

# HABITAT SPECIFIC BEHAVIOR OF THE PARAKEET AUKLET IN THE BARREN ISLANDS, ALASKA

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We are not aware of any published accounts of the behavior of the Parakeet Auklet (*Cyclorhynchus psittacula*). Previous studies of this species have centered on its ecology in the Bering Sea (Bédard 1969a, 1969b, Sealy 1968, Sealy and Bédard 1973). Our intent is to discuss and relate the basic behavior patterns of this species to the reproductive cycle and components of the nesting environment.

## STUDY AREA AND METHODS

This study was conducted on East Amatuli, one of the Barren Islands (58°55'N, 152°10'W), which are located between the Kodiak Island archipelago and the Kenai Peninsula, near the entrance to Cook Inlet. A complete description of the Barren Islands can be found in Bailey (1976).

We studied part of a 50-pair colony in East Amatuli cove. All observations of behavior and activity were made from a blind located at the edge of the auklet colony. Supplementary data were obtained by observing nest sites from a second blind and by hiding among the boulders at a second colony. Preliminary observations were made between 14 May and 1 June 1976. Data collection occurred between 8 June and 28 August 1976, during which period we spent a total of 219 hours observing Parakeet Auklets.

Specific behaviors were described from field notes and from analyzing black and white and color photographs of specific postures and flock arrangements. On 10 occasions, a quantitative analysis of behavioral bouts was made by making 5-minute counts every 15 minutes from dawn to dusk. Colony attendance and habitat utilization were studied by recording all movements between the major recognized habitat components from the time of auklet arrival to departure.

## RESULTS AND DISCUSSION

### DISTRIBUTION AND ABUNDANCE

Compared with populations in the Aleutians and in the Bering Sea, the number of Parakeet Auklets in the Barren Islands was small. Bailey (1976) estimated the total population to be 900-1000 pairs in nine different colonies on five islands. Colonies varied in size from 10

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to 200 pairs and were found where there were boulders and cliffs with suitable crevices.

### GENERAL BREEDING BIOLOGY

Parakeet Auklets were already present at the colony when we arrived on 14 May 1976. Our knowledge of the general chronology of the breeding cycle was determined from a small number of eggs and young found in the few accessible rock crevices.

Previous studies on the breeding biology have been conducted much farther north on St. Lawrence Island, Alaska (63°51'N, 171°36'W) (Sealy and Bédard 1973). Egg-laying is roughly three weeks earlier in the Barren Islands than on St. Lawrence. Initiation of egg-laying is strongly influenced by snow melt, which apparently occurred on the Barren Islands between mid-April and early May 1976 (Bailey pers. comm.). Parakeet Auklets lay a single egg clutch, which is incubated for about 36 days. Nestlings fledged on St. Lawrence Island at 77% adult weight after 35 days in the nest crevice.

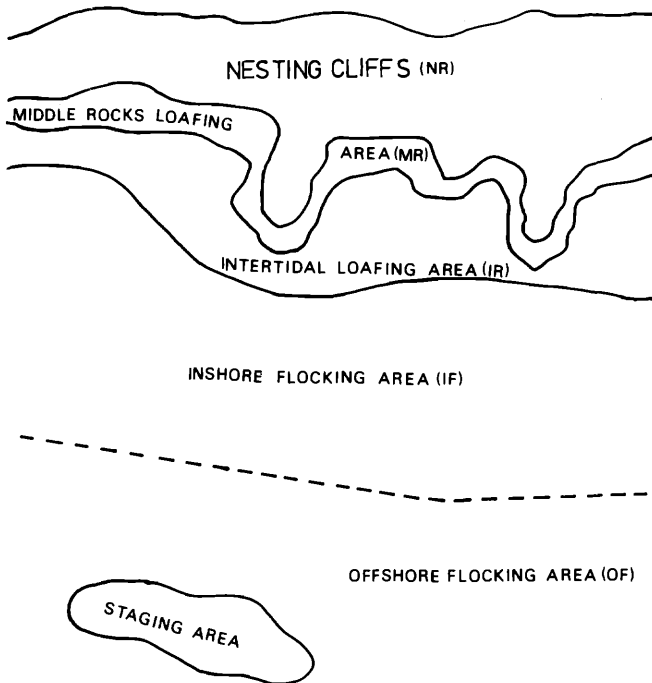


Figure 1. Subdivisions of the nesting environment of the Parakeet Auklet on East Amatuli Island, Alaska.

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Table 1. Major types of Parakeet Auklet behavior in the various subdivisions of the nesting environment in the Barren Islands, Alaska.

CATEGORY	SUBDIVISIONS OF THE NESTING ENVIRONMENT			
	NESTING CLIFFS AND ROCKS	MIDDLE ROCKS, INTERTIDAL ROCKS	INSHORE FLOCKING AREA	OFFSHORE FLOCKING AREA
<i>Maintenance Behavior</i>				
Preening	X	X	X	X
Bathing			X	X
Diving			X	X
<i>Displacement and Alarm Behavior</i>				
Bill-dipping			X	X
Wing-flapping		X	X	X
Diving			X	X
Flight intention call	X	X	X	X
<i>Courtship Behavior</i>				
Billing	X	X	X	X
Duetting	X	X	X	X
Copulation	(X) <sup>1</sup>		X	
<i>Agonistic Behavior</i>				
Neck Stretch		X	X	X
Water-chase			X	X
Neck-stretch bill-up		X	X	X
Combat		X	X	
TOTAL	5	8	14	12

<sup>1</sup>Observed by Bédard on St. Lawrence Island.

HABITAT AFFINITIES OF BASIC BEHAVIOR PATTERNS

The nesting environment had terrestrial and aquatic components which were closely interrelated. Figure 1 illustrates our arbitrary subdivisions of the nesting environment; these include nesting cliffs, middle rocks loafing area, intertidal loafing area, inshore flocking area, offshore flocking area and a staging area. We believe these are real and are recognized by Parakeet Auklets. We have illustrated the several displays in the aquatic (Figure 2) and terrestrial components (Figure 3). Our observations concern those behavioral traits manifest during the mid-incubation to fledging stages (Table 1).

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### MAINTENANCE BEHAVIOR

*Preening and bathing.* Preening by Parakeet Auklets occurred frequently in most of the habitats. It was often conspicuous when an auklet returned to the water after visiting its nest. Preening was also common among birds resting on rocks near the nest. We rarely observed auklets preening in the intertidal zone. We noted auklets bathing (Figure 2) in all areas of the cove, but particularly in the inshore area where auklets engaged in bathing after they returned from a visit to the nest site.

Diving occurred under three circumstances: 1) feeding, 2) flocking behavior and 3) moving in or out of the inshore water area. Dives of feeding auklets appeared to be deeper than dives with other apparent functions. We observed auklets feeding in Amatuli Cove but most, apparently, fed at sea. When social interactions were intense

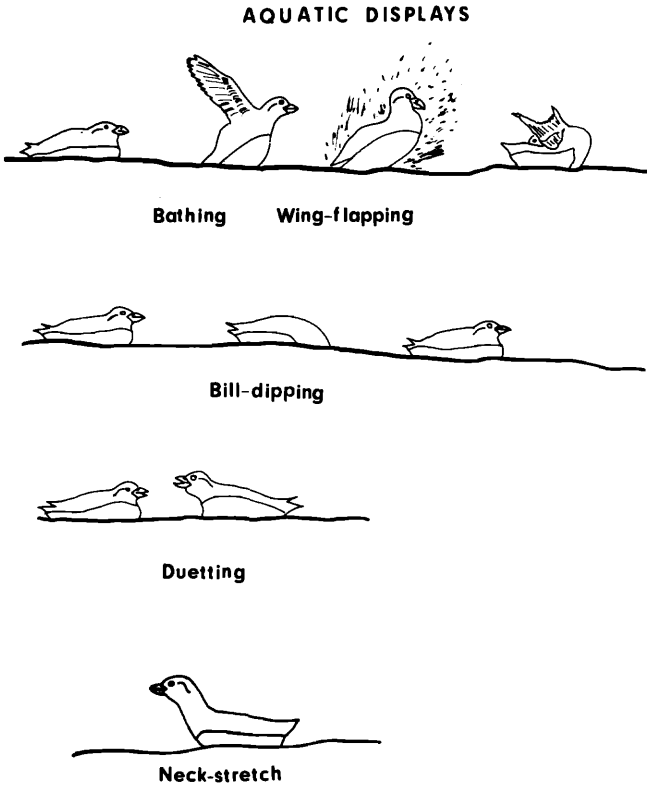


Figure 2. Displays of the Parakeet Auklet performed on the water at East Amatuli Cove, East Amatuli Island, Alaska.

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among members of a flock offshore, diving sometimes appeared to occur spontaneously and for no apparent reason. This type of diving was more common in flocks of 10 or more auklets and was always followed by a series of wing flaps.

### DISPLACEMENT AND ALARM BEHAVIOR

*Bill-dipping.* This display (Figure 2) is widespread in aquatic birds (Drent 1965 and references cited by him). It consists of thrusting the bill and forehead under the surface. The intensity of bill-dipping in Parakeet Auklets was variable but was usually high when the birds were preparing to come ashore or were disturbed by the appearance of a predator near the colony.

*Wing-flapping.* Wing-flapping (Figure 2) was most noticeable after an auklet had dived or when it returned to the water from the colony site. It was less common after a bout of preening, whether on land or water. Wing-flapping occurred with about equal frequency regardless of distance from shore.

*Diving.* Parakeet Auklets often dived in response to low-flying Glaucous-winged Gulls (*Larus glaucescens*), Black Oystercatchers (*Haematopus bachmani*), or other birds. Newly arriving auklets that joined the flock often elicited diving behavior. The function of this remains obscure but seems to be an integral part of social activities in a colony.

*Flight intention call.* Flight intention calls are common among many birds and may be elicited by a variety of factors, ambivalence and alarm being common ones. These calls were given by auklets prior to flight from land or from the inshore and to the offshore waters. They were also given with high intensity when a predator approached. The quality of this call was similar to that of the Cassin's Auklet (*Ptychoramphus aleuticus*) (pers. obs.). Flight intention calls have been described for the Pigeon Guillemot (*Cephus columba*) (Drent 1965) and we have heard them from Rhinoceros Auklets (*Cerorhinca monocerata*) in Washington and Alaska.

### COURTSHIP BEHAVIOR

*Billing and duetting.* Billing is a characteristic courtship behavior of several seabirds, particularly puffins and guillemots (Storer 1952, Drent 1965). Billing and associated vocalizations serve to initiate and maintain the pair bond in most species. In the Parakeet Auklet, however, billing is not well-developed and is usually a part of duetting. Duetting occurred when two auklets vocalized face-to-face at a close distance (3 cm - 14 cm), their bills sometimes touching. Duetting usually occurred between members of a pair, but not exclusively. On

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several occasions we observed duetting between non-mated birds. Pairs engaged in duetting in the middle rock and nest rock areas and on the water (Figures 2 and 3). In large flocks, the duetting pair often encountered interference from other birds in the flock. This made bouts of duetting difficult to initiate and complete. On 10 June (0950-1015), we observed two copulation attempts on the water which appeared to follow intensive duetting.

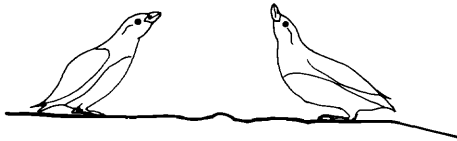
### AGONISTIC BEHAVIOR

We were unable to demonstrate that Parakeet Auklets had a clearly defined territory. They appeared to vocalize intensively from the nest crevice, but this vocalization could be an expression of either courtship or territoriality. If there is a nest territory, it is very small.

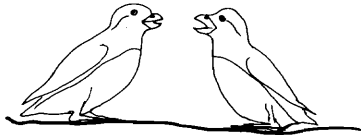
Agonistic behavior was clearly associated with defense of individual distance on both shore and water. This defense included the following specific behaviors: neck-stretch, neck-stretch bill up, and water-chase. We rarely observed direct combat.

*Neck-stretch and neck-stretch bill-up.* The neck-stretch display occurred in both aquatic and terrestrial habitats (Figures 2 and 3). It is a

### TERRESTRIAL DISPLAYS



Neck stretch-Bill up



Duetting

Figure 3. Displays of the Parakeet Auklet performed on land at East Amatuli Island, Alaska.

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low intensity display that occurred when a bird's individual distance had been violated. The neck-stretch bill-up display is a high intensity display, usually preceding direct combat.

*Water-chase.* The water-chase resulted when one bird approached another with its head lowered and lunged at that bird on the water (Figure 2). The second bird would rush away with its bill up but faced away from the chaser. This display apparently was given when the individual distance was violated.

### GENERAL FLOCK BEHAVIOR

As the season progressed, the daily arrival time of the Parakeet Auklet at the colony became later (Figure 4). Early in the season, auklets arrived at the staging and offshore flocking area in pairs or small groups. There they socialized by vocalizing, bill-dipping, wing-flapping and other displays. Staging was a characteristic flock behavior during the early part of the breeding cycle. The whole flock or large groups of auklets would leave the staging area and either swim or fly to the inshore flocking area (Figure 1), where most of the social behavior occurred. High intensity bill-dipping occurred as frequently as 30 per bird per minute, while the birds swam in the inshore flocking area.

Once at the inshore flocking area, auklets had a rather distinct flight pathway to the nesting area. Variations in arrival flight behavior of alcids may be attributed to nest site location and type, wing

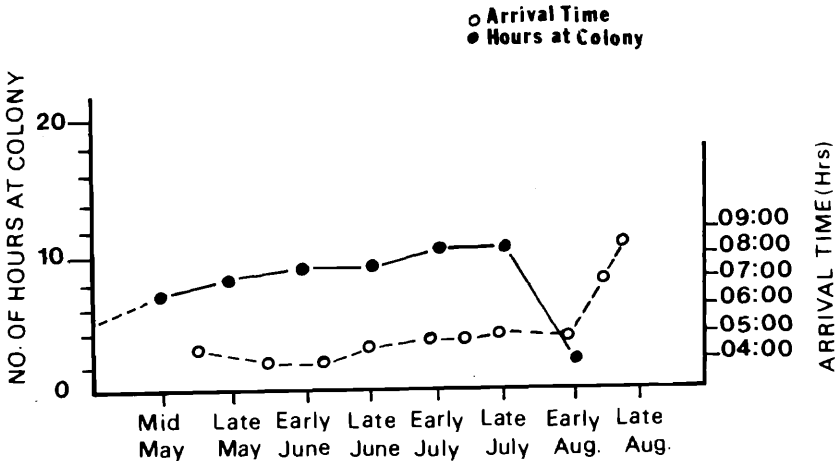


Figure 4. Arrival times and total colony attendance of Parakeet Auklets at East Amatuli Island, Alaska, 1976.

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loading characteristics, and presence of avian predators. We characterized alcid arrival flight paths as direct, circular and modified circular (see Figure 5). The modified circular flight of the Parakeet Auklet was typical during incubation when there was much social behavior occurring in the inshore flocking area. During the nestling phase, arrival flights became more direct, and less time was spent in the inshore flocking area.

After socializing in the flocking area, auklets reached the nest by one of three different methods, which were based on where the auklets landed; landing location appeared to depend on the location

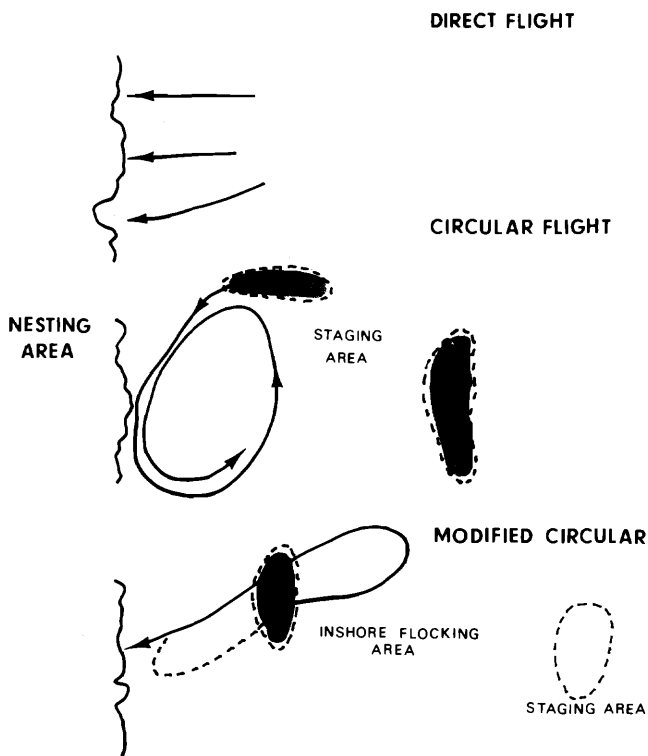


Figure 5. Characteristic arrival flight pathways used by alcids at their colony sites. Direct flights are typical of Common Murres (*Uria aalge*); circular flights are performed by Horned Puffins (*Fratercula corniculata*), Tufted Puffins (*Lunda cirrhata*) and Rhinoceros Auklets (*Cerorhinca monocerata*); the modified circular flight is typical of the Parakeet Auklet.



of the nest. All methods involved the modified circular flight which is a circling flight over water and then a direct flight to the nest (Figure 5). Auklets nesting high on the cliff tended to fly to the nest without landing elsewhere. The function of the circling may have been to acquire enough air speed to fly up about 10 m to the nests. The second method involved landing on the middle rocks; from there the birds slowly walked to the nest site or made short flights. During this time, there were associated behaviors such as duetting, vocalizations, agonistic postures and preening. The third method was similar to the second except that the auklets first landed in the intertidal and then slowly walked through the middle rocks to their nests. These latter birds nearly always swam from the flocking area to rocks immediately beneath their nest sites.

The inshore flocking area was the center of most social behavior. We observed at least 14 different displays by auklets in the inshore flocking area (Table 1). Normal diurnal activity in the early season consisted of repeated flights from the flocking area to the loafing and nest rocks. However, as the demands of feeding young became greater, the amount of social behavior decreased. The average number of auklets in the inshore flocking area decreased from a high of 18 birds in late May to a low of 1 in mid-August (Figure 6). The number of flights made to the rocks showed a different seasonal pattern (Figure 7). There were few direct flights to the rocks early in the season; but as egg-laying progressed, more and more birds flew directly to the rocks. The peak of flight behavior occurred in mid-July, which agrees closely with what Sealy and Bédard (1973) found for St. Lawrence Island. In early August, auklets arriving with engorged gular pouches would spend 15-45 minutes in the inshore flocking area before they delivered food to their nestling. By mid-August, there was little use of the staging or inshore flocking areas. Most auklets flew directly to the inshore flocking area where they spent only a few minutes before they flew to the nest crevice; a few auklets flew directly to the nest crevice without using either the staging or inshore flocking areas.

#### TIME BUDGET

During the breeding season, the time budget of Parakeet Auklets was divided into the time spent in oceanic and nesting environments. The oceanic portion consisted of a feeding area distant from the nesting environment. The nesting environment consisted of both terrestrial and aquatic components (Figure 1). We determined the time budget for Parakeet Auklets during the latter part of the breeding cycle (Table 2).

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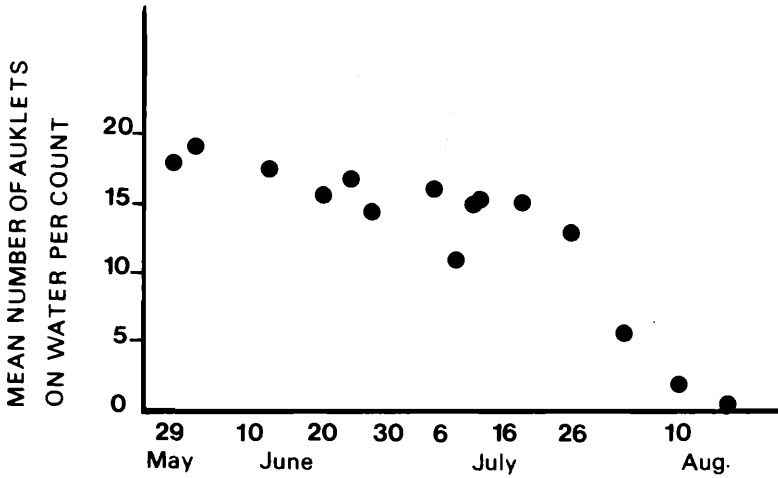


Figure 6. Number of Parakeet Auklets observed in the inshore flocking area at East Amatuli Cove, Barren Islands, Alaska during 1976.

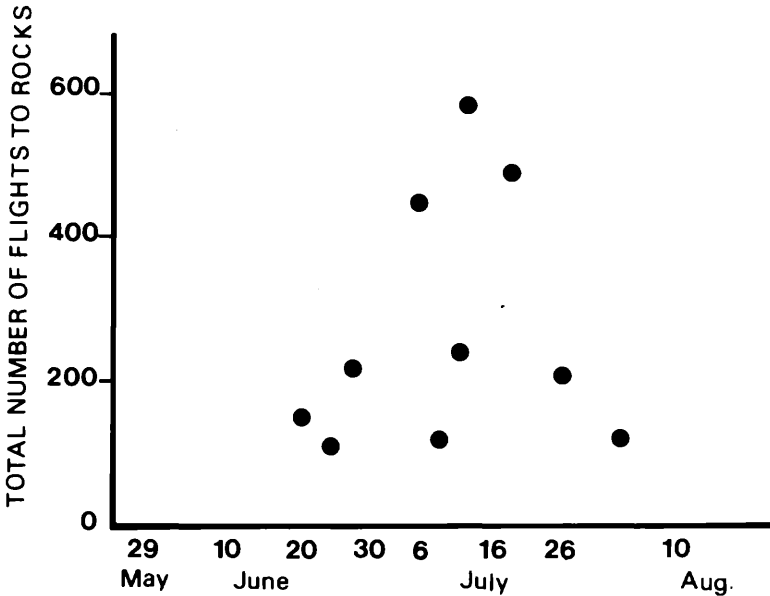


Figure 7. Number of Parakeet Auklet flights per day at a 50-pair colony on east Amatuli Island, Barren Islands, Alaska. The number of flights to rocks was recorded on 10 dates during the 1976 nesting season.

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Table 2. Habitat-specific time budget of the Parakeet Auklet on 25 July 1976 in the Barren Islands, Alaska.

HABITAT COMPONENT	NO. OF MINUTES	PERCENT OF TIME BUDGET
Oceanic Environment <sup>1</sup>	860	59.7
Nesting Environment		
Staging Area (S)	35	2.4
Offshore Flocking Area (OF)	103	7.2
Inshore Flocking Area (IF)	307	21.3
Intertidal Loafing Area (IR)	27	1.9
Middle Rocks Loafing Area (MR)	20	1.4
Nesting Cliffs and Rocks (NR)	88	6.1
Total Time in Nesting Area	580	40.3
<b>TOTAL MINUTES (24 hours)</b>	<b>1440</b>	<b>100.0</b>

<sup>1</sup>Birds in the oceanic environment were presumed to be engaged in feeding behavior.

When Parakeet Auklets were in the late stages of incubation or early nestling period, they spent about 60% of their time at sea feeding and about 40% at or near the colony site. Of this, roughly 20% of their time was spent in various types of social behavior in the inshore flocking area.

Figure 4 shows the amount of time auklets spent at the colony site. Early in the season, auklets spent 5 to 7 hours in the cove and nest rocks. During the middle portion of the breeding cycle, they were in the area 9 to 10 hours. After hatching and brooding was completed, Parakeet Auklets abandoned the nesting area; they returned only to feed the young, spending less than 3 hours at the colony site each day.

### SUMMARY

The nesting environment of the Parakeet Auklet consisted of both aquatic and terrestrial components. The nesting environment consisted of a staging area, flocking areas closer to shore, and various terrestrial areas. Habitat affinities of 14 different behaviors were described. During the early and middle parts of the nesting cycle, auklets approached the nesting colony site by flying to the inshore flocking area and then making a circular flight to the nesting area. Most social behavior occurred in the inshore flocking area. As the season progressed, social behavior decreased rapidly. During late in-

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incubation, Parakeet Auklets spent about 60% of their time at sea. Forty percent of their time was spent at or near the colony site; of this, about 20% was spent engaged in social behavior in the inshore flocking area. Additional studies of the social behavior of other species of auklets may be helpful in further defining their phylogenetic and ecological relationships.

## ACKNOWLEDGEMENTS

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