



Earliest Breeding Records of Storm-Petrels in British Columbia, 1909-1927: Triangle Island, Tree Islets, Cox Island, Cleland Island, Lepas Bay Islands, and Tian Islets

Harry R. Carter¹ and Spencer G. Sealy²

¹Carter Biological Consulting, 1015 Hampshire Road,
Victoria, British Columbia, Canada V8S 4S8

²Department of Biological Sciences, University of Manitoba,
Winnipeg, Manitoba, Canada R3T 2N2

Abstract

To augment and clarify earlier historical summaries of breeding seabirds in British Columbia, we collated published and unpublished information on the earliest known breeding records of Fork-tailed Storm-Petrel (*Oceanodroma furcata*) and Leach's Storm-Petrel (*O. leucorhoa*) on Triangle Island (1909); Tree Islets (1910); Cox Island (1920); Cleland Island (1925); and Lepas Bay Islands, Tian Islets, and other islands (1927). These records were incomplete or not included in *A Catalogue of British Columbia Sea-bird Colonies* by Drent and Guiguet (1961) and partial summaries of historical information on breeding seabirds in British Columbia (Campbell et al. 1990, Rodway 1991). While examining these breeding records, we also uncovered or clarified historical information for Common Murre (*Uria aalge*), Pigeon Guillemot (*Cephus columba*), Ancient Murrelet (*Synthliboramphus antiquus*), Cassin's Auklet (*Ptychoramphus aleuticus*), Rhinoceros Auklet (*Cerorhinca monocerata*), and Tufted Puffin (*Fratercula cirrhata*). For Triangle Island, we provide details for the earliest breeding records in 1909 for Pelagic Cormorant (*Phalacrocorax pelagicus*), Bald Eagle (*Haliaeetus leucocephalus*), Peregrine Falcon (*Falco peregrinus*), Black Oystercatcher (*Haematopus bachmani*), Glaucous-winged Gull (*Larus glaucescens*), Pigeon Guillemot, Cassin's

Auklet, Tufted Puffin, Common Raven (*Corvus corax*), and Steller's Sea Lion (*Eumetopias jubatus*).

Introduction

To add to the history of knowledge of seabird colonies in British Columbia, we collated published and unpublished information on the earliest Fork-tailed Storm-Petrel (*Oceanodroma furcata*; Figure 1) and Leach's Storm-Petrel (*O. leucorhoa*; Figure 2) breeding records at six colonies from 1909 to 1927 (see Figure 3 for locations). Some of these records were summarized in Drent and Guiguet (1961) but little information was provided about how many records had been obtained. Between 1929 and 1954, five of these six and more storm-petrel colonies were better described (Young 1930, 1931, Drent and Guiguet 1961). In addition to storm-petrels, our summary expands upon recent summaries of the known history of breeding of Common Murre (*Uria aalge*), Pigeon Guillemot (*Cephus columba*), Ancient Murrelet (*Synthliboramphus antiquus*), Cassin's Auklet (*Ptychoramphus aleuticus*), Rhinoceros Auklet (*Cerorhinca monocerata*), and Tufted Puffin (*Fratercula cirrhata*) in British Columbia (Carter et al. 2001, Sealy and Carter 2007, Carter and Sealy 2008, 2010, 2011), as well as for several other seabirds, birds, and marine mammals.



Figure 1. Fork-tailed Storm-Petrel is a locally common breeding seabird on islands along the outer coast of British Columbia. *Photo by R. Wayne Campbell.*



Figure 2. Leach's Storm-Petrel is a locally abundant breeding seabird on islands along the outer coast of British Columbia. *Photo by R. Wayne Campbell.*

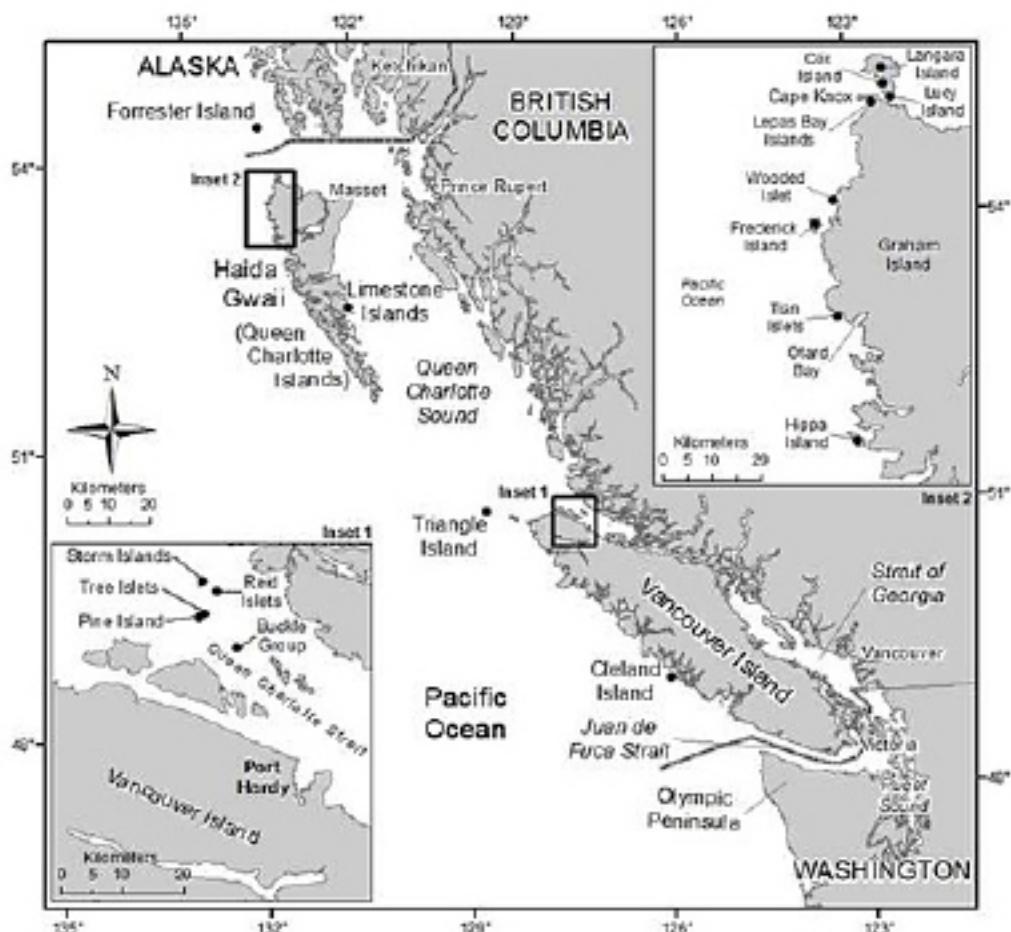


Figure 3. British Columbia coast showing place names mentioned in the text. Solid dots refer to seabird breeding locations. Map prepared by *CloverPoint Cartographics Ltd., Victoria, BC*.

Triangle Island (Scott Islands, Northwest Vancouver Island) – 1909 to 1913



Figure 4. Triangle Island, located about 50 km off the northwest tip of Vancouver Island, BC, is the province's largest and most diverse marine bird nesting colony. *Photo by R. Wayne Campbell.*



Figure 5. Triangle Island (144 ha) is treeless and its steep slopes are covered mainly by wind-pruned salmonberry (*Ribes spectabilis*) and grasses. It supports the largest Common Murre, Thick-billed Murre (*Uria lomvia*), Cassin's Auklet, and Tufted Puffin colonies in BC. *Photo by R. Wayne Campbell.*

Occurrence of Fork-tailed and Leach's storm-petrels in British Columbia waters in the late 19th century had been noted by Mayne (1862), Fannin (1891, 1898), Macoun (1900), Kermode (1904), and Macoun and Macoun (1909), but these authors did not document breeding. First mention of breeding in British Columbia was made by William L. Dawson and John H. Bowles (1909:871-872) in *The Birds of Washington*, where they noted that Fork-tailed Storm-Petrel breeds "on certain islands off the coasts of Oregon and Vancouver Island, northward on the American side to the Aleutians" and Leach's Storm-Petrel breeds "on islands from the western coast of Mexico north to Sitka." Dawson and Bowles (1909) did not provide specific evidence of storm-petrel breeding in British Columbia, but Walter J. Burton, an egg collector from Victoria, had provided information to Dawson for his book and may have informed him of recent unpublished breeding observations from Vancouver Island. In June and July 1909, single eggs of Fork-tailed Storm-Petrel and Leach's Storm-Petrel were collected at Triangle Island (50.87°N; 129.83°W; Figure 3) off the northwest end of Vancouver Island by Burton (Carl et al. 1951, Drent and Guiguet 1961; Table 1), who was accompanied by Warburton M. Pike, a well-known British explorer, author and hunter (e.g., Pike 1892, 1896) who then resided in the Canadian Gulf Islands near Victoria. Little information about this important trip has been reported in the ornithological literature so we pieced together what was available to us for all species. In particular, Carl et al. (1951) omitted most information about the 1909 trip, which apparently was not available to them.

The earliest reported visits to the vicinity of Triangle Island (Figure 4) occurred on 3 September 1860, 19 July 1861, and 12 June 1862 by Captain G.H. Richards aboard the British coastal survey ship H.M.S. *Plumper* or H.M.S. *Hecate*, but breeding seabirds were not reported in this area (Mayne 1862, Dorricott and Cullon 2012). In September 1878, George M. Dawson did not visit Triangle Island when he visited Quatsino Sound on northwest Vancouver Island (Cole and Lockner 1989). The first documented information on breeding seabirds at Triangle Island apparently was obtained by Charles F. Newcombe in 1898 when he collected one Common Murre egg (Figure 6) on "West Coast of British Columbia" (Guiguet 1950:12).



Figure 6. The shape, colour, and varied patterns on the shell of a Common Murre egg made it appealing to oologists who collected hundreds for museums in the late 19th and early 20th centuries. However, Newcombe's purpose in collecting eggs was to document breeding and provide museum specimens for seabirds in BC. *Photo by R. Wayne Campbell.*

Guiguet (1950) also mentioned 10 Common Murre egg specimens in the British Columbia Provincial Museum (BCPM; now Royal British Columbia Museum [RBCM]) collection that had been obtained from Triangle Island by Burton on 20 June 1900. We did not find any other information to confirm any trip to Triangle Island by Newcombe, Burton, or others to collect seabird eggs in 1898 or 1900 and eggs may have been purchased from someone locally. Drent and Guiguet (1961) provided different information for nine eggs in the BCPM collection: (1) four eggs collected by Burton on 20 June 1900; (2) four eggs collected by Newcombe and Burton on 13 July 1909; and (3) one egg collected by Burton on 15 July 1909. We did not locate any egg cards or egg specimens in the RBCM collection from Triangle Island in 1898 or 1900 but we located cards for four Common Murre eggs collected on Triangle Island in 1909 and two in 1910 (Table 1; Figure 6). However, we did not find two of the 1909 egg specimens (RBCM #E1150, #E0222) in the RBCM collection. Likely referring to 1898 or 1900 egg specimens from Triangle Island, Kermode

(1904:7) first reported that the Common Murre bred in British Columbia “on West Coast of Vancouver Island.” The large Common Murre colony at Triangle Island reported in Brooks and Swarth (1925) likely referred to information obtained between 1898 and 1913 (Table 1; see below).

In 1909, the goal of Burton and Pike for visiting Triangle Island was “to examine into the nesting habits of the various ocean birds that were reported to breed on these islands in great quantities ...” (Pike 1909:863), including collecting eggs for Burton’s collection. We can imagine three possible scenarios for Burton and Pike to have obtained knowledge of seabirds breeding at Triangle Island prior to June 1909: (1) from Francis Kermode or Newcombe who resided in Victoria, along with Burton; (2) from a *Daily Times* (1909a) article published on 8 May 1909 after a brief survey for a lighthouse conducted by B.H.

Fraser, likely in late April 1909, which noted that “The place is infested with sea lions, and all kinds of sea birds and eagles [Bald Eagles (*Haliaeetus leucocephalus*)] make their home there (Figure 7);” or (3) from Cecil de Blois Green after a possible visit to the island in May 1909 (see below). The 1909 trip to Triangle Island also may have been fostered through news of the recent exploits of Dawson who had successfully explored and documented extensive breeding by nocturnal seabirds (storm-petrels and certain alcids) on the northwest coast of the Olympic Peninsula, Washington, in 1905 to 1907 (Dawson 1908 a,b). However, in southeast Alaska, breeding by nocturnal seabirds had been well described earlier at St. Lazarus Island since 1866 and at Forrester Island in 1897 (Dall and Bannister 1869, Baird et al. 1884, Grinnell 1897, 1898, Cantwell 1898, Mailliard 1898, also see Carter and Sealy 2011).

Table 1. Breeding seabird specimens obtained in 1909 and 1910 at Triangle Island, British Columbia, either in the collection or recorded at the Royal British Columbia Museum.

Date	Collector	Species	Specimen Type	RBCM No.
22 May 1909	Cecil de Blois Green	Common Murre	Egg	E1527
26 May 1909	Cecil de Blois Green	Common Murre	Egg	E1526
1 June 1909	Walter J. Burton	Cassin’s Auklet	Egg	E0244
20 June 1909	Walter J. Burton	Fork-tailed Storm-Petrel	Egg	Unk ¹
July 1909	Walter J. Burton	Cassin’s Auklet	Egg	E1241
July 1909	Walter J. Burton	Common Murre	Egg	E1150 ²
15 July 1909	Walter J. Burton	Common Murre	Egg	E0222 ²
15 July 1909	Walter J. Burton	Cassin’s Auklet	Mount	E1448
15 July 1909	Walter J. Burton	Rhinoceros Auklet	Skin	E1447
20 July 1909	Walter J. Burton	Leach’s Storm-Petrel	Egg	Unk ³
20 June 1910	Walter J. Burton	Common Murre	Egg	E0223
20 June 1910	Walter J. Burton	Common Murre	Egg	E0224 ²

¹ Collection date reported by Carl et al. (1951) but specimen not found in the RBCM collection; a specimen without data (#E0823) may be this egg.

² Egg card found but specimen not in the RBCM collection.

³ Collection date reported by Carl et al. (1951) but specimen not located in the RBCM collection; a specimen without data (#E0822) may be this egg.



Figure 7. At Triangle Island, Bald Eagles nest on the ground, usually atop rock pinnacles. Photo by R. Wayne Campbell.

Regardless of all possible considerations that led to the trip, Burton departed from Vancouver on 3 June 1909 aboard the steamer *Camosun* headed for Alert Bay where he planned to meet Pike and travel on Pike's launch around the north end of Vancouver Island (*Daily Colonist* 1909a). They encountered some difficulties along the way but managed to convince two Danish settlers from Cape Scott to take them to Triangle Island in a small sailboat, arriving before 12 June (*Daily Colonist* 1909b). They likely arrived about 9 June because Pike (1909) stated that the stay was 14 days and they departed on or about 23 June (see below). While the two Danish settlers immediately returned to Cape Scott, Burton and Pike stayed at Triangle Island until after 20 June, likely to 23 June, because the sailboat had to arrive and wait at the island for three days for a gale to pass to allow a beach pick up (Pike 1909), and this sailboat was expected but had not yet arrived by 20 June (*Daily Colonist* 1909c; *Daily Times* 1909b). The treacherous sail back to Cape Scott occurred on the same day as the pickup (Pike 1909). Once at Cape Scott, they likely took Pike's launch back to Port Hardy on 24 June. On 25 June 1909, Burton and Green collected an egg of the Rhinoceros Auklet (Figure 8) (RBCM #E247) at Pine Island, near Port Hardy (see Tree Islets 1910 below). Pike apparently was not with them but he may have taken them to the island in his launch, stayed in Port Hardy (possibly for maintenance of his launch), or continued south to Victoria without Burton.



Figure 8. Eggs of most burrow-nesting seabirds in British Columbia are all-white, including Rhinoceros Auklet. In this photo, the late Dr. Rudolf H. Drent is holding an adult auklet and an egg that is lightly soil-stained from the burrow. Photo by R. Wayne Campbell.

On 22 and 26 May 1909, before Burton and Pike arrived at Triangle Island, at least two Common Murre eggs were collected, with Green listed as collector (Table 1). Green had previously observed seabirds around the north end of Vancouver Island at least since 1907 (see below). We suspect that he may have first visited Triangle Island in late May 1909, but we could not find any other information documenting a trip then by Green or anyone else. While Burton and Pike were at the island, only one seabird egg (Fork-tailed Storm-Petrel) apparently was collected, on 20 June, which is still in the RBCM (Table 1). However, the Cassin's Auklet egg reported to have been collected on 1 June may have been collected on 21 June and was later mislabeled. Six other seabird eggs (including the Leach's Storm-Petrel egg) in the RBCM collection also were collected at Triangle Island but between 1 and 20 July 1909 (Table 1), after Burton and Pike had departed. Given the great difficulty of getting to Triangle Island, it is highly unlikely that Burton, Pike, or Green returned to Triangle Island at the end of June or early July without recording notes of the trip. Instead, we suspect that someone else on Triangle Island involved in lighthouse construction, which began around 20 June (*Daily Colonist* 1909c,d; *Daily Times* 1909b), obtained or saved these eggs for Burton (possibly when breaking ground for the lighthouse

and related activities) and they were later brought to Burton by ships returning to Victoria after delivering additional supplies to Triangle Island (e.g., in late August 1909; *Daily Colonist* 1909d). We did not find any other information to verify how seabird eggs were collected in July 1909 from Triangle Island.

It was not too surprising that Common Murre eggs were not collected between 9 and 23 June 1909. In late June 1949, Common Murres had only begun to lay (Guiguet 1950) and, hence, they may not have been available during Burton and Pike's stay, which possibly accounts for only two murre egg specimens from July. But somehow, Green had been able to obtain two murre eggs laid unusually early in late May (Table 1). Cassin's Auklet eggs also likely had hatched or were in an advanced stage of development prior to late May, making egg specimens difficult to obtain in June, unless eggs found were "addled" or abandoned (Drent and Guiguet 1961). Tufted Puffins also might not have laid many eggs before 21 June, accounting for the lack of specimens in the RBCM collection (Drent and Guiguet 1961). While the timing of the June 1909 visit for egg collecting might not have been ideal, Burton and Pike also weathered several gales during this period, which likely reduced the time available for collecting eggs (Pike 1909, Murray 1994).

As early as late June or July 1909, we suspect that Burton and Pike informed Dawson of their new seabird discoveries (including Fork-tailed Storm-Petrel breeding but not yet that of Leach's Storm-Petrel) at Triangle Island. While Pike (1909) did not mention breeding storm-petrels, we suspect that the single Fork-tailed Storm-Petrel egg (Figure 9) and single Leach's Storm-Petrel egg may not have been identified immediately (especially if adults were not incubating these eggs), but that Burton later identified them in Victoria and possibly informed Dawson later in the summer or fall. Inclusion of last-minute unconfirmed information about storm-petrel breeding in British Columbia prior to publication may partly account for the few words given this topic (and weighted more towards Fork-tailed Storm-Petrel) provided in Dawson and Bowles (1909). Burton later donated his egg collection, including one egg of each storm-petrel species, to the BCPM in 1919, and this was likely when evidence of breeding

storm-petrels at Triangle Island in 1909 first became more widely known (Kermode 1920). Storm-petrel breeding records at Triangle Island in 1909 were not specifically reported in the literature until Carl et al (1951:B42) noted that "Burton collected a [Fork-tailed Storm-Petrel] egg on June 20th 1909" and "An egg of [Leach's Storm-Petrel] was collected by Burton on July 20th, 1909." By contrast, only empty storm-petrel burrows had been found at Triangle Island by the party of BCPM biologists (Charles J. Guiguet, G. Clifford Carl, Frank L. Beebe and George A. Hardy) on 24 June to 1 July 1949. Subsequently, storm-petrels were not further documented breeding until 1974 and 1975 when Leach's Storm-Petrels were heard calling in the vicinity of their burrows (Vermeer et al. 1976). We did not locate the 1909 Fork-tailed Storm-Petrel egg and the 1909 Leach's Storm-Petrel egg in the RBCM collection as reported by Carl et al. (1951). However, we did locate one Fork-tailed Storm-Petrel egg without data (RBCM #E0823) and one Leach's Storm-Petrel egg, also without data (RBCM #E0822) which may be these eggs. We consider 1909 eggs reported from Triangle Island to represent the first breeding records of Fork-tailed Storm-Petrel and Leach's Storm-Petrel in British Columbia.



Figure 9. Fork-tailed Storm-Petrel lays a single egg in a burrow in soil or under debris, such as driftwood, at times on a small mat of grasses. Photo by R. Wayne Campbell.

In 1909, Burton and Pike seemed initially most impressed with their first discovery of the large colony of Cassin's Auklets on Triangle Island (Drent and Guiguet 1961, Carter and Sealy 2011), which were

referred to as “little auks” in a Victoria newspaper (*Daily Colonist* 1909c,d). However, they also were the first to report the large colony of Tufted Puffins at Triangle Island, although apparently no eggs were collected, as well as breeding Steller’s Sea Lions (*Eumetopias jubatus*). Pike (1909:864) provided a detailed description of auklet and puffin breeding habitats and populations, as well as sea lion breeding behaviour:

“Thus the burrowing grounds of Triangle Island, which extend over its whole surface, are occupied by two species only – the crested [Tufted] puffin (*Lunda cirrhata*) and Cassin’s auklet (*Ptychoramphus aleuticus*), both of which are present in almost incredible numbers. The lower slopes beginning from beach-level have been taken possession by the auklets, the puffin burrows beginning at an elevation of one hundred feet, and continuing to the tops of the sloping cliffs. The top of the island is again taken up by the auklets, as the puffins seem to dislike level ground. In the many holes which we dug out in various parts of the island, no other burrowing bird was discovered.”

“With regard to the actual numbers of the puffins and auklets, a conservative estimate, formed by taking the number of holes to the acre and the total acreage of the island, gave the result that there were half a million of each of these two species on an island roughly three miles in circumference. When the other fish-eating birds are taken into consideration, and also the large herds of hair-seals [Harbour Seal *Phoca vitulina*] and sea-lions [Steller’s Sea Lion], the weight of the daily supply of fish yielded by the ocean for this one island must be enormous.”

“There are two main resorts for the sea-lions on outlying rocks, one on the east and one on the west side of the island; but the young cubs, which were about a couple of weeks old at the time of our visit [Figure 10], are left unattended throughout the day on the shingle beaches of the main island. Here they lie absolutely defenceless in a death-like stupor, but luckily without any natural enemies. By standing windward of them and poking them freely with a stick, you can rouse them sufficiently to bellow and

finally to take to the water; but they are inexpert in the breakers, and are evidently not allowed to frequent the outlying rocks, over which the surf breaks with violence, during the first few weeks of life.”



Figure 10. Steller’s Sea Lion pups at Triangle Island, BC, in June 1909. This is one of the earliest photographs of Steller’s Sea Lions at Triangle Island. Photo by W. Pike. Reprinted courtesy *Country Life* magazine.

Brooks and Swarth (1925:24) reported breeding Cassin’s Auklets on “the west coast of Vancouver Island,” presumably referring in part to Triangle Island in 1909, although breeding also had been found at Cox Island near Langara Island, Haida Gwaii, in 1920 (Brooks 1926). Until recently, the 1909 egg from Triangle Island was considered to be the first evidence of breeding Cassin’s Auklets in British Columbia (Drent and Guiguet 1961; RBCM #E0244; #E1241), but breeding actually had been documented earlier by Newcombe on the Limestone Islands, Haida Gwaii, in 1901 (Carter and Sealy 2010, 2011). Brooks and Swarth (1925:24) also noted breeding Tufted Puffins “at a number of points along the coast from Langara Island to Bare Island (Haro Strait),” potentially including Triangle Island. Carter and Sealy (2011) were not aware of Tufted Puffin observations in 1909 at Triangle Island, which also are among the earliest records for the province.

Another interesting but previously unreported finding from the 1909 Triangle Island trip was an adult male Rhinoceros Auklet in breeding plumage (Figure 11) collected on 15 July 1909 with Burton



Figure 11. A Rhinoceros Auklet in breeding plumage, with its white facial plumes and “horn” on the bill, is unmistakable. Photo by R. Wayne Campbell.

listed as collector although it was apparently collected by another person (RBCM #1447). This appears to be the only specimen obtained and may be all or part of the basis for the report of a colony “near Cape Scott” (Brooks and Swarth 1925:24). It is not clear whether this individual was taken from a nest burrow or found dead. In any case, this species may have bred at Triangle Island prior to 1970 without detection, although adults also were observed near shore in 1949 when breeding was considered likely (Carl et al. 1951, Hancock 1970, Carter and Sealy 2011).

Pike (1909:864) also documented the first breeding (but with no eggs or skins collected) or first occurrence at Triangle Island for several other seabirds and “predatory” birds (Carl et al. 1951, Beebe 1960, Drent and Guiguet 1961), but these were not the first records for British Columbia:

Pelagic Cormorant (*Phalacrocorax pelagicus*) – “... abundant, nesting together in fairly accessible places, mostly on outlying rocks.”

Black Oystercatcher (*Haematopus bachmani*) – “plentiful enough, nesting on every beach, and keeping up a perpetual clamour.” (Figure 12)

Glaucous-winged Gull (*Larus glaucescens*) – “the only one of its family nesting on the island, and not particularly numerous...”

Pigeon Guillemot – “rather scarce”

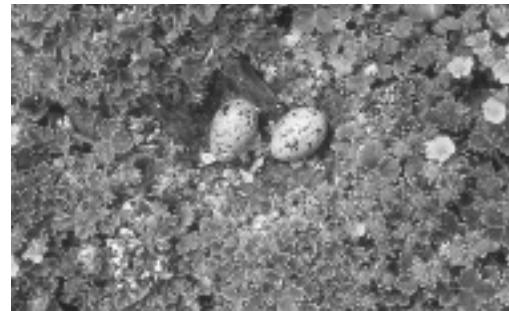


Figure 12. On Triangle Island, most Black Oystercatcher nests are found near the surge-protected upper beaches scattered around the island. Photo by R. Wayne Campbell.

Common Murre – “Of the other sea-birds [besides Cassin’s Auklet and Tufted Puffin] which breed in the cliffs and on the beaches, the most plentiful was the Californian [Common] murre (*Uria troile californica*), but not approaching in quantity to the number of birds to be seen on the guillemots’ nesting cliffs in England or Scotland.”

Bald Eagle – “we found a pair of white-headed eagles ...”

Peregrine Falcon (*Falco peregrinus*) – “two pairs of falcons ...”

Common Raven (*Corvus corax*) – “a family of ravens.”

Other landbird species noted in June 1909 (Pike 1909) included: a “wren” (probably Pacific Wren *Troglodytes pacificus*), the “painted thrush” (probably Varied Thrush *Ixoreus naevius*), a small “warbler” (probably Orange-crowned Warbler *Oreothlypis celata*), two species of “sparrow” (probably Fox Sparrow *Passerella iliaca* and Song Sparrow *Melospiza melodia*), and a flock of “crossbills” (probably Red Crossbill *Loxia curvirostra*). All of these species except Varied Thrush were noted at Triangle Island in late June 1949 and Varied Thrush was noted at nearby Lanz Island in 1950 (Carl et al. 1951).

On 20 June 1910, two Common Murre eggs were collected at Triangle Island, with Burton listed as collector (RBCM #E0223, #E0224; Table 1), but we found only RBCM #E0223 in the collection. We could not find any information about a 1910 trip to Triangle Island by Burton or others. We suspect that these murre eggs were collected for Burton by an unknown person working at the lighthouse or they were collected in 1909 and were mislabeled subsequently. They also may in part represent eggs reported by Drent and Guiguet (1961) as collected on 20 June 1900.

In May 1912, Burton, Green, and Pike apparently attempted another trip to Triangle Island, when they noted Crested Auklets (*Aethia cristatella*) “along the north end of Vancouver Island” (Brooks and Swarth 1925, Munro and Cowan 1947, Sealy and Carter 2012). Brooks (1930) also referred to a 1913 trip (but possibly actually in 1912) to Triangle Island by Green, Pike, and Burton but it apparently was too rough to land or otherwise make it to the island. We could not find any ornithological findings at Triangle Island by Burton, Green, and Pike from 1912 or 1913 trips (Carl et al. 1951, Drent and Guiguet 1961).

In July 1913, five Common Murre eggs were collected at Triangle Island: four (RBCM #E1151, #E0225, #E0226, #E0227) by William A. Newcombe and one (RBCM #E2079) that lacked a collector’s name. Glaucous-winged Gull eggs also were collected (Drent and Guiguet 1961). The 1913 trip to Triangle Island by C.F. Newcombe and his son, W.A. Newcombe, focused mainly on sealions and plants, likely accounting for the few seabird eggs collected (Newcombe and Newcombe 1914, British Columbia Provincial Museum 1921, Carl et al. 1951, Drent and Guiguet 1961).

Pike also wrote an unpublished and undated manuscript (pre-1916) titled “The northern coast line of British Columbia?” (BCA I/NA/P63.2), where he included many observations that apparently refer to the 1909 Triangle Island trip and perhaps indicates subsequent knowledge of storm-petrel eggs collected at the island. On page 5 of this manuscript, he noted that: “... the land birds are replaced by the petrels, shearwaters and many other birds which make little use of the land except during the nesting season.”

Tree Islets (Queen Charlotte Strait, North Vancouver Island) – 1910



Figure 13. Tree Islets are situated off northeastern Vancouver Island in Queen Charlotte Strait, BC. Seven seabird species breed on the four islets (6.9 ha). Photo by R. Wayne Campbell.



Figure 14. The three smaller Tree Islets are mostly bare but the main islet has a Sitka spruce (*Picea sitchensis*) forest with an understory of salmonberry, elderberry (*Sambucus* sp.), currant (*Ribes* sp.), and bracken fern (*Pteridium aquilinum*). Photo by Michael S. Rodway.

The next evidence of storm-petrels breeding in British Columbia was one Fork-tailed Storm-Petrel egg specimen (Munro and Cowan 1947; RBCM #E35) and one Leach’s Storm-Petrel egg specimen (RBCM #E34), both collected by Burton on 25 June 1910 on a small island at the entrance to Queen Charlotte Sound. Drent and Guiguet (1961) did not include either record, apparently because they ignored records with



Figure 15. Fork-tailed Storm-Petrel egg (RBCM #E35) collected on 25 June 1910 at Tree Islets, BC, by W. Burton. This is the second breeding record for British Columbia. *Photo by Gavin Hanke.*

vague locations. Queen Charlotte Sound and Queen Charlotte Strait are contiguous and often confused (Carter and Sealy 2008). Munro and Cowan (1947) also did not mention Burton as the collector of the Fork-tailed Storm-Petrel egg, even though Burton's name was written on labels for both eggs. We have determined below that this small unnamed island most likely was the Tree Islets (50.98° N; 127.72° W; Figure 13) off Pine Island in western Queen Charlotte Strait, near the entrance to Queen Charlotte Sound, where breeding by Leach's Storm-Petrel was noted by Young (1930, 1931) in 1929, and where breeding by both storm-petrels has been subsequently recorded (Campbell 1976, Campbell et al. 1990, Rodway and Lemon 1991, Rodway 1991). We consider the single eggs of each species apparently collected at the Tree Islets in 1910 to be the second breeding records of the Fork-tailed Storm-Petrel (Figure 15) and Leach's Storm-Petrel (Figure 16) in British Columbia.

In a letter dated 26 January 1919 by William Spreadborough to Percy A. Taverner (CMNAC/1996-021), Spreadborough stated:



Figure 16. Leach's Storm-Petrel egg (RBCM #E34) collected on 25 June 1910 at the Tree Islets, BC, by W. Burton. This is the second breeding record for British Columbia. *Photo by Gavin Hanke.*

"I am sending you a few notes that I got from Mr. Green some years since

Tufted Puffin. Triangle Island Eggs 17 June

California [Common] Murre. Triangle Island. Eggs 17 June.

Rhinoceros Auklet. Pine Island, Eggs 20 May.

Cassin's Auklet. Triangle Island. Eggs hatched June

Gray Forktailed Petrel [Fork-tailed Storm-Petrel], small island north of Pine Island Eggs 20 May.

Leach's Forktailed Petrel [Leach's Storm-Petrel], small island north of Pine Island Eggs 20 May."

"I am sending these notes to give some idea of the breeding season of some of the sea bird [sic]. Mr. Green was disappointed at the number of birds that he found breeding on Triangle Island he thought before he went there that he would find a number of species but it was not the case ..."

Breeding seabirds were described early in the 20th century at Pine Island because a lighthouse had been built there in 1907, allowing easy transportation and access. Much earlier, the first breeding record for Rhinoceros Auklet in British Columbia also apparently had been obtained there, in 1858 (Carter and Sealy 2011). On 31 May 1901, a Rhinoceros Auklet egg also was collected by an unidentified collector (RBCM #E2097), possibly Newcombe, who visited the area around this time but we could not confirm that he had visited Pine Island (he may have purchased the egg). On 14 May 1907, Green also collected a Rhinoceros Auklet egg at Pine Island (Carter and Sealy 2011; RBCM #E1535). In 1909, Green and Burton visited Pine Island and collected a Rhinoceros Auklet egg on 25 June (*i.e.*, on the same day of June as the 1910 visit), with Burton recorded as the collector (Young 1930, 1931; RBCM #E247). Drent and Guiguet (1961) reported that Burton also collected a Rhinoceros Auklet egg at Pine Island in 1910 but we did not find this specimen in the RBCM.

We believe that notes pertaining to storm-petrels and Rhinoceros Auklets in the Pine Island area, obtained by Green years before Spreadborough's January 1919 letter, referred to a 20 May 1912 or 1913 visit (likely in association with the planned Triangle Island trip mentioned above), rather than the 25 June 1909 or 1910 visits. Green noted storm-petrels breeding on a "small island north of Pine Island," which suggests Tree Islets (Figure 10). This is the closest small island with breeding storm-petrels, and is about 0.4 km north of Pine Island. However, storm-petrels also breed on the Reid Islets and Storm Islands, which are north to northwest of Pine Island and about 3.0 km and about 3.2 km distant, respectively, as well as at the Buckle Group about 3.6 km to the east (Campbell 1976; Rodway and Lemon 1991; Figure 3). It seems most likely that Green and Burton collected storm-petrel eggs from Tree Islets on 25 June 1910 and Burton retained them for his collection. In any case, we did not find any other information about trips by Green or Burton to Pine Island or Tree Islets in 1910. Other notes provided by Green about Tufted Puffin, Common Murre, and Cassin's Auklet (Figure 17) in June at Triangle Island appear to reflect an amalgamation of information from 1909 obtained by Green, Burton, and Pike (see Triangle Island above).

Starting in 1910, Green (1916) turned much of his attention to Peregrine Falcons and seabirds at Langara Island, Haida Gwaii, BC, but he still managed to visit the Queen Charlotte Strait area in May 1912 or 1913 with Burton and Pike.



Figure 17. Cassin's Auklet is one of seven species of seabirds known to breed on Tree Islets. This chick was extracted from its burrow on the islets on 12 June 1976. Photo by R. Wayne Campbell.

Campbell et al. (1990) listed the earliest breeding records for Fork-tailed Storm-Petrel and Leach's Storm-Petrel at Tree Islets in 1909 (without details but based on records catalogued in the British Columbia Nest Record Scheme [BCNRS]). At our request, R.W. Campbell (pers. comm.) re-examined BCNRS records and found a photocopy of the record card for the Fork-tailed Storm-Petrel egg (RBCM #35) collected on 25 June 1910. The year 1909 reported by Campbell et al. (1990) for Fork-tailed and Leach's storm-petrels breeding at Tree Islets appears to be an error; 1910 is correct for both species, as outlined above. We did not find any information in the BCNRS about breeding by Leach's Storm-Petrels at Tree Islets in 1910 but we have provided other support for documented breeding in 1910 at Tree Islets.

Cox Island (Northwest Haida Gwaii) – 1920



Figure 18. Cox Island is a small island in Cloak Bay off the southwest side of Langara Island, BC. This west side view from June 1946 shows Langara Island in the background. *Photo by Charles J. Guiguet.* Reprinted from Drent and Guiguet (1961:8).



Figure 19. The plateau atop Cox Island is forested but sheer cliffs and conglomerate rock pillars have provided nesting sites for Pelagic Cormorants and Peregrine Falcons. This south end view shows porthole rock on 18 May 1977. *Photo by Michael S. Rodway.*

Both species of storm-petrel were reported breeding, supported by specimens, at Cox Island (54.20°N ; 133.02°W ; Figures 1 and 4) off Langara Island by Allan C. Brooks and Green on 22 July 1920 (Brooks and Swarth 1925, Brooks 1926, Taverner 1926, 1928, Drent and Guiguet 1961). We consider these observations and specimens to represent the third breeding record for each storm-petrel species in British Columbia. Carter and Sealy (2010) reported one chick specimen of Fork-tailed Storm-Petrel (MVZ #99150; Figure 20) and three incubating adult Leach's Storm-Petrels (MVZ #81730, #99138, #99139) collected at Cox Island by Brooks on 22 July 1920. Searching ORNIS more recently, we uncovered more Fork-tailed Storm-Petrel specimens, originally in the Brooks collection — one adult (AMNH #349402) and one chick (AMNH #349383) — also collected on 22 July 1920 at the “Queen Charlotte Islands (Langara Island),” which we believe were actually collected at nearby Cox Island because Brooks did not report breeding at Langara Island at this time (Brooks and Swarth 1925, Brooks 1926). Later, in 1952, breeding at Iphigenia Point, Langara Island, by Fork-tailed

Storm-Petrel was documented by Guiguet (Drent and Guiguet 1961). Drent and Guiguet (1961) apparently did not have access to the details of these storm-petrel specimens for Cox Island in 1920 and they also apparently missed or disregarded: (1) information on Ancient Murrelets and Cassin's Auklets breeding at Cox Island, referred to as “an islet in Cloak Bay,” also in 1920; and (2) some 1910-1915 information at Langara Island cited in Green (1916) who had documented breeding there by Cassin's Auklets, Rhinoceros Auklets, and Tufted Puffins (Sealy and Carter 2007, Carter and Sealy 2010, 2011).

Although the only specific breeding locality in British Columbia reported was Cox Island, Brooks and Swarth (1925:30) also noted that both Fork-tailed and Leach's storm-petrels were “Resident and breeding at a number of points along the outer coast line,” likely referring to breeding at Triangle Island in 1909 and Tree Islets in 1910, about which Green was knowledgeable. We are not aware of any visits to other islands by Brooks and Green along the northwest coast of Graham Island where they could have encountered other storm-petrel colonies.



Figure 20. Soon after hatching, the chick of the Fork-tailed Storm-Petrel is a fluffy ball of gray down. *Photo by R. Wayne Campbell.*

Cleland Island (Southwest Vancouver Island) – 1925



Figure 21. Cleland Island is a low 7.7 - ha non-forested basalt island, dominated by grasses and shrubs. It has supported up to nine species of breeding seabirds. *Photo by R. Wayne Campbell.*

Both species of storm-petrels were reported breeding at Cleland Island (49.17° N; 126.08° W; Figure 21) off Clayoquot Sound on the southwest coast of Vancouver Island by Solomon J. Darcus in 1925: on 14 June, one Fork-tailed Storm-Petrel egg (ROM #500065) was collected and, on 19 June, two Leach's Storm-Petrel eggs (RBCM #E1470; UBC #81) (Munro and Cowan 1947, Drent and Guiguet 1961; Darcus 1927 also mentioned this visit). Munro and Cowan (1947) referred to one of the Leach's Storm-Petrel eggs as a Fork-tailed Storm-Petrel egg, apparently in error. Carter (2004:41) provided some unpublished notes from a letter written by Darcus to James A. Munro on 21 July 1925, which also indicated breeding by "about one hundred pairs" in 1925. We consider these observations and specimens to be the fourth breeding record for each storm-petrel species in British Columbia.



Figure 22. The central grassy portion of Cleland Island provides sufficiently deep soil for burrow-nesting Fork-tailed and Leach's storm-petrels but they also nest under scattered driftwood. *Photo by R. Wayne Campbell.*

Lepas Bay Islands, Tian Islets and Other Colonies (Northwest Haida Gwaii) – 1927



Figure 23. An old photograph, found in the British Columbia Nest Record Scheme, was hand labeled “Petrel Island, Le Pas [sic] Bay, West Coast of Graham Island B.C. June 1927 Albert Peve and Wesley Birtch [sic] on beach.” The print was later confirmed to have captured one of the Lepas Bay Islands. The photographer and inscriber are unknown.

Darcus, assisted by a friend, Wesley E. Burtch of Penticton, collected and observed birds at Langara Island and along the west coast of Graham Island from 10 April to 13 July 1927 (Darcus 1927, 1930). During this work, we contend that Darcus visited Lepas Bay Islands (53.97° N; 133.05° W; Figures 23 and 24) and Tian Islets (53.76° N; 133.08° W) (Figure 3), resulting in the first breeding records of Fork-tailed and Leach’s storm-petrels at these islands and collectively the fifth breeding record for each species in British Columbia. However, these discoveries were incompletely reported by Darcus and were not mentioned by Drent and Guiguet (1961). Here, we outline considerations made in our re-assessment and confirmation of these discoveries.

For storm-petrels, Darcus (1930:45-46) reported findings obtained in 1927:

Fork-tailed Storm-Petrel – Abundant, several large breeding colonies of the species being found. The first egg of the species was found on May 14th, but most of them were producing their single egg the last



Figure 24. East side of the west island of Lepas Bay Islands on 23 May 1977. Photo by Michael S. Rodway.



Figure 25. Finding an adult Fork-tailed or Leach's storm-petrel incubating an egg in a burrow is the best way to identify species at storm-petrel nests; both storm-petrels species lay similar-sized all-white eggs. Photo by R. Wayne Campbell.

week in May. The Fork-tailed nests at least a month earlier than the Leach's Petrel.

Leach's Storm-Petrel – Abundant. Mixed breeding colonies of both Leach's and Fork-tailed were found. The first eggs of Leach's Petrel were found on June 30th. The egg is indistinguishable from that of Fork-tailed Petrel (Figure 25).

From a brief reading of these notes about storm-petrels, one could deduce that Darcus referred only to the Cox Island colony, which he certainly visited and collected seabird eggs in 1927 (see below). However, by reading his accounts of other seabird species, a different picture emerges:

Cassin's Auklet – Abundant, breeding all along the coast of Langara Island and along the west coast of Graham Island, where I found scattered breeding colonies for thirty miles. This is the first of the family to nest, eggs in advanced state of incubation being seen as early as April 15th.

Ancient Murrelet – Abundant; the most abundant of the family on Langara Island, its nesting burrows being found as far as one-quarter mile from the sea. I also found breeding colonies of the species on both the north and west coasts of Graham Island. The Indians say it breeds on Hippo [sic] Island, about 50 miles down the west coast of Graham. Hippo Island may be the most southerly breeding place of the species.

Through museum visits and ORNIS searches, we also found the following egg specimens of Fork-tailed Storm-Petrel, Leach's Storm-Petrel and Cassin's Auklet collected by Darcus between 4 April and 30 June 1927 (Table 2):

- (1) 4 April: one Cassin's Auklet egg at Langara Island;
- (2) 22-24 April: three Cassin's Auklet eggs at Langara Island;
- (3) 14 May: two Cassin's Auklet eggs at Cox Island;
- (4) 21 May: six Fork-tailed Storm-Petrel eggs, four at Cox Island and two at Queen Charlotte Islands;
- (5) 1 June: five Fork-tailed Storm-Petrel eggs, two at Cox Island, two at "West coast of Graham Island", and one at "Graham Island";
- (6) 6 June: 12 Fork-

Table 2. Egg specimens of Fork-tailed and Leach's storm-petrels and Cassin's Auklet collected by Solomon J. Darcus at northwest Graham Island, BC in 1927.

Species	Date	Location	Museum¹	Specimen No.
Fork-tailed Storm-Petrel	21 May	Queen Charlotte Islands	CUMV	#45039
	21 May	Cox Island	ROM	#500066
	21 May	Cox Island	ROM	#500067
	21 May	Cox Island	ROM	#500068
	21 May	Cox Island	ROM	#500069
	21 May	Queen Charlotte Islands	WFVZ	#95955
	1 June	Cox Island	RBCM	#E1476
	1 June	West coast of Graham Island	RBCM	#E1477
	1 June	Graham Island	RBCM	#E1479
	1 June	Cox Island	RBCM	#E1483
	1 June	West coast of Graham Island	UBC	#87
	6 June	West coast of Graham Island	CMNAV	#E2558
	6 June	Petrel Island	PSM	#11651
	6 June	Petrel Island	RBCM	#E1474
	6 June	Petrel Island	RBCM	#E1475
	6 June	West coast of Graham Island	RBCM	#E1478
	6 June	West coast of Graham Island	RBCM	#E1480
	6 June	West coast of Graham Island	RBCM	#E1481
	6 June	Queen Charlotte Islands	RBCM	#E1482
	6 June	Sm. is. off west coast Graham Is.	WFVZ	#95954
	6 June	Queen Charlotte Islands	WFVZ	#120723
	6 June	Sm. is. off west coast Graham Is.	WFVZ	#120724
	6 June	Queen Charlotte Group	WFVZ	#181832
	10 June	Queen Charlotte Islands	WFVZ	#123751
Leach's Storm-Petrel	30 June	Cox Island	RBCM	#E1472
	30 June	Cox Island	RBCM	#E1473
	30 June	Cox Island	ROM	#500051
	30 June	Cox Island	ROM	#500052
	30 June	Cox Island	ROM	#500053
	30 June	Cox Island	ROM	#500054
	30 June	Queen Charlotte Group	WFVZ	#122025
	30 June	Queen Charlotte Group	WFVZ	#122026
	30 June	Queen Charlotte Group	WFVZ	#122027
	30 June	Queen Charlotte Group	WFVZ	#123723
Cassin's Auklet	4 April	Langara Island	ROM	#504343
	22 April	Langara Island	RBCM	#E1532
	23 April	Langara Island	RBCM	#E1530
	24 April	Langara Island	ROM	#504344
	14 May	Cox Island	RBCM	#E0245
	14 May	Cox Island	RBCM	#E0246
	20 June 1977	Langara Island	ROM	#504346

¹ Museum acronyms are given in the acknowledgements.

tailed Storm-Petrel eggs, three at “Petrel Island”, six at “West coast of Graham Island” or “Small island off west coast of Graham Island”, and three at Queen Charlotte Islands or Queen Charlotte Group; (7) 10 June: one Fork-tailed Storm-Petrel egg at Queen Charlotte Islands; and (8) 30 June: nine Leach’s Storm-Petrel eggs, five at Cox Island and four at the Queen Charlotte Group.

We suspect that Drent and Guiguet (1961) considered that all of these storm-petrel eggs had been collected at Cox Island in 1927 because: (1) Guiguet was not aware of the existence of the Lepas Bay Islands as he apparently did not visit them in 1947 when he investigated most seabird breeding colonies on the west coast of Graham Island (Drent and Guiguet 1961); (2) specimens on 1 June had both “Cox Island” and “West coast of Graham Island” as localities, potentially indicating that “West coast of Graham Island” was a less precise way of recording Cox Island; and (3) Darcus (1930) and egg specimen data alone did not provide sufficient detail to fully confirm Lepas Bay Islands for any specimens. Most egg cards merely indicated that eggs were taken from burrows. One card for an egg (RBCM #E1483) collected on Cox Island noted that it was taken “in burrow on summit,” which seemed to confirm this location based on the geography of this steep-sided island with a plateau on top. On another egg card for “West coast of Graham Island” (RBCM #E1480), it was noted that the egg was taken “in a deep burrow in small island,” which is consistent with the topography of Cox Island but also for Lepas Bay Islands. Further, on an original Darcus egg card for “Petrel Island” (PSM #11651), it was noted that the “nest was in deep burrow beneath trees on summit,” consistent with Cox Island or Lepas Bay Islands.

We deduced from Darcus (1930) and specimens that Darcus and Burtch travelled at least 30 miles [48 km] south of Cape Knox but not as far as Hippa Island, about 50 miles [80 km] south, between 1 and 7 June 1927. Based on coastal geography in this region, we suspect they travelled as far south as Otard Bay (minimum distance by water about 52 km; distance measurements made with an on-line distance calculator). Four storm-petrel and/or alcid colonies south of Cape Knox subsequently have been

described (Table 3). For Darcus to find “several large colonies” of storm-petrels in the region searched (*i.e.*, Langara Island area and 48 km south of Cape Knox), would have required him to have visited Cox Island, Lepas Bay Islands and Tian Islets. We doubt that Darcus found storm-petrels breeding at Wooded Islets or Frederick Island (see Figure 3 for locations) where only very small numbers bred or were present in 1980 and 1981 (Rodway et al. 1994). Despite Darcus’s use of the name “Petrel Island” for certain egg specimens, we do not believe that he intended to refer to “Petrel Islet” (53.55°N; 133.02°W) off Hippa Island, where both species of storm-petrel also breed (Vermeer et al. 1988, Rodway 1991, Rodway et al. 1994). As already noted, we do not believe that Darcus travelled as far south as Hippa Island in 1927. Most label information did not allow confirmation of these locations. However, two nagging issues suggested that “Petrel Island” and Cox Island could be one and the same location: (1) both collection dates (1 and 6 June) had some egg cards with the vague location “West coast of Graham Island”; and (2) the nest description on one egg card (PSM #11651) at “Petrel Island” indicated that the island was forested on its “summit” (Cox Island is sparsely forested with some tall trees (Figures 18 and 19) on the 90-m high plateau that better resembles a summit but Lepas Bay Islands have only stunted Sitka spruce on the main island’s hilly interior at lower elevation (about 20-30 m; Figures 23 and 24). We have treated these possible inconsistencies as potentially reflecting either: (1) poor record keeping or confusion of data by Darcus between locations when collecting many specimens in a short time from nearby and poorly described localities; or (2) poor transcription of data later from original egg cards to museum egg cards. The weight of evidence leans heavily towards Lepas Bay Islands as the “Petrel Island” on the “West coast of Graham Island” that Darcus intended and we have surmised that eggs collected on 6 June 1927 were from the colony on Lepas Bay Islands.

To find scattered colonies of Cassin’s Auks over 48 km, Darcus also would have had to visit Lepas Bay Islands, Frederick Island, and Tian Islets — the first breeding records for these islands. To find at least one Ancient Murrelet colony south of the Langara Island area, he would have had to visit Frederick Island — the first breeding record for this

Table 3. Years when breeding was first recorded (or suspected [S]) for six seabird species at seven islands between Langara Island and Otard Bay, northwest Graham Island, BC.

Breeding Colony	Fork-tailed Storm-Petrel	Leach's Storm-Petrel	Ancient Murrelet	Cassin's Auklet	Rhinoceros Auklet	Tufted Puffin
Langara Island	1952	-	1910	1910-1915	1910-1915	1910-1915
Cox Island	1920	1920	1920	1920	-	1920
Lucy Island	-	-	1926	1926	-	-
Lepas Bay Islands	1927	1927	-	1927	-	-
Wooded Islet	1980	-	-	-	-	-
Frederick Island	S (1980-1981)	S (1980-1981)	1927	1927	S (1980-1981)	-
Tian Islets	1927	1927	-	1927	-	-

Sources: Green (1916), Brooks and Swarth (1925), Brooks (1926), Darcus (1927, 1930), Young (1927), Drent and Guiguet (1961), Campbell and Garrioch (1979), Rodway (1991), Rodway et al. (1994), Sealy and Carter (2007), and Carter and Sealy (2010, 2011, this paper).

important colony. In addition, Darcus mentioned that Haidas had reported breeding by Ancient Murrelets at Hippa Island — also the first reported breeding at this important colony. Except for Lepas Bay Islands (see below), these colonies were later well documented by Guiguet in 1947 (Drent and Guiguet 1961).

We believe that Darcus and Burtsch travelled south of Cape Knox after collecting eggs at Cox Island on 1 June. Darcus (1930) reported Brant (*Branta bernicula*) on the north coast of Graham Island on 7 June and the first Tufted Puffin eggs at Langara Island on 8 June (RBCM #E1500, #E1501), indicating that he returned to the Langara Island area on either 6 or 7 June. He may not have had a map with names for each island, making the recording of specific locations difficult. It seems most likely that he collected Fork-tailed Storm-Petrel eggs at Lepas Bay Islands on 6 June 1927 on the return trip to Langara Island, about nine km (by water) before reaching Langara Island.

One year earlier, between 9 and about 24 June 1926, Darcus had first visited an island near Cape Knox (the only islands in this vicinity are Lepas Bay Islands) and later reported breeding by Rhinoceros Auklets there to his field companion, Rev. C. J. Young, but no eggs were found and breeding storm-petrels

were not mentioned (Young 1927; also see Darcus 1927 for trip dates). In 1926 at Lepas Bay Islands, Darcus may have misidentified large Cassin's Auklet chicks or found empty Cassin's Auklet burrows (breeding confirmed in 1972; see below) and may have seen Rhinoceros Auklets in nearby waters in 1926; he also may have noted possible storm-petrel burrows in 1926 but he apparently did not excavate any. Darcus (1927, 1930) did not mention Rhinoceros Auklets breeding at an island near Cape Knox, which suggests he changed his mind about breeding there and instead he likely noted Cassin's Auklets breeding there in 1927, which is consistent with his description of scattered breeding colonies for 48 km.

In 1926 and 1927, Darcus searched extensively for the nest and eggs of the Marbled Murrelet (*Brachyramphus marmoratus*) in the Langara Island area (Darcus 1927, Young 1927). Brooks (1926) had described a possible Marbled Murrelet egg collected at Cox Island in 1920 (see Carter and Sealy 2010). Darcus's purported Marbled Murrelet nest discoveries at Cox Island in 1927 were later dismissed as misidentifications of Ancient Murrelet eggs (Drent and Guiguet 1961). Darcus (1930) summarized several other findings during his work in the Langara Island

area in 1927, but he wrote little about these findings likely because: (1) they seemed less important because Brooks and Green had recently documented all burrow-nesting seabird species in the Langara Island area (Brooks and Swarth 1925) and (2) Darcus likely did not originally intend to search for seabird nests for 48 km down the west coast of Graham Island and may have been ill-prepared, without maps showing island names and locations. Regardless, the first documentation of breeding storm-petrels, Ancient Murrelets (Figure 26), and Cassin's Auklets along the northwest coast of Graham Island south of Langara Island seems to have been underappreciated and poorly stated at the time (Darcus 1930), and was missed or excluded by Drent and Guiguet (1961).



tracted from a nesting burrow. Photo by Michael S. Rodway.

Campbell et al. (1990) listed the earliest breeding record for Fork-tailed Storm-Petrel and Leach's Storm-Petrel at "Lepas Islet" as 1927 (without details but based on records located within the BCNRS), although we could not find any direct evidence of breeding Leach's Storm-Petrels at Lepas Bay Islands in 1927. The BCNRS contained record cards for six Fork-tailed Storm-Petrel eggs (apparently the six RBCM specimens) collected by Darcus at "Petrel Island" or "West coast of Graham Island" on 6 June 1927 (Table 2) and four nestling Fork-tailed Storm-Petrels (ANSP #100885, #100887, #100888, #100889) collected by Darcus at "Petrel Island, Parry Passage, QCI" on 29 July 1930. We suspect strongly that the four nestlings were obtained by R.A. Cumming at Cox Island (the only "petrel" island in this area located on the north side of Parry Passage) on 29 July

1930. Cumming (1931) reported collecting adults, downy young, and eggs of Fork-tailed Storm-Petrels and adults and eggs of Leach's Storm-Petrels at Cox Island in July 1930. Through an ORNIS search and museum contact, we found a total of 11 Fork-tailed Storm-Petrel specimens (eight nestlings and three adults; ANSP #100884 to #100894) and three Leach's Storm-Petrel specimens (one nestling and two adults; ANSP #100895 to #100897) that were labeled as collected at "Petrel Island, Parry Passage" on 29 July 1930, with collectors listed as S.J. Darcens and H.S. Drinker III. In addition, 13 more Fork-tailed Storm-Petrel specimens, including eight nestlings (see Figure 20) and 5 adults (ANSP #100871 to #100883), and 18 more Leach's Storm-Petrel specimens, all adults (ANSP #100898 to #100907, #100909 to #100916), were labelled as collected by S.J. Darcens at Cox Island on 19, 21 or 25 July 1930. We also found one more Leach's Storm-Petrel egg that had been collected at Cox Island on 19 July 1930 with Darcus listed as collector (RBCM #1471). We are not aware of a collecting trip by Darcus to the Langara Island area in 1930 (or any time after 1927) and we do not believe that he collected any specimens at Cox Island in 1930. Darcens and Drinker may have accompanied Cumming in July 1930 but this was not mentioned by Cumming (1931). The similarity of the names S.J. Darcus and S.J. Darcens is confusing and may reflect mis-copying of names, but H.S. Drinker definitely is someone else. We have not been able to confirm an egg collector named S.J. Darcens but H.S. Drinker, Jr., was recorded as a bird collector in North Carolina in December 1930 (CAS #66136, #66141, #66333). Eggs collected by Cumming also may have ended up in Darcus's, Darcens's, or Drinker's collections. Using ORNIS, we also found egg specimens of several other bird species (including one Ancient Murrelet egg set) that were recorded as being collected by Darcus at Langara Island between 26 April and 16 May 1936 (PSM #13472, #13473, #14757, #15188, #16583, and #16610). We suspect that these specimens have the wrong year and actually were collected in 1927 by Darcus (when he was in the Langara Island area in April-July) and not in 1926 (when he was present only in June) (Darcus 1927, 1930; Young 1927).

Stapled to a BCNRS card, an intriguing, old faded photographic print (Figure 23) was found with

the following information handwritten in pencil (author unknown) on the back:

"Petrel Island, Le Pas [sic] Bay, West Coast of Graham Island B.C. June 1927 Albert Peve and Wesley Birtch [sic] on beach."

The island in the photo appears to be the main island of Lepas Bay islands. Peve was a resident of Langara Island from the 1920s to early 1950s (R.W. Nelson pers. comm.) and was recorded as a bird collector in this area in September to October 1937, at times with Brooks (e.g., MVZ #103810, #104807). Peve was not mentioned as being present in 1927 by Darcus (1927, 1930), although Burtch was. Regardless of the exact date of the photo, we point out that "Petrel Island" was known to be located in Lepas Bay on the west coast of Graham Island by the unknown inscriber.

Guiguet apparently did not visit Lepas Bay Islands during his work, which was mainly focused on nearby Langara and Cox islands in 1946, 1947, and 1952, and he also missed it when he visited most other seabird breeding islands on the west coast of Graham Island, at least as far south as MacKenzie Island (south of Hippa Island) in 1947 (Drent and Guiguet 1961). Breeding seabirds at Lepas Bay Islands were first described in greater detail in 1971 and 1972. On 31 July 1971, SGS and K.R. Summers (unpublished data retained by R.W. Campbell and M.S. Rodway) briefly visited the main island, and roughly estimated about 1,000 pairs of storm-petrels. Four Fork-tailed Storm-Petrel burrows contained a small chick ($n = 1$), a medium chick ($n = 2$; see Figure 20), and an adult and an egg ($n = 1$). One of the Fork-tailed Storm-Petrel chicks was photographed (Figure 27). Breeding by Leach's Storm-Petrels at Lepas Bay Islands was confirmed in 1971 (although apparently first noted there by Darcus in 1927) when Leach's Storm-Petrels were considered "more abundant than Fork-tailed Storm-Petrels." Details of Leach's Storm-Petrel burrows examined were not recorded, except for one burrow with an adult and egg (Figure 25) that were photographed (Figure 28). Many burrows were empty.



Figure 27. Fork-tailed Storm-Petrel chick. Photo by Spencer G. Sealy, Lepas Bay islands, July 1971. BC Photo 3756 (see Campbell and Stirling 1971).

In 1972, R.W. Nelson (University of Calgary) and his wife, Alora, visited Lepas Bay Islands on 8 June and 7 August and recorded (in the BCNRS):

Fork-tailed Storm-Petrel – On 8 June, 20 burrows contained an adult and egg ($n = 4$), egg only ($n = 1$), adult only ($n = 2$), or were empty ($n = 2$) or too deep and not reachable ($n = 11$); 100-500 nests roughly estimated and most birds appeared to have laid eggs by this date. On 7 August, chicks were found in two burrows and Nelson "guess[ed] Leach's are two to three times as many as Fork-tails."

Leach's Storm-Petrel – On 8 June, two burrows had "pairs of Leach's in them in the same area as the Fork-tails were found." On 7 August, 13 reachable burrows contained one egg only ($n = 3$), two eggs ($n = 1$), adult only ($n = 2$), or were empty ($n = 7$), with many other burrows checked and too deep to access; most birds appeared to have laid eggs somewhat recently and some had not yet laid eggs; Nelson "Guess[ed] Fork-tails are about 1/3-1/2 as many as Leach's."

Cassin's Auklet – On 8 June, one burrow contained a medium-sized chick.

Pigeon Guillemot – On 8 June, several pairs attempting copulation, flying to the top of the cliffs and disappearing into the grass, perched on the rocks and in the water; no nests found but 25-30 nests estimated.



Figure 28. Leach's Storm-Petrel adult and egg extracted from burrow on an island in Lepas Bay, BC. Photo by Spencer G. Sealy, Lepas Bay islands, July 1971. BC Photo 3755.

Breeding by Cassin's Auklet was confirmed at Lepas Bay Islands in 1972, although apparently was first noted there by Darcus in 1927 (see above). Storm-petrel breeding phenology in 1972 suggested that Darcus's visit to Lepas Bay Islands on 6 June 1927 may have been too early in the breeding season to obtain eggs of Leach's Storm-Petrels but Darcus probably discovered adults in burrows at both Lepas Bay Islands and Tian Islets. This explanation jibed with his statement that "Mixed breeding colonies of both Leach's and Fork-tailed were found" (Darcus 1930:46), whereas we found Leach's Storm-Petrel egg specimens obtained only at one colony (Cox Island) on 30 June (Table 2). Darcus's visit to Lepas Bay Islands on 6 June 1927 also may have been too late in the breeding season to obtain auklet egg specimens, given his comment about auklets that "This is the first of the family to nest, eggs in advanced state of incubation being seen as early as April 15th" (Darcus 1930:45-46) and the latest date of egg collection at Cox Island was 14 May, although one egg was collected on 20 June at Langara Island. (Table 2). Instead, he probably noted auklet chicks between 1 and 7 June at Lepas Bay Islands, Frederick Island, and Tian Islets.

Conclusions

Our efforts to piece together published and unpublished historical information on breeding storm-petrels in British Columbia resulted in the re-discovery or clarification of the earliest breeding records of Fork-tailed Storm-Petrel and Leach's Storm-Petrel and early records of several alcids, some other birds, and marine mammals. As we have already established in other recent papers and further emphasize here, the history of breeding seabirds in British Columbia was not fully covered in Drent and Guiguet (1961) and much work is still required to retrieve and assess historical records for an eventual revision of this valuable document (Carter et al. 2001, Sealy and Carter 2007, Carter and Sealy 2008, 2010, 2011). Knowledge of historical seabird breeding records in British Columbia enhances our understanding of long-term changes in population and community structure, and facilitates assessments of expected benefits at seabird colonies from conservation and restoration actions. ↗

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About the Authors



Harry is a private consultant specializing in seabird research, monitoring, surveys, restoration, and conservation on the west coast of North America from Alaska to Baja California. He was a key participant on the first coast-wide seabird colony surveys of British Columbia conducted in 1975 to 1977 by the British Columbia Provincial Museum, under the supervision of R. Wayne Campbell and Charles J. Guiguet, which gave him intimate knowledge of many seabird colonies along the British Columbia coast, as well as stimulating an interest in museum specimens and the historical literature.



Spencer is a professor emeritus of Biological Sciences at the University of Manitoba in Winnipeg. His research has focused on the breeding biology and feeding ecology of seabirds in British Columbia and the northern Bering Sea region, social behaviour of foraging in tropical birds, and the behavioural and evolutionary interactions between avian brood parasites and their hosts. He is past editor of *The Auk* and recently assumed the editorship of *Wildlife Afield*. In retirement, Spencer is completing old projects and initiating new ones.