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ON MATURATION OF THAYER'S GULL

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The New World arctic larid known as Thayer's Gull (*Larus thayeri*) resembles the well known, widely distributed Herring Gull (*L. argentatus*) in so many ways that some taxonomists believe it to be a geographical race of that species. Although we have long entertained the belief that a fairly close taxonomic relationship exists between *thayeri* and *argentatus*, substantiated in part by the studies of Smith (1966), we also recognize the possibility that *thayeri* may, in view of recent findings by Earl Godfrey (pers. comm.), be conspecific with the Iceland Gull (*L. glaucoides*). No doubt many aspects of all these birds' lives, including maturation, need to be explored in depth. Until Godfrey's findings are published, however, we find it expedient to compare *thayeri* with *argentatus* at this time.

The plumages and molts of *thayeri* and *argentatus* appear to be much the same. The careful student cannot help suspecting, however, that identification of *thayeri* under 4 years of age has been guesswork. This being possible, we decided—while based at the village of Cambridge Bay, Victoria Island, in the Canadian Arctic Archipelago, in the summer of 1962—to capture and rear some young Thayer's Gulls; to photograph them from time to time as they developed; and to preserve the rectrices of at least one individual, set by set, so as to ascertain what the tail of a maturing bird of known parentage actually looked like. Our decision resulted in part from realization that a small but thriving colony of *thayeri* nested on one of the Finlayson Islands about 48 km southwest of Cambridge Bay.

SPECIMENS AND METHODS

The colony occupied a cliff on one of the larger islands of the Finlayson Archipelago. Glaucous Gulls (*L. hyperboreus*) nested on the same island, more or less colonially, but above and to one side of the *thayeri* colony. Parmelee had visited the Finlaysons on 21 June 1960, finding eggs in all of the 19 *thayeri* nests that he examined. On 3 June 1962, the 2 of us travelled to the islands by dogsled over the sea ice, finding about 30 Thayer's Gulls and about 50 Glaucous Gulls at the colony-site. On 10 August 1962, Sutton and H. A. Stephens, taken to the colony in the motorboat *Spalding* by Corporal R. I. Fendrick and Special Constable Andrew Iyago of the Royal Canadian Mounted



Thayer's Gull
direct from life
March 15, 1966

Male Thayer's Gull (*Larus thayeri*) about three and one half years old
drawn direct from life by George Miksch Sutton on 15 March 1966.
Captured while still a downy chick in August, 1962,
on one of the Finlayson Islands, in the Canadian Arctic Archipelago,
the bird was reared in captivity.

Police, counted 41 adult *thayeri*, collected one adult female, and captured 7 fairly large but still downy chicks, 2 of which they preserved as skins the following day (Parmelee et al., 1967:159-160).

To the surprise of their captors, the 5 young gulls that were kept alive were far from omnivorous. They preferred fresh fish and fresh meat to any other food. Their disdain for cooked mixtures of oatmeal and powdered eggs was puzzling and exasperating. They loved to bathe and "play" in water furnished them in a dishpan. The flight from Cambridge Bay to Edmonton, Alberta, and the drive from Edmonton to Kansas must have been hard on them, but they survived it all; they adjusted readily to life in a flight cage at the zoo in Great Bend, Kansas; and there some of them probably would be today had one not been "collected" on 15 March 1966, when it was 3 years and 8 months old (direct-from-life drawing made, skin preserved), and had not a mink killed the remaining 4 one year later (31 March 1967). Two of the 4 mink victims were virtually demolished; the skins of the other 2 were preserved.

The fact that the plumage of the caged birds continued to be in good condition and that the birds fared well in captivity merits emphasizing. They did not seem to suffer from the heat even during the summer when extensive molting took place each year.

RESULTS AND DISCUSSION

Color of eyes and eyelids.—Adult *thayeri* and *argentatus* differ considerably, and consistently, in eye-color and eyelid-color. Eyes of adult *thayeri* are of 2 sorts, light and dark. In light-eyed birds the irides are pale yellowish gray or pale brownish gray, clouded with highly variable, unevenly distributed, fine dark speckling. In dark-eyed birds the irides are deep, rich brown, almost black, and without speckling. In adult Herring Gulls the irides are invariably "very pale lemon" yellow (Witherby et al. 1948:93).

Whether adult *thayeri* are both light-eyed and dark-eyed throughout the range of the species remains to be ascertained. We certainly observed both light-eyed and dark-eyed birds in 1962 and 1966 at Cambridge Bay. Smith (1966) presumably observed both in all *thayeri* colonies visited by him in 1960 and 1961. But "all adult" specimens taken by Macpherson at Pelly Bay "had irides more or less speckled with brown or dark gray" (Macpherson 1961:21); and a sketch made on 15 August 1923, by J. Dewey Soper of a bird taken at Dundas Harbor, North Devon Island, a sketch made on 31 July 1929 by Percy A. Taverner of a male taken at the same locality, and sketches made by J. A. Crosby of 3 specimens taken at Resolute Bay on 28 August, 30 August, and 1 September 1954, are *all* of light-eyed birds—facts justifying a suspicion that dark-eyed birds may be absent from, or rare in, some parts of the species' range.

Dark-eyed *thayeri* are recognizably dark-eyed in the field, even at considerable distance. In late August and early September, 1962, Sutton and H. A. Stephens saw about equal numbers of light-eyed and dark-eyed adult birds at Cambridge Bay. Of 9 adults captured by them in padded steel traps

near their tent, 5 were light-eyed and 4 dark-eyed, and none of the 9 had light-and-clear irides or dark-and-speckled irides. The 5 chicks reared by them had fairly light brownish gray eyes until they were about 2½ years old; at that time 3 became increasingly light-eyed and 2 increasingly dark-eyed; but while they were held captive at Great Bend, Kansas (1 October 1962 to 31 March 1967), none of the 4 that were not sacrificed became as light-eyed or as dark-eyed as the fully adult individuals color-photographed at Cambridge Bay in late August and early September, 1962.

Eyelids of *thayeri* a year old or older are reddish flesh-color or purplish flesh-color, while those of adult *argentatus* have been described as "from dull straw-yellow to bright yellow-orange" (Sutton 1932:180): as cadmium yellow, cadmium orange, and deep chrome (Macpherson 1961:24); and as "orange" (Smith 1966:6, and frontispiece; Witherby et al., *loc. cit.*). We find very little concise information on the eyelid-color of Herring Gulls 2 to 4 years of age: Witherby et al. (*loc. cit.*) state that it is "pink-brown" in young birds up to their "third winter." Less-than-one-year-old *thayeri* and *argentatus* may, we believe, resemble each other closely as regards iris-color and eyelid-color.

Nest site preference.—Thayer's Gulls nest on cliffs, usually along the outer coast, and as a rule colonially (Manning et al. 1956:96; Parmelee and MacDonald 1960:62; Macpherson 1961:19; Smith 1966:6), whereas Herring Gulls almost never nest on cliffs and often do not nest colonially. In southern Southampton Island, in 1930, *argentatus* nested chiefly in separate pairs on boulders "in the middle of the tundra" or on "little rocks in the lakes," but also to some extent, in small loose colonies (Sutton 1932:178-179). In 1955, in the vicinity of Cape Dorset, southwestern Baffin Island, *argentatus* nested principally in scattered pairs "on boulders in lakes," though "three colonies were found on small islands in lakes" (Macpherson 1961:22). Neal G. Smith, who, in his study of 4 arctic gulls, paid special attention to nest-site preference, found *argentatus* nesting in scattered pairs and ill-defined colonies in "tundra valleys and flat marshy regions" at Cape Dorset in 1959; in "flat marshy" country in the "Frozen Strait" area [Southampton, Coats, and Vansittart islands and southern Melville Peninsula], in 1960; and "in small numbers on deltas at the heads of fjords" near Home Bay, on the east coast of Baffin Island, in 1961 (Smith 1966:24-29).

Where *thayeri* and *hyperboreus* coexist in a vast area where *argentatus* does not occur, *hyperboreus* breeds commonly on both cliffs and tundra ponds. But where *argentatus* breeds on tundra ponds, *hyperboreus* confines its nesting mostly to cliffs.

Natal plumage of L. thayeri.—According to Manning et al. (1956:100, footnote), the downy chick of *thayeri* has "more white on the breast and belly, slightly less distinct spotting, and slightly less buffy tinting on the back" than

the chick of *argentatus*. These authors continue: "It is doubtful, however, if all the individuals in a mixed series could be correctly separated." Macpherson (1961:31) states that the downy chick of *argentatus* is "slightly more buffy" than that of *thayeri*.

We have not seen a living newly hatched *thayeri*. We have, however, examined 3 small chicks in the collection of the National Museums of Canada, specimens taken by A. H. Macpherson at Pelly Bay on 4 August 1956. These and the 2 older chicks taken by Sutton and Stephens on the Finlayson Islands on 10 August 1962 (see above), differ enough *inter se* to suggest that in *thayeri* there is just as much individual variation in the intensity and distribution of the dark dorsal spotting as there is in the natal plumage of *argentatus*. The 5 just-mentioned *thayeri* prove to be virtually indistinguishable as a group from 5 downy *argentatus* (1 from Great Slave Lake, 1 from Southampton Island, 3 from James Bay) lent by the Carnegie Museum. The *thayeri* are a trifle grayer throughout and a trifle paler below than the *argentatus*, thus agreeing with the descriptions of Manning et al. and Macpherson. The buffiest individual of the 10 is an example of *argentatus* (CM 40064) taken 7 July 1912, at Way Rock, Rupert Bay, James Bay, by W. E. Clyde Todd. That this buffiness is not the result of foxing is evident from the fact that 2 older specimens taken in James Bay in 1912 (CM 40260, 40261) are not by any means as strongly buffy in tone. Unfortunately there are no comments concerning the colors of fleshy parts on any of the 10 original labels.

Winter plumage of L. thayeri.—Two young male *thayeri* taken by Sutton at Cambridge Bay on 6 and 7 September 1962 (GMS 14489, 14490), are in either juvenal or first winter feather. Neither was molting. As prepared specimens they are much like, but paler than, a young Herring Gull taken from a colony of *argentatus* on the Marblehead Rocks near Marblehead, Essex County, Massachusetts, by W. H. Drury, Jr., on 31 August 1965. Whether the 3 specimens are strictly comparable is a question. The Herring Gull is obviously very young, for natal down still clings to some plumage of the head and neck, and the rectrices and remiges are sheathed at the base. Judging from the fact that our captive *thayeri* molted no feathers at all in their cage at Cambridge Bay, and very few in their carrying cage while being transported to Kansas, clearly shows that their postjuvenal molt did not start until after 29 September. This being the case, the 2 "wild" specimens above referred to were probably in *juvenal* rather than first winter feather. While we continue to feel that *thayeri* in its first winter feather may be grayer (less brown) than *argentatus* of the same age, we have no proof of this. The paleness of the 2 *thayeri* is, however, quite apparent; it is noticeable throughout the plumage as a whole in both specimens; and it is especially noticeable in the remiges, rectrices, and dark

parts of the dorsal body plumage. The 5 "juvenal" *thayeri* pictured by Macpherson (1961:plate 4) are, on the whole, paler than the 4 "juvenal" *argentatus* pictured in the same plate. The extent and timing of the postjuvenal molt in *thayeri* remain to be ascertained.

The winter plumage of fully adult *thayeri* differs from the breeding plumage chiefly in that the white of the head and neck is streaked with grayish brown. In this respect *thayeri* resembles *argentatus* closely. Whether *thayeri* under 2 years of age have a summer plumage that is distinguishable from their winter plumage is doubtful; birds up to about 2 years of age are, in other words, more or less streaked on the head and neck at all seasons. Photographs taken of our captives on 26 June 1965 (birds just under 3 years of age), however, show the head and neck to be pure white. Photographs taken on 12 March 1966 (birds about 3½ years old) clearly show all to be streaked on the head and neck, "902" and "903" much more so than the others, "904" decidedly the most heavily of the 5 (see frontispiece).

Changes in rectrices.—Realizing that tail feathers molted normally would be frayed, faded, soiled, or lost, we decided to pull and preserve the rectrices of one of our captive birds at least once a year until a white tail came in. Our assumption that only one of the annual molts would normally be extensive enough to include the tail; that only 3 tails would normally be worn and molted before a fully white tail came in; and that these first 3 tails would show a gradual change from dark gray to pure white, was based on our long-standing belief that such a maturation procedure had been fully documented for the Herring Gull (see Dwight 1920, 1925; Poor 1946). We now believe, however, that no one, not even Dwight or Poor, has studied, compared, and photographed or drawn Herring Gulls of known age continuously in an attempt to ascertain exactly how many partly dark tails are worn before a fully white one comes in. The excellent figures in Dwight may well have been drawn from birds believed, rather than known, to be of a certain age; and Poor's careful studies reveal that "many fourth year birds" do not have pure white tails (Poor 1946:150).

In any event, we pulled and preserved 7 partly dark tails (Fig. 1) from captive *thayeri* "903" (band no. 567-81903) and 4 extensively dark tails from "905" (Fig. 2) before either bird was 4 years old; and "904," photographed on 29 July 1965, had a very dark tail on that date and a still partly dark tail 5 months later (on 11 December 1965) when approximately 3 years and 5 months of age (Fig. 3). This bird was wearing the same, or virtually the same, "partly dark tail" when it was sacrificed on 15 March 1966. On that date 1 rectrix was pure white, a circumstance strongly suggesting (though not proving) that a pure white tail was coming in at last. We have no way

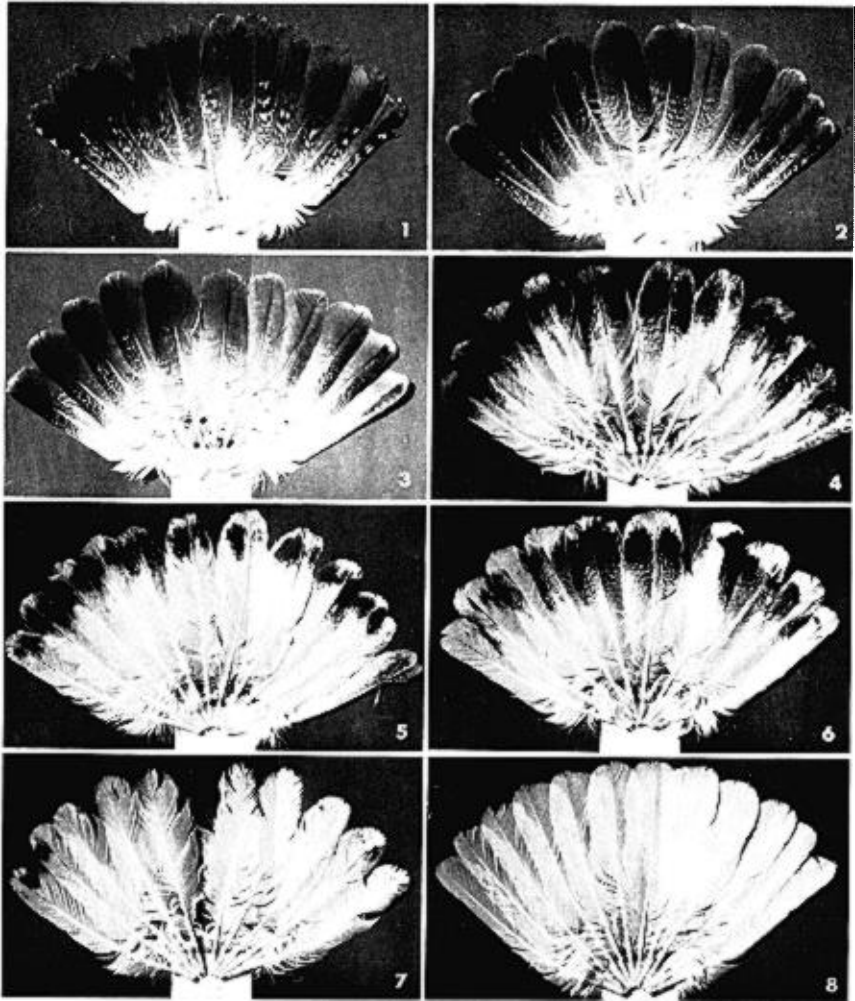


FIG. 1. Eight tails of captive male Thayer's Gull "903." Tails 1-7 were pulled between 27 October 1962 and 9 October 1964, well before the bird was 4 years old. Tail 8, worn by the bird when it was killed by a mink on 31 March 1967, was pure white—like the tail that directly followed tail 7.

of knowing whether there was one white rectrix in the tail on 11 December 1965; no such rectrix clearly shows in the photograph.

We continue to believe that in *thayeri* as well as in *argentatus* only one molt per year involves complete replacement of the remiges and rectrices. We cannot, however, offer proof of this. What we do know, from comparison

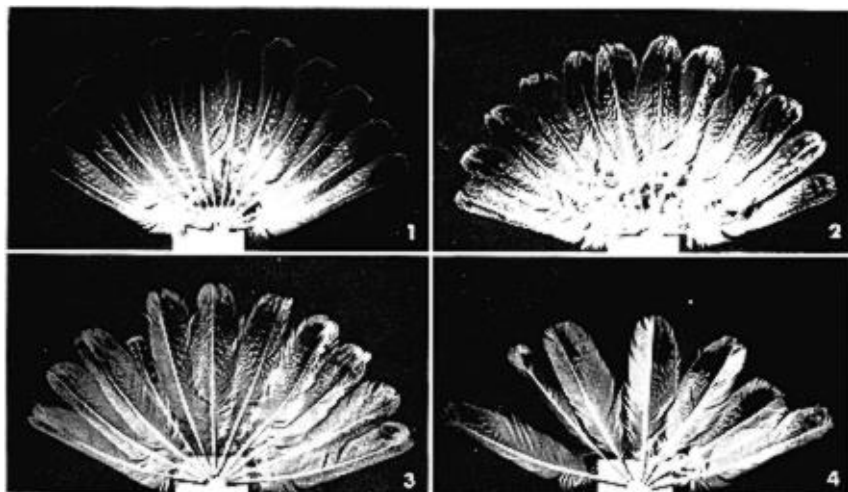


FIG. 2. Four tails of captive female Thayer's Gull "905." Each of these was pulled at one "sitting" (on 24 October 1963; 10 January 1964; 9 April 1964; and 9 October 1964) well before the bird was 3 years old.

of the very dark tail of "904" photographed on 29 July 1965, with the largely white tail worn by the same individual on 11 December 1965 (photograph taken) and on 15 March 1966 (specimen preserved), is that the change from dark to light tail can be swift and striking (see Fig. 3). We are reasonably sure that the "very dark tail" in this case was replaced directly by the "largely white" tail, for it is virtually unthinkable that a wholly different set of rectrices came in and dropped out during the 5-month intervening period. It is also important to note that this molt was natural and not the result of plucking.

Individual variation in the rate at which rectrices are replaced may be very great in *thayeri* less than 4 years old. The "very dark tail" of "904" was photographed 29 July 1965, as stated above; on the same date Tail 7 of "903" was very nearly white (see Figs. 1 and 3). It can be argued, of course, that we are reporting on an abnormal situation because "903's" tails were plucked several times; but we feel that our findings, inconclusive though they may be, should be reported.

The first 7 tails of "903" (Fig. 1) were pulled during the first 3 years of the bird's life. Tail 1 was pulled 3 feathers at a "sitting" between 27 October and 9 November 1962; Tail 2 three feathers at a "sitting" between 12 January and 4 April 1963; the other 5 tails at one "sitting" each respectively on 23 October 1963; 10 January 1964; 9 April 1964; 9 October 1964; and 1 August 1965. The pure white rectrices of Tail 8 were pulled from what

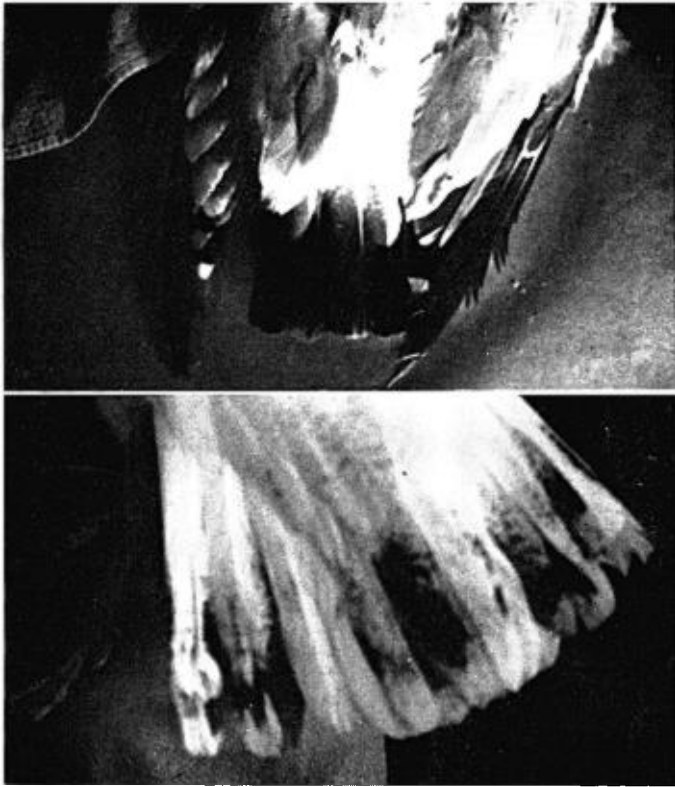


FIG. 3. Dark tail worn by captive male Thayer's Gull "904" on 29 July 1965 (above), and largely white tail worn by same bird on 11 December 1965.

was left after the mink massacre of 31 March 1967. Three of the inner rectrices of Tail 3 are noticeably shorter than the 5 darker ones to their left. These shorter ones were slightly browner (less gray) than the others, too; they developed from papillae that produced the last 3 feathers pulled from Tail 2 on 4 April 1963.

Changes in primaries.—We decided against pulling major wing feathers partly because these proved to be very hard to pull. The primaries of all 5 captives during their first year were grayish brown, without obvious patterning. Four inner primaries pulled from "903" on 12 February, 17 February, 20 March, and 12 April 1963, respectively, were somewhat darker on the outer web and at the tip than throughout most of the proximal part of the inner web, and they had only a faint hint of subterminal patterning.

We do not know exactly when these first primaries were molted. The



FIG. 4. Captive male Thayer's Gulls ("903" and "904"), each about 2½ years old, photographed on same day in February, 1965. Note difference in patterning at tips of primaries.

primaries of 2 birds photographed 9 October 1964, were patterned at the tip, but neither the black nor the white was bold. These primaries were probably of the birds' second set. The wing of "903" photographed in February, 1965, shows what was probably the third set of primaries. These have rather bold black patterning but only a suggestion of white—this being the outermost and on the fifth and sixth, counting from the outside (see Fig. 4). Again we must call attention to individual variation: the primaries of "905," photographed that same day, show no white at all. The boldness of black patterning in "903" could not have resulted from pulling of feathers in the spring of 1963 (see above), for those primaries were pulled from the right wing, and the wing photographed was the left.

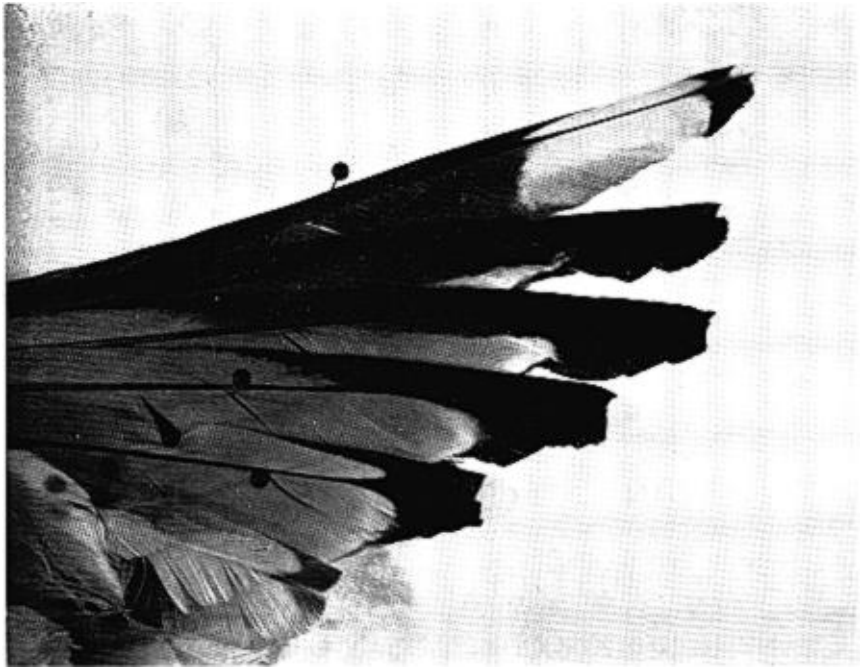


FIG. 5. Primaries of Thayer's Gull "904" (GMS 14938) at approximately 3½ years old. Photo by D. M. Niles.

The inner primaries of "904," photographed 29 July 1965, when the bird was about 3 years old, were boldly tipped with black and white—the patterning being that of the fully mature bird. When this bird was sacrificed 8½ months later, *all* its outer primaries were boldly patterned with black and white at the tip despite the fact that its tail was not yet free of subterminal dark markings. We believe that "904" (GMS 14938) is wearing its fourth set of remiges (Fig. 5).

Assumption of pale gray mantle.—Gulls "903" and "905," photographed several times on 23 October 1963, had no gray feathers in the back plumage, scapulars, or wing coverts (see Fig. 6). These birds were about 15 months old, so their body plumage almost certainly had undergone at least one complete replacement. Just how old the birds were when the gray mantle plumage began to appear, and how old they were when this first gray mantle became complete, we do not know; but all 5 birds, when photographed 24 October 1964, when about 27 months old, had gray mantles.



FIG. 6. Captive Thayer's Gulls about 15 months old, photographed at zoo in Great Bend, Kansas, 23 October 1953. The gray mantle has not yet appeared.

Changes in bill color.—We made no attempt to write down notes on observed changes in bill-color, but colored photographs taken in August and September, 1962, October, 1963, October, 1964, and February, 1965, all show the bills of the captives to be brownish gray (darkest during the first year), without any tinge of yellow, with a dark subterminal area on both maxilla and mandible, and a hint of pinkish flesh-color at the base of the mandible. By 29 July 1965, when Parmelee sketched "902" in watercolor, the bill had become yellow and an orange-red spot had appeared near the tip of the mandible of this 3-year-old bird. On this date a large dusky subterminal spot remained on the maxilla and a small one on the mandible. Kodachromes of "904" and "905" taken 11 December 1965, show the bill to be definitely yellow, with a greenish cast; they also show reduction in size of the dark subterminal spot on both the maxilla and mandible. By 15 March 1966, when Sutton painted and killed "904," the bill was decidedly yellow, the dark subterminal area had largely disappeared, and the orange-red mandibular spot was clearly evident (see color-plate). The patterning of the bill is fairly evident even in the preserved skin.

COMMENTS

Let it be clearly understood that we have not argued that maturation requires more time in *Larus thayeri* than it does in *L. argentatus*. Ascertaining how many sets of rectrices normally are worn and dropped before pure white

rectrices come in will require careful further work over a 4- or 5-year period. Variation in iris-color of *thayeri* should be investigated thoroughly. Parmelee's observations of a dark-eyed subadult captive on 29 July 1965, convinced him that the iris became noticeably darker (and the pupil larger) when the bird was moved from sunlight into shade. Dark-eyed, fully adult, wild birds observed by Sutton at Cambridge Bay in August and September, 1962, were very dark-eyed in full sunlight, where they were photographed (see color-plate). Fully adult *thayeri* should be observed throughout the year to ascertain to what extent the color of irides, eyelids, and bill may vary seasonally.

ACKNOWLEDGMENTS

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REQUESTS FOR ASSISTANCE

A list of birds that eat salt is being prepared. Correlations will be sought taxonomically, between seasons, habitats, condition of the birds (breeding or non-breeding), etc. Any reprints or unpublished accounts would be appreciated. Please send to Kathryn Herson, Biology Department, Western Michigan University, Kalamazoo, MI 49008.

Double-crested Cormorant.—Information is requested on sightings of color marked Double-crested Cormorants. Birds are marked with standard USFWS aluminum leg bands plus colored vinyl leg streamers, on either one or both legs. Data requested: Color and location of streamer, single letter code if possible, date and exact location of sighting. I am especially interested in sightings from wintering areas. Please advise Bird Banding Laboratory, Office of Migratory Bird Management, Fish and Wildlife Service, Laurel, MD 20811 and/or Marcella M. Bishop, Shoreline Route, Polson, Montana 59860.