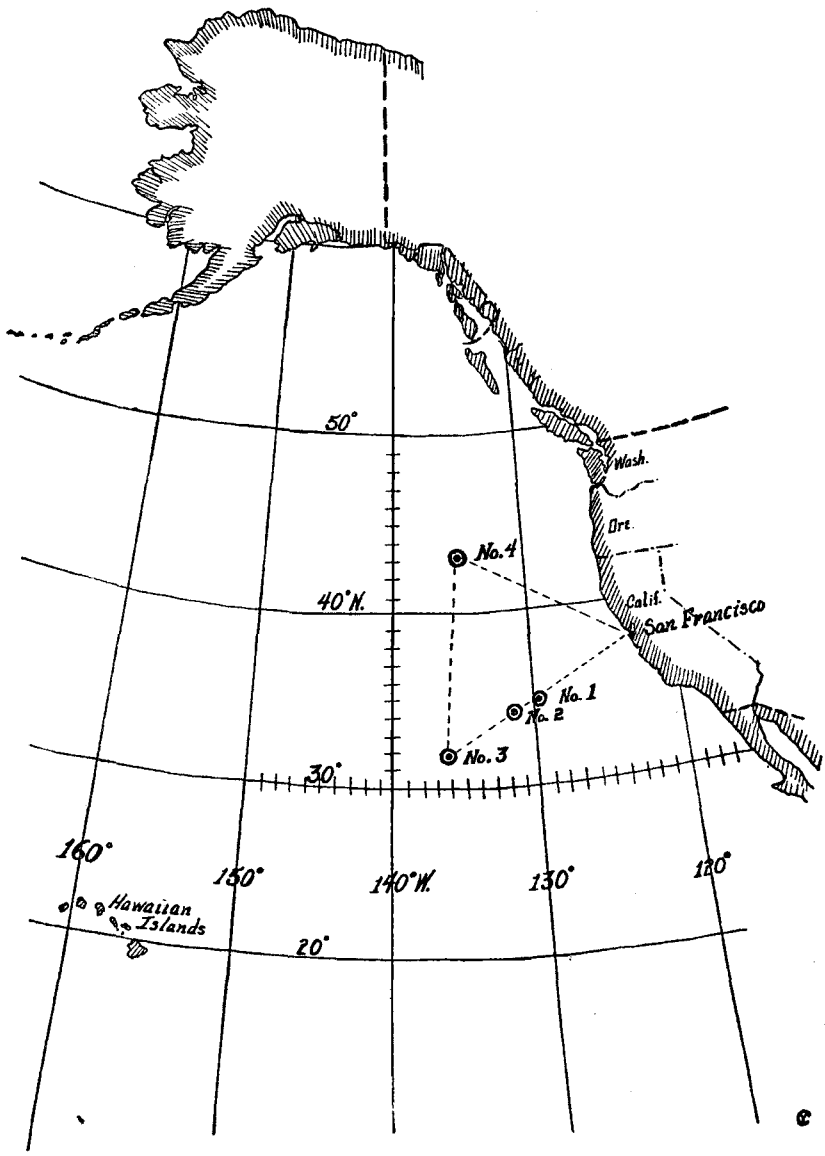
The map (*see* Text-fig. 1) shows the areas covered, which embrace a large, triangular region with its apex at San Francisco, California. The center of area No. 4 was approximately 465 nautical miles directly west from Point Blenco, Oregon, and 490 nautical miles southwest of Straits of San Juan de Fuca, Washington. No. 3 was 800 nautical miles southwest of San Francisco, and due west of northern Lower California.

In general, we went directly to an area from our base in San Francisco Bay and returned by the same route about a month later. On one occasion we proceeded to No. 4 where we remained for a time and then steamed to No. 3. This afforded the chance for me to observe the waters along the western edge of the triangle.

The region covered embraces approximately eleven degrees and twenty minutes of latitude (680 nautical miles), and thirteen degrees, twenty-five minutes of longitude of open ocean. The only observations made along the continental shelf were those in going to and returning from the areas.

CHARACTERISTICS

The Black-footed Albatross (*Diomedea nigripes*), or 'Gooney' as it is usually known by the sailors, is one of three Pacific species found in numbers north of the equator. The other two are the Short-tailed Albatross (*Diomedea albatrus*) and the Laysan Albatross (*Diomedea immutabilis*). The former species is now probably extinct; the last positively identified specimen from California was taken at San Pedro, Los Angeles County, April 3, 1898 (Willett, Pac. Coast Avif., 21: 14, 1933). *Immutabilis* is listed as a rare or casual visitant to California waters (Grinnell and Miller, Pac. Coast Avif., 27: 1–608, 1944). There is only one definite record for California, but there are records for it far off the coastal waters: one sighted approximately 1060 miles west of Cape Mendocino, October 31, 1880 (Bean, Proc. U. S. Nat. Mus., 5: 170, 1882) and two seen about 700 miles southwest of San Francisco, April 8, 1913 (Willett, Condor, 15: 158, 1913). Loomis [Proc. Calif. Acad. Sci., (Ser. 4) 2: 83, 1918] tells of another one shot at 33° 07′ N., 134° W., November 14, 1906, and others seen within about 500 miles of San Francisco. Species other than these three have been reported



TEXT-FIGURE 1.—Region in which observations were made on the Black-footed Albatrosses from February 23 to September 15, 1945. ⊙ = Areas where long periods of observations were made. - - - - - - = Waters passed through.

in this hemisphere but their occurrence is uncertain (Grinnell and Miller, *loc. cit.*).

I saw two Laysan Albatrosses flying over the rough seas on March 17, 1945, approximately 500 nautical miles southwest of San Francisco. Throughout the week previous to seeing these two individuals, on several occasions I had seen a single *immutabilis* gliding over the ocean with the Black-footed Albatrosses. Although they generally remained at a considerable distance from the ship, they occasionally crossed our bow within 200 feet. My 7 x 50 Bausch & Lomb Navy binoculars made close observation possible. Their black wings (silvery on under side), back, and tail, white head and body (other than the back), and pink bill and feet marked them as of this species without a doubt.

Members of the crew told me that they had seen white 'Gooneys' in this area and in another area about half-way between Hawaii and San Francisco several times during the two previous years. According to their accounts, one of them which they had nicknamed 'Alice' would come near the ship and eat scraps thrown over to it.

As indicated above, the individuals of *immutabilis* that I observed were more wary than *nigripes;* they tended to remain farther out from the ship and were not attracted by galley scraps. The weather on this trip was very stormy most of the time; therefore we remained under way a great deal, so that I did not get an opportunity to observe these birds under calm conditions when the ship would 'lie-to.' When the Laysan Albatross did alight on the sea, it was several hundred feet away and usually by itself. The two noted on March 17 apparently showed no tendency to remain near each other; one would often be out several thousand yards from the ship on one side and the other as far out from the ship on the other side. Both birds, however, remained within sight of the ship throughout the afternoon; they were not observed again after the 17th.

Color.—There is considerable variation in the coloration of the Black-footed Albatrosses. Birds I have seen varied from very light tan to almost black. The light tan individual was seen with seven normally colored examples, July 29, 1945, at 35° N., 128° W. The amount of white on the head (forehead, chin and eye region), tail-coverts, belly, and area near the base of the primaries also varies greatly. Some birds have extensive white areas on the rump that extend to the middle of the breast. Some have no white in these areas, and others show only a few white feathers among the dark ones. Most, if not all, of the albatrosses have white areas at the base of their bills. In some this white area extends to the middle of the crown, around the eye and through the throat region to the neck; in others no white is apparent

except for a small margin around the base of the bill. This white margin often is not visible except at close range. All *nigripes* have dark feet and bills; there is a tendency however, for the bills to vary slightly in shade.

Data from five trips show that the ratio of the white-rumped to dark-rumped birds varied between 1:8 and 1:10, and that the ratio changed little between seasons or areas. Making accurate counts for determining ratios was more difficult than one would assume, for white-rumped birds resting on the sea could not be distinguished from dark ones except when they were very close to the ship. When in flight, however, white-rumped birds could easily be determined when in the proper position. Another difficulty in getting accurate counts was that only during stormy weather would most of the albatrosses be in flight and then many of them would be ranging far out from the ship. Those that were close would be continually shifting from port to starboard and vice versa. An albatross approaching head-on, moreover, could not be placed definitely as to rump color. Miller (Condor, 42: 229–238, 1940) estimated that approximately ten per cent of the albatrosses that he observed were white-rumped.

I am of the opinion that the white areas become more extensive as the molting season approaches owing to wearing of feathers and bleaching of pigment. The plumage of molting birds becomes mottled as the new darker feathers replace those worn and bleached.

I was unable to distingush between male and female birds either by color or actions. I am in accord with Miller's (Condor 42: 229–238, 1940) statement:

"I am inclined to believe that this species, like so many other 'tube-noses,' has a wide range of color that is independent of sex, season, or age."

Size.—The seemingly never-ending seas, the unbroken horizon, and the ocean swells distort one's perspective of size. A sailor standing on the fantail of his ship watching the 'Gooneys' swing over the wake, never would guess that the bird in which he is so interested has a wing-spread of seven feet and a body length of nearly two and one-half feet. Only when your ship is 'lying-to' or when a petrel, shearwater or phalarope flies near this bird does one realize its large size.

On our last trip to Station 4 (August 23 to September 12) I had been furnished bands by the Fish and Wildlife Service; the measurements of the three albatrosses that were banded and a fourth one (now in the Museum of the State College of Washington) which was accidentally killed are as follows:

Tip of bill to tip of tail	*Wing-spread*	*Culmen*	*Band-number*
28 in.	80 in.	3.75 in.	44-711602
28.5 in.	76 in.	3.75 in.	44-711603
25 in.	85 in.	4.0 in.	44-711604
27 in.	84 in.	3.75 in.	none

No scales were available, but the weights of those birds handled were estimated to be six pounds. The specimen skinned had considerable fat over most of the body, particularly on the belly, breast and rump.

Flight.—No other bird (possibly the shearwaters excepted) has ever impressed me as being so completely in its element as the albatross when the sea is whipped to a frenzy by storm. Its long, slender wings carry it in perfect balance and grace, first down in the troughs of the waves then up rapidly to as high as 100 feet, on occasions, as it swings directly into the gale, then banks to make a long downward glide, first at right angles to the wind then with it. Often it is completely lost from sight as it glides within inches of the waves and disappears behind another swell only to reappear again, gliding in towards the ship. In the ocean gales or on the turbulant waves it is equally at home.

The larger albatrosses are credited with sailing for long periods of time without flapping their wings; this does not hold true, however, with *nigripes*, even in strong winds. My data on recorded time between wing strokes varies from ten to forty-five seconds, the latter during a fourteen-knot wind. This is no discredit to their mastery of flight, however, for I have seen them apparently enjoying fully a fifty-five knot gale (which was not the case with the ship's crew).

No accurate method was available to determine the exact speed of flight of this species. The ship was equipped with radar and the reflected radar waves from flocks of resting albatrosses were often picked up on the screen, but we were never able to trace them in flight. This has been done, however, by certain types of radar (Buss, Auk, 63: 315–318, 1946; Lack, Nature, 156: 446, 1945; McKay, Nature, 156: 629, 1945). My observations lead me to believe that Black-footed Albatrosses glide over the sea between twenty-four and thirty-two knots (27.6+ to 36.8+ land miles per hour). Our ship under *standard speed* made eleven knots (12.7 m.p.h.); I have seen albatrosses glide past when we were at *standard speed*, then circle out to our beam and on out over the sea for a quarter of a mile or more, then quickly overtake us again. The wind velocity, of course, influences the speed of the birds.

The 'Gooneys'' manner of taking flight varied with weather conditions. During storms they simply rode to the crest of a wave, spread

their wings and took off. On calm days, they expended considerable effort in launching; they spread their long, narrow wings, paddled vigorously with their large webbed feet, and made long awkward strokes with their wings until they actually ran over the water, much like a sea plane 'taking off.' At times they ran one hundred feet before clearing the water, but twenty-five to fifty-foot runs were more common. Calm weather by no means restricts these birds to the water, even though they are most active on stormy days.

As soon as the albatross is air-borne, the feet are carried flat against the body with the webbed toes reaching a little beyond the tail. The feet appear to be used as rudders or as an aid for balance when the bird turns. In landing, the feet, with toes spread, are extended forward towards the water (See Plate 17, upper fig.) and act both as skids and as brakes when contact is made with the surface. On days with brisk winds, I saw albatrosses extend their feet as if to land but seemingly walk on the crest of a wave without actually alighting. I have also seen them skid along the side of an ocean swell with one foot extended as they glided down into a trough. Frequently the tip of one wing would slice along the edge of a wave as the birds flew within inches of the surface.

A general rush for the scraps resulted when galley refuse was thrown overboard. Birds far out flew in to get their share, but birds within two or three hundred yards of the ship often would not bother to launch themselves but flapped and paddled over the water to the food.

When there was a wind or just a slight breeze blowing, 'Gooneys' faithfully stayed on the windward side of the ship; only rarely would one swim to the leeward side. I assume that the main reason for their staying on the windward side was to facilitate quicker 'take-offs' in case they desired to fly. They usually faced the wind and waves during a rough sea.

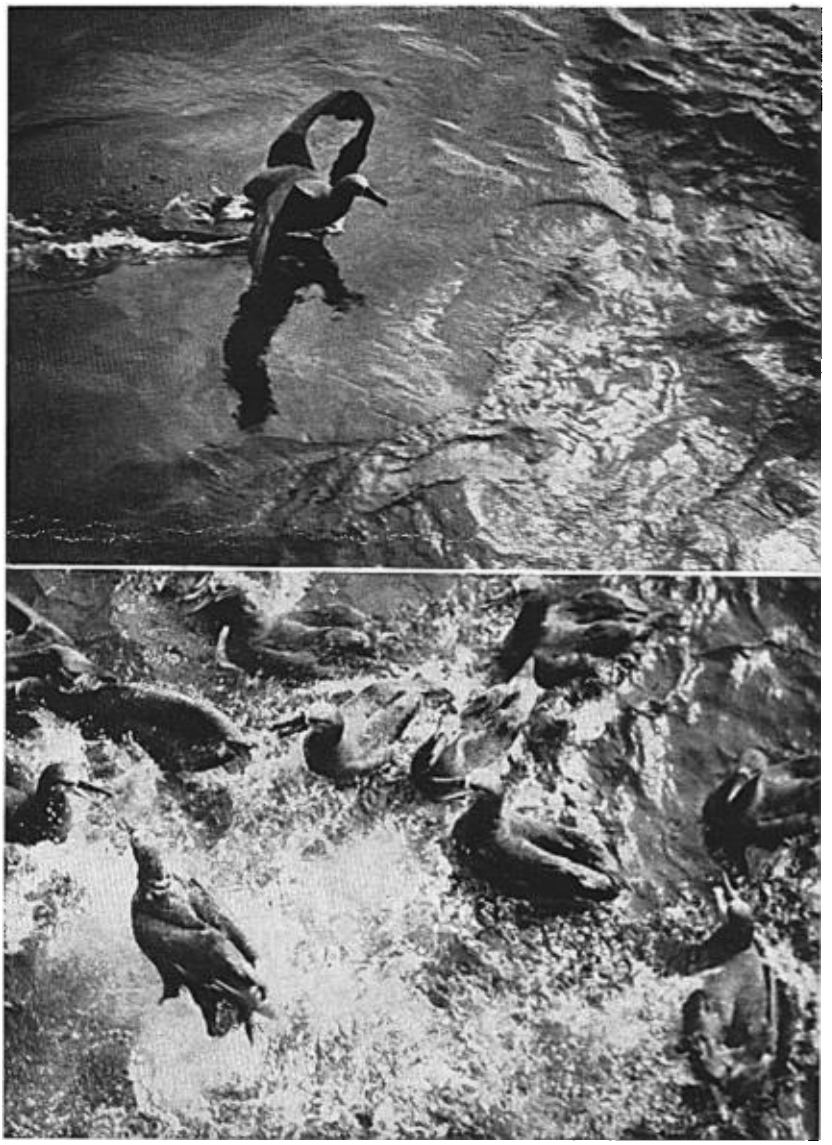
Calls and other activities.—The general impression that many ocean voyagers have of the Black-footed Albatross is of a quiet bird with solitary habits. From a ship 'under way' one seldom sees more than six albatrosses following over the wake (more often the number is between one and three) and seldom does one hear them utter any calls. On the other hand, when an observer has the opportunity to be at sea on a ship 'lying-to' for a period of time, his impression changes. About our stationary ship, at least, large flocks of albatrosses were our constant companions. When food was the subject of dispute, these birds uttered loud, shrill screams or screeches which attracted others of their kind far out from the ship. Bent (U. S. Nat. Mus., Bull. 121: 1–343, 1922) refers to this call as a "whirring groan."

Often when an individual had a choice morsel and desired to keep competitors at a distance, it would spread its wings, open wide its bill, and give forth a series of screams which were louder and higher-pitched than the noise made by domestic pigeons waiting to be fed.

Black-footed Albatrosses were often noted in groups of two, three, and four, performing a sort of dance which may be associated with courtship. After the 'chit chats,' which usually lasted from one to fifteen minutes, were completed, the involved birds went separate ways and paid no further attention to each other. I saw no indications of pairing except under these circumstances. Because these performances were observed on every trip from February to September, it seems doubtful if they are courtship acts. This species, as well as others in the northern hemisphere, breeds during the northern winter months as do their Antarctic relatives (which would be in the southern summer). Black-footed Albatrosses arrive early in November on the islands of the Hawaiian group (Laysan, Gasper Rico, Midway, Marshall, Volcano, and Bonin Islands) to breed, according to Bent (U. S. Nat. Mus., Bull. 121: 1–343, 1922). There appeared to be no correlation with sex or display to ward off other birds from a given area. As a matter of fact I was not certain if males, females or both participated in these so-called 'dances' because I could not distinguish male from female. Possibly it is only a manifestation of a strong social impulse, for individuals occasionally swim close together and rub beaks or caress each other about the neck and head.

This so-called 'dance,' or 'chit chat' as the sailors sometimes called it, consists of a series of exchanged calls similar to those made by goslings when being hovered. This may or may not be supplemented by shaking of heads from side to side or tilting the heads and bills almost perpendicularly to the body axis. Between calls one of the birds or both may make a series of cracking or snapping noises with the bill similar to noises made by young owls and domestic pigeons when molested. On three occasions I noted one of a pair make a series of jumps backwards. This was accomplished by thrusting the feet (toes widely spread) forwards and downwards very rapidly—both feet moved simultaneously. At times this procedure is altered somewhat by one of the birds lifting its wings high over its back and pecking the under wing-coverts. Another part of the 'chit chat' often finds one of the birds stretching its head and neck far out towards the other bird which usually gently pecks the extended head.

On several occasions albatrosses were brought aboard the ship, but none of these birds made any sounds, yet they were well able to defend themselves with their strong, sharp bills. They were unable to fly



(*Upper*) BLACK-FOOTED ALBATROSS LANDING IN THE WAKE OF THE SHIP. NOTE HOW THE WINGS ARE HELD ARCHED AND THE FEET FORWARD AS THE BIRD SKIDS ALONG THE SURFACE OF THE WATER. (*Lower*) LUNCH TIME. THESE BLACK-FOOTED ALBATROSSES COLLECTED ABOUT THE FANTAIL OF OUR SHIP TO GET THEIR PORTION OF THE GALLEY SCRAPS WHICH HAD BEEN THROWN OVERBOARD JUST BEFORE THE PICTURE WAS TAKEN. THE BIRD IN THE LOWER RIGHT-HAND CORNER HAD DIVED FOR THE SCRAP OF FOOD WHICH IT HAS IN ITS MOUTH. THE OTHERS WITH OPEN MOUTHS ARE SCREAMING.

from the deck and were extremely awkward in their movements aboard ship. In some cases the captured albatross regurgitated the stomach contents and appeared seasick from the ship's movement.

Albatrosses, on the whole, are sociable birds that fight little among themselves (except over ship's refuse) or with other species. On calm days large groups congregate in rafts and peacefully loiter away most of an afternoon floating sometimes as far as a mile away from the ship. Individuals join and depart from the raft at will.

They are curious birds and are attracted to any box, plank or floating object that comes along. Japanese fishing balls were sighted by men because 'Gooneys' collected about them. A floating box often formed the nucleus of a loitering flock of Black-foots. During the evening of July 16, as we were 'under way,' a group of albatrosses was sighted massed about a floating object. Upon steaming alongside we found it to be a life raft which had been drifting for some time, judging from the number of attached barnacles. Fifteen albatrosses had collected around this raft, and as we steamed on again a group of them was noted to remain about it. I assume that they may have remained about this raft until dark.

On calm days, a rubber life raft could be paddled amongst a flock of loitering albatrosses; some of the birds would come close enough to inspect the paddles if no quick movements were made. They would not allow a man, however, to swim near them.

Food habits.—Miller (Condor, 42: 229–238, 1940) found squid beaks in all stomachs examined, large fish bones in one, great masses of eggs in two, and tips of *Macrocystis* (a seaweed) in another. His impression of the Black-footed Albatross' food habits was that it is a "feathered pig" and would eat various foods thrown overboard. Bent (U. S. Nat. Mus., Bull. 121: 1–343, 1922) quotes as follows: "It is said by Baird, Brewer, and Ridgway (1884) to feed largely on a pelagic crab." Fisher (Condor, 47: 128–129, 1945) reported albatrosses capturing flying fish. A member of our crew also observed an albatross catch a flying fish that had flown from the path of the ship (position approximately 30° N., 140° W.). The capture was made as the fish re-entered the water. An albatross which was lassoed and brought aboard regurgitated an eight-inch fish, bones of another fish, and remains of squid.

All of the Black-foots which collected about our ship quarreled and scrambled for galley scraps (See Plate 17, lower fig.). They ate all kinds of meats (fats in particular), cereals, pancakes, bread, and other pastries, but would not touch fruits unless they were cooked, except for an occasional apple core. Half-pound chunks of fresh shark meat which were thrown overboard to them were swallowed in one gulp.

Of all the gleanings, fats were their choice. Occasionally individuals would dive below the water surface for food; the usual procedure, however, was to tip in a manner similar to that of river ducks. When scraps of food were thrown directly off the fantail of our moving ship, the whirling current created by the twin screws often sucked some of the scraps far below the surface. Occasionally an albatross which had attempted to secure the food would be caught in the current and forced several feet under water; this apparently disturbed it little for upon its returning to the surface one could often see it swallow some scraps which it had obtained.

I have often watched compact groups remain on the water until darkness prohibited observations. Furthermore, the radar screen occasionally indicated that they remained in groups after nightfall, but at other times they became very active as darkness approached. I am of the opinion that these birds forage for their natural foods throughout the night and, presumably, are more active during early morning hours. When on night watches on moonlight nights I have often seen albatrosses fly past the ship in what I assumed to be their nightly hunts. The silhouettes of albatrosses often passed across the rising or setting moon. My morning observations lead me to conclude that albatrosses hunt most during the early morning hours. While on early morning watches, I never observed large flocks of resting albatrosses; as the morning progressed the number of birds gradually increased as one, two, or more birds came gliding over the ocean from all points of the compass to collect about the ship. Occasionally not a single albatross would be within a mile of the ship at dawn, but by means of binoculars or spotting scope, one could often note them flying over the ocean four to six miles away. By sunrise there usually would be a group gathered near by ready to quarrel over any galley refuse that might be thrown overboard.

DISTRIBUTION AND ABUNDANCE

As previously mentioned, *D. nigripes* nests in the Hawaiian Island group, but young and adults range over the North Pacific Ocean mainly north of the Tropic of Cancer to the Aleutian Islands and southern areas of the Bering Sea, southward along the North American coast from Alaska to Lower California, west to Formosa Channel, Japan, and the Kurile Islands (Bent, U. S. Nat. Mus., Bull. 121: 1–343, 1922). Banding returns indicate the vast areas covered by this sea traveler. Cooke (Bird-Banding, 14: 67–74, 1913) lists records on two returns of young albatrosses banded on Sand Island, Midway Station, Pacific Ocean. One banded on December 25, 1940, by G. C. Munro,

was caught on a fish line near Cape Omaney, Alaska, July 22, 1942; the other bird, banded two days later at the same place, was found dead near Yachato, Oregon, May 27, 1942. Still another Black-footed Albatross, banded on the same date and at the same island, was caught May 23, 1941, by a sailor on a Japanese steamship, Kaihoku-Maru, at 148° 30′ E., 37° 30′ N. about 500 miles northeast of Tokio—an airline distance of at least 2,200 miles (Cooke, Bird-Banding, 16: 105, 1945).

Miller (Condor, 42: 229–238, 1940) points out that *nigripes* is not a channel bird but is found in greatest numbers in the cooler waters outside the channels. He also states: "On passing out to sea into the warmer oceanic waters, one finds their numbers dropping down almost to zero."

My observations along the continental shelf were limited in scope and time for I was in such waters only in going to, and returning from, areas far at sea; I did not note, however, a similar concentration of albatrosses in this restricted region. My conclusions were that these birds were quite uniformly distributed over all of the waters through which we steamed. Rarely would more than six birds follow our ship (usually one to four) but, on the other hand, rare was the occasion when an albatross could not be seen from the ship. Our courses along the southern boundary of the triangular area were several miles south of the Great Circle routes and the others were far from well-traveled shipping routes. Thus albatrosses should not have been concentrated along our courses owing to frequent traveling by other ships. On each trip to sea, albatrosses were sighted soon after we had left the Golden Gate. My record for the closest observation near land was one bird sighted twelve miles out from the Golden Gate Bridge. They were our constant companions (except on rare occasions) from the shallow waters around the Farallon Islands until we returned.

It is my opinion, however, that a single bird would follow our ship for relatively short distances. Miller (Condor, 44: 3–9, 1942) found that out of twenty-five albatrosses marked at sea off of the coast of southern California, only one repeated at fifty and sixty miles, three at forty miles, seven at thirty miles, and twelve at twenty miles. The birds that followed us were not marked, but often one of the birds would be white-rumped. By watching white-rumped individuals I was able to estimate how long individuals would follow the ship. My conclusions were that most albatrosses did not follow the ship for more than four to six hours. Since we made twelve knots, this would indicate that individual birds had ranges not more than 60 miles in diameter. This is not conclusive evidence that albatrosses have individual

or home ranges over certain areas on the ocean but does suggest that such might be the case. On the other hand, large numbers of albatrosses collected about the ship when 'lying-to.' Usually only two or three albatrosses would be around the ship when we arrived at our destination but within a day's time many would have collected about us. In this case the ship appeared to be the hub of activity for these birds. The daily available food from galley scraps may have attracted these birds from distant areas. The constant supply of food, the stationary ship and their apparent social tendencies may have created an unusual situation which disrupted albatrosses' usual distribution.

Abundance.—Many factors affected the number of birds seen each day. At times stormy weather caused us to get 'under way,' ocean currents caused us to drift, and occasionally we would move our position during the day or night. Weather conditions and the time of day also affected the movement of the birds. One hundred and twenty-five albatrosses were sighted and counted by one of the ship's crew, July, 1944, when in an area approximately 1000 miles southwest of San Francisco, California. This ship had been in this region for some time.

The maximum numbers of albatrosses in sight at one time at the four different areas (Text-fig. 1) were as follows:

Areas	*1*	*2*	*3*	*4*		
Days at area	Feb. 24 to March 19	April 10 to May 1	May 24 to June 15	July 22 to July 27	July 8 to July 19	Aug. 23 to Sept. 12
Maximum no. Albatrosses seen	65	50	95	73	53	53

Table 1 shows the maximum number of albatrosses counted daily while we were at Area 4 (two trips are included). My notes are not complete enough to include similar data for the other areas. There was, however, a similar fluctuation from day to day. Apparently weather conditions accounted for some of this, since the largest numbers were sighted on calm days when the albatrosses would collect about us in large, loose flocks. On stormy days they would spend more time flying about over the rough seas and would not necessarily remain in the vicinity of the ship as mentioned previously.

In addition to the variation in maximum numbers of albatrosses seen daily there appeared also to be a noticeable daily rhythm as mentioned under food habits. The data on maximum number of birds seen daily indicate this rhythm somewhat, for in most cases the greatest number of birds were seen during the late afternoons. My

TABLE 1

MAXIMUM NUMBER OF BLACK-FOOTED ALBATROSSES SEEN DAILY AT AREA 4 (465 NAUTICAL MILES W. OF POINT BLENCO, OREGON) ON TWO TRIPS

Date	*Maximum no. of birds seen*	*Time of observation*	*Weather*	*Status of ship*
July 8	4	3:00 P. M.	calm	lying-to
9	23	8:00 P. M.	calm	lying-to
10	33	4:00 P. M.	calm	lying-to
11	53	9:00 A. M.	calm	lying-to
12	42	6:00 P. M.	stormy	lying-to
13	36	? P. M.	stormy	lying-to
14	26	? P. M.	stormy	lying-to
15	26	? P. M.	stormy	under way
16	24	8:00 P. M.	stormy	under way
17	24	4:00 P. M.	calm (overcast)	lying-to
18	24	? P. M.	calm	lying-to
Aug. 23	3	1:45 P. M.	stormy	under way
24	25	? P. M.	stormy	under way
25	(no data)		stormy	under way
26	26	? P. M.	stormy	under way
27	26	6:00 P. M.	stormy	under way
28	53	2:00 P. M.	calm	lying-to
29	44	12:00 noon	calm	lying-to
30	(no data)		stormy	lying-to
31	14	1:00 P. M.	stormy	lying-to
Sept. 1	46	7:45 P. M.	calm	lying-to
2	10	? A. M.	stormy	under way
3	(no data)		stormy	under way
4	(no data)		stormy	under way
5	26	7:00 P. M.	calm	lying-to
6	(no data)		calm	lying-to
7	41	8:00 P. M.	calm	lying-to
8	47	4:30 P. M.	calm	lying-to
9	(no data)		calm	lying-to
10	14	4:55 P. M.	calm	lying-to
11	14 +	? P. M.	stormy	lying-to
12	6	9:00 A. M.	stormy	under way

TABLE 2

NUMBER OF ALBATROSSES SIGHTED FROM THE STATIONARY SHIP AT VARIOUS TIMES OF THE DAY

	A. M.				*P. M.*		
Date	6–8	8–10	10–12	12–2	2–4	4–6	6–8
July 9	—	12	—	14	—	23	—
July 10	—	23	—	—	—	33	—
July 17	—	19	—	—	—	24	—
Aug. 24	—	14	—	—	25	25	—
Aug. 28	—	36	—	—	53	—	43
Sept. 1	4	24	—	—	—	—	46
Sept. 5	2	—	20	20	—	—	26

limited data on numbers sighted throughout the day are not extensive enough to include each day, but the data for the following days do suggest similar trends. This rhythm was more evident on calm days than on stormy ones, because the birds did not fly about so much and the ship was stationary.

Although it was impossible to make hourly observations, the data for the above days show how the total number of birds increased to a maximum number in the afternoons. There is reason to believe that these birds would hunt during the night and early morning and then collect again about the ship throughout the day. This was true especially on calm days.

RELATIONSHIPS WITH SEA LIFE

PELAGIC BIRD ASSOCIATIONS

When the ship was at Station 2 from February to March, there were several Herring Gulls (*Larus argentatus*) and two to four immature Glaucous-winged Gulls (*Larus glaucescens*) (the only gulls seen far out at sea) that remained in the vicinity of the ship throughout most of the stay. The gulls would loaf on the surface of the water among the loose flocks of albatross. On occasion, albatrosses would rush at a gull if it came too close; the gulls, however, ate galley scraps along with the albatrosses. All three species would be so intent upon securing the scraps that they paid little attention to individuals or species. The large size of the albatrosses and their greater numbers, however, forced the gulls to the edges of the feeding area.

At another time a Pomarine Jaeger (*Stercorarius pomarinus*) remained around the ship for the greater part of the day. Albatrosses made no noticeable attempts to attack this bird, yet tolerated its presence only within certain limits; as soon as the jaeger drifted within the 'area of non-tolerance,' the albatross would make an apparently half-hearted attempt to drive the bird from its presence.

Usually Sooty Shearwaters (*Puffinus griseus*) were not seen on the stations except during cyclonic storms when winds were strong and seas rough. Under these conditions both albatrosses and the shearwaters were usually swinging over the ocean swells. When the shearwaters did alight they usually alighted singly and then for only a short time. Once I saw a single shearwater with a raft of albatrosses sitting on the ocean on a calm day. There was no noticeable antagonism.

Fork-tailed Petrels (*Oceanodroma furcata*) and Leach's Petrels (*Oceanodroma leucorhoa*) were seen quite frequently fluttering over the ocean as they fed on plankton or other sea life. No attention was paid by albatrosses or petrels to each other as far as I could determine.

At Area 4 on a dark, rainy, calm morning, a flock of 100 (+ or −) Pintails (*Anas acuta*) decoyed in to a raft of resting albatrosses which were one-fourth of a mile from the ship. During the course of the day, on several occasions I noted Pintails alighting with groups of albatrosses. As was the case with the gulls, the albatrosses would tolerate the ducks at a certain distance, only, and would chase them if they came within the elastic bounds of 'non-tolerance.' Some albatrosses were seemingly more belligerent or 'non-tolerant' than others. A shot by one of our gunner's mates broke a Pintail's wing. Attempts to retrieve the bird at the time failed. Albatrosses were attracted by the duck and followed the bird a mile or more as it swam and drifted from the ship. 'Gooneys,' it appeared to me, attempted to peck it more in curiosity than in a desire to destroy the bird (an hour later, the Pintail drifted back alongside the ship and was collected; it is now in the Museum of Vertebrate Zoology, Berkeley, California).

Albatrosses and Other Sea Animals

Sharks were not uncommon at any of the stations. The crew regularly caught them with baited hooks and lines. Oftentimes a shark swam near the surface with its dorsal fin protruding above the water level. Usually this attracted several seemingly curious 'Gooneys.' They showed no fear and I saw no attempts of the shark to attack them.

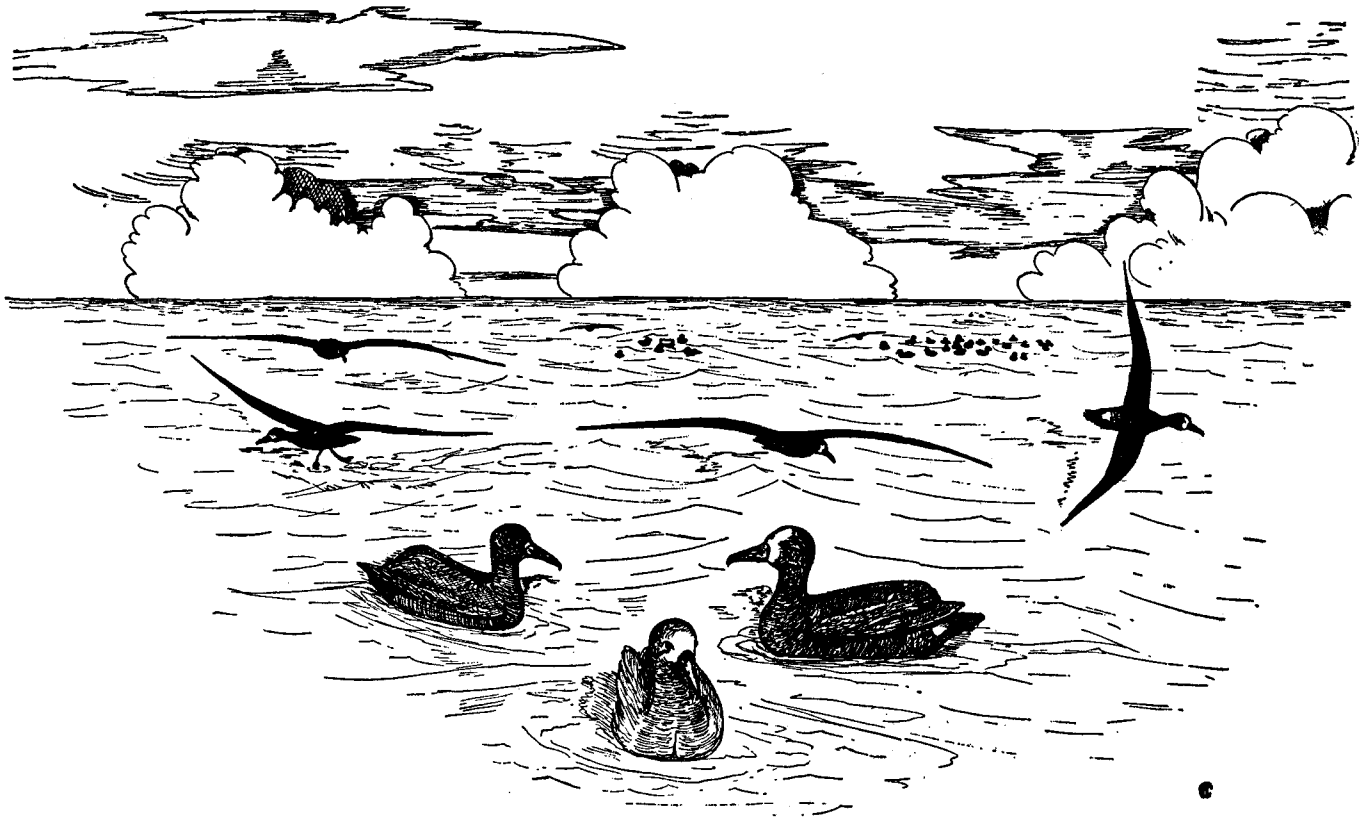
On several occasions I have noted a small group of 'Gooneys' (four to eight) massed about a floating sunfish (*Mola mola*). They usually were pecking the surface of the fish. I have often thought that the fish may have benefited by reduction of its external parasites in this manner. I have no definite observation, however, that the 'Gooneys' were actually eating parasites from the fish. Miller (Condor, 42: 229–238, 1940) also observed this.

I saw seals, porpoises, dolphins and whales on occasions, but I saw no associations between these animals and the albatrosses.

Enemies at Sea

Of all animal life, man is probably the greatest enemy to the Black-footed Albatross. At no time have I seen bird, fish or mammal (man excepted) destroy or attempt to destroy the albatross. Parasites and diseases, however, may cause death. I have not seen a dead albatross at sea, but the possibilities of seeing one are slight. Among the large numbers that were noted day after day in the vicinity of the ship, none were seen that showed outward signs of sickness or disease.

Even man shows much respect for this bird. Sailors will not tolerate, generally speaking, the shooting of the albatross, either in



TEXT-FIGURE 2.—This sketch was made from the fantail of our ship on a calm evening (September, 1945) and shows how the Black-footed Albatrosses gathered in loose flocks away from the ship. The small flock in the middle background had collected about a floating box. Other individuals are gliding in towards the ship. The bird on the extreme left is taking off (note the running position). The three birds in the foreground illustrate the differences in coloration; one is nearly black, whereas the other two have considerable white around the head, and one has a white rump.

respect of his seaworthiness or because of the many superstitions associated with the bird. I suspect the latter indirectly bears more weight.

External parasites (members of the Mallophaga group) were collected from the 'Gooneys' that I had in hand. These parasites seemingly caused albatrosses considerable discomfort at times, for I frequently saw them scratch and peck their body extremities. During the summer months a part of this activity may have been caused, however, by the molt.

From my observations, I concluded that *Diomedea nigripes* lives a life relatively free from predators and other decimating factors while at sea. The situation may be somewhat to the contrary on the breeding and nesting grounds.

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NOTES ON SAIPAN BIRDS

BY KEN STOTT, JR.

THE following observations were recorded during a period extending from December 8, 1945, to January 1, 1946. Although the duration of my assignment on Saipan, in the Marianas Islands, was brief, the nature of my military duties enabled me to spend a greater part of my time there in the field. Almost every part of the island was visited with the exception of the northern section of the central range of hills which at that time was still occupied by Japanese soldiers who had thus far evaded attempts at capture.

The southern tip of Saipan lies at latitude 15° 06′ N. and longitude 145° 45′ E. The island is approximately 15 miles long and 4 miles wide with an area of 72 square miles. A central range of hills runs from north to south, beginning with an 832-foot peak near Marpi Point at the northern end of the island and continuing to rise until an altitude of 1554 feet is reached at the peak of an extinct volcano, Tapatchau. From that point southward, the gradual slope toward Point Nafutan on the southern tip is broken by only two peaks (479 feet and 924 feet, respectively). A coral reef parallels a greater part of the western shoreline which is fairly regular. On the eastern side of the island two short peninsulas, Point Kagman and Point Nafutan, jet out to form Magicienne Bay.

In climate and flora, Saipan offers some contrast to its sister island,