THE EGGS AND YOUNG OF THE BRISTLE-THIGHED CURLEW

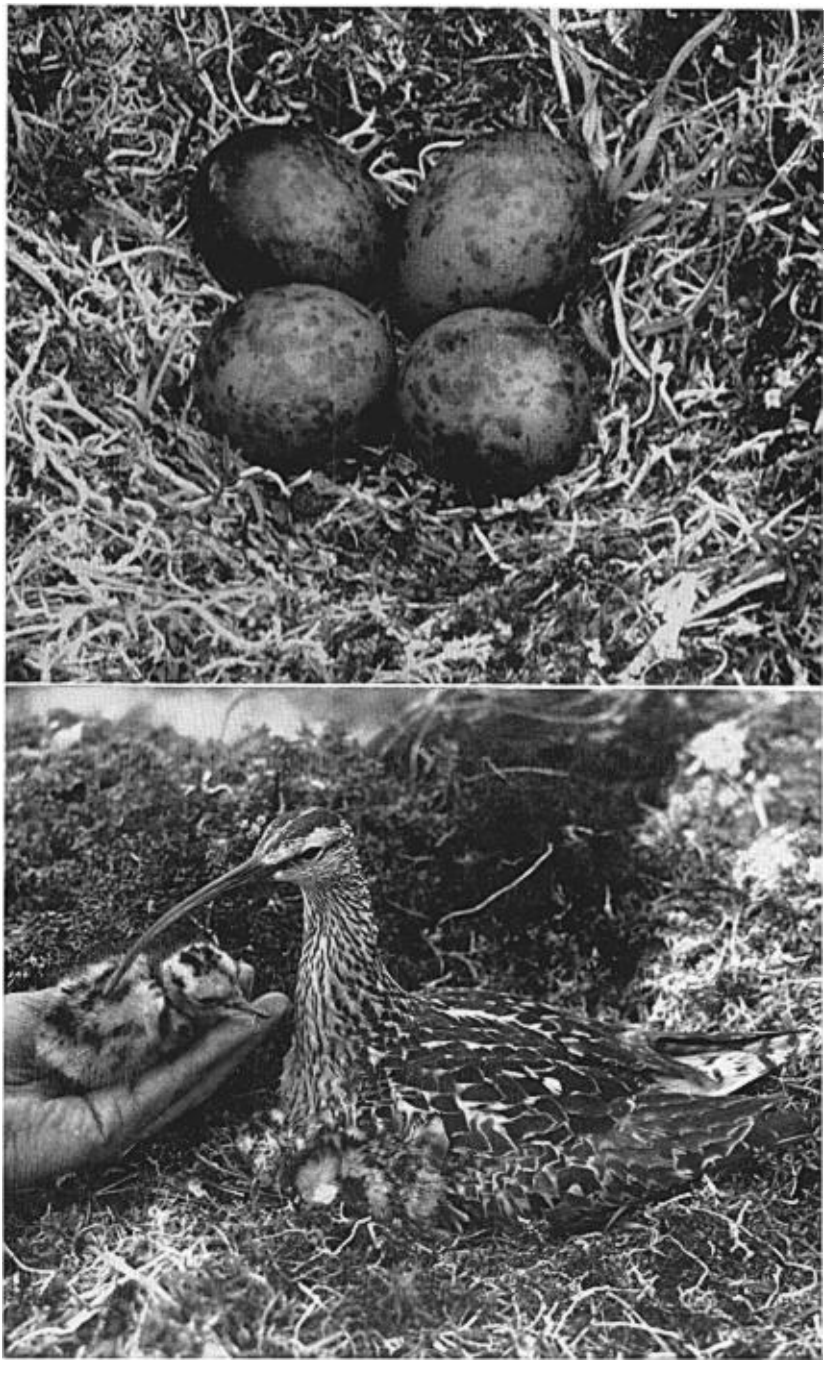
BY ARTHUR A. ALLEN AND HENRY KYLLINGSTAD

THE bristle-thighed curlew, *Numenius tahitiensis*, was first described in 1785 by Latham in his 'General Synopsis of Birds.' The specimen was apparently collected in 1769 on the Island of Tahiti during Captain Cook's first voyage around the world. It was named the "Otaheite Curlew," and for 100 years the species was thought to spend its entire life among the South Pacific Islands. On May 18, 1869, however, Ferdinand Bischoff collected a bristle-thighed curlew at Kenai, Alaska, and numbers of specimens were recorded thereafter by various explorers along the coast during May and August from Kenai to the Meade River, nearly to Point Barrow; it was recognized that the summer home of the bird must be somewhere in western Alaska. Until recently, all collecting was of necessity done along the sea coast or along the main rivers, and these were obviously not included in the nesting range. Until 1948 the actual breeding ground, the nest and eggs and the downy young were unknown to science. Then it was the senior author's privilege to organize an expedition under the auspices of the National Geographic Society. Joining forces with one led by Henry Kyllingstad, sponsored by the Arctic Institute of America, and by using a Bellanca airplane on pontoons, we penetrated the interior to the east side of the coast range. On Saturday, June 12, the first nest of the bristle-thighed curlew was found on the barren tundra about 20 miles north of Mountain Village on the lower Yukon. The nest was discovered by David G. Allen, and Henry Kyllingstad was with him at the time. The following Monday, Warren Petersen and the senior author were taken to the nest, and on the following day a second nest was found by Warren Petersen on an adjacent ridge about a mile to the southwest. An account of the expedition with color plates of the eggs and downy young was published in the 'National Geographic Magazine' (December, pp. 751–770, 1948) and in 'Arctic,' Journal of the Arctic Institute of North America, (1 (2): 113–118, 1948) and need not be duplicated here. A description and comparison with the eggs and young of the other curlews are offered here.

THE BREEDING RANGE

A range of hills or low mountains follows the coastline of Western Alaska from 50 to 100 miles inland. For some 250 miles it forms a barrier to the Yukon River which at this point flows roughly south-

ward before swinging west around the end of the range to find its way into Bering Sea. Mountain Village, a town of some 20 Eskimo families, is on the Yukon at the southern edge of this range. To the westward of the range the country is low, flat, wet tundra, similar to the deltas of the Yukon and Kuskokwim rivers farther south; it is ideal summer range for waterfowl and many shorebirds but not for the bristle-thighed curlews. To the eastward of the mountains are a series of ridges and small plateaus with thickets of alders on the protected slopes, sedges along the brooks and hard barren tundra on the exposed areas. In the alders are found numerous common and hoary redpolls, *Acanthis hornemanni* and *A. flammeus*, a few tree sparrows, *Spizella arborea*, white-crowned, *Zonotrichia leucophrys*, golden-crowned, *Z. coronata*, and fox sparrows, *Passerella iliaca*, and varied, *Ixoreus naevius*, and gray-checked thrushes, *Hylocichla minima*. Near the edges of the thickets are a few willow and rock ptarmigan, *Lagopus lagopus* and *mutus;* along the brooks are a few Grinnell water-thrushes, *Seiurus noveboracensis*, and on the tops of the rounded hills, a few Baird's sandpipers, *Erolia bairdii*. On rocky slopes there are pipits, *Anthus spinoletta*, and on the moister tundra on the west slope, there are many Alaskan longspurs, *Calcarius lapponicus*, savannah sparrows, *Passerculus sandwichensis*, Arctic terns, *Sterna paradisaea*, and western sandpipers, *E. mauri*, all these species increasing farther out on the level, wet area to the westward that soon becomes a paradise for a multitude of water birds. On the flat, dry, exposed ridges to the east of the mountains, however, bird life is particularly scarce. Occasionally one sees a parasitic or a long-tailed jaeger, *Stercorarius parasiticus* or *longicaudus*, skimming over the tundra on its quest for eggs or young of other birds. It finds but little on these ridges, for they seem deserted by all birds except the bristle-thighed curlews, and these are few and far between. In an area of roughly 25 square miles, covered on foot by David Allen, he saw 20 curlews, but the rest of us saw only eight. The two nests found and most of the birds seen were on exactly the same type of tundra which, in addition to the usual gray reindeer moss, has numerous clumps of black, matted, hair-like lichens which gave a characteristic black, speckled appearance not observed elsewhere. In addition, small, weathered rock fragments lay on the surface or projected through the moss; this was not noticeable on most of the tundra traversed in Alaska or around Churchill on Hudson Bay. The absence of the longspurs, savannah sparrows and western sandpipers, usually so abundant in this part of Alaska, was particularly noticeable. It is thought probable that the summer home of the curlews continues northward along the range for several hundred



(*Upper*) NEST AND EGGS OF BRISTLE-THIGHED CURLEW. JUNE 13, 1948. (*Lower*) MALE BRISTLE-THIGHED CURLEW AND YOUNG. NEAR MOUNTAIN VILLAGE, ALASKA, JUNE 17, 1948. Photographs by HENRY C. KYLLINGSTAD.

miles, and perhaps even into the Brooks Range, but no definite information is available.

THE NEST

The two nests discovered were in similar locations and made the incubating bird very inconspicuous; each was a depression in the tundra moss by the side of a hummock of the black lichens and a mat of the creeping Alpine azalea, *Loiseleuria procumbens*. There was little evidence of a real nest having been built, although the depressions, one of which measured 6.75 inches in diameter by 2.5 inches deep, and the other 7 inches by 3.25 inches, were very smooth on the inside, as compared with the rough appearance that the reindeer moss usually presents. There were a few items of broken stems and other materials that could not be identified with the moss or plants growing all about the nest; they may have been brought in from a distance during the nest-building period. This had long since passed at the time of our discovery, when the eggs were nearly ready to hatch.

THE EGGS

The first nest contained four eggs, one of which was taken immediately and preserved as a type. The second nest contained but two, one of which had a large hole in the side, and a partially consumed embryo. The inference was that a jaeger had probably taken the other two eggs and started on the third, when driven away. Incubation, however, was proceeding normally when the nest was found, and the one egg hatched successfully.

In size and color the eggs resemble the eggs of the Hudsonian curlew, *Numenius p. hudsonicus*, and in a large series, some eggs might be indistinguishable, although those before us show a definite difference. A. C. Bent (1929: 117) gives the average of 37 eggs of the Hudsonian curlew as "57.5 x 40.7 millimeters; the eggs showing the four extremes measure 61.9 by 41.7, 59.2 by 43.2, 52 by 38.5 and 55 by 37.2 millimeters." The average length of the five measurable bristle-thighed curlew eggs is 60.2 and the width, 41.98 millimeters. The actual measurements of the five eggs are as follows:

Nest Number One
Length: 57.5; 59.0; 57.5 millimeters
Width: 42.0; 42.0; 41.9 millimeters

The fourth egg was so broken in hatching as to render measurements inaccurate.

Nest Number Two
Length: 65.0; 62.0 millimeters
Width: 42.0; 42.0 millimeters

The eggs as they appear now, several months after collecting, are considerably lighter and greener than shown in the color plate in the National Geographic Magazine (December, 1948, Plate II). This plate is a fairly accurate representation of the original Kodachrome before us, and it agrees with our memory of the eggs as they appeared in the nest when they contained the chicks and were about ready to hatch. Using Ridgway's (1912) terms, the eggs are now "buffy olive" in ground color with spots of "light brownish drab" to "bistre" or "raw umber." The former ground color, as shown in the color plate and the Kodachromes, is more "buffy brown" with spots of "mummy brown." The eggs of the Hudsonian curlew before us and the description by Grinnell (1900) indicate that the eggs of the bristle-thighed curlew (with the contents removed and the shells thoroughly dried) are still less green and more buff in ground color with spots that are larger, but less distinct and somewhat browner than those on the egg of the Hudsonian curlew.

When the nest was first discovered on June 14, one of the eggs was taken and the large embryo removed through an opening in one side. The shell was then filled with cotton and the lid replaced. This egg has remained as intact as the day it was prepared. The other eggs from which the chicks were allowed to hatch were treated in the same way by stuffing them with cotton to their original size and shape. Although some of the cracks showed, they at first resembled the first egg very closely. During succeeding weeks, however, the lining membrane has apparently shrunk and fragments of the shell have snapped off, as though some physical or chemical change had taken place in the last hours of incubation, so as to make the shells more friable. The shell from the second nest, which had a large hole in it when first discovered, has likewise remained intact.

THE DOWNY YOUNG

The color plate of the newly-hatched bristle-thighed curlews (National Geog. Mag., Dec., 1948, Plate II) gives a fairly accurate representation of the "pale pinkish buff" or "vinaceous buff" down with "blackish brown" markings and the "cadet gray" legs and "dark grayish brown" bills.

Young Hudsonian curlews of similar age lack the pinkish cast and vary from "ivory yellow" to "light buff" or "pale olive gray," becoming buffier on the throat and sides of the neck. There are numerous dark-tipped downy feathers scattered through the light areas of the upper parts with the result that the markings appear less distinct than in the bristle-thighed curlews. This probably caused Taverner and

Sutton (1934) to describe the markings as, "many rather indefinite spots and broad, broken stripes of dark brown, or nearly black, on back, thighs, and in front of wings."

The markings are so distinct in the bristle-thighed curlew that they have led us to examine the downy young of such other species of curlews as are available in the Chicago Museum of Natural History, the American Museum of Natural History, the Philadelphia Academy of

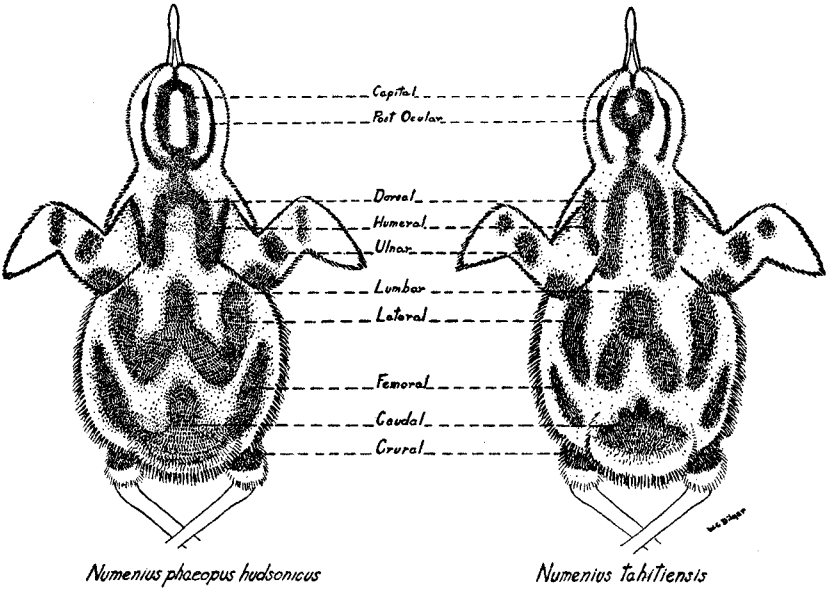


FIGURE 1. Dorsal view of feather tracts of downy, young curlews.

Science and the U. S. National Museum, with the result that we have come to recognize a definite similarity of pattern in all the species. We have, therefore, drawn up a chart of the dorsal markings that seem to follow, more or less, the feather tracts of the adult birds and have given them corresponding names. We are offering here a diagram (Fig. 1) by William Dilger, which compares the bristle-thighed and Hudsonian curlews at the time of hatching, and a discussion of the other species. The patterns are very easily disarranged, even in the living birds, and unless a skin has been carefully made so as to preserve the pattern, casual observation might fail to recognize the regularity indicated in the diagrams. For the sake of clarity, the markings have been somewhat conventionalized in the diagrams. In general, the Hudsonian curlew and the whimbrel, *N. p. phaeopus*, have

TABLE 1

PLUMAGE CHARACTERS OF DOWNY YOUNG OF *Numenius*

	N. tahitiensis	*N. p. hudsonicus*	*N. p. phaeopus*	*N. a. arquatus*	*N. a. americanus*
General color of down	pale pinkish buff or vinaceous buff	ivory yellow, light buff or pale olive gray somewhat buffier on throat and sides of neck	cream buff, becoming chamois or warm buff on throat and upper parts	resembles *N. p. phaeopus* but down appears longer, denser and more buffy	resembles *N. tahitiensis* but slightly less vinaceous
Markings	blackish brown	blackish brown	clove brown or fuscous	resembles *N. p. phaeopus* but browner	blackish brown
Capital tract	a light centered blotch	two distinct stripes	two distinct stripes	a light centered blotch	patch broken into speckles, almost four lines in one specimen
Post ocular	incomplete at rear	complete eye to dorsal	complete eye to dorsal	incomplete but variable	incomplete near eye
Dorsal	distinct inverted V as illustrated	less distinct than in *N. p. p.* or *N. t.*	distinct V	distinct V	somewhat speckled with light down
Lumbar	distinct inverted Y	less distinct Y with broader base	arms of Y fused to form patch	resembles *N. tahitiensis*	confused by speckling with light down
Humeral	narrow, distinct, meets dorsal in some specimens	narrow, less distinct	poorly developed	resembles *N. tahitiensis*	distinct, meets dorsal
Lateral	broad spot	broad spot meets lumbar	broad spot meets lumbar	distinct spot as in *N. tahitiensis*	present but speckled
Femoral	distinct from caudal	meets caudal	meets caudal	distinct from caudal	distinct from caudal but speckled
Crural	conspicuous	inconspicuous	fairly conspicuous	conspicuous	elongate but speckled and variable
Ulnar	three spots most distal variable	three spots	three spots, middle large, distal small	three spots distal variable	three spots, often speckled

definitely striped heads, while in the other species the crown bears an irregular blotch with a light center. The other markings form three irregular "W's" across the back, these being most regular and distinct in the bristle-thighed curlew and the least distinct in the long-billed curlew, *N. americanus*. In all species, there is evidence of a short, whitish stripe above the blackish "lateral" stripe. This is most evident in the bristle-thighed curlew and least in the three specimens of the European curlew, *N. arquatus*, studied.

Except for color of the down, *N. tahitiensis* resembles *N. arquatus* more than the others, in having longer, denser down and in having the dark markings more distinct.

MEASUREMENTS

The only specimens of definitely newly-hatched curlews available for comparison with the bristle-thighed are Hudsonian curlews, three from the Conover and one from the Cornell collections. The averages of four specimens of each species are as follows:

	N. tahitiensis	*N. hudsonicus*
Length	107.25 millimeters	106.66 millimeters
Bill	17.5	16.45
Tarsus	33.75	31.5
Middle toe	30.2	27.0

If these eight specimens are typical of the two species, it would seem that the bristle-thighed curlews may be slightly larger in all their dimensions at the time of hatching and particularly in the size of their feet, the length of tarsus and the lengths of toes.

For the courtesies extended and the loan of specimens, we wish to thank Dr. Austin Rand, H. B. Conover, Dr. Robert C. Murphy, Dean Amadon, R. M. deSchauensee and Dr. Herbert Friedman.

SUMMARY

Two nests and eggs of the bristle-thighed curlew were found on the barren tundra east of the coast range of low mountains in westernmost Alaska north of the mouth of the Yukon. A description of the eggs and a comparison with the eggs of the Hudsonian curlew are given. A description of the downy young is presented, together with a comparison with the young of four other curlews. Reference is made to a color plate of the nest and eggs and one of the downy young in the National Geographic Magazine for December, 1948, where an account of the expedition which found the nests was published.

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