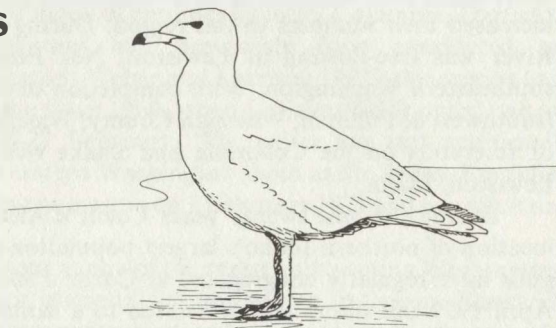


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The *Larus* Gulls of the Pacific Northwest's Interior, with Taxonomic Comments on Several Forms (Part I)

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Editors' note: The peripheral effects of Civilization have done some odd things to the distribution of gulls. We know that, in a general way, but the local and regional details of the phenomenon often go unreported. Gull distribution in the interior of the Pacific Northwest has undergone some marked changes recently, but fortunately the changes have not gone undocumented: John W. Weber, of Pullman, Washington, has taken a special interest in the gulls of his region and has been monitoring their status for several years. In this paper he presents his findings, documenting changes in both gull distribution and in human understanding of it.

Anyone who looks at gulls is bound to wonder occasionally about their complex taxonomy. John Weber has done more than wonder: he has researched the factual and theoretical background for current gull classification, and formulated his own theories. Although some of Weber's conclusions may be at odds with the prevailing opinions on the subject, his ideas certainly merit consideration in the evolving field of gull taxonomy.

SINCE publication of the most recent distributional account of Idaho birds (Burleigh 1972), noteworthy information on the status of gulls in Idaho has accumulated in the form of sight, photographic, and specimen records. This paper presents details of records of gull species new to Idaho and discusses recent distributional changes for some of the known species of gulls from Idaho. The state's first specimen records of Glaucous *Larus hyperboreus*, Iceland *L. glaucoides*, and Thayer's *L. thayeri* gulls are described, and several new records from eastern Washington (east of the Cascades) are presented. In addition, taxonomic comments on the *glaucoides-kumlieni-thayeri* and *glaucescens-occidentalis-argentatus* complexes are included. Data are also given for mantle and wing tip coloration for most of the medium- to large-sized *Larus* gulls known to occur in the Pacific Northwest's interior.

Because the last period of Burleigh's field work in Idaho was from 1947 to 1958, his book does not include some of the state's recent changes in avifaunal distribution. Of the many environmental changes that have occurred since 1958 in Idaho and adjacent areas, two factors probably account for the changes in both abundance and distribution of some species of gulls in this region: man-made reservoirs that satisfy habitat requirements, and nearby garbage dumps which provide an abundant and easily obtainable source of food. The increased number of impoundments in eastern Washington over the last five decades has increased irrigated farmland acreage, providing additional foraging habitat (in warm weather months) for California *L. californicus* and Ring-billed *L. delawarensis* gulls, both of which have apparently increased their numbers in this region. During Burleigh's stay in Idaho, the Snake River was free-flowing at Lewiston, Nez Perce County, and through much of southeastern Washington. With completion of construction of Lower Granite Dam (southwest of Pullman, Whitman County, Washington) on the Snake in 1975, a chain of reservoirs on the Columbia and Snake rivers now links the Pacific Ocean to Lewiston, Idaho.

During the past twenty years Coeur d'Alene, Kootenai County, has been the location of northern Idaho's largest population of wintering gulls. As many as 500 gulls have regularly congregated at Coeur d'Alene's garbage dump each winter. In April 1979 this dump was converted to a sanitary landfill, a site where garbage is deposited and soon covered with soil, reducing the quantity of food available to gulls. As a consequence, fewer gulls might henceforth winter at nearby Coeur d'Alene Lake. Before Walla Walla, Walla Walla County, Washington, substituted a sanitary landfill for a dump in 1978, hundreds of wintering gulls from the Columbia River near Wallula, Walla Walla County, made daily foraging flights (round trip distance, 90km) to the Walla Walla dump. After the dump's conversion to a landfill, the winter population of gulls at Walla Walla plummeted; the writer saw no gulls at this landfill during the 1978-79 winter. As more garbage dumps are replaced by sanitary landfills, it will be interesting to note possible changes in gull distribution over a larger region.

Unless otherwise stated, all of the specimens referred to herein are deposited in Washington State University's Conner Museum (WSUCM).

GLAUCOUS GULL *Larus hyperboreus*

LaFave (1965) recorded this species in Kootenai County, Idaho, and states: "Three immatures were noted at Coeur d'Alene Lake and on the Spokane River at Coeur d'Alene, Idaho, on the 22 February 1963 whereupon photographs were taken at close range by J. Acton. Another immature was noted at Coeur d'Alene on the 16 February 1964." Burleigh (1972) cites LaFave's records, and on the basis of these records says the following of *hyperboreus*: "Apparently of casual occurrence in the northern part of the state . . . It is rather surprising . . . that it is of more than accidental occurrence in Idaho, and it will be of interest to see if in future years it again appears in the state during the winter months."

The writer has three records of this species from Coeur d'Alene, Kootenai County: two first-year immatures (both seen with I.O. Buss; one collected by the writer) on 28 December 1977; one adult and one first-year immature on 31 December 1977; one first-year immature on 26 December 1978. The Glaucous Gull collected on 28 December 1977 is Idaho's first specimen record (WSUCM No. 78-33) of

hyperboreus. This specimen, a male, has the following measurements: wing, 461.5mm; tail, 188.0mm; exposed culmen, 60.5mm; depth of bill at angle of gonys, 20.5mm; tarsus, 76.0mm; weight, 1898.0g. Dimensions compare closely with those listed by Dwight (1925) for male *hyperboreus*. Plumage is pale, mottled brown; the sharply bicolored bill has a pale base and a blackish tip; the tail is mottled.

In addition, the writer observed three first-year Glaucous Gulls near the confluence of the Snake and Clearwater rivers at Lewiston, Nez Perce County, Idaho, and in adjacent Washington (Asotin and Whitman counties) from 21 January to 5 March 1978 (photographs by L. McVicker and the writer on file at WSUCM). This record represents the southernmost occurrence of this species in Idaho and is the first from Washington's southeasternmost block of counties (Asotin, Columbia, Garfield, and Whitman). Although *hyperboreus* had previously been considered as hypothetical in this region of Washington (Weber and Larrison 1977), this species has been known from eastern Washington since 1960, when LaFave (1965) noted two at Spokane, Spokane County, on 25-27 February. The writer has two additional sightings of the Glaucous Gull from eastern Washington (both at the Pasco, Franklin County, garbage dump): one first-year immature on 3 February 1979 and one adult on 28 December 1979.

Jewett *et al.* (1953) list *hyperboreus* as one of the rarest gulls visiting Washington (then known only from coastal waters) in spring, fall, and winter. In Oregon, Bertrand and Scott (1973) list this species as a rare winter visitor along the coast. Recent records suggest that *hyperboreus* is more numerous along coastal areas than previously known. Mattocks and Hunn (1980) report that usually about 25 are now sighted in winter in the northern Pacific Coast region (western regions of Oregon, Washington, and British Columbia). In the interior of the Northwest, however, the records presented herein indicate that the Glaucous Gull now occurs as a scarce but probably regular winter visitor to at least northern Idaho and eastern Washington.

ICELAND GULL *Larus glaucooides*

Discussion of specimen

Burleigh does not include *glaucooides* in Idaho's avifauna, and neither the A.O.U. check-list (1957) nor Godfrey (1966) lists this species occurring west of the Rocky Mountains in North America. Overlooked by Burleigh and Godfrey is the WSUCM specimen (No. 66-129) of a first-year immature female *L. glaucooides* (= *L. leucopterus*) collected by L.D. LaFave at Coeur d'Alene, Kootenai County, on 22 February 1965, noted by Rogers (1965) in Audubon Field Notes, and tentatively identified as *L. g. kumlieni* by the writer. No mention of the disposition or the details of this specimen has heretofore appeared in the literature.

To the best of the writer's knowledge, No. 66-129 is the first specimen of *L. glaucooides* from west of the Rocky Mountains in North America. Purported specimens of the Iceland Gull from California and Washington have been reidentified as other species (Grinnell and Miller 1944; Devillers *et al.* 1971; Mattocks *et al.* 1976). Gabrielson and Lincoln (1959) list two specimen records of the Iceland Gull from Alaska, but their description of these gulls as having "slightly larger" bills than *L. glaucooides* (= *L. leucopterus*) suggests that the specimens are possibly Thayer's Gulls *L. thayeri*. Since the Iceland Gull is not listed in the latest checklist of Alaska birds (Kessel and Gibson 1978), the two purported specimens of *glaucooides* from Alaska

have presumably been reidentified as other species.

Because immature *glaucoides* are sometimes difficult to distinguish from immature *thayeri* (Dwight 1925; Macpherson 1961; Oberholser and Kincaid 1974), the measurements of the LaFave specimen are shown in Table 1 in juxtaposition with those given by Dwight (1925) for Thayer's and Iceland gulls. It should be noted that Dwight did not consider *kumlieni* a race of the Iceland Gull but treated it as a hybrid between *L. thayeri* (= *L. a. thayeri*) and *L. g. glaucoides* (= *L. leucopterus*). Therefore, his measurements and plumage descriptions for *L. leucopterus* pertain only to those gulls he recognized as the eastern race (*L. g. glaucoides*, which breeds in Greenland) of the Iceland Gull. Table 2 gives measurements of No. 66-129 alongside those listed by Smith (1966) for *L. g. kumlieni* and *L. thayeri*. Table 1 shows that the measurements of LaFave's specimen are probably too small for it to be *thayeri*; instead, No. 66-129 appears to be a small Iceland Gull by Dwight's data. Table 2 indicates that the measurements of the LaFave specimen are nearly identical to the average measurements listed by Smith for *L. g. kumlieni*. More significantly, all of the measurements (except wing length) of No. 66-129 fall within Smith's extreme measurements for *kumlieni*, while only one (bill depth at posterior nares) is within Smith's extremes for *thayeri*. Therefore, measurements of this specimen favor its identification as an Iceland Gull and reasonably preclude Thayer's Gull.

Plumage of the LaFave specimen is buff-colored and only slightly darker than the aforementioned *hyperboreus* specimen (No. 78-33), and the bill, except for slight fading at the base, is entirely dark (blackish). The primaries and mottled tail of No. 66-129 more closely resemble those shown by Dwight (1925) for first-year *kumlieni* than those he shows for first-year nominate *glaucoides*. The brownish primaries, slightly darker than the general tone of the wing coverts, of LaFave's specimen lack the subapical spots found in many immature *L. glaucoides*; however, not all immature Iceland Gulls have subapical spots (Macpherson 1961; Andrie, pers. comm.).

TABLE 1. Measurements (mm) of WSUCM No. 66-129 and those from Dwight (1925). No. of specimens, n. Mean values are in parentheses. Weight of No. 66-129 is 885.0g.

	WSUCM No. 66-129	Female Iceland Gull n = 6	Female Thayer's Gull n = 12
Exposed culmen	40.0	39-44 (41.3)	43-56 (48.4)
Depth of bill at angle of gonys	14.7	14-16.5 (15.2)	15.5-17.5 (16.5)
Tarsus	51.5	52-59 (55.8)	58-65 (60.3)
Wing	366.0	378-403 (391.5)	380-405 (395.0)
Tail	145.0	156-165 (160.3)	145-165 (156.8)

TABLE 2. Measurements (mm) of WSUCM No. 66-129 and those from Smith (1966).
 Mean values are in parentheses. No. of specimens, n.

	WSUCM No. 66-129	Females from e. coast of Baffin Is. (<i>hyperboreus</i> , <i>thayeri</i> , <i>kumlieni</i> , and <i>argentatus</i> sympatric).		Females from s.w. Baffin Is. (<i>hyperboreus</i> , <i>kumlieni</i> , and <i>argentatus</i> sympatric).	Females from Frozen Strait (<i>hyperboreus</i> , <i>thayeri</i> , and <i>argentatus</i> sympatric).
		<i>kumlieni</i> n = 341	<i>thayeri</i> n = 187	<i>kumlieni</i> n = 103	<i>thayeri</i> n = 139
Flattened wing	371.0	377-401 (387.3)	380-407 (392.6)	383-407 (392.2)	380-407 (393.9)
Tarsus	51.5	47.3-57.4 (51.65)	53.6-61.0 (58.20)	48.0-57.0 (53.00)	53.2-63.0 (58.07)
Exposed culmen	40.0	34.1-40.1 (37.61)	44.0-51.0 (46.77)	38.0-44.0 (40.77)	42.0-52.7 (46.22)
Bill: anterior nares to tip	19.5	18.0-21.0 (19.50)	21.7-24.8 (23.35)	19.3-22.5 (20.51)	21.0-26.0 (22.97)
Bill: depth at posterior nares	14.2	13.6-15.1 (14.21)	13.9-17.5 (15.02)	13.9-15.3 (14.41)	13.7-17.5 (15.00)

Thus, the preponderance of evidence, in the writer's opinion, suggested the identification of No. 66-129 as *L. g. kumlieni*. This specimen was subsequently examined by R. F. Andrle at the Buffalo Museum of Science, where he compared it with known skins of nominate *glaucoides*, *kumlieni*, and *thayeri*. Andrle found the measurements of No. 66-129 to be smaller than mean measurements given in the literature for *thayeri*. Moreover, he found the primary shading (inner vane of first primary) of No. 66-129 to fall within the color range given by Macpherson (1961) for *kumlieni* but outside Macpherson's range for *thayeri*. Based upon the evidence available to him, Andrle says he "can only conclude that it [No. 66-129] is probably an Iceland Gull." Since he is unaware of constant characters that can be relied upon to distinguish between immature nominate *glaucoides* and immature *kumlieni* (an observation shared by Rand 1942), Andrle did not make a subspecific determination. The writer defers to Andrle's judgment on this matter and believes that the identity of LaFave's specimen should be designated simply as *L. glaucoides*, rather than *L. g. kumlieni*.

Taxonomic discussion of the glaucoides-kumlieni-thayeri complex

Because recent investigations at Home Bay, Baffin Island, have revealed hybridization between *thayeri* and *kumlieni* (W.E. Godfrey, unpublished data; *vide* Andrle), Andrle considered the possibility of No. 66-129 being a hybrid; however, he thinks this possibility is "perhaps remote" since the color of this specimen is similar to that of some Iceland Gull birds of the year taken from or near colonies of *kumlieni* along southwestern Baffin Island, where there are no *thayeri* breeding. Aside from its bearing on the identification of the LaFave specimen, hybridization of these two forms poses interesting questions on the taxonomy of the *glaucoides-kumlieni-thayeri* complex. Are these three forms merely races of one polytypic species? Is gene flow between *kumlieni* and *thayeri* sufficient to maintain a plastic species embracing all three forms?

Before addressing the foregoing questions, a synopsis of the taxonomic history of *kumlieni* and *thayeri* is in order. The form *kumlieni* has been variously treated as: (a) *L. glaucescens* (Kumlien 1879); (b) a full species (Brewster 1883, Taverner 1933); (c) a hybrid of *L. glaucoides* and *L. argentatus* (Dwight 1925); (d) a race of *L. glaucoides* (Rand 1942, A.O.U. check-list 1957). Macpherson (1961) indicates that Thayer's Gull was known to early explorers and was considered by some to be a variety of the "Silvery," or Iceland, Gull. Although W. S. Brooks (1915) described Thayer's Gull as a new species, Dwight (1917, 1925) considered it to be a race (*L. a. thayeri*) of *L. argentatus*, the taxonomic status accorded this form by A.O.U. from 1931 (A.O.U. check-list 1931) until 1973 (Eisenmann 1973); thereafter, A.O.U. treated Thayer's Gull as a distinct species, *L. thayeri*. However, the artist-naturalist Allan Brooks (1937) considered Thayer's Gull specifically distinct from *argentatus* at an earlier date.

Salomonsen (1950) and Macpherson (1961) considered *L. glaucoides* and *L. thayeri* conspecific. Macpherson recognized significant similarities in the *glaucoides-kumlieni-thayeri* complex: preference for cliff-nesting; no divergence in orbital ring coloration; general appearance and proportions. Macpherson, unaware of sympatry in *kumlieni* and *thayeri*, believed that geographical isolation was not an intrinsic isolating mechanism. On the other hand, Smith (1966) established that *kumlieni* and *thayeri* are sympatric on the eastern coast of Baffin Island but was not cognizant of hybridization of these two forms; he believed certain isolating mechanisms effectively prevented interbreeding and therefore treated *kumlieni* and *thayeri* as different species. Smith also observed distinct similarities between these two forms: coincident peaks of reproductive activity where *kumlieni* and *thayeri* are sympatric; randomly mixed nests of *kumlieni* and

thayeri on cliffs where the two forms nest together. In this latter regard, as Smith noted, *kumlieni* and *thayeri* behave as one species. Had Smith known of hybridization of the two forms, perhaps he would have treated them differently.

Smith (1966) considers several factors that reduce the chance of hybridization among four *Larus* gulls (*hyperboreus*, *glaucoides*, *argentatus*, and *thayeri*) that are sympatric in various combinations in the Canadian arctic. He lists three major factors, or isolating mechanisms: temporal pattern of breeding cycle; location of nest site; use of morphological characters in species discrimination. The morphological characters include pigmentation of eye, eye-ring, and wing tips; however, Smith believes that sexual isolation depends almost entirely upon color of eye and eye-ring. He found reproductive isolation complete among the four species. Between *hyperboreus* and *argentatus*, the above mechanisms are understandably effective. As noted by Smith, the peak of sexual activity for *hyperboreus* precedes that of *argentatus* by about two weeks. For nesting, *hyperboreus* uses cliffs, while *argentatus* uses tundra valleys and flat, marshy areas. Contrasting coloration of both orbital ring (*hyperboreus*, yellow; *argentatus*, orange) and wing tip (*hyperboreus*, white; *argentatus*, black) serves to separate these species during breeding (both forms have yellow irides). Hence, the isolating mechanisms discussed by Smith for these two species cogently reduce potential interbreeding. But it should also be noted that these two forms are now known to hybridize in Iceland (Ingolfsson 1970).

However, in the case of *kumlieni* and *thayeri*, two of the three major isolating mechanisms are inoperative since both the breeding cycles and nesting sites of these two forms are the same. Moreover, both forms have a reddish-purple orbital ring. Irides in *kumlieni* vary from completely light to completely dark, while those of *thayeri* are predominately dark. In addition, wing tip darkness of the two forms occasionally overlaps (Smith, p. 64). Where *kumlieni* and *thayeri* use the same nesting sites and occur in randomly mixed nests, what isolating mechanism is effective in reducing hybridization? Smith (p. 96) says the observational and experimental evidence "suggest" assortative mating among *kumlieni* sympatric with *thayeri*; that is, among *kumlieni*, light-eyed females mate with light-eyed males, and dark-eyed females with dark-eyed males. He also states that neither female *kumlieni* iris-morph mates with dark-eyed *thayeri* and that *kumlieni* allopatric with *thayeri* (about 13km southeast of the overlap zone; Smith, p. 69) mate randomly with respect to iris type. The writer wonders how often *thayeri* breach this 13km zone to possibly hybridize with those *kumlieni* showing no preferences as to eye coloration. Smith (p. 69) also says ". . . the assortative mating interpretation [of the data] was reached through hindsight and not via hypothesis and controlled experiment . . ." Smith's choice of words indicates that assortative mating as a barrier to hybridization of these forms has yet to be proved. If so, his treatment of *kumlieni* and *thayeri* as different species is open to question.

The relationship between Iceland and Thayer's gulls can be better understood by hypotheses on the origin and evolution of these forms. Smith (1966) proposes that both *glaucoides* and *thayeri* evolved from isolated populations of *argentatus* during the Pleistocene, while Macpherson (1961) theorizes that these forms differentiated from isolated populations of a nearctic immigrant during the same period; Macpherson also suggests that *L. glaucescens* is probably the nearest relative of *L. glaucoides*. The writer believes that *hyperboreus*, *glaucoides*, *thayeri*, *argentatus*, and certain other *Larus* gulls (*glaucescens*, *schistisagus*, *occidentalis*, *fuscus*, *californicus*, *marinus*, and possibly *delawarensis* and *canus*) are cladogenetic descendants of an unknown *Larus* form from the late Pliocene or early Pleistocene. Geographic separation of ancestral forms during successive glacial and interglacial stages of the Pleistocene resulted in various combinations of isolated populations; among the forms comprising these populations, there were probably varying degrees of hybridity. Intermittent gene flow during past eras accounts for the similarities shared by today's species, and present-day interbreeding among a number of these forms attests to their evolutionary plasticity. As an alternative

to the hypotheses offered by Macpherson and Smith, the writer suggests that *glaucoides* and *thayeri* were conspecific, but distinct from *argentatus*, before the last Pleistocene glacial (Wisconsin stage). With the advent of the ice movements of the Wisconsin, the conspecific *glaucoides-thayeri* form separated into two isolated populations, evolving into two incipient species, Thayer's Gull in the western arctic and Iceland Gull in the eastern arctic. Before speciation was complete, the glaciers retreated, bringing the two forms in contact along eastern Baffin Island. Interbreeding produced an intermediate form, *kumlieni*. The remarkable similarities existent in the *glaucoides-kumlieni-thayeri* complex can be more plausibly explained, perhaps, by the writer's conjecture on the origin of these forms.

Although Dwight's (1925) taxonomic designation of these three forms is different from that of today, he came close to treating them as one species. Dwight considered Thayer's Gull a race (*L. a. thayeri*) of the Herring Gull, and as mentioned earlier, he did not recognize *kumlieni* as a subspecies of the Iceland Gull. *L. glaucoides* (= *L. leucopterus*), as treated by Dwight, included only the eastern race (*L. g. glaucoides*) of the Iceland Gull. Perplexed by *kumlieni*, Dwight devotes considerable discussion to this form, including the following (p. 195): "Surprising as it may seem, a large series shows that with increase of the white element whatever it is, as indicated by paler and paler primaries and larger areas of white, there is complete intergradation, first between *Larus argentatus thayeri* and the bird now known as '*Larus kumlieni*,' and then between '*Larus kumlieni*' and *Larus leucopterus*. There is no escaping from this fact, explain it as we may. As no new character appears we are obliged to discard mutation as an explanation and we are, therefore, forced to the conclusion that '*kumlieni*' is some sort of hybrid, unless we are prepared to consider *Larus argentatus* and *Larus leucopterus* a single species because completely connected by intergrades in size, in color and in pattern. Nobody is likely to accept this latter conclusion so foreign to generally accepted ideas of species and therefore hybridity is the most plausible explanation of '*kumlieni*.'" If Dwight were making a determination of the relationship among *thayeri*, *kumlieni*, and nominate *glaucoides* in light of our present knowledge of these forms and of speciation in general, the writer believes he would have regarded them as conspecific.

Unfortunately, our knowledge of these arctic gulls is lacunary, and more work must be done, both on the gulls' breeding grounds and in the laboratory, before the relationship among these forms is clarified. In particular, Smith's observation of assortative mating among *kumlieni* sympatric with *thayeri* requires further study. The degree of interbreeding between *kumlieni* and *thayeri* has yet to be determined, but extensive hybridization would clearly be a strong argument for conspecificity. While limited hybridization is insufficient evidence for conspecificity, the taxonomic expedient of treating the *glaucoides-kumlieni-thayeri* complex as conspecific would not only explain the behavioral similarities among these forms but would also reconcile the puzzling problem of the considerable variation and apparent overlap in coloration of both the primary patterns and irides of *kumlieni* and *thayeri*. The generally larger size of *thayeri*, the most northern breeding race of this polytypic species, could be accounted for by Bergmann's rule.

Possible other records of the Iceland Gull from the Pacific Northwest and adjacent regions

Idaho: a second-year immature seen and photographed by T.H. Rogers and others on 29-30 January 1977 and 5 February 1977 at Coeur d'Alene, Kootenai County (Rogers 1977); a first-year immature seen by I.O. Buss and the writer on 28 December 1977 at Coeur d'Alene.

Washington: individual immature gulls noted in the Spokane area (presumably

Spokane County) from 18 January to 27 February 1960 and on 14-17 March 1961 (LaFave 1965); one immature seen at Banks Lake, Grant County, by W.A. Hall on 5 April 1967 (Rogers 1967).

Montana: one immature studied and photographed by P.D. Skaar and others at Canyon Ferry Dam near Helena on 2-25 February 1978 (Skaar pers. comm.; Rogers 1978).

The above sight records, including the one by the writer, are dubious because of the similarity of some very light-colored immature *thayeri* to immature *glaucoides*. For the same reason, separation of these species in immature plumage on the basis of photographs is uncertain. Any sight records of adult *glaucoides* from the Pacific Northwest should also be treated with caution, for they can possibly be attributed to leucistic or albinistic gulls of other species. The writer has observed numerous *thayeri* birds of the year along coastal Washington during the past several winters, but none has been as light-colored as LaFave's specimen (No. 66-129) of *glaucoides* or the immature gull seen by I.O. Buss and the writer at Coeur d'Alene on 28 December 1977. There is a good possibility, then, that one or more of the above-listed sight or photographic records is of *glaucoides*, but at present, there is no evidence to indicate that the Iceland Gull is anything more than accidental in this region.

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To be continued.