testis 1 mm, 12.0 g. Both birds were in fresh basic plumage; neither showed any emargination of primary 6; in both, the leg color was listed as dusky brownish, the soles and base of the posterior tarsus were yellowish.

We also observed one Blackpoll Warbler closely on 22 Nov 1980 near Bijagua, Prov. Alajuela, on the lower Caribbean slope of the Cordillera de Guanacaste. The bird was accompanying a mixed-species flock of greenlets, flycatchers, gnatcatchers, tanagers, and other migrant warblers (Tennessee, *Vermivora peregrina*; Chestnut-sided, *D. pensylvanica*) along the edge of dense second-growth adjoining primary forest at ca. 500 m elevation. Also, Stiles saw a Blackpoll Warbler at Puerto Vargas, on the Caribbean coast, on 7 Nov 1978. This bird was foraging alone in scrubby second-growth during the rainy, windy conditions of a Caribbean storm.

There are now at least ten records of Blackpoll Warblers in southern Middle America, assuming that all reported sightings and bandings are valid; the species is best considered a casual migrant and winter resident in this region. It appears to arrive late in the fall, the earliest record being a banded bird from Bocas del Toro on 19 October 1964 (Ridgely 1976); at least some individuals remain through January or later (Stiles and Smith 1980). The lack of records north of Costa Rica suggests that the birds straggle in directly from the Caribbean, rather than migrating down the coast with other transient warblers. The appearance of Blackpoll Warblers in southern Middle America is at most slightly later than their main passage through the West Indies (cf. Chapman 1917, Barbour 1943, Bond 1971). None of the birds seen or netted in Costa Rica seemed to be associating with *D. castanea*, which normally arrives in early-to-mid October, becomes extremely abundant by late October, and is uncommon at best from mid-November on through the winter (Stiles, unpubl. data). We mist-netted flocks of Bay-breasted Warblers in the week or two preceding the capture of each of our Blackpolls, but not on the day of capture in either case. The pattern of Blackpoll reports in Costa Rica (sea level to middle elevations on both slopes) suggests that birds straggle in individually and wander about, perhaps settling for the winter. A similar pattern seems to hold for several other warblers that normally migrate to or through the West Indies and are rare to accidental on both slopes of Costa Rica in winter. These include the Palm (*D. palmarum*), Prairie (*D. discolor*), Cape May (*D. tigrina*), Pine (*D. pinus*), and Black-throated Blue (*D. caerulescens*) warblers (cf. Stiles and Smith 1980).

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PREDATION ON STEAMER-DUCKS BY KILLER WHALE

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Aquatic predators from four zoological classes—Cephalopoda, Chondreichthyes, Osteichthyes, and Mammalia—have been observed to prey at least occasionally on marine birds. Hindwood (1964) reported attacks by octopuses (*Octopus* spp.) on several larids and a penguin. Several species of shark, notably the tiger shark (*Galeocerdo cuvier*), are known to have eaten a variety of marine birds (Glegg 1945, Harrison 1955, Brooke and Wallet 1976). Legendre (1941) listed the blue shark (*Charcarias glaucus*) as a predator of seabirds. Other marine piscine predators of birds include cod (*Gadus* spp.; Cobb 1927, Scheffer 1942, Glegg 1945, Harrison 1955), monkfish (*S. squatina*; Glegg 1945, Davenport 1979), eels (*A. anguilla*; Glegg 1945), and angler-fish (*Lophius piscatorius*; Legendre 1926, Leach 1943, Glegg 1945). Lowe (1943) and French (1981) observed attacks on birds by unidentified marine fishes.

Several pinnipeds are known predators of marine birds. Grey (*Haliochoerus grypus*; Grant and Bourne 1971, Kinnear 1977), harp (*Phoca groenlandica*; Glegg 1945), New Zealand fur (*Arctocephalus forsteri*; Stonehouse 1967), and leopard seals (*Hydrurga leptonyx*; Hamilton 1946, Glegg 1947) have been observed to kill or contain seabirds. Southern sea lions (*Otaria byronia*) are efficient predators of several South American marine birds, including steamer-ducks (*Tachyeres* spp.; Hamilton 1946, Glegg 1947, Boswall 1972).

We know of no published record of predation on birds by cetaceans, except Hamilton's (1946) report of a presumably accidental ingestion of a Cape Petrel (*Daption capense*) by a blue whale (*Balaenoptera musculus*). Killer

whales (*Orcinus orca*) have been suspected of killing sea birds (Taverner 1943, Glegg 1947, Stonehouse 1967), but direct observation or conclusive evidence is lacking. We report here an attack by a killer whale on White-headed Flightless Steamer-Ducks (*T. leucocephalus*; Humphrey and Thompson 1981) in Atlantic-coastal Argentina.

In early October 1977, Straneck encountered a pair of adult White-headed Flightless Steamer-Ducks resting on rocks on a beach north of Punta Tombo, Chubut. His approach disturbed the birds, which then entered the water and swam approximately 40 m away from shore. Roughly 50 m down the beach four killer whales were attempting to capture a young southern sea lion. One of these whales separated from the herd and swam toward the pair of steamer-ducks. Moments later the two ducks, apparently unaware of the approaching whale, were swallowed together by the killer whale and taken underwater. Seconds later the male steamer-duck returned to the surface and "steamed" rapidly to shore. "Steaming" refers to a rapid, turbulent method of surface locomotion that involves both wings and feet (Livezey and Humphrey, in press). The duck then rested on the shore for some time and later began to preen itself. Its left wing hung to the ground and the feathers were bloody. Neither the whale nor the female steamer-duck was seen again.

Killer whales feed primarily on large bony fish, sharks, pinnipeds, and other cetaceans, and typically hunt in herds (Nishiwaki 1972). Straneck regularly saw herds of killer whales close to shore at Punta Tombo, but feels that they rarely attacked birds. Only killer whales and southern sea lions are known subaquatic predators of steamer-ducks, but the ranges of several other potential submarine predators—southern fur seal (*Arctocephalus australis*), elephant seal (*Mirounga leonina*), leopard seal, and several species of shark—coincide with the marine distributions of four species of steamer-duck in Argentina, Chile, and the Falkland Islands (Consejo Federal de Inversiones Argentina 1963).

The total losses of steamer-ducks to aquatic predators is unknown, but the prevalence of permanent flightlessness in the genus *Tachyeres* may increase such mortality. We speculate that "steaming" may be an escape mode that distracts predators and obscures the "steaming" birds from below. When birds move together in large flocks, the target-obscuring effect of "steaming" is probably enhanced by the increased risk-sensitivity and mutual protection afforded individuals in groups (Hamilton 1971, Lazarus 1972, Caraco 1981).

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