

July 5, 1909, was killed by a Shrike at Evansville, Illinois, April 1, 1912.

All these and a host of other interesting, inviting and important questions yet remain to be answered more fully. The opportunities are large; the workers are few; only a bare beginning has been made.

In conclusion—the results already obtained from bird banding have justified its practice; but the work should not devolve upon a limited number of persons. It should be made the duty and the effort of many individuals and organizations for it is only by carrying on the work in an extensive way that large and valuable results can be obtained. With the plan now headed by the United States Biological Survey renewed energy and activity should greet the efforts of this active and efficient branch of the Federal Department of Agriculture.

The writer would take this final opportunity of emphasizing to the members of the Wilson Ornithological Club the desirability of their coöperation in furthering the work of bird banding and in seeing to it that every banded bird which is secured shall have a "return" record sent to the proper authorities.

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### COMPARATIVE PERIODS OF NESTLING LIFE OF SOME NORTH AMERICAN NIDICOLÆ

BY FRANK L. BURNS

[CONTINUED FROM LAST ISSUE]

Again to show the fine detailed work of some of our observers, I have assembled a table exhibiting day by day the increase in weight (in grams) of some nestlings taken in 1906 by the late John F. Ferry, Lake Forest, Ill. The Cedar Waxwing study (Aug. 20-28) is incomplete, but the development and length of nestling life of the Cowbird (June 11-22), Yellow Warbler (June 21-July 2) and Wood Thrush (June 11-22), exhibit a relatively slower growth, considering size, than the Catbird (June 13-24) and the Brown Thrasher (July 8-19).

	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
Cowbird . .				7.7	23.3		24.9		31.1	28.0		**
Cedar Waxwing	2.2	3.0	4.5	8.0	7.7				*			
	3.0	4.0	6.5	13.5	12.5	15.5	13.0		*			
	4.0	5.4	8.0	17.0	15.0	20.0			*			
	3.1	4.9	8.0	17.0	15.5	19.0	16.0		*			
Yellow Warbler				7.8	8.0	8.3	8.5					**
				6.2	7.2	8.3	7.3	7.7	9.4			**
Catbird . .		4.6			18.6	23.3	23.3	29.5	31.1	31.1	**	
ave. 3 yg.		6.2	15.5	15.5	15.5	22.0	25.2	27.2	28.5	**		
Brown Thrasher	3.1	7.5	9.0	12.0	17.5	21.2	25.5	40.5	51.5	47.5	49.5	**
	6.0	9.5	13.0	17.0	23.5	28.2	35.0	38.0	45.0	39.0	42.5	**
	8.2	8.5	11.0	15.5	22.0	27.5	34.0					**
Wood Thrush	6.5											**
	3.1		6.2	18.6			24.9		37.3	34.2		**

\* Found dead. \*\* Departed.

There is probably no other incident in the life history of our American birds in which our ornithologists are more profoundly ignorant than that of the approximate duration of nestling cycles. That of the Booby is said to be three months or more, that of the Gannet five or six months and of the Albatross ten months. Mr. A. C. Read has returned a nestling blank showing that the Ground Dove had completed a nestling cycle in 27 days. Mr. Charles H. Rogers, in New Jersey, and the writer, in Pennsylvania, found that of the Mourning Dove to be 30-32 days; a much shorter period than that of the somewhat nidifugous Whip-poor-will or Nighthawk, if one bases the completion of the cycle at the flying age. The Phoebe usually requires less than 40 days (Burns Ms., Vickers Ms.) and the Crested Flycatcher 51 days (McKennon Ms.). Some of our Sparrows, Mockers, and the Robin have a cycle of 30-35 days (Mss. of Burns, Ferry, Link, McKennon and Redfield) being two or more weeks less than the Baltimore Oriole and Purple Grackle. The House Wren and Bluebird complete in about 35-45 days, while the Bewick's Wren and Chickadee require 52-53 days (Wiley Ms., Link Ms.). The Warblers have a short cycle but as a rule are rather tardy nesters.

I regret that my material is altogether too scanty to more than suggest a few simple conclusions on the nestling life periods of our *Nidicolæ*.

First. There seems to be a constant increase in the period of nestling development up to and including family groups, to correspond with the increase in size of the parent bird, and this must be taken into consideration in making

further comparisons. Considering size, the Hummingbird group appears to exceed all other groups, both in duration of incubation and the length of time the young remain in the nest: approaching like periods of the much larger-bodied and closely allied Swift.

Second. The normal nestling period of any species equals or exceeds the period of embryological development; i.e. when the period of incubation of a species is brief, the time in which the young occupy the nest is correspondingly brief and when the incubation of a species is of long duration the young are a long time helpless. Fright or restlessness may drive some species prematurely from the nest, especially ground or near ground nestling species like the Pelican, Cormorant, Ibis, Bittern, Heron, Dove, Vulture, Marsh Hawk, Short-eared Owl, Cuckoo, Horned Lark, Bobolink, Meadowlark, and many of the Sparrows, Warblers, Mockers and Thrushes, but they seldom travel far from the nest for some time.

Third. Young born naked, never acquiring natal down (gymnopædic, or psilopædic) including the Parrots, Cuckoos, Woodpeckers, Kingfishers, Hummingbirds and Swifts, develop slower physically than most nidicolous birds born with or acquiring a full or scanty clothing of natal down; though this is not so apparent in the American Cuckoos, since the early development of the feet of these birds enables them to clamber about at an early age; an important qualification for the perservation of the young of these large, bush-nesting birds. The European Cuckoo, however, vacates the nest only a few days before flight which occurs when about twenty-one days old (*Cf. Taylor, The Strand Magazine, xli, pp. 652-656*). It is noteworthy that the nestlings of most other species habitually breeding in situations affording extraordinary protection from natural enemies and the weather, or of species nesting in less protected situations but capable of defending the young from any ordinary danger, have young that are rather slow to depart from their nests and their departure signifies the completion of their fledgling, as well as nestling life. The impulse to vacate is not ordinarily

quicken by forces without and is therefore largely dependent upon maturity of fledgling life.

Fourth. Nothing seems more probable than that the Nidicolæ evolved from the Nidifugæ, and that if the economy of nature demanded it, all North American Nidifugæ, with the possible exception of the *Anseres*, Shore and Gallinaceous birds would readily yield to nidicolous habits and conditions.

An interesting writer (*Cf. Finn, Bird Behavior Psychological and Physiological*) regards the Passive or Nestling (Nidicolæ) type as degenerate, and states that with the exception of the Osprey, which has variegated down, all Nidicolæ appear self-colored, usually black, white, grey or buff, when they have down at all; while the Active or Chick (Nidifugæ) type are generally characterized by the more primitive striped, pied marked or spotted down.

The appended table of periods of nestling life was originally collated not only from my own notes and the manuscript of my friends, but from the pages of our leading American ornithological periodicals and many other ornithological works, for my own personal use in connection with bird banding, and though neither remarkable for the number of volumes searched or ideal for the purpose of comparison, it will at least call attention to the need of such data. Perhaps an ideal table would include the entire juvenal life from birth to the acquisition of equilibrium or wing power.

#### ALCIDÆ:

Tufted Puffin, remains in nest until fully feathered and able to take care of itself (Bent quoting Emerson, *Life Histories North American Diving Birds*, p. 85.)

Puffin, able to leave burrow in 4 or 5 weeks and follow parents to sea (Bent, *Life Hist. N. A. Diving Bds.*, 92.)

Horned Puffin, leave nest before able to fly (Bent quoting Turner, *Ibid.*, 101.)

Rhinoceros Auklet, nearly full grown (Willett, *Bird-Lore*, xiv, 423); evidently estimated at about 30 days (Bent quoting Heath, *Life Hist. N. A. Diving Bds.*, 106.)

Cassin's Auklet, fully 21 days, until able to fly (Heath, *Condor*, xvi, 34; Bent, *Life Hist. N. A. Diving Bds.*, 113.)

Crested Auklet, until able to fly, about the last of August or later (Bent, *Ib.*, 122.)

Whiskered Auklet, until fully fledged (Bent quoting Stejneger, *Ib.*, 125.)

Least Auklet, data seems to indicate 4 or 5 weeks (Bent, *Ib.*, 180.)

Black Guillemot, about 25 days (Bent quoting Walker, *Ib.*, 208); for a long time, until fully fledged or nearly so (Bent, *Ib.*, 159.)

Mandt's Guillemot, develops slowly (Bent, *Ib.*, 164.)

Pigeon Guillemot, until fully fledged (Bent quoting Emerson, *Ib.*, 170.)

Dovekie, the young begin hatching about the middle of July and the first birds come off the nests about the middle of August (Bent quoting Ekblaw, *Ib.*, 218.)

#### DIOMEDEIDÆ:

Laysan Albatross, 6 months before flying (Fisher, *Auk*, xxi, 19.)

#### PORCELLARIIDÆ:

Audubon's Shearwater, large downy young (Plath, *Bird-Lore*, xv, 349.)

Storm Petrel, until fully fledged and able to fly (Macgillivray, *History of British Birds*, v, 468.)

Leach's Petrel, possibly 60 days or more (Knight, *Journal Maine Ornithological Society*, ii, 5.)

Black Petrel, more than 14 days (Van Rossem, *Condor*, xvii, 77.)

Socorro Petrel, same as Black Petrel (Van Rossem, *Ib.*)

Fork-tailed Petrel, nearly full grown (Willett, *Bd.-Lore*, xiv, 423.)

#### PHAETHONTIDÆ:

Yellow-billed Tropic Bird, about 60-62 days (Gross, *Auk*, xxix, 60; Plath, *Wilson Bulletin*, No. 95, 50.)

#### SULIDÆ:

Booby, approximately 3 months from laying of egg to flight of young (Chapman, *Camps and Cruises of an Ornithologist*, 217.)

Gannet, appears to remain in the nest for ten weeks, and after that it stands on its ledge, or even on its old nest, for two or three weeks more (Gurney Ms.)

#### ANHINGIDÆ:

Anhinga, born naked, will jump from the nest to the water, dive and swim, at a very early age, not over three weeks, but often stays in the nest or close by for eight or nine weeks, as near as I have noted (Bayard Ms.)

#### PHALACROCORACIDÆ:

Cormorant, apparently considerably over a month (Audubon,

Ornithological Biographies); until more than half grown (Knight, J. M. O. S., ii, 37.)

Double-crested Cormorant, long period (Palmer, Condor, xviii, 123); on July 9th the young were in the egg or very small, none were out of the nests; on July 23rd they were full grown and running after their parents to be fed. Within a day or so a few began trying their wings and descending to the water 200 or 300 feet below, but it was probably considerably later before they had all flown, later than August 6th (Townsend Ms.)

Florida Cormorant, almost full grown (Phillips, Auk, xxvii, 314); until able to fly, about eight or nine weeks (Baynard Ms.)

Brandt's Cormorant, at least over 25 days (Loomis, Calif. Water Birds, No. 1, 219.)

Pelagic Cormorant, nearly full grown (Willett, Bd-Lore, xiv, 428.)

#### PELECANIDÆ:

American White Pelican, about 42 days before flight (Finley, Condor, ix, 38); 14 days in nest (Skinner, Ib., xix, 181.)

Brown Pelican, 10 weeks before flight (Chapman, Camps and Cruises of an Ornithologist, 94.)

#### PLATALEIDÆ:

Roseate Spoonbill, at least 30 days (Chapman, Bd.-Lore, xvi, 217.)

#### IBIDIDÆ:

White Ibis, 14 days in nest and 42 days before flight (Baynard, Bluebird, vii, 16.)

Glossy Ibis, same as White Ibis (Baynard, Wils. Bul., No. 84, 103.)

#### CICONIIDÆ:

Wood Ibis, about 8 or 10 weeks before leaving nesting tree (Baynard Ms.)

#### ARDEIDÆ:

American Bittern, about 14 days (Chapman, Bd.-Lore, i, 149; Tabor, Ib., vii, 168; Rockwell, Condor, xiv, 119.)

Least Bittern, about 9 days (Potter, Cassinia, xx, 14) 7 days, leaving nesting site in 13 days (Ib., xxiii, 30.)

Great Blue Heron, about 35 days (Cameron, Auk, xxiii, 256; Carriger and Pemberton, Condor, x, 81; Huey, Ib., xvii, 59.)

Egret, 11 or 12 weeks before independent of parents (Baynard Ms.)

Green Heron, about 14 days (Wheelock, Auk, xxiii, 432.)

Anthony's Green Heron, more than 15 days (Huey, Condor, xviii, 59.)

Black-crowned Night Heron, about 20 days (Burns Ms.); less

than 30 days (Vinal, *Bd.-Lore*, xix, 164); able to leave in 21 days, stayed 35 days (Rockwell, *Condor*, xii, 118.)

#### COLUMBIDÆ:

Band-tailed Pigeon, about 30 days (Bendire quoting Bryant, *Life Hist.*, I, 127.)

White-crowned Pigeon, approximately about 30 days (Bendire, *Ib.*, 131.)

Passenger Pigeon, about 14 days (Deane quoting Whittaker, *Auk*, xiii, 236.)

Mourning Dove, 10-12 days (Burns and Rogers Mss.; Gifford, *Condor*, xi, 85, and *Bird News*, No. 2, 8.)

White-winged Dove, between 21 and 28 days (Wetmore, *Condor*, xxii, 141.)

Ground Dove, 10 days (Read Ms.)

#### CATHARTIDÆ:

California Vulture, over 6 months (Finley, *Condor*, xii, 5).

Turkey Vulture, about 6 weeks (Jackson, *Bd.-Lore*, v, 186.)

Black Vulture, flight in 14 weeks (Baynard, *Bluebird*, vii. 31.)

#### FALCONIDÆ:

White-tailed Kite, about 30 days (Peyton, *Condor*, xvii, 230.)

Marsh Hawk, 33-34 days (Saunders, *Condor*, xv, 103; Peabody, *Bd.-Lore*, ii, 49.)

Sharp-shinned Hawk, 22-24 days (Rust, *Condor*, xvi, 14); 32 days (Willard, *Ool.*, 8, 63.)

Cooper's Hawk, 33 days (Burns Ms.)

American Goshawk, 60 days (Knight, *Bds. Me.*, 225.)

Red-tailed Hawk, about 60 days (Seaton, *Auk*, ii, 22.)

Red-shouldered Hawk, 25 days (Hegner, *Bd. Lore*, viii, 151.)

Texas Red-shouldered Hawk, about 30 days (Willett, *Auk*, xxxii, 323.)

Swainson's Hawk, 28-35 days (Wheelock, *Bds. Calif.*, 153; Finley, *Auk*, xxx, 174; *Ib.*, pl. xiii); 28-35 days (Cameron, *Auk*, xxviii, 174.)

Broad-winged Hawk, 41 days (Burns, *Wils. Bul.*, No. 76-77, 268, also *Ib.*, No. 37, 90.)

American Rough-legged Hawk, about 42 days (Bendire, *Life Hist.*, I, 258.)

Ferruginous Rough-leg, about 54 days (Cameron, *Auk*, xxxi, 163.)

Golden Eagle, 60-68 days (Finley, *Condor*, viii, 1; Cameron, *Auk*, xxii, 162, and xxv, 251); about 11 weeks (Macpherson, *Home Life of the Golden Eagle*.)

Bald Eagle, more than 42 days (Hoxie, *Auk*, xxvii, 452; Baynard, *Wils. Bul.*, pl. between 122 and 123); about 65 days (Bailey,

Bds. Va., 120); probably at least 90 days (Oberholser, U. S. Dept. Agri. Biol. Survey, bul. 27, 9.)

Black Gyrfalcon, approx. over 60 days (Bendire quoting Turner, Life Hist., I, 187.)

Duck Hawk, 40-44 days (Allen and Knight, Bd.-Lore, xv, 6; Dixon, Condor, x, 198; 41 days (Richards, Auk, xxxvi, 350.)

American Sparrow Hawk, 27-29 days (Sherman, Auk, xxx, 417.)

#### PANDIONIDÆ:

American Osprey, about 28 days (Chapman, Bd.-Lore, x, 155; Wheelock, Bds. Calif., 165); 35-45 days (Howe, Auk, xii, 389; Skinner, Condor, xix, 120); about 42 days (Chapman, Camps and Cruises of an Ornithologist, 52.)

#### STRIGIDÆ:

American Barn Owl, 56 days (Finley, Am. Bds., 81.)

#### BUBONIDÆ:

American Long-eared Owl, about 28 days (Burns Ms.); about 35 days (Wheelock, Bds. Calif., 169.)

Short-eared Owl, 14 days, though only a few feet from the nest for a month longer (Saunders, Condor, xiv, 120.)

Florida Barred Owl, about 42 days (Bendire quoting Ralph, Life Hist. I, 342.)

Screech Owl, 30-32 days (Sherman, Auk, xxviii, 166.)

California Screech Owl, about 35 days (Bendire quoting Emerson, I, 342.)

Rocky Mountain Screech Owl, at least 30 days (Rockwell, Condor, ix, 144.)

Great Horned Owl, 44-46 days (Keys, Condor, xiii, 1.)

Pacific Horned Owl, 49 days (Dixon, Condor, xvi, 53.)

Western Horned Owl, about 56 days (Cameron, Auk, xxiv, 268.)

#### PSITTACIDÆ:

Carolina Paroquet, more than 45 days (Nowotny, Auk, xv, 31.)

#### CUCULIDÆ:

Road-runner, less than 7 days, and in 30 days able to care for itself (Sutton, Bd.-Lore, xiii, 58, and xv, 324.)

Yellow-billed Cuckoo, 7 days (Herrick, Jour. Exp. Zoöl., ix, 171; Pop. Sci. Monthly, 77, 95; Burns Ms.): 9 days (Bayliss, Auk, xxxv, 162.)

California Cuckoo, less than 14 days (Jay, Condor, xiii, 69.)

Black-billed Cuckoo, 6-7 days, climbing until the 15th day (Saunders, Bd.-Lore x, 205; Shuver, B.M.O.C., ii., 16; Herrick, Pop. Sci. Monthly, 77, 128.)

#### ALCEDINIDÆ:

Belted Kingfisher, 24-28 days (Baily, Bd.-Lore, ii, 77; Herrick,



Pop. Sci. Monthly, 77, 133; Wheelock, Auk, xxii, 70; Finley, Am. Bds., 146.)

PICIDÆ:

Hairy Woodpecker, about 21 days (Bendire, Life Hist., i, 49.)  
Burns Ms.)

Harris's Woodpecker, 21-28 days (Wheelock, Bds. Calif., 365.)

Cabanis's Woodpecker, nearly 28 days (Wheelock, Ib., 367.)

Downy Woodpecker, at least 11 days (Burns Ms.)

Nuttall's Woodpecker, 21-28 days (Wheelock, Bds. Calif., 365.)

White-headed Woodpecker, nearly 28 days (Wheelock, Ib. 367.)

Arctic Three-toed Woodpecker, 28-35 days (Wheelock, Ib., 369.)

Yellow-bellied Sapsucker, more than 10 days (Bolles, Auk, ix, 109.)

Red-breasted Sapsucker, 24 days (Wheelock, Bds. Calif., 464.)

Northern Pileated Woodpecker, evidently about 30 days (Carriger and Wells, Condor xxi, 155); nearly 42 days (Wheelock, Bds. Calif., 373.)

Red-headed Woodpecker, about 35 days (Potter, Bd.-Lore, xiv, 216.)

California Woodpecker, about 20-21 days (Myers, Condor, xvii, 183); about 24 days (Wheelock, Bds. Calif., 378.)

Lewis's Woodpecker, about 21 days (Bendire, Life Hist., ii, 120);  
21-28 days (Wheelock, Bds. Calif., 466.)

Flicker, 26-28 days (Sherman, Wils. Bul. 72-73, 133.)

Red-shafted Flicker, nearly 21 days (Wheelock, Bds. Calif., 190.)

MICROPODIDÆ:

Chimney Swift, about 26-31 days, including time spent close by nest (Bendire quoting Widmann, Life Hist., ii, 179; Honeywell, Bd.-Lore, xi, 266; Knight, Bds. Me., 302; Burns Ms.)

White-throated Swift, about 21 days (Hanna, Condor, xi, 89.)

TROCHILIDÆ:

Blue-throated Hummingbird, 18 days (Brewster, Auk, vii, 206.)

Ruby-throated Hummingbird, 22 days (Metcalf, Ool., 28, 163; Hitchcock, Bd.-Lore, xix, 79); 28 days (Smith, Bird-Lore, xxii, 275.)

Costa's Hummingbird, 17 days (Wheelock, Bds. Calif., 422.)

Black-chinned Hummingbird, 16 days (Lacey, Auk, xxviii, 210.)

Anna's Hummingbird, 21 days (Bowles, Colnor, xii, 127; Bryan, Ib., iv, 35; Wheelock, Bds. Calif., 424.)

CAPRIMULGIDÆ:

Whip-poor-will, two or more days if undisturbed (Job, The Sport of Bird Study, 108.)

Nighthawk, a few days (Job, Ib., 110); able to fly in 18 days (Herrick, Home Life of Wild Birds, 81.)

## TYRANNIDÆ:

Kingbird, 18 days (Weldon, Bd.-Lore, viii, 122; Herrick, Home Life of Wild Birds, 28.)

Crested Flycatcher, 18-20 days (Knight, Bds. Me., 311; McKinnon Ms.)

Ash-throated Flycatcher, 16 days (Wheelock, Bds. Calif., 326.)

Phœbe, 15-16 days (Knight, Bds. Me., 313; Vickers Ms.; Morrell, J.M.O.S., iv, 32; Saunders, Condor, xvi, 131); 20 or 21 days (Clise, Bd.-Lore, xx, 378.)

Say's Phœbe, 16-18 days (Saunders, Condor, xvi, 134.)

Black Phœbe, 16-18 days (Jewett, B.C.O.C., i, 13.)

Olive-sided Flycatcher, about 21 days (Bendire, Life Hist., ii, 285.)

Wood Pewee, 16-18 days (Bendire, Ib., ii, 291; Knight, Bds. Me., 317.)

Trail's Flycatcher, about 14 days (Bendire, Life Hist., ii, 309.)

Alder Flycatcher, 13 days (Knight, Bds. Me., 320; Stanwood, J.M.O.S., xii, 5.)

Least Flycatcher, 13-15 days (Knight, Bds. Me., 322; Herrick, Bd.-Lore, iv, 80.)

Wright's Flycatcher, 14 days (Wheelock, Bds. Calif., 445.)

Vermillion Flycatcher, 16 days (Wheelock, Ib., 470.)

## ALUDIDÆ:

Prairie Horned Lark, 7 days (Terrill, Wils. Bul., 100, 138; about 10 days (Judd, Bd.-Lore, x, 129.)

Pallid Horned Lark, 9 days (Wheelock, Bds. Calif., 297.)

Dusky Horned Lark, 6 or 8 days (Kennedy, Condor, xv, 136.)

Streaked Horned Lark, 7-13 days, flying in 19 days (Merrill, Auk, v, 260.)

(TO BE CONCLUDED IN NEXT ISSUE)