Assortative mating in Lesser Snow Geese (*Anser caerulescens*). Behav. Gen. 6: 127–140.

JOHNSGARD, P. A. 1965. Handbook of waterfowl behavior. Ithaca, New York, Cornell Univ. Press.

LENSINK, C. J. 1968. Neckbands as an inhibitor of reproduction in Black Brant. J. Wildl. Mgmt. 32: 418–420.

MANNING, T. H., E. O. HÖHN, & A. H. MACPHERSON. 1956. The birds of Banks Island. Natl. Mus. Can. Bull. 143: 1–144.

PALMER, R. S. 1976. Handbook of North American birds, vol. 2. New Haven, Connecticut, Yale Univ. Press.

Received 5 October 1981, accepted 30 June 1982.

Natal and Juvenal Plumages of the Blue-and-White Swallow (*Notiochelidon cyanoleuca*)

KEITH A. ARNOLD,[1] EVA JOLENE BOYD,[1] AND CHARLES T. COLLINS[2]
[1]*Texas Cooperative Wildlife Collections, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, Texas 77843 USA, and*
[2]*Department of Biology, California State University, Long Beach, California 90840 USA*

Although much information is available on the pterylosis of some Old World and North American hirundinids (Nitzsch 1867; Shufeldt 1890; Lowe 1938; Wetherbee 1957, 1958), there is a dearth of such data on most neotropical passerines (Collins 1963a, 1973). The pterylosis of the neotropical genus *Notiochelidon* (*sensu latu*) is completely unknown (Clench in litt. to Arnold). Here we describe the natal and juvenal plumages of the Blue-and-White Swallow (*N. cyanoleuca*) based on five nestlings of the following stages of Wetherbee (1957): Stage B—TCWC 10947, 10948; Stage D—TCWC 10945, 10946, and 10976. All five birds were salvaged after falling from nests in a house located in the Parque National de Guatopo, Esta. Miranda,

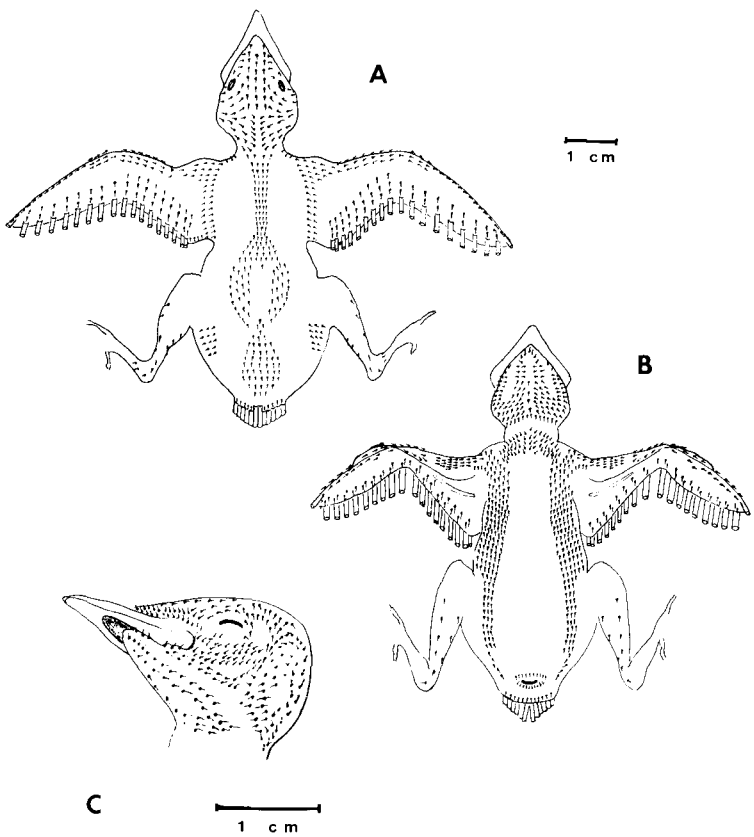

Fig. 1. Pterylosis pattern of the Blue-and-White Swallow, drawn directly from specimens. A. Dorsal view. B. Ventral view. C. Ventro-lateral view of head. Views A and B drawn to the same scale.

TABLE 1. Comparison of neossoptiles in Hirundinidae genera.

	Tachycineta bicolor[a] (*n* = 26)		*Riperia riperia*[a] (*n* = 26)		*Stelgidopteryx serripennis*[a] (*n* = 10)	
	Length	Number[b]	Length	Number[b]	Length	Number[b]
Orbital	2	0 (0–5)	—	—	—	—
Coronal	6	5 (2–12)	8	4 (3–8)	8	4 (2–5)
Occipital	6	2 (2–4)	9	3 (2–4)	8	2 (1–3)
Mid-dorsal	9	3 (1–4)	12	5 (3–6)	10	5 (4–5)
Scapular	7	7 (1–9)	12	5 (0–8)	10	6 (6–6)
Femoral	"short"	1	—	1	—	1
Rectrix	1	12 (0–12)	1	12 (12–12)	1	12 (12–12)
Secondary	—	—	—	—	—	—
Pelvic (upper)	3	0 (0–1)	—	—	—	—

[a] From Wetherbee (1957, 1958).
[b] First number represents average followed by minimum–maximum values in parentheses.

Venezuela. Collins' observations of 12 Stage A nestlings from at Estacion Biologica de Rancho Grande, Est. Aragua, Venezuela are also presented.

We do not know how many nests are involved at Guatopo or if any of the five birds were siblings. The nests from which these five birds fell were located in spaces between overlapping sheets of corrugated asbestos roofing on the house occupied by the collecter, James R. Dixon. The 12 nestlings examined by Collins came from six nests.

Natal pterylosis.—We based this description on the two Stage B nestlings specimens. In Table 1 we have compared *Notiochelidon cyanoleuca* to other New World swallows (Wetherbee 1957, 1958). It has the lowest number of neossoptiles (14 body + 12 retrix) of all species compared, although the ranges of most species overlap the two specimens we have available. In both specimens the right side of the mid-dorsal tract has two neossoptiles but shows a follicle for the third. Furthermore, on one bird (10948), the right wing and the right and occipital region of the head are damaged, preventing an accurate account. Although both specimens are Stage B and it is possible that some of the neossoptiles had worn off as the nestlings moved about in the nest, these counts are in close agreement with Collins' observation made on the newly hatched young (Stage A) at Rancho Grande (Table 1).

The neossoptiles appear to be between Pale Ochraceous-Salmon and Light Ochraceous-Salmon in color (capitalized color names taken from Ridgway 1912). As the specimens were originally preserved and stored for several weeks in 10% formalin, these color designations should be viewed with caution. Furthermore, the limited sample size does not allow for individual or geographic variations.

Juvenal plumage.—We used the three Stage D birds to describe the coloration of this plumage. Ventrally, the feathers are white except for a region of Cinnamon Bluff on the flanks were the white meets the dark dorsal plumage. The lower back is Iron Gray, the wings and tail are Slate Black, and the upper back and head are Olivaceous Black.

We have compared our specimens of *Notiochelidon* with the descriptions of Nitzsch (1867) and Schufeldt (1890). We clipped one Stage D bird to allow close examination of the feather tracts (Fig. 1); the other four specimens were examined for possible differences. Basically, *Notiochelidon* fits the general description of hirundinids given by Schufeldt (1890). Clench (in litt, to Arnold 19 February 1981) said that an adult that we sent her ". . . is a very typical swallow in pterylosis pattern (at first look)."

We believe several points are worthy of special mention: (1) Shufeldt (1890: 353) points out that in North American hirundinids the bifurcation of the dorsal saddle begins in the middle of the back rather than between the thighs, as reported by Nitzsch (1867); *Notiochelidon* has the bifurcation described by Shufeldt. (2) Shufeldt described the saddle in *Progne* as connecting ". . . to the anterior end of the rump-tract by distinct and well-marked rows of contour feathers." He noted similar conditions for *Petrochelidon* (= *Hirundo*), *Clivicola* (= *Riparia*), and *Stelgidopteryx*. Shufeldt noted the absence of the joining between the saddle and the rump-feathers in *Tachycineta bicolor* and *T. thalassina*. In our Stage D nestlings no such connection exists (as in *Tachycineta*), but it is evident in the Stage B nestlings. Apparently, in *Notiochelidon*, growth processes produce a hiatus between these areas. (3) A down-like series of semi-plumes occurs as single mediad rows along the humeral and femoral tracts and as lateral rows along the dorsal (double) and pelvic (single) regions of the ventral tracts. These semi-plumes are 10–10.5 mm on the dorsal regions and 9–9.3 mm on the ventral tract. A few scattered true downs occur between these tracts on the dorsal surface and lateral to the sternal and axillary regions of the ventral tracts. These semi-plumes are more developed than the adjacent tele-

TABLE 1. Continued.

Hirundo rustica[a] (*n* = 17)		*Hirundo pyrrhonota*[a] (*n* = 10)		*Notiochelidon cyanoleuca* (TCWC) (*n* = 3)		*Notiochelidon cyanoleuca* (Collins) (*n* = 16)	
Length	Number[b]	Length	Number[b]	Length	Number[b]	Length	Number[b]
—	—	—	—	—	—		
8	7 (4–10)	7	7 (2–7)	5	3 (2–3)	5	3 (3–5)
9	6 (3–8)	7	3 (2–4)	6	2 (2–2)	5	2 (1–2)
12	4 (1–4)	11	5 (4–5)	10.5	3 (2–3)	9	3 (2–4)
13	9 (7–10)	11	9 (8–9)	7	6 (6–6)	7	6 (3–7)
8	3 (0–3)	10	5 (4–6)	—	—	—	—
?	?	1	12 (12–12)	1	12 (12–12)	not recorded	
—	—	2	1 (1–1)	—	—	—	—
—	—	—	—	—	—	—	—

optiles and presumably aid in the development of thermoregulation. Collins (1963b) reported a similar condition in the Chestnut-collared Swift (*Cypseloides rutilus*), but this appears to be the first record of such in a passerine.

Two other points are of interest: (1) an apterium exists between the submalar and cervical regions on the ventral tract, and (2) no hiatus exists at the junction of the axillary and abdominal regions where the number of rows is reduced; such conditions are unknown among other swallows.

We thank Mary H. Clench for her advice, James R. Dixon for procuring the specimens, and Carlos Rivero-Blanco for the permanent loan of the specimens. Mary Clench, James Dixon, and R. Douglas Slack reviewed the paper. This is contribution TA 16939 of the Texas Agricultural Experiment Station.

LITERATURE CITED

COLLINS, C. T. 1963a. The natal pterylosis of tanagers. Bird-Banding 34: 36–38.

———. 1963b. The "downy" nestling plumage of swifts of the genus *Cypseloides*. Condor 65: 324–328.

———. 1973. The natal pterylosis of the Swallow-tanager. Bull. Brit. Ornithol. Club 93: 155–157.

LOWE, P. R. 1938. Some anatomical notes on the genus *Pseudochelidon* Hartlaub with reference to its taxonomic position. Ibis 2: 429–437.

NITZSCH, C. L. 1867. Nitzsch's pterylography (Translated from the German, P. L. Sclater, Ed.). London, Ray Society.

RIDGWAY, R. 1912. Color standards and nomenclature. Washington, D.C., published by the author.

SHUFELDT, R. W. 1890. Studies of the Macrochires, morphological and otherwise with the view of indicating their relationships and defining their several positions in the system. J. Linnean Soc. London 20: 299–394.

WETHERBEE, D. 1957. Natal plumages and downy pterylosis of passerine birds of North America. Bull. Amer. Mus. Nat. Hist. 113: 339–436.

———. 1958. New descriptions of natal pterylosis of various bird species. Bird-Banding 29: 323–326.

Received 11 December 1981, accepted 28 June 1982.