

A Nocturnal Seabird

The Rhinoceros Auklet

(*Cerorhinca monocerata*)

The Rhinoceros Auklet is large fossorial alcid which, because it usually returns to its colonies only after dark, is not well known to either naturalists or seabird scientists. It is closely related to the puffins (Hudson et al 1969) and like them has somber plumage with a decorated bill and face during the breeding season. The bill ornament, in this case, is a flat horn that rises from the base of the upper mandible and makes the bird's common names singularly appropriate in both English and French — Alque à bec cornu. A similar horn appears on many of the traditional masks carved by natives of the Pacific Northwest but they are frequently attributed to mythical birds by less ornithologically astute anthropologists.

There are not many colonies of Rhinoceros Auklets in North America and most of the large ones are in British Columbia. The birds nocturnal habits have made them difficult to discover. The colony on Triangle Island (10,000 pairs) suspected by Brooks and Swarth (1925), not observed, if it was present, by Drent and Guiget (1961) was not observed until 1966 (Hancock 1970). The other large colonies are on Pine Island (50,000 pairs), Storm Island (60,000 pairs), and Lucy Island near Prince Rupert (25,000 pairs). The Storm Island colony has developed since 1929 (Young 1929) but Lucy and Pine Island were known to egg collectors much earlier (Brook 1923, Brooks and Swarth 1925). The remaining colonies in Canadian waters contain only eight or nine thousand pairs. The largest of the dozen known colonies in Alaska is just north of the boundary on Forester Island (54,000 pairs, SOWLS et al. 1978). There are two moderately sized colonies south of British Columbia, in Washington, one on Protection Island (17,000 pairs Wilson 1977) and another on Destruction Island (16,000 pairs Leschner 1976). All of these are small compared to the 400,000 pairs reported for Teuri Island, Japan (Thoresen 1983).

Rhinoceros Auklets nest in a variety of habitats but all colony sites must meet certain criteria. There must be suitable soil and protection for the burrows as well as ample and reliable supplies of food. The food must be close by because

the birds are not strong fliers. Their wing loading is about four times greater than a gull's (Hudson et al 1969) and they must carry a daily supply of food to the single young that try to raise each year. The colony must also be relatively safe from predators and disturbance by animals large enough to damage the burrows. It is this last requirement that limits them to small islands.

The islands that meet the other criteria are quite varied. Some are covered with grasses and shrubs such as Salmon Berry but lack trees (Triangle and Cleland); others are densely treed (Lucy, Storm, and Pine). The common characteristic of all of those sites is their situation in oceanic waters that are cool and have a high salinity (Thomson 1981). Those locations also seem to be favoured by the small fish that the Rhinoceros Auklets feed to their young. There are no Rhinoceros Auklet colonies in brackish water, although Lucy Island is very close to the mouth of the Skeena River.

Our knowledge of the auklet's life cycle is largely based on the research of Richardson (1961), Wilson (1977), and Leschner (1976) on Protection and Destruction Islands in Washington. Vermeer (1979) and Vermeer and Cullen (1979, 1982) monitored the growth rate of chicks on Triangle Island, however, and some of the causes of reproduction problems in 1976 and 1977 have been investigated (Vermeer 1980).

Paired adults arrive in March to begin the preparation of a nest site. That may involve clearing out the burrow used last year, finishing a new burrow begun the previous summer or starting a new burrow altogether. On Protection Island, the burrows are in sandy soil on a slope between 37° and 45°. They range upward from an area about 10m above the tideline to more than 100m above the bluffs. Triangle and Pine Island may fit the general description to some extent but Cleland does not have that much relief and as on Lucy Island many burrows are on flat ground just above the beach. Perhaps only the entrance face needs to be on a slope and any irregularity caused by a root, log, or clump of grass will serve.

Wilson (1977) felt that the slope offered an upward approach that reduced air speed and softened the landing. That may have reduced the number of dropped fish because he only saw gulls patrolling the flatlands in the morning. On treed islands such as Lucy and Pine there is a clear preference for the steep slopes where the trees are sparse or give way to patches of grass. However, the ability of auklets, on those islands, to hurtle through trees and shrubbery in the dark, yet land adjacent to their bur-

rows with a full load of fish, could inspire the most jaded devotee of video games and star-war films.

None of the field workers have been able to record the displays of territoriality in this species although there must be some method by which site ownership and mates are retained from year to year. Thoresen (1983) was able to observe the birds on Teuri Island, Japan, where much activity occurs in daylight. He observed extensive "billing" between mated pairs both on land and at sea. Ownership of burrows was declared by a distinctive upright-huff posture and an aggressive hunched walk with measured steps. There was also the bill-gaig that is characteristic of Puffins and some vigorous fighting that is not.

The similarity of the sexes has precluded any observation of division of labour in nest site preparation. The burrow entrances are frequently at the base of a tree, shrub, or clump of grass where the roots reinforce the opening. They run for two or three meters and often break through to the surface again. In that case, the original entrance is sometimes abandoned. Richardson (1961) described them as having a drop off of a few centimeters into the egg chamber but this is not always obvious. The egg chamber is, however, wider than the rest of the burrow and may be adjacent to a small side chamber used for defecation. On Protection Island, Richardson (1961) reported that both the chick and the adult came to the mouth of the burrow to defecate. We have not observed that behavior among any of the burrowing alcids in British Columbia where River Otters, Bald Eagles, Common Ravens, and Northwestern Crows are numerous and effective predators. Rhinoceros Auklet burrows have more fecal material near their mouths than those of other species except Cassin's Auklet.

Following the completion of the burrow, there is a period of undescribed behavior in which the burrow is frequently abandoned for a week or so. Possible both members of the pair are feeding and copulating at sea. The female needs to accumulate reserves for her single large egg and the male will assist with incubation duties. Similar behavior is noticeable in Ancient Murrelets (Sealy 1972) but it appears to be poorly defined in northern alcids because the breeding season is not as tightly synchronized as it is in tropical seabirds (Lack 1966).

Egg formation consumes so much of the birds resources because the final product is very large (45.7x68.9mm and 77.7g, Wilson 1977). That represents nearly 15 percent of the adult weight and exceeds the 9 to 12 percent invested by

puffins. The laying date may be a characteristic of the individual bird and seems to be the same from year to year. It occurs sometime between the last week of April and the end of May. The egg is then incubated by both parents taking three-day shifts for 31 to 33 days (Richardson 1961). Leschner (1976) reported some apparent attempts at relaying when the original egg had been lost.

On Protection Island, hatching is marked by the appearance of egg shells and membranes at the mouths of the burrows. In British Columbia, that evidence is either concealed or quickly scavenged by crows. The five or six week period from hatching to fledging is marked solely by a dramatic increase in the amount of nocturnal activity on the colony. From an hour or so after sunset until the small hours of the morning, the adults return with food for their young.

On Triangle Island, that return is marked by a spectacular fly-past as thousands of Rhinos circled the south bay at the end of twilight. Passing flights have been attributed to social interaction and predator avoidance in puffins (Lack 1966) but the absence of nocturnal predators, the long term stability of pair bonds, and the ability of the bird to find one burrow among thousands in the dark, leads me to believe that they are simply taking bearings from previously selected landmarks. On foggy days, they arrived on Triangle Island early enough for photographs to be taken. Perhaps they needed that extra light for navigation.

Passing flights on Lucy Island occurred well after total darkness. They still managed to land accurately, if somewhat noisily, by crashing through the forest canopy darkness. They still managed to land accurately, if somewhat noisily, by crashing through the forest canopy and shrubbery to clear areas near the burrows. On Cleland, a treeless and flat island, the nightly arrival, in early August, consisted of a massed high speed pass only a few feet above the grass. It was repeated a dozen times, but at each pass a few birds would drop into the grass or shrubs near their burrow. Within two hours, only single birds were arriving.

Each parent carries a load of fish crosswise in its bill and scurries to its burrow as soon as it has landed. The loads usually consist of a half dozen fish in the 10cm class, but sometimes there can be more than a dozen (Richardson 1961). A misguided individual on Lucy Island, brought in a 26g salmon, 149mm long that could have choked its chick. Such large fish are sometimes an indicator of poor foraging conditions and

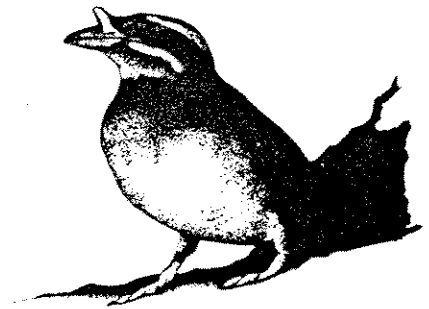
low reproductive success (Vermeer 1980).

On all the colonies of the British Columbia and Washington coasts, examined so far, (Protection Island, Richardson 1961; Destruction Island, Wilson 1977; Triangle Island, Vermeer 1980; and Lucy Island, the Pacific Sandlance (*Ammodytes hexapterus*) is the preferred food for the young. These are usually moist and fresh on the Canadian colonies and Richardson (1961) reported a live specimen being brought into Protection Island. Failure of the Sandlance was the apparent cause of delayed fledging and fledging of under weight young on Triangle Island in 1976 and 1977 (Vermeer 1980) but there was not the catastrophic failure suffered by the Tufted Puffins because the Rhinoceros Auklets seem able to utilize a variety of species (Table 1).

At night, Sandlance which lacks a swim bladder (Hart 1973) and has a negative buoyancy, bury themselves in sand. they also bury themselves when threatened by predators, although cod, for instance, can pull them from beneath the surface (Girsa and Danilov 1976). While Rhinoceros Auklets do prey on schools (Grover and Olla 1983) perhaps they also forage in the same way as the cod. Rapid predation on high densities of relatively immobile fish could be more energy efficient than pursuing swirling schools whose behavior is designed to confuse predators. It would also help to explain why parent birds arrive on the colonies with fresh or alive fish immediately after dark.

The young auklets appear to be able to fast as long as 3 or 4 days without food and Vermeer and Cullen (1982) attribute their slow growth curve to their ability to withstand adverse food supplies. The situation is somewhat tenuous, however, and there is no reported incidence of the adults succeeding in raising two young. The artificial twinning experiments carried out by Summers and Drent (1979) were inconclusive. The result was likely as due to aggression between the young which were not of the same age, as due to the inability of the adults to supply enough food.

The young can fledge at 50 percent of the adult weight but the mean on Triangle Island was 69 percent in 1978 (Vermeer and Cullen 1982). The young still have patches of down when they leave the burrow for good and walk to the beach. On steep slopes, they may flutter short distances but they have had no opportunity to exercise flight muscles in the confines of the burrow. However they seem to be able to travel well on water. Wilson (1977) could find no



fledged chicks at sea within 5 or 6 km of the colony during the fledging period.

Although the biology of the post-breeding dispersal of this species is unknown, they do congregate in large flocks close to colonies prior to a departure for the winter. It was from flocks such as those that Wilson (1977) was able to collect specimens that indicated a synchronous moult, at least among the non-breeders. Little is known their wintering habits beyond the A.O.U. Checklist (1885) comment that there is a general movement southward. Young's (1929) report of birds far out to sea has been refined by Crowell and Nehls (1977) observation of birds over the edge of the continental shelf. Concentrations from 5,000 to 12,000 birds have been observed in Monterey Bay, California (Stallcup and Winter 1975, Winter and Laymon 1979). The numbers reported from further north have always been small, with 37 being considered a noteworthy observation (Crowell and Nehls 1974, 1976; Hunn and Mattocks 1978; Forsell and Gould 1981; Gould et al. 1982; Mattocks and Hunn 1983).

In most seabirds, the number seen in the winter does not compare to the estimates of the breeding population and the origin of winter birds is anyone's guess. In 1983, a flightless chick banded at Lucy Island, near Prince Rupert, British Columbia on 13 July was recovered on 8 December near Cambria, California. That was the first recovery of its kind. It shows that banding in the north may benefit from the increased number of beached bird surveys being conducted in the south.

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Squirrels and Beavers

The government publication, **Mammals of B.C.**, makes no mention of squirrels eating pine bark. Perhaps the squirrels around the beaver dams of Moose Meadows, Castlegar, have been watching beavers eating bark and are giving it a try.

On a recent cross country ski trip on Moose Meadows we saw a Red Squirrel (*Tomiascus hudsonicus*) eating the bark of a Jack Pine twig (*Pinus contorta*). Others have observed squirrels eating bark also.

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