



LABORATORY
OF ORNITHOLOGY
LIBRARY



*Gift
of
Tom Whiteaway*

CORNELL UNIVERSITY LIBRARY



Cornell University Library

The original of this book is in
the Cornell University Library.

There are no known copyright restrictions in
the United States on the use of the text.

<http://www.archive.org/details/cu31924090277413>

SMITHSONIAN INSTITUTION.
UNITED STATES NATIONAL MUSEUM.
SPECIAL BULLETIN.

LIFE HISTORIES
OF
NORTH AMERICAN BIRDS,

FROM THE PARROTS TO THE GRACKLES,

WITH SPECIAL REFERENCE TO

THEIR BREEDING HABITS AND EGGS,

BY

CHARLES BENDIRE, CAPTAIN AND BREVET MAJOR, U. S. A. (Retired).

*Honorary Curator of the Department of Oölogy, U. S. National Museum,
Member of the American Ornithologists' Union.*

WITH

SEVEN LITHOGRAPHIC PLATES.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1895.

TOM WHITEWAY
28 APRIL 1987
ENTERPRISE, AL

ADVERTISEMENT.

This work (Special Bulletin No. 3) is one of a series of papers intended to illustrate the collections belonging to, or placed in charge of, the Smithsonian Institution, and deposited in the United States National Museum. It supplements Special Bulletin No. 1, by the same author, which contains descriptions of the breeding habits and eggs of the gallinaceous birds, pigeons, doves, and birds of prey.

The publications of the National Museum consist of two series—the Bulletin and the Proceedings. A small edition of each paper in the Proceedings is distributed in pamphlet form to specialists in advance of the publication of the bound volume. The Bulletin is issued only in volumes. Most of the volumes hitherto published have been octavos, but a quarto form has been adopted for works of the size and character of the present Bulletin.

The Bulletin of the United States National Museum, the publication of which was commenced in 1875, consists of elaborate papers based upon the collections of the Museum, reports of expeditions, etc. The Proceedings are intended to facilitate the prompt publication of freshly acquired facts relating to biology, anthropology, and geology, descriptions of restricted groups of animals and plants, discussions of particular questions relative to the synonymy of species, and the diaries of minor expeditions.

Other papers of more general popular interest are printed in the appendix to the annual report.

Papers intended for publication in the Proceedings and Bulletin of the United States National Museum are referred to the advisory committee on publications, composed as follows: Frederick W. True (chairman), R. Edward Earll (editor), James E. Benedict, Otis T. Mason, Leonhard Stejneger, and Lester F. Ward.

S. P. LANGLEY,

Secretary of the Smithsonian Institution.

WASHINGTON, D. C., *June 10, 1895.*

TABLE OF CONTENTS.

PSITTACEOUS BIRDS.

Family PSITTACIDÆ. Parrots, Paroquets, etc.

	Page.
1. <i>Conurus carolinensis</i> , Linnæus..... Carolina Paroquet (Pl. I, Fig. 1).....	1

PICARIAN BIRDS.

Family CUCULIDÆ. The Cuckoos, Anis, etc.

2. <i>Crotophaga ani</i> , Linnæus..... The Ani (Pl. I, Fig. 6).....	6
3. <i>Crotophaga sulcirostris</i> , Swainson..... Grooved-billed Ani (Pl. I, Fig. 7).....	9
4. <i>Geococcyx californianus</i> , Lesson..... Road Runner (Pl. I, Fig. 2).....	13
5. <i>Coccyzus minor</i> , Gmelin..... Mangrove Cuckoo.....	17
6. <i>Coccyzus minor maynardi</i> , Ridgway..... Maynard's Cuckoo.....	19
7. <i>Coccyzus americanus</i> , Linnæus..... Yellow-billed Cuckoo (Pl. V, Fig. 1).....	19
8. <i>Coccyzus americanus occidentalis</i> , Ridgway... California Cuckoo (Pl. V, Fig. 2).....	25
9. <i>Coccyzus erythrophthalmus</i> , Wilson..... Black-billed Cuckoo (Pl. V, Figs. 3 and 4).....	27
10. <i>Cuculus canorus telephonus</i> , Heine..... Siberian Cuckoo.....	32

Family TROGONIDÆ. Trogons.

11. <i>Trogon ambiguus</i> , Gould..... Coppery-tailed Trogon.....	32
--	----

Family ALCEDINIDÆ. Kingfishers.

12. <i>Ceryle alcyon</i> , Linnæus..... Belted Kingfisher (Pl. I, Fig. 3).....	34
13. <i>Ceryle americana septentrionalis</i> , Sharp..... Texan Kingfisher (Pl. I, Fig. 4).....	39
14. <i>Ceryle torquata</i> , Linnæus..... Ringed Kingfisher.....	40

PICINE BIRDS.

Family PICIDÆ. Woodpeckers.

15. <i>Campophilus principalis</i> , Linnæus..... Ivory-billed Woodpecker.....	42
16. <i>Dryobates villosus</i> , Linnæus..... Hairy Woodpecker.....	46
17. <i>Dryobates villosus leucomelas</i> , Boddart..... Northern Hairy Woodpecker.....	50
18. <i>Dryobates villosus audubonii</i> , Swainson..... Southern Hairy Woodpecker.....	51
19. <i>Dryobates villosus harrisi</i> , Audubon..... Harris's Woodpecker.....	52
20. <i>Dryobates villosus hyloscopus</i> , Cabanis..... Cabanis's Woodpecker.....	53
21. <i>Dryobates pubescens</i> , Linnæus..... Downy Woodpecker (Pl. I, Fig. 24).....	55
22. <i>Dryobates pubescens gairdnerii</i> , Audubon..... Gairdner's Woodpecker.....	58
23. <i>Dryobates pubescens oreæus</i> , Batchelder..... Batchelder's Woodpecker.....	60
24. <i>Dryobates borealis</i> , Vieillot..... Red-cockaded Woodpecker.....	61
25. <i>Dryobates scalaris bairdi</i> , Selater..... Baird's Woodpecker.....	63
26. <i>Dryobates scalaris lucasanus</i> , Xantus..... St. Lucas Woodpecker.....	65
27. <i>Dryobates nuttallii</i> , Gambel..... Nuttall's Woodpecker.....	65
28. <i>Dryobates arizonæ</i> , Hargitt..... Arizona Woodpecker.....	68
29. <i>Xenopicus albolarvatus</i> , Cassin..... White-headed Woodpecker.....	70
30. <i>Picoides arcticus</i> , Swainson..... Arctic Three-toed Woodpecker.....	74
31. <i>Picoides americanus</i> , Brehm..... American Three-toed Woodpecker.....	77
32. <i>Picoides americanus alascensis</i> , Nelson..... Alaskan Three-toed Woodpecker.....	80
33. <i>Picoides americanus dorsalis</i> , Baird..... Alpine Three-toed Woodpecker.....	80
34. <i>Sphyrapicus varius</i> , Linnæus..... Yellow-bellied Sapsucker.....	82
35. <i>Sphyrapicus varius nuchalis</i> , Baird..... Red-naped Sapsucker.....	88

TABLE OF CONTENTS.

		Page
36. <i>Sphyrapicus ruber</i> , Gmelin.....	Red-breasted Sapsucker.....	92
37. <i>Sphyrapicus thyroideus</i> , Cassin.....	Williamson's Sapsucker.....	97
38. <i>Ceophloeus pileatus</i> , Linnæus.....	Pileated Woodpecker (Pl. I, Fig. 5).....	102
39. <i>Melanerpes erythrocephalus</i> , Linnæus.....	Red-headed Woodpecker.....	107
40. <i>Melanerpes formicivorus bairdi</i> , Ridgway.....	Californian Woodpecker.....	112
41. <i>Melanerpes formicivorus angustifrons</i> , Baird ..	Narrow-fronted Woodpecker.....	117
42. <i>Melanerpes torquatus</i> , Wilson.....	Lewis's Woodpecker.....	117
43. <i>Melanerpes carolinus</i> , Linnæus.....	Red-bellied Woodpecker.....	121
44. <i>Melanerpes aurifrons</i> , Wagler.....	Golden-fronted Woodpecker.....	124
45. <i>Melanerpes uropygialis</i> , Baird.....	Gila Woodpecker.....	127
46. <i>Colaptes auratus</i> , Linnæus.....	Flicker.....	129
47. <i>Colaptes cafer</i> , Gmelin.....	Red-shafted Flicker.....	134
48. <i>Colaptes cafer saturator</i> , Ridgway.....	Northwestern Flicker.....	137
49. <i>Colaptes chrysoides</i> , Malherbe.....	Gilded Flicker.....	138
50. <i>Colaptes rufipileus</i> , Ridgway.....	Guadalupe Flicker.....	140

MACROCHIRINE BIRDS.

Family CAPRIMULGIDÆ. Goatsuckers, etc.

51. <i>Antrostomus carolinensis</i> , Gmelin.....	Chuck-will's-widow (Pl. I, Figs. 8, 9).....	142
52. <i>Antrostomus vociferus</i> , Wilson.....	Whip-poor-will (Pl. I, Figs. 10, 11).....	146
53. <i>Antrostomus vociferus macromystax</i> , Wagler..	Stephens's Whip-poor-will.....	151
54. <i>Phalænoptilus nuttalli</i> , Audubon.....	Poor-will (Pl. I, Fig. 23).....	153
55. <i>Phalænoptilus nuttalli nitidus</i> , Brewster.....	Frosted Poor-will.....	157
56. <i>Phalænoptilus nuttalli californicus</i> , Ridgway..	Dusky Poor-will.....	158
57. <i>Nyctidromus albicollis merrilli</i> , Sennett.....	Merrill's Parouque (Pl. II, Figs. 1, 2).....	160
58. <i>Chordeiles virginianus</i> , Gmelin.....	Nighthawk (Pl. III, Figs. 1, 2, 3).....	163
59. <i>Chordeiles virginianus henryi</i> , Cassin.....	Western Nighthawk (Pl. III, Fig. 4).....	167
60. <i>Chordeiles virginianus chapmani</i> , Sennett.....	Florida Nighthawk (Pl. III, Figs. 5, 6).....	170
61. <i>Chordeiles acutipennis texensis</i> , Lawrence....	Texan Nighthawk (Pl. III, Figs. 7, 8, 9, 10).....	172

Family MICROPODIDÆ. Swifts.

62. <i>Cypseloides niger</i> , Gmelin.....	Black Swift.....	175
63. <i>Chaetura pelagica</i> , Linnæus.....	Chimney Swift (Pl. I, Fig. 25).....	177
64. <i>Chaetura vauxii</i> , Townsend.....	Vaux's Swift (Pl. I, Fig. 26).....	183
65. <i>Aëronautes melanoleucus</i> , Baird.....	White-throated Swift.....	185

Family TROCHILIDÆ. Hummingbirds.

66. <i>Eugenes fulgens</i> , Swainson.....	Rivoli Hummingbird.....	188
67. <i>Cœligena elemenciæ</i> , Lesson.....	Blue-throated Hummingbird.....	190
68. <i>Trochilus colubris</i> , Linnæus.....	Ruby-throated Hummingbird (Pl. I, Fig. 27).....	192
69. <i>Trochilus alexandri</i> , Bourcier and Mulsant.....	Black-chinned Hummingbird.....	198
70. <i>Trochilus violajungulum</i> , Jeffries.....	Violet-throated Hummingbird.....	201
71. <i>Calypte costæ</i> , Bonreier.....	Costa's Hummingbird.....	202
72. <i>Calypte anna</i> , Lesson.....	Anna's Hummingbird.....	206
73. <i>Selasphorus floresii</i> , Gould.....	Flores's Hummingbird.....	209
74. <i>Selasphorus platycercus</i> , Swainson.....	Broad-tailed Hummingbird.....	210
75. <i>Selasphorus rufus</i> , Gmelin.....	Rufous Hummingbird.....	213
76. <i>Selasphorus alleni</i> , Henshaw.....	Allen's Hummingbird.....	216
77. <i>Stellula calliope</i> , Gould.....	Calliope Hummingbird.....	219
78. <i>Calothorax lucifer</i> , Swainson.....	Lucifer Hummingbird.....	222
79. <i>Amazilia fuscicaudata</i> , Fraser.....	Rieffer's Hummingbird.....	223
80. <i>Amazilia cerviniventris</i> , Gould.....	Buff-bellied Hummingbird.....	225
81. <i>Basilinna xantusi</i> , Lawrence.....	Xantus's Hummingbird.....	226
82. <i>Basilinna leucotis</i> , Vieillot.....	White-eared Hummingbird.....	227
83. <i>Iache latirostris</i> , Swainson.....	Broad-billed Hummingbird.....	228

PASSERINE BIRDS.

Family COTINGIDÆ. Cotingas.

84. <i>Platypsaris albiventris</i> , Lawrence.....	Xantus's Becard.....	230
--	----------------------	-----

TABLE OF CONTENTS.

VII

Family TYRANNIDÆ. Tyrant Flycatchers.

		Page.
85. <i>Milvulus tyrannus</i> , Linnæus.....	Fork-tailed Flycatcher.....	231
86. <i>Milvulus forficatus</i> , Gmelin.....	Scissor-tailed Flycatcher (Pl. I, Figs. 12, 13).....	233
87. <i>Tyrannus tyrannus</i> , Linnæus.....	Kingbird (Pl. I, Figs. 14, 15).....	236
88. <i>Tyrannus dominicensis</i> , Gmelin.....	Gray Kingbird (Pl. II, Figs. 3, 4).....	241
89. <i>Tyrannus melancholicus couchii</i> , Baird.....	Couch's Kingbird (Pl. II, Figs. 5, 6).....	243
90. <i>Tyrannus verticalis</i> , Say.....	Arkansas Kingbird (Pl. I, Figs. 16, 17).....	245
91. <i>Tyrannus vociferans</i> , Swainson.....	Cassin's Kingbird (Pl. I, Figs. 18, 19).....	249
92. <i>Pitangus derbianus</i> , Kaup.....	Derby Flycatcher (Pl. I, Figs. 20, 21).....	251
93. <i>Myiozetetes texensis</i> , Giraud.....	Giraud's Flycatcher (Pl. I, Fig. 22).....	254
94. <i>Myiodynastes luteiventris</i> , Selater.....	Sulphur-bellied Flycatcher (Pl. II, Fig. 7).....	256
95. <i>Myiarchus crinitus</i> , Linnæus.....	Crested Flycatcher (Pl. II, Figs. 8, 9).....	259
96. <i>Myiarchus mexicanus</i> , Kaup.....	Mexican Crested Flycatcher (Pl. II, Figs. 10, 11).....	263
97. <i>Myiarchus mexicanus magister</i> , Ridgway.....	Arizona Crested Flycatcher (Pl. II, Fig. 12).....	264
98. <i>Myiarchus cinerascens</i> , Lawrence.....	Ash-throated Flycatcher (Pl. II, Fig. 13).....	266
99. <i>Myiarchus lawrencens nuttingi</i> , Ridgway.....	Nutting's Flycatcher (Pl. II, Fig. 14).....	269
100. <i>Myiarchus lawrencii</i> , Giraud.....	Lawrence's Flycatcher.....	270
101. <i>Myiarchus lawrencei olivascens</i> , Ridgway.....	Olivaceous Flycatcher.....	270
102. <i>Sayornis phœbe</i> , Latham.....	Phœbe (Pl. I, Fig. 28).....	272
103. <i>Sayornis saya</i> , Bonaparte.....	Say's Phœbe (Pl. I, Fig. 29).....	276
104. <i>Sayornis nigricans</i> , Swainson.....	Black Phœbe (Pl. I, Fig. 30).....	280
105. <i>Contopus borealis</i> , Swainson.....	Olive-sided Flycatcher (Pl. II, Figs. 15, 16).....	282
106. <i>Contopus pertinax</i> , Cabanis.....	Cones's Flycatcher (Pl. II, Fig. 17).....	286
107. <i>Contopus virens</i> , Linnæus.....	Wood Pewee (Pl. II, Figs. 18, 19).....	288
108. <i>Contopus richardsonii</i> , Swainson.....	Western Wood Pewee (Pl. II, Figs. 20, 21, 22).....	291
109. <i>Empidonax flaviventris</i> , Baird.....	Yellow-bellied Flycatcher (Pl. II, Fig. 23).....	295
110. <i>Empidonax difficilis</i> , Baird.....	Western Flycatcher (Pl. II, Fig. 24, 25).....	298
111. <i>Empidonax ciueritius</i> , Brewster.....	St. Lucas Flycatcher.....	301
112. <i>Empidonax acadicus</i> , Gmelin.....	Acadian Flycatcher (Pl. II, Figs. 26, 27).....	302
113. <i>Empidonax pusillus</i> , Swainson.....	Little Flycatcher (Pl. II, Figs. 28, 29).....	305
114. <i>Empidonax pusillus traillii</i> , Audubon.....	Traill's Flycatcher (Pl. II, Fig. 30).....	310
115. <i>Empidonax minimus</i> , Baird.....	Least Flycatcher (Pl. II, Fig. 31).....	312
116. <i>Empidonax hammondi</i> , Xantus.....	Hammond's Flycatcher (Pl. II, Fig. 32).....	315
117. <i>Empidonax wrightii</i> , Baird.....	Wright's Flycatcher (Pl. II, Fig. 33).....	318
118. <i>Empidonax griseus</i> , Brewster.....	Gray Flycatcher.....	320
119. <i>Empidonax fulvifrons</i> , Giraud.....	Fulvous Flycatcher.....	321
120. <i>Empidonax fulvifrons pygmaeus</i> , Cones.....	Buff-breasted Flycatcher.....	321
121. <i>Pyrocephalus rubineus mexicanus</i> , Selater.....	Vermilion Flycatcher (Pl. II, Figs. 34, 35).....	322
122. <i>Ornithion imberbe</i> , Selater.....	Beardless Flycatcher.....	325
123. <i>Ornithion imberbe ridgwayi</i> , Brewster.....	Ridgway's Flycatcher.....	325

Family ALAUDIDÆ. Larks.

124. <i>Alauda arvensis</i> , Linnæus.....	Skylark (Pl. V, Fig. 23).....	327
125. <i>Otocoris alpestris</i> , Linnæus.....	Horned Lark.....	330
126. <i>Otocoris alpestris leucolæma</i> , Coues.....	Pallid Horned Lark (Pl. V, Fig. 24).....	332
127. <i>Otocoris alpestris praticola</i> , Henshaw.....	Prairie Horned Lark (Pl. V, Fig. 25).....	334
128. <i>Otocoris alpestris arenicola</i> , Henshaw.....	Desert Horned Lark (Pl. V, Fig. 26).....	338
129. <i>Otocoris alpestris giraudi</i> , Henshaw.....	Texan Horned Lark (Pl. V, Fig. 27).....	340
130. <i>Otocoris alpestris chrysolæma</i> , Wagler.....	Mexican Horned Lark (Pl. V, Fig. 28).....	341
131. <i>Otocoris alpestris rubea</i> , Henshaw.....	Ruddy Horned Lark (Pl. V, Fig. 29).....	343
132. <i>Otocoris alpestris strigata</i> , Henshaw.....	Streaked Horned Lark.....	344
133. <i>Otocoris alpestris adusta</i> , Dwight.....	Scorched Horned Lark (Pl. V, Fig. 31).....	345
134. <i>Otocoris alpestris merrilli</i> , Dwight.....	Dusky Horned Lark (Pl. V, Fig. 30).....	346
135. <i>Otocoris alpestris pallida</i> , Townsend.....	Sonoran Horned Lark.....	347
136. <i>Otocoris alpestris insularis</i> , Townsend.....	Insular Horned Lark.....	347

Family CORVIDÆ. Crows, Jays, Magpies, etc.

137. <i>Pica pica hudsonica</i> , Sabine.....	American Magpie (Pl. III, Figs. 11, 12, 13).....	349
138. <i>Pica nuttalli</i> , Audubon.....	Yellow-billed Magpie (Pl. III, Fig. 14).....	355
139. <i>Cyanocitta cristata</i> , Linnæus.....	Blue Jay (Pl. V, Figs. 5, 6).....	356
140. <i>Cyanocitta cristata florincola</i> , Coues.....	Florida Blue Jay (Pl. V, Figs. 7, 8).....	361
141. <i>Cyanocitta stelleri</i> , Gmelin.....	Steller's Jay (Pl. V, Fig. 9).....	362
142. <i>Cyanocitta stelleri frontalis</i> , Ridgway.....	Blue-fronted Jay (Pl. V, Fig. 10).....	365
143. <i>Cyanocitta stelleri macrolopha</i> , Baird.....	Long-crested Jay (Pl. V, Figs. 11, 12).....	367

	Page.
144. <i>Cyanocitta stelleri amnectens</i> , Baird	Black-headed Jay..... 369
145. <i>Aphelocoma floridana</i> , Bartram	Florida Jay (Pl. V, Fig. 13)..... 370
146. <i>Aphelocoma woodhousei</i> , Baird.....	Woodhouse's Jay (Pl. V, Fig. 14)..... 372
147. <i>Aphelocoma californica</i> , Vigors	California Jay (Pl. V, Figs. 15, 16, 17, 18)..... 374
148. <i>Aphelocoma californica hypoleuca</i> , Ridgway..	Xantus's Jay..... 378
149. <i>Aphelocoma californica obscura</i> , Anthony.....	Belding's Jay..... 379
150. <i>Aphelocoma insularis</i> , Henshaw	Santa Cruz Jay..... 379
151. <i>Aphelocoma sieberii arizonæ</i> , Ridgway.....	Arizona Jay (Pl. V, Figs. 19, 20)..... 380
152. <i>Aphelocoma cyanotis</i> , Ridgway.....	Blue-eared Jay..... 382
153. <i>Xanthocephala luxuosa</i> , Lesson.....	Green Jay (Pl. III, Figs. 15, 16, 17)..... 383
154. <i>Perisoreus canadensis</i> , Linnæus.....	Canada Jay (Pl. III, Figs. 18, 19)..... 385
155. <i>Perisoreus canadensis capitalis</i> , Baird.....	Rocky Mountain Jay..... 388
156. <i>Perisoreus canadensis fumifrons</i> , Ridgway.....	Alaskan Jay..... 390
157. <i>Perisoreus canadensis nigricapillus</i> , Ridgway..	Labrador Jay (Pl. III, Fig. 20)..... 392
158. <i>Perisoreus obscurus</i> , Ridgway	Oregon Jay (Pl. III, Fig. 21)..... 394
159. <i>Corvus corax sinuatus</i> , Wagler.....	American Raven (Pl. IV, Figs. 1, 2)..... 396
160. <i>Corvus corax principalis</i> , Ridgway.....	Northern Raven (Pl. IV, Fig. 3)..... 400
161. <i>Corvus cryptoleucus</i> , Couch.....	White-necked Raven (Pl. IV, Figs. 4, 5, 6, 7)..... 402
162. <i>Corvus americanus</i> , Audubon.....	American Crow (Pl. IV, Figs. 8, 9, 10, 11, 12; Pl. V, Figs. 21, 22)..... 405
163. <i>Corvus americanus floridanus</i> , Baird.....	Florida Crow (Pl. IV, Figs. 13, 14)..... 413
164. <i>Corvus caurinus</i> , Baird.....	Northwest Crow (Pl. IV, Fig. 15)..... 414
165. <i>Corvus ossifragus</i> , Wilson	Fish Crow (Pl. IV, Figs. 16, 17)..... 415
166. <i>Nucifraga columbiana</i> , Wilson.....	Clarke's Nutcracker (Pl. III, Figs. 22, 23)..... 418
167. <i>Cyanocephalus cyanocephalus</i> , Wied.....	Piñon Jay (Pl. III, Figs. 24, 25)..... 424
Family STURNIDÆ. Starlings.	
168. <i>Sturnus vulgaris</i> , Linnæus.....	Starling..... 427
Family ICTERIDÆ. Blackbirds, Orioles, etc.	
169. <i>Dolichonyx oryzivorus</i> , Linnæus	Bobolink (Pl. VI, Figs. 1, 2)..... 429
170. <i>Molothrus ater</i> , Boddart	Cowbird (Pl. VI, Figs. 3, 4, 5, 6)..... 434
171. <i>Molothrus ater obscurus</i> , Gmelin	Dwarf Cowbird (Pl. VI, Figs. 7, 8)..... 441
172. <i>Calliothrus robustus</i> , Cabanis.....	Red-eyed Cowbird (Pl. VI, Fig. 9)..... 443
173. <i>Xanthocephalus xanthocephalus</i> , Bonaparte...	Yellow-headed Blackbird (Pl. VI, Figs. 10, 11, 12)..... 446
174. <i>Agelaius phœniceus</i> , Linnæus.....	Red-winged Blackbird (Pl. VI, Figs. 13, 14, 15)..... 449
175. <i>Agelaius phœniceus sonoriensis</i> , Ridgway.....	Souoran Redwing..... 453
176. <i>Agelaius phœniceus bryanti</i> , Ridgway	Bahaman Redwing..... 453
177. <i>Agelaius gubernator</i> , Wagler.....	Bicolored Blackbird (Pl. VI, Figs. 16, 17)..... 455
178. <i>Agelaius tricolor</i> , Nuttall.....	Tricolored Blackbird (Pl. VI, Figs. 18, 19)..... 456
179. <i>Sturnella magna</i> , Linnæus.....	Meadowlark (Pl. VI, Figs. 20, 21)..... 458
180. <i>Sturnella magna mexicana</i> , Sclater	Mexican Meadowlark (Pl. VI, Fig. 22)..... 461
181. <i>Sturnella magna neglecta</i> , Audubon	Western Meadowlark (Pl. VI, Figs. 23, 24)..... 462
182. <i>Icterus icterus</i> , Linnæus.....	Troupial..... 466
183. <i>Icterus gularis</i> , Wagler.....	Gular Oriole..... 466
184. <i>Icterus audubonii</i> , Giraud	Audubon's Oriole (Pl. VI, Figs. 25, 26, 27)..... 469
185. <i>Icterus parisorum</i> , Bonaparte	Scott's Oriole (Pl. VI, Figs. 28, 29)..... 471
186. <i>Icterus cucullatus</i> , Swainson.....	Hooded Oriole (Pl. VI, Figs. 30, 31, 32)..... 474
187. <i>Icterus cucullatus nelsoni</i> , Ridgway.....	Arizona Hooded Oriole (Pl. VII, Figs. 1, 2)..... 476
188. <i>Icterus spurius</i> , Linnæus.....	Orchard Oriole (Pl. VII, Figs. 3, 4, 5)..... 479
189. <i>Icterus galbula</i> , Linnæus.....	Baltimore Oriole (Pl. VII, Figs. 6, 7, 8, 9)..... 482
190. <i>Icterus bullocki</i> , Swainson.....	Bullock's Oriole (Pl. VII, Figs. 10, 11, 12, 13)..... 486
191. <i>Scolecophagus carolinus</i> , Müller	Rusty Blackbird (Pl. VII, Figs. 14, 15, 16)..... 489
192. <i>Scolecophagus cyanocephalus</i> , Wagler.....	Brewer's Blackbird (Pl. VII, Figs. 17, 18, 19, 20)..... 493
193. <i>Quiscalus quiscula</i> , Linnæus.....	Purple Grackle (Pl. VII, Figs. 21, 22, 23)..... 497
194. <i>Quiscalus quiscula agleus</i> , Baird	Florida Grackle (Pl. VII, Figs. 24, 25)..... 500
195. <i>Quiscalus quiscula æneus</i> , Ridgway.....	Bronzed Grackle (Pl. VII, Figs. 26, 27)..... 501
196. <i>Quiscalus macrourus</i> , Swainson.....	Great-tailed Grackle (Pl. VII, Figs. 28, 29)..... 504
197. <i>Quiscalus major</i> , Vieillot	Boat-tailed Grackle (Pl. VII, Figs. 30, 31)..... 506

I N T R O D U C T I O N .

This volume on the Life Histories of North American Birds, like the one preceding, is based on the collections in the United States National Museum, and relates only to land birds. The classification given in the Code and Check List of the American Ornithologists' Union has again been followed, and the species and subspecies have been treated in a manner similar to that adopted in the earlier volume.

Since the publication of the initial volume the oölogical collection has been very materially increased. Dr. William L. Ralph, of Utica, New York, has, with commendable liberality, presented his entire collection, numbering over seven thousand specimens, to the Smithsonian Institution. This contains beautifully prepared sets of the eggs of many of the rarer species, quite a number of which have heretofore been unrepresented. To this collection our generous friend is constantly adding, regardless of expense.

My thanks are especially due to Dr. Ralph and to my numerous correspondents whose names appear in the body of this volume; by the kind cooperation of these gentlemen I have been greatly aided in the preparation of this work. I am also indebted to the United States Department of Agriculture for the many courtesies extended through Dr. C. Hart Merriam, who has given me access to the collections and furnished me with the results of the investigations made by this Department.

The original water-color drawings from which the plates have been reproduced, like those of the former volume, are the work of Mr. John L. Ridgway, of Washington, District of Columbia, and of the same standard of excellence. The chromo-lithographic reproductions are by the Ketterlinus Printing Company, of Philadelphia, Pennsylvania, and I am pleased to be able to say that they come up fully to my expectations. The illustrations are all natural size.

THE AUTHOR.

LIFE HISTORIES OF NORTH AMERICAN BIRDS.

BY CHARLES BENDIRE, *Captain and Brevet Major, U. S. Army (retired).*

PSITTACEOUS BIRDS.

Family PSITTACIDÆ. PARROTS, PAROQUETS, ETC.

I. *Conurus carolinensis* (LINNÆUS).

CAROLINA PAROQUET.

Psittacus carolinensis LINNÆUS, *Systema Naturæ*, ed. 10, I, 1758, 97.

Conurus carolinensis LESSON, *Traité d'Ornithologie*, 1831, 211.

(B 65, C 315, R 392, C 460, U 382.)

GEOGRAPHICAL RANGE: Florida and the Indian Territory, sporadically only; casually along the Gulf coast and the Lower Mississippi Valley, north to southwestern Missouri.

The range of the Carolina Paroquet, the only representative in the United States of this numerous family, is yearly becoming more and more restricted, and is now mainly confined to some of the less accessible portions of southern Florida, and to very limited areas in the sparsely settled sections of the Indian Territory, where it is only a question of a few years before its total extermination will be accomplished. Formerly this species had quite an extensive distribution in the United States, ranging from Florida, the Gulf, and the South Atlantic States generally, north to Maryland, Pennsylvania, Ohio, Indiana, Illinois and Nebraska, and casually even to Michigan and New York, while west it reached to Texas and eastern Colorado. It was especially common then throughout the entire Mississippi Valley and the heavily timbered bottom lands of the larger tributaries of this stream.

With the more general settlement of the regions inhabited by these birds, their numbers have gradually but steadily diminished, and even as early as 1832 Audubon speaks of their not being nearly as common as formerly. As late, however, as 1860 they were still comparatively numerous throughout the Gulf States and the Mississippi, Arkansas, and White River valleys; and I well remember seeing large flocks of these birds throughout that year in the vicinity of Fort Smith, Arkansas, and near several of the military posts in the Indian Territory.

At present it is very doubtful if the Carolina Paroquet can be considered a regular resident anywhere excepting the localities already mentioned, and it is rapidly disappearing from these, especially the Indian Territory. Occasionally a pair are still seen in southern Louisiana, and as late as the fall of 1891 Mr. Thurman S. Powell saw a couple at the Linchpin Camping Grounds, Stone County, Missouri. Although rather restless birds at all times, they can generally be considered as residents wherever found, roving about from place to place in search of suitable feeding grounds, and usually returning to the same roosting place, some large hollow tree, to which they retire at night, hooking or suspending themselves by their powerful beaks and claws to the inner rough wall of the cavity.

Previous to the more extensive settlement of the country, their food consisted of the seeds of the cocklebur (*Xanthium strumarium*), the round seed balls of the sycamore, those of the cypress, pecan and beech nuts, the fruit of the papaw, (*Asimina trilobata*), mulberries, wild grapes, and various other wild berries. According to Mr. J. F. Menge, they also feed on the seeds extracted from pine cones and those of the burgrass, or sand bur (*Cenchrus tribuloides*), one of the most noxious weeds known. They are also rather fond of cultivated fruit, and in Florida they have acquired a taste for both oranges and bananas. They are also partial to different kinds of grains while in the milk. Mr. Frank M. Chapman states that while collecting on the Sebastian River, Florida, in March, 1890, he found them feeding on the milky seeds of a species of thistle (*Cirsium lecontei*), which, as far as he could learn, constituted their entire food at that season. He says: "Not a patch of thistles did we find which had not been visited by them, the headless stalks showing clearly where the thistles had been neatly severed by the sharp, chisel-like bill, while the ground beneath favorite trees would be strewn with the scattered down."¹

According to the observations of Mr. August Koch, published in "Forest and Stream," September 24, 1891, they also feed on the red blossoms of a species of maple (*Acer rubrum*). In the vicinity of Fort Smith, Arkansas, during the fall and winter of 1860-61, I frequently saw flocks of these birds in osage orange trees, which attain a large size here, biting off the fruit and feeding on the tender buds; here they were also accused of doing considerable injury to Indian corn while still in the milk, and many were shot for this reason, and there is no doubt that they do more or less damage to both fruit and grain.

Although clumsy-looking birds on the ground, it is astonishing how readily they move about on the slenderest limbs in trees, frequently hanging head down, like Crossbills and Redpolls, nipping off the seed bulbs of the sycamores, etc., and swinging themselves, with the assistance of their powerful beaks, from the extremity of one branch to another.

Their flight, which is more or less undulating, resembles both that of the Passenger Pigeon and again that of the Falcons; it is extremely swift and graceful, enabling them, even when flying in rather compact flocks, to dart in

¹ Proceedings of the Linnæan Society, New York, for the year ending March 7, 1890.

and out of the densest timber with perfect ease. Their call notes are shrill and disagreeable, a kind of grating, metallic shriek, and they are especially noisy while on the wing. Among the calls is one resembling the shrill cry of a goose, which is frequently uttered for minutes at a time. Formerly they moved about in good-sized and compact flocks, often numbering hundreds, while now it is a rare occurrence to see more than twenty together, more often small companies of from six to twelve. When at rest in the middle of the day on some favorite tree they sometimes utter low notes, as if talking to each other, but more often they remain entirely silent, and are then extremely difficult to discover as their plumage harmonizes and blends thoroughly with the surrounding foliage.

They are most active in the early morning and again in the evening, while the hotter parts of the day are spent in thick-foliaged and shady trees. They are partial to heavily timbered bottom lands bordering the larger streams and the extensive cypress swamps which are such a common feature of many of our Southern States. Social birds as they are, they are rarely seen alone, and if one is accidentally wounded, the others hover around the injured one until sometimes the whole flock is exterminated. This devotion to one another has cost them dearly, and many thousands have been destroyed in this way.

Mr. E. A. McIlhenny has kindly furnished me with the following notes on their habits as observed by him in southern Louisiana, where the species was still comparatively abundant a few years ago, but has now nearly disappeared:

"The Carolina Paroquet may be looked for in this section about April 25, or when the black mulberries begin to ripen. This fruit seemed to be their favorite food, and in the morning, from sunrise to about 7 o'clock, and in the evening, from 5 o'clock to sunset, at which hours they feed, they were to be found in the mulberry groves. They spent the rest of the day and roosted at night in the live-oak timber. In the morning, just before sunrise, they mounted the tallest trees, congregating in small bands, all the while talking at a great rate. As the sun rises they take flight for the nearest mulberry grove, where they partake of their morning meal amidst a great amount of noise. After they have eaten their fill they generally go to the nearest stream, where they drink and bathe; they then go to some dense oak timber, where they pass the heat of the day. After they get in the oaks they rarely utter a sound. In the afternoon they go through the same performance, with the exception of going to the water.

"The flight of the Carolina Paroquet, once seen, is never to be forgotten; it is undulating, somewhat like the woodpecker's, but very swift. While on the wing they chatter and cry continually; this cry sounds like 'qui,' with the rising inflection on the i; this is repeated several times, the last one being drawn out like 'qui-i-i-i.' These birds are rarely met with in the summer, and I do not think they nest here. They are most plentiful in May and September. In the fall they feed on the fruit of the honey locust, and are then more often seen on the ground."

The total extermination of the Carolina Paroquet is only a question of a few more years, and the end of the present century will probably mark their

disappearance. Civilization does not agree with these birds, and as they certainly do some damage to fruit in sections where they still exist, nothing else than complete annihilation can be looked for. Like the Bison and the Passenger Pigeon, their days are numbered.

Considering how common this bird was only a few decades ago, it is astonishing how little is really known about its nesting habits, and it is not likely that we will be able to learn much more about them. The general supposition is that they breed in hollow trees, such as cypress, oak, and sycamore, and that they nest rather early in the season, while others think they nest rather late. There are two eggs in the United States National Museum collection, No. 17709, in rather poor condition, which are entered as having been taken in St. Mary's Parish, Louisiana, March, 1878. I have endeavored to obtain some further particulars about them, but have been unsuccessful. One egg laid in captivity by a bird in the possession of Mr. R. Ridgway was deposited in August, 1877, and another in July, 1878, and one in September, 1883. There are also a couple of eggs in the collection of the American Museum of Natural History, New York City, collected by the late Dr. S. W. Wilson, of Georgia, which I believe are genuine; these are said to have been taken on April 26, 1855, from a hollow tree, the eggs being deposited on a few chips in the cavity; the exact locality where they were obtained is not given, but the collection was chiefly made on St. Simon Island and in Wayne and McIntosh counties, Georgia.

Mr. William Brewster, of Cambridge, Massachusetts, ever alert to obtain new information about the habits of our birds, while on a visit to Florida elicited the following, published by him in "The Auk" (Vol. VI, 1889, pp. 336, 337), which is well worth inserting here. He says: "While in Florida, during February and March, 1889, I questioned everybody whom I met regarding the nesting of the Parrakeet. Only three persons professed any knowledge on this subject. The first two were both uneducated men, professional hunters of alligators and plume birds. Each of them claimed to have seen Parrakeets' nests, which they described as flimsy structures built of twigs and placed on the branches of cypress trees. One of them said he found a nest only the previous summer (1888), while fishing. By means of his pole he tipped the nest over and secured two young birds which it contained. This account was so widely at variance with what has been previously recorded regarding the manner of nesting of this species that I considered it at the time as a mere fabrication, but afterwards it was unexpectedly and most strongly corroborated by Judge R. L. Long, of Tallahassee. The latter gentleman, who, by the way, has a very good general knowledge of the birds of our Northern States, assured me that he had examined many nests of the Parrakeet built precisely as above described. Formerly, when the birds were abundant in the surrounding region, he used to find them breeding in large colonies in the cypress swamps. Several of these colonies contained at least a thousand birds each. They nested invariably in small cypress trees, the favorite position being on a fork near the end of a slender horizontal branch.

“Every such fork would be occupied, and he has seen as many as forty or fifty nests in one small tree. Their nests closely resembled those of the Carolina Dove, being similarly composed of cypress twigs put together so loosely that the eggs were often visible from the ground beneath. The twigs of the cypress seemed to be preferred to those of any other kind of tree. The height at which the nests were placed varied from 5 or 6 feet to 20 or 30 feet. Mr. Long described the eggs as being of a greenish-white color, unspotted. He did not remember the maximum number which he had found in one set, but thought it was at least four or five. He had often taken young birds from the nests to rear or to give to his friends. He knew of a small colony of Parrakeets breeding in Waukulla Swamp, about 20 miles from Tallahassee, in the summer of 1885, and believes that they still occur there in moderate numbers.

“It seems difficult to reconcile such testimony with the statements of Audubon, Wilson, and others that the Carolina Parrakeet lays its eggs in hollow trees. It may be, however, that, like the Crow Blackbird, and some of the Owls, this Parrot nests both in holes and on branches, according to circumstances; at all events the above account has seemed to me to rest on evidence sufficiently good to warrant its publication.”

It is quite possible that the Carolina Paroquet, from its exceedingly social nature, was compelled where very numerous to resort to open nesting sites from necessity, as suitable cavities are rarely found in sufficient quantities close to each other to accommodate any considerable number of pairs. We find this to be the case with *Bolborhynchus monachus* Boddärt, the Green Paroquet of Paraguay, Uruguay, and the Argentine Republic, which suspends its nests from the extremities of branches, to which they are firmly woven. Mr. Gibson describes their nests as follows: “New nests consist of only two chambers, the porch and the nest proper, and are inhabited by a single pair of birds. Successive nests are added until some of them come to weigh a quarter of a ton, and contain material enough to fill a large cart. Thorny twigs firmly interwoven form the only material, and there is no lining in the breeding chamber even in the breeding season. Some old forest trees have seven or eight of these huge structures suspended from the branches, while the ground underneath is covered with twigs and remains of fallen rocks.”¹

Another species the Patagonian Parrot, *Conurus patagonus* (Vieillot), found in the Argentine Republic, and in Patagonia, excavates its nest in perpendicular banks, like our Kingfisher; while the Ground Parrakeet, *Pezoporus formosus* Latham), of Australia nests in tall grass.

Although nearly all the species of this numerous family nest in hollow trees, as stated above, there are exceptions to this rule, and it is quite probable that some of our Carolina Paroquets nested at times in Florida as Judge R. L. Long described, and again both in communities in large hollow trees and singly, as Alexander Wilson states, all of these different assertions being probably correct.

We have no positive information about the number of eggs laid by this species in a wild state.

¹ Argentine Ornithology, Vol. II, 1889, pp. 43-46.

Dr. Karl Russ, of Berlin, Germany, in his interesting article on this species in his work on "Die Fremdländischen Stubenvögel, Die Papageien" (Vol. III, 1879, pp. 221-236), mentions several instances of the Carolina Paroquets breeding in captivity in Germany, where the eggs were deposited in June and July, two being the number laid; but in his "Handbuch für Vögelliebhaber," he gives the number from three to five, and he describes these as pure white, fine grained, very round, and quite glossy, like Woodpeckers' eggs, measuring 38 by 36 millimetres, or about 1.50 by 1.42 inches.

Mr. Robert Ridgway's birds would not use the nesting boxes provided for them, and both females deposited their eggs on the floor of the cage; they were laid in July, August, and September, respectively. None of these eggs can be called round; they vary from ovate to short ovate, and are rather pointed. They are white, with the faintest yellowish tint, ivory-like and quite glossy; the shell is rather thick, close grained, and deeply pitted, not unlike the eggs of the African Ostrich (*Struthio camelus*), but of course not as noticeable. Holding the egg in a strong light, the inside appears to be pale yellow.

These eggs measure 36.32 by 26.92, 34.54 by 27.18, and 33.27 by 26.92 millimetres, or 1.43 by 1.06, 1.36 by 1.07, and 1.31 by 1.06 inches.

The deep pitting is noticeable in every specimen, and there can be no possible doubt about the identity of these eggs. The other eggs in the collection about whose proper identification I am not so certain, and whose measurements I therefore do not give, have a much thinner shell, and do not show the peculiar pitting already referred to. There is no difficulty whatever in distinguishing these eggs from those of the Burrowing Owl or the Kingfisher, both of which are occasionally substituted for them.

The type specimen, No. 20784 (Pl. 1, Fig. 1), was laid in confinement on July 19, 1878, and is the smallest of the three eggs whose measurements are given above.

Family CUCULIDÆ. THE CUCKOOS, ANIS, ETC.

2. *Crotophaga ani* LINNÆUS.

THE ANI.

Crotophaga ani LINNÆUS, Systema Naturæ, ed. 10, I, 1758, 105. Type *C. ani* Linnæus.
(B 66.67, C 288, R 389, C 425, U (383).)

GEOGRAPHICAL RANGE: West India Islands and northern South America, east of the Andes; south to northern Argentina; casually north to the southern United States, Florida and Louisiana.

The Ani, also called Black Ani, Black Witch, Blackbird, Savanna Blackbird, and Tickbird, can only be considered as a straggler within the borders of the southern United States. It is a common resident species in the West India Islands and in northern South America east of the Andes Mountains, and reaches the southern limits of its range in northern Argentina. There are two

specimens in the United States National Museum collection, taken within the limits of the United States—one from the Dry Tortugas by Mr. J. Wurdeman, on June 24, 1857; the other by Mr. G. A. Boardman, from Charlotte Harbor, Florida.

A small flock of five of these birds was seen in July, 1893, at Diamond, Louisiana, opposite Point la Hache, and one of these was shot. This is now in the possession of Mr. George E. Beyer, who considers the Ani a regular summer resident in that locality.

The Ani is most commonly found at altitudes below 1,000 feet and rarely above 3,000. One of its principal call notes, according to Mr. John S. Northrop, who observed this species on Andros Island, one of the Bahamas, is "wee-eep," the second syllable uttered in a much higher key than the first; another common call sounds like "que-yu." When perched on trees they are said to sit very close together in rows, and being good-natured social birds, they are rarely seen alone.

The most complete account of the general habits of the Ani is that of Mr. Charles B. Taylor, Rae Town, Kingston, Jamaica, in "The Auk" (Vol. IX, 1892, pp. 369-371).

"The Ani appears to be abundant in all parts of the island. It is one of the commonest birds near Kingston, and in most open or sparsely wooded lands or in the vicinity of cultivated clearings little groups or companies may nearly always be seen. Blackbirds are invariably present wherever cattle are pastured. I can not recollect an instance in which I have noted a herd of cows at pasture without a flock of these birds appearing in company with them or in their immediate vicinity. This association is, doubtless, chiefly for the purpose of feeding on the ticks and other parasites on the animals, a good work largely shared by the Grackles (*Quiscalus crassirostris*). It is most interesting to watch a company of Blackbirds when thus engaged. Many are perched on the backs of the cattle (two or three sometimes on one cow); others are on the ground, hopping about fearlessly among the grazing herd, searching for insects at the roots of the herbage, or capturing those disturbed by the feet of the cattle. At this time one or more individuals are stationed on some tree close by, from which they now and again call to those in the open with that remarkable cry, variously syllabicated by some, but which I have at times thought strangely like the wailing of a young cat. Insects of all orders and their larvæ, ticks, grubs, etc., form their chief food. Occasionally, perhaps, a few small lizards are taken, and, I believe, the eggs of other birds, as I once found in the stomach of a female portions of an egg, apparently that of some small bird. Gosse records having seen these birds eating the ripe berries of the fiddle wood, but I have not noticed them at any time eating vegetable food.

"The Blackbirds at their best have a very lean and shabby appearance, and are slow and awkward in their movements. I have watched an individual make several ineffectual attempts to alight on the frond of a cocoanut palm; but even among the branches of other trees their actions appear awkward. Their flight

is slow and gliding, somewhat labored, and of little duration, the birds often appearing to fall short of the point originally aimed at. Yet they will chase the large yellow butterflies, and I was shown a large green locust that one of these birds was seen to capture in flight and afterwards drop. In the progress of a flock from place to place they do not usually fly all together, but move away in straggling groups or couples. One or more individuals first start off with their wailing call, followed soon after by two or three; after a little delay, then two more go; another pause, then one, then three, and so on. If a tree has very dense foliage, they alight (with much awkward scrambling) on the tops or extremities of the highest branches, where they may gain a clear and uninterrupted view, and this is usually the case when they are traversing very open country.

"Their nesting habits are exceedingly curious and interesting. Many individuals (possibly members of one flock) work together in the construction of a large nest, in which all the females of the company lay their eggs. The number of eggs deposited in different nests varies greatly, but is of course dependent on the number of birds in a company. Six and eight eggs are commonly found. I once took eleven, and in August, last year, I saw a clutch of twenty-one that had been taken from a single nest. It is probable that normally not more than two eggs are deposited by each bird, but nothing definite can be said on this point. The nest, which is usually placed high up in a tall tree, very frequently in a clump of mistletoe on a 'bastard cedar,' is a large, loosely constructed mass of twigs, entirely lined with dried leaves. But the most remarkable circumstance in connection with the nesting of these birds is the deposition of the eggs in regular layers, with leaves between. This custom I had long heard of before an opportunity offered for personal observation. In the first nest I examined the eggs were in two distinct layers, separated by a deep bed of dry leaves; the bottom layer consisted of four eggs, and these, strange to say, were all infertile. I believe this singular habit is practiced in all cases where a large number of birds resort to the same nest. The eggs are a deep bluish green, but when freshly laid are covered with a white, chalky coat, which soon becomes much scratched and erased on all. Now, what seems very singular is that comparatively little of this chalky covering gets rubbed off the sides, where, from the turning over of the eggs in the nest, we should expect to see the greatest extent of denudation, whereas one or both ends are nearly always wholly denuded. That this circumstance is not merely accidental I feel sure, as in a large series of clutches that I have examined more than two-thirds of the number of eggs show this peculiarity. So cleanly and evenly is it done, and to such an extent, that I feel confident that it is the work of the birds themselves, their beaks alone being able to accomplish it. At the same time it is easy to see that the marks and scratches at the sides are the result of friction with the twigs and leaves of the nest. Average measurements of the eggs are 1.33 by 1.20 inches. I have found eggs and young in February and throughout the succeeding months to August, two or three broods probably being reared. I have also seen young, fully fledged,

but unable to fly, hopping about the branches of the nesting tree; and on another occasion, some, more advanced, searching for insects in the grass at the roots of a large guango tree, in company with many old birds."

The eggs of the Ani are glaucous-blue in color, and this is overlaid and hidden by a thin, chalky, white deposit; as incubation advances the eggs become more or less scratched and the blue underneath is then plainly visible in places, giving them a very peculiar appearance. In shape they vary from oval to elliptical oval; the shell is fine grained, rather strong, and without luster.

The average measurement of forty eggs in the United States National Museum collection, mostly from the West Indies, is 34.66 by 26 millimetres, or about 1.36 by 1.02 inches. The largest egg of the series measures 39.62 by 26.67 millimetres, or 1.56 by 1.05 inches; the smallest, 29.21 by 23.37 millimetres, or 1.15 by 0.92 inches.

The type specimen, No. 6048 (Pl. 1, Fig. 6), from a nest containing seven eggs, was taken by Mr. W. T. March, near Spanish Town, Jamaica, on July 30, 1862.

3. *Crotophaga sulcirostris* SWAINSON.

GROOVE-BILLED ANI.

Crotophaga sulcirostris SWAINSON, Philosophical Magazine, I, 1827, 440.
(B —, C —, R 390, C 426, U 384.)

GEOGRAPHICAL RANGE: Along the western slopes of the Andes, in South America, to the Pacific coast; from Peru north through Central America on both coasts, and through Mexico to the lower Rio Grande Valley in Texas, and southern Lower California. Casual in the United States in southern Florida, southern Louisiana, southern Arizona, and California.

The breeding range of the Groove-billed Ani or Jewbird within the United States is a very limited one and appears to be confined to the Lower Rio Grande Valley in Texas, where it was first discovered near Lomita by Mr. George B. Sennett, on May 19, 1878, and added by him to our fauna. Since then it has been found breeding in small numbers in chaparral in the vicinity of Brownsville, and its nest and three sets of eggs were taken there and are now in the Ralph collection in the United States National Museum.

It straggles occasionally along the Gulf coast to southern Louisiana. Mr. E. A. McIlhenny shot one of these birds on Avery's Island on August 23, 1891, which is now in his collection, and it has also been taken in Florida. It is a common resident in suitable localities throughout the greater part of Mexico, the southern parts of Lower California, the whole of Central America, along both coasts, and those portions of South America situated on the western slopes of the Andes south to Peru. It is a bird of the lowlands, being rarely met with at altitudes over 700 feet, and it is generally resident wherever found.

Prof. A. L. Herrera, of the National Museum of the City of Mexico, has kindly furnished me with the following notes:

"*Crotophaga sulcirostris* is known to the inhabitants here as the *Pijon* and *Garrapatero*. It is a social bird, being usually found in small companies of from six to fifteen individuals, absolutely monogamous, sedentary, and of semidomesticated habits, frequenting the haciendas and the fields and pastures in their vicinity, and as it is considered very useful because of its habit of destroying large numbers of parasites infesting the cattle, it is not molested by the inhabitants, and becomes very tame. It extracts the *Ixodes* and other *Acaridans* with remarkable skill, without causing ulcerations which might result from the proboscis or sucker remaining in the fibers of the skin, and it must be regarded as one of the most useful birds of Mexico, especially of the warm regions, so abounding in parasites of all kinds. It is noteworthy that all the *Crotophagæ* I have collected were remarkably lean, which the natives assert is their normal condition; and without exception the *Garrapatero* is found in all the warmer parts of Mexico where there are cattle."

Mr. E. Kirby Smith, of Jataplan, Vera Cruz, Mexico, writes me that the Groove-billed Ani is locally known there as the *Chicuya*, usually inhabiting the thick chaparral and uttering, almost constantly, a peculiar cracking sound. He has found their nests in brush thickets, usually not more than 6 feet from the ground—rather loose structures, resembling the nests of the Cardinal (*Cardinalis cardinalis*), but larger, and has observed as many as fifteen eggs in a nest.

Mr. Charles W. Richmond has kindly furnished me with the following notes on the general habits of this species as observed by him in the vicinity of Bluefields, Nicaragua:

"A very abundant resident. It appears to breed at various times during the year, as I have found fresh eggs July 6, 1892, and young birds, recently from the nest, November 29, the breeding season spreading over seven months of the year at least, as it begins nesting earlier than the date of taking my first eggs. Nests are frequently built in the heart of a thick, thorny orange or lemon tree, and this appears to be a favorite situation. In this case the nest is from 4 to 7 feet from the ground, and, besides being difficult to get at, is somewhat protected from invasion by the wasps which almost invariably take up their abode in the same tree. In going through a small lemon grove I found an old nest of this species. In the cavity there were no eggs, but on poking the nest to pieces six badly decayed eggs rolled out.

"One nest containing three eggs in the proper place and two others at the bottom, under the lining of green leaves, was located in a bamboo about 12 feet from the ground. The eggs were fresh, and more would probably have been deposited; the leaves forming the lining were still green. The parent birds were away at the time. Another nest was situated in some vines which had overrun an old tree stub, and was about 15 feet from the ground.

"It may be that where numerous eggs are deposited in one nest only those eggs that are deposited in the proper place and directly influenced by the incubating bird are hatched, while those placed among the sticks forming the

bulky exterior are left unhatched. It would be interesting to watch the progress of a large nestful of eggs and note results. The nests found by me were all composed of dead black twigs, rather loosely put together, very bulky and conspicuous structures, lined with green leaves, or, if old nests, with leaves that had the appearance of having been picked green. On one occasion I saw a bird, with nesting material in its bill, taking short flights from one bamboo to another, followed by several other birds composing the company, but none of these latter had nesting material with them.

“At Mr. Haymond’s plantation, on the Escondido River, above Bluefields, this species was unusually plentiful, owing, no doubt, to a large number of cattle kept there. The birds follow these animals as they meander over the pastures, hopping along on each side of an animal, catching grasshoppers and other insects which the cow disturbs as it moves along. Frequently the cow moves too rapidly and the birds lag behind, when they make short flights to the front again, passing over one another after the manner of the Grackles when feeding in a field. Only half a dozen birds or so follow a cow usually, and not many congregate in one flock, except when roosting. On this plantation, where the species is more abundant than usual, the birds appear to roost in numbers. An orange tree near the house was a favorite place where thirty or forty birds came to pass the night, flying in from the surrounding pasture about dusk, and after a few short flights from one tree to another, passed into the roost one or two at a time, hopping about as if seeking a favorable perch, uttering their peculiar note meanwhile. Out of this roost I shot seventeen birds one evening, and the males greatly predominated; there were only five females in the lot. The note of this species reminds one somewhat of the Flicker, *Colaptes auratus*, but may be better represented by the combination ‘plee-co,’ rapidly repeated, with the accent usually on the first syllable, but sometimes on the last. I have frequently found one of the small flocks resting on a bush or bamboo along the water’s edge, perfectly silent, until my near approach started them off, one or two at a time, scolding as they went. Their flight is even, slow, as short as possible, and consists of a few flaps of the wings, followed by a short sail, then a few more flaps, etc.

“The food of those examined by me on banana plantations consisted almost entirely of small grasshoppers, the stomachs being much distended with these insects. From the fresh earth found on the bill and feet of these birds, I should judge they also feed on the ground. The *Crotophaga* is gregarious all the year round.”

The following observations on the nesting habits of this species, based on manuscript notes of Mr. Anastasio Alfaro, director of the National Museum of Costa Rica, at San Jose, and recently published by Mr. George K. Cherrie, are especially interesting.

“The *Zopilotillo* (so-pee-lo-tée-yo), also known as ‘Tijo-tijo’ (tee-ho), in imitation of its peculiar notes, which seem to repeat the word *tijo* over and over again, is very abundant in the fields near Tambor (a little town about 20 miles

northwest of San Jose), where, along the hedgerows and in the scrubby timber, as well as on the skin of the cattle, they find those insects which constitute their food. The woodticks, or garropatos, from the legs and about the head and neck of the cattle are esteemed above all else a favorite morsel. In this locality I have collected three nests during the month of May, the first with nine eggs, the second with eleven, and the last with thirteen. Some years ago I remember seeing a nest, situated in the branches of a mango tree, that contained fourteen eggs.

"The nests that I have collected agree with the observations made by Zeledon. The structure is voluminous, composed chiefly of coarse dead twigs, but presents one peculiarity not observed in any other bird, namely, the nest being lined with fresh green leaves. My three specimens were all placed in low trees, and neither was found at a greater height than 3 metres. One had been built above an old nest of one of the larger *Tyrannidæ*.

"It will not be without interest, I think, to insert my observations relative to one of these nests. On the 20th of May I noticed a *Zopilotillo* with a dry stick in his bill, which was immediately carried to a point in the hedgerow, where it was deposited with three others. After assuring myself that the bird was building its nest there, I retired, with the intention of returning at a more opportune moment. And when, one week later, I returned to the same spot, what was my surprise to see not only the nest completed and containing six eggs, but more than this—in the thorns and leaves about it were scattered seven more eggs! As a consequence, if that collection was not the work of the *Zopilotillos* collectively, the poor owner would have had to deposit three eggs daily. In the finding of some of the eggs scattered in the leaves was revealed one of the architect's peculiarities. A hole had been left in the center of the nest and only recently filled with leaves, whose fresh green color testified that they had been cut and placed there later than the others forming the carpeting to the bottom of this common incubator.

"The eggs were all fresh, the six occupying the nest having the characteristic rough, white, calcareous surface, perfectly clean, and without the slightest variation in color. Not so with the eggs found about the outside of the nest. Those found in contact with the leaves had taken on a dirty yellowish tinge. Those held suspended among the leaves and thorns showed various spots and lines of the lustrous blue color forming the base for the chalky external coat. The scratches had been caused by a too close contact with the thorns."¹

There can no longer be any doubt that the general nesting habits of this species are similar to those of the Ani, and that frequently more than one female lays in the same nest, although this habit may not be so universal as with the preceding species.

The three sets of eggs from the Ralph collection, taken near Brownsville, Texas, contained, respectively, four, five, and five eggs; in two of these the eggs were fresh, and in the other incubation had just commenced when taken,

¹ The Auk, Vol. IX, 1892, pp. 325, 326.

on May 28, 1892. These sets appear to have been laid by one bird, the eggs in each set resembling each other very closely. They were placed in huisache trees (*Acacia farnesiana*), from 6 to 10 feet from the ground, in rather open woods.

A nest now before me, taken by Mr. Charles W. Richmond, near the Escondido River, Nicaragua, on July 6, 1892, containing three fresh eggs when found, is composed of small twigs of a vine, mixed with a few blades of cane leaves, and the center is filled with a layer of leaves of different species. It is a rather loose structure, about 10 inches in diameter and 4 inches in height. The inner cup measures 4 inches in diameter by $2\frac{1}{2}$ inches in depth. Nothing definite is known about the time of incubation, nor whether the male assists in this duty; from three to five eggs seem to be laid by each female, and two or three broods are probably raised in a season.

The eggs are mostly oval in shape, but occasionally one is found that may be called elliptical ovate. They resemble those of the Ani very closely and the same description will answer for both, with the exception that the chalky matter covering the glaucous-blue ground color appears to be heavier in the present species, giving them a more uniform milky blue appearance, and that they are also considerably smaller.

The average measurement of forty eggs in the United States National Museum collection is 31.13 by 23.93 millimetres, or about 1.23 by 0.94 inches. The largest egg of the series measures 33.53 by 25.15 millimetres, or 1.32 by 0.99 inches; the smallest, 27.68 by 21.84 millimetres, or 1.09 by 0.86 inches.

The type specimen, No. 18565 (Pl. 1, Fig. 7), from a set of five eggs, was taken by Mr. L. Belding, near San Jose del Carbo, Lower California, on April 29, 1882, and represents an unscratched specimen.

4. *Geococcyx californianus* (LESSON).

ROAD-RUNNER.

Saurothera californiana LESSON, *Complement des Œuvres de Buffon* VI, 1829 (?), 420.

Geococcyx californianus BAIRD, *Birds of North America*, 1858, 73.

(B 68, C 289, R 385, C 427, U 385.)

GEOGRAPHICAL RANGE: Central and northern Mexico and adjoining portions of the United States; east through the western half of Texas, and extreme western Indian Territory; north to southwestern Kansas, southern Colorado, southern Utah, southern Nevada, and southwestern Oregon (?); Lower California.

The Road-runner, equally well known as the "Chaparral Cock," and occasionally called "Snake-killer," "Ground Cuckoo," "Lizard Bird," and by the Spanish-speaking population of our southern border "*Paisano*" and "*Correcamino*," is generally a resident and breeds wherever found, excepting perhaps in the extreme northern portions of its range. This it reaches in Shasta County, California, on the western slopes of the Sierra Nevada, in about latitude 40° N., while on the east side of these mountains it has as yet not been observed north

of Inyo County, California, about latitude 36° N. In southwestern Kansas it is undoubtedly quite rare and can only be considered as a straggler.¹

Its general habits are far more terrestrial than arboreal, spending most of its time on the ground in search of food, and frequenting the drier desert tracts adjacent to river valleys, and the lower foothills, covered by cactus, yuccas, and thorny undergrowth. It rarely ventures into the higher mountain ranges among the conifers, but breeds occasionally among the oaks bordering the pine belt. It is most abundant at altitudes ranging from 2,000 to 3,500 feet, and is seldom seen within the United States above 5,000 feet; but in the San Pedro Martir range, in Lower California, Mr. A. W. Anthony has met with the Road-runner at an altitude of 7,000 feet above sea level, and at Glorietta, New Mexico, it has recently been reported as breeding at a height of 8,000 feet.

The Chaparral Cock is rather unsocial in its habits, and it is rare to see more than a couple together excepting after the breeding season, when the young still follow one of the parents. Its food consists almost entirely of animal matter, such as grasshoppers, beetles, lizards, small snakes, land snails, the smaller rodents, and not unfrequently of young birds. On the whole, these birds do far more good than harm. When the fig-like fruit of the giant cactus is ripe they also feed on this; in fact, many mammals and birds seem to be very partial to it. It is astonishing how large an animal can be swallowed by one of these birds. I have found a species of garter snake fully 20 inches long in the crop of one shot in Arizona.

Mr. Anthony writes me on this subject as follows: "A half-grown bird which I shot at San Quentin, Lower California, presented an unusually bunched appearance about the throat and neck, a fullness which was accounted for upon dissection by the discovery of an immense lizard which had been swallowed entire but a few moments before the bird was shot. I know of several instances of Road-runners making a meal of a nest of young House-finches, *Carpodacus mexicanus frontalis*, and other small birds."

I am aware that there is a pretty general belief in localities where the Road-runner is common, and where the rattlesnake is usually more so, that these birds are more than a match for even the largest of these reptiles, and attack and kill them wherever found, an assertion I very much question. It is said when one of these birds, while rambling about, meets a rattlesnake, coiled up and asleep after a good meal, it quietly hedges the reptile in with a ring or fence of the joints of the *Cholla cactus*, and after having done so, drops a similar joint from above on the sleeping reptile, which, being enraged thereby, thrashes around and soon becomes covered with the sharp spines, and then falls an easy victim to the bird, after becoming exhausted in vain attempts to free itself. The bird is said to first pick its eyes out and so render it entirely helpless. This is a very plausible story, and while I am only too well aware of the sharpness of the spines of the *Cholla*

¹In a letter received from Mr. A. W. Anthony, written on August 5, 1888, and overlooked by me when this article was written, he informs me that a Road-runner, accompanied by three young, was seen by a traveling companion of his who knew these birds well, on the line of railroad between Albany and Ashland, Oregon, about 50 miles south of Albany, some time in August, 1887. This extends its range considerably northward.

cactus, I know that such a hedge proves no barrier to these snakes, and that they do not mind such obstructions in the least, passing over without touching them. I consider this story on a par with the generally accepted belief of hunters and frontiersmen in the West, that rattlesnakes will not cross over horsehair ropes, when laid around one's bed while camping out. I admit having heard this frequently from persons I had no reason to doubt, that I was a firm believer in the statement, and made use of this snake protector for a number of years; but at last my faith was rudely shattered by seeing a medium-sized rattlesnake deliberately crawling over such a rope which I had stretched around my tent. The snake paid no attention to the hair rope, but slightly curved its body where about to come in contact with it, gliding over without touching it, and, finding a sunny spot at the side of the tent, coiled up to take a rest, part of its body lying directly on the rope. Since witnessing this performance I have naturally lost faith in this belief, and have wished many times since that it had not been so rudely shaken, especially when in sections of the country where these reptiles are abundant and where one is liable to find his blankets occupied by one or more rattlers.

Road-runners are ordinarily rather shy and suspicious birds, and not as often seen as one would think, even where comparatively common. Within the United States they are most abundant along the southern borders of Texas and Arizona, and in southern California. I found them quite common in the vicinity of my camp on Rillito Creek, near Tucson, Arizona, and also near Anaheim, Orange County, California, and I have examined about twenty of their nests. Notwithstanding their natural shyness, they are inquisitive birds, and where they are not constantly chased and molested will soon become used to man. One of these birds paid frequent visits to my camp, often perching on a mesquite stump for half an hour at a time, within 20 yards of my tent. While so perched it would usually keep up a continuous cooing, not unlike that of the Mourning Dove, varied now and then by a cackle resembling that of a domestic hen when calling her brood's attention to some choice morsel of food. This call sounded like "dack, dack, dack," a number of times repeated. Another peculiar sound was sometimes produced by snapping its mandibles rapidly together. While uttering these notes its long tail was almost constantly in motion and partly expanded, and its short wings slightly drooped. In walking about at ease, the tail is somewhat raised and the neck partly contracted. When suddenly alarmed the feathers of the body are compressed and it trusts almost entirely to its legs for escape, running surprisingly fast. While running it can readily keep out of the way of a horse on a fair gallop on comparatively open ground, and should the pursuer gain too much on the bird, it suddenly doubles on its course and takes advantage of any thickets or broken ground in the vicinity, and is soon lost to sight. Its flight is apparently easy and, considering its short wings, is rather swift.

In southern Arizona the breeding season begins sometimes as early as the middle of March, but the majority of the birds there, as well as throughout the balance of their range, do not commence nesting before April, and nidifi-

cation lasts through the summer months, two and occasionally three broods being raised in a season. While the first set of eggs laid by such species as rear more than one brood in a season is usually larger in number than subsequent ones, it seems to me that with the Road-runner the reverse is the case.

During the month of April, 1872, I found several nests, none of which contained more than three eggs, all well incubated when found; similar small sets were found during the first half of May, while in June and July the sets numbered from four to six eggs, the latter the largest sets observed by me in Arizona. The following explanation may account for this:

In southern Arizona, during the spring months, insects and reptiles, which form the bulk of the food of these birds, are rather scarce, while in June, as soon as the rains commence, and later through the summer, suitable food is far more abundant and a larger family can be much more readily cared for, and I am of the opinion that these birds know this and act accordingly. Occasionally a larger number of eggs is found, however, and Lieut. H. C. Benson, Fourth Cavalry, United States Army, writes me that he saw a nest of this species, near Fort Huachuca, containing six young birds, all of different sizes, and two eggs; the largest of the young was about ready to leave the nest, and the smallest only a day or two old.

Their nesting sites are quite variable. In southern Arizona the majority of nests found by me were placed in low mesquite trees or thick bushes, and in different species of cacti, such as the prickly pear, cholla, and others. Occasionally one of their nests is placed on top of a mesquite stump, surrounded by green sprouts, or in a hackberry or barberry bush. I found one nest in a palo verde tree, and another in a willow thicket; in the latter case the birds did not build their own nest, but appropriated one of the Crissal Thrasher, *Harporhynchus crissalis*. Mr. F. H. Fowler writes me from Fort Bowie that he saw a nest near there, placed in the hollow of a dead stump.

In Texas the Roadrunner sometimes nests in ebony bushes, and in California it has been known to use the nest of the California Jay, *Aphelocoma californica*, in oak trees, sometimes fully 16 feet from the ground. Usually the nests are placed from 3 to 8 feet from the ground, and only in rare instances higher. Sometimes they are found in quite open situations, but generally they are well concealed from view.

A typical nest of the Road-runner may be described as a rather flat and shallow but compactly built structure, about 12 inches in diameter and varying in thickness from 4 to 6 inches, with but little depression interiorly. The ground work consists of sticks from 5 to 10 inches long, lined more or less regularly with finer material of the same kind and finished off with dry grasses. Occasionally bits of dry cow or horse dung, a few feathers, the inner bark of the cottonwood, dry mesquite-seed pods, bits of snake skin, and small grass roots are used, and now and then no lining is found, the eggs lying on a simple platform of twigs.

The number of eggs to a set varies in different localities from two to nine, and occasionally as many as twelve have been found in a nest, possibly the

product of two birds. Sets ranging from four to six eggs are the rule. In large sets several sterile eggs are nearly always found, and I believe that rarely more than five young are hatched at one time. Incubation begins sometimes with the first two eggs laid, especially when the set is to be a large one, and again I have taken apparently full sets of four eggs in which there was no perceptible difference in the size of the embryos. Occasionally an egg is deposited daily, usually only every other day, and sometimes the intervals are still greater. Incubation lasts about eighteen days, and both sexes assist in this labor.

The parents are devoted to their young, and when incubation is well advanced the bird will sometimes allow itself to be caught on the nest rather than abandon its eggs. The nestlings, when disturbed, make a clicking noise with their bills. When taken young, they are readily tamed, soon becoming attached to their captor, showing a great deal of sagacity, and making amusing and interesting pets.

The eggs of the Road-runner are white in color and unspotted, mostly ovate and short ovate, and rarely elliptical ovate in shape. The shell consists of two layers, the lower one close and fine grained, always pure white, without gloss; the upper, a mere film similar to that covering the ground color of the Anis, but more firm and not so easily scratched or rubbed off. This overlaying film gives these eggs sometimes a very pale yellow tint and a moderately glossy appearance.

The average measurement of one hundred and one eggs in the United States National Museum collection is 39.12 by 29.97 millimetres, or 1.54 by 1.18 inches. The largest egg of the series measures 44.45 by 29.97 millimetres, or 1.75 by 1.18 inches; the smallest, 36.07 by 28.19 millimetres, or 1.42 by 1.11 inches.

The type specimen, No. 20464 (Pl. 1, Fig. 2), from a set of four eggs, Bendire collection, was taken by the writer near Tucson, Arizona, on June 18, 1872, and represents an averaged-sized egg of this species.

5. *Coccyzus minor* (GMELIN).

MANGROVE CUCKOO.

Cuculus minor GMELIN, Systema Naturæ, I, i, 1788, 411.

Coccyzus minor CABANIS, Journal für Ornithologie, 1856, 104.

(B 71, C 292, R 386, C 429, U 386.)

GEOGRAPHICAL RANGE: The West India Islands, excepting the Bahamas; the coast regions of northern South America from Guiana to Colombia, thence north through Central America on both coasts; on the Pacific, to the Isthmus of Tehuantepec; on the Gulf coast to Tampico, Mexico, and probably still farther north; in the United States to the coast of Louisiana, and in southern Florida, on the west side mainly, north to about latitude 27° 30'.

The breeding range of the Mangrove, also known as the "Black-eared" Cuckoo, and on the Island of Jamaica as the "Young Old-man Bird," is, in the United States, as far as known, a very restricted one, being mainly confined

to the Keys, and the west coast of southern Florida, north to about latitude 27°, and to the Gulf coast of Louisiana. In Florida it appears to be rather rare, while in southern Louisiana it is reported as somewhat more common.

Audubon first met with this species on Key West and states that its habits are much the same as those of the better known Yellow and Black-billed Cuckoos. It seems to be found only in the immediate vicinity of the coast, among the mangroves, live oaks, and dense shrubbery usually found growing in such localities. Mr. E. A. Mcllhenny writes me: "The Mangrove Cuckoo is not an uncommon summer visitor on the coast of southern Louisiana, where it usually arrives about March 15 and leaves in September. Here it frequents the live-oak timber near streams or swamps, and usually nests on horizontal branches of wax myrtle, from 4 to 12 feet from the ground.

"The earliest date on which I have taken a nest was on April 17, 1891; this contained three eggs. On July 27, 1892, I took a set of four eggs, and I believe that two broods are raised in a season. Both of these nests were placed in wax myrtles, and were almost flat and rather poorly constructed platforms, composed of dry twigs of the wax myrtle, no lining, and with barely any depression in the center. I am inclined to believe that the Mangrove Cuckoo is more common now than formerly, and also less shy. It does not begin to incubate until the full set of eggs has been deposited. When disturbed on the nest the female almost always shows fight; that is, she will raise her feathers, spread her tail, and fly at you very much as a hen would when guarding her young, and at the same time she utters a clucking sound which resembles that of a domestic hen very closely. Its food consists of locusts, grasshoppers, etc."

Audubon states that it is fond of sucking the eggs of all kinds of birds in the absence of their owners, and that it also feeds on fruits and various kinds of insects.

There are no fully identified eggs of this species in the United States National Museum taken within our borders, but a number collected by Mr. W. S. March, near Spanish Town, Jamaica, in May, 1862, are unquestionably referable to this Cuckoo. They are pale glaucous green in color, and vary in shape from blunt ovate to nearly a perfect oval. The shell is close grained, rather thin, and without gloss. The egg resembles that of the better known Yellow-billed Cuckoo very closely, but averages a trifle larger.

The average measurement of twelve eggs from Jamaica is 30.88 by 23.45 millimetres, or about 1.21 by 0.92 inches. The largest egg measures 32.51 by 24.64 millimetres, or 1.28 by 0.97 inches; the smallest, 29.72 by 21.59 millimetres, or 1.17 by 0.85 inches.

The type specimen, No. 6052 (not figured), from a set of six eggs, was taken by Mr. W. S. March, referred to above, near Spanish Town, Jamaica, in May, 1862.

6. *Coccyzus minor maynardi* RIDGWAY.

MAYNARD'S CUCKOO.

Coccyzus maynardi RIDGWAY, Manual North American Birds, 1887, 274.*Coccyzus minor maynardi* ALLEN, Ms.

(B 71 part, C 292 part, R 386 part, C 429 part, U 386a.)

GEOGRAPHICAL RANGE: Bahama Islands and southern Florida; Cuba?

Within the United States the range of Maynard's Cuckoo, a somewhat smaller and paler race than the preceding, and from which it has been separated within the last decade, is a still more restricted one, and it has so far only been found at Key West, where it is rather rare, but it is thought to breed there in limited numbers. It is likely to occur also in suitable localities at points along the east coast of Florida, north to about latitude 27° and possibly still farther. It is evidently only a summer visitor to our shores, retiring south again in winter. It is said to be common throughout the Bahamas, and Mr. J. S. Northrop, on a recent visit to Andros Island, in the spring of 1890, obtained several specimens of this Cuckoo there and saw others. Their notes were frequently heard by him in the mangroves or near by. The stomachs contained the remains of small insects and grasshoppers.

Their general habits, mode of nidification, and eggs doubtless resemble those of the Yellow and Black-billed Cuckoos very closely. There are no positively identified eggs of Maynard's Cuckoo in the United States National Museum collection, but they are not likely to differ any in color or much in size from those of the preceding species.

7. *Coccyzus americanus* (LINNÆUS).

YELLOW-BILLED CUCKOO.

Cuculus americanus LINNÆUS, Systema Naturæ, ed. 10, I, 1758, III.*Coccyzus americanus* BONAPARTE, Journal Academy Natural Sciences, Phila., III, ii, 1824, 367.

(B 69, C 291, R 387, C 429, U 387.)

GEOGRAPHICAL RANGE: Eastern North America; north in the Dominion of Canada to Nova Scotia, southern New Brunswick, southern Quebec, and Ontario to about latitude $45^{\circ} 30'$. In the United States, through southern Maine, Michigan, Wisconsin, southern Minnesota, and South Dakota; west to Nebraska, Kansas, the Indian Territory, and Texas; south to Florida, the Gulf coast, and the West India Islands; in winter to eastern Mexico, and Costa Rica, Central America. Casual to eastern Colorado, Wyoming, and North Dakota. Accidental in Greenland, Great Britain, and Belgium.

The breeding range of the Yellow-billed Cuckoo, also known as "Rain Crow" or "Rain Dove," "Kow-Kow," "Wood Pigeon," "Indian Hen," and in some of the West India Islands as "May Bird," is coextensive with its geographical distribution in the United States and the southern portions of the

Dominion of Canada; and it also breeds on a number of the West India Islands, but in the Lower Rio Grande Valley and in the extreme western parts of Texas it is replaced by the California Cuckoo during this time. It is a moderately common bird in suitable localities throughout the greater part of its range in the United States, excepting along our northern border, but on account of its shy and retiring ways it is much more frequently heard than seen; it is only a summer visitor throughout the greater portions of its range in the United States, excepting Florida and parts of the Gulf coast, where some of these birds are known to winter, but by far the greater number retire still farther south to the West India Islands, and others through eastern Mexico, as far as Costa Rica. The Yellow-billed Cuckoo usually arrives in the Northern States about the commencement of May, and remains there until the end of September or the early part of October. It is decidedly arboreal in its habits, and is rarely seen on the ground, where, on account of its short and weak feet, its movements are rather awkward; but on the wing it is exceedingly graceful; its flight is noiseless and swift, and it moves or rather glides through the densest foliage with the greatest ease, now flying sidewise, and again twisting and doubling at right angles through the thickest shrubbery almost as easily as if passing through unobstructed space, its long tail assisting it very materially in all its complicated movements. Few of our birds show to better advantage on the wing than the Yellow-billed Cuckoo. It rarely indulges in protracted flights on its breeding grounds, but keeps mostly in the shadiest trees, in dense thickets along water courses, or on small islands, shrubbery bordering country roads, the outskirts of forests, and were it not for its peculiar call notes, which draw attention to its whereabouts at once, it would be much less frequently seen than it usually is, even where fairly common; on the whole, it must be considered as a rather shy, retiring, and suspicious bird.

Its call notes are much more varied than is generally supposed, but it is impossible to positively distinguish them from those of its somewhat smaller relative, the Black-billed Cuckoo, which is likewise found throughout a considerable portion of its range, and it is extremely difficult to indicate these notes on paper. On the whole, I consider those of the Yellow-billed Cuckoo to be the louder of the two, but this is only a matter of opinion, and it is rather difficult to state just what difference exists between them. One of their commonest notes is a low "noo-coo-coo-coo;" another sounds more like "cow-cow-cow" or "kow-kow-kow," several times repeated; others resemble the syllables of "ough, ough, ough," slowly and softly uttered; some remind me of the "kloop-kloop" of the Bittern; occasionally a note something like the "kiuh-kiuh-kiuh" of the Flicker is also uttered; a low, sharp "tou-wity-whit" and "hweet hwee" is also heard during the nesting season. Though ordinarily not what might be called a social bird, I have sometimes during the mating season seen as many as eight in the same tree, and on such occasions they indulge in quite a number of calls, and if the listener can only keep still long enough he has an excellent opportunity to hear a regular Cuckoo concert.

From an economic point of view there are few birds which do more good than the Yellow-billed Cuckoos, as they live almost entirely on caterpillars, and even the hairy and sharp-spined ones are eaten by them in large numbers. Among the most important ones so destroyed are the cankerworm, the tent caterpillar (*Clisiocampa americana*), and that of *Vanessa antiopa*, as well as of numerous other butterflies, grasshoppers, beetles, cicadas, small snails, etc., and different kinds of fruit, as berries, mulberries, grapes, and others. Mr. J. L. Davison, of Lockport, New York, has also observed it catching winged ants, like a Flycatcher. I am aware that this species has been accused of destroying the eggs and even of eating the young of smaller birds, but I am strongly inclined to believe that this accusation is unjust, and in my opinion requires more substantial confirmation. I have never yet had any reason to suspect their robbing smaller birds' nests, and the very fact that they live in apparent harmony with such neighbors, who do not protest against their presence, as they are in the habit of doing should a Blue Jay, Grackle, or Crow come too close to their nests, seems to confirm this view. I am upheld in this opinion by a number of careful observers whom I have questioned on this important subject. Only two of my correspondents seem to be inclined to believe this charge to be well founded. Mr. William Brewster, of Cambridge, Massachusetts, writing me on this subject, says: "While I have never seen either of our Cuckoos destroy the eggs of other birds, nevertheless I think they do it occasionally. One of my reasons for this belief is that many of our smaller birds, Warblers, Sparrows, etc., show great anxiety whenever the Cuckoos approach their nests, and they pursue and peck at them when they take wing, behaving toward them, in fact, exactly as they do toward the Crows, Jays, and Grackles, which we *know* eat eggs whenever they can get a chance. My other reason is that one of my friends once shot a Cuckoo (*C. americanus*, I think it was) whose bill was smeared all over with the fresh yolk of an egg." Mr. H. P. Attwater, of San Antonio, Texas, although he has not observed it personally either, informs me that in his neighborhood this bird is locally known to the boy collectors as the Egg-sucker, and that some claim to have observed it in the act of stealing eggs.

Should an occasional pair of these birds, however, be guilty of such reprehensible conduct, which I am not yet prepared to admit, it by no means follows that it is a common practice. All of our Cuckoos deserve the utmost protection; it is simply astonishing how quickly a pair of these birds will exterminate the thousands of caterpillars infesting orchard and other trees in certain seasons; it makes no difference how hairy and spiny these may be, none are rejected by them, although no other birds will touch them, and the walls of their stomachs are sometimes completely pierced by the sharp, stiletto-like hairs, without injury, and apparently not incommoding these birds in the least. Their benefit to the horticulturist is immense, and he has certainly no better friends among our birds.

Although the Yellow-billed Cuckoo generally arrives in our Northern States about the middle of May, and occasionally a week or so earlier, it usually nests

rather late, and oftener, I believe, in the first week in July than in June. Like most birds, they are more noisy during mating time than at other seasons, and they are most often heard during damp, cloudy weather or before a storm, and on this account they are often called "Rain Crows," their continuous calls being supposed to presage wet weather.

As a rule they are shy and silent, unobtrusive birds, their plain, grayish-brown upper parts, with a faint bronze luster, harmonizing so perfectly with their surroundings that they are readily overlooked in the dense foliage and tangled undergrowth which they usually frequent, and it is no easy matter to study them closely, though occasionally a pair will select its nesting site close to human habitations and even in cities, when they lose their natural shyness to some extent.

Mr. Mark L. C. Wilde, of Camden, New Jersey, writes me: "On June 22, 1893, while passing the corner of Sixth and Market streets, I was surprised to see a Yellow-billed Cuckoo fly off her nest, which was built on the limb of a maple tree that hung over Market street, on which the electric cars run every ten or fifteen minutes. The nest contained two fresh eggs. There are no woods nor open fields within a mile or so of the tree in which the nest was built, although there are a number of shade trees around the city and plenty of caterpillars for them to feed upon."

In the southern portions of their range, including Florida and the Gulf States, nidification begins occasionally early in April, and fresh eggs may be found sometimes in the last two weeks of this month; but the majority of these birds rarely commence laying here before the second week in May. In the District of Columbia a few pairs nest in the latter part of this month, but the greater portion do not before June, and occasionally not before July, while instances of fresh eggs, possibly second layings, have been found in the latter part of August and even in the beginning of September. In the northern portions of its range the breeding season is at its height during the latter part of June and the first week of July, and here one brood only is raised, while in the south they sometimes raise two.

Mr. O. Widmann, of Old Orchard, Missouri, has kindly sent me the following notes on this species: "The Yellow-billed Cuckoos begin to lay here May 15. If the eggs are taken and none left in the nest, the birds abandon it and build another; but I do not think that two broods are raised in a season. This species begins to arrive here in the last days of April, but to get the earliest dates one must be up at 2 a. m., when their call is heard from time to time. After daybreak they are seldom heard before the first days of May, regularly only after the 5th. I found them very numerous in the St. Francis region the second week in May, where they were among the most conspicuous birds. At that time they seemed to live mostly on a large kind of May or willow fly (*Ephemera*), which the male bird caught and brought to his mate, who kept quietly perched and apparently awaiting his attentions. He alighted gracefully on her back and presented complaisantly the choice morsel, which was received with half-turned head and

open bill—the whole a picture of love and devotion pleasant to witness, and not marred by any unesthetic act or motion. One of the favorite foods of the Cuckoo in September is the elderberry, and the last week of this month may be set down as the time for its final departure.”

The Yellow-billed Cuckoo is one of the poorest nest builders known to me, and undoubtedly the slovenly manner in which it constructs its nest causes the contents of many to be accidentally destroyed, and this probably accounts to some extent for the many apparent irregularities in their nesting habits. The nests are shallow, frail platforms, composed of small rootlets, sticks, or twigs, few of these being over 4 or 5 inches in length, and among them a few dry leaves and bits of mosses; rags, etc., are occasionally mixed in, and the surface is lined with dry blossoms of the horse-chestnut and other flowering plants, the male aments or catkins of oaks, willows, etc., tufts of grasses, pine and spruce needles, and mosses of different kinds. These materials are loosely placed on the top of the little platform, which is frequently so small that the extremities of the bird project on both sides, and there is scarcely any depression to keep the eggs from rolling out even in only a moderate windstorm, unless one of the parents sits on the nest, and it is therefore not a rare occurrence to find broken eggs lying under the trees or bushes in which the nests are placed. Some of these are so slightly built that the eggs can be readily seen through the bottom. An average nest measures about 5 inches in outer diameter by $1\frac{1}{2}$ inches in depth. They are rarely placed over 20 feet from the ground, generally from 4 to 8 feet upon horizontal limbs of oak, beech, gum, dogwood, hawthorn, mulberry, pine, cedar, fir, apple, orange, fig, and other trees. Thick bushes particularly such as are overrun with wild grape and other vines, as well as hedgerows, especially those of osage orange, are also frequently selected for nesting sites. The nests are ordinarily well concealed by the overhanging and surrounding foliage, and while usually shy and timid at other times, the Yellow-billed Cuckoo is generally courageous and bold in the defense of its chosen home; the bird on the nest not unfrequently will raise its feathers at right angles from the body and occasionally even fly at the intruder.

The number of eggs in a set varies from two to five; sets of three are most common, while those of four are not at all rare. Now and then as many as six and seven have been found in one nest, but it is always more or less questionable if such large sets are the product of the same female. Usually an egg is deposited daily, and as a rule incubation does not commence until the set is completed; but there are also exceptions, and the bird may commence incubation when the first egg is laid, and at the same time continue laying at irregular intervals, varying from two to eight days, so that one will occasionally find birds of different ages and eggs in various stages of incubation in the nest. I must confess that no such instances have come under my own observation, but this fact has been so well established that there can be no question of it. It is also well known that this species will occasionally deposit an egg or two in the nests of the Black-billed Cuckoo, and the latter returns the compliment, and

now and then one of their eggs has been found in the nests of other species, such as the Wood-thrush, Robin, Catbird, Cedar-bird, Black-throated Sparrow, Cardinal, and Mourning Dove. Such instances appear to be much rarer, however, than those in which they interlay with each other, and the majority of these may well be due to accident, their own nest having possibly been capsized, and necessity compelled the bird to deposit its egg elsewhere. Such instances do occur at times with species that can not possibly be charged with parasitic tendencies.

There is a set of four eggs of the Meadow Lark (Ralph collection) before me now, taken on May 6, 1892, in Volusia County, Florida, which in addition contained an egg of the Florida Quail; another set of four eggs of the Gray-tailed Cardinal, taken by Mr. H. P. Attwater, near Rockport, Texas, on April 28, 1893, and presented to the collection here, contains also an egg of the Scissor-tailed Flycatcher, and I might cite other instances if I deemed it necessary.

It is indisputable, however, that some latent traces of parasitism exist in our Cuckoos, but these are not very frequent and seem to be principally confined among themselves, and are apparently more prevalent among the Black-billed species than the present one. Mr. Robert Ridgway tells me that he found both species nesting in an apple orchard, near Mount Carmel, Illinois, in June, 1864, in adjoining trees, the two nests being not over 10 feet apart.

Incubation, I think, lasts about fourteen days, and I believe the female performs the greater portion of this duty. The young when first hatched are repulsive, black, and greasy-looking creatures, nearly naked, and the sprouting quills only add to their general ugliness. If the eggs are handled the bird frequently forsakes the nest, either throwing them out or abandoning them. The eggs are elliptical oval in shape, about equally obtuse at either end; the shell is close grained, rather thin, and without gloss. The ground color varies from a uniform Nile blue to pale greenish blue when fresh, fading out in time to a pale greenish yellow. They are unspotted, but occasionally one or two eggs in a set present a sort of mottled appearance, the ground varying somewhat on different parts of the shell. Their color is one of those subtle tints which it is difficult to describe accurately. Many of the eggs resemble in tint some of the lighter-colored Heron's eggs.

The average measurement of sixty-six specimens in the United States National Museum collection is 30.28 by 22.94 millimetres, or about 1.19 by 0.90 inches. The largest egg in the series measures 33.53 by 25.40 millimetres, or 1.32 by 1.00 inches; the smallest, 27.94 by 21.34 millimetres, or 1.10 by 0.84 inches.

The type specimen, No. 25977 (Pl. 5, Fig. 1), from a set of three eggs, was taken by Mr. D. B. Burrows, near Lacon, Marshall County, Illinois, on July 5, 1893, and presents the mottled appearance previously referred to.

8. *Coccyzus americanus occidentalis* RIDGWAY.

CALIFORNIA CUCKOO.

Coccyzus americanus occidentalis RIDGWAY, Manual North American Birds, 1887, 273.

(B —, C —, R 387 part, C 429 part, U 387a.)

GEOGRAPHICAL RANGE: Western North America; north to the southern portions of British Columbia; east to the Rocky Mountains and southern Texas; south over the tablelands of Mexico; northern Lower California.

The breeding range of the California Cuckoo, for which the name "Western Yellow-billed Cuckoo" seems to be more appropriate, is coextensive with its distribution in the United States. As far as yet known it reaches the northern limits of its breeding range about latitude $50^{\circ} 45'$, near Kamloops, in British Columbia, and its southern and eastern limits in the lower Rio Grande Valley, in southern Texas. The eastern slopes of the Rocky Mountains appear to form the eastern limits of its range in this direction. Although nowhere common, it seems to be generally distributed over the Pacific Coast States and Territories.

Mr. F. Stephens writes me: "I consider the California Cuckoo a rare summer resident of the valleys of southern California. The only instance of its breeding here, that I know of, was in the San Bernardino Valley; I saw the parent fly from the nest, which was in a slender willow growing in a thicket in a moist location. The little tree leaned, but was too strong to admit of my pulling the nest within reach; I therefore attempted to climb to the nest and succeeded in spilling the eggs, which broke on striking the ground. The fragments were pale green. The eggs were fresh and appeared to be two in number. I think the date was the latter part of May, 1882."

Mr. Charles A. Allen, of Nicasio, has found this subspecies breeding in the willow thickets along the Sacramento River, California, where it appears to be not uncommon in suitable localities. Dr. Clinton T. Cooke considers it moderately common in the vicinity of Salem, Oregon, and Mr. R. H. Lawrence met with it occasionally in the Columbia River Valley, in Clarke County, Washington. It appears to reach the center of its abundance, the lower Rio Grande Valley, in Texas, about the beginning of April, and sometimes nests there in the latter part of this month, but ordinarily not before May, while in southern Arizona it appears to arrive considerably later. I noticed it first on June 10, 1872, among the willows in the Rillito Creek bottom, and again on the 19th, but failed to find a nest before July 17, but after this date I found several others; two of these as late as August 22. Its general habits, call notes, and food are very similar to those of its somewhat smaller eastern relative, and excepting this difference and its stouter and larger beak, it is otherwise indistinguishable. On the whole, it appears to be more common west of the Sierra Nevada and the Cascade Mountains than in the interior, where I only met with it on a single occasion, near Old Fort Boise, at Keeneys Ferry, on the Oregon side of Snake River, and here I found a nest of this subspecies on August 2, 1876, containing

three half-grown young. The nest was placed in a clump of willows, within a few feet of where I was camped, and my attention was first attracted to it by the uneasy manner in which the parents moved through the willows, constantly flitting back and forth, and always with a large black cricket (*Anabus simplex* or *purpuratus*) in their bills, on which they seemed to feed their young entirely. They picked most of these repulsive-looking creatures from grass stalks and low shrubs on which they were feeding, and although there were numbers of them to be found all around, as well as in camp, they generally went off some little distance to get them. The nestlings, only two or three days old, were ugly-looking creatures, and their bodies were almost naked. The parents soon lost their fear caused by my proximity, and flew back and forth at short intervals during the three hours of daylight in which I had an opportunity to observe them. The young uttered occasionally a low, wheezy note, like "ugh, ugh," but on the whole both parents and young were rather silent. This subspecies has also been met with in Utah, and Mr. A. W. Anthony observed a Cuckoo which is unquestionably referable to this subspecies near Ensenada, Lower California. If the California Cuckoo showed the same parasitic habit of occasionally depositing one or more of its eggs in the nests of other birds, as its eastern relatives are now and then known to do, I believe that I should have observed the fact in southern Arizona. Here I found eight of their nests with eggs, and fully five hundred nests of smaller birds, which nested in similar localities among the willow thickets and mesquite bushes, overrun with vines, in the creek bottoms, but not a single instance of parasitism came under my observation. The California Cuckoo built its own nest in every case, and while it generally was a loose, slovenly affair, without any pretence to architectural beauty, I think on the whole it compared favorably with the nests of our two better-known eastern species; some at least were fairly well lined with dry grasses and the blossoms of a species of *Evax*, and there was generally a slight depression in the center of the nest for the eggs to rest in. I took my first set, containing two fresh eggs, on July 17, 1872; on the 25th of this month I found another set of four eggs in which incubation had slightly and uniformly begun. On July 27 I secured two more sets, one of four, the other of three eggs, both fresh; and I did not find any more until August 21, when I took a set of three, one of which contained a large embryo, another one somewhat less advanced, and the remaining egg was addled. Next day I found two more nests, one containing a set of three, in which incubation had commenced evenly, the other held two fresh eggs, and on August 24 I found the last nest, which contained a single fresh egg, to which no others were added. Two of these nests contained incomplete sets when found, and an egg was added in each case on succeeding days. As a rule, incubation does not begin until the set is completed, and an egg is deposited daily. Both sexes assist in incubation and in the care of the young. I believe only one brood is raised in southern Arizona in a season. The nests here were placed in willow or mesquite thickets, from 10 to 15 feet from the ground, and they were usually fairly well concealed by the surrounding foliage.

The eggs of the California Cuckoo are usually three or four in number. They are light greenish blue in color, unspotted, and in time this unstable tint fades to a uniform pale yellowish green. They are mostly elliptical oval in shape; a few may be called elliptical ovate, one end being slightly more pointed than the other. The shell is fine grained, rather thin, and without gloss. The eggs average a trifle larger than those of the Yellow-billed Cuckoo.

The average measurement of forty-three specimens in the United States National Museum collection is 30.85 by 23.16 millimetres, or about 1.21 by 0.91 inches. The largest of these eggs measures 33.53 by 24.38 millimetres, or 1.32 by 0.96 inches; the smallest, 27.43 by 21.08 millimetres, or 1.08 by 0.83 inches.

The type specimen, No. 20470 (Pl. 5, Fig. 2), Bendire collection, from a set of four eggs, was taken by the writer on Rillito Creek, near Tucson, Arizona, on July 27, 1872. This is one of the largest eggs in the series, and is slightly faded, fresh eggs looking somewhat brighter.

9. *Coccyzus erythrophthalmus* (WILSON).

BLACK-BILLED CUCKOO.

Cuculus erythrophthalmus WILSON, American Ornithology, IV, 1811, 16, Pl. 28.

Coccyzus erythrophthalmus BONAPARTE, Journal Academy Natural Sciences, Phila., III, ii, 1824, 367.

(B 70, C 290, R 388, C 428, U 388.)

GEOGRAPHICAL RANGE: Eastern North America; north in the Dominion of Canada to Nova Scotia, New Brunswick, southern Quebec, and Ontario, to about latitude 47°, and in the provinces of Manitoba and eastern Assiniboia to about latitude 51°; west in the United States to the eastern foothills of the Rocky Mountains, Montana, Wyoming, Colorado, and Texas; south, in winter, to the West India Islands, Central America, and northern South America. Accidental in Great Britain and Italy.

The Black-billed Cuckoo, a slightly smaller bird than the Yellow-billed, is likewise known by the different local names of the latter, and is often mistaken for it. It appears to be somewhat hardier, extending its migrations several degrees farther north, and it breeds throughout its range from about latitude 35° northward. Occasionally it has been reported as breeding still farther south, but below the latitude named it must be considered as an irregular and rare summer resident. In eastern North America it reaches the northern limits of its range in about latitude 47°, while in the interior, in the provinces of Manitoba and eastern Assiniboia, it has been found as far north as latitude 51°, and it ranges probably still farther in this direction. The eastern slopes of the Rocky Mountains appear to form the western limits of its habitat. Here it has been obtained at Pryor's Fork of the Yellowstone, Montana, and I found it breeding on the Little Horn River, near Fort Custer, on June 25, 1885. Mr. W. G. Smith has observed it in Larimer County, Colorado, where he believes it breeds, but it is rare. It is a fairly common species in suitable localities throughout the greater part of its range, and in the more northern portions it outnumbered the Yellow-

billed Cuckoo considerably. In winter it occurs to some extent in Florida and along the Gulf coast, but by far the greater number pass beyond our borders to the West India Islands, and even through Mexico and Central America to northern South America. It usually reenters the United States from its winter haunts in the South during the first half of April, arriving on its more northern breeding grounds generally about a week earlier than the Yellow-billed Cuckoo. The return migration in the fall ordinarily begins in the latter part of September, while a few of these birds linger sometimes well in October and occasionally even until early November.

Its general habits, plumage, manner of flight, food, and many of its call notes are very similar to those of the Yellow-billed species, and it is rather difficult to distinguish one from the other unless very close to them. Like the species referred to, it is eminently beneficial, and deserves the fullest protection. They frequent the same kind of localities, and are especially partial to the shrubbery along water courses, lakes, ponds, hillsides bordering wet meadows, overgrown here and there with clumps of bushes, and the outer edges of low-lying forests, while they are far less often observed in high and dry situations any distance away from water. On the whole, its call notes appear not to be quite so loud as the Yellow-billed Cuckoo's, and rather more pleasing to the ear. Their ordinary note is a soft "cöc-cöc," a number of times repeated. Mrs. Olive Thorne Miller, well known as an enthusiastic and painstaking observer, describes their alarm note as "cuck-a-ruck," and gives a very full and interesting account of the actions of a pair of these birds in her charmingly-written "Little Brothers of the Air." From personal observations, I am inclined to believe that the Black-billed Cuckoo is more irregular in its nesting habits than the Yellow-billed, and that cases of parasitism are of more frequent occurrence. I also think their eggs are much oftener found in different stages of incubation than appears to be the case with the Yellow-billed species.

Mr. J. L. Davison, of Lockport, New York, well known as a careful and reliable ornithologist, in his list of birds of Niagara County, New York, originally published in "Forest and Stream," September, 1889, makes the following remarks about this Cuckoo:

"I have often found the eggs of this species in the nest of *C. americanus*, but only once have I found it in the nest of any other bird. June 17, 1882, I found a Black-billed Cuckoo and a Mourning Dove sitting on a Robin's nest together. The Cuckoo was the first to leave the nest. On securing this I found it contained two eggs of the Cuckoo, two of the Mourning Dove, and one Robin's egg. The Robin had not quite finished the nest when the Cuckoo took possession of it and filled it nearly full of rootlets; but the Robin got in and laid one egg. Incubation had commenced in the Robin and Cuckoo eggs, but not in the Mourning Dove's eggs. I have the nest and eggs in my collection. * * *

"I am also quite certain that I have seen the Black-billed and Yellow-billed Cuckoo feeding young in the same nest, an account of which was published in 'Forest and Stream.' Since then I have found a number of nests containing

the eggs of both species, and have come to the conclusion that I was not mistaken in that observation. On September 10, 1883, I found a nest of the Black-billed Cuckoo containing two young birds not more than one day out of the shell; the two previous nights we had severe frosts that destroyed vegetables."

While instances of the Black-billed Cuckoo laying in the nests of the Yellow-billed are not especially rare, cases where it lays its eggs in those of other species, especially smaller ones than itself, are decidedly uncommon. I have never seen a case of this kind, but, nevertheless, several well-authenticated instances have been recorded which leave no room for doubt; of these I will only quote one, published by Dr. C. K. Clarke, of Kingston, Ontario, Canada, who says: "In an orchard we discovered a Black-billed Cuckoo sitting in a Chipping Sparrow's nest, and the bird did not attempt to move till we almost touched it. It now seemed very evident that the case against the bird was a strong one, and when a Cuckoo's egg was found in the nest the chain of evidence was complete. The egg was hatched and produced a tyrannical young Cuckoo, who turned his companions out of the nest and made himself as comfortable as possible as long as was necessary. Two of us saw the old Cuckoo actually sitting in the nest, and there was no doubt about the matter. We have been informed that the erratic nesting of the Cuckoo has been repeated in the same orchard since the occasion referred to, but of this we have no accurate information."¹

Its eggs have been found in the nests of the Wood Pewee, Yellow Warbler, Catbird, and others. Nidification commences rather late, rarely before the middle of May; full sets of eggs are sometimes found about the end of this month, but much more frequently during June and July. Occasionally a set is met with in the latter part of August, probably a second clutch. The earliest nesting record I know is one of May 7, 1878, where Mr. Robert Ridgway found a set of these eggs near Mount Carmel, Illinois; these are now in the United States National Museum collection. Ordinarily an egg is deposited daily until the set is completed, but not unfrequently they are laid at considerably longer intervals, and it is well known that young of different ages, as well as eggs in various stages of incubation, are sometimes found in the same nest.

The nests of the Black-billed Cuckoo appear to be slightly better built than those of the Yellow-billed species; the platform is usually constructed of finer twigs, the soft inner bark of cedar, fine rootlets, weed stems, etc., and there is generally more lining. This consists of the aments of oak, white and black ash, and maple, willow catkins, and the flowers of the cudweed or everlasting (*Gnaphalium*), dried leaves, and similar materials. The majority of the nests are placed in rather low situations, mostly not over 6 feet from the ground, on horizontal limbs of bushy evergreens, pines, cedars, and hemlocks, or in deciduous trees and shrubs, such as the box elder, chestnut, thorn apple, and beech trees; also in hedges, briar and kalmia patches, occasionally on old logs, and now and then even on the ground. Dr. P. L. Hatch reports such instances in

¹ Transactions of the Canadian Institute, Oct., 1890, Vol. I, Part I, pp. 48-50.

his "Birds of Minnesota," 1892 (p. 222). There is but little difference in the size of their nests from those of the Yellow-billed Cuckoo, and the same measurements will answer for both.

The Black-billed Cuckoo is apt to desert its nest if it knows it has been discovered. Judge J. N. Clark, of Saybrook, Connecticut, writes me: "Of all the Cuckoos' nests which I have found, before the set was complete, if the bird was at the nest, and one generally is, the next visit would always find the nest deserted and one or more of the eggs gone; at least such has been my frequent experience." On the data sheet of a set of three eggs of this species in the Ralph collection, taken on May 29, 1879, by Mr. W. W. Worthington, on Shelter Island, Suffolk County, New York, I find the following entry in the collector's handwriting: "On visiting this nest first it contained two eggs; the following day it was empty. I then left it one day, and on the next visit it contained three eggs. I have carefully examined these eggs, and they certainly look as if they had all been laid by the same bird." I had a somewhat similar experience with the only nest of this species I found near Fort Custer, Montana, on June 22, 1885. This was placed in a bull or buffalo berry bush (*Shepherdia argentea*) close to the banks of the Little Horn River, about 4 feet from the ground. I noticed the bird slipping off as I approached, and on looking into the bush and separating the branches I found the nest and saw that it contained only a single egg, which appeared to be very peculiarly marked. I did not touch this, and left the vicinity at once. On revisiting the place again on the 24th, I found the nest empty and no trace of the egg on the ground below the nest. I was much provoked at not having taken the egg when I first found the nest, as it was a very deeply colored one, and after making a thorough search through the thickets on that side of the river, I gave it up for that day, but returned again on the 25th and examined a patch of wild rose bushes about 100 yards from the old site and on the opposite bank. Almost as soon as I entered this thicket I saw a Cuckoo flying up into a willow sapling and acting in a very excited manner; a few minutes later I found a nest, containing, to the best of my belief, the identical egg I had seen in the first one. The second nest was evidently built in a hurry, and consisted simply of a very slight platform of dry twigs, with scarcely any lining whatever. It was placed 3 feet from the ground, in a dense clump of wild rose bushes, and was well concealed from view. To make sure, this time I took the single egg, which is the most peculiarly colored one I have yet seen of this species, and is reproduced on Pl. 5, Fig. 3.

Although not what might be called a very social bird at any time, occasionally in some particularly suitable place a number of pairs may be found nesting close together. Mr. H. W. Flint, of New Haven, Connecticut, writes me: "I know of one spot in this vicinity where the Black-billed Cuckoo might almost be said to breed in colonies—a sloping hillside near a traveled road. Here I have found seven nests of this species within an hour, none of them placed over 3 feet from the ground. I have also frequently found their nest on

a fallen limb, the top of which was resting upon underbrush. As an exception to their low nesting, I once found a nest containing two well-feathered young and two fresh eggs over 18 feet from the ground, placed in the top of a cedar tree, in a dense thicket of other cedars."

Both sexes assist in incubation as well as in the care of the young; they appear to be devoted parents, and the fact that they are occasionally willing to abandon their young to the mercy of foster parents appears rather unaccountable, to say the least, especially when it is positively known that they occasionally remove their eggs, as well as the young, from one nest to another in order to better protect them from possible harm. In my opinion, the real causes for the so utterly inconsistent behavior on the part of some of these birds are not yet fully understood.

The number of eggs laid to a set varies from two to seven; sets of three or four are most common, and those of over five are rare. Dr. Louis B. Bishop found a set of seven eggs of this species near New Haven, Connecticut, on June 7, 1893, in which three eggs were fresh, in two incubation had just begun, in another it was somewhat more advanced, and in one egg the embryo was well formed. There is frequently considerable difference in size among the eggs found in the same set, although apparently laid by the same bird. In a set of three eggs, for instance, No. 26019, United States National Museum collection, taken by Mr. Thad. Surber, near White Sulphur Springs, West Virginia, on June 3, 1893, the measurements are as follows: 26.92 by 20.07, 24.89 by 19.81, and 22.35 by 18.54 millimetres, or 1.06 by 0.79, 0.98 by 0.78, and 0.88 by 0.73 inches; the difference is, of course, not always so great, but is often quite perceptible. The eggs of the Black-billed Cuckoo are more nearly oval than elliptical oval, and shorter and rounder than those of the Yellow-billed Cuckoo, and much more deeply colored. Like these, they are unspotted; the shell is thin and fine grained, with little or no gloss. Their color is difficult to describe exactly, varying from Nile blue to pale beryl green, and occasionally the shell shows a decidedly marbled appearance, caused by different shades running into each other, an illustration of which is shown in Pl. 5, Fig. 3. Aside from their deeper color, they are also readily distinguished from the eggs of the Yellow-billed Cuckoo by their smaller size.

The average measurement of forty-two specimens in the United States National Museum collection is 27.23 by 20.53 millimetres, or about 1.07 by 0.81 inches. The largest egg of the series measures 29.97 by 22.86 millimetres, or 1.18 by 0.90 inches; the smallest, 22.35 by 18.54 millimetres, or 0.88 by 0.73 inch.

The type specimen, No. 22444 (Pl. 5, Fig. 3), a single egg, Bendire collection, was taken by the writer near Fort Custer, Montana, on June 25, 1885, and is a very peculiarly colored specimen, while No. 26019 (Pl. 5, Fig. 4), from a set of three eggs, and taken by Mr. Thad. Surber, on June 3, 1893, near White Sulphur Springs, West Virginia, represents about an average egg of this species.

10. *Cuculus canorus telephonus* (HEINE).

SIBERIAN CUCKOO.

Cuculus telephonus HEINE, Journal für Ornithologie, 1863, 352.

Cuculus canorus telephonus STEJNEGER, Bulletin 29, U. S. National Museum, 1885, p. 224.

(B —, R —, C —, U [388.1.])

GEOGRAPHICAL RANGE: Eastern Asia, casually to the Pribilof Islands, Alaska.

The Siberian Cuckoo claims a place in our fauna on the strength of a single specimen having been taken by Mr. William Palmer at Northeast Point, St. Paul's Island, Alaska, on July 4, 1890, which is now in the United States National Museum collection. Mr. Palmer states "when collected it was busily engaged capturing some large flies which are abundant on these islands, and with which its stomach was literally packed. It had been seen by the natives in the same place for more than two weeks, and was probably the same individual seen by myself on June 13, when becalmed in a fog off the eastern side of the same island, on which occasion it circled overhead like a gull for some time, while calmly inspecting the boat, and then moved off northward."¹

As far as I can learn, nothing definite has as yet been ascertained regarding its nesting habits and eggs. They undoubtedly correspond closely to those of its well-known western relative, the common European Cuckoo, *Cuculus canorus*, and Dr. Stejneger tells me that in its general habits and call notes he could not detect the slightest difference from those of the latter. At his suggestion, I have substituted the name of "Siberian" for "Kamschatkan" Cuckoo, which is more applicable to the bird described by him as *Cuculus peninsulae*, from Kamschatka.

Family TROGONIDÆ. TROGONS.

11. *Trogon ambiguus* GOULD.

COPPERY-TAILED TROGON.

Trogon ambiguus GOULD, Proceedings Zoological Society, 1835, 30.

(B 65, C 284, R 384, C 422, U 389.)

GEOGRAPHICAL RANGE: Southern Mexico from Oaxaca and Guerrero, north to the valley of the lower Rio Grande, in Texas, and the mountains of southwestern New Mexico, and southern Arizona.

The Coppery-tailed Trogon, the only representative of this magnificently plumaged family in the United States, must be considered as a rather rare summer resident within our borders, and very little is yet known about its general habits. There is no longer any doubt, however, that it breeds in some of the mountain ranges of southern Arizona, and probably also in the San Luis Mountains, in the extreme southwestern corner of New Mexico. First Lieut.

¹ The Auk, Vol. XI, 1894, p. 325.

H. C. Benson, Fourth Cavalry, United States Army, secured a young male in its first plumage in the Huachuca Mountains, Arizona, on August 24, 1885, and an adult female was shot in the same vicinity by Mr. F. H. Fowler in the first part of August, 1892. Another adult female, which evidently had a nest close by, was obtained by Dr. Edgar A. Mearns, United States Army, on June 23, 1892, on the east side of the San Luis Mountains, close to the Mexican boundary line. The long tail feathers in this specimen are much worn and abraded, and look as if the bird had passed considerable time in very limited quarters. Its mate was also seen, but not secured. Judging from the character of the country this species inhabits in southern Arizona, that is pine forest regions, it is probably only a straggler in the lower Rio Grande Valley in Texas, and does not breed there.

Dr. A. K. Fisher has kindly furnished me with the following notes on this species: "Soon after arriving at Fort Huachuca, Arizona, I learned that the Trogon was not uncommon among the pines in the neighboring mountains. A reliable young man informed me that he had killed three during the previous season (1891), and a rancher who raises fruit in Ramsay Canyon stated that the species visited the gardens in considerable numbers, especially during the period when cherries were ripe. He had noticed the first arrival on May 17.

"On June 9, in company with Capt. J. L. Fowler and his son Frederick, I made a trip toward the head of Tanner or Garden Canyon, as it is more commonly designated in the vicinity. While riding up the shady trail among the pines a beautiful male Trogon flew across the path and alighted among the trees on the opposite side of the narrow canyon. It was impossible to follow it and to pass through the thick underbrush and loose rocks without making considerable noise, which startled the bird, and it was finally lost among the thick foliage. Higher up in the mountains we heard its peculiar note, which was uttered at regular intervals, and closely resembled that of a hen Turkey. Later in the afternoon, on the way down, another was heard, and by carefully approaching along the hillside a male was discovered sitting on the lower limb of a pine. It sat straight upright, with the tail hanging perpendicular to the body, and while uttering its note the head was thrown backward and the bill extended nearly upward. After watching the bird for a few moments it was secured. The testes were well developed. The stomach contained a few smooth caterpillars."

The general habits of the Coppery-tailed Trogon probably do not differ much from those of other members of this family about which a little more is known. According to Gould, who published a magnificent monograph of this family, "Trogons are usually found singly or in pairs, and keep mostly in the shade of forest trees, perching on the lower limbs of these. During the breeding season they are continually calling to each other, and are called '*Viadas*' (Widows) by the Mexicans; they are easily located on this account and are not particularly shy. Their food consists of fruit, grasshoppers, and other insects, and in their actions while catching the latter they are said to resemble a Fly-catcher, starting and returning from a perch like these birds, and often sitting

for hours in the same place. They are often met among flocks of other birds, such as Flycatchers, Tanagers, Creepers, and Woodpeckers."¹

All of the Trogons, whose mode of nidification is known, resort to natural cavities in trees or to some of the larger woodpecker holes, the eggs being deposited in the bottom of the hole, on the rubbish or chips which may be found in it. These are said to vary from two to four, more likely the former number. As far as known, they are unspotted; the egg of the handsome Quezal (*Pharmocrus mocinno*) is described as of a pale bluish-green color; that of the Mexican Trogon (*Trogon mexicanus*) is said to be very pale greenish, while the eggs of *Trogon surucua* from Paraguay are said to be pure white.

I have seen eggs purporting to belong to this species; but their large size, as well as the source from which they came, do not warrant me in giving measurements or a description of these specimens, and as far as I know genuine eggs of the Coppery-tailed Trogon still remain to be described.

Family ALCEDINIDÆ. KINGFISHERS.

12. *Ceryle alcyon* (LINNÆUS).

BELTED KINGFISHER.

Alcedo alcyon LINNÆUS, Systema Naturæ, ed., 10, I, 1758, 115.

Ceryle alcyon BONAPARTE, Proceedings Zoological Society, 1837, 108.

(B 117, C 286, R 382, C 423, U 390.)

GEOGRAPHICAL RANGE: North America generally; south to Panama and the West Indies.

The Belted Kingfisher, ordinarily simply called "Kingfisher," is one of our best-known birds, and it is generally distributed in suitable localities throughout the North American Continent, though seldom very common anywhere. Its breeding range extends from Florida and Texas north to the shores of Labrador, Hudson Bay, the Arctic Ocean, and Bering Sea. In the more northern parts of its range it is only a summer resident, but not a few winter in some of the New England and other Northern States, as well as in Oregon and Washington, on the Pacific coast. These birds which brave the severe winter climate along our northern border are probably migrants from the far North, and better adapted to withstand the cold, the only requisite being sufficient open water to enable them to obtain their necessary supply of food. In the mountain regions of Colorado, Wyoming, and Montana they range to an altitude of 9,000 feet in summer, and perhaps still higher, while in the southern Sierra Nevada they reach nearly the same elevations.

In its general appearance the Kingfisher is a striking but rather top-heavy looking bird; its satin-like plumage feels dense and smooth to the touch, as if it was oiled, while its soft, weak feet look out of all proportion to its rather large

¹ Monograph of the Trogonidæ, 2d ed., 1875, Pl. VIII, not paged.

head and body. They seem almost inadequate to support its weight, and certainly do not appear to be much adapted to walking, an exercise which I have never seen one indulge in.

In its disposition it must be classed among the unsocial and quarrelsome birds, and, excepting during the mating and breeding season, it is rare to see two together. As in everything else, however, there appear to be exceptions to this rule, as Mr. W. E. Loucks, of Peoria, Illinois, writes me: "Along the Cedar River, in Iowa, I found these birds in great numbers. A large clay bank along the river resembled a honeycomb, so numerous were the holes made by these birds. This is the only case that I know of where Kingfishers have been found breeding in close proximity."

As a rule each pair of birds seem to claim a certain range on some suitable stream, lake, or mill pond, and should others intrude on this they are quickly driven off. Clear streams or ponds, bordered with perpendicular banks and low, brush-covered shores, are their favorite resorts, and along such places one will not have to go far before hearing the characteristic rattle of the Kingfisher, or perhaps seeing one perched on a partly submerged snag or rock, on a pile of driftwood near the shore, or on some small branch directly overhanging the water. Every bird seems to have several favorite perches along its range, each perhaps quite a distance away from the next, to which it flies from time to time, generally uttering its well-known shrill rattle in doing so. It is a sedentary bird, but ever watchful and rather shy, sitting frequently for an hour at a time in the same position, occasionally moving its head back and forward, watching for its prey as a cat does for a mouse. In such a posture the Kingfisher is one of the most charming features of brook and pool. Should an unfortunate fish come within sight at such times, our lone fisher is at once alert enough, craning its neck and looking into the water, until the proper moment arrives for it to plunge downward, head first, completely disappearing out of sight, and usually emerging with a wriggling captive firmly grasped in its bill, for it rarely misses its victim. It generally rises some feet into the air before dashing perpendicularly into the water.

While different kinds of small fish undoubtedly constitute a large part of the Kingfisher's food where readily procurable, various species of crustacea, as well as insects, such as coleoptera, grasshoppers, and the large black crickets found in many of our Western States, are also eaten to a greater or less extent, according to circumstances; frogs and lizards are also acceptable prey. In southern Arizona, for instance, where running streams are few, I have found Kingfishers breeding in localities where fish must have formed but a very small percentage of their daily fare; there they lived principally on lizards, beetles, and large grasshoppers. I have more than once seen one of these birds perched on some twig overhanging a dry, sandy river bed, where no water was to be found within several miles, on the watch for the kind of food procurable in such localities.

Mr. W. E. Loucks writes me that he has found nests of these birds in the banks of dried-up streams, miles from any water containing fish, and says that

he does not know upon what the parents fed their young. In fact, even in places where they can readily live on fish, they do not appear to confine themselves to such an exclusive diet. While stationed at Fort Klamath, Oregon, I placed a small steel trap on top of a post standing some 10 yards from the banks of Fort Creek, a clear mountain stream abounding in fish, for the purpose of catching a Screech Owl I often heard calling in the vicinity and was anxious to obtain, but was not able to see to shoot on account of the dense fir trees it frequented. I finally concluded to try trapping it. Twice I baited the trap with mice, and once with a small bird, and on the next morning I found a Kingfisher caught by the neck; it had evidently plunged down on the bait to carry it off. The post in question had, as far as I know, never been used as a perch or lookout by the Kingfishers, as it was too far from the creek. Judging from these occurrences, I believe that not a few mice, and possibly small birds also, are caught by them during their nocturnal rambles, and they are certainly fully as active throughout the night as in the daytime.

In favorite spots where fish are plenty, and where there is no suitable place for a perch, they sometimes remain poised over such localities for a minute or more, hovering in the air some 6 feet or more over the water, as does the Sparrow Hawk when searching for grasshoppers and mice in a meadow. When a fish is caught it is at once carried in the bill to the nearest perch or rock, against which it is beaten until dead, and is then swallowed head first. The indigestible parts, such as bones and scales, are afterwards ejected in oblong pellets, which can be seen lying around in their burrows or about their favorite perches.

By far the larger number of fish caught by the Kingfisher consist of species not considered worth much as food fishes, and they rarely average over 3 inches in length. Occasionally, however, a larger one is mastered by one of these birds. Mr. Manly Hardy, of Brewer, Maine, writes me: "I shot a Kingfisher last spring which had swallowed a pickerel considerably longer than the bird from the end of the bill to the tip of the tail, the tail of the fish protruding from the throat, while the head was partly doubled back, causing a large protuberance near the vent."

In stormy weather, when the water becomes rough or muddy, these birds suffer greatly and sometimes almost perish from want of food, and then occasionally resort to eating vegetable matter to sustain life. Dr. Elliott Coues has published the following observations on this subject, communicated by Mrs. Mary Treat, Green Cove Spring, Florida: "A Kingfisher whose feeding ground is just in front of my windows fishes from a private wharf, where he is seldom disturbed, and has become so tame that he pursues his avocations without concern, though I may be standing within a few feet of him. * * * When the water is so rough that it is difficult for him to procure fish, instead of seeking some sequestered pool he remains at his usual post, occasionally making an ineffectual effort to secure his customary prey, until, nearly starved, he resorts to a sour-gum tree (*Nyssa aquatica* L.) in the vicinity, and greedily devours the berries. Returning to his post, he soon ejects a pellet of the large seeds and

skins of the fruit. I have saved some of these pellets as well as those composed of fish bones and scales."¹

The first migrants to return from their winter quarters appear in the Middle States generally about the second week in March, and sometimes a week or so later, according to the season, and in higher latitudes considerably later and not until after the ice commences to break up. In our Southern States nidification commences usually in April; in the Northern ones, rarely before the first week in May, and in arctic North America and northern Alaska, seldom earlier than the latter half of June. Mr. Charles H. Townsend, of the United States Fish Commission, in 1885 found these birds common and breeding on the shores of the Kowack River, near Kotzebue Sound, Alaska, and within the Arctic Circle, the most northern breeding record known to me. The return migration from their breeding grounds in our Northern States sometimes begins about the latter part of September, and in mild falls not before the middle of October, and occasionally still later, they remaining until the streams become covered with ice.

The favorite nesting sites of the Kingfisher are perpendicular clay or reasonably compact sand banks, occasionally mixed more or less with gravel; also railroad cuts. These banks or bluffs usually abut directly on water. A nearly circular burrow or tunnel is dug into these, averaging about 4 inches in diameter. They are excavated by the birds; the entrance hole is usually from 2 to 3 feet below the top of the bank, but sometimes fully 20 feet from the top. The burrows vary in length from 4 to 15 feet, according to the nature of the soil, and sometimes run in perfectly straight for the entire distance; again they diverge at different angles, at various distances from the entrance. The nesting chamber is dome-shaped, usually from 8 to 10 inches in diameter, and always at a slightly higher level than the entrance hole. The time required to dig out a burrow depends largely on the nature of the soil to be removed, taking sometimes two or three weeks, but generally much less. I have personally seen an instance where a pair of these birds excavated a new burrow in a rather friable clay bank near Fort Lapwai, Idaho, to a depth of 5 feet (estimated measurement) in a little over three days. How they manage to dig so rapidly, considering their short and weak-looking feet, with which they must remove the greater part of the material, has always been a mystery to me, and I would not believe them capable of accomplishing such an amount of work had I not seen it done. When not disturbed the same nesting site is resorted to from year to year. Sometimes the male burrows an additional hole near the occupied nesting site, usually not over 3 feet deep, to which it retires to feed and to pass the night.

Dr. William L. Ralph informs me that he has found them occupying the old burrows of Rough-winged Swallows, *Stelgidopteryx serripennis*.

Dr. A. K. Fisher has kindly furnished me the following notes on the nesting habits of this species as observed by him: "On June 6, 1882, the writer found two nests of the Kingfisher in the side of a railroad cut near Croton Lake, Westchester County, New York. The burrows were placed in a bank not over

¹ Bulletin Nuttall Ornithological Club, Vol. III, 1878, p. 92.

7 feet above the roadbed and within 18 inches of the top. That of the first one ran in about 7 feet and turned to the right as it entered the nesting chamber. The seven fresh eggs were placed in a nest of coarse grass, which, although rather scanty, covered the floor of the cavity on all sides. The burrow of the second one extended in about $4\frac{1}{2}$ feet, and, like the other previously mentioned, turned toward the right as the expanded nesting cavity was reached. The nest, which was quite elaborate, was composed wholly of fish scales and bones, arranged in a compact, saucer-shaped mass. The writer made a tunnel from the top of the bank so as to intercept the burrow as it entered the nesting cavity. Viewed through this hole, the nest was a beautiful affair. The scales, which looked as if made of frosted silver, formed a delicate setting for the six pure-white eggs lying in the center, and by the projected light made a most effective picture. On two occasions, near Sing Sing, New York, the writer found the Kingfisher and Rough-winged Swallow using burrows having a common entrance. It is probable in each case that the swallow had commenced its diverging burrow after the larger bird completed its work."

The number of eggs varies usually from five to eight, and sets of six or seven are most often found. Instances, however, have been recorded where as many as fourteen eggs have been found at one time, and Mr. Charles A. Strawn, of Cerro Gordo, Arkansas, informed Mr. Robert Ridgway, under date of March 22, 1890, that he had taken eleven young Kingfishers out of a burrow on Dog River, Douglas County, Georgia. How the female managed to cover this number of eggs and hatch them all is certainly surprising. If the first set of eggs is taken, the birds abandon the burrow and excavate a second one near by, and frequently within a few feet of the first one, and lay a second set, consisting rarely of more than six eggs. Only a single brood is raised in a season. In a newly excavated nest the eggs are usually laid on the bare ground, while in such as have been occupied in previous seasons the eggs are frequently found deposited on quite a thick layer of fish bones, scales, crawfish shells, and wing covers of beetles remaining from former years, but which can not be considered as part of the nest. The male does not assist in incubation, but supplies its mate with food while so engaged, and she rarely leaves the nest after the first egg has been laid; at any rate I have invariably found the bird at home if there were any eggs in the nest. Incubation lasts about sixteen days. The young when first hatched are blind, perfectly naked, helpless, and, in a word, very unprepossessing. They scarcely look like birds while crawling about in the nest, where they remain several weeks, their growth being very slow. The excrement of the young is promptly removed and the burrow is kept rather clean. They utter a low, puffing sound when disturbed, and frequently vary considerably in size, as if incubation, in some instances at least, began with the first egg laid. The young, even after they have left the nest for some time, require the attendance of their parents before they are able to secure subsistence for themselves.

The eggs of the Kingfisher are pure white in color; the shell is strong, fine grained, smooth, and rather glossy, especially so in fresh eggs; in strongly incu-

bated ones this gloss is less noticeable. They are generally short ovate and sometimes rounded ovate in shape.

The average measurement of eighty-seven eggs in the United States National Museum collection is 34.04 by 26.67 millimetres, or 1.34 by 1.05 inches. The largest egg of the series measures 37.08 by 27.94 millimetres, or 1.46 by 1.10 inches; the smallest, 30.78 by 26.42 millimetres, or 1.21 by 1.04 inches.

The type specimen, No. 20467 (Pl. 1, Fig. 3), from a set of six eggs, Bendire collection, was taken by the writer near Fort Lapwai, Idaho, on May 11, 1870, and represents about an average-sized egg.

13. *Ceryle americana septentrionalis* SHARPE.

TEXAN KINGFISHER.

Alcedo cabanisi TSCHUDI, Fauna Peruana, Ornithologie, 1844, 253.

Ceryle americana septentrionalis SHARPE, Catalogue of Birds, British Museum, XVII, 1892, 134.

(B 118, C 287, R 383, C 424, U 391.)

GEOGRAPHICAL RANGE: From the Isthmus of Panama north through Central America, to northern Mexico, Chihuahua, and southwestern Texas.

The Texan Kingfisher, the smallest representative of the *Alcedinidæ* found in the United States, is not nearly as well known as the Belted Kingfisher, and its breeding range is confined to a comparatively small portion of western Texas, while even here it appears to be of rather irregular occurrence. It is reported as fairly abundant along a number of the tributaries of the Guadalupe River, in Comal County, also on some of the streams in Bexar and Edwards counties, and thence westward along the various tributaries to the Rio Grande, like Devils River, etc. Dr. Edgar A. Mearns, United States Army, met with it in Kenney County, at Fort Clark, at Strickland's Springs, and Las Moras Creek, and it seems to be present on nearly every creek or stream whose waters are sufficiently clear to enable it to make a living. It is not found regularly along the shores of muddy streams, such as the lower Rio Grande and Nueces rivers and others in southwestern Texas, and its presence seems to depend almost entirely on the clearness of the water. It reaches the northern limits of its range in Texas, as far as known, in about latitude 30°, but in northern Mexico it ranges at least a degree farther north. Dr. Edgar A. Mearns, United States Army, while on duty with the International Boundary Survey, obtained a specimen at Pajon Bonito, Chihuahua, September 8, 1893, 10 miles southeast of monument 66, close to the Arizona line, which is the most northern record known to me. It appears to be a constant resident in southwestern Texas, and breeds wherever found.

Its general habits, food, and breeding habits are similar to those of the Belted Kingfisher. Mr. W. Brewster described the first authentic eggs of this species taken within our borders, in the "Bulletin of the Nuttall Ornithological Club" (Vol. 4, 1879, pp. 79, 80). He says: "This beautiful little Kingfisher was

found by Mr. W. H. Werner in comparative abundance at several points in Comal County, notably about some of the springs that empty into the Guadalupe River. A set of six eggs taken in April, 1878, was authenticated by the capture of both parent birds, the female being caught on the nest. * * * The nesting cavity was in a sand bank near the water's edge; the eggs were laid on the bare sand, no fish bones or other extraneous material being near. The entrance was not quite $1\frac{3}{4}$ inches in diameter, and the hole extended inward from the face of the bank about $3\frac{1}{2}$ feet." * * *

The nests of many of these little Kingfishers are yearly destroyed by high water flooding their burrows, caused by heavy rains and cloud-bursts, which are more or less prevalent in southern and western Texas. It is not uncommon on both the Medina and San Antonio rivers, and a nesting site on the last-mentioned stream found by Mr. C. H. Kearny, in the spring of 1892, containing six fresh eggs, is described by him as being located in a bank about 15 feet high and about 5 feet above the water level. The nesting chamber, which was slightly larger than the tunnel leading to it, was placed about 2 feet from the mouth of the hole. There was no nest proper, but a few fish bones and scales were scattered about the eggs. In the same bank a number of Bank Swallows (*Clivicola riparia*) had taken up temporary homes, and one of their holes was located within a foot of that of the Kingfishers. They are devoted parents, and these birds will usually allow themselves to be caught rather than forsake their eggs. They generally are five or six in number, and, like the eggs of all Kingfishers, they are pure white in color and unspotted. The shell is close grained, but rather thin, and while some sets are quite glossy, others show little or no luster. They are usually rounded elliptical oval in shape, and not short ovate, like the majority of the eggs of the Belted Kingfisher.

The average measurement of fourteen eggs is 24.38 by 18.53 millimetres, or 0.96 by 0.73 inch. The largest egg measures 25.40 by 19.05 millimetres, or 1 by 0.75 inch; the smallest, 23.62 by 18.29 millimetres, or 0.93 by 0.72 inch.

The type specimen, No. 20468 (Pl. 1, Fig. 4), from a set of five eggs, Bendire collection, was taken near New Braunfels, Texas, on March 4, 1879, and represents an average egg of this species.

14. *Ceryle torquata* (LINNÆUS).

RINGED KINGFISHER.

Alcedo torquata LINNÆUS, Systema Naturæ, ed. 12, I, 1766, 180.

Ceryle torquata BOIE, Isis, 1828, 316.

(B —, C —, R —, C — U [390.1].)

GEOGRAPHICAL RANGE: From southern Argentina north through South and Central America to northeastern Mexico (Nuevo Leon), and casually to the lower Rio Grande Valley in Texas.

This handsome Rufous-breasted Kingfisher, the largest found on the American continent, has a wide distribution, occurring in suitable localities throughout the greater part of South America, the whole of Central America, and most of

Mexico. It has only recently been added to our fauna, and it is doubtful if it breeds within our borders. An adult female was shot by Mr. George B. Benners, of Philadelphia, Pennsylvania, on June 2, 1888, about a mile below Laredo, Texas, on the United States side of the Rio Grande. He says: "It was sitting on some old roots which had been washed up into a heap by the current of the river, and was shot immediately, so I did not see it fly or hear its call." This specimen is now in possession of the Academy of Natural Sciences of Philadelphia, Pennsylvania.¹

Although moderately common, and distributed over extensive areas, very little has as yet been published about the life history of this giant among Kingfishers. Dr. Herman Burmeister, in his "Thiere Brasiliens," 1856 (Vol. I, p. 415), says: "This is the largest of the American Kingfishers, and it is pretty generally distributed over the warmer portions of South America, along the shores of wooded streams, where it sits on limbs overhanging water, watching for fish, which constitute its principal food. It nests in perpendicular banks, occasionally quite a distance from water, in burrows from 5 to 6 feet deep, and lays two white eggs."

Mr. Charles W. Richmond, in his interesting paper on "Birds from Nicaragua and Costa Rica," makes the following remarks about the species: "Very common. This species has a note similar to that of *C. alcyon*, but somewhat stronger. One morning a pair of these birds went through a very curious performance. Attention was first called to them by their loud, rattling cry, which was kept up almost constantly as they circled and gyrated about over the water, occasionally dropping, not diving, into the water, and sinking below the surface for a moment. This maneuvering lasted some minutes, after which both birds flew upstream, uttering their ordinary note.

"Two or three individuals were in the habit of passing the night at some point on the creek back of the 'L. P.' plantation, and came over just about dusk every evening. I noticed them for several months, and was struck with the regularity of their coming and the course taken by each on its way to the roost. The birds could be heard a considerable distance away just before dusk, uttering their loud, single 'chuck' at every few beats of the wings. They appeared to come from their feeding grounds, often passing over the plantation opposite, probably to cut off a bend in the river. One of the birds invariably passed close to the corner of the laborers' quarters, though at a considerable height, and the other near a trumpet tree some distance away. The third bird was only a casual visitor. At times the birds came together, but usually there was an interval of several minutes. Their routes met at a turn of the creek a few rods back of the house, where they usually sounded their rattling notes and dropped down close to the water, which they followed to the roost. This was in a huge spreading tree, covered with parasitic plants and numerous vines, which hung in loops and festoons from the limbs. On one occasion I shot at one of the birds as it came clucking overhead, and caused it to drop several

¹The Auk, Vol. XI, 1894, p. 177.

small fish. A female nearly ready to deposit eggs was shot October 9. The birds made their appearance rather late in the morning, usually after 8 o'clock, and at times spent several hours of the day up there. Although the birds appeared to have their home at this place, I did not, on any of my numerous trips up the creek, discover the site."¹

From Mr. Richmond's observations it would appear as if *C. torquata* nested at all times of the year.

The most northern Mexican record for this species is, I believe, the one from Rio de las Ramos, State of Nuevo Leon, in about latitude 25° 30'. This specimen was obtained by Mr. W. Lloyd, on February 28, 1891, and is now in the collection of the United States Department of Agriculture.

I have been unable to find a more accurate description of the eggs of this species than the one above given, but, judging from the size of the bird, they should be considerably larger than those of *C. alcyon*.

Family PICIDÆ. WOODPECKERS.

15. *Campephilus principalis* (LINNÆUS)

IVORY-BILLED WOODPECKER.

Picus principalis LINNÆUS, Systema Naturæ, ed. 10, I, 1758, 113.

Campephilus principalis GRAY, List Genera of Birds, 1840, 54.

(B 72, C 293, R 359, C 431, U 392.)

GEOGRAPHICAL RANGE: South Atlantic and Gulf States; north to the southern portions of South Carolina, Georgia, Alabama, Mississippi, and Arkansas; west to southeastern Texas. Formerly north to North Carolina, Tennessee, Kentucky, southern Indiana, Illinois, southern Missouri, and the southern parts of the Indian Territory.

The Ivory-billed Woodpecker, also called "White-billed Woodpecker," "White-billed Logcock" and "Woodcock," is the largest representative of this family found in the United States, being a resident of the mainland and the numerous islands along the south Atlantic and Gulf coasts and breeding wherever found. In former years its range was much more extended than it is at present; then it penetrated well into the interior, along the shores of the Mississippi River and its larger tributaries, having been reported from White County, Illinois; Franklin County, Indiana, and Franklin County, Tennessee, as well as at other points inland. At present it appears to be fairly abundant in Florida, in portions of southern Mississippi along the Yazoo River, and in the extensive swamps in southern Louisiana. In the first-mentioned State Mr. Arthur T. Wayne obtained not less than thirteen specimens in the month of April, 1893, and about ten more were seen. He says, "A young female taken April 15 was about two weeks from the nest. I never observed it singly, it being always seen in company with two or three others of this species. I was told by old hunters that they breed early in February. The locality where this bird is to be found at all times is in

¹ Proceedings of the U. S. National Museum, Vol. XVI, pp. 510, 511.

what the people call 'burn-outs.' These are large tracts of heavy timber which the forest fires have destroyed; and the dead trees harbor beetles, etc. A nest which I examined was dug in a live cypress about 50 feet high."¹

Mr. E. A. McIlhenny has kindly furnished me with the following notes on this interesting species: "In the cypress swamps adjacent to Avery's Island, Louisiana, these noble birds are still quite common, and here, in their favorite haunts, I have watched them for years. I believe they remain mated for life, for I have observed several pairs of them year in and year out, and can always find them near the spot where they have their nest or winter home, from which place they are hard to drive away, thereby showing a fondness for locality seldom seen in birds of this family. The nest is generally placed in a cypress or tupelo gum tree, one that is partly dead being preferred, and the cavity is excavated in the dead part of the tree. I have never found a nest in wood in which there was sap, or in rotten wood. The site for the nest being chosen, the female begins the excavation during the last week in March or the beginning of April, and from eight to fourteen days are spent in finishing it, the female doing all the work, while the male sits around and chips the bark from the neighboring trees. The eggs are deposited as early as April 9, on which date I took a set of three fresh eggs in 1892, and on May 19 I took from the same pair, in the same tree, but in a lower excavation, a set of four eggs in which incubation was considerably advanced. But one brood is reared in a season, and the young remain with the parents until the mating season in the following year.

"A typical nest of this bird is one I found on May 2, 1892. It was situated in a partly dead cypress, 41 feet up. The entrance was oval and measures $4\frac{1}{8}$ by $5\frac{3}{4}$ inches. The excavation was $21\frac{1}{2}$ inches deep, and was much larger at the bottom than at the top. It contained three eggs, deposited on about an inch of fine chips. The eggs measured 1.40 by 1.01, 1.38 by 1.02, and 1.37 by 1.02 inches; they are very glossy and quite pointed. When the young are hatched, both parents feed them, often going quite a distance into the open country in search of food. As soon as they leave the woods they mount to a considerable height, their flight being very strong, and, like that of all Woodpeckers, undulating. The only note I have heard these birds give is made while on the wing; it is very shrill, and resembles somewhat the call of the Pileated Woodpecker, but is quite beyond being put on paper; the call of the female does not perceptibly differ from that of the male. They are very silent birds at all times, and during the breeding season I have never heard their cry. They have, however, another mode of calling each other: one bird will alight on a dry limb of some tree and rap on it with its bill so fast and loud that it sounds like the roll of a snare drum; this it continues to do at short intervals until its mate comes. When in search of food this bird evinces great cleverness. It will alight on a dead limb, and after tapping it a few times with its beak it puts its ear to the wood and listens for the movements of any grub that may be

¹The Auk, Vol. X, 1893, p. 338.

at work there, and after it locates one, the energy it displays in getting at it is remarkable. It braces itself with the stiff feathers of its tail, and in striking a blow uses the body from the legs up to give force to it. The blow it delivers while in this position is very hard, and sounds as if some one was striking on a tree with a hammer. Its food consists of grubs and insects that inhabit decayed wood. In the fall and winter it feeds to some extent on the mast of the live oak, and stores acorns in holes for its winter supply. I have seen them destroy the nests of the gray squirrels to obtain the acorns and nuts they had put by for the winter. They would sit on the top of the nest and with a few strokes of their bill scatter it in every direction."

In a recent interview with Mr. McIlhenny he told me that he found another nest of this species in the early part of May, 1894, containing five young about three days old, whose eyes were still closed. The nesting site was in a dead gray oak, in the main trunk, about 30 feet from the ground, and the cavity was about 3 feet deep; the female was in the hole, and flew out when the tree was struck; the male was not seen.

According to Audubon, this bird feeds on grapes, blackberries, and persimmons. Mr. Maurice Thompson states that it eats ants, and he published a very interesting article on this species under the title of "A Red-headed Family," which may be found in the "Oologist" (Vol. VI, February, 1889, pp. 22-29), and is well worth reading.

The eggs of the Ivory-billed Woodpecker are still quite rare in collections. The Public Museum, in Milwaukee, Wisconsin, contains a set of three, presented by the late Capt. B. F. Goss, who wrote to me that they were taken in the Neches River bottom, in Jasper County, Texas, on May 3, 1885. The cavity was about 2 feet deep, situated 40 feet from the ground, and the entrance was large enough to admit the collector's arm. The American Museum of Natural History, in New York, contains a set of four eggs taken on April 10, in the Alatamaha Swamp in Georgia, by the late Dr. S. W. Wilson. These measure 1.36 by 0.95, 1.34 by 0.98, 1.25 by 0.95, and 1.29 by 0.98 inches. The United States National Museum has five of these eggs. Two were received from Mr. N. Giles, of Wilmington, North Carolina, but no date or locality is given; the remaining three are a set from the Ralph collection, taken in Lafayette County, Florida, on April 19, 1893. One of these eggs contained a large embryo; the other two were addled. The nesting site was excavated in a dead bay tree, 30 feet from the ground, and the cavity was 2 feet deep. The female was shot when the eggs were taken.

Mr. W. E. D. Scott makes the following statement: "To-day, March 17, 1887, I found a nest of the Ivory-billed Woodpecker, and obtained both parent birds and the single young bird which was the occupant of the nest. The cavity was dug in a large cypress tree in the midst of a dense swamp, and was 41 feet from the ground. The opening was oval, being $3\frac{1}{2}$ inches wide and $4\frac{1}{2}$ inches high. The same cavity had apparently been used before for a nesting place; it was cylindrical in shape and a little more than 14 inches deep. The

young bird in the nest was a female, and, though one-third grown, had *not yet opened its eyes*. The feathers of the first plumage were apparent, beginning to cover the down, and were the same in coloration as those of the adult female bird."¹

Recent observations all tend to show that the Ivory-billed Woodpecker is an exceedingly wild and suspicious bird, and as the country becomes more settled it retires from the advance of civilization to the more inaccessible swamps, where it is not so liable to be molested. In such localities it appears to be still reasonably common, as well as on some of the islands off the south Atlantic and Gulf coasts. The present restriction of its range is probably due more to its wild and suspicious nature than to actual decrease in numbers, as it has but few enemies excepting man, and is well able to protect itself against the others. One of the most notable differences in the nesting habits of this handsome Woodpecker appears to be the fact that instead of making a round entrance hole, as do the smaller members of this family found in the United States, it prefers one which is oval in shape.

The eggs of the Ivory-billed Woodpecker are pure china white in color, close grained, and exceedingly glossy, as if enameled. They vary in shape from an elongate ovate to a cylindrical ovate, and are more pointed than the eggs of most of our Woodpeckers. They appear to me to be readily distinguished from those of the Pileated Woodpecker, some of which are fully as large. From three to five eggs are laid to a set, and only one brood is raised in a season. As both sexes among all the better-known species of Woodpeckers assist in incubation, it is probable that the same holds good with this species as well, and this lasts probably from sixteen to eighteen days.

The average measurement of thirteen eggs is 34.87 by 25.22 millimetres, or about 1.37 by 0.99 inches. The largest egg measures 36.83 by 26.92 millimetres, or about 1.45 by 1.06 inches; the smallest, 34.54 by 23.62 millimetres, or about 1.36 by 0.93 inches.

The type specimen, No. 26365 (not figured), from a set of three eggs, Ralph collection, was taken in Lafayette County, Florida, April 19, 1893.

As all Woodpeckers' eggs are pure white, and as many differ only very slightly in size and shape, but considerably in the degree of glossiness, which could not be accurately shown in the illustrations, I have only figured the eggs of two well-known species, selecting those of the Pileated and Downy Woodpeckers, which show fairly well the extremes in size.²

¹ The Auk, Vol. V, 1888, p. 186.

² I had hoped to be able to add the large Imperial Woodpecker, *Campephilus imperialis*, to our list before this volume went to press. Lieut. Harry C. Benson, Fourth Cavalry, U. S. Army, found it to be common in the pine forests of the Sierra Madre in northern Sonora, Mexico, in 1887, and shot a specimen within 50 miles of the boundary line; but up to date it has not been observed by either Dr. A. K. Fisher or Mr. W. W. Price, who both collected in the Chiricahua Mountains during the summer of 1894, where it is most likely to be found.

16. *Dryobates villosus* (LINNÆUS).

HAIRY WOODPECKER.

Picus villosus LINNÆUS, *Systema Naturæ*, ed. 12, I, 1766, 175.

D[ryobates] villosus CABANIS, *Museum Heineanum*, IV, June 15, 1863, 66.

(B 74, part; C 298, part; R 360; C 438, part; U 393.)

GEOGRAPHICAL RANGE: Eastern North America; north in the southern provinces of the Dominion of Canada to Nova Scotia, New Brunswick, southern Quebec, Ontario, and southern Manitoba; south through the United States, excepting the South Atlantic and Gulf States; west to eastern Montana and Wyoming, Nebraska, Kansas, the Indian Territory, and eastern Texas. Accidental in England.¹

The breeding range of the Hairy Woodpecker, also known as "Big Sapsucker" and "Big Guinea Woodpecker," is coextensive with its geographical range, and it is generally a constant resident wherever found. It is fairly common through the wooded regions of our Northern and Middle States, and in winter is occasionally found in some of the Southern States—Louisiana, for instance. It is a resident in the mountainous portions of North Carolina, while in the lowlands it is replaced by the smaller southern race, *Dryobates villosus auduboni*. It is a hardy bird, and intense cold does not appear to affect it much. As a rule it is rather unsocial, and, unless followed by their young, more than a pair are rarely seen together. It does not live in harmony with smaller species of its own kind, and drives them away, when they encroach on its feeding grounds, being exceedingly greedy in disposition and always hungry. It is partial to timbered river bottoms, the outskirts of forests, and occasionally it makes its home in old orchards and in rather open, cultivated country, interspersed here and there with isolated clumps of trees; it is also found in the midst of extended forest regions.

The Hairy Woodpecker, like most of its relatives, is an exceedingly beneficial and useful bird, which rids our orchards and forests of innumerable injurious larvæ, like those of the Boring Beetles, *Buprestidæ*, which burrow in the wood and between the bark and trunk of trees. It never attacks a sound tree. Although commonly known as Sapsucker, this name is very inappropriate; it is not in search of sap, but of such grubs as are found only in decaying wood; nevertheless it is exceedingly difficult to make the average farmer believe this, and in winter, when these birds are more often seen about the vicinity of dwellings and the neighboring orchards than at other seasons of the year, many are shot under the erroneous belief that they injure the very trees they are doing their best to protect. In central New York, and undoubtedly in other sections as well, where a few decades ago one could see some of the finest apple orchards to be found anywhere, you may look in vain for them now. Nearly every tree

¹Mr. E. W. Nelson, in his report upon the Natural History Collections made in Alaska in the years 1877-1881, p. 145, records this species as occurring in British Columbia and thence north along the southeastern coast of Alaska. I have not been able to find any specimens collected by him in the U. S. National Museum collections and simply mention this record.

of any size now shows abundant and unmistakable signs of decay, caused by the increase of the insects which live in them and the decrease of such birds as destroy these pests. In Oneida and Herkimer counties, New York, the top of nearly every black ash tree is dead and the trees are slowly decaying, undoubtedly due to some species of boring beetle; there are not enough Woodpeckers left to check the increase of these pests, and not alone the orchards but quantities of valuable timber are being slowly but surely destroyed by them.

The food of the Hairy Woodpecker, besides larvæ, consists of various species of small beetles, spiders, flies, ants, and in winter, when such food is scarce, to some extent of seeds and grain, and less often of nuts and acorns. I have seen it cling to fresh hides hung up to dry, picking off small particles of fat and meat, and in summer it occasionally eats a few berries of different kinds. In the fall of the year it can often be seen inspecting old fence posts and telegraph poles, probably on the lookout for cocoons, spider eggs, etc. Mr. V. A. Alderson, of Marathon County, Wisconsin, publishes the following interesting statement in the "Oologist" (Vol. VII, July, 1890, p. 147): "Last summer potato bugs covered every patch of potatoes in Marathon County (being my home county), Wisconsin. One of my friends here found his patch an exception, and therefore took pains to find out the reason, and observed a Hairy Woodpecker making frequent visits to the potato field and going from there to a large pine stub a little distance away. After observing this for about six weeks, he made a visit to the pine stub, and found, on inspection, a large hole in its side, about 15 feet up. He took his ax and cut down the stub, split it open, and found inside over 2 bushels of bugs. All had their heads off and bodies intact. Now, why did the Woodpecker carry the bugs whole to the tree and only bite off and eat the heads, which could have been done in the potato field?"

Like all Woodpeckers, it is an expert climber, and moves rapidly up and around trees in short hops; it is equally easy for it to go backward or sidewise, and it is astonishing how readily it can move in any direction. The strong feet and sharp claws enable it to hold firmly to the bark, and the stiff, spiny tail feathers also come in play while it is at work, acting as a support for the body which is well thrown back when a blow is delivered with its powerful chisel-like bill. Although usually rather shy, when busy in search of food one will occasionally allow itself to be very closely approached. I have seen one alight on the trunk of a crab-apple tree within 3 feet of me and deliberately commence searching for larvæ, apparently perfectly unconcerned about my presence, and when I moved up a little closer, he simply hopped around on the opposite side of the tree and continued his search; every once in a while, however, his head would appear from behind the tree to see if I was still watching him. He remained fully thirty minutes on the same tree, where he evidently found an abundance of food, and then flew off uttering several loud notes like "huip, huip." Its ordinary call sounds like "trrii, trrii," a shrill, rattling note.

The tongue of the majority of our Woodpeckers is especially adapted for extracting larvæ, etc., from the wood in which they live. The tongue proper is

rather small, flat, and terminates in a sharp, horny point, which is armed at the sides with a series of bristle-like barbed hooks; the worm-like neck, or the hyoid process to which it is attached, is generally rather long and curves around the back of the skull in a sheath, and this can readily be thrown forward for 2 or 3 inches. A sticky saliva is also secreted, with which the tongue is covered to facilitate the extraction of the food they are in search of. Their sense of hearing must be exceedingly acute, as they appear to readily detect the slightest movement of any insect under the bark or in the solid wood, and they make no mistakes in properly locating it. Their flight is rapid, undulating, usually not very protracted, and they rarely descend to the ground in search of food, where their movements are rather awkward and clumsy. Notwithstanding the amount of labor required for the Hairy and other Woodpeckers to obtain the necessary amount of nourishment, they are usually in good condition, and in winter not unfrequently excessively fat.

Our Hairy Woodpecker is one of the earliest of this family to breed. The mating season begins in the latter part of March, and the species is at this time one of the noisiest members of this family. The male, when not in search of food, now seems to occupy himself almost exclusively with drumming on a resonant dead limb, generally situated near the top of some tall tree. The louder the noise produced, the more satisfactory it appears to be to the performer; it seems to be a sort of love note and call to the female, and, as far as I have been able to observe, is only indulged in by the male. In flying from one tree to another a shrill, sharp "huip, huip" is often uttered, and during the mating season both sexes are very demonstrative and utter quite a number of different notes. I believe this species remains paired through life. Nidification begins usually early in April, and it requires about a week to prepare the nesting site. Both sexes take part in this labor, and it is really wonderful how neat and smooth an excavation these birds can make with their chisel-shaped bills in a comparatively short time. The entrance hole is as round as if made with an auger, about 2 inches in diameter, and just large enough to admit the body of the bird; the edges are nicely beveled, the inside is equally smooth, and the cavity is gradually enlarged toward the bottom. The entrance hole, which is not unfrequently placed under a limb for protection from the weather, generally runs in straight through the solid wood for about 3 inches, and then downward from 10 to 18 inches, and some of the finer chips are allowed to remain on the bottom of the cavity in which the eggs are deposited. Both dead and living trees are selected for nesting sites, generally the former. When living trees are chosen, the inner core or heart of the tree is usually more or less decayed. These nesting sites are nearly always selected with such good judgment that such obstacles as hard knots are rarely encountered; should this occur, the site is abandoned and a fresh one selected. After this is completed the male frequently excavates another hole, or even several, in the same tree or in another close by, in which to pass the night or to seek shelter, and to be close to the nest while the female is incubating; these holes are not so deep as the others. A fresh nesting site is

generally selected each season, but where suitable trees are scarce the same one may be used for several years in succession, and in such a case it is usually thoroughly cleaned out and the old chips in the bottom removed and replaced by fresh ones. Beech, ash, poplar, birch, oak, sycamore, haw, and apple trees are mostly used for nesting sites.

Mr. D. B. Burrows writes me: "In Marshall County, Illinois, the river bottoms are subject to overflow during the spring, and high water lasts frequently for two or three months, causing the willows and soft maples to die in great numbers, sometimes leaving belts of dead trees of considerable extent. Among these the Hairy Woodpecker is always to be found. The nesting season commences earlier than that of any of the Woodpeckers found in this locality, and seems to be quite regular. From my notes I find the time to secure fresh eggs to be from the 20th to the 24th of April. Here they nest mostly in dead willows, though maple trees from which the bark has fallen off, leaving a smooth trunk, are also frequently used."

In Maine they nest sometimes in dead spruce and fir trees, but deciduous trees seem to be preferred throughout their range. In the New England States and northern New York fresh eggs are usually found during the first week in May, and ordinarily only one brood is raised in a season. In the Adirondaeks their holes are often found from 40 to 50 feet from the ground. The duties of incubation are divided between the sexes and last about two weeks. The young when first hatched are repulsive-looking creatures, blind and naked, with enormously large heads, and ugly protuberances at the base of the bill, resembling a reptile more than a bird. They are totally helpless for some days, and can not stand; but they soon learn to climb. They are fed by the parents by regurgitation of their food, which is the usual way in which the young of most Woodpeckers are fed when first hatched. Later, however, a few species, like the Red-headed Woodpecker and other members of this genus, feed their young in the ordinary manner, carrying the food in their bills. The young remain in the nest about three weeks. When disturbed they utter a low, purring noise, which reminds me somewhat of that made by bees when swarming, and when a little older they utter a soft "purr, purr." Even after leaving the nest they are assiduously cared for by both parents for several weeks, until able to provide for themselves. Should the first set of eggs be taken, a second, and sometimes even a third, is laid at intervals of from ten to fourteen days; and if the nesting site has not been destroyed or the entrance hole enlarged (which can readily be avoided by sawing out a sufficiently large piece below the hole, enabling the collector to insert his hand, and replacing this again carefully after taking the eggs) they will frequently use it a second time.

The number of eggs laid to a set varies from three to five, usually four. I have been informed that sets of six and seven have been taken, but I doubt this. They are mostly oval in shape, sometimes elliptical oval, and occasionally rounded ovate. The shell is very finely granulated, glossy, and semitranslucent when fresh, the yolk being plainly visible then; but as incubation advances it

becomes more opaque. Like all Woodpeckers' eggs, they are pure white and unspotted.

The average measurement of twenty-nine specimens in the United States National Museum collection is 23.65 by 17.94 millimetres, or about 0.93 by 0.71 inch. The largest egg of the series measures 25.91 by 18.80 millimetres, or 1.02 by 0.74 inches; the smallest, 20.57 by 16.26 millimetres, or 0.81 by 0.64 inch.

The type specimen, No. 24721 (not figured), from a set of five eggs, was taken by Dr. William L. Ralph near Holland Patent, Oneida County, New York, on May 5, 1891.

17. *Dryobates villosus leucomelas* (BODDÆRT).

NORTHERN HAIRY WOODPECKER.

Picus leucomelas BODDÆRT, Table des Planches Enluminées d'Histoire Naturelle, 1783, 21.
Dryobates villosus leucomelas RIDGWAY, Proceedings U. S. National Museum, VIII, 1885, 355.
 (B 74, part; C 298, part; R 360a; C 438, part; U 393a.)

GEOGRAPHICAL RANGE: Northern North America; from about latitude 49° in the eastern parts of the Dominion of Canada north to about latitude 66°, and probably still farther in the interior; west to eastern Alaska; south, in winter only (?), to the northern border of the United States.

The breeding range of the Northern Hairy Woodpecker, also known as the "Great White-backed Sapsucker" and "Phillips's Woodpecker," a somewhat larger race, and usually with a greater amount of white in its plumage than the preceding, is probably coextensive with its geographical distribution; it also appears to be resident wherever found. Mr. B. R. Ross, of the Hudson Bay Company, took a male near Fort Simpson, on the Mackenzie River, in latitude 62° N., on December 29, 1860, and Mr. McQuesten obtained a female at Fort Reliance, on the upper Yukon, in Alaska, in about latitude 66° N., on September 15, 1878; both of these specimens are now in the United States National Museum. North of latitude 56° it is reported to be rare, and it is not often met with near the coast in Alaska. Prof. Winfrid A. Stearns reports taking a specimen of *Dryobates villosus* in Labrador on October 28, 1882, exact locality not stated, which is unquestionably referable to this race; but Mr. L. M. Turner, during his sojourn of several years in Ungava, failed to meet with it, and it is probably rare throughout this region. It is reported as a common resident of British Columbia, east of the Cascades, and in the Rocky Mountain sections, by Mr. John Fannin.

While stationed at Fort Custer, Montana, I took several specimens during the winter of 1884-85, which I referred to *Dryobates villosus*; one of these skins, a fine male, taken on April 19, 1885, is now in the United States National Museum collection, and this is a perfectly typical example of the northern race. It is therefore possible that it breeds in limited numbers along our northern border, but it may only have been a late straggler. I shot it in a cottonwood grove on the Big Horn River.

Its general habits, food, mode of incubation, etc., are probably the same as those of *Dryobates villosus*. There are no positively identified eggs of this race in the collection; but they undoubtedly resemble those of the preceding species, averaging probably a trifle larger.

18. *Dryobates villosus audubonii* (SWAINSON).

SOUTHERN HAIRY WOODPECKER.

Picus audubonii SWAINSON and RICHARDSON, Fauna Boreali Americana, II, 1831, 306.
Dryobates villosus audubonii RIDGWAY, Proceedings U. S. National Museum, VIII, 1885, 355.
(B 74, part; C 298, part; R 360, part; C 438, part; U 393b.)

GEOGRAPHICAL RANGE: South Atlantic and Gulf States; north to North Carolina, southern Tennessee, etc.; west to Louisiana and southeastern Texas. (?) Casual in the Bahamas.

The breeding range of the Southern Hairy Woodpecker, a somewhat smaller race than *Dryobates villosus*, is likewise coextensive with its geographical distribution, it generally being resident wherever found. It reaches the northern limits of its range in North Carolina. The Brimley Brothers write me that it occurs in the vicinity of Raleigh, where it is rather rare, and nests quite early, as young birds were found nearly fully fledged on May 25, 1891. Mr. William Brewster also met with it in the lowlands in Franklin County, North Carolina, and up to an elevation of 4,000 feet at Highlands, in Macon County, while Dr. W. H. Fox reports seeing a few each year in Roane County, Tennessee; specimens sent by him have been identified at the United States National Museum as referable to this subspecies. The late Mr. C. W. Beckham met with it at Bayou Sara, Louisiana, and Mr. E. A. McIlhenny found it nesting on May 12, 1892, in a cavity of a pin oak, 21 feet from the ground, in New Iberia Parish, Louisiana. Here it frequents the oak timber on high land, and is said to be rare. Although not yet reported from southeastern Texas, its range probably extends into this State also. The late Dr. W. C. Avery found it breeding in Alabama, where it is not uncommon, and Dr. William L. Ralph has taken three sets of eggs in Putnam County, Florida, which are now in the collection of the United States National Museum. Nidification commenced early in April, and several sets of eggs found by him during the last week in this month were well advanced in incubation. The cavities were in all cases excavated in cypress trees growing on the edge of swamps, and located from 28 to 45 feet from the ground. The number of eggs to a set were three or four, the first number being the more common.

The general habits, food, etc., of the Southern Hairy Woodpecker are similar to those of *Dryobates villosus*, but this subspecies seems to be more fond of fruit and berries, and the young are fed largely on figs. The eggs are scarcely distinguishable from those of the Hairy, excepting that they are a trifle narrower, and all are elliptical ovate in shape.

The average measurement of nine specimens from the Ralph collection is 23.66 by 17.40 millimetres, or about 0.93 by 0.68 inch. The largest egg measures 24.89 by 17.53 millimetres, or 0.98 by 0.69 inch; the smallest, 22.86 by 17.02 millimetres, or 0.90 by 0.67 inch.

The type specimen, No. 24182 (not figured), from a set of three eggs, was taken by Dr. William L. Ralph near San Mateo, Putnam County, Florida, on April 21, 1891.

19. *Dryobates villosus harrisii* (AUDUBON).

HARRIS'S WOODPECKER.

Picus harrisii AUDUBON, Ornithological Biography, V, 1839, 191.

Dryobates villosus harrisii RIDGWAY, Proceedings U. S. National Museum, VIII, 1885, 355.
(B 75, C 298a, R 360b, C 439, U 393c.)

GEOGRAPHICAL RANGE: Pacific Coast regions; from northern California (Humboldt Bay) north (near the coast only) through Oregon, Washington, and British Columbia to southern Alaska (Sitka).

Until within the last few years all the Hairy Woodpeckers from the eastern slopes of the Rocky Mountains to the Pacific coast have been considered as belonging to this subspecies, but recently Mr. William Brewster separated and described a new form in "The Auk" (Vol. V, July, 1888, p. 252), which restricts the range of the present subspecies under consideration very materially.

The breeding range of this race, as now considered, is a very limited one, and is probably coextensive with its geographical distribution. It is apparently confined to the immediate vicinity of the coast, and is not found at any great distance inland. Among the specimens collected by me at Fort Klamath, Oregon (mostly winter birds), there are two which might be called intermediates between this and the more recently separated *Dryobates villosus hyloscopus*, but the majority are clearly referable to the latter. In the typical Harris's Woodpecker the under parts are much darker, a smoky brown, in fact; it is also somewhat larger and is very readily distinguishable from the much lighter-colored and somewhat smaller Cabanis's Woodpecker. It has been taken as far north as Sitka, Alaska, and seems to be a fairly common resident near Puget Sound, Washington, from which locality I recently received a perfectly typical skin taken by Mr. S. F. Rathbun on February 14, 1892, here it breeds in the pine and fir forests. Its general habits, food, mode of nesting, etc., are similar to those of the preceding subspecies. Its eggs are probably a little larger than those of Cabanis's Woodpecker, but as there are no absolutely identified specimens in the United States National Museum collection as yet, I can not give actual measurements.

20. *Dryobates villosus hyloscopus* (CABANIS).

CABANIS'S WOODPECKER.

Dryobates hyloscopus CABANIS and HEINE, Museum Heineanum, IV, ii, 1863, 69.
 (*Dryobates villosus*) *hyloscopus* BREWSTER, Auk, V, July, 1888, 252 (in text).
 (B 75, part; C 298a, part; R 360b, part; C 439, part; U 393d.)

GEOGRAPHICAL RANGE: Western North America; north to Montana, Idaho, and Washington, excepting the coast regions; east to the eastern slopes of the Rocky Mountains and adjacent ranges; south through California, Arizona, and New Mexico to northern Mexico and Lower California.

Cabanis's Woodpecker is generally intermediate in size between *Dryobates villosus* and *Dryobates villosus leucomelas*, and is distinguishable from the former by its plain black or much less spotted wing coverts and tertials, and from *Dryobates villosus harrisi* by its lighter-colored under parts and somewhat smaller size. I have recently had an opportunity to examine several skins of this subspecies, taken in the vicinity of Fort Sherman, Idaho, by Dr. James C. Merrill, United States Army, which are almost as large as *Dryobates villosus leucomelas* and fully as large as *Dryobates villosus harrisi*. It is practically a resident wherever found, and its breeding range is coextensive with its geographical distribution. In winter it is often met with in the valleys adjacent to mountain ranges, to which it retires in summer to breed; but these vertical migrations, if they may be called so, are never very extended.

Cabanis's Woodpecker does not appear to be found north of our border, and has not as yet been reported from any point in the Dominion of Canada, nor does it reach any great distance beyond the eastern slopes of the Rocky Mountains and adjacent ranges. Dr. G. S. Agersborg gives it as a common resident of southeastern South Dakota, but I doubt if perfectly typical specimens of this race are found east of the Black Hills in this State. It inhabits all the mountain regions of the interior up to altitudes of 10,000 feet, and occurs also south of our border in northern Mexico. In southern Arizona it does not appear to breed in the lower valleys, but I have shot several near Tucson in winter, and it merely retires to the neighboring mountains here, where it finds a suitable summer climate during the season of reproduction. Mr. A. W. Anthony observed it in the San Pedro Martir Mountains, Lower California, at altitudes from 7,000 to 10,000 feet. Mr. Denis Gale found it breeding in Boulder County, Colorado, on May 28, 1886, in a live aspen tree, at an altitude of about 8,500 feet. The nest contained five eggs, in which incubation was somewhat advanced. Mr. William G. Smith also reports it as common in Colorado, coming down into the valleys in winter. He says it is the earliest of the Woodpeckers to breed, that it commences nesting in the latter part of April, and usually excavates its holes in old dead pines, frequently at a considerable distance from the ground, and that he has seen full-grown young by June 1.

In California Cabanis' Woodpecker is common in the mountains, but in the lowlands in the southern parts of this State Mr. F. Stephens considers it a

rather rare summer resident. He found it breeding in a cottonwood tree, near San Bernardino, on March 29, 1885. Mr. Lyman Belding took several nests of this subspecies in Calaveras County, in the Sierra Nevadas; in one, found on June 6, 1879, which had been excavated in a dead pine stump, 12 feet from the ground, the eggs, three in number, were on the point of hatching. In his notes he says: "I scared the female from it and prevented her return by inserting a stick, the end of which protruded for several feet. When she found she could not enter she gave several cries, which brought the male, who hopped up and down the stick a few times, striking it with his bill and screaming angrily, pausing occasionally, and apparently deliberating on the best method of extracting it." Another nest, found by him on July 10, 1880, was located only 3 feet from the ground, and contained young which were still in the nest on the 20th. Mr. Charles A. Allen informs me that along the Sacramento River, in California, it breeds in sycamores and willows, but that it is not common there.

I have met with Cabanis's Woodpecker in most of our Northwestern States, but found it nowhere very common. I took my first nest near Camp Harney, Oregon, on May 29, 1875, in a canyon on the southern slopes of the Blue Mountains, at an altitude of about 5,000 feet. The cavity was excavated in the main trunk of a nearly dead aspen, about 12 feet from the ground. The entrance hole was about $1\frac{3}{4}$ inches in diameter, and the cavity about 9 inches deep. It contained four much incubated eggs. The female was in the hole, and stayed there looking out until I had struck the tree several times with a hatchet, when she flew off and alighted on one of the limbs of the tree, uttering cries of distress, which brought the male, who was still more demonstrative, hopping from limb to limb, squealing and scolding at me and pecking at the limbs on which he perched. At Fort Klamath, Oregon, it was somewhat more common, and here I took several of its nests. It appears to be especially abundant in tracts in which the timber has been killed by fire, and where many of the slowly rotting trunks still remain standing. Such burnings are frequently met with in the mountains, and seem to attract several species of Woodpeckers, presumably on account of the abundance of suitable food to be found. Full sets of eggs may be looked for in ordinary seasons during the first ten days in May, and occasionally even earlier, as I found a nest with four young, several days old, on May 21, 1883. Inasmuch as this Woodpecker nests rather early, it is possible that two broods are raised in a season. Dead or badly decayed trees are preferred to live ones for nesting purposes, and deciduous trees to conifers; it also nests occasionally in firs and madrone trees.

Like the Hairy Woodpecker, Cabanis's is very noisy, especially in the early spring. It likewise is a great drummer, and utters a variety of notes, some of which sound like "kick-kick, whito, whito, whit-whit, wi-wi-wi-wi," and a hoarse guttural one, somewhat like "kheak-kheak" or "khack-khack." It is one of our most active Woodpeckers, always busy searching for food, which consists principally of injurious larvæ and eggs of insects, varied occasionally with a diet of small berries and seeds, and in winter sometimes of piñon nuts, pine seeds, and

acorns. At this season I have often seen this species around slaughter houses, picking up stray bits of meat or fat, and have also seen it pecking at haunches of venison hung up in the open air. It is a rather unsocial bird at all times, and it is rare to see more than a pair together, excepting when still caring for their young to which they appear to be very devoted for some time after these have left their nests.

Its nesting habits are entirely similar to those of *Dryobates villosus*; both sexes share the work in excavating the nesting site, as well as the duty of incubation, which lasts about fifteen days. Their holes are usually located from 12 to 18 feet from the ground, and occasionally as low as 3 feet, or again in the dead top of a tall pine, fully 50 feet up, and it breeds earlier than any other Woodpecker found in the same localities. The number of eggs laid to a set varies from three to six; those of four are by far the most common; sets of five are only occasionally met with, while sets of six are very unusual. Mr. Denis Gale has taken a set of six, and I also found one. The eggs lie on the fine chips left in the bottom of the cavity, and are occasionally well packed into these, so that only about one-half of the egg is visible. They resemble the eggs of *Dryobates villosus* in color, but those of an elliptical ovate shape are more common than the oval and elliptical ovals, averaging, therefore, more in length, while there is proportionably less difference in their short diameter.

The average measurements of forty-four specimens in the United States National Museum collection is 24.95 by 18.49 millimetres, or about 0.98 by 0.73 inch. The largest egg of the series measures 26.16 by 18.80 millimetres, or 1.03 by 0.74 inches; the smallest, 23.37 by 17.78 millimetres, or 0.92 by 0.70 inch.

The type specimen, No. 19422 (not figured), from a set of three eggs, Bendire collection, was taken by the writer in the Blue Mountains, near Camp Harney, Oregon, on May 29, 1875.

21. *Dryobates pubescens* (LINNÆUS).

DOWNY WOODPECKER.

Picus pubescens LINNÆUS, Systema Naturæ, ed. 12, I, 1766, 175.

D[ryobates] pubescens CABANIS, Museum Heineanum, IV, June 15, 1863, 62.

(B 76, C 299, R 361, C 440, U 394.)

GEOGRAPHICAL RANGE: Eastern and northern North America; from Florida and the Gulf States north through the Dominion of Canada, in southern Labrador, to about latitude 55° N.; thence in a northwesterly direction through the Northeast Territory, Keewatin, and the Northwest Territory to northern Alaska, to about latitude 66° N.; west to Manitoba, North and South Dakota, Nebraska, Kansas, the Indian Territory, and eastern Texas. Irregularly to Montana, Colorado, Idaho, Oregon, Washington, and California. Accidental in England.

The Downy Woodpecker, also known as the "Little Sapsucker" and "Little Guinea Woodpecker," is the smallest of our *Picidæ*, closely resembling a Hairy Woodpecker in coloration, but much smaller. Like it, it is an extremely hardy

bird, and is equally at home in the boreal regions or in semitropical Florida. Its breeding range is an extensive one and corresponds with its geographical distribution. Although of a more or less roving disposition in winter, in certain localities throughout its range, caused probably by abundance or lack of food, it can not be considered as a strictly migratory bird, as it appears to be a resident even in winter in northern Alaska, a fact that is well attested from the numerous specimens taken there at that season and now in the United States National Museum collection.

I notice that the under parts of all the Alaskan specimens and others from the far north are much lighter colored than birds from the southern parts of its range, they also generally average somewhat larger, and if *Dryobates villosus leucomelas* is considered a good race, our northern Downy Woodpecker would appear to me to be equally well entitled to subspecific rank. I took a single specimen of this northern form, a male, near Fort Custer, Montana, on January 28, 1885, which is identical with the birds found in Alaska, probably a straggler from the far north. I have also seen a perfectly typical specimen of this species, a female, taken by Mr. S. F. Rathbun, near Seattle, Washington, on February 20, 1892.

The Downy Woodpecker is more sociable and confiding in man than the Hairy Woodpecker; it likes to take up its home in the vicinity of human habitations, and I believe throughout the eastern United States it is more abundant than its larger relative. Unfortunately, it is also considered a Sapsucker, and many of these exceedingly useful little Woodpeckers are killed yearly through lamentable ignorance, under the supposition that they injure the fruit trees by boring in the bark, while in fact they render the horticulturist inestimable service by ridding his orchard of innumerable injurious insects, their eggs and larvæ, and few of our native birds deserve our good will more than the little Downy Woodpecker. The most stringent protection is none too good for it. It is one of the most industrious of birds, is always at work hunting for food, and the number of injurious beetles and their larvæ, caterpillars, etc., destroyed by a single bird in the course of a season must be enormous. Aside from such a diet, it feeds also on ants and their larvæ, spiders and their eggs, and more rarely on small grains, berries, and nuts. It does not object to raw meat, and if a piece is hung up in winter where it can readily get at it, it will pay it regular visits as long as it lasts. It is partial to rather open and cultivated country, interspersed here and there with small woods and orchards; and to the scattering trees and shrubbery of river and creek bottoms, the shade trees along country roads, and along the edges of clearings, and it is even at home in villages. It especially loves to feed in orchards, and also in alders and white birch trees. It begins near the roots and carefully scans every cranny as it hops along, looking now on one side and then on the other, and no lurking insect seems to escape its sharp eye. It is less often met with in the more extensive forests, excepting along water courses, and it does not seem to care much for burnt tracts, which have so much attraction for the Hairy and other Woodpeckers. Although not particularly sociable to its own kind, it loves to be in company with other smaller insect-

ivorous birds, such as Chickadees, Nuthatches, and others, especially in winter. It is not as noisy a bird as the majority of Woodpeckers, and utters but few notes, excepting during the mating season when two or three males are in pursuit of a female. While searching for food it utters occasionally a low "pshir, pshir." One of its common call notes sounds like "pwit, pwit," terminating with "tchee, tchee, tchee," rapidly repeated. Another note, uttered when a pair are chasing one another, reminds me somewhat of the "kick-kick" of the Flicker, but is not uttered quite as loudly. In the early spring the male frequently amuses himself by persistently drumming on some resonant dry limb, often for fifteen minutes at a time, to attract the attention of his mate, or as a challenge to some rival, but later in the season this is less frequently heard. It is exceedingly graceful in all its movements on a tree trunk, moving up or down as well as sidewise with equal facility, and I have seen it hanging perfectly motionless for minutes at a time in the same position, apparently as if in deep thought. While at Holland Patent, New York, during the summer of 1893, I had excellent opportunities to watch these interesting birds; a pair had raised a brood in a dead limb of a maple tree in the public square of the village, and one or more could be seen about at almost any hour of the day, and I have more than once walked up to within 3 feet of one. As they had never been molested, they were tame, and allowed themselves to be closely approached. The young of the year were, apparently, much more suspicious than the old birds.

In the more southern portions of its range, as in Florida, nidification usually begins about the middle of April; in New England and along our northern border, from four to five weeks later, and in Alaska rarely before June 1. Apple, pear, cherry, oak, maple, poplar, alder, American linden or basswood, ash, willow, and magnolia trees appear to furnish its favorite nesting sites, and it prefers to dig out a home in some dead limb, or in the dead top of the trunk, but it also nests in live trees, usually selecting those in which the core shows signs of decay. In Florida slender dead saplings are preferred. The entrance hole is just about large enough to admit the body of the bird with somewhat of an effort, perfectly circular, measuring about $1\frac{1}{2}$ inches in diameter. The inner cavity is gradually enlarged toward the bottom, where it is about 3 inches wide, and the sides are chipped smooth; the hole is usually from 6 to 9 inches in depth, and the bottom is covered with a layer of fine chips on which the eggs are deposited. Both sexes assist in this work, and it takes about a week to complete a suitable excavation. After it is finished the male frequently digs out a somewhat shallower one for himself in the same tree, or in another close by. A new site is usually selected each season in the vicinity of the old one, but occasionally this is cleaned out, deepened a little, and used for several years in succession. Each pair of birds lay claim to a certain range, and intruders on this are driven away.

The Downy Woodpecker, although small in size, does not lack for courage. Mr. J. W. Preston writes me: "On May 15, 1891, a female Downy was attracted from her nest in a decaying branch of a weeping willow near our house by a Red-headed Woodpecker, which was tapping on the tree trunk. It at once

attacked the larger intruder fearlessly, and several times she darted at its head without frightening it away, and at last the defense became so spirited that the Red-head seized the little one by the wing, tearing a secondary therefrom, and flew off with its trophy."

The number of eggs laid to a set varies from three to six, sets of four or five being most commonly found; one egg is deposited daily. In the north, as a rule, only a single brood is raised in a season; in the more southern parts of its range it probably raises two. If the first set of eggs are taken, and the entrance hole has not been enlarged, it will often lay a second set in the same cavity, and occasionally a third set. Incubation lasts about twelve days, and the male performs his full share of this duty. The young are diligently cared for, for some time after leaving the nest, and when able to provide for themselves each goes its own way. In the winter they dig shallower excavations in dead trees, old stumps, or fence posts in some sheltered situation, in which they spend the nights, and to which they retire during stormy weather. In Florida full sets of fresh eggs may be looked for during the last week in April, and in our Northern States about a month later. The nesting sites vary from 5 up to 50 feet. There is considerable variation in the size of the eggs of this species; like those of all Woodpeckers, they are glossy white in color, and mostly ovate and rounded ovate in shape.

The average measurement of sixty specimens in the United States National Museum collection is 19.40 by 15.08 millimetres, or about 0.76 by 0.59 inch. The largest egg of the series measures 22.35 by 16.26 millimetres, or 0.88 by 0.64 inch; the smallest, 17.78 by 13.46 millimetres, or 0.70 by 0.53 inch. The set to which the smallest egg belongs was taken by Dr. William L. Ralph, in Putnam County, Florida, and one of the five eggs it contained is figured. The cavity was excavated in the dead top of a magnolia tree standing in an open field near woods, 48 feet from the ground.

The type specimen, No. 25594 (Pl. 1, Fig. 24), from a set of five eggs, Ralph collection, was taken as stated above, on April 30, 1892, and represents one of the smallest eggs of the series.

22. *Dryobates pubescens gairdnerii* (AUDUBON).

GAIRDNER'S WOODPECKER.

Picus gairdnerii AUDUBON, Ornithological Biography, V, 1839, 317.

Dryobates pubescens gairdnerii RIDGWAY, Proceeding U. S. National Museum, VIII, 1885, 355.
(B 77, C 299a, R 361a, C 441, U 394a.)

GEOGRAPHICAL RANGE: Western North America; from southern California north through Oregon and Washington into British Columbia, to about latitude 55°, and possibly farther north; east to the eastern slopes of the Sierra Nevada and Cascade ranges and somewhat beyond.

Gairdner's Woodpecker, the western representative of the Downy, is principally distinguishable from it by having the middle and greater wing coverts plain black, or only slightly spotted with white. Its range is apparently rather

restricted, and seems to be mainly confined to that part of California west of the Sierra Nevadas. Mr. E. W. Nelson reports it as rare in the piñon belt of the Panamint and Grapevine mountains during Dr. C. Hart Merriam's explorations in the Death Valley region, in the southeastern parts of this State, in 1891. In Oregon and Washington it probably does not reach very far beyond the eastern slopes of the Cascades, while in central British Columbia it is known to occur as far north as Lake Babine, in about latitude 55° . Among a collection of birds and eggs sent by Mr. R. MacFarlane from Fort St. James was a single skin of this subspecies taken in June, 1889.

Gairdner's Woodpecker is more or less a resident and probably breeds wherever found. It is said to be rather common in parts of northern California and in Oregon, but I found it somewhat rare everywhere in the west. It occurs in small numbers about Fort Klamath, Oregon, where I took a set of four slightly incubated eggs, near the Indian Agency, in a dead aspen sapling, on June 9, 1883. The cavity was about 8 inches deep and situated 15 feet from the ground. All of the Klamath birds are typical, and fully as dark underneath as any from the coast. I also met with this or the lately described Batchelder's Woodpecker near Fort Walla Walla, Washington, and on the John Day River, Oregon, but it was of rare occurrence in both localities, and seemed to be confined to the willows near streams. Mr. Rollo H. Beck, of Berryessa, California, writes me that it is a fairly common resident there, and is principally found along the water courses of the foothills, and only occasionally along the creeks and streams in the valleys. Mr. Charles A. Allen informs me that it breeds in the oaks and willows along the Sacramento River, California, but that it is not common. Its breeding sites seem to be confined to deciduous trees, preferably dead ones, or old stumps, and besides these already mentioned, sycamore and cottonwoods are occasionally used. Their nesting sites are rarely found at any great distance from the ground, usually ranging from 4 to 20 feet up and rarely higher.

Its general habits, food, call notes, mode of nidification, etc., are similar to those of the Downy Woodpecker, and the same description will answer for both. As California is a great fruit-growing State, Gairdner's Woodpecker should be especially protected for the good work it does by ridding the orchards of noxious insects and their larvæ. In southern California nidification begins sometimes as early as the middle of April, while farther north it is several weeks later; four or five eggs are usually laid to a set, and one is deposited daily. Ordinarily but one brood is raised in a season. The eggs of Gairdner's Woodpecker resemble those of the Downy in every respect, but average a trifle smaller.

The average measurement of thirty-four specimens in the United States National Museum collection is 18.80 by 14.22 millimetres, or 0.74 by 0.56 inch. The largest egg of the series measures 20.32 by 16 millimetres, or 0.80 by 0.63 inch; the smallest, 17.53 by 13.21 millimetres, or 0.69 by 0.52 inch.

The type specimen, No. 19433 (not figured), from a set of four eggs, Bendire collection, was taken by the writer near Fort Klamath, Oregon, on June 9, 1883.

23. *Dryobates pubescens oreæcus* BATCHELDER.

BATCHELDER'S WOODPECKER.

Dryobates pubescens oreæcus BATCHELDER, Auk, VI, July, 1889, 253.

(B 77, part; C 299a, part; R 361a, part; C 441, part; U 394b.)

GEOGRAPHICAL RANGE: Rocky Mountains and adjacent mountain regions from Arizona and New Mexico north through Colorado, Wyoming, and Montana, probably to the southern parts of eastern British Columbia and western Alberta, in the Dominion of Canada; west through Utah and southeastern Idaho to Nevada. Casually to southern California.

Batchelder's Woodpecker, recently separated from Gairdner's by Mr. C. F. Batchelder, whose name it bears, is distinguishable from the preceding subspecies by having the under parts pure white instead of smoky brown; the white areas are generally more extended, and the under tail coverts are immaculate instead of being spotted or barred with black. It is also somewhat larger. Like the former, it is distinguishable from *Dryobates pubescens* by the absence or scarcity of the white markings on the wing coverts. The geographical and breeding range of Batchelder's Woodpecker is as yet but very indefinitely ascertained. Dr. Edgar A. Mearns, United States Army, reports it as breeding sparingly through the *Pinus ponderosa* belt, ascending into the Spruce zone, on the San Francisco cone, and considers it the rarest of the Woodpeckers found in Arizona. Mr. Denis Gale took a nest and eggs of this subspecies in Boulder County, Colorado, on June 12, 1889. The excavation was found in a half-dead aspen, 30 feet from the ground, and presumably well up in the mountains, as Mr. William G. Smith informs me that it is only a winter visitor in the lower valleys, and is never seen there during warm weather. I found it rare near Fort Custer, Montana, and only obtained a single male specimen, on November 23, 1884, among the willows and cottonwoods on the Little Horn River. Dr. James C. Merrill, United States Army, met with it breeding at Fort Shaw, Montana, early in June, 1879, and tells me that five or six eggs are generally laid to a set, and that the nesting habits are just like those of the Downy Woodpecker. Among some skins recently sent me for examination by the Doctor, from Fort Sherman, Idaho, taken during the winter of 1894 and 1895, are four specimens which certainly can not be referred to either Batchelder's or Gairdner's Woodpeckers; neither can they be called typical "*Dryobates pubescens*," but two of the specimens come much nearer the latter than to the other two subspecies, the under tail coverts in all of them being distinctly spotted. I am at a loss where to place them, and it will require a larger series of skins to determine their proper status. Dr. C. Hart Merriam saw a small Woodpecker among some burnt timber in the upper part of Wood River Valley, Idaho, which, in all probability, was referable to this subspecies. The United States National Museum collection also contains specimens from the Bitter Root Valley, Montana; the upper Humboldt Valley, in Nevada; from the head waters of the Cheyenne River, and from Laramie, Wyoming; and it appears to be more common on the

eastern slopes of the Rocky Mountains than on the western and through the Great Basin regions. It undoubtedly is also found in the Rocky Mountain regions of southern British Columbia and the Province of Alberta. Its general habits, food, etc., resemble those of the two preceding subspecies in every way. The eggs are also similar.

The average measurement of eleven specimens is 19.05 by 15.24 millimetres, or 0.75 by 0.60 inch. The largest egg measures 19.81 by 15.24 millimetres, or 0.78 by 0.60 inch; the smallest, 17.53 by 14.99 millimetres, or 0.69 by 0.59 inch.

The type specimen, No. 21945 (not figured), from a set of four eggs, was taken by Dr. James C. Merrill, United States Army, near Fort Shaw, Montana, on June 12, 1879.

24. *Dryobates borealis* (VIEILLOT).

RED-COCKADED WOODPECKER.

Picus borealis VIEILLOT, Oiseaux Amerique Septentrionale, II, 1807, 66.

Dryobates borealis RIDGWAY, Proceedings U. S. National Museum, VIII, 1885, 355.

(B 80, C 296, R 362, C 433, U 395.)

GEOGRAPHICAL RANGE: Southeastern United States; north to North Carolina, Tennessee, Arkansas, and the Indian Territory; west to eastern Texas. Casually to New Jersey, Pennsylvania, and Kentucky.

The Red-cockaded Woodpecker, a common resident of our South Atlantic and Gulf States, is particularly abundant in the pine forests of South Carolina, Georgia, and Florida. In the northern half of North Carolina it is rather rare, but it probably breeds in the vicinity of Raleigh, as Mr. H. H. Brimley shot a female there in pine woods on April 22, 1891. There are also several specimens in the United States National Museum collection from Roane County, Tennessee; it has likewise been reported from Newport, in northeastern Arkansas, and from the Indian Territory; these points probably mark the northern limits of its breeding range. Mr. Henry Nehrling found it not uncommon in the flat, sandy pine woods in southeastern Texas, which marks the western limits of its known range.

The majority of observers state that it is strictly a bird of the pines, and that it breeds only in trees of that kind, while Mr. Nehrling says that it usually excavates its nesting sites in deciduous trees, and Mr. E. A. McIlhenny writes me that in southern Louisiana it generally nests in willow and china trees. The Red-cockaded Woodpecker is reported to be one of the noisiest members of this family, but at the same time more sociable in disposition than other species. Its call notes are said to be uttered in a rather petulant manner, and Alexander Wilson compares them to the querulous cries of young birds. Its food, like that of all our Woodpeckers, consists mainly of small insects and their larvæ, cocoons, and spiders, and, in summer, to some extent of berries and fruits. Mr. E. A. McIlhenny writes that in southern Louisiana the fig crop ripens during their breeding season, and that the young are fed to a considerable

extent on them, the parent taking the stem of a fig in its beak and carrying it entire to the nest. Audubon mentions poke and smilax berries, grapes, and pine flowers as being eaten by them.

In Florida, South Carolina, and Louisiana nidification commences rather early, sometimes in February; but full sets of eggs are rarely found before the last week in April, and the majority of these birds commence laying about May 1. Mr. Arthur T. Wayne writes me from Mount Pleasant, South Carolina, on this subject as follows: "The Red-cockaded Woodpecker prefers the long-leaf pine to breed in, but I have also found the nest in the short-leaf species. In this vicinity the hole is invariable excavated in a live pine, and sometimes as many as six holes are found in a single tree. It never lays until the gum pours freely from the tree it nests in, and to hasten its flow the birds dig into the tree on all sides, above and below the hole. The height of its nesting site varies from 20 to 70 feet."

Trees in which the heart is diseased are usually selected for such a purpose, and the cavity is excavated in the main trunk of the tree, ordinarily from 25 to 35 feet from the ground. The entrance hole, which is about 2 inches in diameter, frequently passes through 6 inches of solid wood before it reaches the somewhat softer decayed inner parts of the tree, and the nesting cavity, which is gradually enlarged toward the bottom, varies from 6 to 10 inches in depth by about $3\frac{1}{2}$ inches in diameter. Both sexes assist in this labor, as well as in incubation, which lasts about fourteen days. Ordinarily only one brood is raised in a season, but from the fact that Mr. Henry Nehrling found young in July which had only recently left the nest, it is possible that a second brood is occasionally reared. Dr. William L. Ralph tells me that this species is quite common in the low, flat pine woods in Putnum County, Florida, where he has found several of its nests. All of these were excavated in the trunks of live pine trees, and it took considerable labor to get at the eggs; these are three or four in number, rarely more. The eggs of this Woodpecker are pure glossy white, and mostly elliptical ovate in shape. The shell is moderately strong, close grained, and semitranslucent when fresh.

The average measurement of twenty-three specimens in the United States National Museum collection is 24.07 by 17.46 millimetres, or about 0.95 by 0.69 inch. The largest egg measures 26.42 by 18.54 millimetres, or 1.04 by 0.73 inches; the smallest, 22.10 by 17.27 millimetres, or 0.87 by 0.68 inch.

The type specimen, No. 24724 (not figured), from a set of four eggs, was taken by Dr. William L. Ralph on May 9, 1891, near San Mateo, Putnam County, Florida.

25. *Dryobates scalaris bairdi* (SCLATER).

BAIRD'S WOODPECKER.

Picus bairdi (SCLATER'S MSS.) MALHERBE, Monograph of the Picidæ, I, 1861, 118, Pl. 27.
Dryobates scalaris bairdi RIDGWAY, Manual of North American Birds, 1887, p. 285.
 (B 79, C 297, R 363, C 434, U 396.)

GEOGRAPHICAL RANGE: Northern Mexico and southern border of the United States, from Texas through southern New Mexico and Arizona to southeastern California; north to southern Nevada and southwestern Utah.

Baird's Woodpecker, also known as "Texan Sapsucker" and "Ladder-backed Woodpecker," is generally resident and breeds wherever found. It attains about the northern limits of its range in southwestern Utah, where Dr. C. Hart Merriam met with it near the mouth of the Santa Clara River; he also observed it at Upper Cottonwood Springs, at the eastern base of the Charleston Mountains, Nevada, and an adult male was taken by him on Beaverdam River, in northwestern Arizona, on May 9, 1891. This extends its northern range to about latitude 37°. In Texas and New Mexico it is rarely met with north of latitude 34°. The western limits of its range are found in southeastern California, in San Bernardino County. Mr. F. Stephens, who is well known as an accurate observer, writes me on this subject: "I have taken Baird's Woodpecker, mated, in April, in the eastern end of the San Gorgonio Pass, in San Bernardino County, California, and also at other times and places in the Colorado desert, where it is not as common, however, as Nuttall's Woodpecker." Dr. A. K. Fisher took two specimens on January 4 and 5, 1891, at Hesperia, in the same county. The eastern limit of its range appears to be found in southeastern Texas, where Mr. Henry Nehrling reports it as common in all the wooded districts of Harris, Montgomery, Galveston, and Fort Bend counties, and from our present knowledge it appears to occur throughout the greater part of this State, excepting the northern and northeastern portions. Baird's Woodpecker is but a trifle larger than the Downy, and its habits, call notes, food, etc., are very similar. It prefers the lowlands and river bottoms to the uplands, and it is rarely found at altitudes above 4,000 feet. I found it common in the mesquite groves on the Santa Cruz River, between Tucson and the Papago Mission Church, Arizona, and much less so among the cottonwoods and willows on Rillito Creek. In Arizona it is also met with in the oak belt, but apparently not in the pines.

Mr. W. E. D. Scott states: "I have frequently met with Baird's Woodpecker in the Cholla region in Arizona, digging in the ground at the roots of a cactus. They are at times gregarious. I particularly noticed this in December, 1885, when I often met with this species in flocks of from four to a dozen on the plains at an altitude of 3,000 feet. I have found the species breeding in May at an altitude of 3,500 feet. On May 27, 1884, I found a nest in a mesquite tree, which contained five eggs nearly ready to hatch; the opening to the nest was 14 feet from the ground."¹

¹ The Auk, Vol. III, 1886, p. 426.

Baird's Woodpecker, like several other species, is very fond of the ripe fig-like fruit of the giant cactus, and I have met it more than once in Sahuarito Pass, Arizona, eating it on the ground. It nests by preference in mesquite trees, one of our hardest woods, and it must require a long time to chisel out a nesting site in one of these trees. While it is true that the heart is usually more or less decayed, the birds have first to work through an inch or two of solid wood which is almost impervious to a sharp ax. Dr. James C. Merrill, United States Army, reports Baird's Woodpecker as a common resident in the vicinity of Fort Brown, Texas, and that he took several sets of its eggs there; it was also met with by Mr. G. B. Sennett near Hidalgo, Texas, where a nest was found on April 29 containing three young birds and a sterile egg. In Texas it has also been found nesting in hackberry and china trees, as well as in telegraph poles and fence posts. In southern New Mexico and Arizona it nests sometimes in the flowering stems of the agave plant and also in yucca trees, and I have found it nesting on Rillito Creek, Arizona, in a small dead willow sapling not over $3\frac{1}{2}$ inches in diameter. The cavity was about 12 feet from the ground and 10 inches in depth, and the entrance hole a trifle over $1\frac{1}{2}$ inches in diameter. This nest was found on June 8, 1872, and contained only two eggs, in which incubation was about one-half advanced; the eggs laid on fine chips. The nesting sites are placed at various distances from the ground, from 3 to 30, usually from 6 to 14 feet. Dead branches of trees or partly decayed ones seem to be preferred to live ones.

From two to five eggs are laid to a set, usually four or five, and incubation, in which both sexes assist, lasts about thirteen days. In the lower Rio Grande Valley full sets of fresh eggs are sometimes found by the middle of April, but throughout the greater part of its range not until the first week in May. I believe one brood only is raised, as a rule, in a season; but, as fresh eggs are sometimes found as late as July, it is probable that a second brood is occasionally reared. The eggs of Baird's Woodpecker are glossy white in color, fine grained, and mostly oval or elliptical oval in shape, varying occasionally to elliptical ovate.

The average measurement of fifty-seven specimens, mostly from the Ralph collection and taken in the lower Rio Grande Valley, is 20.74 by 15.92 millimetres, or about 0.82 by 0.63 inch. The largest egg of the series measures 22.10 by 16.76 millimetres, or 0.87 by 0.66 inch; the smallest, 17.27 by 15.49 millimetres, or 0.68 by 0.61 inch, and a runt in the collection measures only 14.48 by 11.43 millimetres, or 0.57 by 0.45 inch.

The type specimen, No. 20904 (not figured), from a set of four eggs, was taken by Dr. James C. Merrill, United States Army, near Fort Brown, Texas, on May 23, 1877.

26. *Dryobates scalaris lucasanus* (XANTUS).

ST. LUCAS WOODPECKER.

Picus lucasanus XANTUS, Proceedings Academy Natural Sciences, Philadelphia, 1859, 298.
Dryobates scalaris lucasanus RIDGWAY, Proceedings U. S. National Museum, VIII, 1885, 355.
 (B —, C 297b, R 363a, C 436, U 396a.)

GEOGRAPHICAL RANGE: Lower California; casual (?) in southern California.

The St. Lucas Woodpecker, a closely allied race to Baird's Woodpecker, is a common resident in the southern portions of the peninsula of Lower California, where it was discovered by Mr. J. Xantus, near Cape St. Lucas, and described in the "Proceedings of the Academy of Natural Sciences in Philadelphia, Pennsylvania, in 1859." Mr. Walter E. Bryant, in his "Catalogue of the Birds of Lower California," makes the following remarks about this subspecies: "I first met with this Woodpecker on Santa Margarita Island, and afterwards collected specimens as far north as latitude 28°; Mr. Belding found it very common at the Cape region, but rarely saw any in the Victoria Mountains."¹

Mr. A. W. Anthony took a specimen at San Telmo, Lower California, on April 30, 1893, and saw others there, and Mr. W. W. Price took another on April 29, 1889, at White Water, San Diego County, California, which extends the range of this subspecies considerably to the northward.

Mr. Gerritt S. Miller, jr., of Cambridge, Massachusetts, who records the capture of the above specimen, which is now in his collection, says in referring to it: "Mr. Price writes me that the specimen was shot from a t elegraph pole about 3 miles west of the station of White Water. Woodpeckers, apparently of the same kind, were seen on several other occasions on the telegraph poles along the line of the Southern Pacific Railroad, near White Water, but they were very shy and no more could be killed. The birds were nesting in the telegraph poles, there being no other wood in the region."²

The eggs of the St. Lucas Woodpecker I believe remain still undescribed, but are probably indistinguishable from those of the preceding subspecies, and its general habits also appear to be very similar.

27. *Dryobates nuttallii* (GAMBEL).

NUTTALL'S WOODPECKER.

Picus nuttallii GAMBEL, Proceedings Academy Natural Sciences, Philadelphia, April, 1843, 259.

Dryobates nuttallii RIDGWAY, Proceedings U. S. National Museum, VIII, 1885, 355.
 (B 78, C 297a, R 364, C 435, U 397.)

GEOGRAPHICAL RANGE: Northern Lower California from the San Pedro Martir Mountains, north through California to southern Oregon (Umpqua Valley), west of the Sierra Nevada and Cascade Mountains.

Nuttall's Woodpecker, which is about the same size as the Texan Woodpecker, is an inhabitant of the lower foothill regions throughout its range, and is

¹ Proceedings of the California Academy of Sciences, 2d series, Vol. II, 1889, p. 286.

² The Auk, Vol. XI, 1894, p. 178.

most common in the oak belt and the deciduous trees along water courses, rarely being met with among the conifers. It is a resident and breeds throughout the greater portion of California west of the Sierra Nevadas, but is nowhere especially common. In southern Oregon it appears to be rare, and the only specimens recorded from this State are the one taken by Dr. J. S. Newberry in the Umpqua Valley, which is in the United States National Museum, but has no date on the label, and another taken near Ashland, now in the collection of the United States Department of Agriculture, Washington, D. C. It is apparently more abundant in southern California than elsewhere. Mr. F. Stephens reports it there as a common resident below the pine region, in which it occurs but sparingly. Mr. Charles A. Allen writes me: "It breeds among the oak groves and perhaps among the willows along the Sacramento River, but I never found it far away from the oaks. Its habits are similar to those of Gairdner's Woodpecker, but its notes are quite different—so much so as to be appreciated even by a novice."

Mr. H. W. Henshaw describes the call of Nuttall's Woodpecker as consisting of a series of loud rattling notes, much prolonged, and says: "They can not be compared with those of any other Woodpecker with which I am acquainted." He further states: "This Woodpecker is a bird particularly of the oak groves, and ranges from the lower valleys of the mountains to a height of at least 6,000 feet, where, near Fort Tejon, I found it fairly numerous among the pines, this being the only locality where I found it among the conifers."¹

Mr. A. W. Anthony, in his list of "Birds of San Pedro Martir, Lower California," published in "Zoe" (Vol. IV, p. 236), says: "Common along all the timbered streams as high as 4,000 feet, or the limit of the live oaks and sycamores."

Mr. Rollo H. Beck, of Berryessa, California, writes me as follows: "Nuttall's Woodpecker is a fairly common resident in the mountains to the east of Santa Clara County. It seems to prefer the oak trees to other kinds, climbing up and down the limbs, much the same as Gairdner's does, in the search for grubs and insects. On May 13, 1892, I found a female digging a cavity for a nest on the under side of a dead oak limb, about 24 feet from the ground; the cavity was about 8 inches deep and not yet completed. Next day, while walking down a small gulch, I saw a female fly from a hole in a sycamore limb, which had been split off from the main trunk and lodged on a limb of another tree close by. The under side of the limb was dead, but the upper part was still living. Red-shafted Flickers had dug several holes in the same limb, and one of these contained eggs. I procured a rope and returned to this tree about four hours later, and when I had climbed to within 4 feet of the nest the female flew off. On examination I found that the nest contained young, just hatched; both parents remained close by and uttered notes of protest until I left. They appear to be partial to gulches, where white and live oak trees are numerous, and I have not noticed any in the valleys, among the willows along streams, where Gairdner's Woodpeckers are common."

¹Geographical Surveys West of the 100th Meridian, 1876, p. 258.

Mr. B. T. Gault published an interesting article on Nuttall's Woodpecker in "Bulletin II, Ridgway Ornithological Club," April, 1887 (pp. 78-81), from which I extract the following: "Although I have been as far south as San Diego, California, and as far north as the Russian River, Sonoma County, stopping at intermediate points, I have observed this bird at but one locality. This assertion, however, may not cut any figure, for my stops were necessarily short in some places. The region I refer to lies at the upper end of the San Bernardino Valley and back from the coast about 50 miles. It is near a ranche known as 'Crafton Retreat.'

"I had been out on the bowlder plain several hours, on the morning of April 23, 1883, collecting birds, and spying a clump of elder bushes in the distance, not far from the brook, the thought occurred to me that I might take a rest beneath their shade and at the same time be ready for any bird that put in an appearance. These bushes, or more properly trees, are a great deal larger shrub than our eastern plant, their trunks growing from 4 to 8 inches through; and if they are not the same species, their umbellate blossoms are strikingly similar, if not identical, to those of our common eastern shrub (*Sambucus canadensis*). I had hardly seated myself on an arm of the shrub when my attention was attracted to a hole in the main trunk, directly above my head. At almost the same instant a bird appeared at the opening from within, and dodged back again as soon as she saw me. The movement was executed so quickly that I was unable to tell whether it was a Wren or a Woodpecker, but concluded that it was the latter. Upon examination of the aperture it seemed to have been lately made. Of course I thought that there would be no trouble in dislodging her, and commenced to rap on the trunk of the shrub with the butt of my gun; but this seemed to have no effect. I then walked back about 50 feet, and, taking a stand, waited from ten to fifteen minutes in the hope that she would come out, affording me an opportunity to secure her and thus solve the mystery, but in this maneuver I was also baffled. I then went up to the bush and shouted with all my might, but this did not shake her nervous system in the least, when I finally resorted to my jackknife in order to enlarge the orifice, but, from its being such a tedious job, gave it up in disgust. The next morning I took a hatchet along with me, for I desired very much to know what that hole contained. It did not take me very long to cut a place large enough for me to get my hand in, and I was thoroughly surprised to learn that the bird was still on her nest. I pulled her out, and she appeared to be stupefied—dead, apparently—but soon revived. Upon further inspection I found that the nest contained eggs. The bird proved to be a female Nuttall's Woodpecker, and the eggs were pretty well advanced in incubation and would have hatched in a few days.

"The nest, which was about $5\frac{1}{2}$ feet from the ground, was nearly a foot deep and about 5 inches wide. The hole at the entrance to the nest was but a little larger than a silver half dollar. The eggs were six in number, their dimensions being 0.85 by 0.66, 0.87 by 0.65, 0.82 by 0.64, 0.85 by 0.66, 0.85 by 0.66,

and 0.84 by 0.64 inch, respectively. By the above measurements one will readily see that the eggs average very evenly. They are of a pearly white color, and seem to taper off, being more pointed at the small end than is usually the case among the *Picidae*. The male of this pair (for these were the only ones seen in the vicinity) was shot a little while before at the brook. I afterwards observed some of these birds among the oaks in the foothill canyons, hearing their notes for the first time. Dr. Cooper mentions taking the female from the nest, and perhaps this may be characteristic of the species—indeed, it may be of frequent occurrence among Woodpeckers; but of the many Woodpeckers' nests that I have examined none have been so persistent in holding the fort as *Dryobates nuttallii*."

Their food appears to consist mainly of insects and their larvæ, and probably occasionally of berries and fruits. Its favorite nesting sites are in oaks, sycamores, cottonwoods, and occasionally in elders, willows, and the giant cactus, generally in dead limbs or old stubs, and usually at no very great height from the ground. Nidification usually commences early in April and continues through May. Only one brood is raised in a season, but if the eggs are taken a second set is laid about two weeks later. Both sexes assist in the excavation of the nesting site, as well as in incubation, which lasts probably about fourteen days. Nuttall's Woodpecker, like the majority of this family, is a devoted parent, and loath to leave its eggs or young, frequently allowing itself to be caught on the nest. It is a very beneficial species to the horticulturist, and deserves the fullest protection. The number of eggs to a set varies from four to six, sets of four being most often found. They are usually short ovate in shape, occasionally ovate. The shell is fine grained, strong, pure white in color, and rather glossy.

The average measurement of twenty-two specimens in the United States National Museum collection is 21.34 by 16.19 millimetres, or about 0.84 by 0.64 inch. The largest egg measures 23.62 by 16 millimetres, or 0.93 by 0.63 inch; the smallest, 19.30 by 15.75 millimetres, or 0.76 by 0.62 inch.

The type specimen, No. 26631 (not figured), from a set of four eggs, Ralph collection, was taken near Lakeside, San Diego County, California, on May 5, 1890.

28. *Dryobates arizonæ* (HARGITT).

ARIZONA WOODPECKER.

Picus arizonæ HARGITT, Ibis, 1886, 115.

Dryobates arizonæ RIDGWAY, Manual of North American Birds, 1887, 286.

(B —, C —, R 365, C 437, U 398.)

GEOGRAPHICAL RANGE: Southern Arizona, southwestern New Mexico, and adjacent portions of western Mexico to Zacatecas and Jalisco.

The range of the Arizona Woodpecker within the United States is a rather restricted one, it having as yet been obtained only in the Chiricahua, Huachuca, Santa Rita, and Santa Catalina mountains, in southern Arizona, and on the east

side of the St. Luis Mountains, near the international boundary line, in southwestern New Mexico, where Dr. E. A. Mearns, United States Army, collected several specimens in June, 1892; but it does not appear to be very common anywhere. It is probably a resident and breeds wherever found. It was first added to our fauna by Mr. H. W. Henshaw, who considers it as not uncommon in the foothills of the Chiricahua Mountains, where he took several specimens in the latter part of August, 1874, and states: "This rare Woodpecker is a common species on the foothills of the Chiricahua Mountains, where it was one of the first birds that met my eye when the section where it abounds was first entered. * * * So far as I could ascertain, at this season at least, it is confined to the region of oaks, ranging from about 4,000 to 7,000 feet, thus inhabiting a region about midway between the low valleys and the mountain districts proper. Here they appeared to be perfectly at home, climbing over the trunks of the oaks with the same ease and rapidity of movement that distinguish the motions of the Downy or Hairy Woodpecker, though their habits, in so far as they are at all peculiar, are perhaps best comparable to those of the Red-cockaded Woodpecker of the South (*Dryobates borealis*), especially their custom of moving about in small companies of from five to fifteen, though they were occasionally found singly or in pairs.

"When in pursuit of food, they almost always alighted near the base of the trees, gradually ascending and making their way along the smaller limbs and even out among the foliage, appearing to prefer to secure their food by a careful search than by the hard labor of cutting into the wood in the way the Hairy Woodpecker employs its strength. * * * I found them at all times rather shy and gifted with very little of that prying curiosity which is seen in some of the better-known species of this family; and if by chance I surprised a band feeding among the low trees, a sharp warning note from some member more watchful than the rest communicated alarm to the whole assembly, when they took flight immediately, showing great dexterity in dodging behind trunks and limbs, and making good their retreat by short flights from one tree to another till they were out of sight."¹

Mr. F. Stephens found a nest containing young birds in the Santa Rita Mountains on May 16, 1880, in a sycamore tree; and Mr. W. E. D. Scott records another, found on May 27, 1884, in the Catalina Mountains, in an oak, about 10 feet from the ground. He says: "The nest was much like that of the Hairy Woodpecker, save that the opening was a little smaller. It contained three young birds about two-thirds grown and half feathered."²

The habits of the Arizona Woodpecker are probably very similar to those of the other members of the genus *Dryobates*, and this species seems to be principally confined to the oak belt and the timber of the foothills along the few streams found in the regions it inhabits. Lieut. H. C. Benson, Fourth Cavalry, United States Army, as well as Dr. A. K. Fisher, met with it in the vicinity of

¹U. S. Geographical Surveys West of the 100th Meridian, Vol. V, 1875, pp. 389, 390.

²The Auk, Vol. III, 1886, p. 426.

Fort Huachuca, and the latter also found it in the Chiricahua Mountains, south of Fort Bowie. He tells me that on May 14, while collecting in Garden Canyon, in the Huachuca Mountains, a mile or more above the Post garden, he found a nest of this species in a large maple which overhung a stream. The cavity was situated in a dry branch, about 20 feet from the ground, and was about a foot in depth. It contained four young, which were still naked.

I have only seen one set of eggs of this species, which were taken near Fort Huachuca, Arizona, in May, 1890. They are usually three or four in number; the shell is close grained and glossy; they measure 21.08 by 16 millimeters, or 0.83 by 0.63 inch, and resemble the eggs of Baird's Woodpecker very closely. There are no specimens in the United States National Museum collection.

29. *Xenopicus albolarvatus* (CASSIN).

WHITE-HEADED WOODPECKER.

Leuconerpes albolarvatus CASSIN, Proceedings Academy of Natural Sciences, Philadelphia, October, 1850, 106.

Xenopicus albolarvatus MALHERBE, Monograph of the Picidæ, II, 1862, 221.
(B 81, C 295, R 366, C 442, U 399.)

GEOGRAPHICAL RANGE: Higher mountain ranges of western North America; from southern California north through Oregon and Washington to southern British Columbia; east to western Nevada and western Idaho.

The habitat of the White-headed Woodpecker is restricted to the higher mountain ranges of the Pacific province. It is a bird of the pine and fir forests, and is usually resident and breeds wherever found. It is most common at altitudes of from 5,000 to 9,000 feet, but in winter it descends somewhat lower, and may then be sometimes seen as low as 3,000 feet, and occasionally even near sea level, Mr. S. Hubbard, jr., having taken a specimen near Gray's Harbor, Washington, as recorded in "Zoe" (July, 1892, p. 141). It has been met with at Similkameen, in the Cascade Mountains, in southern British Columbia, which marks the northern limit of its known range; at Mount Idaho and near Fort Sherman, Idaho, which marks the eastern, and in the Volcan Mountains, in California, which is the most southern record for this species. Mr. Robert Ridgway found it not uncommon near Carson City, while Mr. H. W. Henshaw observed it at Lake Tahoe, Nevada, and I met with it in the Blue Mountains, near Camp Harney, Oregon, where it was rarely seen. Its center of abundance appears to be found in the higher Sierra Nevadas, in California, and in the Cascade Mountains, in Oregon. Both Dr. J. C. Merrill, United States Army, and myself found it common at Fort Klamath in winter, but none apparently bred near the Post. The only nest found by me there was on the slopes of Crater Lake Mountain, about 12 miles north of Fort Klamath, at an estimated altitude of about 6,500 feet. The nesting site was excavated in an old pine stump, about 15 feet from the ground, and contained four slightly incubated eggs on May 29, 1883.

In the Blue Mountains, near Camp Harney, Oregon, this species was rare, but I found two nests there, one on May 25, 1875, containing two fresh eggs, in a dead limb of a pine, and about 25 feet from the ground. The other was found on May 6, 1877, containing four fresh eggs; the cavity was located in a dead pine stump, about 15 feet from the ground, near Ruby's sawmill, on the Canyon City road, at an altitude of about 5,500 feet; it was about 10 inches deep, the entrance hole being circular and about $1\frac{3}{4}$ inches in diameter; the eggs were placed on a layer of fine chips, and, I believe, were the first described of this species.

Mr. L. Belding writes: "Common in the fir forests of the Sierra Nevada from about 4,000 feet upward; most numerous at about 5,000 feet. Rare in the tamaracks. * * * Its burrows are often within 2 or 3 feet of the ground. I have seen two nests in cuts for shakes or shingles, made after the tree was sawed into sections, and one in a small, short stub of a dogwood (*Cornus nuttalli*); May 25, 1879, first full set of eggs taken at Big Trees. At Bloods, 7,200 feet altitude, I have taken them as late as July 17. The eggs are usually four, although I have seen five. In winter it is found sparingly in the upper edge of the foothills, at 3,000 feet altitude. I found it rather common about Big Trees in the mild January of 1879, until 2 feet of snow fell, after which none were seen."¹

It is found on both sides of the Sierra Nevadas, but seems to be much more common on the western slope. Mr. F. Stephens writes me: "*Xenopicus albolarvatus* is a resident of the pine regions of southern California, but is not common excepting possibly in a few localities. I have never observed it below the pines. I have taken incubating birds in June in the Cuyamaca Mountains at altitudes of about 7,000 feet. The nesting sites here were in very large dead pine trees and inaccessible. The white head makes the bird easily recognizable; its notes are somewhat different from those of other Woodpeckers in this region, and seem to me more like those of *Dryobates arizonæ*. On June 19, 1893, I found a nest of this bird in the San Jacinto Mountains, at an altitude of about 5,800 feet, in a rotten pine stub about 9 feet from the ground; it contained three young of different ages, the eldest being able to fly a very little."

Mr. Rollo H. Beck informs me that he found this species fairly common in the pine timber near the road from Murphy's to the Yosemite Valley, California, and that he discovered three nests with young on June 8, 1893. These were all located in cavities in dead pine stumps, from 6 to 15 feet from the ground. A nest containing three fresh eggs was also discovered in a similar stump only 4 feet from the ground, the cavity being 8 inches deep. He writes also: "I noticed one of these birds on some fallen logs near the road, busily engaged in catching spiders, searching for grubs, and frequently flying after passing insects, catching them in mid-air in the manner of the California Woodpecker."

Dr. James C. Merrill, United States Army, makes the following interesting remarks about this species, as observed by him at Fort Klamath, and as these entirely agree with my own, I give them entire:

¹Land Birds of the Pacific District. California Academy of Sciences, II, 1890, p. 63.

"*Xenopicus albolarvatus*.—This interesting Woodpecker was first observed November 9; by December it had become rather abundant, and so continued until the latter part of February, but after the middle of March none were seen. During the breeding season careful search failed to reveal its presence near the fort, nor was it found in the higher mountains north of the valley in July and August. One would think that the peculiar coloration of the White-headed Woodpecker would make it very conspicuous and its detection an easy matter, but this is by no means the case, at least about Fort Klamath. On most of the pines in this vicinity there are many short stubs of small broken branches projecting an inch or two from the main trunk. When the sun is shining these projections are lighted up in such a manner as to appear quite white at a little distance, and they often cast a shadow exactly resembling the black body of the bird. In winter, when a little snow has lodged on these stubs, the resemblance is even greater, and almost daily I was misled by this deceptive appearance, either mistaking a stub for a bird or the reverse.

"I have rarely heard this Woodpecker hammer, and even tapping is rather uncommon. So far as I have observed, and during the winter I watched it carefully, its principal supply of food is obtained in the bark, most of the pines having a very rough bark, scaly and deeply fissured. The bird uses its bill as a crowbar rather than as a hammer or chisel, prying off the successive scales and layers of bark in a very characteristic way. This explains the fact of its being such a quiet worker, and, as would be expected, it is most often seen near the base of the tree, where the bark is thickest and roughest. It must destroy immense numbers of *Scolytidæ*, whose larvæ tunnel the bark so extensively, and of other insects that crawl beneath the scales of bark for shelter during winter. I have several times imitated the work of this bird by prying off the successive layers of bark, and have been astonished at the great number of insects, and especially of spiders, so exposed. As the result of this, and of its habit of so searching for food, the White-headed Woodpeckers killed here were loaded with fat to a degree I have never seen equaled in any land bird, and scarcely surpassed by some Sandpipers in autumn.

"Though not shy, and with care generally approachable to within a short distance, it is watchful and suspicious, and seems to know very well what is going on, even if it does not see fit to fly away, though it is more apt to do this than to dodge around the trunk. The flight is direct, and rather slow and heavy. Its skull is noticeably less hard and dense than that of *Dryobates harrisi* or *Picus arcticus*. During the winter it is silent, the only sound I have heard it make being a harsh screech when wounded."¹

Since then the Doctor has also found it during the winter of 1894–95 near Fort Sherman, Idaho, where it is not uncommon, and probably breeds in the mountains in the vicinity.

¹ The Auk, Vol. V, 1888, p. 253.

I consider the White-headed Woodpecker a rather silent and more sedate bird than most of the other members of this family, the only note I have heard it utter being a sharp, clear "witt-witt" as it passes from one tree to another. During the winter its food consists principally of spiders and insects and their larvæ; and in summer, as Mr. Charles A. Allen, of Nicasio, California, informs me, "It feeds its young on the large black ants with which all the dead pines and stumps are covered at that time of year."

Nidification usually begins about the middle of May and continues through June. The sexes relieve each other in the preparation of the nesting site, which is usually located in a dead stub of a pine or fir; one that is partly decayed seems to be preferred as it rarely excavates one in solid, hard wood. The nesting sites are seldom situated over 15 feet from the ground, and sometimes as low as 2 feet. The entrance hole is about $1\frac{1}{2}$ inches wide, perfectly circular, and just large enough to admit the bird; the inner cavity gradually widens towards the bottom, and is usually from 8 to 12 inches deep, the eggs lying on a slight layer of fine chips, in which they become well embedded as incubation advances. Occasionally a rather peculiar site is selected. Mr. Charles A. Allen found a nest of this species in a post in one of the snow sheds on the Central Pacific Railroad, between Blue Canyon and Emigrant Gap, about 40 feet from the entrance of the shed, and some thirty trains passed daily within a few feet of the nest, which contained six eggs when found. Incubation lasts about fourteen days, and both sexes assist in this, as well as in the care of the young, which are born blind and remain so until about half grown.

The number of eggs to a set varies from three to seven, sets of four being most common. There is only a single set of five in the United States National Museum collection, taken by Mr. L. Belding, at Big Trees, California, on June 8, 1879; but Mr. Charles A. Allen writes me that he has found seven eggs in one of their nests. These vary in shape from ovate to short ovate; the shell is pure white, fine grained, and only moderately glossy. When fresh and unblown they are of a delicate pinkish tint and semitranslucent, and the yolk can be plainly seen; as incubation advances they become more and more opaque.

The average measurement of forty-one specimens in the United States National Museum collection is 24 by 18.07 millimetres, or about 0.95 by 0.71 inch. The largest egg of the series measures 25.40 by 19.30 millimetres, or 1.00 by 0.76 inch; the smallest, 21.84 by 17.78 millimetres, or 0.86 by 0.70 inch.

The type specimen, No. 19436 (not figured), from a set of four eggs, Bendire collection, was taken by the writer, near Camp Harney, Oregon, on May 6, 1877.

30. *Picoides arcticus* (SWAINSON).

ARCTIC THREE-TOED WOODPECKER.

Picus (Apternus) arcticus SWAINSON, Fauna Boreali Americana, II, 1831, 313.*Picoides arcticus* GRAY, Genera of Birds, I, 1845, 434.

(B 82, C 300, R 367, C 443, U 400.)

GEOGRAPHICAL RANGE: Northern North America; south to the northern border of the eastern United States; regularly to northern New England and the northern parts of New York, Michigan, Wisconsin, and Minnesota; casually to Massachusetts, northern Connecticut, northern Pennsylvania, and northern Illinois. In the Rocky Mountains to Montana and Idaho, and in the western United States south to California and Nevada to about latitude 39° (Lake Tahoe), and possibly still farther south in the Sierra Nevada in winter.

The northern limits of the range of the Arctic or Black-backed Three-toed Woodpecker are not yet very well defined, and, judging from the few specimens from far northern localities in the United States National Museum collection, it appears to be much rarer there than the next species. It certainly must be considered a rare resident in Labrador, as Mr. L. M. Turner obtained only a single specimen during several years' residence in the district of Ungava. This was taken at the "Forks" on December 18, 1882, and none were observed by him in the vicinity of Fort Chimo. There are several specimens in the collection from Moose Factory, James Bay, and others from Forts Rae and Providence, on Great Slave Lake; from Fort Chipewyan, on Lake Athabasca, and a single one from Fort Reliance, on the Upper Yukon River, Alaska, in latitude 64° N., which marks about the most northern point of its known range. The Museum possesses another Alaska specimen also, taken in March, 1893, by Mr. C. L. McKay, on the Mechatna River, and it appears to be rare here also. Its southern limits are much better defined, and include the northern border of the eastern United States, reaching the southern point of its range in the Adirondacks, New York, in about latitude 44°, where it also breeds; and occasionally stragglers are taken somewhat farther south in winter—in Massachusetts, for instance; it is also recorded from Connecticut, northern Pennsylvania, and northern Illinois. It is not uncommon in the northern parts of Michigan, Wisconsin, and Minnesota, and breeds in suitable localities in all these States. It does not appear to occur in the southern Rocky Mountains in the United States, excepting in Montana, but it is abundant in the Cascade Mountains, Oregon, and in the Sierra Nevada in California and Nevada, south to about latitude 39° (Lake Tahoe). It has also been met with in Washington, Idaho, and eastern British Columbia, and is said to be common in the wooded parts of Manitoba; it is certain also to occur in suitable localities in Assiniboia and Alberta, as well as in the intervening regions wherever suitable timber is found.

The Arctic Three-toed Woodpecker is essentially a bird of the pine, spruce, fir, and tamarack forests, and is rarely seen in other localities. It is generally a resident, rarely migrating to any distance, and probably breeds wherever found.

Its flight is swift, greatly undulating, and is often protracted for considerable distances. It is quite common in northern Maine, and Mr. Manly Hardy considers it as the tamest and most stupid of the Woodpeckers found in that State. He writes me: "Here (in Maine) it is rarely, if ever, found in any numbers far from burnt tracts; if in green growth, usually singly, or at most in pairs; but on newly burnt lands specimens may be found by the score, and their sharp, shrill 'chirk, chirk' can be heard in all directions. It seems to feed entirely on such wood worms as attack spruce, pine, and other soft-wood timber that has been fire-killed. Specimens are so abundant in such places that I once shot the heads off of six in a few minutes when short of material for a stew."

The food of this Woodpecker seems to consist almost entirely of tree-boring insects and their larvæ, mainly *Buprestidæ* and *Cerambycidæ*; but Audubon states that it feeds also on berries and fruits. It never attacks a healthy tree, and is far more beneficial than harmful, and deserves protection.

Mr. J. W. Preston, of Baxter, Iowa, writes me that he found this Woodpecker breeding in Becker County, Minnesota, the nesting site being situated in a live larch tree, about 30 feet from the ground; it contained young on June 13, 1887. Dr. James C. Merrill, United States Army, found it breeding in Prickly Pear Canyon, on the road between Helena and Fort Shaw, Montana, as well as near Fort Klamath, Oregon; and Mr. R. S. Williams writes me that the species is tolerably common about Columbia Falls, Montana. Mr. R. MacFarlane found it nesting near Fort Providence, Great Slave Lake, Northwest Territory, and Mr. C. Kriehoff at Three Rivers, Lower Canada, eggs taken by the two last-named gentlemen being now in the collection. Dr. C. Hart Merriam found two nests, with eggs, of this species in the Adirondacks, near Seventh Lake, Fulton Chain, Hamilton County, New York, on May 27 and June 2, 1883, and has kindly furnished me with the following notes:

"The water of Seventh Lake, Fulton Chain, had been raised by a dam at the foot of Sixth Lake, flooding a considerable area along the inlet, and the trees killed by the overflow stood in about 6 feet of water. In 1883 the place was first visited by me, May 27. Both species of Three-toed Woodpeckers (*Picoides americanus* and *arcticus*) were tolerably common, and one new nest of each was found. That of *P. arcticus* contained one fresh egg. The nest was 10 inches deep, and the opening within 5 feet of the surface of the water. It was in a dead spruce, 10 inches in diameter. A pair of White-bellied Swallows (*Tachycineta bicolor*) had feathered their nest in a deserted Woodpecker's hole higher up in the same stub. The place was next visited June 2, but the date proved still too early. Several unfinished nests of *P. americanus* were found, and one completed nest with four fresh eggs of *P. arcticus*. Like the one found on my first visit, it was in a dead spruce and about 5 feet above the water. The nest was 11 inches deep and the orifice $1\frac{3}{4}$ inches in diameter. Many of last year's nests were occupied by White-bellied Swallows. Some of the Three-toed Woodpeckers were unusually noisy, the males scolding, rapping loudly on the dead wood, and making much ado for these ordinarily quiet birds. Nests were found in balsam,

spruce, and tamarack trees, and varied from 4 to 15 feet above the water. A fortnight later (June 15) I found a nest of *Picoides arcticus*, containing young (apparently about a week old), at West Pond, near Big Moose Lake. It was in a tamarack tree and about 10 feet above the ground. A last year's nest in an adjacent tamarack was occupied by a family of flying squirrels."

I first met with the Arctic Three-toed Woodpecker on the summit of the Blue Mountains, near Soda Springs, Grant County, Oregon, in August, 1876, at an altitude of about 5,500 feet, where it was rare, and again near Fort Klamath, during the year 1882-83. There they were fairly common in winter, frequenting the more open pine forests in the mountain valleys, but were rarely seen by me in summer, and I believe they mostly retired to an extensive burnt tract, some 30 miles to the northeast of the post, near the head waters of the Deschutes River, to breed. Like the Hairy Woodpecker, they are persistent drummers, rattling away for minutes at a time on some dead limb, and are especially active during the mating season, in April. I have located more than one specimen by traveling in the direction of the sound when it was fully half a mile away. On May 10, 1883, while en route from Fort Klamath to Linkville, Oregon, and only a few miles from the latter place, just where the pine timber ended and the sagebrush commenced, I found a male busily at work on a pine stump, only about $2\frac{1}{2}$ feet high and about 18 inches in diameter, standing within a few feet of the road, and close to a charcoal burner's camp, in quite an open and exposed situation, nearly all the timber in the vicinity having been cut down. The stump was solid, full of pitch, and showed no signs of decay; the entrance hole was about $1\frac{1}{2}$ inches in diameter and 8 inches from the top. The cavity, when first examined, was only about 2 inches deep, and on my return, two days later, it had reached a depth of 4 inches; the female was then at work. To make sure of a full set of eggs, I waited until the 25th. The cavity then was found to be 18 inches deep, and was gradually enlarged toward the bottom. The four eggs it contained had been incubated about four days. The female was on the nest, and uttered a hissing sound as she left it, and might easily have been caught, as she remained in the hole until the stump was struck with a hatchet. The sides of the cavity were quite smooth, and the eggs were partly embedded in a slight layer of pine chips. The locality where this nest was found was near the top of a low divide, not over 4,100 feet in altitude. The majority of nesting sites seem to be located in dead trees or stumps, and rarely at any great height varying usually from $2\frac{1}{2}$ to 8 feet from the ground.

Both sexes assist in nidification, which is usually at its height between May 20 and June 10, as well as in incubation, which lasts about two weeks. Only one brood is raised in a season. The eggs are generally four in number. These are mostly ovate in shape. The shell is fine-grained and only moderately glossy, and, like the eggs of all Woodpeckers, pure white in color.

The average measurement of thirteen eggs in the United States National Museum collection is 24.38 by 18.29 millimetres, or 0.96 by 0.72 inch. The largest egg measures 25.40 by 19.56 millimetres, or 1.00 by 0.77 inch; the smallest, 22.35 by 17.53 millimetres, or 0.88 by 0.69 inch.

The type specimen, No. 19411 (not figured), from a set of four eggs, Bendire collection, was taken by the writer, about 30 miles south of Fort Klamath, Oregon, on May 25, 1883.

31. *Picoides americanus* BREHM.

AMERICAN THREE-TOED WOODPECKER.

Picoides americanus BREHM, Handbuch der Vögel Deutschlands, 1831, 195.
(B 83, C 301, R 368, C 444, U 401.)

GEOGRAPHICAL RANGE: Northern North America east of the Rocky Mountains; south (principally in winter) to the northern border of the United States; west, casually, to the western slope of the Bitter Root Mountains, in eastern Idaho.

The American Three-toed, also known as the "Banded-backed," "White-backed," or simply as "Banded Three-toed" Woodpecker, is mostly resident and breeds wherever found. Along our northern border it seems to be much rarer than the preceding species, and only breeds in small numbers in Maine, the White Mountains in New Hampshire, the Adirondacks in New York, possibly in the Green Mountains in Vermont, and probably along the west shore of Lake Superior in Minnesota; but it is evidently still rarer in the western portions of its range, within the limits of the United States. The only western specimens, taken within our borders, in the United States National Museum collection, are a female, collected by Dr. J. G. Cooper, on September 9, 1860, on the western slope of the Bitter Root Mountains, Idaho, and a pair sent to me by Mr. R. S. Williams, of Columbia Falls, Montana, taken on October 9 and 11, 1893. He writes me: "It is much rarer here than *P. arcticus*, and I consider it a much more silent bird, its ordinary call notes differing much from those of the former and resembling more those uttered by the genus *Dryobates*."

Mr. L. M. Turner met with this Woodpecker in the vicinity of Fort Chimo, Ungava, and secured several specimens at Whitefish Lake, where the spruce and junipers attain a slightly greater size than nearer the Post. In his manuscript notes he says: "Farther to the southward, where the timber is larger and better suited to their habits, they become correspondingly more numerous, and in southern Labrador, south of the 'Height of Land,' they are reported to be quite plentiful. The manner of flight of this species is less vigorous than that of *Picoides arcticus*, yet differing in a manner that is difficult to describe. These birds are not easy to detect, as they rarely utter a note, and then only a squealing, prolonged sound, similar to that made by *Sphyrapicus varius*. They are oftener found solitary, rarely two being found in the same patch of wood, excepting in the breeding season, and later when followed by their young. I observed their habit of decorticating large areas of the trunks of trees, very rarely the larger branches, and in only one instance have I found a funnel-shaped hole in a much-decayed snag."

Stragglers have been taken in winter in Massachusetts and also in Wisconsin, but it does not often find its way so far south. According to Sir John

Richardson, it is found in all the forests of spruce fir lying between Lake Superior and the Arctic Sea, and is the most common Woodpecker north of Great Slave Lake. Its food, like that of the preceding species, consists principally of wood-boring insects and their larvæ, found in dead and decaying timber.

Mr. Manly Hardy informs me that the American Three-toed Woodpecker is rather rare in Maine, and he has no positive proof that it breeds there.

Dr. C. Hart Merriam was, I believe, the first naturalist who took the eggs of this species within the limits of the United States, and he published the following account in the "Bulletin of the Nuttall Ornithological Club" (Vol. III, 1878, p. 200):

"June 4, 1878.—Shortly after crossing Moose River this morning, en route for the Fulton chain of lakes, Mr. C. L. Bagg and I were so fortunate as to secure a set of the eggs, with both parent birds, of *Picoides americanus* (old *hirsutus*). We had just crossed the boundary line between Lewis and Herkimer counties, when Mr. Bagg called my attention to a 'fresh hole,' about 8 feet from the ground, in a spruce tree near by. On approaching the tree a yellow crown appeared in the hole, showing that the male bird was 'at home.' To prevent his escape I jumped toward the tree and introduced three fingers, which were immediately punctured in a manner so distasteful to their proprietor as to necessitate an immediate withdrawal and exchange for the muzzle of my friend's gun. A handkerchief was next crowded into the hole, but was instantly riddled and driven out by a few blows from his terrible bill. It was then held loosely over the hole, and as the bird emerged I secured and killed him. Through the kindness of a friend, my pocket contained one of those happy combinations of knives, saws, and button hooks—a sort of tool chest in miniature—which one sometimes sees in the shop windows and is apt to regard with awe rather than admiration, but which constitutes, nevertheless, one of the most useful articles in a naturalist's outfit. With this instrument we were enabled to saw a block from the face of the nest, and to secure, uninjured, the four nearly fresh eggs which it contained. While wrapping up the eggs the female returned, and, as she alighted on the side of the tree, was killed by Mr. Bagg. The orifice of the hole was about 8 feet high and 1½ inches in diameter, and the cavity was about 10 inches deep. * * * So far as I am aware, this rare Woodpecker is only found along the eastern border of Lewis County, in the Adirondack region, where it is a resident species, and even here it is much less common than its congener, the Black-backed Woodpecker."

Dr. Merriam also informs me that "numerous nests were found in the Adirondacks in June, 1883. Most of them were in the flooded timber bordering the inlet of Seventh Lake, Fulton Chain. They varied from 5 to 12 feet in height above the water, and were in spruce, tamarack, pine, balsam, and cedar trees. A set of four fresh eggs was taken June 8. The feathers were worn off the bellies of both male and female before the nests were completed." He also took another set of four eggs of this species, one of them a runt, on June 8,

1883, near Sixth Lake, Fulton Chain, Hamilton County, New York, in a similar situation, and generously presented both of these sets to me.

During a careful examination of the series of specimens of this bird and its two recognized subspecies, I found several skins collected by Mr. R. MacFarlane in the vicinity of Fort Anderson, in latitude $68^{\circ} 30'$ N., Northwest Territory, which appear to me to come nearer to this species than to *Picoides americanus alascensis*, to which Mr. E. W. Nelson refers them. Mr. MacFarlane also forwarded two sets of eggs, with the parents, at the same time, and some of these are now in the United States National Museum collection. A single egg, originally from a set of three taken on May 30, 1863, accompanied by the female bird, was taken from a cavity in a pine tree, 4 feet from the ground, and another set of four, of which there are three eggs remaining, and likewise accompanied by the male bird, was taken on June 5, 1864, from a hole in a dry spruce, situated about 6 feet from the ground. The eggs from the last set were said to have been lying on the decayed dust of the tree, and were perfectly fresh when found. For some reason no mention has been made of these eggs in the "History of North American Birds," although they were in the collection when that work was written and were correctly labeled.

The general habits of the American Three-toed Woodpecker appear to be very similar to those of the preceding species, and it seems, if possible, to be even a more hardy bird than the latter, extending its range to the northern limit of trees. Nidification, even in the most northern parts of its range, seems to commence about the same time as it does in the Adirondacks, long before the ice and snow disappear. The usual number of eggs laid appears to be four, and both sexes assist in incubation. Mr. MacFarlane, in his manuscript notes, mentions finding a nest of four young Woodpeckers, in all probability of this species (as one of these birds was seen in the vicinity on June 21, 1862) which were then already apparently about a week or ten days old. As incubation probably lasts about fourteen days, the eggs must have been laid in the last week in May. The eggs of the American Three-toed Woodpecker are ovate in shape and pure white in color; the shell is fine grained and only moderately glossy.

The average measurement of twelve eggs in the United States National Museum collection is 23.41 by 17.80 millimetres, or about 0.92 by 0.70 inch. The largest egg measures 24.13 by 17.78 millimetres, or 0.95 by 0.70 inch; the smallest, 23.11 by 17.78 millimetres, or 0.91 by 0.70 inch.

The type specimen, No. 23785 (not figured), Bendire collection, from a set of four eggs, was taken by Dr. C. Hart Merriam, on Moose River, Herkimer County, New York, on June 4, 1878, as previously stated.

32. *Picoides americanus alascensis* (NELSON).

ALASKAN THREE-TOED WOODPECKER.

Picoides tridactylus alascensis NELSON, *Ank*, I, April, 1884, 165.*Picoides americanus alascensis* RIDGWAY, *Proceedings U. S. National Museum*, VIII, 1885, 355.

(B —, C —, R —, C —, U 401a.)

GEOGRAPHICAL RANGE: Alaska Territory; casually? south through western British Columbia to northwestern Washington (vicinity of Mount Baker); east irregularly to Great Bear Lake and the Mackenzie River Valley, Northwest Territory, Dominion of Canada.

The Alaskan Three-toed Woodpecker, described by Mr. E. W. Nelson in "The Auk" (April, 1, 1884), is mainly distinguishable from the preceding species by its much more conspicuous nuchal collar and generally heavier white barring of the back and rump, larger white wing markings, and with the top of the head more or less mixed with white. The most typical specimens of this race come from central Alaska, and as it approaches the range of *Picoides americanus* on the east it gradually intergrades with this as well as with *Picoides americanus dorsalis* in the south, and it is largely a matter of individual opinion just where to draw the line of its range; I prefer to restrict it mainly to Alaska. Very little is as yet known about its general habits, food, etc., but it is not likely that it differs much in these respects. It is probably a resident and breeds wherever found. Mr. E. W. Nelson, in his report on the "Natural History Collections made in Alaska, 1877-1881," published by the Signal Service, United States Army, 1887 (p. 159), says: "On the Yukon these birds are said to prefer the groves of poplars and willows to the spruces. During my visits to the interior I saw it alive only in a few instances, and learned nothing of its habits. From the number of skins brought me by the few traders, taken at various points along the course of the Yukon, from near the mouth of that stream to the vicinity of Fort Reliance,¹ its great abundance is attested."

Nothing has been published about its nesting habits and eggs, but these are not likely to differ from those of the preceding form.

33. *Picoides americanus dorsalis* BAIRD.

ALPINE THREE-TOED WOODPECKER.

Picoides dorsalis BAIRD, *Birds of North America*, 1858, 100.*Picoides americanus dorsalis* BAIRD, *Ornithology of California*, I, 1870, 336.

(B84, C 301a, R 368a, C 445, U 401b.)

GEOGRAPHICAL RANGE: Rocky Mountain regions of the United States and the Dominion of Canada; south to Arizona and New Mexico; north through Colorado and intervening States; and through Alberta and eastern British Columbia to Fort Liard and Cassiar, and occasionally to southern Alaska (Fort Kenay).

The Alpine or "Striped-backed Three-toed" Woodpecker is the most southern representative of this genus, and appears to be confined mainly to the Rocky

¹The Fort Reliance referred to by Mr. Nelson is situated on the Upper Yukon River, in Alaska; another (now abandoned) Hudson Bay Company post, situated on the eastern end of Great Slave Lake, was similarly named, and should not be confounded with it.

Mountains and neighboring ranges. It is readily distinguishable from the two preceding forms by the continuous white middle line of the back, with few, if any, black bars, the markings being mostly longitudinal, and smaller white spots on the quills. The top of the head is much less streaked with white than the Alaskan race, and the bill is also more slender than in the latter. It is probably resident and breeds wherever found. It has been met with in the Black Mountains, at Cantonment Burgwin, near Taos, New Mexico; in the White and San Francisco Mountains, in Arizona; and in the higher ranges in Colorado, etc., as well as in the Rocky Mountains, and the Selkirks in Alberta, and eastern British Columbia northward to about Fort Liard and Cassiar, near the northern boundary of this province, whence it straggles occasionally along the coast ranges into southern Alaska (Fort Kenay). It rarely occurs north of latitude 62°, however, where it is replaced by the preceding subspecies. Comparatively little has yet been recorded about the nesting habits, etc., of this subspecies.

Dr. Edgar A. Mearns, United States Army, in his paper on "Arizona Mountain Birds," says: "The Alpine Three-toed Woodpecker breeds commonly throughout the pine belt, seldom ascending far into the spruce woods of the highest peaks. On the northwestern slope of San Francisco Mountain I discovered a nest of this species on June 8, 1887. The female was seen alone, pecking at a large yellow pine, which, although dead, still retained its bark and was quite solid. While feeding she uttered a peculiar, harsh, nasal cry. I shot her, and then noticed a small, neatly bored hole in the south side of the pine trunk, about 30 feet from the ground and away from branches. With the aid of a rope, and taking a start from the saddle, I was scarcely able to climb to the nest, which the male did not quit until I was well up; then he came out and uttered a sudden, sharp 'whip-whip-whip' in a menacing tone, remaining hard by while I worked with saw and chisel. It took me nearly half an hour to make an opening sufficiently large to admit the hand, as the burrow was situated so extraordinarily deep. Two young, male and female, with feathers just sprouting, were found on a bed of small chips at the bottom of the burrow, not more than 8 inches lower than the entrance, but in the very heart of the tree, the cavity being oblique and pear-shaped, and having the strong odor characteristic of Woodpeckers' nests in general. Both parents and their progeny were preserved, and are now in the American Museum collection. The irides of the adults were dark cherry red; their feet, claws, and basal half of mandible plumbeous, the rest of the bill being plumbeous black."¹

Mr. W. G. Smith writes me: "I found this bird quite common in Arapahoe County, and have also met with it in summer in Estes Park, Larimer County, Colorado, and have reason to believe that it breeds there; I never saw it at low elevations." Mr. G. F. Breninger informs me that he found a nest of this subspecies in the beginning of May, at an altitude of about 6,500 feet, west of Fort Collins, Colorado; the nesting site was located in a burnt spruce stump, about 15 feet from the ground, and contained five eggs.

¹ The Auk, Vol. VII, 1890, p. 252.

There are no eggs of the Alpine Three-toed Woodpecker in the United States National Museum collection, and I am unable to give exact measurements; but these are not likely to differ much in shape or size from those of the American Three-toed Woodpeckers.

34. *Sphyrapicus varius* (LINNÆUS).

YELLOW-BELLIED SAPSUCKER.

Picus varius LINNÆUS, *Systema Naturæ*, ed. 12, I, 1766, 176.

Sphyrapicus varius BAIRD, *Birds of North America*, 1858, 103.

(B 85, C 302, R 369, C 446, U 402.)

GEOGRAPHICAL RANGE: Eastern and northern North America; in the eastern parts of the Dominion of Canada north to Nova Scotia, New Brunswick, southern Quebec and northern Ontario; thence in a northwesterly direction to Forts Resolution, Providence, and Rae, on Great Slave Lake, and somewhat north of Fort Simpson, Northwest Territory, to about latitude 63° 30' N.; west, to Fort Liard, in northeastern British Columbia, and in the United States to North and South Dakota, Nebraska, Kansas, the Indian Territory, and Texas; south, in winter, to the West India Islands, and through Mexico to Guatemala, Honduras and Costa Rica, Central America. Accidental in Greenland.

The Yellow-bellied Sapsucker, also known as "Red-throated Sapsucker," "Squealing," and "Whining Woodpecker," is a common summer resident in suitable localities in the eastern United States north of about latitude 42°, and in Pennsylvania, Ohio, Indiana, and Illinois it is known to breed as far south as latitude 40°, while in the Smoky Mountains, in western North Carolina, it reaches the extreme southern points of its breeding range in the southeastern corner of Macon County, close to the northern border of Georgia, near latitude 35°. Here Mr. William Brewster, to whom the ornithologists of the United States are greatly indebted for a large amount of valuable information, met with this species sparingly, and shot two specimens, both incubating, in May, 1885. It is claimed, however, that it has also been found breeding on the Medina River, near San Antonio, Texas, by Dr. Heerman, and that its eggs were taken by him, which would extend its breeding range still farther south. More recent observers do not appear to confirm this, and report *Sphyrapicus varius* only as a migrant in that vicinity.

Near the Atlantic coast, in the maritime provinces of the Dominion of Canada, it is rather rare, and I believe it has not yet been found in Newfoundland or Labrador, but it is more common in the interior. It is an abundant summer resident in the northern New England States and northern New York; and in the Adirondacks it appears to me to outnumber all other Woodpeckers.

Mr. W. E. Loucks, of Peoria, Illinois, writes me: "I consider this bird to be a tolerably common resident here; I have found it breeding, and a few may remain here through the winter, as I have seen them quite late in the fall. On May 18, 1891, while collecting in the river bottom, I discovered a nest of this species in the trunk of a solid dead tree, about 15 feet from the ground. I gave

the trunk a sharp rap with my walking stick; this had the effect of bringing out a female Sapsucker, which gazed out inquisitively, and then flew to a distant branch and was joined by her mate. Climbing to the hole, I found it had been dug into the solid wood for about 3 inches, and, upon opening it to secure the eggs, I found the depth to be about a foot. The excavation tapered from the entrance to the bottom, the diameter of the latter being somewhat greater. The sides had been finely and evenly chiseled, far surpassing any nest of a Woodpecker that it has been my lot to examine. The entrance itself was a marvel, being about $1\frac{1}{2}$ inches in diameter, and extending about 3 inches into the wood. It was so perfect that it resembled an auger-bored hole. The excavation contained five partly incubated eggs, of a dirty-white color, which were deposited upon a good bed of chips at the bottom. The birds were not very shy, sitting around on the dead limbs, preening their feathers, making short visits to some other tree, and then returning. I took another set of eggs on June 8, and found the birds there in summer in succeeding seasons, but took no nests."

Mr. D. B. Burrows, of Lacon, Illinois, likewise informs me that the Yellow-bellied Sapsucker is a common summer resident of Marshall and adjoining counties in Illinois, where it is confined almost entirely to the river bottoms. He wrote me: "These birds make their appearance here the latter part of April, and nesting begins by the middle of May or the first week in June. During my collecting trips by skiff in the overflowed bottom lands I always met with this bird, and considered it common. They are easily located by their peculiar complaining but rather feeble calls, and a few moments' watching will usually locate the nesting site. When nesting they always seem to be uneasy if their nest is approached and very soon fly to the tree in which it is located. In most instances it is a newly excavated cavity in a dead willow, ranging from 8 to 40 feet from the water or ground."

Prof. Barton W. Evermann records it as a rare summer resident in Carroll County, Indiana, where he has also obtained it in winter, on December 15, 1884, and January 11, 1885.

Dr. Elliott Coues gives it as a common summer resident in the wooded bottoms of the Missouri region, and found it breeding commonly along the Red River in North Dakota. It appears also to be common throughout the wooded regions of the provinces of Manitoba, eastern Assiniboia, and Saskatchewan, Canada, and thence northward as already indicated. A set of eggs taken near Fort Resolution, Great Slave Lake, in June, 1862, by Mr. Alex. McKenzie, is now in the United States National Museum collection. Mr. R. MacFarlane also found it breeding at Fort Providence, near the head waters of the Mackenzie River, in the spring of 1886, this being the most northern breeding record known to me; but there is a specimen in the collection which is labeled as having been taken 100 miles northwest of Fort Simpson, which marks the most northern known point of its range, where it probably also breeds. The western limits of its breeding range in the United States are not well defined; I have no records from either Kansas or Nebraska, and doubt if it breeds in the former, or much beyond the eastern limits of the latter State.

The Yellow-bellied Sapsucker is a regular migrant, usually arriving on its breeding grounds in our more northern States about the middle of April, the males preceding the females about a week, and returning to its winter homes in the south in the latter part of September and throughout October; while many, presumably birds which spend the summer in the more southern portions of their breeding range, extend their migrations to the West India Islands, and others even through Mexico to Guatemala and Honduras, in Central America. It is sometimes met with in winter as far north as latitude 40° , and occasionally even farther. None of our Woodpeckers are more noisy and boisterous than this species; their querulous call notes are uttered very frequently after their return from their winter homes, and the males may at this time be heard drumming almost incessantly, resorting to a resonant limb of some tree, the gable of a roof, and even to tin escape pipes. Dr. C. Hart Merriam, in his paper on the "Birds of Lewis County, New York," makes the following remarks on this subject: "At this season scarcely an hour passes, from daylight till sunset, that one or more can not be heard drumming with commendable perseverance upon the tin roofs, eave troughs, or escape pipes of our houses or some of the out-buildings. They strike the tin violently half a dozen or more times, evidently enjoying the sound thus produced, and then rest a few minutes before repeating the performance. Each Woodpecker usually returns to the same spot, and on our roof are several patches the size of one's hand from which the paint has been entirely drummed off. On the escape pipe they sometimes follow around a joint, and by constant and long-continued pounding so loosen the solder that the dependent portion of the pipe falls down. How they manage to cling to these vertical pipes and nearly perpendicular portions of the roof is a mystery to me. I have seen both sexes at work on our roof, but the female does not often indulge in this pastime, and is rarely observed to take part in the boisterous gambols of the males."¹

This species is a true Sapsucker; its hyoid apparatus is not as well developed as is the case in the majority of our Woodpeckers, the tongue being but slightly extensile and reaching only a little distance beyond the tip of the bill. One of the most notable peculiarities of this Woodpecker and that from which it derives the name of "Sapsucker," is its habit of tapping certain trees, especially in the spring of the year, puncturing both the outer and inner bark with small holes resembling gimlet holes, which causes the sap to flow freely; on this, as well as on the tender inner bark, it lives to a considerable extent.

At this season of the year I believe the greater portion of their sustenance is derived in this manner, varied with a diet of spiders, ants, beetles, and other winged insects and such of their larvæ as are found hidden under the bark; while they rarely dig sufficiently deep in the more solid wood to reach those of the *Buprestidæ* and other wood borers, which are the staple food of the majority of our Woodpeckers. For this reason, instead of being a beneficial species, like the rest of this family, in certain localities, as where apple orchards are abun-

¹ Bulletin Nuttall Ornithological Club, Vol. IV, 1879, p. 2.

dant, it becomes a nuisance, and materially injures, and eventually kills, many such trees. Indirectly it also causes the death of many a Hairy and Downy Woodpecker (the best friends the fruit grower has), these species being frequently shot through ignorance of their habits or because they are mistaken for Sapsuckers. Besides puncturing apple trees, it is also partial to the thorn apple, elm, white and yellow birch, red and sugar maple, poplar, red oak, hemlock, white and mountain ash, and several species of pines. That it should be fond of the sweet sap of trees does not surprise me, as this contains considerable nourishment, and likewise attracts a good many insects, which the birds eat; but it is not so easy to account for its especial predilection for the sap of the mountain ash, which has a decidedly bitter taste, and I believe possesses intoxicating properties, unless it be taken for the latter purpose; and the fact that after drinking freely of the sap of this tree it may often be seen clinging to the trunk for hours at a time, as if stupefied, seems to confirm this view. It is well known that some of our birds indulge in such disreputable practices, and possibly this species must be included in the number, as there are sots among birds as well as among the genus *Homo*. Aside from sap, the soft inner bark of trees, and the various insects already mentioned, it feeds to a considerable extent on berries of different kinds, such as those of the sour gum, dogwood, frost grapes, blueberries, raspberries, strawberries, and blackberries, as well as occasionally, when hard pressed by hunger, on nuts, acorns, and sometimes even on Indian corn.

Mr. Otto Widmann, of Old Orchard, Missouri, has kindly furnished me with the following notes, as observed by him in that vicinity: "They are unobtrusive and rather sluggish birds, quite unlike the Hairy and Downy Woodpeckers. They may be seen sitting for half an hour at a time in the same place, sometimes crosswise on a branch. During a late wintry spell, when a freezing rain had enveloped everything in a sheet of ice, a Sapsucker hugged a piece of bacon hung up in a tree for two whole days. While the Downy and Hairy never get tired of eating nuts, the Sapsucker uses them only when hard pressed by hunger, and after his return in February he spends his whole time puncturing the pines. His favorite tree among our ornamental evergreens is the Austrian pine, his second choice is the Scotch pine, while he never taps the white pine and Norway spruce. Of deciduous trees he occasionally punctures the shell-bark hickory, sugar maple, and crab apple; this, however, is not done to any great extent.

"The trunks and larger limbs of the Austrian and Scotch pines look very badly at times, but, strange to say, though they are not only girdled, but in some places compactly covered with holes, the trees thrive as though they had not been hurt by the perforations and loss of sap. This sap has no terebinthine taste, but is as sweet and pure in flavor as that of a deciduous plant; but the exudations of resin, the secondary result of the Sapsucker's labors, mar the appearance of these trees by running down its sides or hardening into unsightly lumps. Many of the birds remain in southern Missouri during winter."

Mr. Manly Hardy, of Brewer, Maine, writes me as follows about this species: "Though not generally considered as a very hardy bird, they are really one of our very earliest migrants to arrive here in the spring. I have heard them drumming in March, when the thermometer was from 15° to 20° below zero, just as soon as the first sign of sunrise could be noticed, on one of the very coldest mornings I ever experienced. I have sometimes been inclined to the belief that some of them hibernated in hollow trees and passed the winter with us. They have spoiled several trees in my garden. Formerly I always protected them, and did not allow them to be molested; but I find that confidence in them has been misplaced. They destroyed a large, handsome mountain ash tree in my yard, and I believe another will die. I have only saved the trees by killing every Sapsucker coming near them. Where they only partly circle the tree it only stops its growth, but where they entirely girdle a limb or the trunk in several places, and close together, it stops the flow of the sap and it soon dies. I have examined into the matter very closely and there is no doubt of the cause."

I consider the Yellow-bellied Sapsucker the commonest Woodpecker in the Adirondack wilderness, in New York. Its ordinary call note is a whining "whäee," and it utters a number of other sounds, some of these resembling the calls of the Blue Jay, and others those of the Red-shouldered Hawk. During the mating season, when the sexes are chasing each other, a series of notes like "hoih-hoih," a number of times repeated, are frequently heard. Although generally disposed to be more or less noisy, while clinging to their food trees they are nearly always silent as far as my observations go. On June 25, 1892, in the woods in Herkimer County, New York, I noticed a series of drinking holes in a sugar maple standing close to the edge of a swamp, which ran up and down, on one side of the tree only, for a distance of 3 feet. These drinking places were visited by different birds at short intervals. All were silent while at the tree, excepting one, a male, which always made a peculiar snorting or purring sound when alighting. There were three rows of holes, each about an inch apart, running parallel to each other, and these were separated about every 6 inches by an untouched space some 3 inches wide. On June 24, 1892, I noticed a nest of this species in the trunk of a dead maple, about 40 feet from the ground, near Wilmurt, New York. It contained nearly full-grown young, which kept up an almost constant clamor for food while I was watching them. In the Adirondacks they prefer ash and butternut trees to nest in, but elms, birches, and maples are also frequently selected for this purpose, while in the river bottoms in Illinois and Indiana they often breed in willows or cottonwoods. Solid dead trees seem to be preferred; if a living one is selected it is usually one in which the core is decayed. The nesting sites vary from 8 to 50 feet in height from the ground, being usually about 25 feet up, and these are either excavated in a dead limb or the main trunk of the tree; if in the latter, frequently directly under a limb, which affords some protection against storms. They are rather tame and fearless about their homes, and generally allow themselves to be closely approached.

While in the woods one morning, seated against the trunk of a maple, observing the movements of a Winter Wren and her brood, a male Yellow-bellied Sapsucker suddenly flew down from a neighboring tree and alighted on the side of the one on which I was leaning, within a foot of my head. He startled me not a little, and no doubt he was equally astonished, as he remained only about a minute, and, uttering a sharp note, like "huwy," beat a hasty retreat. Its favorite resorts during the breeding season are deciduous and mixed woods, generally close to water, in river bottoms, along the shores of the numerous lakes and the borders of swamps, while it is much less frequently seen at this season of the year in extensive coniferous forests.

In the more southern portions of its breeding range nidification usually commences about the beginning of May, and somewhat later farther north. It takes about a week or ten days to complete the excavation for a nesting site, which is usually gourd-shaped, varying from 6 to 18 inches in depth. The entrance hole is perfectly circular, about $1\frac{1}{2}$ inches in diameter, and just large enough to admit the bird; the sides of the excavation are smooth, and a layer of fine chips is left in the bottom of the hole, on which the eggs are deposited. The sexes relieve each other in this work, and also share the duties of incubation. Several other fresh holes are usually excavated in the same tree, presumably by the male, to which he probably retires to rest during the night, and to guard his mate from possible danger.

Fresh eggs may be looked for during the latter half of May and the first week in June, and from five to seven are laid to a set, those containing five or six eggs being most common. An egg is deposited daily, and should the first clutch be taken, a second, usually containing four eggs, is laid about two weeks later, frequently in an excavation in the same tree. They are devoted parents, and when incubation is somewhat advanced, or the young have been recently hatched, the bird on the nest is loath to leave it, and will sometimes allow itself to be captured rather than to desert its treasures. The one off duty may also frequently be seen clinging just below the hole, and remaining in this position perfectly motionless for several minutes at a time, as if in a deep study. The eggs, like those of all Woodpeckers, are pure white in color, the shell is close-grained and only moderately glossy; in shape they vary from ovate to elliptical ovate, and occasionally to an elliptical oval.

The average measurement of seventeen eggs in the United States National Museum collection is 22.23 by 17.06 millimetres, or about 0.88 by 0.67 inch. The largest egg measures 23.37 by 17.53 millimetres, or 0.92 by 0.69 inch; the smallest, 20.57 by 16.26 millimetres, or 0.81 by 0.64 inch.

The type specimen, No. 24726 (not figured), from a set of six eggs, was taken by Dr. William L. Ralph, near Trenton Falls, Herkimer County, New York, on May 28, 1886, from a cavity in a rotten limb of an elm tree standing in an open field.¹

¹For further information on this species, I refer the reader to Mr. William Brewster's interesting article in the *Bulletin of the Nuttall Ornithological Club*, Vol. I, 1876, pp. 63-70; also, to one by Dr. C. Hart Merriam, published in the same *Bulletin*, Vol. IV, 1879, pp. 1-6; and to the careful observations made by the late Mr. Frank Bolles, published in the *Auk*, Vol. VIII, 1891, pp. 256-70, and Vol. IX, 1892, pp. 109-119.

35. *Sphyrapicus varius nuchalis* BAIRD.

RED-NAPED SAPSUCKER.

Sphyrapicus varius var. *nuchalis* BAIRD, Birds of North America, 1858, 103.
(B 86, C 302a, R 369a, C 447, U 402a.)

GEOGRAPHICAL RANGE: Rocky Mountains and adjacent ranges from western Texas, Arizona, and New Mexico; north through Colorado, Utah, Nevada, Wyoming, Montana and Idaho, into the British provinces of Alberta and eastern British Columbia to about latitude 54° and probably farther; west to the Cascade Range in Washington and Oregon, and the Sierra Nevada in California, and in winter into Lower California and northern Mexico. Casually east to western Kansas (Wallace).

The breeding range of the Red-naped Sapsucker or Woodpecker appears to be principally confined to the higher mountain ranges of the interior from Colorado northward, as already indicated, and west to the eastern slopes of the Cascade Mountains in Oregon, Washington, and British Columbia. It is questionable if it breeds, to any extent at least, in the Sierra Nevadas, in northern California, or in the mountains of New Mexico, Arizona, and western Texas, where it seems to be only a migrant. Dr. Elliott Coues, however, in the "Proceedings of the Philadelphia Academy of Natural Sciences," January, 1866, records the Red-naped Sapsucker as a permanent and abundant resident in Arizona; but more recent observations made in various parts of this territory do not confirm this statement, and I believe it is only a rather rare migrant. Its summer home appears to be restricted to the borders of the numerous streams found throughout the mountains of the interior, including the eastern slopes of the Rocky Mountain system and those of the Cascades, at altitudes from 5,000 to 10,000 feet. It usually arrives on its breeding grounds about the first half of May, and the fall migration commences about October 1. Its general habits are similar to those of the preceding species, and in the fruit-growing sections within its range, in southern Utah, for instance, it is said to do considerable damage to the orchards in the early spring and again in the fall, tapping the peach and apple trees for sap in the same manner as *Sphyrapicus varius* does in the East. Its principal food consists of small beetles, spiders, grasshoppers, ants, and such larvæ as are to be found under the loose bark of trees, as well as of wild berries of different kinds.

Mr. F. Stephens writes me: "*Sphyrapicus varius nuchalis* is very rare in southern California. On November 2, 1891, a neighbor of mine shot a female of the year and brought it to me; he said that it was boring holes in the apple trees and had damaged one considerably. This is the only California instance of sap-sucking (in orchards) known to me." In a more recent letter he informs me that he met with this Woodpecker on Lassen Creek, in Modoc County, California, at an altitude of 5,600 feet, on August 2, 1894, obtaining both parents and a family of young of the year

Mr. W. G. Smith informs me that this Sapsucker is a common summer resident in Estes Park, Colorado, breeding from 7,000 feet up to nearly timber line, invariably nesting in live quaking aspens, between June 1 and 15.

The following is taken from an article of mine published in "The Auk" (Vol. V, 1888, pp. 226 to 229), with some slight alterations made in the text:

This race of *Sphyrapicus varius* I have met sparingly in various portions of the Blue Mountains of Oregon, Washington Territory, and Idaho, and as far west as the eastern slope of the Cascade Range in Southern Oregon, in the Klamath Lake region, where, however, it was rare and replaced by *Sphyrapicus ruber*, the two species overlapping each other, but not intergrading, and remaining perfectly distinct. I first met with the nest and eggs of this bird in a small aspen grove at the edge of a beautiful little park-like prairie, near the summit of the Blue Mountains, in Grant County, Oregon, on June 12, 1877.¹ I was escorting an army paymaster from Canyon City to Camp Harney, Oregon, where I was then stationed. After a laborious climb to the top of the steep mountain at the foot of which the little mining town of Canyon City nestled, I stopped for some twenty minutes to rest the animals and to eat lunch. The spot was a lovely one; the little grove at the edge of the heavy pine forest contained perhaps half a dozen aspens that measured a foot or more through, and a number of smaller ones. I had made myself comfortable under one of the largest ones, which stood on the outer edge of the grove, watching the horses enjoying the luxuriant grass, and was busily engaged in eating my lunch, sharing it with several Oregon Jays, *Perisoreus obscurus*, which were quite tame and absorbed my entire attention for some time. A Red-naped Sapsucker was, in the meantime, flying about my tree, alighting on others in the vicinity, and keeping up a constant chatter. I thought at first he was jealous of the Jays, and paid no attention to him, till he flew onto the tree I was sitting under, which brought out his mate. Their nesting site was directly over my head, about 20 feet from the ground, and I might have noticed it sooner by the fresh chips dropped by the birds in excavating the cavity, and which were lying all around me, had I not been entirely absorbed in watching the Jays, or 'Meat Birds,' as they are called there by the hunters and trappers. It did not take long for one of my men to climb up and chop a sufficiently large hole in the tree to insert the hand. The entrance to the excavation was exceedingly small, not over $1\frac{1}{4}$ inches in diameter, about 8 inches deep, and about 4 inches wide at the bottom. It contained three nearly fresh eggs, lying partly embedded in a layer of fine chips. About a year afterwards, when passing the same spot, June 2, 1878, I took another set of three fresh eggs of this species out of a hole in another, somewhat smaller aspen tree in the same grove. Although aspens of suitable size were to be found in several places in the immediate vicinity of Camp Harney, Oregon, which is located at the foot and on the southern slope of the Blue Mountains, at an altitude of about 4,800

¹ But I had previously found a nest with young in June, 1875, in the same locality, as well as several in 1876.

feet, I failed to find any of these birds nesting there, though they were met with by me at various times in the vicinity, and sometimes even quite a distance away from the mountains. They are only summer residents in that region, but an occasional straggler remains in sheltered locations throughout the winter. I am inclined to think that this bird is much more common in the Rocky Mountain region.

Mr. Denis Gale, of Gold Hill, Colorado, kindly furnished me with the following observations regarding this subspecies. He writes as follows:

"My observations have been that this subspecies invariably selects for its nesting site a living aspen tree. I have never met with it in any other. This tree favors the mountain gulches and low, sheltered hillsides, at an altitude of from 7,000 to 10,000 feet. Above this point they do not attain sufficient size, and are mostly dwarfed and scrubby. Here in Colorado *Sphyrapicus varius nuchalis* is seldom found above 9,000 feet or much below 8,000 feet. The aspen tree is short lived, and ere much of a growth is attained, a cross section, in the majority of instances, will show a discolored center of incipient decay, involving half or two-thirds of its entire diameter, with a sound, white sap zone on the outer circumference, next to the bark. This sound, healthy zone nourishes the tree until the decayed core discovers itself in some withered limbs, and frequently the top of the tree manifests the canker.

"Such trees the Red-naped Sapsucker selects for its nesting site, and with great perseverance chisels through this tough, sound zone, from 1 to 1½ inches in thickness, commencing with a very small hole and gradually extending its circumference with each stage of the deepening process, working from the lowest center out, till the exact circumference of the intended aperture of entrance is attained. In thus radiating in circles from the central point the minute chips are chiseled out with considerable ease. This mode of working is observed until the tough zone is worked through; what remains then is comparatively easy work; the soft, soggy, lifeless inside is worked into and downward with greater facility, and a roomy, gourd-shaped excavation quickly follows, the female doing the excavating from beginning to end, and, according to exigencies, completes it in from six to ten days.

"Some idea of the vitality and toughness of this zone of sap in a live aspen may be realized when it is stated that in a tree used consecutively for three or four years, if undisturbed, as is the general custom of *Sphyrapicus varius nuchalis*, the entire aperture will be almost closed by the recuperative agency of the sap which quickly heals and closes up the wound. No other Woodpecker will face such a formidable task. *Picus villosus harrisii* comes next as a borer; then follows *Sphyrapicus thyroideus*. Both of these species nest sometimes also in apparently live aspens, but upon close inspection such trees will be found to be badly decayed.

"*Sphyrapicus varius nuchalis* usually insists upon a new excavation each year. The height of the nesting sites from the ground varies from 5 to 30 feet; the full set of eggs is four or five in number; sometimes a smaller num-

ber of eggs mark a full set, presumably the nest of one of last year's birds. Fresh eggs may be looked for in Colorado from June 1 to 15, and should the first set be taken, a second one may generally be found from ten to fifteen days later; and, as a rule, the second nesting site will not be greatly distant from the first one. Several nests of this species may be found within a short distance of each other in the same aspen grove."

My own limited observations during the breeding season bear out Mr. Gale's statements completely, viz, that this species breeds exclusively in live aspen trees. Dr. J. C. Merrill, United States Army, in "Bulletin Nuttall Club," October, 1881, states, however, that he found a nest of these birds in a dead cottonwood tree in Montana. In southwestern Oregon, in the mountain parks of the Klamath Lake region, these birds breed sparingly at as low an altitude as 5,000 feet, and it is more than probable that at a higher one, near the summit of the Cascade Range, they may be quite common.

In the Blue Mountain region, in eastern Oregon, I found them breeding only in the single locality already mentioned, at an altitude from 6,000 to 7,000 feet. During the winter months, I have occasionally observed a Red-naped Sapsucker in the Harney Valley, in Oregon, busily engaged in hunting for food among the willow thickets found growing along the banks of the small streams in that sagebrush-covered region, often long distances away from timber of any size. In *Sphyrapicus varius nuchalis* the red or crimson markings found about the head and throat of adult birds are usually wanting in the young birds of the year, or else are replaced by a pale, claret-colored tinge on the corresponding parts. The black on the back and wings is also duller and not so deep, and the general pattern less distinct.

I believe that both sexes assist in the labor of excavating the nesting site, the female appearing to do the greater part of the work, however, which is frequently very laborious, and that the male also shares the duties of incubation, which lasts about fourteen days. The number of eggs to a set varies from three to six, usually four or five; these are mostly ovate in shape, a few are elliptical ovate; they are pure white in color; the shell is fine grained and moderately glossy.

The average measurement of thirty-five specimens in the United States National Museum collection is 22.78 by 17.07 millimetres, or about 0.90 by 0.67 inch. The largest egg of the series measures 24.13 by 18.29 millimetres, or 0.95 by 0.72 inch; the smallest, 20.83 by 16.76 millimetres, or 0.82 by 0.66 inch.

The type specimen, No. 19415 (not figured), from a set of three eggs, was taken by the writer on the summit of the Blue Mountains, in Grant County, Oregon, as previously described, on June 12, 1877.

36. *Sphyrapicus ruber* (GMELIN).

RED-BREASTED SAPSUCKER.

Picus ruber GMELIN, *Systema Naturæ*, I, 1788, 429.*Sphyrapicus ruber* BAIRD, *Birds of North America*, 1858, 104.(B 87, C 302*b*, 303?, R 369*b*, C 448, U 403.)

GEOGRAPHICAL RANGE: Pacific Coast districts, from northern Lower California through California, Oregon, Washington, and British Columbia; north to southern Alaska; east mainly to the western slopes of the Sierra Nevada, and on both sides of the Cascade Mountains in Oregon, Washington, and British Columbia.

The Red-breasted Sapsucker or Woodpecker is only a summer resident from northern California northward, and a resident throughout the balance of its range in the Sierra Nevadas, in the southern half of this State. Mr. H. W. Henshaw found it near Fort Tejon in August, 1876, taking a young bird there and seeing several others. Mr. F. Stephens writes me: "I saw one in June in the San Bernardino Mountains, where it probably breeds, and consider it as a rather rare winter visitant near the coast."

Mr. L. Belding says: "A common summer resident in the fir forests of the Sierra. Like nearly all the California Woodpeckers, it is found lower down in the winter, then becoming rather common in the foothills, although rarely seen in the valleys. I have seen a considerable number of its burrows in Calaveras, Tuolumne, Alpine, Butte, and other counties. They are rarely below 30 feet, and are often overlooked or found with some difficulty, as they frequently are in bark-covered trees. It was noticed at Sierra Valley and Donner Lake."¹

Mr. Charles A. Allen, of Nicasio, California, writes me: "These Woodpeckers are very fond of hanging to telegraph poles, and may be found drumming along the line of the Central Pacific Railroad through the Sierra Nevadas, where you can hear them beating a tattoo for hours at a time. If you try to approach one, as soon as a certain distance is reached the bird will sidle to the opposite side of the pole, and then keep peeping around the corner at whatever has excited his suspicions, and as soon as it thinks it has a good opportunity to escape it will fly away with a shrill cry, and keep the pole in line between it and yourself for protection. Here they are very shy, and remain very quiet if discovered. They feed their young on black ants and other insects, which they pick out of decayed trees."

Dr. Clinton T. Cooke found the Red-breasted Sapsucker moderately common in the vicinity of Salem, Oregon, and took two sets of eggs from dead cottonwoods, one set containing five fresh eggs, on May 12, 1888, the other, also of five, on May 15, 1891, in which incubation had commenced. The nesting sites were situated 20 and 25 feet from the ground. Mr. A. W. Anthony writes me that this species was rather common in Washington County, Oregon,

¹Land Birds of the Pacific District, California Academy of Sciences, II, 1890, pp. 66, 67.

in 1885. He located two pairs in a grove of alders, and another was found excavating a nesting site in a big fir stub, fully 50 feet from the ground, on April 10. They seemed to prefer the orchards to the forests, although they were often seen in the maples. He also observed it in March near Ensenada, Lower California.

Mr. R. H. Lawrence met with this species at Ridgefield, Washington, on October 2, 1892. Mr. R. MacFarlane found it breeding near Fort St. James, Stewart Lake, British Columbia, on May 25 and 31, 1889, and sent eggs of this species, and also a young bird of the year, taken near Babine, somewhat farther north, to the United States National Museum. It reaches the northern limits of its breeding range in southern Alaska. A specimen taken on June 5, 1882, near Fort Wrangel, by Mr. W. A. Jones, is now in the United States National Museum collection.

The following account is taken from my article on this species published in "The Auk" (Vol. V, 1888, pp. 229-234), only a few changes being made in the text:

In my various travels throughout the interior of Oregon, Nevada, Washington, and Idaho, covering over fifteen years, I never met with this bird till the summer of 1882, when I was ordered to take station at Fort Klamath, located near the northern end of Klamath Lake, in the southwestern part of Oregon. Here I found the Red-breasted Sapsucker an abundant summer resident, and I have no doubt a few of these birds winter in the more sheltered portions of the deep canyons of the lower Klamath River region. They are among the earliest birds to arrive in the spring. The first bird of this species shot by me, in the spring of 1883, was obtained on March 13, and I have seen a few as late as November. On one of my collecting trips, the morning of April 4, 1883, while riding through a patch of pine timber, near Wood River, the principal stream running through the center of Klamath Valley, I noticed a flock of these birds, at least twenty in number. They were very noisy, apparently glad to get back to their summer homes, and seemed to have an excellent time generally, flying from tree to tree and calling to each other.

As I wanted a couple of specimens, I was compelled to disturb their jollification; those procured were both males, and presumably the entire flock belonged to this sex. By April 20 they had become very common, and some pairs at least were mated and had already selected their future domiciles, in every case a good-sized live aspen tree. The males might at that time be heard in almost all directions drumming on some dry limb, generally the dead top of one of these trees. They scarcely seemed to do anything else. At least five pairs nested within half a mile of my house, and I had excellent opportunities to observe them. Some birds, apparently more industrious than others, would not be satisfied with one hole, and excavated several, sometimes all in the same tree; others contented themselves with a single one. It is possible that the extra ones, after being begun, were abandoned, either being found to be too damp inside or for some other cause unknown to me; or they may have been

made by the male for his own use to pass the nights in and be close to his mate in case of danger; or, again, just to keep his bill in chiseling practice. I am myself inclined to think that the female does nearly, if not quite all, the work on the cavity in which she deposits her eggs.

These birds are not at all shy during the breeding season, allowing you to approach them closely; but they have an extraordinarily keen sense of hearing. I frequently tried to sneak up to a tree close to my house which I knew had been selected by a pair of these birds, to watch them at work, but I was invariably detected by the bird, no matter how carefully I tried to creep up, before I was able to get within 30 yards, even when she was at work on the inside of the cavity and could not possibly see me. The bird would cease working at once, her head would pop out of the hole for an instant, and the surroundings be surveyed carefully. If I kept out of sight and perfectly still, she would probably begin working again a few minutes afterwards, but if I moved ever so little, without even making the least noise, in my own estimation, she would notice it and stop working again at once. If the tree were approached too closely, she would fly off, uttering at the same time a note resembling the word 'jay,' or 'chäe,' several times repeated, which would invariably bring the male around also, who had in the meantime kept himself busy in some other tree, either drumming or hunting for food. While the female was at work on the inside of the excavation the male would fly to the entrance, from time to time, and look in, probably asking his mate how her work was coming on, how soon they might begin housekeeping, etc.; and at other times he would hang, for five or ten minutes even, just below the entrance to the burrow, in a dreamy sort of study, perfectly motionless and seemingly dazed, evidently thinking of the family responsibilities that were soon to come.

I am inclined to think that this species does not indulge in the habit of girdling trees for the sap and the soft inner bark (*cambium*) to the same extent that *Sphyrapicus varius* does—at any rate, not during the breeding season. These birds were, as I said before, extremely abundant in the vicinity of Fort Klamath, and this being the case, evidence of their work in this direction should have been rather common. I do not remember having seen more than two instances showing extensive and systematic signs of girdling—one, a medium-sized cottonwood limb, showed the punctures all over for a distance of 3 feet; the other, a species of mountain ash, on which none of the shoots were over 3 inches through, had been riddled all over by the birds. These mountain-ash shrubs, none of which grow to any size, were rare, however, in that vicinity.

Throughout its range I think this species breeds frequently at lower altitudes than *Sphyrapicus varius nuchalis*. Fort Klamath, however, although but 4,200 feet above sea level, has a very cool summer climate, frosts occurring in almost every month of the year. The surrounding country is very beautiful at that time. Heavy, open forests of stately pines and firs, among these the graceful and beautiful sugar pine, are found on the mountain sides and reaching well down into the green, park-like valleys. Interspersed here and there are aspen

groves of various extent, their silvery trunks and light-green foliage blending artistically with the somber green of the pines. These aspen groves are the summer home of the Red-breasted Sapsucker.

As far as my own observations go, healthy, smooth-barked aspens are always selected as suitable nesting sites by these birds. The trees used vary from 12 to 18 inches in diameter near the ground, and taper very gradually. The cavity is usually excavated below the first limb of the tree, say from 15 to 25 feet from the ground. The entrance hole seems to be ridiculously small for the size of the bird—perfectly circular, from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches in diameter only—so small, indeed, that it seems as if it took considerable effort for the bird to squeeze himself in and wriggle out of the hole.

The gourd-shaped excavation varies in depth from 6 to 10 inches, and it is from 3 inches near the top to 4 or 5 inches wide at the bottom. The finer chips are allowed to remain in the bottom, forming the nest proper, on which the eggs are deposited. Frequently they are more than half covered by these chips. The interior of the entire excavation is most carefully smoothed off, which must consume considerable time, considering the tough, stringy, and elastic nature of the wood when filled with sap, making it even more difficult to work when partly decayed, which seems to be the case with nearly all aspens of any size. Probably eight or ten days are consumed in excavating a satisfactory nesting site. All the larger and coarser chips are dropped out of the hole and scattered about the base of the tree. From the quantity of these found under every tree occupied by these birds during the nesting season of 1883, I am inclined to believe that they are only satisfied with an entirely new nesting site every year, and not simply with an old one repaired to answer the purpose. These same chips are an extremely simple and sure guide to their nest.

In hunting for them I looked for the chips on the ground first, and after finding these it did not take long to find the hole from which they came. In this manner it was an easy matter to find their nest, and I took no less than fifteen sets of their eggs in a single season, and might have taken more had I been so inclined, especially by following up the birds for their second set, where they had been robbed previously. Ordinarily but one brood is raised in a season.

The number of eggs varies from five to six to a set. Full sets of fresh eggs may be looked for in that locality from May 20 to June 5, and I have taken nearly fresh eggs as late as June 13. I took my first set on May 23, 1883. It contained six fresh eggs, and the cavity was about 7 inches deep, the entrance about 8 inches below and directly under the first limb of the tree, as usual a live aspen, about 18 feet from the ground. While the nest was being rifled of its contents both parents flew about the upper limbs of the tree, uttering a number of different sounding, plaintive cries, like 'peeeye,' 'pinck,' and 'peurr,' some of these resembling somewhat the purring of a cat when pleased and rubbing against your leg. I used to note the different sounds in a small note-

book at the very time, but scarcely ever put them down alike; each time they appeared a trifle different to the ear, and it is a hard matter to express them exactly on paper.

The eggs, when fresh and before blowing, like those of all Woodpeckers, show the yolk through the translucent shell, giving them a beautiful pinkish appearance, as well as a series of straight lines or streaks, of a more pronounced white than the rest of the shell, running toward and converging at the smaller axis of the egg. After blowing, the pink tint will be found to have disappeared and the egg changed to a pure, delicate white, the shell showing a moderate amount of luster. There is considerable variation in their shape, running as they do through all the different ovates to an elongated ovate.

Both sexes assist in incubation, which lasts from twelve to fourteen days, I think. Their food consists principally of grubs, larvæ of insects, ants, various species of lepidoptera, which they catch on the wing, like Flycatchers, and berries. Of the latter quite a number of different edible species are found about Fort Klamath, and they seem to be especially fond of wild strawberries, which grow there in abundance. The young, after leaving the nest, stick to the tree in which they were hatched for the first day or two, without venturing to fly.

The beautiful carmine or crimson on the head and breast in the adults is replaced by claret-brown in the young, varying in amount and intensity in different individuals; in some it is very distinct and prevalent. The yellow, so plainly noticeable on the belly of adult birds, is also wanting in the young. The colors throughout are much duller and the general pattern less distinct. By the latter part of September the majority of these birds leave for their winter haunts, only a few stragglers remaining. These are possibly birds that breed farther northward and winter in the warm valleys of northern California, and are then comparatively near the end of their migration, remaining in the Klamath Valley region, where there is always an abundance of food for the Woodpecker family, judging from the number of different species of these birds found there throughout the year, till the heavy winter snows drive out the less hardy, among which the Red-breasted Sapsucker must be included.

While stationed at Fort Klamath, Oregon, I took especial pains to collect a good series of both adult and young birds of this species, as well as a number of sets of their eggs, and devoted considerable time, at no little inconvenience to myself, to observe their general habits closely. Although my personal observations differ materially from those of other naturalists (see 'History of North American Birds,' by Baird, Brewer, and Ridgway, Vol. II, pp. 544 and 545), I am confident that they will be found substantially correct by future observers.

The average measurement of seventy-two specimens in the United States National Museum collection is 23.37 by 17.58 millimetres, or about 0.92 by 0.69 inch. The largest egg of the series measures 25.40 by 17.78 millimetres, or 1.00 by 0.70 inch; the smallest, 21.84 by 17.27 millimeters, or 0.86 by 0.68 inch.

The type specimen, No. 19395 (not figured), from a set of six eggs, was taken by the writer near Fort Klamath, Oregon, on May 23, 1883.

37. *Sphyrapicus thyroideus* (CASSIN).

WILLIAMSON'S SAPSUCKER.

Picus thyroideus CASSIN, Proceedings Academy of Natural Sciences, Philadelphia, 1850, 1851, 349.

Sphyrapicus thyroideus BAIRD, Birds of North America, 1858, 106.
(B 88, 89; C 304, 305; R 370; C 449; U 404.)

GEOGRAPHICAL RANGE: Western North America; from the eastern slopes of the Rocky Mountains west to the Pacific coast, and from Arizona and New Mexico northward to southern British Columbia; east, in winter only, to western Texas (Concho and Tom Green counties); south to Jalisco, Mexico.

The southern limits of the breeding range of Williamson's Sapsucker, also known as the "Black-breasted," "Brown," and "Round-headed" Woodpecker, as far as they can be defined at present, extend through the higher mountain ranges of northern New Mexico, such as the Black and Culebra mountains, the Mogollon and San Francisco mountains of Arizona, and northward along the eastern slopes of the Rocky Mountains, where it has as yet been found breeding only in Colorado. However, as several specimens have been taken on Laramie Peak, in southeastern Wyoming, in August, this would indicate that it breeds at least as far north in this direction. I have been unable to find any records for Montana. The northern limits of its summer range on the Pacific Coast include southern British Columbia, where it has been taken near Similkameen in June, 1882, and it breeds throughout the Cascade Mountains of Washington and Oregon and southward through the Sierra Nevadas, in southern California.

Mr. F. Stephens writes me: "I have found *Sphyrapicus thyroideus* feeding their young in Taquitch Valley, in the San Jacinto Mountains, in southern California, on June 20, 1893, at an altitude of about 7,500 feet, and shot the female. The nest was some 45 feet from the ground, in a dead and broken fork of an otherwise green fir. The nest contained three young, one of which laid dead and decomposing in the bottom of the nest; the others were but a few days old. In the week following I saw several more adults of this species, between 7,500 and 8,500 feet altitude, and succeeded in shooting two more. The locality where they were obtained is in about latitude 33° 50'. I have also taken it near Fort Bayard, New Mexico."

Mr. Robert Ridgway obtained specimens near Carson City, Nevada, and at Parley's Park, in the Wahsatch Mountains, in Utah, where it is known to breed, and Mr. H. W. Henshaw found it to be a fairly common summer resident in the mountains near Fort Garland, in southern Colorado.

Mr. W. G. Smith writes me: "Williamson's Sapsucker is a common summer resident in Estes Park, Colorado, where it nests mostly in dead pines, often within a few feet of the ground, and again as high as 70 feet up. Full sets of fresh eggs are usually found here during the first week in June. The male appears to me to do most of the incubating, and hereabouts it is most often found at altitudes between 7,000 and 8,000 feet, but I have also taken it at much higher ones, where it nests somewhat later."

Mr. Lyman Belding, in his "Land Birds of the Pacific District," speaking of this species, says: "Tolerably common from about 7,000 feet upward in summer, often breeding in living tamaracks and covered with their resinous juice. In winter down to about the lower edge of the sugar pine (*Pinus lambertiana*), altitude about 2,500 feet, but rare here, and mostly female or young birds found so low, while at Big Trees, Calaveras County, California, January 6-13, 1879, I got thirteen adult males. In the breeding season they are most numerous in the valleys, as at Bloods, Hermit Valley, Blue Lakes, etc. Their burrows vary from 5 to 6 feet up to 30 or 40 feet. The young were still in their nests at Bloods, July 21, 1880, but in 1881 they were about a month earlier."¹

The following account is taken from my article on this species published in "The Auk" (Vol. V, 1888, pp. 235-239), a few alterations being made in it:

This interesting Woodpecker is so unique in the entire difference of coloration of the sexes that for a long time they were considered and described as separate species. It remained for Mr. H. W. Henshaw, when attached as naturalist to Lieut. George M. Wheeler's expedition, engaged upon the geographical exploration of Colorado and New Mexico, in 1873, to establish their identity, he finding the supposed two species paired and breeding, near Fort Garland, Colorado, in June of that year. Like *Sphyrapicus varius nuchalis*, it has an equally wide and extended range, reaching from the eastern slopes of the Rocky Mountains to the western spurs of the Sierra Nevada and Cascade ranges in California and Oregon. In its habits, however, it differs considerably from the three other species of the genus *Sphyrapicus*, all of which seem to prefer regions abounding in deciduous trees, and using these, as far as at present known, almost exclusively for nesting purposes, while Williamson's Sapsucker gives the preference to coniferous forests, selecting pines to breed in, at least as frequently as aspens, and, according to my own observations, oftener than the latter.

Although it undoubtedly occurs in the region intervening between the Rockies on the east and the Cascades on the west, I can not positively recall a single instance where I have seen this bird in the entire mountain system, beginning at the Bitter Root Range, in Montana, in the east, following the continuation of this through the Blue Mountains of Washington and Oregon, as well as in most of the Salmon River mountain country in Idaho, till I first met with it on the eastern slopes of the Cascade Range, near Fort Klamath, Oregon, in the autumn of 1882. It was here Dr. J. S. Newberry obtained the type of the so-called '*Sphyrapicus williamsoni*.' Here I saw it for the first time on September 23, and as late as November 8 of the same year, taking specimens on both dates. Strange to say, all the birds I saw and secured for a period covering about five weeks, at that time, were females; and I only succeeded on October 28 in seeing and obtaining my first male of this species. It was taken under rather peculiar circumstances. I had only to walk a couple of hundred yards from my house to find myself in a fine, open pine forest. Gun in hand, I, as usual, took a short stroll that morning, following close along the banks of Fort Creek, directly east

¹ Occasional Papers, California Academy of Sciences, II, 1890, pp. 67, 68.

of the Post, and I had not proceeded more than half a mile from my house when I saw two males chasing each other about a dead pine stump, and uttering at the same time shrill cries. These cries attracted my attention to the birds. I tried to get within ordinary shooting distance, but they took alarm and flew in opposite directions before I was near enough. Nevertheless, I took a snap shot at the one nearest to me; but it continued its flight, apparently uninjured, crossing the creek, about 60 yards in advance of me, which was too deep and cold for me to ford, and, much to my disgust, disappeared in the heavier pine timber on the opposite side, without stopping while it was in sight. As it was useless as well as impracticable to follow this one, I kept on in the direction the other had taken, but failed to see it again. Fully an hour afterwards, on my way back to the Post, and when within a few yards of the place where I first noticed the two birds; tired out and disgusted, I sat down on an old log and was taking a rest, absorbed in reflections on my bad luck, when, from quite a distance, I noticed a black-looking bird flying toward me, coming from the opposite side of the creek, and from the same direction the one I shot at had taken earlier in the morning. Its flight was so peculiar and strange, constantly sinking, that I refrained from shooting when it first came within range. No wonder; it was its last expiring effort, and it actually dropped within a yard of where I was sitting. It was unquestionably the very bird I had shot at more than an hour before; no one else was out hunting at the time, as no other shots were heard. A single No. 12 pellet had penetrated the lungs, and the bird, in its dying struggle, had evidently tried to reach the same stump again on which I first noticed it.

My earliest record for 1883, on which date I obtained a male specimen, was March 20. It seems to me to be a more solitary bird than *Sphyrapicus ruber*. I never saw more than two together or in close proximity of each other. It is also more shy, and does not allow itself to be approached so readily as either of the preceding species. Its breeding range extends, near Fort Klamath, from an altitude of about 5,000 feet to the higher peaks of the Cascade Range, which attain in that vicinity a height of about 9,000 feet. On the mountain slopes about Crater Lake it seems to be most abundant, but not as much so as is *Sphyrapicus ruber* in the lower valley, where almost every aspen grove harbors a pair of these birds.

Crater Lake itself is such a strangely interesting and unique freak of nature, the peer in sublime grandeur of the Yosemite Valley, in California, and the Yellowstone Park, with its grand canyons and geysers, in Wyoming, and so little known withal, that I will give a short description of it as it appeared in "The Auk:" "The lake is about $7\frac{1}{2}$ miles long and 6 wide, and unlike anything found in this or any other country. It is situated on the summit of the Cascade Range, about 25 miles north of Fort Klamath, at an altitude of about 7,500 feet; the highest peak in the vicinity reaches up to 9,000 feet. The rocky walls surrounding it on all sides are nowhere less than 1,000 feet and in places more than 2,000 feet high, at many points almost perpendicular, so that a stone can

be thrown without striking anything on its way till it reaches the water, fully 2,000 feet below. It is said to be some 1,800 feet deep, and in places is probably more. One can not realize the magnitude of this hole in the ground without seeing it. A mountain the size of Mount Washington, the highest peak of the White Mountains, in New Hampshire, might be dumped into it and not fill it up then. The water is beautifully clear and deep azure blue in color; the only living thing seen near it on a visit to the lake on July 27, 1882, was a solitary female Wandering Tattler (*Heteractitis incanus*), apparently very correctly named. An island, covered with good-sized trees, rises out of the water to a height of nearly a thousand feet, on the west side of the lake. It is composed mostly of volcanic scoriæ and pumice, and evidently was the principal cone of the now extinct crater, traces of whose activity in former times, in the shape of heavy pumice deposits, can be found for 50 miles inland to the east, on the road from the Deschutes River to Fort Klamath. There is only one place from which the shore of the lake can be reached with comparative safety, and even from there it is by no means an easy matter."

Mr. Gale, who is quite familiar with this species, writes me that in Colorado they nest sometimes at an altitude of 10,000 feet, and that they are generally distributed between that limit and 8,000 feet. The nesting sites, he says, are as often met with in moderately thick woods as in the more open clearings and isolated pine trees and shrubs, the only condition guiding their choice of a home being a shelter from the strong west winds. My own observations agree pretty well with his. He says: "A marked peculiarity I have noted with *Sphyrapicus thyroideus* is that the male takes a lookout station upon some suitable tree, where, at the approach of any possible danger, he gives the alarm by striking a short dry limb with his bill, by which a peculiar vibrating sound is given out, which the female, not very distant, fully understands, and is at once on the alert. If either excavating, guarding, or covering her eggs, she will immediately look out of her burrow, and, should the intruder's path lie in the direction of her nest, she will silently slip away and alight in a tree some distance off, but in view of both her nest and the intruder. The first or second blow of a hatchet upon the tree trunk in which the nest is excavated will mark her movement again by a short flight, so managed as not to increase the distance—in fact oftener coming nearer. When satisfied that her treasures have been discovered, she utters a peculiar, low, grating sound, not unlike the purring of a cat. The male then comes to the fore and braving the danger, is very courageous, and, should the eggs be far advanced in incubation, he will even enter the nest when you are almost within reach of it. When the latter is rifled, he is always the first to go in and discover the fact, often passing in and out several times in a surprised sort of manner. The large, gaping opening made by the robber's hatchet he seems to ignore altogether. To him it seems impossible that a few minutes only suffices to cut through the wall of wood that took his mate as many days of hard labor to accomplish. Presently he is joined by the female, a joint inspection is made, a verdict of grand larceny quickly reached,

and the conclusion arrived at: 'Well, we shall have to try again, with the hope of better luck next time.'

Nidification is similar to that of the other species of the genus, with the exception already mentioned, of the difference in the kind of trees preferred. The height of nesting sites varies considerably, say from 5 to 60 feet, and perhaps still more in exceptional cases. Fresh eggs may be looked for, according to altitude, from May 20 to June 15; on May 26, 1887, Mr. Gale took a fine set of six, which I judge to have been perfectly fresh, from the exquisite manner in which they are prepared.

I obtained my first set of eggs of this species on June 3, 1883, about 9 miles north of Fort Klamath, in the open pine forest on the road to Crater Lake. It consisted of five eggs, slightly incubated. The nesting site was excavated in a partly decayed pine whose entire top for some 20 feet was dead; the height of the excavation from the ground was about 50 feet. The man climbing the tree reported it to be about 8 inches deep and about 5 inches wide at the bottom, and freshly made. A second set, of six fresh eggs, was taken June 12 of the same year, about 12 miles north of the Post, at a still higher altitude than the first one. It came also out of a pine about 40 feet from the ground. A third nest, found a week later, near the same place, contained five young, just hatched. This nest was in a dead aspen, about 20 feet from the ground. Only one brood is raised, and, like the two other species, it is only a summer resident in the vicinity of Fort Klamath. Its food seems to consist almost exclusively of insects and their larvæ, various species of lepidoptera, and an occasional grasshopper. Berries, I think, are seldom eaten by them.

I have found fully fledged young in July; a young female, shot July 21, must have left the nest certainly by the beginning of the month. When the young are large enough to fly, they are not at all rare at the lower altitude of Fort Klamath. They show the same differences in coloration in the sexes in their first plumage, with the following exceptions: The young males lack the red on the throat, which is replaced by dirty white; the sulphur yellow on the lower parts is mostly wanting, a slight trace of it being noticeable on some specimens; and the black on the back is much duller. The young females differ likewise by the absence of yellow on the belly, the black patch on the breast is wanting, the markings and barrings on the upper parts are less distinct, and the colors generally duller. In its undulating flight from tree to tree this species utters a shrill note, like "huit, huit."

Williamson's Woodpecker winters in the lower valleys and foot hill regions in the southern half of California, and southward in the pine forests of Arizona, New Mexico, western Texas, and probably also in similar localities of northern Mexico. The number of eggs laid to a set varies from three to seven, sets of five or six being most often found. These, like all Woodpecker's eggs, are pure china-white in color; the shell is close grained, rather thin, and only slightly glossy. In shape they vary from ovate to elongate ovate, and a few approach an ovate pyriform, a shape apparently not found in the eggs of the other species of this genus.

The average measurement of thirty-four specimens in the United States National Museum collection is 24.20 by 17.19 millimetres, or about 0.95 by 0.68 inch. The largest egg of the series measures 25.40 by 17.78 millimetres, or 1.00 by 0.70 inch; the smallest, 22.35 by 16.51 millimetres, or 0.88 by 0.65 inch.

The type specimen, No. 19409 (not figured), from a set of five eggs, was taken by the writer near Fort Klamath, Oregon, on June 3, 1883.

38. *Ceophlœus pileatus* (LINNÆUS).

PILEATED WOODPECKER.

Picus pileatus LINNÆUS, *Systema Naturæ*, ed. 10, I, 1758, 113.

C[eophlœus] pileatus CABANIS, *Journal für Ornithologie*, 1862, 176.

(B 90, C 294, R 371, C 432, U 405.)

GEOGRAPHICAL RANGE: More or less irregularly distributed through the heavier wooded districts of North America, excepting Newfoundland, -Labrador, the shores of Hudson Bay, and those portions of the Northwest Territory, in the Dominion of Canada, north of latitude 63°. In the United States, apparently absent or very rare in the southern Rocky Mountains, and in the Territory of Alaska. Rare or extirpated in the more thickly settled parts of the eastern United States.

The Pileated Woodpecker, also known in different sections as "Cock of the Woods," "Logcock," "Woodcock," "Black Log" or "Black Woodcock," "Johnny Cock," "Wood-hen," "Woodchuck," and, according to Mr. B. F. Gault, by the peculiar name of "Good-Gods" in southeastern Missouri, is generally resident and breeds wherever found, although in winter it may sometimes rove about more or less, according to the food supply. Throughout most of our Eastern States, north of latitude 39°, the Pileated Woodpecker is now somewhat rare, and here it is mainly confined to the heavily timbered bottom lands along the larger streams and the more thinly settled sections in the mountain regions, where in a few favorable localities it is still met with in small numbers.

In quite a number of our Southern States, however, it is far more common, and in suitable localities it may be called fairly abundant. This is especially the case throughout the greater part of Florida, as well as in portions of South Carolina, Georgia, Alabama, Mississippi, Louisiana, Arkansas, southern Missouri, the Indian Territory, and the greater part of Texas. It is by no means rare in portions of the other Southern States, as it is well known to occur throughout North Carolina, generally below an altitude of 4,500 feet, and I have occasionally seen bunches of these birds, numbering from four to twelve, exposed for sale in the markets of Washington, D. C., which had been killed in some of the neighboring counties in Virginia, where this large and handsome Woodpecker appears to be considered as a game bird. I tried to eat one, when short of meat, while traveling through the Blue Mountains of Oregon, but I certainly can not recommend it. It feeds to a great extent on the large black wood ants, which impart to it a very peculiar, and to me an extremely unpleasant

flavor, a kind of sweet-sour taste, which any amount of seasoning and cooking does not disguise, and I consider it as a very unpalatable substitute for game of any kind.

In the Rocky Mountain regions of Arizona, New Mexico, Colorado, and Wyoming the Pileated Woodpecker apparently does not occur, and if it occasionally should, it must be considered very rare. The same remarks apply to Utah and the greater part of Nevada, but it is occasionally met with in the western part of the latter State. I found it quite rare also in Idaho, Oregon, and Washington, excepting in the coast regions of the latter States. In California it is not uncommon in portions of the Sierra Nevadas, while in British Columbia it appears to be far more abundant than anywhere else west of the Rocky Mountains, both on the coast and in the interior, especially in the vicinity of Lake Babine, in about latitude 55° , from which point Mr. R. MacFarlane sent a number of specimens to the United States National Museum in 1889. It has also been taken by Mr. B. R. Ross, of the Hudson Bay Company, at Fort Liard, in the extreme northeastern corner of British Columbia, and on Big Island, in Great Slave Lake, by Mr. John Reed, which marks the most northern point of its known range.

It can thus be seen that the Pileated Woodpecker is by no means distributed over the whole of North America, and that it is not found in many heavily timbered sections which appear to be equally suitable as a habitat as many of those which it occupies. It is eminently a bird of the more extensive forest regions, and is as much at home in a semi-tropical as in a cold climate. As a rule, specimens from the northern borders of its range are considerably larger than those from the south. There appears to be considerable difference in the habits of this bird; in some sections it is extremely shy and wary, while in others it is exactly the reverse.

Mr. Manly Hardy, of Brewer, Maine, writes me: "This splendid bird is not uncommon in the heavily timbered portions of our State, and, although usually very shy, becomes accustomed to man if not disturbed. I once had two so tame they would allow me to sit within 4 paces of them, and put my hand upon the tree when they were not 10 feet above my head. They usually select certain large dead hemlock trees to which they go almost daily, often remaining for hours, repeating their visits until the bark is almost entirely removed from the tree. It was owing to the proximity of several such trees to my home camp that I was able to become so familiar with them. They often chisel holes 6 or 8 inches deep in cedar and other soft-wood trees, and as large as the holes in a post-and-rail fence. I have seen one pick a large hole through 2 inches of frozen green hemlock to get at the hollow interior, and it seemed impossible that a steel tool of the same size could have done such work without being broken. They are easily called by clapping the hands so as to imitate their pounding. This requires skill, but I have taught others so that they have been successful in it. When called they seem to lose their usual shyness, and seem stupefied at not finding their mate, as they had expected. I have found them

nesting in the large yellow birch, and once found one late in the fall at work inside the tree, as I have often seen other species of Woodpeckers do in the fall; but whether working on next year's nest or providing a winter's retreat is unknown to me. Its food consists very largely of ants. In some cases it descends to the ground to obtain them, after the manner of the Flicker. I have seen them in Yosemite Valley and Calaveras Grove, California, and their actions and notes seemed exactly the same as in Maine birds.

"I once saw a Sharp-shinned Hawk persecute a pair of these Woodpeckers most persistently. They spent considerable of their time on some dead hemlocks close to my camp, and while busily at work the little Hawk would dart at one and follow him with his legs stretched out as if to seize him, all the time uttering a 'ca-ca-ca' to scare him. When the Woodpecker alighted and faced him from behind a tree, the former would also alight close by on some convenient limb, ready to repeat the performance as soon as the other commenced to work again. Sometimes the Woodpecker, instead of flying, would sidle around the body of the tree, and the Hawk would occasionally follow him twice entirely around before alighting to take a rest, only to make a fiercer dash next time. On some days this performance would be continued for at least an hour at a time, and the Hawk seemed to put in all the time he could spare from getting a living in annoying these birds. It was very evident, however, that he dared not seize one, as he easily could have done had he wished to do so. One would hardly think that a Pileated Woodpecker could catch on the side of a tree, swing his body around, and present his bill to the Hawk so quickly, but I saw this done dozens of times. The Sharp-shinned Hawk reminded me of some people who never can bear to see others getting an honest living.

"The Pileated Woodpecker is a constant resident in Maine, but rarely leaves the vicinity of large timber. It prefers places where large hemlocks abound, especially those localities where a few have been killed by camp building or small fires. In fall and winter a pair will regularly visit such trees every day for weeks, spending hours daily in stripping off the bark, until trees from 2 to 3 feet in diameter are often entirely denuded or large patches of the bare wood are exposed. In the spring I have often seen bushels of bark under a single tree."

Mr. R. S. Williams, of Columbia Falls, Montana, writes me: "*Ceophloeus pileatus* is rather common all through the timber of the Upper Flathead River region, in the northwestern part of the State. The bark of the western yellow pine seems to offer attractive foraging for these birds. One tree I observed, some 2 feet in diameter, is about stripped to the wood for 50 or 60 feet up. The birds strike their blows sidewise, splitting the bark off in thin scales that soon accumulate in large heaps at the base of the trees where they work. I ran across one bird obtaining his meal in a rather novel manner. He was eating the berries of a dogwood (*Cornus stolonifera*), and as the stem of the shrub was much too small for him to perch upright on, he allowed himself to swing

head downward, and, stretching his neck to one side, managed to reach the berries. Not unfrequently they search for food on the ground, usually alighting low down on a trunk and dropping backward, a few inches at a time, till they reach the base, where they search among the chips, etc., but constantly looking up with the most knowing glances, as if to say that they were not to be surprised in such a proceeding. I have never seen this species east of the Rocky Mountains in Montana."

I have seen this species in but few localities in the West, and with but one exception I always found the Pileated Woodpecker extremely shy and difficult to approach. In the latter part of June, 1882, I found a nest containing four young about one-half mile southeast from Fort Klamath, Oregon, and I noticed this family on several occasions afterwards in the heavy pine timber in the vicinity of the Post. These birds were not shy, and I could readily have shot them all, but refrained, hoping they would nest in the neighborhood again next season, which they, however, failed to do. The ordinary call note is a loud "cäck-cäck-cäck," several times repeated; another resembles the "chuck-up" of the Red-shafted Flicker, only somewhat slower, louder, and clearer; others again remind me of the cackling of a domestic hen. One of its love notes, according to Mr. A. Nehrling, sounds like "a-wuck, a-wuck," and one of alarm, or anger, like "ha-hi, ha-hi." It is very noisy during the mating season and indulges in a good deal of drumming at this time of year. I believe they remain mated through life, and pairs are more frequently seen than single birds.

Its food consists of the different species of boring beetles and their larvæ infesting timbered tracts, and of ants, many of which it captures on the ground; it also feeds on wild grapes, the berries of the black gum, dogwood, pokeweed, service berries, acorns, bechnuts, and chestnuts. Considered from an economic point of view, it does far more good than harm, and only attacks decaying and fallen timber. In the mountains of Oregon, and presumably in other localities, the Pileated Woodpecker is most frequently met with in the extensive burnt tracts, the so-called "deadenings," where forest fires have swept through miles of fine timber and killed everything in its path. Such localities afford this species an abundant food supply in the slowly decaying trees, and are sure to attract them. I have seen the sun obscured for weeks at Fort Klamath by the dense smoke caused by such a fire, which raged in the Cascade Mountains, near Diamond Park, some 50 miles north of the Post, in August, 1883. The bright scarlet crests of these birds were in former years highly prized by many of the Indian tribes in our Northwestern States, being used as ornaments on their war bonnets, and these birds were eagerly hunted for this purpose. Its flight is both strong and swift at times, but, as a rule, when at ease it is slow and crow-like, rather more direct and not so undulating as that of most of our Woodpeckers, and is often protracted for long distances.

In southern Florida the mating season commences early in March, and farther north correspondingly later. A suitable tree having been selected, generally a dead one in large and extensive woods, both birds work alternately on the nesting site. This is usually excavated in the main trunk, from 12 to 75

feet from the ground, and it takes from seven to twelve days to complete it. The entrance measures from 3 to $3\frac{1}{2}$ inches in diameter, and it often goes 5 inches straight into the trunk before it is worked downward. The cavity varies from 7 to 30 inches in depth, and is gradually enlarged toward the bottom, where it is about 6 inches wide. A layer of chips is left at the bottom, on which the eggs are deposited. Occasionally the entrance hole, instead of being circular, is oval in shape, like that of the Ivory-billed Woodpecker. The inside of the cavity is quite smooth, the edges of the entrance are nicely beveled, and, taken as a whole, it is quite an artistic piece of work. Some of the birds, presumably such as have been molested previously, are quite shy and artful, removing every trace of chips as soon as loosened and dropping them in different places, at some distance from the nesting site, so as not to betray its location by the accumulation of chips at the base of the tree, and occasionally they show, if possible, still more intelligence. Dr. William L. Ralph tells me that in the spring of 1892 he found a nest of this species in Putnam County, Florida, where the bird is quite common, excavated in a dead cypress in swampy woods, which was comparatively easy to get at. He found this in the second week in April, about the time nidification is at its height there. On rapping on the trunk of the tree the bird, which was at home, stuck his head out of the hole and dropped some chips, naturally causing the Doctor to believe that the nesting site was still unfinished. The same performance was repeated on several subsequent visits, and finally he concluded to examine the nest anyhow, when he found nearly full-grown young. This pair of birds must have had eggs at the time he first discovered the nest, and the chips were simply thrown out as a ruse to deceive him.

The trees most often used for nesting sites are cypress, gum, pine, fir, tamarack, oak, sycamore, elm, birch, and cottonwood, and in southern Florida the trunk of the cabbage palmetto also furnishes suitable nesting sites. Besides the customary layer of chips found in the bottom of the hole, one of the nesting sites examined by Dr. Ralph contained fully a pint of clean sand. A fresh cavity is generally made each season, and this species also excavates others in the fall of the year to retire to during inclement and stormy weather in winter. On the data blank furnished by Dr. Ralph, for a set of three eggs taken by him in Putnam County, Florida, on April 20, 1892, from a hole in the side of a rotten pine stump, 27 feet above the ground, in low, flat pine woods, near a small swamp, I find the following entry: "This nest was examined April 13, but contained no eggs. At that time the cavity was opened by tearing out a piece about 3 inches wide from the aperture nearly to the bottom. The damaged place was repaired by nailing over it a piece of bark from the stump, with a small hollow in the top, to restore the opening to its proper shape." The cavity was about 18 inches deep. In northern Florida full sets of eggs may be looked for about April 15. Three eggs to a set seems to be the usual number found here, and most of the eggs in the United States National Museum collection came from this State. Dr. A. K. Fisher took a set of four at Lake George, Warren County, New York, on May 15, 1878; and Mr. J. Harris Reed,

of Beverly, New Jersey, writes me: "On June 4, 1893, in company with a friend, I discovered a nest of the Pileated Woodpecker, in Cape May County, New Jersey, containing five young birds. Our attention was attracted by the female, who, with food in her mouth, flew about us from tree to tree, very much agitated, and uttering a chattering note resembling that of a tree frog. Upon an examination of the surrounding trunks of dead trees, we located the nest, which was about 12 feet above the ground. Two of the young were removed and examined, they were nearly able to fly. Although we remained there nearly an hour watching the female through field glasses as she returned to the nest to feed her young, the male bird was not seen. This is the first occurrence of its breeding in this locality that I have met with."

From three to five eggs are usually laid to a set, but I have seen it stated that the Pileated Woodpecker often laid six, and that a nest found near Farmville, Virginia, contained eight. An egg is deposited daily, and incubation begins occasionally before the set is completed, and lasts about eighteen days, both sexes assisting in this duty, as well as in caring for the young. Like all Woodpeckers, the Pileated are very devoted parents, and the young follow them for some weeks after leaving the nest, until fully capable of caring for themselves. Only one brood is raised in a season. The eggs of the Pileated Woodpecker are pure china-white in color, mostly ovate in shape; the shell is exceedingly fine grained and very glossy, as if enameled; they are not as pointed as those of the Ivory-billed, and average smaller.

The average measurements of twenty-nine specimens in the United States National Museum collection, mostly from Florida, are 32.44 by 24.08 millimetres, or about 1.28 by 0.95 inches. The largest egg of the series measures 35.56 by 25.15 millimetres, or 1.40 by 0.99 inches; the smallest, 30.22 by 22.61 millimetres, or 1.19 by 0.89 inches.

The type specimen, No. 26529 (Pl. 1, Fig. 5), Ralph collection, from a set of three eggs, was taken by Dr. William L. Ralph, near San Mateo, Florida, April 13, 1893. It represents one of the larger eggs of the series.

39. *Melanerpes erythrocephalus* (LINNÆUS).

RED-HEADED WOODPECKER.

Picus erythrocephalus LINNÆUS, Systema Naturæ, ed. 10, I, 1758, 113.

Melanerpes erythrocephalus SWAINSON, Fauna Boreali Americana, II, 1831, 316.

(B 94, C 309, R 375, C 453, U 406.)

GEOGRAPHICAL RANGE: Temperate North America; from the southern United States north in the eastern provinces of the Dominion of Canada to about latitude 46°; rare or casual only in the maritime provinces; in the interior in Manitoba north to about latitude 50°; west, in the United States, to the eastern slopes of the Rocky Mountains from Montana to Colorado, western Kansas, the Indian Territory, and the eastern half of Texas. Casual in Utah (Salt Lake City) and southern Arizona (Chiricahua Mountains).

The Red-headed Woodpecker, one of the best known and handsomest species of the *Picidae* found in the United States, is unquestionably the most disreputable representative of this family; but this fact does not appear to be very

generally known. Throughout the greater portion of the eastern United States it is a rather irregular resident. Many of these birds winter along our northern border, in certain years, when they can find an abundant supply of food; in fact, it is not unusual to find the Red-headed Woodpecker at such times in localities where snow falls to a depth of 3 feet and more. Throughout the western parts of its range, however, it appears to migrate pretty regularly, and it is rare to see one of these birds there, north of latitude 40° , in winter. In the eastern portions of the New England States, bordering the Atlantic Ocean, it is rather rare, and the same remarks apply to that part of New York east of the Hudson River, and to Vermont east of the Green Mountains, where it is only a casual summer visitor. Its breeding range is coextensive with its distribution. Birds that migrate usually return to their summer homes about the latter part of April or the beginning of May, and leave for the south again about the first of October. Their movements are very uncertain at all times, and are evidently regulated largely by the food supply; even on their breeding grounds, where they may be common one year, not a single pair may be found the next. Its favorite resorts in summer are the borders of woods, fringes of timber along streams, solitary trees in fields and pastures, shade trees along country woods, and on the treeless prairies of some of our Western States it contents itself with telegraph poles, fence posts, etc. In the South, newly cleared fields in which a number of dead, girdled trees still remain standing are much resorted to, and in such localities these birds are very abundant at almost all seasons, but especially in winter.

In summer the food of the Red-headed Woodpecker consists to a considerable extent of insects of different kinds, such as grasshoppers, ants, beetles, and flies, many of which are caught on the wing, and of such larvæ as may be hidden under the bark of trees, or in rotten wood; but it rarely digs out those of the wood-boring beetles which are found in more solid trees. At this season it also feeds largely on fruits and berries, such as cherries, apples, pears, figs, peaches, and grapes, as well as on blackberries, raspberries, mulberries, poke and elder berries, green peas, and Indian corn in the milk; and last, but not least, on young birds and eggs. In the late fall and winter its diet is more largely vegetable, one of its staples being beechnuts; the berries of the sour gum, dogwood, and palmetto are also largely eaten; acorns, Indian corn, and small grains are likewise used, and it is well known that these birds also store away supplies, consisting both of insects and vegetable matter, for winter use.

One of the strangest things in the life history of this species, so entirely different in every respect from the habits of all our other Woodpeckers, is the fact that it feeds on both the eggs and young of other birds. I would hesitate somewhat to record such an exceedingly pernicious habit if I had the least doubt as to it and had not personally witnessed it. I have been aware of the fact that it did sometimes throw out the eggs of other birds nesting in cavities in trees, since May 18, 1885, when I found a Red-headed Woodpecker rifling the nest of a Red-shafted Flicker near Fort Custer, Montana, where both these species were not uncommon. The cavity contained six fresh eggs, two of which had

already been thrown out, and I caught the Red-head in the act, coming out of the hole with his bill stuck through the third. At that time I simply considered this act on its part as a forcible appropriation of a coveted nesting site, as suitable trees were scarce in this vicinity, and thought no more about the matter. The next year I saw the following article in the "Oologist" (Vol. 3, April, 1886, p. 29), which I was rather reluctant to believe at first, written by a gentleman signing himself L. B. F., Augusta, Ga.:

"Cannibalism of the Red-headed Woodpecker.—I noticed two interesting incidents last spring connected with a Red-headed Woodpecker, which may interest the readers of the 'Oologist.' Early in May I found a nest of this bird containing six eggs, situated in the dead branches of an oak, 30 feet high. Near by a Crested Titmouse had industriously carved out his little home, in which he was feeding a nest full of young. A few days after, having taken the Woodpecker's eggs (I needed them for my collection), I was watching the Titmouse's nest to see him feed his little ones, when suddenly the owner of the robbed nest flew down and lit near the entrance to the nest of its neighbor, and thrusting his head inside, he deliberately drew out a young bird, carried it to a branch near by, and ate it. He and his mate repeated the same action until they had killed the whole brood; after which, having pulled out the lining of the nest, they flew away. This was very surprising to me, as I have never heard of Woodpeckers indulging in cannibalism before. But I had not yet done with the actions of the Woodpeckers. A week or so after having broken up the Crested Titmouse nest, I noticed the Red-heads repeatedly visiting the site of their old nest. This aroused my curiosity, and supposing they had decided to lay a new clutch, I visited the cavity to see whether my supposition was true. What was my surprise to find that the hollow contained not eggs, but the decaying body of a Great Crested Flycatcher. How it came there I know not; but I am fully convinced that the Red-heads visited the spot for the purpose of devouring the vermin which infested the decaying flesh."

A similar incident is recorded in the same periodical (Vol. 5, June, 1889, p. 113), where one of these birds was seen, near Hyde Park, Ontario, July, 1886, carrying away a freshly killed young robin. Mr. W. G. Smith, formerly of Loveland, Colorado, well known as a perfectly reliable and careful observer, writes me: "The Red-headed Woodpecker is a common summer resident in the lower foothills along the eastern slopes of the Rocky Mountains in this State, and I consider it a veritable butcher among our Nuthatches and Chickadees, driving every one away from its nesting sites, and woe to the bird that this villain can reach. It destroys both eggs and young, dragging the latter out of their nests and frequently leaving them dead at the entrance of their holes."

Mr. Howard Jones, Circleville, Ohio, I believe was the first naturalist to record the fact that this species robbed the nests of other birds of their eggs, and states how a colony of Cliff Swallows which had established themselves under the eaves of a large barn, near Mount Sterling, Ohio, was nearly exter-

minated by these pests. (See "Ornithologist and Oologist," Vol. 8, July, 1883, p. 56.) To these instances I will now add my own testimony, if further confirmation of the evil doings of this handsome freebooter is wanted.

On the evening of July 1, 1892, while walking with Dr. William L. Ralph along the border of an open piece of mixed woods, used as a pasture, near Holland Patent, New York, we noticed a Red-headed Woodpecker take something, apparently a bunch of moss, from a crotch of a maple and carry it to a fence post of an adjacent field. After worrying some time in trying to swallow something rather too large for his gullet, he finally succeeded, after an effort, and then worked some little time, evidently trying to secrete the remainder. Both of us had our field glasses and were watching the bird's actions closely. After some little time he flew back to the tree he had started from, while we proceeded to the fence post to investigate, and, much to our disgust and surprise, we found the freshly killed and partly eaten body of a young bird, almost denuded of feathers, securely tucked away behind the loose bark of the post. His victim was too much mutilated to identify positively, but looked like a half-grown Bluebird, whose head had been crushed in, the brain abstracted, and the entire rump and entrails torn out; the only parts left intact were the breast, upper part of the back, and the lower portion of the head. The missing parts had evidently just been eaten by the rascal while clinging to the top of the post, and the remnant was then hidden for future use. After carefully replacing this as nearly as possible in the position in which it was found, we returned; but I was interested enough to revisit the spot next morning, only to find that the Red-headed Woodpecker had evidently been there before me and breakfasted on the remains of the bird, as not a vestige of the victim was there to tell of the tragedy. It is sincerely to be hoped that all Red-headed Woodpeckers are not addicted to cannibalism; but when this matter is looked into more carefully I fear that this habit will be found not uncommon.

Its flight, like that of all Woodpeckers, is undulating and surging, and the bird looks especially graceful and pleasing on the wing. It is an adept fly-catcher, and its vision is exceedingly sharp. A considerable portion of its food is picked up from the ground. I have seen one drop down from his perch on some dead limb, fully 20 feet overhead, pick up a small beetle out of the grass, fly back to its perch to eat it, and repeat the same performance as soon as another was espied. I have also seen them cling to the side of a tree or fence post, perfectly motionless, for fifteen minutes at a time.

Dr. William L. Ralph tells me that the Red-headed Woodpecker is the latest of these birds to arrive on its breeding grounds in Putnam County, Florida, where it rarely begins laying before May 1. It undoubtedly spends the winters in some other part of the State where the food supply is more abundant. It is known to breed throughout the South, from Florida westward through the eastern half of Texas, and to the foothills of the Rocky Mountains where it is fairly common, in suitable localities, from Colorado northward, but it has not yet been found in New Mexico. In the South it is stated to raise two

broods in a season, but in the northern parts of its range it raises only one. While stationed at Camp Harney, Oregon, I was much surprised to see a headdress of a prominent Pah-Ute chief profusely decorated with a number of the heads of the Red-headed Woodpecker, and I was led to believe that it might possibly occur in the vicinity, but learned subsequently that an enterprising Indian trader had imported a number of the skins from the East and sold them to the Indians at fancy prices. Mr. Robert Ridgway records having seen one near Salt Lake City, Utah, probably a straggler, and I know of only one other reliable record west of the Rocky Mountains, that of a bird taken by Mr. W. W. Price, in the Chiricahua Mountains, Arizona.

Like most Woodpeckers, the Red-headed is rather noisy during the mating season, continually frolicking and playing hide and seek with its mate, and when not so engaged, amusing itself by drumming on some resonant dead limb, or on the roof and sides of houses, barns, etc. It is a rather suspicious bird, but where not molested it will occasionally nest in close proximity to houses. Its ordinary call note is a loud "tchur-tchur;" when chasing each other a shrill note like "chärr-chärr" is frequently uttered, and alarm is expressed by a harsh, rattling note, as well as by one which, according to Mr. Otto Widmann, is indistinguishable from the note of the Tree-frog (*Hyla arborea*). He tells me that both bird and frog sometimes answer each other. I consider this species rather quarrelsome and domineering, both toward its own kind and with other birds, and see little in its general character to commend. From an economic view, it appears to me certainly to do fully as much if not more harm than good, and I consider it less worthy of protection than any of our Woodpeckers, the Yellow-breasted Sapsucker not excepted.

In the northern parts of its range nidification begins usually during the last week in May or the first week in June. Some of its nesting sites are exceedingly neat pieces of work; the edges of the entrance hole are beautifully beveled off, and the inside is as smooth as if finished with a fine rasp. The entrance is about $1\frac{3}{4}$ inches in diameter and the inner cavity varies from 8 to 24 inches in depth; the eggs are deposited on a layer of fine chips. It usually nests in the dead tops or limbs of deciduous trees, or in old stumps of oak, ash, butternut, maple, elm, sycamore, cottonwood, willow, and other species, more rarely in coniferous and fruit trees, at heights varying from 8 to 80 feet from the ground, and also not infrequently in natural cavities. On the treeless prairies it has to resort mainly to telegraph poles and fence posts, and here it also nests under the roofs of houses or in any dark corner it can find.

Incubation lasts about two weeks, and both sexes assist in this labor, as well as in the preparation of the nesting cavity; an egg is laid daily, and incubation sometimes commences before the set is completed. The young of this species are fed in the ordinary way, at any rate after they are half grown, the parents bringing their food in their bills. The number of eggs to a set varies from four to seven, sets of five being most frequently found, while occasionally as many as eight eggs have been taken from a nest. Mr. R. C. McGregor records taking

a set of ten eggs of the Red-head, varying in size from ordinary down to that of the Song Sparrow. Incubation varied from fresh in the smallest egg to advanced in the larger; the nest was in the end of a rotten limb of a large willow, about 20 feet from the ground. Locality, Crow Creek, Weld County, Colorado, May, 1887.¹ Like the eggs of all our Woodpeckers, they are pure china-white in color; the shell is fine grained and rather glossy, and when fresh they are quite translucent; they are mostly short ovate in shape, and show but little variation in this respect.

The average measurement of sixty eggs in the United States National Museum collection is 25.12 by 19.25 millimetres, or about 0.99 by 0.76 inch. The largest egg of the series measures 26.92 by 20.32 millimetres, or 1.06 by 0.80 inches; the smallest, 22.90 by 18.03 millimetres, or 0.90 by 0.71 inch.

The type specimen, No. 23423 (not figured), from a set of five eggs, was taken by Mr. C. W. Richmond, near Washington, D. C., June 23, 1885.

40. *Melanerpes formicivorus bairdi* RIDGWAY.

CALIFORNIAN WOODPECKER.

Melanerpes formicivorus bairdi RIDGWAY, Bulletin No. 21, U. S. National Museum, 1881, 34, 85.

(B 95, C 310, R 377, C 454, U 407.)

GEOGRAPHICAL RANGE: Northern and western Mexico, northern Lower California, and adjacent portions of the United States, from western Texas, New Mexico, and Arizona, north through California into western Oregon to about latitude 44°; east to the western slopes of the Sierra Nevada and Cascade mountains in California and Oregon. Sporadically on the eastern slopes of the Cascades in Lake and Klamath counties, Oregon.

In suitable localities, the Californian Woodpecker is one of the most abundant and familiar species along our southern border, and it is also rather common in many portions of California and western Oregon. Being essentially a bird of the oak belt, this handsome Woodpecker need only be looked for where these trees are abundant. In the northern portions of California and in southwestern Oregon it is rarely met with at a greater altitude than 4,500 feet, but in Arizona, New Mexico, and in northern Lower California it is often found at considerable distances above this point. In California it reaches the eastern limits of its range on the western slopes of the Sierra Nevadas, and in Oregon it rarely crosses over to the eastern slopes of the Cascades. As far as I have been able to ascertain, it reaches the northern limits of its range in Oregon, and it appears to be rare or entirely absent in the northwestern parts of this State. I have been unable to find a single reliable record of its occurrence in Washington, and do not believe that it has ever been met with so far north. It attains the eastern limit of its range, as far as known, in the Santa Fe Mountains, in northern New Mexico, where Mr. H. W. Henshaw secured several specimens, and it is also common in the Guadalupe and Davis Mountains, and

¹The Oologist, vol. 5, March, 1888, p. 44.

in the hilly country in the vicinity of Harris Lake, near the head waters of the Guadalupe River, in Kerr County, Texas. A female, shot on November 25, 1894, in the vicinity of this lake, was recently sent me for examination by Mr. H. P. Attwater, of San Antonio, Texas, and he writes me that it is reported as fairly common there in winter, and may possibly also breed there. This, as far as I can ascertain, marks the most eastern point of its known range within our borders.

Messrs. L. Belding and A. W. Anthony both met with the Californian Woodpecker in northern Lower California, and it is well known to be a common inhabitant of many localities in northern Mexico. It is usually a resident and breeds wherever found, and it is generally more partial to the canyons and foothill regions than to the extensive level tracts and larger valleys.

The Californian Woodpecker is by far the most social representative of this family found within the United States, and it is no unusual occurrence to see half a dozen or more in a single tree. It is also a well-disposed bird, and seldom quarrels or fights with its own kind or with smaller species; but it most emphatically resents the thieving propensities of the different Jays, Magpies, and Squirrels, when caught trespassing on its winter stores, attacking these intruders with such vigor and persistency that they are compelled to vacate the premises in a hurry. Its manner of flight and call notes closely resemble those of the Red-headed Woodpecker, and, like it, it loves to cling to some convenient dead limb near the top of a tree and drum for hours at a time. It is one of the most restless Woodpeckers I know of, and never appears to be at a loss for amusement or work of some kind, and no other bird belonging to this family could possibly be more industrious. During the spring and summer its food consists, to a great extent, of insects, including grasshoppers, ants, beetles, and different species of flies, varied occasionally with fruit, such as cherries, which are carried off whole, apples, figs, and also berries and green corn; but acorns always form its principal food supply during the greater portion of the year, and large numbers are stored away by it in the thick bark of pines, as well as in dry and partly rotten limbs of oak and other trees, also in telegraph poles and fence posts. This peculiar habit of storing acorns in receptacles especially made for this purpose, and not under loose bark or similar hiding places, seems, however, to be principally confined to the birds found in California and southwestern Oregon, while it has not as yet been noted, to the same extent at least, in the somewhat smaller birds found in Arizona and New Mexico; and this habit is far too noticeable to have been overlooked by the many careful ornithologists who have visited Arizona since I was there in 1872 and 1873, and have had far better opportunities for observing its habits than I enjoyed. Although I traveled over considerable areas in both years where these birds were fairly common in places, I saw no evidence of their storing acorns in the way they do in the more northern parts of their range, though I must confess that I was then generally far more on the lookout for hostile Indians than ornithological matters.

Dr. E. A. Mearns, United States Army, separated the birds found in Arizona from those in California and Oregon, describing the southern form as *Melanerpes formicivorus aculeatus*, and taking into consideration the principal difference claimed by him, which appears to be constant, and also some apparent discrepancies in its general habits, I believe it is as well entitled to subspecific rank as not a few other now recognized subspecies. The most notable difference of this southern form from other recognized races of this species is the small size and peculiar shape of the bill. Referring to its habits, the Doctor says: "A very common resident in the pine belt, breeding plentifully. I have found it as high as the spruce forests, but never in them. It is essentially a bird of the pines, only occasionally descending to the cottonwoods of the low valleys. The oaks which are scattered through the lower pine zone supply a large share of its food. Its habit of industriously hoarding food in bark of pines and in all sorts of chinks and hollows is well known. These stores are the source of unending quarrels between this Woodpecker and its numerous pilfering enemies, and I have laid its supplies under contribution myself, when short of provisions and lost from the command with which I had been traveling, by filling my saddlebags with half-dried acorns from under the loose bark of a dead pine."¹

In Mexico it is reported that they store acorns in the dry flower stalks of the yuccas and the maguay, *Agave americana*, which is generally known as the "mesal plant" in Arizona.

In the Rogue River Valley, in southwestern Oregon, I found these birds exceedingly abundant in the canyons and foothills along the western slopes of the Cascade Mountains, and here one could see evidences of their industry every little while. I have seen the thick bark of large sugar and other pines, as well as partly decayed oak limbs and telegraph poles, completely riddled with small holes. Some trees certainly contained thousands of holes. A section of a partly decayed oak limb now before me, which is 3 feet 2 inches long and 5½ inches in diameter, of which only about three-fifths of the surface has been utilized (the remainder having probably been found too solid) contains 255 holes by actual count. These holes are circular, and average about three-quarters of an inch in depth by half an inch in diameter; each one is intended to hold a single acorn, and they are generally placed from half an inch to an inch apart. The acorns fit these holes pretty accurately, and are apparently always driven in point foremost, the base of the acorn being flush with the surrounding wood and not readily extracted. It seems improbable and almost impossible, for a single pair of these birds to be able to excavate all the holes found in certain favorite trees, and I believe that stores so put away are shared in common by a number of birds living in the vicinity. There is considerable difference in the edible qualities of acorns; some are exceedingly palatable, while others are rather bitter. The Californian Woodpeckers know this, and as far as I have been able to detect only select the sweet ones. The supposition that they store only wormy ones, and allow the inhabitant to get fat before eating it, is nonsense; the meat

¹ The Auk, Vol. VII, 1890, pp. 249-254.

of the acorn is the attraction, not the worm in it, and there is no doubt that it furnishes their principal food during the winter, and more or less during the remainder of the year as well. To get at their contents, they are carried to a convenient tree where a limb has been broken off; the acorn is then driven firmly into some suitable crack between the splinters, or in a crevice in the bark (any place which holds it firmly answering the purpose) it is soon split open, the outer hull removed, and the kernel is then ready to be eaten.

Mr. F. Stephens writes me: "The Californian Woodpecker is an abundant winter resident in the oak forest, on the mountain slopes in southern California, and a rather common summer resident in mixed oak and pine forests; less common, though still not rare, in summer, in the oaks below the pines. It is always active and noisy, and more or less gregarious. At one of my camps in the pine region of Smith's Mountain a family of this species developed the sap-sucking habit. I had noticed some fresh holes in the bark of two live oaks, a foot or two from the ground, from which sap was flowing, and later I saw the birds drinking; in one case three were seen drinking at the same time. This is the only instance of the habit in this species that has come under my observation."

I found the Californian Woodpecker very abundant on the western slopes of the Cascade Mountains, on the wagon road from Fort Klamath to Jacksonville, Oregon, in the middle of June, 1883. Shortly after crossing the summit, and as soon as the first oak trees were met with along the western slope of the mountains, some of these birds were continually in sight, and their loud "tchurr, tchurr" could be heard in all directions. Several nests with young were found, and these made a buzzing sort of noise when disturbed; a single set of four slightly incubated eggs, one of them a runt, was taken on June 15, 1883, probably a second laying, the first set having been destroyed, as nearly all the birds had good-sized young at that time. The nests were all situated in live-oak trees, from 15 to 25 feet from the ground. The site, from which I obtained the set of eggs, was excavated on the under side of one of the main branches of a good-sized oak, about 22 feet from the ground, some eight feet away from the main trunk, and rather difficult to get at. I never saw Woodpeckers so abundant anywhere as this species was here. Evidences of their indefatigable industry were frequently visible. A telegraph pole was observed which was fairly honeycombed with small holes, and a large black pine had the bark perforated from near the base of the tree fully 40 feet up and all around the trunk. This tree alone must have contained several thousand holes. The only locality where I have observed this species on the eastern slopes of the Cascade Mountains was near Pelican Bay, on the west side of Klamath Lake, where a few straggling oaks existed, the only ones I have seen on that side of the mountains; this accounted for the presence of this Woodpecker there. It was quite rare, however, only three birds being noticed. I am erroneously quoted in "Nests and Eggs of American Birds," by Oliver Davie (3d edition, 1889, p. 220), as having found this species breeding near Camp Harney,

Oregon; I never met with this bird in southeastern Oregon, and know that it does not occur there.

Mr. J. K. Lord, the naturalist of the British Boundary Commission, on May 25, 1860, observed this species on the head waters of the Deschutes River, Oregon, also on the eastern slopes of the Cascades, among a mixed growth of pines and oaks. The latter are found here only in a few localities, and are not generally distributed through this region. He does not claim to have met this species in Washington, and is misquoted in "History of North American Birds" (Vol. II, 1874, p. 568).

Viewed from an economic standpoint, the Californian Woodpecker deserves protection, as it is unquestionably more beneficial than otherwise. The small amount of fruit it steals during a season is fully paid for by the insects and their larvæ it destroys at the same time.

In the more southern portions of its range nidification commences sometimes as early as April, and somewhat later farther north. The nesting sites are mostly excavated in white-oak trees, both living and dead, but preferably one of the former is selected in which the core of the tree is decayed. It also nests occasionally in sycamores, cottonwoods, and large willow trees, and more rarely in telegraph poles. Both sexes assist in the excavation of the nesting site, as well as in incubation. The entrance hole is about $1\frac{3}{8}$ inches in diameter, perfectly circular, and is sometimes chiseled through 2 or 3 inches of solid wood before the softer and decayed core is reached. The inner cavity is gradually enlarged as it descends, and varies from 8 to 24 inches in depth, usually being from 4 to 5 inches in diameter at the bottom, where a quantity of the fine chips are allowed to remain, on which the eggs are deposited. In the Rogue River Valley the nesting season is at its height about the latter part of May, and full sets of fresh eggs may be looked for here about the 20th of that month. I have seen the parents here carrying food in their bills to the young, and I believe they are mostly fed in this way. The number of eggs laid to a set is usually four or five, rarely more. Mr. F. H. Fowler, Fort Bowie, Arizona, writes me that he has taken a set of ten, saying, however, "evidently the product of two females."

Like the eggs of all Woodpeckers, they are pure white in color; the shell is fine grained and not nearly as glossy as in the eggs of the preceding species. They are mostly short ovate in shape, a few only being elongate ovate.

The average measurement of nineteen specimens in the United States National Museum collection is 25.40 by 19.05 millimetres, or 1.00 by 0.75 inch. The largest egg measures 26.42 by 19.81 millimetres, or 1.04 by 0.78 inches; the smallest, 24.38 by 18.29 millimetres, or 0.96 by 0.72 inch; and a runt egg, 19.05 by 13.21 millimetres, or 0.75 by 0.52 inch.

The type specimen, No. 19414 (not figured), Bendire collection, from a set of four eggs, was taken by the writer near Ashland, Oregon, on June 15, 1883.

41. *Melanerpes formicivorus angustifrons* BAIRD.

NARROW-FRONTED WOODPECKER.

Melanerpes formicivorus var. *angustifrons* BAIRD, Ornithology of California, I, 1870, 405.
(B —, C 310a, R 377a, C 455, U 407a.)

GEOGRAPHICAL RANGE: Southern portions of Lower California.

The Narrow-fronted Woodpecker, a slightly smaller race with a brighter sulphur-yellow throat and a narrower frontal band than the Californian Woodpecker, is confined to the more southern portions of the peninsula of Lower California. It was described by the late Prof. Spencer F. Baird, in the "Ornithology of California, 1870" (p. 405), from specimens obtained by Mr. J. Xantus, in the vicinity of Cape St. Lucas, Lower California. Since then Mr. L. Belding found it common at Miraflores, and still more abundant in the Victoria Mountains. Mr. M. Abbott Frazar, while collecting for Mr. William Brewster, in 1887, in the Sierra de la Laguna, Lower California, found a nest of this subspecies on June 3, containing four eggs, which are now in Mr. Brewster's collection. He describes these as white, with a rather dull gloss, varying in shape from blunt ovate to broad elliptical oval, measuring, respectively, 0.95 by 0.75, 0.94 by 0.74, 0.89 by 0.77, and 0.89 by 0.76 inch; or 24.13 by 19.05, 23.88 by 18.80, 22.61 by 19.56, and 22.61 by 19.30 millimetres. Mr. Frazar tells me that, as nearly as he remembers, the nesting site was in a dead pine stump at no very great distance from the ground. Its general habits, food, etc., appear to be very similar to those of the Californian Woodpecker. There are no eggs of this subspecies in the United States National Museum collection.

42. *Melanerpes torquatus* (WILSON).

LEWIS'S WOODPECKER.

Picus torquatus WILSON, American Ornithology, III, 1811, 31, Pl. XX, Fig. 3.
Melanerpes torquatus BONAPARTE, Geographical and Comparative List, 1838, 40.
(B 96, C 311, R 376, C 456, U 408.)

GEOGRAPHICAL RANGE: Western North America; from western Texas, New Mexico, and Arizona through Colorado, Wyoming, western South Dakota, Montana, and intervening regions west to the Pacific coast; north to southern British Columbia on both sides of the Cascade Mountains, and to southern Alberta, in the Dominion of Canada. Casual in western Kansas.

Lewis's Woodpecker, a handsome and rather peculiarly colored species, whose rich dark crimson and bristle-like breast feathers identify it at once, is of common occurrence in suitable localities throughout the West, ranging from the eastern slopes and foothills of the Rocky Mountains and adjacent ranges westward to the Pacific coast. In the more northern parts of its range it is only a summer visitor, and from about latitude 38° south it is an irregular resident,

retiring to the lower foothills and valleys to winter. It is especially abundant along the eastern slopes of the Sierra Nevadas, in California and Nevada, as well as on those of the Cascades in Oregon and Washington, and on both sides of the Blue Mountains and connecting ranges in Oregon, Washington, and Idaho. In the immediate vicinity of the coast it is not so common and occurs only sparingly, but a few appear to winter here.

Mr. R. H. Lawrence writes me: "I occasionally saw one in January, 1892, at Vancouver, and later in the season several apparently nested in the vicinity of Ridgeville, Clarke County, Washington, in the broken tops of large cottonwoods or willows, on the border of a slough of the Columbia called 'Lake River.' In the summer these birds came to feed in some cherry trees by the farmhouse where I stopped. Upon flying away each one usually carried off a cherry in its bill. The only call or note of this bird I have heard is a kind of peeping twitter, a sound that is weak and feeble for a bird of this size to give. On July 10, 1892, I saw one on a cherry tree in the garden, circling for insects; each time it flew a robin chased it, almost touching it, as valiant as a Crow after a Hawk, but the bird made no resistance to the several attacks. I also observed this species, on September 27, 1893, near Wilson's Peak, in southern California, at an altitude of about 5,200 feet, flying by with an acorn in its bill."

Mr. F. Stephens writes me: "*Melanerpes torquatus* is irregular in appearance in southern California, but is at times abundant. I have seen this species under circumstances that warrant the belief that it occasionally breeds here, but such instances are rare."

It probably breeds in small numbers in the pine forests of the higher mountain ranges in Arizona and southern New Mexico, where it has been found at all seasons of the year by different observers. I saw large flocks near my camp on Rillito Creek, during the winter of 1872-73, on several occasions; they are more or less gregarious at this season. In northern New Mexico and in Colorado it is a common summer resident up to 7,000 feet; these remarks apply also to similar regions in Wyoming and Montana. The eastern limit of its breeding range extends to the Black Hills, in South Dakota, where Mr. W. T. Wood took a specimen on August 2, 1856, which is now in the United States National Museum collection. In winter it has been met with in western Texas, and it straggles also occasionally into the western parts of Kansas. Although I have not been able to find a single reliable record of this bird having been taken in any of the northern States of the Mexican Republic, I am confident it will yet be found there as a winter visitor. I have met with Lewis's Woodpecker in the vicinity of nearly all the Military Posts I have been stationed at in the West, but found it nowhere so abundant as along the southern slopes of the Blue Mountains, in the vicinity of Camp Harney, Oregon, during the years 1875 to 1878. Here it was only a summer resident, usually arriving about the 20th of April, and in some seasons from seven to ten days later. It is by far the most silent Woodpecker I have met, and, aside from a low twittering, it

rarely utters a loud note. Even when suddenly alarmed, and when it seeks safety in flight, the shrill "huit, huit" given on such occasions by nearly all of our Woodpeckers is seldom uttered by it. Only when moving about in flocks, on their first arrival in the spring and during the mating season, which follows shortly afterwards, does it indulge in a few rattling call notes, resembling those of the Red-shafted Flicker, and it drums more or less, in a lazy sort of way, on the dead top of a tall pine, or a suitable limb of a cottonwood or willow. Its flight is not nearly as swift as that of the majority of our Woodpeckers, and reminds one more of that of Clarke's Nutcracker and some of our Jays, being accompanied by a considerable amount of flapping of the wings; it is also less undulating and more direct. In summer its food consists mainly of insects of different kinds, such as grasshoppers, large black crickets, ants, beetles, flies, larvæ of different kinds, as well as of berries, like wild strawberries and raspberries, service berries and salmon berries, acorns, pine seeds, and juniper berries, while in cultivated districts cherries and other small fruits enter into its daily bill of fare. Here, when common, it may occasionally do some little damage in the orchards, but this is fully compensated by the noxious insects it destroys at the same time. In localities where grasshoppers are abundant they live on these pests almost exclusively while they last. Mr. Shelly W. Denton tells me he noticed this Woodpecker gathering numbers of May flies (*Ephemera*) and sticking them in crevices of pines, generally in trees in which it nested, evidently putting them away for future use, as they lasted but a few days. It is an expert flycatcher, and has an extremely keen vision, sallying forth frequently after some small insect when this is perhaps fully 100 feet from its perch. Solitary trees, such as have a few dead limbs near their tops and afford a good outlook over the surrounding country, are much liked by them, and such a one is almost certain to be tenanted by a pair of these birds, if there are any to be found in the vicinity. I have rarely seen Lewis's Woodpecker in deep forests; far more frequently just on the outskirts of the pines, in juniper groves on the table-lands bordering the pines, as well as in the deciduous timber along streams in the lowlands, and occasionally even in solitary cottonwoods or willows, near some little spring, in the drier sagebrush-covered flats, miles away from the nearest forest; it is by no means as particular in the choice of a nesting site as the majority of our Woodpeckers. Shortly after arriving on their breeding grounds a suitable site is selected for the nest, and not infrequently the same excavation is used for successive years. In most cases the nesting sites are excavated either in the tops of tall pines or in dry cottonwoods, and in tall rotten tree trunks, occasionally in partly decayed limbs of sycamores, oaks, and less frequently in junipers and willows. The nests, as a rule, are not easily gotten at, and quite a number are practically inaccessible, varying in height from 6 to fully 100 feet from the ground. Dr. C. T. Cooke informs me that in the vicinity of Salem, Oregon, it usually nests in oaks, and is a rare breeder there. Lieut. H. C. Benson, United States Army, has sent to the National Museum a set of five eggs, taken near Gilroy, California, on May 8, 1894.

Mr. W. G. Smith took several sets of eggs near Loveland, Colorado, during the first ten days in June, and I have found it breeding near Fort Lapwai, Idaho, at Walla Walla, Washington; and at Fort Klamath and Camp Harney, Oregon. At the latter place these birds nested mostly in junipers, and their eggs were comparatively easily obtained. I have taken fresh eggs, a set of eight, here on May 17, and another of seven as late as June 29, showing the nesting season to be somewhat variable. The junipers which are selected for nesting sites were invariably decayed inside, and after the birds had chiseled through the live wood, which was usually only from 1 to 2 inches thick, the remainder of the work was comparatively easy; the same site, if not disturbed, was occupied for several seasons, and in such the inner cavity was much deeper, some being fully 30 inches deep and generally about 4 inches wide at the bottom. The entrance hole varies from 2 to $2\frac{1}{2}$ inches in diameter, and when this is made by the birds it is always perfectly circular; but occasionally a pair will take advantage of an old knot hole, if it and the cavity it leads to are not too large. The presence of fresh chips found at the bottom of the tree enabled me to readily tell if the site was a newly made one, or one of the previous year, and a rap against the trunk easily told if it was occupied. On its breeding grounds Lewis's Woodpecker appears to be a stupid and rather sluggish bird; it does not show nearly as much parental affection as most of the other members of this family, and it is much less demonstrative. It is not at all shy at such times, and will often cling to some convenient limb on the same tree while its eggs are being taken, without making the least complaint. A second and smaller set is generally laid a couple of weeks later, if the first one is taken, and not infrequently in the same nest, if the entrance hole has been left intact. Both sexes assist in incubation, and this lasts about two weeks. The young leave the nest about three weeks after they are hatched, and are readily tamed. I kept a couple for several days, but they had such enormous appetites that I was glad to give them their liberty, as they kept me busy providing suitable food. They were especially fond of grasshoppers, but also ate raw meat, and climbed everywhere over the rough walls of my house. A considerable share of the food of these birds is picked up off the ground, and they appear to be much more at home there than Woodpeckers generally are. The young are fed on insects, and I believe also on berries; I have seen one of these birds alight in a wild strawberry patch, pick up something, evidently a strawberry, fly to a tree close by in which the nest was situated, and give it to one of the young which was clinging to the side of the tree close to the nesting site.

From five to nine eggs are laid to a set; those of six or seven are the most common, but sets of eight are not very rare; I found several of that number, and a single set of nine.

The eggs of Lewis's Woodpecker vary greatly in shape and also in size. They are mostly ovate or short ovate in shape, but an occasional set is decidedly rounded ovate, while others are elliptical ovate; the shell is close grained and, in

most cases, dull, opaque white, without any gloss whatever. Some sets, however, are moderately glossy, but scarcely as much so as the better-known eggs of the Red-headed Woodpecker, and none are as lustrous as the eggs of the Flicker.

The average measurement of one hundred and seventy-one specimens in the United States National Museum collection is 26.23 by 20.26 millimetres, or about 1.03 by 0.80 inches. The largest egg of the series measures 29.97 by 22.35 millimetres, or 1.18 by 0.88 inches; the smallest, 23.88 by 16.51 millimetres, or 0.94 by 0.65 inch; and a runt egg, 18.80 by 15.24 millimetres, or 0.74 by 0.60 inch.

The type specimen, No. 19363 (not figured), Bendire collection, from a set of nine eggs, was taken by the writer near Camp Harney, Oregon, on May 24, 1877; incubation had commenced in seven of these eggs and two were fresh; the male was caught in the nest.

43. *Melanerpes carolinus* (LINNÆUS).

RED-BELLIED WOODPECKER.

Picus carolinus LINNÆUS, *Systema Naturæ*, ed. 10, I, 1758, 113.

Melanerpes carolinus RIDGWAY, *Annals Lyceum Natural History*, New York, X, Jan., 1874, 378.

(B 91, C 306, R 372, C 450, U 409.)

GEOGRAPHICAL RANGE: Eastern United States; from Florida and the Gulf coast, north to southern New York, Pennsylvania, Ohio, southern Michigan, southern Wisconsin, southeastern South Dakota, and southern Ontario, in the Dominion of Canada; west to Nebraska, Kansas, the Indian Territory, and through about the eastern half of Texas. Rare or casual in eastern New York, Connecticut, and eastern Massachusetts.

The northern limits of the breeding range of the Red-bellied Woodpecker, also known as the "Carolina" and "Checkered" Woodpecker, "Zebra Bird," "Woodchuck," and in Florida as "Orange Sapsucker" and "Sham-shack," are not well defined as yet. It is questionable if it breeds in New York, although specimens have been taken in different localities in this State both in fall and winter. It is known to breed regularly in southwestern Pennsylvania, in Washington and Westmoreland counties, where it is a resident, and in a number of instances Red-bellied Woodpeckers have been taken much farther north in this State, mainly in winter. From southwestern Pennsylvania westward it becomes both more common and a more regular summer resident throughout its range as already indicated. In Nebraska it appears to be rare north of the Platte River, and it is also reported as a rare summer visitor in southeastern South Dakota by Dr. G. S. Agersborg, where he says it probably breeds. Strange to say, it has not been reported yet from any place in Minnesota; but it will undoubtedly be found in some of the southern counties in this State. Although the western limits of the range of this species are generally given as reaching the eastern slopes of the Rocky Mountains, I can not find any positive and reliable records of its occurrence west of the States of Nebraska and Kansas, and in these it seems to be rare in the western parts. It is fairly common and breeds

in the Indian Territory and the eastern part of Texas. It is a constant resident south of about latitude 39° , and not a few winter even at the northern limits of its range. It is a common and well-known resident in suitable localities throughout all the Southern and Middle States within its habitat. I presume, like the Red-headed Woodpecker, they are more or less irregular in their movements at this season, depending mainly on an abundant winter food supply. This handsome Woodpecker is not at all uncommon here in the adjoining counties of Maryland and Virginia, and is also met with in the District of Columbia. Here it is a resident, and prefers the more heavily timbered bottom lands and swampy woods to the hilly and drier forests. Throughout the northern portions of its range it prefers deciduous or mixed forests to coniferous, but in the south it is apparently as common in the flat, low pine woods as in the oak hammocks. Newly cleared lands in which numbers of girdled trees still remain standing are favorite resorts for this as well as other species. The Red-bellied, like the majority of our Woodpeckers, is a rather noisy bird. Its ordinary call note resembles the "tchurr, tchurr" of the Red-headed very closely; another sounds more like "chawh, chawh," and this is occasionally varied with a disagreeable creaking note, while during the mating season peculiar, low, mournful cooing sounds are sometimes uttered, which somewhat resemble those of the Mourning Dove. Its food consists of about equal proportions of animal and vegetable matter, and it feeds considerably on the ground. Insects, like beetles, ants, grasshoppers, different species of flies, and larvæ are eaten by them, as well as acorns, beechnuts, pine seeds, juniper berries, wild grapes, blackberries, strawberries, pokeberries, palmetto and sour-gum berries, cherries, and apples. In the South it has acquired a liking for the sweet juice of oranges and feeds to some extent on them; but as it always returns to the same one, until this ceases to yield any more juice, the damage done in this is but slight. It has also been observed drinking the sweet sap from the troughs in sugar camps. The injury it commits by the little fruit it eats during the season is fully attoned for by the numerous insects and their larvæ which it destroys at the same time, and I therefore consider this handsome Woodpecker fully worthy of protection. It is generally a rather shy and retiring bird throughout the greater part of its range; but in a few localities it is quite the reverse, and, according to Prof. D. E. Lantz, has been known to excavate its nesting sites in the cornices of buildings in Manhattan, Kansas. Here, as well as in some other of our prairie States, it nests also in telegraph poles.

Birds that migrate from the northern portions of their range usually arrive on their breeding grounds rather early, sometimes by March 20, and shortly afterwards preparations for nesting are commenced. A suitable site is readily found in the decayed top of some tree, or in an old stump, near a stream along the edges of a pasture, or close to some road, and less often farther in the center of a forest. Deciduous trees, especially the softer wooded ones, such as elms, basswood, maple, chestnut, poplar, willow, and sycamore, are preferred to the harder kinds, such as ash, hickory, oak, etc. In northern Florida they nest fre-

quently in pines. Several excavations are often found in the same tree in which the nest is located, and occasionally the same site, with slight repairs, is used for more than one season. Mr. E. A. McIlhenny tells me that this species is quite common near Alton, Illinois, where he saw an enormous cottonwood tree, standing near the banks of Wood River, occupied by several pairs of these birds, the tree being fairly riddled with their holes.

Mr. D. B. Burrows, of Lacon, Marshall County, Illinois, has kindly sent me the following notes on this species, as observed by him:

"The Red-bellied Woodpecker is a fairly common species in this section, and is found in the river bottoms, in the bluffs, or in the small timber tracts bordering the prairies. I also met with this species frequently in southern Arkansas, and found it to be the most common Woodpecker in north central Texas, and there it frequently makes its nest in telegraph poles. During the nesting season I have found the birds to be quite noisy about the nest, and in several instances have discovered the site, while building, by the noisy call of the bird; a search would reveal the female clinging to the tree just beneath the opening. Sometimes I have observed her standing motionless for quite a while, as though resting from her labors. This bird is a good nest builder, and with its sharp bill is able to excavate cavities in living trees. I have never found a nest in a tree that was wholly dead. Sometimes the dead extremity of an upright branch of a living tree is used, and again I have found the nest in the trunk of a living tree; in two instances I have found second-growth, living black oaks used, the nest cavity being about halfway up, where the body of the tree was not more than 7 inches in diameter. The birds do not seem to be particular as to the kind of tree used, as I have found them in many different species. The nest ranges from 15 to 60 feet from the ground. When it is reached, the birds fly about uneasily, uttering their oft-repeated "cha-cha-cha," and I have had the female alight on the same branch that I was on and but a few feet distant.

"In this part of Illinois the nesting season begins in April. I have taken fresh eggs as early as May 2 and as late as June 6, and have found young in the nest as early as the latter part of April, so that in some instances eggs are deposited quite early. I have never found more than four eggs to the clutch in this locality. In central Texas I took the first full set of five eggs on April 23, and believe they do not begin to nest much earlier in their southern range than they do here. The eggs taken from this locality average much larger than my Texas specimens, and five eggs to the clutch are not uncommon farther south."

Both sexes assist in excavating the nesting site, as well as in incubation, which lasts about fourteen days. The sites selected are usually from 5 to 70 feet from the ground, and resemble those of our other Woodpeckers in every respect, averaging about 12 inches in depth. It takes from seven to ten days to excavate a nest, and frequently the birds rest for a week afterwards before beginning to lay; an egg is deposited daily, and from three to five are usually laid to a set, rarely more. Climate seems to affect the time of their nesting very

little, as they appear to lay quite as early in the northern parts of their range as in the more southern. Full sets of fresh eggs may be looked for the last week in April and during the first half of May. Generally only one brood is raised in a season. Both parents are devoted to their eggs and young, and will frequently allow themselves to be captured rather than forsake their treasures. The eggs are white, mostly ovate in shape; the shell is fine grained and rather dull looking, with little or no gloss, resembling in this respect the eggs of Lewis's Woodpecker more than those of the Red-headed species.

The average measurement of twenty-four specimens in the United States National Museum collection (the majority of these coming from Florida) is 25.15 by 18.54 millimetres, or 0.99 by 0.73 inch. The largest egg measures 26.67 by 19.30 millimetres, or 1.05 by 0.76 inches; the smallest, 23.11 by 16.76 millimetres, or 0.91 by 0.66 inch.

The type specimen, No. 24727 (not figured), Ralph collection, from a set of four eggs, was taken by Dr. William L. Ralph, near San Mateo, Florida, on May 18, 1885.

44. *Melanerpes aurifrons* (WAGLER).

GOLDEN-FRONTED WOODPECKER.

Picus aurifrons WAGLER, Isis, 1829, 512.

Melanerpes aurifrons RIDGWAY, Proceedings U. S. National Museum, VIII, 1885, 355.
(B 92, C 307, R 373, C 451, U 410.)

GEOGRAPHICAL RANGE: Eastern Mexico; south to the City of Mexico; west to Jalisco; north into the southern portions of central Texas to about latitude 35° 10' (Young County). Apparently not found in western Texas west of longitude 101°.

The breeding range of the Golden or Yellow-fronted Woodpecker is coextensive with its geographical distribution in the United States, and it is probably a constant resident wherever found. The northern limits of its range have been considerably extended during the past few years, the most northern point where it has been found, as far as known at present, being Belknap, Young County, Texas, where Mr. G. Ragsdale observed this species in the fall of 1878, and I would not be surprised to find it still farther extended into the extreme southwestern parts of the Indian Territory and Oklahoma. While it appears to be pretty generally distributed throughout southern Texas, it is less abundant in the central districts of the State, and throughout the more western parts it appears not to be found at all. In some of the eastern portions of its range in Texas it overlaps that of the preceding species, and its general habits are very similar to those of the former. It is equally at home in the more or less stunted mesquite, huisache (*Acacia farnesiana*), and post-oak thickets of the drier plains, as in the heavier and more luxuriant forests of the river bottoms.

Mr. D. B. Burrows has kindly furnished me with the following notes on the habits of this species, as observed by him near Roma, Starr County, Texas,

on the lower Rio Grande: "The Golden-fronted Woodpecker is a common resident species in this locality, and much more abundant than Bairds' Woodpecker, the only other variety that I have found here. They may be found wherever there is a growth of trees sufficiently large to afford nesting places, but are most numerous in the river bottoms where there is a heavy growth of old mesquite timber. During the fall and winter they may be found traveling about from place to place in pairs, and are easily located by the call note, which somewhat resembles that of the Red-bellied Woodpecker, the habits of the two birds being in many respects quite similar. In the spring, when nesting, they become very noisy, and when approached, utter their alarm note with great vigor. I have never known this species to drum on a dead limb, as most of the other Woodpeckers do. When searching for food they may be seen very diligently at work near the base of old trees, among the thick bushes, or even on the ground. The nest is by preference made in the live trunks of large trees, usually the mesquite, but sometimes in a dead stump or limb, the same cavity being used year after year, and it is quite a rare thing to see a fresh excavation. The nesting season begins in April, and most of the nests contain fresh eggs by May 10. I took a set of six eggs from a cavity in a live mesquite tree, the opening being but 2 feet 9 inches from the ground, but usually they are placed from 8 to 20 feet up. Although the birds are not notably shy, yet it is my experience that they leave the nest when approached, and it is a hard matter to find the bird in the excavation. If the nest is molested, the birds return and vigorously protest."

Mr. H. P. Attwater writes me: "The nearest point where these birds nest in the vicinity of Rockport, on the Gulf coast, is in the mesquite region, from 15 to 20 miles north of this place. Here their favorite nesting sites are in telegraph poles, and there are few that are without Woodpecker holes, as they appear to make new ones every year. Near San Antonio, Texas, where the Golden-fronted Woodpecker is a common resident, it nests in all kinds of tall live timber, pecan, oak, and large mesquite trees being preferred, but telegraph poles furnished favorite sites here also. A line running out of San Antonio to a ranch nine miles distant was almost destroyed by these birds; they came from all sides, from far and near, and made fresh holes every year, sometimes as many as five or six in a single pole. Here it also nests occasionally in artificial nesting sites, like bird boxes, etc., in yards and gardens."

I have read the following statement in a newspaper, said to have been made by a prominent official of one of the transcontinental telegraph lines, of which I quote only a portion:

"Woodpeckers are attracted to telegraph poles by the humming noise of the wires, caused by the latter's vibration in the wind, they believing that the noise is made by insects boring in the poles, and these birds accordingly lost much time and energy in knocking against the poles with their bills in order to drive the supposed insects to the surface, where the latter would be readily captured if they were only there to come out."

I do not believe for an instant that these birds are quite as readily deceived as this. The real cause of their predilection for telegraph poles, in my opinion, is this: These poles are in many instances taller than the prevailing timber found in the vicinity, and afford a much better outlook over the surrounding country. All Woodpeckers are fond of clinging to the highest dry limbs they can find in the vicinity of their nesting sites; hence their preference for telegraph poles in prairie country or in mesquite and post-oak scrub, which rarely attain any great height in the dry plains and hills where they are usually found. In such sections the telegraph poles furnish not alone a better outlook, but also convenient and secure nesting sites, and they are not slow to avail themselves of such advantages.

Their food consists of insects of various kinds, such as beetles, ants, grasshoppers, also larvæ, acorns, Indian corn, and different kinds of wild berries and fruit. Considered from an economic point of view, this Woodpecker certainly does more good than harm, and the only thing that can be said against it is that in certain localities where it is common it may make itself more or less of a nuisance by injuring telegraph poles.

Nidification commences sometimes in the latter part of March, but usually not much before the middle of April; both sexes assist in this labor, and it takes from six to ten days to excavate a proper nesting site; both live and dead trees are used for this purpose, as well as telegraph poles and fence posts; the holes are rarely over 12 inches deep, and are situated at no great distances from the ground, mostly from 6 to 25 feet up. From four to seven eggs are laid to a set, usually five or six; these are pure white; the shell is close grained, dull looking, with little or no gloss, and varying in shape from ovate to short and rounded ovate.

Incubation lasts about fourteen days, and both sexes share this duty. The earliest breeding record I have is April 7, 1884, on which date the late Capt. B. F. Goss took a set of five eggs, near Corpus Christi, Texas, which is now in the United States National Museum collection. It is probable that two broods are occasionally raised in a season, as there are sets of eggs in the collection taken in June, and two of these in the latter part of this month.

The average measurement of seventy-three eggs in the United States National Museum collection is 25.85 by 19.50 millimetres, or about 1.02 by 0.77 inches. The largest egg of the series measures 27.94 by 19.56 millimetres, or 1.10 by 0.77 inches; the smallest, 22.86 by 17.78 millimetres, or 0.90 by 0.70 inch.

The type specimen, No. 20902 (not figured), from a set of four eggs, was taken by Dr. James C. Merrill, United States Army, near Fort Brown, Texas, on April 28, 1877.

45. *Melanerpes uropygialis* (BAIRD).

GILA WOODPECKER.

Centurus uropygialis BAIRD, Proceedings Academy Natural Sciences, Philadelphia, June, 1854, 120.

Melanerpes uropygialis RIDGWAY, Proceedings U. S. National Museum, VIII, 1885, 355.
(B 93, C 308, R 374, C 452, U 411.)

GEOGRAPHICAL RANGE: Southeastern California, southern Arizona, southwestern New Mexico, Lower California; south to Jalisco and Aguas Calientes, Mexico.

The Gila Woodpecker is a common resident in suitable localities throughout the greater part of southern Arizona, and is most common at altitudes of about 2,500, but it is met with here up to 4,500 feet. Although it has been reported as having been taken in several localities in New Mexico, for instance, by Lieutenant Whipple on Bill William's Fork, on February 16, 1854, this is really in western Arizona; a couple of more recent records, from Pueblo Viego, New Mexico, September 19 and 27, 1873, by Dr. C. G. Newberry, I believe will also have to be changed to Arizona, but I have been unable to find this place on any of the later maps. The only locality in New Mexico where the Gila Woodpecker seems to occur is in the Guadalupe Mountains, in the extreme southwestern corner of the Territory, where Dr. Edgar A. Mearns, United States Army, found it common along the international boundary line in the summer of 1893, and forwarded several specimens obtained in that vicinity to the United States National Museum. It reaches the northern limits of its range in the United States in the vicinity of Fort Mohave, Arizona, about latitude 35°, while in southeastern Arizona I believe it has not been detected as yet north of the Gila River, in about latitude 33°. It seems also to be found throughout the greater part of Lower California, where both Messrs. J. Xantus and L. Belding report it as common in the vicinity of Cape St. Lucas. Mr. Walter E. Bryant observed a few on Santa Margarita Island, and met with it generally along the overland route, and Mr. A. W. Anthony writes me: "I found the Gila Woodpecker not uncommon from the southern slopes of the San Pedro Martir Mountains nearly or quite to the coast of San Fernando, Lower California. Its presence was governed entirely by the giant cactus, and it was only in the near vicinity of the large growths of these that they were to be found." In a subsequent communication he states: "At the time I left my camp in the dry desert region, about 50 miles south of San Quentin, Lower California, on June 25, 1894, young of *Dryobates scalaris lucasanus*, *Melanerpes uropygialis*, and *Colaptes chrysoides* were all common in families. The cacti found here were vastly larger than in southern Arizona."

Relating to its distribution in southeastern California, Mr. F. Stephens sends me the following notes: "The western limit of this Woodpecker seems to be the Colorado River. I expected to find it in the central part of the Colorado Desert, where such species as *Dryobates scalaris bairdi*, *Pipilo aberti*, and *Harporhynchus crissalis* occur, but so far I have failed. I found a set of three partly incubated

eggs in a freshly excavated hole in a growing willow on May 4, 1886, opposite Yuma, on the California side of the Colorado River."

I first met with the Gila Woodpecker during the winter of 1871-72 in the vicinity of my camp on the Santa Cruz River, a few miles south of Tucson, and subsequently found it to be a common breeder at my permanent camp on Rillito Creek, some seven miles from Tucson. Its general habits resemble those of the Californian Woodpecker in many respects. Like it, it is a rather noisy bird; its ordinary call note, sounding like "dchürr, dchürr," can be heard in all directions in the spring; when flying from one point to another it usually utters a sharp, shrill "huit" two or three times, resembling the common call note of the Phainopepla, and which may readily be mistaken for it. It is also more or less addicted to drumming on the dead tops of cottonwood, sycamore, and mesquite trees. Its flight, like that of most Woodpeckers, is undulating, rather swift, and, on the whole, I consider it a more or less suspicious and shy bird. In southern Arizona at least, it seems to be equally partial to the well-timbered bottom lands and mountain canyons as well as to the giant cactus groves in the more arid foothill regions.

Its food consists of insects of various kinds, such as ants, beetles, grasshoppers, and larvæ, and in season largely on the sweet, fig-like fruit of the sahuaras, the giant cactus, and also, to a considerable extent, on the viscous berries of a species of mistletoe which is commonly found on most of the larger cottonwoods, oaks, and mesquite trees in these regions. These sticky, whitish-looking berries are a favorite food of many Arizona birds. While the majority of the Gila Woodpeckers in southern Arizona nest probably in sahuaras, quite a number breed also in the larger cottonwoods, sycamores, and mesquite trees, generally, however, either in inaccessible situations in dead limbs which can not be trusted, or in the live mesquite trees, in which the entrance can only be enlarged with a great deal of labor. I know no native tree whose wood is harder than this.

According to my observations, nidification in southern Arizona begins about the latter part of April, and full sets of fresh eggs may be looked for during the last two weeks in May. I found my first set of four eggs on Rillito Creek, on May 23, 1872. The nesting site was excavated in a limb of a large cottonwood tree, on the under side, and about 20 feet from the ground. The cavity was 18 inches deep and 4 inches wide at the bottom; the entrance hole was perfectly circular and only 2 inches in diameter. The limb was partly dead, and the nesting site was located in this, a few chips being left in the bottom of the hole, on which the eggs were deposited. Both birds were on hand and very uneasy while I was rifling the nest, uttering notes of protest from a limb overhead. As soon as I descended the tree they examined their despoiled home in turn, and were evidently much surprised to find their eggs gone. On May 28, 1872, I found a second nest, also containing four eggs, in a sahuara, about 20 feet from the ground. It caused me fully two hours of hard work, with two men assisting me, to get these, by planting a pole alongside and about

a foot from the cactus, and climbing up this. Incubation was about one-fourth advanced; the female was at home, but flew out as soon as the cactus was struck with a stick. The inner cavity was only $4\frac{1}{2}$ inches deep and quite roomy; the juices of the cactus formed a hard incrustation, and the eggs laid on the bare, hard floor. On May 30 I took another nest, also in a cactus, containing four much-incubated eggs. This time I tried chopping, and had ropes thrown around the top of the cactus to steady it and let it come down slowly, but this plan did not work well, and two of the eggs were broken.

Fully three-fourths of these birds nest in cacti here, while the remainder, nesting in trees, are about equally difficult to get at. Most of their nesting sites are used for several years in succession; in fact, I doubt very much if a freshly excavated hole in a giant cactus is fit to nest in the same season. Both sexes assist in excavating the nesting site, and incubation lasts about two weeks.

The number of eggs to a set varies from three to five, sets of four being most common. Like those of all Woodpeckers, they are pure white in color. The shell is fine grained and not very glossy—not nearly as much so as the eggs of the Red-headed Woodpecker; they resemble more the eggs of the other species of this genus in this respect, and in shape they vary from ovate to elliptical ovate.

The average measurement of twelve eggs in the United States National Museum collection is 24.38 by 18.09 millimetres, or about 0.96 by 0.71 inch. The largest egg measures 27.43 by 18.80 millimetres, or 1.08 by 0.74 inches; the smallest, 22.86 by 17.27 millimetres, or 0.90 by 0.68 inch.

The type specimen, No. 19418 (not figured), Bendire collection, from a set of four eggs, was taken by the writer on Rillito Creek, near Tucson, Arizona, on May 23, 1872.

46. *Colaptes auratus* (LINNÆUS).

FLICKER.

Cuculus auratus LINNÆUS, *Systema Naturæ*, ed. 10, I, 1758, 112.

Colaptes auratus VIGORS, *Zoological Journal*, III, 1827, 444.

(B 97, C 312, R 378, C 457, U 412.)

GEOGRAPHICAL RANGE: Eastern North America; from Florida and the Gulf coast north through the maritime provinces of Canada to Newfoundland and southern Labrador, and the shores of Hudson Bay, to about latitude 58°; thence in a northwesterly direction to Alaska, to about latitude 68°; west through about the eastern half of Texas, the greater part of the Indian Territory, Kansas, the eastern half of Nebraska, South and North Dakota, and the provinces of Assiniboia and Saskatchewan, Dominion of Canada, to northern British Columbia. Casual in California; accidental in Greenland and Europe.

The breeding range of the Flicker, also commonly known as "Golden-winged Woodpecker," "Yellow-shafted Flicker," "Yellow-hammer," and less often as "High-hole" or "High-holder," "Clape," "Wake-up," besides a number

of other more or less local names, is nearly coextensive with its geographical distribution. In the more northern portions of its range it is a regular migrant, while it is usually a resident south of latitude 38° , and winters in considerable numbers farther north, stragglers remaining even in Maine and New Brunswick. In the Southern States it is much more abundant in winter than in summer; still a number of these birds breed in southern Florida, while it appears to be a rather rare breeder in the immediate vicinity of the Gulf coast, in Louisiana and eastern Texas. It is a very common bird in suitable localities throughout the eastern United States and the more southern parts of the Dominion of Canada, being generally found below altitudes of 4,000 feet, and few species are more generally and better known than the Flicker. Its breeding range also is more extensive than that of any other member of this family found on the North American continent, ranging from about latitude 28° in Florida to Fort Anderson, British North America, in latitude $68^{\circ} 35' N.$, and probably still farther north. Here Mr. R. MacFarlane reports it as "by no means scarce in the valley of the Anderson; but, as its eggs were not in demand, very few indeed were gathered for transmission to Washington, D. C."¹

It probably breeds throughout Alaska; both Messrs. J. Lockhart and Robert Kennicott forwarded skins and eggs from Fort Yukon, which are now in the United States National Museum collection, and it has been taken within a few miles of the coast in Bering Strait. One of the most western breeding records known to me is that furnished by Mr. R. MacFarlane, from Fort St. James, Stewart's Lake, British Columbia, who found the Flicker not uncommon there, both skins and eggs, taken in the summer of 1890, having been forwarded by him to the United States National Museum. In Labrador it is rare, and I doubt if it breeds there to any extent, excepting perhaps in the extreme southern portions. Along the western borders of its range in the United States it intergrades with *Colaptes cafer*, and quite an extensive transition zone exists here, including western Texas, the eastern slopes of the Rocky Mountains, and adjacent ranges, in which typical specimens of both species are found, as well as many intermediates which show the chief characteristics of one or the other species more or less distinctly. The same conditions exist to a somewhat less degree on the Pacific Coast, in California, Oregon, Washington, and British Columbia, where *Colaptes auratus* from Alaska intergrades with *Colaptes cafer* from the interior, and probably also with the darker northwest coast form, known as *Colaptes cafer saturator*. For more detailed information on this subject I refer the reader to Dr. J. A. Allen's interesting paper.²

The Flicker is one of the most sociable of our Woodpeckers, and is apparently always on good terms with its neighbors. Birds which migrate usually return to their summer homes early in April, and occasionally even in March, and one will not have far to go then without hearing some of its

¹ Proceedings U. S. National Museum, 1891, vol. 14, p. 438.

² The North American Species of the Genus *Colaptes*, considered with special reference to the relationships of *Colaptes auratus* and *Colaptes cafer*, published by the American Museum of Natural History, Bulletin, Vol. IV, 1892, pp. 21-44.

many and rather melodious calls. The males usually precede the females a few days, and as soon as the latter arrive one can hear their well-known voices in all directions. One of their commonest calls at this season of the year is a clear "whick-ah, whick-ah;" another sounds like "quit-u, quit-u," a number of times repeated; "tchuck-up, tchuck-up," is another familiar sound uttered by them; a far-reaching "clape, clape" is also frequently uttered, while a quickly given rolling or rattling "thee-he-he-he-he" and a low "cäck-cäck-cäck" seem to be the notes of endearment. Another call when courting its mate sounds like "ouit-ouit" and ends with a soft "puir, puir," or a cooing "yu-cah, yu-cah." Low, chuckling sounds are also frequently uttered during their love making; another common call note sounds like "zee-ah, zee-ah," and during the summer a clear "pi-ack, pi-ack," or "pioh," is also frequently heard; in fact, no other of our Woodpeckers utters such a variety of sounds.

The Flicker is especially demonstrative during the mating season, and is an ardent wooer. It is an exceedingly interesting and amusing sight to see a couple of males paying their addresses to a coy and coquettish female; the apparent shyness of the suitors as they sidle up to her and as quickly retreat again, the sly glances given as one peeps from behind a limb watching the other—playing bo-peep—seem very human, and I have seen few more amusing performances than the courtship of a pair of these birds. The defeated suitor takes his rejection quite philosophically, and retreats in a dignified manner, presumably to make another trial elsewhere. I have never yet seen a pair of males fight over a coveted female. Few birds deserve our good will more than the handsome Golden-winged Woodpecker, and it is well entitled to all of the consideration generally shown it. Looked at from an economic point of view, it is an exceedingly useful bird, destroying many noxious insects and their larvæ, a great many of which are gleaned from the ground, as it is far more terrestrial in its habits than any other member of this family. Its beak is frequently covered with soil from digging in pastures after grubs and earthworms, and also in ant-hills after these insects or their larvæ, of which it is especially fond; it also feeds on hairless caterpillars. Different kinds of berries and fruit, such as cherries, apples, persimmons, strawberries, mulberries, raspberries, wild grapes, dogwood, whortle, poke, and sour-gum berries, and occasionally green corn, are also eaten by it. The damage it does to cultivated fruits is very trifling, and this bird deserves the fullest protection.

In the northern portions of its range nidification begins about a couple of weeks after the birds arrive from the South, and a suitable place is then selected for a nesting site. It prefers open country, interspersed here and there with groves and orchards, to the deeper forests to nest in. It is easily pleased in this respect—any old stump, a partly decayed limb of a tree, near the outskirts of a forest, along the banks of a creek, beside a country road, or in an old orchard, will answer the purpose. A fresh cavity is usually excavated every year, but where suitable trees or stumps are not readily available the same may be occupied for several seasons in succession. In the vicinity of Washington, District of

Columbia, these birds nest in the oak, ash, chestnut, elm, maple, poplar, willow and sycamore; spruce and birches are also used, but, on the whole, soft-wood trees seem to be preferred to hard ones. In the Southern States it breeds frequently in pines, and in the prairie States it occasionally selects strange nesting sites. Here it has been known to chisel through the weather-boarding of dwelling houses, barns, and other outbuildings, and to nest in the hollow space between this and the crossbeams; its nests have also been found in gateposts where both people and stock pass constantly, in church towers, and in burrows of Kingfishers and Bank Swallows in the perpendicular banks of streams. Dr. G. S. Agersborg, of Vermillion, South Dakota, records finding a nest of a Flicker in an old wagon hub, about 2 feet from the ground, and hidden by a rank growth of weeds; but the most peculiar nesting site I have ever heard of is one described to me by Mr. William A. Bryant, of New Sharon, Iowa, under date of December 7, 1892. He writes: "On a small hill, a quarter of a mile distant from my home, stood a haystack which had been placed there two years previously. The owner, during the winter of 1889-'90, had cut the stack through the middle and hauled away one portion, leaving the other standing with the end smoothly trimmed. The following spring I noticed a pair of Yellow-shafted Flickers about the stack showing signs of wanting to make it a fixed habitation. One morning a few days later I was amused at the efforts of one of the pair. It was clinging to the perpendicular end of the stack and throwing out chipped hay at a rate to defy competition. This work continued for nearly a week, and in that time the pair had excavated a cavity 20 inches in depth. The entrance was located $8\frac{1}{2}$ feet above ground, and was $2\frac{1}{2}$ inches in diameter and dug back into the stack for 6 inches, where it turned sharply downward and was slightly enlarged at the bottom. On May 28 I took a handsome set of seven eggs from the nest, the eggs lying on a bed of chipped hay. The birds lingered about the stack and by June 14 had deposited another set of eggs. They remained in the vicinity until autumn. During that winter the balance of the stack was removed. They returned the following spring, and, after a brief sojourn, departed for parts unknown. I never could quite understand the philosophy of their peculiar choice of this site, as woodland is abundant here. A well-timbered creek bottom was less than half a mile distant, while large orchards and groves surround the place on every hand."

Flickers nest occasionally in natural cavities and at distances from the ground varying from $2\frac{1}{2}$ to 60 feet, but mostly between 10 and 20 feet. Old rotten stumps, and dead or partly decayed trees are preferred to live ones. The entrance hole is usually $2\frac{1}{4}$ inches in diameter, and the inner cavity varies from 8 to 30 inches in depth. It is gradually enlarged toward the bottom, and a layer of fine chips, on which the eggs are deposited, is allowed to remain. Its flight, although apparently laborious, is strong and swift, and, like that of all Woodpeckers, undulating or wave-like. It frequently perches on a limb instead of clinging to it, as do others of the tribe. In the spring of the year it also indulges in drumming, but not to the same extent as the majority of this family.

Mr. Manly Hardy, of Brewer, Maine, writes me: "I once found one asleep on the outside of a tree, late in the evening. I was traveling by moonlight, and knowing the exact location of the nest in a small poplar, decided to visit it. I walked close under the bird, without apparently waking him, and then struck the tree a blow with a club, which I felt sure would stun him, but he flew off all right. There was no bird inside of the hole, so he slept outside, clinging to the tree, from choice. This proves that they can and do sleep in this way. In blueberry time they congregate in flocks—I have seen at least thirty at once—and at such times their entrails are dyed blue from the fruit eaten. I have fed the young with strawberries when they were still in their nest, being obliged to put the first into their bills; but after that they ate them greedily, and would scratch up to the hole and look out when they heard me coming, acting just as if it was the old bird which was feeding them."

Nidification in the southern portions of its range begins ordinarily in the last half of March, and in the north from four to fully six weeks later. Both sexes assist in the construction of the nesting site as well as in incubation, and the male usually does his full share of work at both. According to Dr. William L. Ralph's observations in Florida, the male usually sits on the eggs during the night. In the South fresh sets of eggs may be looked for during the first week in April; in the vicinity of Washington, District of Columbia, during the first half of May, and in the more northern parts of its range, in Alaska and the Northwest Territory, about the first ten days in June.

Flickers breeding in Florida are generally somewhat darker colored and smaller than those from the more northern States, and this latter difference is especially noticeable in the eggs. From five to nine eggs are usually laid to a set, mostly six or seven; but considerably larger ones are sometimes found, possibly the product of two females laying in the same nest; but the fecundity of this Woodpecker is known to be very great. Prof. B. W. Evermann took not less than thirty-seven eggs from a pair of these birds (out of the same nest) between May 4 and June 22, 1885; and a still more remarkable instance is recorded in the "Young Oologist" (Vol. I, June, 1884, p. 26), by Mr. Charles L. Phillips, of Taunton, Massachusetts, who found two eggs of this bird in a cavity of a large willow on May 6, 1883, of which he took one, leaving the other as a nest egg; and he continued to do this day after day until the poor bird had laid seventy-one eggs in seventy-three days. Mr. Steward Ogilby, of Staten Island, New York, also reports, in "Forest and Stream" of June 25, 1885 (p. 427), finding a brood of not less than nineteen young Flickers in one nest, all alive and apparently in good condition. It seems almost impossible for a single bird to cover and hatch such a number of eggs, but the fact that the young were apparently well fed and in good condition is still more remarkable, and the parents must certainly have had a busy time to provide for such a large family.

The eggs of the Flicker are glossy white in color, and when fresh appear as if enameled; the shell is very close grained and exceedingly lustrous, as if polished, resembling the eggs of the Ivory-billed and Pileated Woodpeckers in

this respect. They are quite variable in shape; the majority are ovate, others short and elliptical ovate, and a few approach subpyriform, while some are nearly perfect ovals. An egg is deposited daily until the set is completed, and incubation lasts about fifteen days; this ordinarily does not begin until the set is completed, but now and then young birds and eggs in different stages of advancement are found in the same nest. The young are able to leave their nest in about sixteen days; they crawl about on the limbs of the tree for a couple of days before they venture to fly, and return to the nest at night. The parents are rather suspicious about the nesting site, and endeavor to keep out of sight as much as possible, even where not molested; they are devoted in the care of their young, and will frequently allow themselves to be captured on the nest. In the more northern portions of their range only a single brood is raised in a season; in the south possibly two. The return migration to their winter homes usually begins about the latter part of September, and is occasionally protracted from four to six weeks later in favorable localities.

The average measurement of one hundred and ninety-six eggs of this species in the United States National Museum collection, mostly from the more northern portions of its range, is 27.96 by 21.50 millimetres, or about 1.10 by 0.85 inches. The largest egg of the series measures 30.48 by 22.86 millimetres, or 1.20 by 0.90 inches; the smallest, 24.64 by 20.83 millimetres, or 0.97 by 0.82 inch. Three sets of eggs—two of five and one of six—taken in Putnam County, Florida, by Dr. William L. Ralph, average only 25.82 by 20.52 millimetres, or about 1.02 by 0.81 inches. The largest of these eggs measures 26.42 by 21.34 millimetres, or 1.04 by 0.84 inches; the smallest, 24.89 by 18.03 millimetres, or 0.98 by 0.71 inch, which is quite a perceptible difference in size.

The type specimen, No. 24612 (not figured), from a set of ten eggs, was taken on June 8, 1891, by Mr. R. MacFarlane, near Cumberland House, Saskatchewan, Dominion of Canada.

47. *Colaptes cafer* (GMELIN).

RED-SHAFTED FLICKER.

Picus cafer GMELIN, Systema Naturæ, I, 1788, 431.

Colaptes cafer STEJNEGER, Standard Natural History, IV, 1885, 428

(B 98, C 314, R 378b, C 459, U 413.)

GEOGRAPHICAL RANGE: Western North America; from the Isthmus of Tehuantepec, north over the table-lands of Mexico, through western Texas, New Mexico, Arizona, California, Oregon, the eastern portions of Washington, to southern British Columbia (east of the Cascade Mountains only) and southern Alberta; east, regularly to the eastern slopes of the Rocky Mountains, through Colorado, Wyoming, Montana, and western Assiniboia in the Dominion of Canada, and sporadically to Kansas, Nebraska, North and South Dakota; west, in Washington, only to the Cascade Mountains; south, in northern Lower California, in the San Pedro Martir Mountains, to about latitude 31°.

The Red-shafted Flicker, in which the under surface of the quills and tail feathers are deep orange vermilion, instead of yellow as in the preceding species, replaces the latter throughout the western United States and along the

southwestern border of the Dominion of Canada, east of the Cascade Mountains. It is a resident throughout the greater part of its range, excepting the more northern portions, wintering regularly in the vicinity of Fort Walla Walla, Washington, in latitude 46° , and it is pretty generally distributed, being as much at home in the higher mountain ranges up to altitudes of about 10,000 feet, as in the lower and much hotter valleys among the timbered bottom lands. As already stated, this species intergrades extensively with the preceding one along the eastern borders of its range, and typical specimens are not uncommonly met with in western Kansas, western Nebraska, and southwestern South Dakota; but as transition forms, or so-called "hybrids," predominate largely here, I do not include these sections in their range proper, considering them as neutral ground on which typical specimens of both species are about equally common.

Its breeding range is nearly coextensive with its geographical distribution. It appears to be an equally common summer resident on the Mexican table-lands as in the western United States. Here, however, it is not met with in summer in the lower Rio Grande Valley, nor throughout the dry and arid portions in the western parts of Texas and similar regions in southern New Mexico and Arizona, where it rarely breeds below altitudes of 6,000 feet. Mr. W. A. Anthony met with it in the San Pedro Martir Mountains, in Lower California, in summer, at altitudes of from 7,000 to 10,000 feet, evidently nesting; and near the coast, in winter, as low as 3,000 feet. I found this handsome bird a common summer resident nearly everywhere throughout the West, from eastern Montana west through Idaho, Oregon, Washington, and Nevada, to California, and an abundant winter resident in the vicinity of Tucson, southern Arizona, where it unquestionably breeds in the pine belt in the higher mountains.

In its general habits, food, call notes, etc., the Red-shafted Flicker resembles the preceding species very closely, and I have been unable to detect any notable differences. It is a trifle larger bird than the preceding, and in certain sections appears to be rather more partial to extensive forests than its eastern relative. Its nesting habits are also quite similar, and it adapts itself readily to the conditions found in its surroundings. Its favorite nesting sites are old rotten stumps or trees, such as cottonwoods, willows, sycamores, junipers, oaks, and pines. It nests also in holes in banks, in the sides of houses, in gate posts, etc. In the more northern portions of its range the migrants usually return to their breeding grounds during the last week in March or the beginning of April. Nidification begins about the 1st of May, and full sets of fresh eggs may be looked for about the middle of that month. The earliest set found by me, one of eight eggs, was on May 4, 1871, near Fort Lapwai, Idaho; the latest, one of seven eggs, on June 6, 1875, near Camp Harney, Oregon. In southern California they nest mostly in April, and here, Mr. F. Stephens writes me, "the Red-shafted Flicker is a common resident; I find it from sea level to the upper limits of timber, anywhere where trees occur. It often feeds on ants and insects picked from the ground." One brood only is usually raised in a season; but I believe an occasional pair of early nesting birds raises two. Among some peculiar nesting sites of this species the following deserve mention:

Mr. Walter E. Bryant gives the following: "One of these was in a bridge bulkhead, a few feet above the Carson River, Nevada. The interior of the structure was filled with gravel and large stones, among which the eggs were deposited. Another pair used a target butt, at a much-frequented range, as a substitute for a stump. A third nest was in a sand bank, 3 feet from the top and 10 from the creek. This hole was apparently specially prepared, and not one made by a ground squirrel, such holes being sometimes used by these birds."¹

Mr. Charles A. Allen, of Nicasio, California, found a pair of Red-shafted Flickers nesting in a similar situation in a creek bank, the burrow containing seven eggs, which he took. About ten days later, happening to pass the same spot, he examined the hole again and found it occupied by a California Screech Owl, which in the meantime had deposited four eggs. Some two weeks subsequently he examined it for a third time, and on this occasion the tenant proved to be a Sparrow Hawk, which was setting on five handsome eggs. There was no nesting material present on any occasion, the eggs lying on some loose dirt.

Near Fort Lapwai, Idaho, on June 2, 1871, I found a pair of Long-eared Owls and Red-shafted Flickers nesting in an old cottonwood stump; the Owls occupied a natural cavity, and the Flickers had excavated their nesting site directly over that of the former, the entrance holes, although on different sides of the stub, were not over 2 feet apart. The Red-shafted Flicker's eggs, seven in number, were on the point of hatching, while those of the Owls were about half incubated. These birds evidently lived on good terms with each other. Occasionally, after incubation has commenced, additional eggs are laid at different intervals by this species. On June 6, 1875, near Camp Harney, Oregon, I found a pair of these birds nesting in a rotten pine stump, on the southern slopes of the Blue Mountains, the entrance hole being 3 feet from the ground. This nest contained three young birds, apparently just hatched, and two eggs already chipped, besides five perfectly fresh ones, one of these being a runt egg. In this vicinity the Red-shafted Flicker was very common, and nested mostly in junipers, usually from 3 to 12 feet from the ground; but I have also seen them entering holes in the dead tops of large pines, fully 70 feet above the ground. Besides the usual insects and larvæ upon which this species feeds, I have seen it catch grasshoppers, both on the ground and on the wing, and it is likewise very fond of wild strawberries and service berries. Considered from an economic point of view, the Red-shafted Flicker is as beneficial as the preceding species, and, like it, deserves the fullest protection.

The number of eggs in a set varies from five to ten, sets of six or seven being most common. These are indistinguishable from those of the preceding species, excepting that they average a trifle larger, and the same description will answer for both.

The average measurement of one hundred and fifty-two eggs in the United States National Museum collection is 28.34 by 21.68 millimetres, or about 1.12 by 0.85 inches. The largest egg of the series measures 32.76 by 22.35 milli-

¹ Bulletin California Academy of Sciences, II, August 2, 1887, pp. 451, 452.

metres, or 1.29 by 0.88 inches; the smallest, 25.15 by 20.57 millimetres, or 0.99 by 0.81 inch; and a runt, 20.57 by 15.75 millimetres, or 0.81 by 0.62 inch.

The type specimen, No. 19391 (not figured), from a set of ten eggs, was taken by the writer near Fort Walla Walla, Washington, on May 11, 1882.

48. *Colaptes cafer saturator* RIDGWAY.

NORTHWESTERN FLICKER.

Colaptes mexicanus saturator RIDGWAY, Proceedings Biological Society of Washington, II, April 10, 1884, 90.

Colaptes cafer saturator RIDGWAY, MS.

(B —, C —, R —, C —, U 413a.)

GEOGRAPHICAL RANGE: Northwestern coast regions, from northern California north to southern Alaska (Sitka).

The breeding range of the Northwestern Flicker, a somewhat darker-colored race than *Colaptes cafer*, is confined to the coast districts of Washington, British Columbia, and the southern parts of Alaska north to Sitka, where it occurs both in the uplands and lowlands. In the corresponding regions in western Oregon, and probably also in northwestern California, it appears to be found only on the summits of the different mountains between the Cascades and the coast during the breeding season, where the same moist climate prevails as is found in the immediate vicinity of the coast, while in the drier lowlands, such as the Umpqua, Rogue, and Willamette river valleys, it is replaced by *Colaptes cafer* and by intermediates between the two forms. A specimen in the collection of the United States Department of Agriculture, taken near Glendale, in Douglas County, Oregon, on June 13, 1894, although not quite typical, seems to bear out this view; another from near Sodaville, Linn County, in the United States National Museum collection, taken in September, however, is a perfectly typical *Colaptes cafer saturator*. As this subspecies is known to be a common winter resident in British Columbia, it is questionable if the latter was a migrant. I first met with this dark-colored race in the Puget Sound region, Washington, in the latter part of May, 1894, and found it moderately common in the vicinity of Seattle, in partly cleared tracts where there was a good deal of dead timber, and also in the rich bottom lands of the Puyallup River. Here, as the majority of its nesting sites are located in rotten trees, and frequently quite a distance from the ground, its eggs are rather hard to obtain.

Mr. John Fannin, curator of the Provincial Museum at Victoria, British Columbia, in his "List of Birds" found in that Province, reports this subspecies as follows: "Abundant west of the Cascades; a number winter in the neighborhood of Victoria."

According to Mr. E. W. Nelson, it does not appear to go regularly as far north as Sitka, Alaska. He says: "During Bischoff's visit to Sitka, at the time of the Russian-American telegraph expedition, numbers of these beautiful birds were taken there, and some of the specimens are now in the collection

of the National Museum. Since then, however, the bird has not been secured from that region. Both forms, *Colaptes auratus* and *Colaptes cafer saturator*, undoubtedly breed in that section, their habitats overlapping, but no intermediate examples have been secured thus far."¹

Its general habits, food, call notes, and nidification, as well as its eggs, are similar to those of the two preceding species, and the same description will answer for them. The only absolutely identified set in the United States National Museum collection is an incomplete one of four, taken by Mr. James Hepburn, near Victoria, British Columbia, in May, 1867. These measure, respectively, 30.94 by 21.84, 30.48 by 22.35, 30.78 by 21.59, and 30.22 by 21.34 millimetres; or 1.22 by 0.86, 1.20 by 0.88, 1.21 by 0.85, and 1.19 by 0.84 inches.

The type specimen, No. 13205 (not figured), is the largest egg of this set.

49. *Colaptes chrysoides* (MALHERBE).

GILDED FLICKER.

Geopicus chrysoides MALHERBE, Review et Magasin Zoologique, IV, 1852, 553.

Colaptes chrysoides REICHENBACH, Handbuch der speciellen Ornithologie, Scansoriae, 1854, 413.

(B 99, C 313, R 379, C 458, U 414.)

GEOGRAPHICAL RANGE: Lower California and Sonora, Mexico; north, through southern and portions of northwestern Arizona, to latitude 35°. Casually to southeastern California.

The Gilded Flicker, also known as "Cactus" or "Cape" Flicker, which has the yellow shafts and quills of *C. auratus* and the red malar patch and ashy throat, as in *C. cafer*, is a common resident of the giant cactus belt of southern Arizona, the adjacent Mexican State of Sonora, and similar regions in Lower California. It was also met with on the Colorado River, near Fort Mohave, Arizona, by Dr. J. G. Cooper, in February, 1861, where these birds were feeding on larvæ and insects among the poplar trees, and were very shy and wary. It undoubtedly occurs also, occasionally at least, on the California side of the Colorado, but only as a straggler. It breeds throughout the rest of its range.

Mr. F. Stephens, who has collected quite extensively in southern Arizona, writes me: "So far as my experience goes, this Flicker is restricted to the giant cactus region. The most western point at which I have seen this species was near the head waters of Big Sandy Creek, in western Arizona, where the giant cactus is common. I have looked closely for this bird at Yuma, but failed to find it. All but one of the sets of eggs I have taken were found in holes in the giant cactus. The exception was a set taken near Tucson, Arizona, on April 25, 1884, from a dead cottonwood stub, and I shot the male in the mouth of the hole."

Mr. A. W. Anthony writes me: "The Gilded Flicker is rather common in the heavy growth of giant cactus, *Cercus pringlei*, but not adverse to the candle-

¹ Report upon Natural History Collections made in Alaska, No. 3, 1887, p. 161.

wood forests which cover a large part of the peninsula between latitudes 28° and 30°. Young were found by me in June at San Fernando and near San Carlos, Lower California.”

Mr. J. Xantus found the Gilded Flicker very common in the vicinity of Cape St. Lucas, and quite a number of specimens now in the United States National Museum collection were taken by him there; these average a trifle smaller than the Arizona birds.

Mr. W. E. D. Scott met with this species in the early spring and fall on the San Pedro slope of the Catalina Mountains, in southern Arizona, as high up as 3,000 feet, and saw now and then single individuals in the mesquite timber, far away from any giant cactus.¹

I first met with this Flicker in some large cottonwoods on Rillito Creek, near Tucson, in the spring of 1872, and also found a pair nesting in a dead limb of one of these trees, but the site was inaccessible. I at first considered these birds rare, and not until the nesting season was over did I discover how abundant they were in an extensive giant cactus grove in Sahuarita Pass, a few miles northeast of my camp. Here numbers of them were feeding on the sweet, fig-like fruit of this cactus, in company with other species, and, as many of the cacti had holes dug in their sides, this was unquestionably a favorite breeding place for them. I do not consider the Gilded Flicker a very shy bird in the late summer and fall, and I could have shot numbers of them at different times had I wanted to do so. I paid but little attention to this species when I first saw it, taking it at the time to be the common eastern Flicker, from the similarity of its appearance when flying, and only discovered my error on shooting one on June 16, 1872. Its call notes, manner of flight, and general habits are so similar to those of the common Flicker that one, particularly a novice, as I was then, might readily make such a mistake. Its food consists mainly of insects of different kinds and their larvæ, as well as of wild berries and fruits, and it obtains a good portion of this on the ground.

By far the greater number of these birds nest in the sahuaras or giant cactus; and where these are not found within reasonable distances, this species is not apt to be met with, at least not during the breeding season. This is at its height from the middle of April to the end of May, and, as Mr. F. Stephens has taken its eggs in June, it is possible that two broods are occasionally raised in a season. It nests at varying distances from the ground from 8 to 40 feet, generally at heights of about 15 feet. I have the indurated form of a nesting cavity of this species now before me, showing its exact shape. The hardened walls are about one-fourth of an inch thick, and show the inner contour of the cavity perfectly. The entrance is nearly 3 inches in diameter; inside it is about 7 by 4 inches wide and 5½ inches deep. The sides and bottom of the cavity are quite smooth, considering the nature of the substance (the soft inner pulp of the cactus) out of which it is excavated. It occupied only one-half of the trunk of one of these giant cacti, and the rear of the cavity did not quite reach

¹ The Auk, Vol. V, 1886, p. 429.

the center of the plant. The eggs lay on the hardened floor, and not, as usual, on a layer of chips. I am inclined to believe that a freshly excavated nesting site is not habitable for some weeks, as it must require some time for the exuding sap to harden. The mold before me somewhat resembles a wasp's nest, both in color and shape, and if suspended from the limb of a tree might easily be mistaken for one. From two to five eggs are laid to a set, usually four, and these are indistinguishable in shape and color from those of the rest of our Flickers.

The average measurement of seven eggs in the United States National Museum collection is 28.96 by 21.63 millimetres, or about 1.14 by 0.85 inches. The largest egg measures 30.78 by 22.10 millimetres, or 1.21 by 0.87 inches; the smallest, 26.92 by 20.32 millimetres, or 1.06 by 0.80 inches.

The type specimen, No. 22635 (not figured), from a set of four eggs, was taken by Mr. Herbert Brown, near Tucson, Arizona, on May 25, 1884, from a hole in a giant cactus, 15 feet from the ground.

50. *Colaptes rufipileus* RIDGWAY.

GUADALUPE FLICKER.

Colaptes mexicanus rufipileus RIDGWAY, Bulletin U. S. Geological and Geographical Survey of the Territories, II, No. 2, April 1, 1876, 191.

Colaptes rufipileus RIDGWAY, Bulletin Nuttall Ornithological Club, II, July, 1877, 60.
(B —, C —, R 380, C —, U 415.)

GEOGRAPHICAL RANGE: Guadalupe Island, Mexico.

The Guadalupe Flicker was discovered by Dr. Edward Palmer in 1875, while engaged in making natural history collections on Guadalupe Island, off the coast of Lower California, and nearly all of the land birds obtained by him at the time proved to be insular forms and new to science. Since then Mr. Walter E. Bryant has twice visited this remote island, which is situated about 250 miles to the south and west of San Diego, California, the northern extremity lying in about latitude $29^{\circ} 10'$ N. and longitude $118^{\circ} 18'$ W. It is about 15 miles in length, with a maximum width of 5 miles, and it is said to reach an altitude of about 4,500 feet at its highest point. There are some pines, cypress trees, and cabbage palms found on the island. For all the information we possess about the life history of this insular Flicker, whose habitat appears to be confined to this island, we are indebted to Mr. Bryant, who published an interesting paper entitled "Additions to the Ornithology of Guadalupe Island" (in Bulletin 6, California Academy of Sciences, January 5, 1887, pp. 269 to 318), from which I extract the following relating to this little-known species:

"Comparatively speaking, this bird was not rare in the restricted area of the large cypress grove, but apart from this locality less than a dozen were seen. Three specimens were taken among some palms, within a short distance from the beach, on the eastern side of the island. Only one was heard among the pines at the northern portion, and in the vicinity of the large palm grove on the northwestern slope they were occasionally seen.

“Of all the species of this family I have ever met with, none have been so tame and unsuspecting or less frightened by the report of a gun. In January I witnessed a peculiar habit not before noticed, I believe, in birds of this genus. A pair of Flickers were perched facing each other upon a gnarled root about 3 feet from the ground, their heads within a foot of each other. Suddenly the male, who had been sitting motionless before the female, began a somewhat grotesque performance, which consisted in a rapid bobbing of his head. In this he was immediately followed by the female. This spasmodic bobbing and bowing they repeated alternately a few times, when both stopped as suddenly as they had commenced. After an interval of a few seconds the male began again, and was joined by the female. The movement resembled more an upward jerk of the head than a bow.

“Approaching on my hands and knees to get a closer view, I could hear a low, chuckling sound while these strange actions were in progress. What the outcome of this love-making—for such I regarded it—would have been I did not ascertain. The fear of losing the specimens—almost the first I had seen—prompted me to fire. The first shot brought down the female. At the report away flew the male, followed by another male, which, unseen by me, had been quite near, on the ground. They returned while I was still holding the female, and thus gave me an opportunity of securing them both. Their evident lack of timidity permitted me to draw near enough to plainly distinguish the characteristic bright red cheek patches. In February I saw a repetition of the action above noted, the birds being in a cypress tree above me. They were very tame, especially the female, who came quite near as I lay upon the ground, whistling “quit-tu, quit-tu,” and watching her puzzled actions. In a half-dead cypress this pair had partially pecked a cavity for a nest. In addition to the familiar scythe-whetting notes they have the peculiar “wake-up” call and its rapid prelude of monosyllables. By imitating this call I decoyed a distant female to within short range, the bird coming through the thickest of the cypress grove, stopping at short intervals to call and listen for a reply.

“The food of this species during a portion of the year consists largely of smooth-skinned caterpillars, besides numerous beetles and ants; the latter are always obtainable and, growing to a large size, figure as an important item of their diet. The scarcity of decayed trees, with the exception of fallen ones, necessitates either work upon seasoned wood or the resort to dead palm stumps. The nests will therefore be found at heights varying from 3 to 15 feet.

“By March 16 the birds were invariably found in pairs, and my wish to secure a setting of eggs before departing seemed in a fair way of being fulfilled. Strolling among the cypress, on the 27th of March, I found four trees upon which the birds were at work or had been recently, and in such cases the birds themselves were always to be found in the immediate vicinity. Passing a half-dead tree, I heard the sounding taps of a Woodpecker at work, and as I neared the spot the slight noise which I made as I carefully picked my way over the rock-strewn ground caused a handsome male bird to suddenly appear at an

opening about 4 feet high. With a foot grasping either side of the entrance he gazed upon the intruder. Having comprehended the situation, he flew to another tree, where he quietly awaited my inspection and departure. The hole was then down about 15 inches. By April 7 it had reached a depth of about 20 inches, and contained six fresh eggs, upon which the female was then sitting. As no description has hitherto appeared of the eggs of this species it may be well to present here the measurements of this set (No. 803, author's oölogical collection). They correspond exactly, both in color and general shape, with scores of other eggs of this genus, and offer the following measurements in millimetres: 28 by 22, 28 by 22, 28 by 22.5, 29 by 22, 29.5 by 22, 29.5 by 22;" or about 1.11 by 0.87, 1.11 by 0.87, 1.11 by 0.89, 1.14 by 0.87, 1.16 by 0.87, and 1.16 by 0.87 inches.

There are no eggs of this species in the United States National Museum collection.

Family CAPRIMULGIDÆ. GOATSUCKERS, ETC.

51. *Antrostomus carolinensis* (GMELIN).

CHUCK-WILL'S-WIDOW.

Caprimulgus carolinensis GMELIN, Systema Naturæ, I, ii, 1788, 1028.

Antrostomus carolinensis GOULD, Icones Avium, 1838.

(B 111, C 264, R 353, C 396, U 416.)

GEOGRAPHICAL RANGE: From the South Atlantic and Gulf States and the Lower Mississippi Valley north to the southern portions of Virginia, Illinois, and Indiana, the greater portion of Arkansas, southern Missouri, and the Indian Territory; west to Texas; south in winter to the West India Islands, and through eastern Mexico and Central America to Colombia, South America. Casual in southern Kansas; accidental in Massachusetts.

The breeding range of Chuck-will's-widow, also locally known in South Carolina as the "Dutch Whip-poor-will" or "Chip-the-red-oak-white-oak," and in some of the West India Islands as the "Spanish Whip-poor-will," is coextensive with its geographical distribution in the United States, excepting the lower Rio Grande Valley, in Texas. It is only a summer visitor over the greater portion of its range with us, but, according to Mr. W. E. D. Scott, in "The Auk" (Vol. VI, 1889, p. 252), "Some of these birds are resident on the Gulf coast of Florida, at least as far north as Tarpon Springs, where in winter, in December and January, they are rather rarer than at other seasons of the year." Mr. E. A. McIlhenny also tells me that they are common residents in southern Louisiana. By far the greater number, however, retire farther south, wintering in the West India Islands, as well as in Central America, and a few even pass the Isthmus of Panama to Colombia, South America. They usually reenter the United States, from their winter homes in the south, early in April, and move leisurely northward to their breeding grounds, returning southward again about the beginning of September. The males usually make their appearance on the breeding grounds

a few days before the females. During their migrations they are said to travel singly, or at most in small companies, and not in large flocks, like most other species, and these journeys are performed entirely at night.

Chuck-will's-widow is the largest of the *Caprimulgidae* found in the United States, and, like the rest of the members of this family, it is crepuscular and nocturnal in its habits, being rarely seen on the wing in the daytime, unless accidentally startled from its hiding place. It spends its days mostly hidden away in dark shady places in woods, among the undergrowth, especially along rocky hillsides, resting either on the ground or in some hollow log, under a ledge of rock, or perched lengthwise on some low limb of a bushy, densely-foliaged tree. Although a tolerably common bird throughout the more southern portions of its range, it is by no means as well known generally as it might be, and only a careful and patient observer can expect to become familiar with its general habits. Its flight is extremely noiseless, the very embodiment of grace and agility combined, and in this respect it resembles our Owls somewhat, now skimming along close to the ground, dropping down suddenly to pick up some beetle, then dashing upward again, perhaps after a moth; constantly twisting and turning from one course to another, but always on the lookout for any passing insect. As soon as the sun has disappeared behind the horizon, all the Chuck-will's-widows in the neighborhood become alert at once, leave their customary resting places in search of food, and, during the mating season especially, commence to utter the peculiar call, "chûck-will's-widow," from which they have derived their name. This strangely doleful-sounding note is occasionally, particularly while under sexual excitement, uttered very rapidly for two or three minutes or more, the syllables being all rolled into one, until the bird is compelled to take a rest from sheer want of breath. The late Dr. William C. Avery, of Greensboro, Alabama, well known as an excellent observer, wrote me as follows on this subject: "In general cadence the first three syllables are about equal, the syllable 'wid' being accented and emphasized, and the last syllable, 'ow' being only about half the quantity of the first three. Pronounce the syllables just as I have given them here, with the accent on 'wid' and the quantity of the preceding ones equal in length with the intoned syllable, and you have the call note of *Antrostomus carolinensis*."

"When frightened from its nest, or when flying late in the evening, it utters a harsh note at times, and this resembles, to my ear, the syllable 'baw! baw! baw!' These notes, apparently of displeasure or alarm, are low and can not be heard at a great distance, while, during a still night, the 'chuck-will's-widow,' or call note, rapidly repeated, may be heard for a mile or more. These notes, during the mating season at least, are uttered from dusk to about 9 p. m., and while singing they usually sit on the ground, on a log or rock, or occasionally on a fence rail, or on a low limb of a tree, and in such a position they usually sit lengthwise, not crosswise, on the limb. I have known this bird from early boyhood and am positive that it never chants its monotonous song while on the wing, as has been recently stated. It is also said 'that if either

their eggs or young are disturbed they are carried off in the capacious mouths of the birds to some distant part of the forest, in the same manner that a cat transports her kittens.' I must say that I do not believe this assertion. I purposely flushed the parent off the eggs which I sent you three times on May 3, 1890, when I first found the nest, and once on the 4th, altogether four times, before I took the set, and yet the old bird returned each time and continued to sit in the same place as long as her eggs remained there. When I flushed the parent from her nest on the 3d of May she had only one egg, though she was setting; on the 4th she still had but one, and it was only on the 5th, the third day after I found the nest, that she laid the last egg."

It is possible that this species removes its eggs to a different locality occasionally when disturbed, but this habit does not, by any means, appear to be universal; the young, however, are more frequently hidden in some other place by the parents under similar circumstances.

The food of Chuck-will's-widow consists mainly of beetles, winged ants, and other insects, especially the night-flying *Lepidoptera*—such as the *Spingidæ* (Hawk moths), *Saturnoidæ* (silk moths), and *Noctuidæ* (Owl moths)—and the enormous width of its short bill enables it to swallow the largest of these very readily. It does occasionally aspire to larger game, and it seems to be a well-established fact that small birds form a portion of its regular bill of fare.

A well-authenticated instance of its cannibalistic tendencies is published by Dr. F. W. Langdon among his field notes on Louisiana birds, in the "Journal of the Cincinnati Society of Natural History" (Vol. IV, 1881, p. 151), in which he makes the following statement: "The stomach of a female shot on April 14 contained the partially digested body, entire, of a Swamp Sparrow, intermingled with the feathers of which were numerous remains of insects, chiefly small beetles."

More recent observations, made by Mr. John I. Northrop on Andros Island, one of the Bahamas, between March 14 and July 3, 1890, fully confirms this. He published the following regarding this species: "Three specimens were taken, two of which were disturbed in the woods during the daytime and the other shot at dusk. Upon examining the stomach of the first one shot, I found, among an indistinguishable mass of brownish matter, a small bone, about half an inch long, that looked like the leg of a small bird. The next one examined contained in its stomach the partially digested remains of an entire Hummingbird, enough of which was preserved to identify it beyond a doubt as *Sporadinus ricordi*."¹

Audubon, as well as Dr. John Gundlach, also mentions having found the remains of birds in the stomachs of this species, and it would appear that such a diet formed a not unusual part of its regular fare.

In the southern part of their range nidification begins sometimes by April 10, more often in the latter part of this month and during May, and occasionally eggs are found as late as June 30. I believe, as a rule, only one brood is raised

¹ The Auk, Vol. VIII, 1891, p. 73.

in a season; but this last record, which is from Titusville, Florida, seems to indicate that two broods may occasionally be raised under favorable circumstances. The most northern breeding record I have is one from the Washita River, in the Indian Territory, in about latitude 35° , but it undoubtedly breeds in suitable localities as far north as latitude 38° . Although fairly abundant throughout the greater part of Texas during the breeding season, it is not found anywhere in the lower Rio Grande Valley or vicinity, and I have no authentic records of its breeding there, where it appears to be entirely replaced by Merrill's Parauque, *Nyctidromus albicollis merrilli*. It appears to be quite common in Putnam County, Florida, and the majority of the eggs in the United States National Museum collection were obtained there by Dr. William L. Ralph, where it mostly nested in oak thickets, under trees whose branches nearly touched the ground, both in swampy and dry situations.

Chuck-will's-widow makes no nest; the eggs are usually laid on the dry leaves covering the ground, in deciduous forests, and occasionally on the bare ground, either in flat woods or on brush-covered and rocky hillsides—in fact, such nesting places seem to be preferred by this species to flat, level woods, when obtainable. The two eggs are deposited on alternate days, and incubation commences with the first egg laid. I believe the female performs the duties of incubation almost entirely, but both sexes are very devoted parents. The bird on the nest will try as assiduously to draw the intruder away from its young as the Ruffed Grouse, by feigning injury and fluttering along on the ground. It usually also emits a hissing noise when disturbed.

The eggs of Chuck-will's-widow are among the handsomest found in the United States; the shell is fine-grained, rather thin, and moderately glossy in most cases. They are usually elliptical oval in shape, or about equally rounded on both ends. The ground color of these eggs is of such a subtle tint that it is almost impossible to describe it accurately; it varies from a rich cream, with a faint pinkish suffusion, to a pale cream, and more rarely to a pure white. They are in most cases more or less profusely blotched, marbled, and spotted with different shades of brown, tawny, fawn, and Isabel-color, underlaid and mixed with lighter shades of ecru drab, lavender, pearl gray, and pale heliotrope purple. In an occasional specimen some of the markings take the shape of irregular lines and tracings, like those of the eggs of the Grackles; in others they are fine and minute, obscuring the ground color to some extent. In some specimens the darker shades predominate; in others, the lighter; in fact, there is an endless variation in the style of markings, but in the entire series there is not a single specimen which is not perceptibly marked. The eggs are rather large, considering the size of the bird.

The average measurement of forty-two specimens in the United States National Museum collection is 35.87 by 25.76 millimetres, or about 1.41 by 1.01 inches. The largest egg of the series measures 40.13 by 27.43 millimetres, or 1.58 by 1.08 inches; the smallest, 35.30 by 25.15 millimetres, or 1.39 by 0.99 inches.

The type specimen, No. 20444 (Pl. 1, Fig. 8), from a set of two eggs, Bendire collection, was taken in Comal County, Texas, on June 15, 1879, and represents a small but a very handsome egg. No. 24488 (Pl. 1, Fig. 9), also from a set of two eggs, from the Ralph collection, was taken by Dr. William L. Ralph, in Putnam County, Florida, on May 1, 1891, and represents one of the bolder-marked types, the specimen being somewhat above the average size.

52. *Antrostomus vociferus* (WILSON).

WHIP-POOR-WILL.

Caprimulgus vociferus WILSON, American Ornithology, V, 1812, 71, Pl. 41, Figs. 1-3.

Antrostomus vociferus BONAPARTE, Geographical and Comparative List, 1838, 8.

(B 112, C 265, R 354, C 397, U 417.)

GEOGRAPHICAL RANGE: Eastern North America; north to the southern portions of the Dominion of Canada in the provinces of Nova Scotia, Quebec, and northern Ontario, to southwestern Keewatin and western Manitoba; west in the United States through eastern North and South Dakota, Nebraska, western Kansas, the Indian Territory, and Texas; south in winter through eastern Mexico to Guatemala. Casual to Porto Rico and the West Indies.

While the familiar call of the Whip-poor-will, from which it receives its name, is almost universally known to every farmer's boy throughout its range, the bird itself is not nearly so often correctly identified, and our common Nighthawk, or Bull-bat, is frequently mistaken for the author of these notes. It is only a summer visitor throughout the greater portion of the United States and the southern parts of the Dominion of Canada, usually arriving from its winter haunts in Guatemala and southern Mexico, along the southern portions of its breeding range in the United States, about the middle of March; and moving leisurely northward, it reaches our middle States about April 15, and the more northern ones from one to three weeks later. Not a few Whip-poor-wills winter regularly in the southern parts of Florida, as well as along the Gulf coast of Louisiana; these are probably birds which breed mainly north of the United States. As far as I have been able to ascertain, this species reaches the extreme northern limits of its range on the north shore of Lake Winnipeg, near Norway House, one of the Hudson Bay Company's Posts, situated in the southwestern part of the Province of Keewatin, in about latitude 54°. It is a common summer resident in suitable localities throughout Manitoba, and a set of eggs is now in the United States National Museum collection taken by Mr. William MacTavish, near Lake Manitoba, in June, 1862. The western limits of its range extend well into the Great Plains. Mr. A. W. Menke writes me that he has shot this species in Finney County, in southwestern Kansas, where it evidently breeds, but is rare; and it is undoubtedly also a summer resident throughout the greater part of Nebraska, as well as of North and South Dakota.

Mr. William Lloyd records it as a summer resident in the eastern portions of Concho County, and Mr. H. P. Attwater observed it in Bexar County, Texas.

These points furnish probably about the western limits of its breeding range in this State. It is apparently a very rare summer resident in Florida, and in the immediate vicinity of the south Atlantic and Gulf coasts in Alabama and Mississippi; it becomes somewhat more generally distributed throughout the hill country of western South Carolina, northern Georgia, and Alabama, but is still rare here. The late Dr. William C. Avery, one of the most reliable ornithologists of the South, met the Whip-poor-will near Anniston, Alabama, in July, and while rather rare, it unquestionably breeds there to a limited extent. Mr. W. J. Myers records it as sometimes breeding in Hillsboro County, Florida, where he found a nest and two eggs on April 5, 1893; and Mr. E. A. McIlhenny informs me that he found it nesting on Avery's Island, in southern Louisiana, where it was a rare summer resident, but far more common in fall and winter. He also says: "These birds are very tame, for on two occasions, while sitting still in the twilight to observe the movements of some Owls, I have had them come so close that I could have caught them. On one occasion one lit on my knee, and another on my foot as it was extended before me." The Florida and Louisiana breeding records are the most southern I know of, and it breeds more or less commonly in suitable localities throughout the remainder of its range. Like many other species, it is very much attached to its once chosen haunts, and will return to them from year to year, often nesting in the identical spot, or at most within a few feet of it, if the immediate surroundings have not been changed too much in the meantime. It returns south again during the first part of October. Its favorite resorts are dense, shady thickets, bordering on clearings and river valleys; rocky and brush-covered hillsides, and rolling country, interspersed alternately with woods and cultivated tracts, are preferred to the more level prairie regions. In the latter it is only found along the river bluffs, among the shrubbery, and rarely any distance away on the open and nearly treeless plains, unless at dusk and in early hours of the night, while in search of food on the roads leading through these. Its flight is strong, swift, graceful, and entirely noiseless, gliding like a shadow close along the ground in pursuit of night-prowling insects, mainly *Lepidoptera* and *Coleoptera*, on which it feeds almost exclusively. In the Western States, which are sometimes overrun by swarms of Rocky Mountain Locusts, it also feeds largely on these when abundant. Considered from an economic point of view, the Whip-poor-will is an eminently useful and beneficial bird, deserving the fullest protection. Like Chuck-will's-widow, it is crepuscular and nocturnal in its habits, and is rarely seen in the daytime unless accidentally driven from its hiding place. It passes the hours of daylight in shady retreats, either on the ground or on low limbs of trees (on which it always perches lengthwise) on old logs, and on or under rocks well covered by underbrush. It is rarely found at higher altitudes than 3,500 feet. The familiar call note of the Whip-poor-will is well expressed by its name, but it sounds to me more like "Whip-poor-wick," especially when uttered close to the listener. On their first arrival on the breeding grounds this call is especially frequently and rapidly repeated at the

beginning of dusk, and throughout the early part of the night, sometimes for minutes at a time, without any perceptible intermission, and one can then easily decoy these birds by imitating this call.

They are said to sing also occasionally during the day, but I never heard one at such a time, even during cloudy weather. As the breeding season advances they become more and more silent, but they sometimes sing as late as September, never with the vim and persistency, however, as on their first arrival, when frequently half a dozen or more of these birds may be heard at the same time, forming a perfect chorus, their notes blending so completely into each other that they sound like a continuous "whipper-whipper-whipper," the last syllable being entirely lost in the medley of noise produced; still such vocal concerts are not especially unpleasant to the ear, and rather lull the listener into a sound sleep.

About dusk the Whip-poor-will emerges from its hiding place in some neighboring thicket and goes hawking for its evening meal. A considerable portion of its food is picked up from the ground, especially on well-traveled roads, on which it frequently indulges in a dust bath to rid its body of vermin. It will visit some favorite spots regularly, and slightly sandy roads are preferred to heavier soil. Its movements on the ground are rather awkward, its feet being weak and short; but few of our birds are more graceful on the wing than the Whip-poor-will. I have seen one touch the back of its wings together as it swept by me, arrest its noiseless flight instantly, drop to the ground almost perpendicularly, pick up some insect, and dash away as suddenly as it halted. At such times it occasionally utters a low, purring or grunting noise like "däck-däck," and another sounding like "zue-see, zue-see," which can not be heard unless one is close by.

While on a collecting trip in Herkimer County, New York, with Dr. William L. Ralph, in June, 1893, I witnessed a most amusing performance, which one may see perhaps once in a lifetime. I happened to be in a little outbuilding, some 20 feet in the rear of the house at which we were stopping, early on the evening of the 24th, about half an hour after sundown, when I heard a peculiar, low, chucking noise outside, which was directly followed by the familiar call of "whip-poor-will." A pair of these birds paid us regular visits from the neighboring forest, often perching on the roof of the house, on the garden fence, on the limbs of a crab-apple tree near by, or occasionally alighting on the sandy road passing in front of the house, where they would allow themselves to be closely approached before taking wing, and treated us to a nightly concert. Directly alongside of the small outbuilding previously referred to, a barrel of sand and lime had been spilled, and from the numerous tracks of these birds, made by them nightly afterwards, it was evident that this spot was visited regularly, and was the trysting place of at least one pair. Looking through a small aperture, I saw one of the birds waddling about in a very excited manner over the sand-covered space, which was perhaps 2 by 3 feet square, and it was so much interested in its own performance that it did not notice me,

although I made some noise trying to fight off a swarm of mosquitoes which assailed me from all sides. Its head appeared to be all mouth, and its notes were uttered so rapidly that, close as I was to the bird, they sounded like one long, continuous roll. A few seconds after his first effort (it was the male) he was joined by his mate, and she at once commenced to respond with a peculiar, low, buzzing or grunting note, like "gaw-gaw-gaw," undoubtedly a note of approval or endearment. This evidently cost her considerable effort; her head almost touched the ground while uttering it, her plumage was relaxed, and her whole body seemed to be in a violent tremble. The male in the meantime had sidled up to her and touched her bill with his, which made her move slightly to one side, but so slowly that he easily kept close alongside of her. These sidling movements were kept up for a minute or more each time; first one would move away, followed by the other, and then it was reversed; both were about equally bold and coy at the same time. Their entire love making looked exceedingly human, and the female acted as timid and bashful as many young maidens would when receiving the first declarations of their would-be lovers, while the lowering of her head might easily be interpreted as being done to hide her blushes. Just about the time I thought this courtship would reach its climax, a dog ran out of the house and caused both to take flight. He always showed an unaccountable antipathy for these birds, and invariably chased them as soon as one would alight near by. I watched for them on several subsequent evenings, in the same place, but they never returned there so early, but their fresh tracks on the sand showed that the place had been visited later in the night.

In the more southern portions of its range the Whip-poor-will nests usually about the first week in May, occasionally only during the last two weeks in April, and in the more northern parts usually not before June

Mr. H. W. Flint, of New Haven, Connecticut, has kindly furnished me with the following notes on this species: "This beautiful bird is a great favorite of mine, and I have devoted considerable time to studying its habits. It shows a strong attachment for certain localities to the neglect of others apparently equally suited to its tastes, and I have taken five sets of its eggs within 100 feet of a given point, and even when the first set was taken the female will often lay again within a rod or two of the original site. It nests rather early, May 20 to 25 being the average date of my finds. I know of no more ludicrous sight in bird life than that offered by the female when suddenly surprised with young. She flies or rather flops about the intruder in a circle, often alighting to tumble about upon the ground among the leaves, spreading the tail and opening the mouth, at the same time emitting a sound something like the cry or whine of a very young puppy, and also other guttural, uncouth sounds, wholly indescribable, the young themselves, in their scanty dress of dark yellow fuzz, apparently all mouth, adding to the general effect. I once, and once only, saw a female (the male is never present at the nest) carry a young bird about a rod, but can not say she used her bill, and don't think she did, but I am almost

sure the claws and legs only were used, as the young was hugged close to the body. I have never known the eggs to be removed, though I have left them in two or three different instances.

"I found a pair of young one morning and went home after my camera; but upon my return, several hours later, they were gone and the old bird also, and a careful search failed to disclose their retreat. In this case it would appear that the old bird removed them, as they were certainly too young to travel far themselves. The eggs that I have found (with the exception of one set) resemble each other closely, and were all taken in moderately open second-growth woodland and on ridges somewhat elevated above the immediate surroundings. No attempt at a nest has been observed; the eggs were placed in slight depressions and usually on one large leaf, never near a log or rock.

"The set referred to above as exceptional is quite heavily marked, and one egg has the spots on one side merged into one large blotch. It was taken July 4, 1884, at Deep River, Connecticut, and is the latest date on which I have found eggs, though I believe that two broods are reared."

The Whip-poor-will, like the other species of the *Caprimulgidæ* found in the United States, makes no nest, but deposits its eggs usually on a layer of dry leaves of deciduous trees, sometimes on dry pine needles, and occasionally on the bare ground, generally under thick bushes which afford plenty of shade, in some secluded and out-of-the-way corner, near the outskirts of forests, or on brush-covered hillsides, river bluffs, etc., which are not readily accessible and not disturbed much. It is naturally a timid and retiring bird, and does not brook repeated intrusion very gracefully. The nesting site selected is always a well-drained and a dry one; light and sandy soils are preferred to heavier ones, and it rarely, if ever, nests in places that are subject to overflow.

The number of eggs to a set is two; these are deposited on alternate days, and incubation commences with the first egg laid. I believe the female attends to this duty almost exclusively, and she is a most devoted parent, using all the well-known artifices of many ground-building species to entice the intruder away from the vicinity of her treasures. Occasionally she will remove her eggs if the nesting site has been disturbed, and the egg is said to be carried away in her capacious mouth; but this is not a regular habit by any means. The callow young, however, are more frequently carried to a safe locality if too often disturbed. The eggs of the Whip-poor-will are large for the size of the bird, and elliptical oval in shape; the shell is rather frail, close-grained, and somewhat variable in the amount of luster present; some are rather glossy, while others show little or no gloss.

The ground color of these eggs is usually pure white; occasionally a faint cream tint is perceptible, and the markings consist of blotches, spots, and tracings of different shades of brown, tawny and lighter tints of ecru drab, lavender, lilac, and pearl gray. In most specimens the markings are profuse; in some the darker, but in the majority the lighter tints predominate, and an occasional egg is almost unspotted. On the whole, they are not nearly as

handsome eggs as those of Chuck-will's-widow, and they are generally much lighter colored.

The average measurement of thirty-three specimens in the United States National Museum collection is 29.13 by 21.29 millimetres, or about 1.15 by 0.84 inches. The largest egg of the series measures 30.48 by 22.86 millimetres, or 1.20 by 0.90 inches; the smallest, 27.68 by 20.57 millimetres, or 1.09 by 0.81 inches.

The type specimen, No. 18256 (Pl. 1, Fig. 10), from a set of two, was taken by Mr. Robert Ridgway, near Wheatland, Indiana, in May, 1888, and represents one of the better-marked eggs of this species; No. 20450 (Pl. 1, Fig. 11), from the Bendire collection, also from a set of two, was taken on June 9, 1887, at Owings Mills, Baltimore County, Maryland, and shows one of the lighter-marked specimens.

53. *Antrostomus vociferus macromystax* (WAGLER).

STEPHENS'S WHIP-POOR-WILL.

Caprimulgus macromystax WAGLER, Ibis, 1831, 533.

Caprimulgus vociferus macromystax HARTERT, Ibis, 1892, 286.

(B —, C —, R —, C 881, U 417a.)

GEOGRAPHICAL RANGE: From Guatemala, Central America, north over the Mexican table-lands to southwestern New Mexico and southern Arizona.

Stephens's Whip-poor-will, a somewhat larger subspecies than its eastern relative, was first described by Mr. William Brewster, in the "Bulletin of the Nuttall Ornithological Club" (Vol. VI, 1881, pp. 69-72), from a specimen obtained by Mr. F. Stephens, who first met with it in the Chiricahua Mountains, Arizona, on May 2, 1880. Subsequently he found it also in the Santa Rita Mountains, in 1881, where it was, however, less numerous than in the former range the year previous. In speaking of Stephens's Whip-poor-will, Mr. Brewster says, on page 71: "In the Chiricahua Mountains it is apparently not uncommon, to judge from the following notes which accompanied my specimen: 'I have heard several of these Whip-poor-wills singing at one time, and am told that they were heard here last year. I hear *P. nuttalli* every evening. They keep high up the mountain side, while this Whip-poor-will affects the lower part of the canyons.' * * *

"In a recent letter Mr. Stephens adds: 'I heard the first Whip-poor-will about the middle of May. By June 1 they were as common as I ever knew them to be in the East; sometimes I could hear three or four whistling at once; they were very restless and rather shy, so I got only the specimen I sent you, and a female shot in the daytime. The latter flew off her nest, which, as usual, was only a very slight depression in the ground, but in this case was overhung by a rock. The single egg (now before me) is plain white, with very faint brownish spots, so faint that one would hardly notice them. She would have laid no more; this was on July 4, 1880.'"

In the same bulletin (Vol. VII, 1882, p. 212) Mr. Brewster describes this egg as follows: "The egg is white, with a dull gloss. At first sight it appears to be immaculate, but a closer inspection reveals a few faint blotches of the palest possible purple, so faint, indeed, that they might pass for superficial stains were it not for the fact that they underlie the external polish. The absence of well-defined markings may probably be explained by the assumption that the bird had laid one or more clutches earlier in the season, thus exhausting her supply of coloring pigment. The specimen measures 1.17 by 0.87 inches (or 29.72 by 22.10 millimetres)."

Mr. F. Stephens, in his notes on this subspecies sent to me, says: "The locality where I found the egg was a gulch near the summit of the Chiricahua Mountains, in a thick forest of yellow pine. The nest, if it can be called so, was a slight depression scratched in the ground, under the edge of a boulder. Incubation was advanced. I do not agree with Mr. Brewster (to whom I presented the egg) in thinking that it was a second brood. My opinion is that this species is a late breeder, as it is also a late migrant."

Dr. A. K. Fisher met with Stephens's Whip-poor-will during the month of June, 1894, and has given me the following notes: "The Whip-poor-will's note was not heard at Fort Bowie, Arizona, during the last three weeks of May, 1894. When we made camp at the mouth of Rucker Canyon, some forty miles south of the Post, in the Chiricahua Mountains, on the last day of the month, we heard a few, and a couple of days later found the species abundant higher up in the same canyon, among the pines (*P. ponderosa*). Here at early dusk and at dawn their notes were heard almost continuously, and numbers of birds were seen. On June 5 Mr. Fred. Hall Fowler found a nest, if the slight depression in the ground can be so designated, on a steep side hill about 50 feet above the stream. It was situated under an overhanging bush at the edge of a flat rock, and contained two young, recently hatched, and the fragments of egg shells from which they had emerged.

"At Fly Park (altitude about 10,000 feet) the species was very much less common, though a few were heard every night. While feeding they often alight on a prominent rock or dead stub, from which they launch out after passing insects and return to wait for other prey."

Its call note, although resembling that of the common Whip-poor-will, is said to be harsher and louder. Lieut. H. C. Benson, Fourth Cavalry, United States Army, also met with it near Fort Huachuca, and shot a female there on May 18, 1887, which is now in the United States National Museum collection.

Mr. W. W. Price writes me: "I distinctly heard the note of Stephens's Whip-poor-will in the Graham Mountains, Arizona, at about 7,000 feet elevation, on July 19, 1894. I also have good reasons to believe the testimony of a Government packer, who says he has heard its cry in the White Mountains, north of Fort Apache, in about latitude 34°."

It appears to be pretty generally distributed throughout the higher mountain ranges of southern Arizona, and undoubtedly breeds wherever found; its

favorite resorts seem to be the rocky sides of canyons. The remnants of the eggshells found by Mr. Fowler (the lower half), which he kindly sent me for examination, are uniformly pale cream colored and apparently unspotted; and the egg of this species is evidently but slightly marked. He writes me: "The eggs were deposited on a bed of oak leaves by the side of a large rock; there was no nest excepting the bare leaves, which had been hollowed out slightly; both parents and the two young ones were taken and they are now in my collection; the latter were covered with light brown down, and were not more than 1½ inches long."

There are no eggs of Stephens's Whip-poor-will in the United States National Museum collection, and no specimens are figured.

54. *Phalænoptilus nuttalli* (AUDUBON).

POOR-WILL.

Caprimulgus nuttalli AUDUBON, Birds of America, VII, 1843, 350, Pl. 495.

Phalænoptilus nuttalli RIDGWAY, Proceedings U. S. National Museum, III, 1880, 5.

(B 113, C 266, R 355, C 398, U 418.)

GEOGRAPHICAL RANGE: Western United States, from the Sierra Nevada and the Cascade mountains eastward to southeastern South Dakota, eastern Nebraska, Kansas, the Indian Territory, and eastern Texas; north to eastern Washington, Idaho, Montana, and southern North Dakota; south in winter through eastern Mexico to Guatemala, Central America. Casual east to Iowa and Missouri.

The Poor-will or Nuttall's Poor-will, a somewhat smaller species than our eastern Whip-poor-will, is distributed over quite an extensive range, its habitat being mainly confined to the interior, from the eastern borders of the Plains and the Great Basin regions to the Sierra Nevada and Cascade mountains on the West. As far as yet known it does not appear to be found north of our border, but it will not surprise me to see it yet recorded from the southern portions of western Assiniboia and Alberta, in the Dominion of Canada, especially as it is known to occur in Montana, the type coming from the upper Missouri River, in that State. Its breeding range is coextensive with its distribution in the United States, where it is chiefly a summer resident; the majority of these birds migrate to the table-lands of eastern Mexico, and many go still farther south to Guatemala. A few, however, winter along our southern border, in the Colorado Desert in southeastern California, as well as in similar localities in southern Arizona, New Mexico, and southwestern Texas. I heard the unmistakable notes of this species early in December, 1872, in the vicinity of my camp on Rillito Creek, near Tucson, Arizona, and again about the middle of February, 1873.

In some of its habits it differs considerably from the preceding species of this family which are almost entirely confined to the denser woodlands; the Poor-will, however, although frequently found in similar localities, is apparently equally as much at home on the open prairie and the almost barren and arid regions of the interior, which are covered only here and there with stunted

patches of sage (*Artemisia*) and other desert plants. The climate does not seem to affect it much, as it inhabits some of the hottest regions of the continent, like Death Valley, in southeastern California, as well as the slopes of the Rocky and Blue mountains, in Oregon, where it reaches altitudes of from 6,000 to 8,000 feet. I have heard the Poor-will in Bear Valley, Oregon, in a locality where frost could be found every month in the year. In the eastern parts of its range it overlaps that of the Whip-poor-will for some distance, and it appears to be quite common in portions of eastern Kansas, notably so about Manhattan, where Prof. D. E. Lantz has repeatedly found it breeding. In a letter dated October 4, 1892, speaking of Nuttall's as well as of the more recently described Frosted Poor-will, he says: "The Frosted Poor-will is not uncommon in this locality. I have noticed more specimens at the time of their spring migration than later. Indeed, at that time it seems about as common as the other form, *Phalænoptilus nuttalli*. But in the breeding season nearly all the birds seem to be of the latter kind. However, my own observations lead me to regard the 'frosted' as a mere color phrase of *Phalænoptilus nuttalli*. I have met with both birds together in migration, and once found a pair of fledglings near where they were hatched, one of the birds showing a decided hoary or frosted coloring on the wing and tail feathers, the other being without these markings. Only the female parent was seen. She was a typical *Nuttalli*. The young birds were caught and handled. The frosted one was not so well developed as the other. So far as I have observed, there is no difference in the habits or in the eggs of the two birds.

"I have found a number of sets of the older variety, some of them before I knew that there was a frosted form; since then I have always been careful to positively identify the parents before taking the eggs. The birds can easily be secured by the use of a butterfly net, or even by dropping a hat over them as they sit in the sun; but the precaution to secure them is unnecessary to the practical eye, for one can always have leisure to study them before they take to flight. With one exception the eggs taken were laid upon bare patches of gravel or on low, flat rocks, and placed usually near a bunch of weeds or a tuft of grass. The exception was a set found on the bare ground in an alley in Manhattan City. This alley was in constant use and it was strange that the eggs remained for so long a time undisturbed, for when taken incubation had begun in both eggs. The Poor-wills usually keep to the vicinity of steep hills and old dead grass. They seem to return to the same locality from year to year to breed."

The food of the Poor-will consists mainly of the smaller night-flying moths, beetles, locusts, etc., of which a considerable portion are gathered from the ground. Its flight is swift, easy, and perfectly noiseless as it skims along close to the ground in search of suitable morsels, and of these the more indigestible parts, such as wing coverts of beetles, etc., are ejected in the form of pellets, in the same manner as in the Raptores and other birds. As far as I have been able to observe, it does not utter its well-known and mournful-sounding note of "puih-whee-ee" while on the wing, and the last syllable is uttered so low that

unless one is close to the bird it can not be readily detected. I have heard the unmistakable song of this species in many places in the West, but although fairly common over a great extent of country, it is much more frequently heard than seen. I have also spent considerable time in vainly looking for the eggs of this species, and only succeeded in obtaining a single set. Its lugubrious calls are most often heard shortly after dusk, along the sides of rocky canyons in the foothills, and less often on the level plains and the mountain summits; its call note is also occasionally uttered in the daytime, but not often.

Mr. Fred. W. Koch writes me on this subject as follows: "On the morning of May 5, 1891, in the vicinity of Matarango Spring, in the Coso Valley, California, while walking along a sheep trail on the hillside above the spring, I was surprised to hear a Poor-will call from the opposite hill several yards away. Thinking it singular for this bird to utter its note in the daytime, I stopped to hear it repeated and to make sure of its identity. Just then its mate flew up about 10 feet away, and on examination I found a single fresh egg laid on the ground in a little bare spot a few feet in diameter; next day there were two eggs, which were taken. The bird probably uttered the call to warn its mate." This set is now in the United States National Museum collection.

This species was fairly common near Camp Harney, Oregon, along the slopes of Rattlesnake Canyon, in which the Post was built. It usually arrived here about April 15, and any fine evening after sundown several of these birds would "tune up" and commence calling from different directions along the sides of the canyon, and keep up their concert for an hour or more. On the evening of May 20, 1877, while returning to my quarters, I noticed a pair of these birds hopping along the main road directly in front of the officers' quarters, evidently feeding, and subsequently I saw sometimes half a dozen, within a distance of 300 yards, similarly engaged. They were quite tame, and would scarcely move out of my way. I more than once approached within two feet of one before it took flight, and then it flew only a few feet before settling down again. A very low, grunting sound, like "pweek pweek," and another caused by the snapping together of the mandibles, were the only noises made while so engaged; they never uttered their ordinary call on this road. On June 4, 1877, a short distance above the Post, I flushed one of these birds on a small plateau, over which numerous bowlders were scattered; the scant patches of soil being covered with sage and other bushes. This bird fluttered and tumbled around me in a circle, which made me suspect that its nest was close by; but the most careful search failed to reveal it. I am positive a pair nested there, as I could hear their calls in about the same place every night. The Poor-will sits so close and its plumage harmonizes so perfectly with the ordinary surroundings that its eggs or young are only discovered by accident. The only set of eggs obtained by me was found on the dry, barren plains south of my camp on Rillito Creek, near Tucson, Arizona, on August 2, 1872; they were fresh and laid on the bare ground under a small grease-wood bush (*Obione*) and were fully exposed to the sun. The male was shot. From the late date on which these eggs were found I believe

this species raises two broods a year, at least throughout the southern portions of its range. It did not appear to be common on these plains, but in the foothills its calls were much more frequently heard.

The eggs of Nuttall's Poor-will were first discovered by Dr. G. Suckley, on July 17, 1859, on the North Fork of the Platte River, in western Nebraska, and an egg of this set is at present in the United States National Museum collection. I find that it had been correctly entered, but its existence had evidently been overlooked, as no mention of it is made in the "History of North American Birds, 1874," by Baird, Brewer, and Ridgway. There are also specimens from Nevada, California, Utah, Colorado, and Arizona in the collection. Like the balance of the species belonging to this family, Nuttall's Poor-will is crepuscular and nocturnal in its habits, and is rarely met with in the daytime unless accidentally flushed; but as it is very tame, and will scarcely move unless in danger of being stepped on, it is very seldom seen during the day which it spends in repose under some bunch of grass or a low bush, beside a rock or sometimes on one, and although it may often be sitting in plain view and within a few feet of one, it is not readily detected. I think it rarely perches on low limbs of trees. Although common enough in suitable localities throughout its range, genuine eggs of Nuttall's Poor-will are still rare in oölogical collections.

Nidification begins rather late; the earliest breeding record I have is May 5, from southeastern California; the majority mention the months of June and July, and a single one names the beginning of August. Two eggs are laid to a set on alternate days; I believe both sexes assist in incubation and in the care of the young, and both are devoted parents; they will let you almost touch them before they forsake their treasures. The eggs lay usually on the bare ground, close to some little bush, to shelter them somewhat from the rays of the sun. They vary from oval to blunt elliptical oval in shape; the shell is rather thin, close grained, and moderately glossy. Their color is usually stated to be white, but on close inspection it can readily be seen that it is a delicate cream, with a faint pinkish tint which does not perceptibly fade. Eggs in the collection taken more than twenty years ago still plainly show this peculiar tint. The eggs are unspotted as a rule, but an occasional specimen shows a few faint, darker shell markings around one end, which are barely perceptible to the naked eye, and which fade considerably in time.

The average measurement of thirteen specimens in the United States National Museum collection is 25.15 by 19.05 millimetres, or 0.99 by 0.75 inch. The largest egg measures 26.67 by 20.32 millimetres, or 1.05 by 0.80 inches; the smallest, 22.35 by 19.30 millimetres, or 0.88 by 0.76 inch.

The type specimen, No. 24454 (Pl. 1, Fig. 23), from a set of two eggs, Ralph collection, was taken in Estes Park, Colorado, on June 19, 1891, and represents about an average-sized specimen of this species.

55. *Phalænoptilus nuttalli nitidus* BREWSTER.

FROSTED POOR-WILL.

Phalænoptilus nuttalli nitidus BREWSTER, Auk, IV, April, 1887, 147.

(B 113, part; C 266, part; R 355, part; C 398, part; U 418a.)

GEOGRAPHICAL RANGE: Apparently similar to that of the Poor-will.

The Frosted Poor-will, a lighter-colored and grayer bird than Nuttall's Poor-will is likely to prove only a color phase of the latter, especially as the known range of the two appears to be practically identical, was first described by Mr. William Brewster in "The Auk" (Vol. IV, 1887, p. 147), from specimens taken on the Nueces River, Texas, February 27, 1886. It has since then been met with in southeastern California, Arizona, southern New Mexico, Colorado, and Kansas. Its general habits appear to be entirely similar to those of the preceding species, but there is as yet not sufficient material available to enable one to come to any positive conclusions about the proper status of this pale form. The late Col. N. S. Goss, in his work on the "Birds of Kansas, 1891" (p. 346), makes the following pertinent remarks on this subspecies: "This bird does not appear to differ in habits, actions, or size from *P. nuttalli*, and I am impressed with the thought that it may possibly prove to be a dichromatic phase, like that of the Screech Owl (*Megascops asio*), rather than a subspecies, as now entered."

The very fact that it can not be considered as having a range of its own where the typical Poor-will is not also found seems to confirm this view. One of the lightest-colored specimens of this pale form which I have seen (an adult female) was secured in Death Valley, California, on January 28, 1891, and is now in the ornithological collection of the United States Department of Agriculture, in this city. Other specimens from the same region are typical *Phalænoptilus nuttalli*, and both phases winter to some extent in these desert regions. A set of eggs of this race, taken with the parent, in Riley County, Kansas, on June 26, 1889, by Mr. Eben M. Blachly, are now in the Goss collection in the Public Museum at Milwaukee, Wisconsin. They were laid upon the bare ground, under a bunch of grass upon the prairie, near the edge of a cornfield; they measure 1.05 by 0.79 and 1.03 by 0.78 inches; or 26.67 by 20.07 and 26.16, by 19.81 millimetres. There are no absolutely identified eggs of this subspecies in the United States National Museum collection, and they are indistinguishable from those of the Poor-will.

56. *Phalænoptilus nuttalli californicus* RIDGWAY.

DUSKY POOR-WILL.

Phalænoptilus nuttalli californicus RIDGWAY, Manual of North American Birds, 1887, 588, footnote.

(B 113, part; C 266, part; R 355, part; C 398, part; U 418 b.)

GEOGRAPHICAL RANGE: Pacific coast regions, from California north to Washington (?), south to northern Lower California.

The range of the Dusky, also known as the "California," Poor-will is confined to the moist coast districts of California, and probably to similar localities in Oregon and Washington. Messrs. Lyman Belding and A. W. Anthony likewise report it from Tia Juana and the San Pedro Martir Mountains, in northern Lower California. The most typical examples of this dusky race come from localities west of the coast range in California, while the birds of the interior and the western slopes of the Sierra Nevadas are, more or less, intermediate between this and the common Poor-will. Its breeding range is coextensive with its distribution in the United States. Mr. F. Stephens writes me: "The Dusky Poor-will is frequently heard in the spring and fall, and a few winter in sheltered valleys near the coast in San Diego County, but it is apparently a rare summer resident in southern California, and I have never taken its eggs." Mr. Charles A. Allen, of Nicasio, California, considers it a common summer resident in Marin County, where it arrives about the first week in March and remains during the breeding season.

Mr. R. H. Lawrence writes me from Monrovia, Los Angeles County, California, as follows: "The California Poor-will is pretty common here. I first heard its notes on May 3. According to my hearing, the words 'Pearl-rab-it' give a fair idea of its call in letters. There is a kind of chuck or catch-breath after the first two syllables which really makes the call have three. It is clearly given, and the first two syllables can be heard at a considerable distance; when excited more than commonly this call note is reiterated with animation for a short time, but it is generally given with slight pauses after each call, then a longer interval of silence follows as the bird moves to another place. While flying in sight I have never heard it give any sound. On August 1, while walking along the road to Duarte, about 10.30 p. m. on a moonlight night, I flushed one; it flew just ahead of me till I had passed its nesting place, when it wheeled around and alighted there again, seeming to nestle down to the ground, which was packed hard just there. On approaching it again, it flew off a little farther along the road; when startled it gave quickly, two or three times in succession, a low, soft note, like 'pweek, pweek, pweek,' which could only be heard a few yards away.

"On May 5, 1893, while hurrying to catch a train, along a road following the edge of a wash, a boy stopped me to show me a nest of the California Poor-will; we flushed the bird after nearly treading on her, looking about our feet

for the right spot, when she flew a few yards and alighted. A single egg lay there in a slight depression on the clean and somewhat coarse gravel, which was rather smooth for a few feet about. Around was the usual brushy chaparral of the wash. The egg was brought to me by the boy in the evening, with the bird, and a slightly smaller one had been taken the day previous from the same nest."

Mr. Lawrence kindly presented these eggs to the United States National Museum collection, as well as the parent. This is not quite a typical *Phalaenoptilus nuttalli californicus*, but it approaches this subspecies closer than the true *P. nuttalli*. The fact that the female returned to lay her second egg in the same spot from which the first had been taken the day before shows how tenacious these birds are to a locality once chosen for a nesting site. To further confirm this, Mr. Rolla H. Beck writes me that he shot two of these Poor-wills in June, 1894, in Monterey County, within a few feet of the spot where he tried to kill one with a fishing pole two years previously.

Mr. Walter E. Bryant, in his "Catalogue of the Birds of Lower California," makes the following remarks about this subspecies: "Noted at several places between Tia Juana and San Pedro Martir by Mr. Belding. Mr. Anthony has met with it up to 8,000 feet altitude, and says it winters in the low hills near the coast. Poor-wills were heard every evening on the steep hillsides at Comondu and at various localities. The only specimen secured, a male, was taken at Pozo Grande, March 19, 1889. I followed the bird some time before getting a shot, and each time that it was frightened it flew about 100 yards and alighted on cactus about 3 feet high. The Mexicans call them 'Tapa-camino' when they see them in the trail at dusk; but they also call the Night-hawks by the same name. At Comondu they were known as 'Cow-day,' from the almost perfect resemblance of their note to those words. In upper California the birds, which I have frequently heard, utter the notes rapidly, and sounding 'poor-will' clearly; in Lower California the sounds are given quite slowly, and resemble the words 'cow-day' rather than 'poor-will.'"¹

The only set of eggs of this subspecies in the United States National Museum collection is the one already referred to, presented by Mr. R. H. Lawrence. These two eggs are indistinguishable from those of the common Poor-will. Their ground color shows the same pale creamy tint, with a faint pinkish tinge, and their shape is also similar. They measure 26.42 by 19.30 and 25.15 by 19.30 millimetres, respectively, or 1.04 by 0.76 and 0.99 by 0.76 inches.

The type specimen, No. 25937 (not figured), from a set of two, taken near Monrovia, California, on May 4, 1893, was presented by Mr. R. H. Lawrence, as already stated.

¹Proceedings of the California Academy of Sciences, 2d series, Vol. II, 1889, pp. 287, 288.

57. *Nyctidromus albicollis merrilli* SENNETT

MERRILL'S PARAUQUE.

Nyctidromus albicollis merrilli SENNETT, Auk, V, Jan., 1888, 44.

(B —; C —; R 356, part; U 395, part; U 419.)

GEOGRAPHICAL RANGE: Southern Texas; south through northeastern Mexico to the Isthmus of Tehuantepec.

The range of Merrill's Parauque within the United States is a rather restricted one, being mainly confined, as far as known, to the lower Rio Grande Valley and southern Texas. The most eastern point from which it has yet been reported is Aransas County, where Mr. H. P. Attwater recently shot a specimen near Rockport. It is known to be fairly common in the vicinity of Corpus Christi. Mr. D. B. Burrows also met with it on the Nueces River, and these points probably mark the eastern limits of its range. We are indebted to Dr. James C. Merrill, United States Army, for the discovery of this handsome subspecies within our borders, who took the first specimen within the limits of Fort Brown, Texas, on April 1, 1876, and on May 2 he also obtained the eggs. Since then it has been found to be a common summer visitor in the lower Rio Grande Valley, and a number winter there as well; but the majority pass south into eastern Mexico, usually returning again to their breeding grounds early in March.

In speaking of the habits of this subspecies, Dr. Merrill says: "It frequents shady thickets and copses (where these can be found), and, when flushed, dodges rapidly and silently among the bushes, but soon alights, only to repeat the short flight when again approached. The eggs are deposited in such a situation, usually at the foot of a bush. The parent, when startled from her eggs, makes no attempt to decoy one away, but, flying a few yards, alights to watch the intruder, frequently raising herself on her legs and nodding in a curious manner, uttering at the same time a low, whining sound. Their notes are among the most characteristic night sounds of the lower Rio Grande, and are constantly heard at evening during the summer months. They consist of a repeated whistle resembling the syllables 'whew-whew-whew-whew-whe-e-e-e-w,' much stress being laid upon the last, which is prolonged. The whole is soft and mellow, yet can be heard at a great distance. The preliminary 'whews' vary somewhat in number, and late in the season are often omitted altogether." * * *

"On the 15th of May, 1876, I found a set of eggs near camp, at Hidalgo, and on returning in about fifteen minutes to secure the parent, who had disappeared among the thickets, I found that she had removed the eggs, although they had not been touched."¹

Mr. D. B. Burrows has also kindly furnished me with the following notes on Merrill's Parauque: "While in the lower Rio Grande country, in Starr County, Texas, during the fall of 1890, I first met with this bird. It seems to be a resident species, for I met with it during the winter months as well as during the spring

¹ Proceedings U. S. National Museum, Vol. I, 1878, p. 145.

and summer. When the nesting season is over the birds remain quiet, and their peculiar whistling note is not heard with regularity, and yet, on very warm nights during each of the winter months, I have occasionally heard them. During the winter the birds may be flushed from the dense thickets in the bottom lands, but as the nesting season approaches they leave these close retreats and seek more open ground. During the daytime the birds were commonly found on the ground at the foot of a growth of bushes or among fallen branches, and I have occasionally found them perched, nighthawk-fashion, upon a low branch not more than a foot from the ground. When closely approached, they dart quickly forward in a zigzag course, dropping as suddenly to the ground. This flight is short, usually not more than 50 or 60 feet, and when settled they commonly remain perfectly quiet until again flushed. They have a peculiar way of turning or facing about as they strike the ground, so that they can better watch the approaching danger. They lie so close that it is with great difficulty that they can be detected, unless the spot is carefully marked. In a number of instances, where the bird seemed to feel that it was observed, I have had them go through a peculiar bowing movement, resembling that of the Burrowing Owl, except that the body is raised from its completely prostrate position. Often when flushed they will utter a peculiar note, sounding like the syllable 'kop,' uttered with an explosive effect. On several occasions, in the fall of the year, when returning from a hunt, I have been startled by a peculiar 'put, put,' which caused me to stop short and grasp my gun a little tighter, feeling sure that I had disturbed a wild turkey and that this was his warning note. Cautiously approaching the spot, I have found that it was made by a Parauque, which was usually perched upon the extremity of a low, dead limb, or on the top of a bush. At these times I found that the bird was watching for food, and at intervals would leave the perch, dart off a short distance as if in pursuit of an insect, and as quickly return, in very much the same manner that the Whip-poor-will is accustomed to do. I believe that these birds are strictly insectivorous; but I have never made an examination of the stomach except in one instance. The stomach of this bird, killed in January, showed parts of the feet and wings of small beetles and other insects.

"At the approach of the breeding season and as early as the middle of March the peculiar whistle of the Parauque becomes general, and along the lower Rio Grande, where they are common, it may be heard on all sides. This species is strictly nocturnal. When flushed in the daytime they avoid striking against bushes with wonderful skill, but they are quite sensitive to a strong light. The birds begin to call as the dusk of the evening comes on. The commonest call is a long-drawn 'ko, whe-e-e-e-w,' much prolonged, and raised to a high pitch toward the last. This is repeated often and with great energy, and on a still night may be heard at a long distance. At other times the first syllable is omitted. Again it is varied by a repetition of the first syllable, as 'ko, ko, ko, ko-whe-e-e,' the first syllables repeated deliberately, and the last not so long drawn and suddenly cut short.

"I have never found the Parauque nesting in the dense thickets, where they hide during the winter. They seek the more open ground, the high, level spots near the river, or up some arroya, among scattering bushes and pear cactus, but never on the rocky hills, where the Texan Nighthawk is frequently found. In one instance a nest was found at the edge of a cultivated field. The eggs are placed on the bare ground, with no attempt at nest building, and usually at the foot of a clump of bushes. The bird, when flushed from the nest, quietly darts off and drops to the ground but a short distance away.

"During the winter and spring (1894) I found the Parauque to be fairly common along the lower course of the Nueces River, but I do not think that it is to be found much farther east, and I know that a little farther north its place is taken by the Chuck-will's-widow. Here, as on the Rio Grande, I found it resident throughout the year, and although it breeds there, I was not successful in finding any nests."

The food of Merrill's Parauque, like that of the rest of the *Caprimulgidæ*, consists mainly of night-flying insects, such as moths, beetles, etc. The crop of a specimen shot by Mr. H. P. Attwater, near Rockport, Texas, was filled with fireflies, *Photinus pyralis?* In the lower Rio Grande Valley fresh eggs are occasionally taken in the second week in April, but the breeding season is not at its height before May and lasts well into June. The earliest breeding record I have is April 14; the latest, June 27; in both cases the eggs were fresh. It is probable that two broods are, at least occasionally, raised in a season.

The eggs of Merrill's Parauque approach an elliptical ovate more than an elliptical oval, one end being always more perceptibly pointed than the other. The shell is close-grained, rather thin, and either without gloss or only moderately glossy. Their ground color varies from cream and vinaceous buff to a rich salmon buff, and this is more or less abundantly spotted and splashed with buffy pink, ecru drab, pale lavender, and more rarely with deeper shades of cinnamon rufous. In an occasional specimen the markings are mainly confined to the larger end, but in the majority they are pretty evenly scattered over the entire surface of the egg. A few are but slightly marked, and unless carefully examined might pass for immaculate. They are handsome eggs, and do not resemble any others of the *Caprimulgidæ* found in the United States.

The average measurement of forty-one specimens in the United States National Museum collection, mostly from the Ralph collection, is 31.24 by 22.66 millimetres, or about 1.23 by 0.89 inches. The largest egg of the series measures 33.27 by 24.13 millimetres, or 1.31 by 0.95 inches; the smallest, 27.18 by 20.57 millimetres, or 1.07 by 0.81 inches.

Of the type specimens, No. 25289 (Pl. 2, Fig. 1), from a set of two eggs, Ralph collection, taken on May 16, 1892, represents one of the better marked examples, while No. 26335 (Pl. 2, Fig. 2), also from a set of two and from the same collection, taken on April 16, 1893, represents one of the lighter-marked types of this species. Both were obtained in Cameron County, Texas.

58. *Chordeiles virginianus* (GMELIN).

NIGHTHAWK.

Caprimulgus virginianus GMELIN, *Systema Naturæ*, I, ii, 1788, 1028.*Chordeiles virginianus* SWAINSON, *Fauna Boreali Americana*, II, 1831, 496.

(B 114, C 267, R 357, C 399, U 420.)

GEOGRAPHICAL RANGE: Eastern North America; north in the Dominion of Canada to Nova Scotia, New Brunswick, Quebec, northern Ontario (Moose Factory), and Keewatin (Fort Churchill), in latitude 59°, and thence in a northwesterly direction to the Mackenzie River Valley, in the vicinity of Fort Good Hope, to about latitude 65°; west in the United States to the eastern border of the Great Plains and, sporadically only, along the southern boundary of the Dominion of Canada and the northern border of the United States, in the wooded districts, to southern British Columbia, Washington, Oregon, and northern California; south in winter to the Bahama Islands, Central America, and the greater part of South America.

The range of the Nighthawk, also known as "Bull-bat," "Mosquito Hawk," "Will o' the Wisp," "Pisk," "Pyramidig," and sometimes erroneously as "Whip-poor-will" (being frequently mistaken for this species), is quite an extended one. It is only a summer visitor throughout the United States and the Dominion of Canada, generally arriving from its winter haunts in the Bahamas, Central and South America in the latter half of April, reaching the more northern parts about a month later, and leaving the latter again in large straggling flocks about the end of August, moving leisurely southward and disappearing gradually along our southern border about the latter part of October. Its migrations are very extended and cover the greater part of the American continent.

Its breeding range in the United States and the Dominion of Canada is coextensive with its geographical distribution. On the Atlantic Seaboard it reaches the northern limits of its range in about latitude 51°, in the Province of Quebec; and although it has been recorded from Labrador, I fail to find any positive evidence of its occurrence there. Several specimens have been taken at Moose Factory, northern Ontario; and among a collection of skins from Fort Churchill, on the west shore of Hudson Bay, in about latitude 59°, now in the Edinburgh Museum, is an adult female taken by Dr. Gillespie, jr., while stationed there as an officer of the Hudson Bay Company, previous to 1845. Thence it probably ranges in a northwestern direction to the Mackenzie River Valley, north of Fort Simpson. Mr. James Lockhart sent a skin to the United States National Museum, obtained near Fort Good Hope, Northwest Territory, in about latitude 66°, which is the northernmost record I have been able to find. The western limits of the Nighthawk are not so easily defined. In this direction it reaches the eastern borders of the Great Plains, and it is also found sporadically throughout the better-timbered parts along the southern boundary of the Dominion of Canada and the northern border of the United States, west to southern British Columbia, Washington, Oregon, and northern California (Mount Shasta), where it is replaced in the more open portions of these regions by the lighter-colored western representative, *Chordeiles virginianus henryi*. I was quite

surprised to find that skins taken by me in the vicinity of Fort Klamath, Oregon, and now in the United States National Museum collection, are almost indistinguishable from typical specimens from the eastern United States; they certainly approach the eastern bird far more closely than the lighter-colored western subspecies. The same remarks apply to specimens from southern British Columbia, Washington, and northern California. Along the respective borders of their ranges the two forms overlap sometimes for considerable distances, the present species occupying the outskirts of the better-timbered tracts, while the western race is principally restricted to the more open prairie country.

The Nighthawk is generally a common summer resident throughout the eastern United States north of latitude 35°, while south of this it is more irregularly distributed, but breeds, to some extent at least, in all of our Southern States, excepting perhaps Florida and the immediate vicinity of the Gulf coast. Its common name is somewhat of a misnomer; it is by no means nocturnal in its habits; in fact, it is diurnal and crepuscular, and it is not at all unusual to see numbers of these birds on the wing on bright sunny days; but it does most of its hunting in cloudy weather and in the early mornings and evenings, retiring to rest soon after it becomes dark; but during bright moonlight nights it keeps up its flight somewhat later and I have heard its calls as late as eleven o'clock.

It is one of our most graceful birds on the wing and its aerial evolutions are truly wonderful; one moment it may be seen soaring through space without any apparent movement of its pinions, and again its swift flight is accompanied by a good deal of rapid flapping of the wings, like that of our Falcons, and this is constantly more or less varied by numerous twistings and turnings. While suddenly darting here and there in pursuit of its prey I have seen one of these birds shoot almost perpendicularly upward with the swiftness of an arrow in pursuit of some insect. Its tail appears to assist it greatly in these sudden zigzag changes, being partly expanded during most of its complicated movements. I know of no more interesting sight than to watch a number of Nighthawks while engaged in feeding, skimming close to the ground or over the waters of some pond or lake, gliding swiftly along in all kinds of serpentine gyrations with the utmost grace and ease, and no matter how limited the space may be and how numerous the birds, none will ever get in the way of each other; all their movements seem to be accomplished in the most harmonious manner.

The Nighthawk is a social bird while on the wing, and I have seen fully a hundred at one time hawking over a small mountain meadow or a pond, and they certainly seemed to enjoy each other's company. While on the wing their querulous and squeaky call note, sounding like "æh-eeek, æh-eeek" or "speek-speek," is repeated at different intervals. Mr. W. E. Grover describes this note as a sharp, mowing "mueike," and it is also said to resemble the word "beard," uttered in a whisper. When disturbed while sitting on its eggs it usually utters a low, purring or chuckling sound; and during early spring the male frequently

descends rapidly from high above, the vibration caused by the air passing through the primaries producing a peculiar booming sound which has been compared to that made by blowing through the bunghole of an empty barrel; this comes perhaps as near to it as it can be described. It is amazing to see what perfect control these birds have over themselves during this peculiar performance; descending as they do almost with the rapidity of a lightning flash, one would think they could not possibly arrest their downward course in time to prevent being dashed to the ground; but at the proper moment, by a single reverse movement of their wings, they rise in a gradual curve, to resume their flight or repeat the same performance. This aerial play seems to be principally confined to the mating and breeding season. I have never observed it later in the year.

On the ground, however, the Nighthawk does not show to such good advantage and its movements here are slow, unsteady, and evidently more or less laborious. Its food consists mainly of insects, such as flies and mosquitoes, small beetles, grasshoppers, crickets, and the smaller night-flying moths, and I believe that all are caught on the wing. It must be considered as an eminently useful and beneficial bird and deserves the fullest protection. Unfortunately, however, the Nighthawk is considered as a legitimate game bird in certain sections, and many are killed yearly for food, as well as for sport, simply to show the gunner's skill in marksmanship; and the good they do through the destruction of millions of troublesome insects is entirely lost sight of. Its favorite haunts are the edges of forests and clearings, burnt tracts, meadow lands along river bottoms, and cultivated fields, as well as the flat mansard roofs in many of our larger cities, to which it is undoubtedly attracted by the large amount of food readily obtainable in such localities, especially about electric lights, and also the convenient and secure nesting sites afforded on the gravel-covered surfaces of the roofs, which may be found everywhere in abundance. During the heat of the day the Nighthawk may be found resting on horizontal limbs of trees, on fence rails, the flat surface of some lichen-covered rock, on stone walls, old logs, chimney tops, and on railroad tracks. When perched on the limb of a tree, a log, or a fence rail, it always sits lengthwise, and excepting during the mating and breeding season I have rarely seen one on the ground.

Strictly speaking, the Nighthawk is not a forest bird, as it only frequents their outskirts, or extensive clearings and burnt tracts, while it avoids the denser and heavier growth of timber. It does not object to sunshine like the Whip-poor-will and the Chuck-will's-widow, and apparently is not affected by the light in the way they are.

In New England and most of the other Northern States nidification rarely commences before the first week in June (more often during the second), and continues well into July. The earliest date I know of on which its eggs have been taken is May 27 in southern Michigan; the latest, July 19 in southern Pennsylvania. In the more southern parts of its range it usually nests in the first half of May, and young are occasionally found by the end of this month. Like the rest of the *Caprimulgidæ*, the Nighthawk makes no nest, but deposits its

two eggs on the bare ground, frequently in very exposed situations, sometimes on some little elevation, or in slight depressions on flat rocks, between the rows in corn or potato fields, in pastures, on gravel bars, and cinder piles near furnaces, and within recent years they also nest more and more frequently on the flat, gravel-covered roofs of houses in our larger cities. They undoubtedly find such nesting sites very convenient and secure, but the intense heat to which the eggs and young are necessarily exposed during the day must be something fearful, and I have no doubt that some of the latter perish, and that not a few of the eggs become addled, from this cause. In favorite localities the Nighthawk breeds occasionally in small colonies, and several pairs may be found breeding in close proximity to each other. I believe, as a rule, only a single brood is raised in a season, but if the first set of eggs is taken, a second one will be laid about a week after, which consists occasionally of only a single egg.

The Nighthawk was quite common along the borders of the open pine forests near Fort Klamath, Oregon, and all the nests found here were placed close to the edge of the perpendicular rim rock which skirts Klamath Valley toward the east. The eggs were invariably laid within a foot of the edge, and I presume such places were selected for protective purposes to lessen the danger of their being stepped on by cattle or horses. These birds always pick out a dry and well-drained spot in which to lay their eggs, and if discovered on the nest, the parent attempts by all the well-known tactics of ground-breeding birds to draw the intruder away from the spot, fluttering in front of him, just out of reach, uttering at times low cries of distress, etc. Occasionally the eggs or young are removed quite a little distance by the parent, but this habit is by no means universal. A nest examined by me on June 14, 1893, in Herkimer County, New York, was found in a slight natural depression on a well-drained fern-covered side hill, in an old clearing, close to a small lake. The eggs laid on the bare ground about an inch or more apart, which seems to be their usual position, the ends pointing in the same direction; when covered, each rests against opposite sides of the breast of the parent and is held in place by the wings. I purposely flushed this bird several times to note her actions. It allowed me to approach her within a couple of feet each time before flying off, and then it only retired a short distance, alighting on a prostrate old log close by, remaining perfectly silent. About five minutes after I left, it returned and settled again on the eggs while I was still in plain view. I flushed her again shortly afterwards, and she repeated the same performance; but the third time she uttered a low, purring noise as she flew, probably a note of protest. I was in hopes that she might try to remove her eggs and I would have a chance to observe how this was done, but she failed to gratify my wishes. The male did not put in an appearance during the two hours spent in watching the nest. As nearly as I can ascertain, incubation lasts about sixteen days, and both sexes assist in this duty. The young are fairly well covered with gray down when first hatched; they grow rapidly, and while small one of the parents is always close by.

•

Only two eggs are laid to a set (on alternate days) and incubation begins with the first one deposited. The shell is strong, close-grained, and generally moderately glossy; in shape they vary from elliptical ovate to elliptical oval, the former prevailing in the majority, one end being a trifle smaller than the other. Their ground color is quite variable, and ranges from a pale creamy white through different shades of cream, olive buff, and olive gray, and they are profusely blotched and speckled with different shades of slate black, drab, smoke and lilac gray, and tawny olive, mixed with lighter shades of pearl gray, lavender, and plumbeous. In some specimens the markings are fine and uniform in size, almost obscuring the ground color; in others they are less numerous, but large and prominent. There is an endless variation in their markings. Scarcely any two sets resemble each other closely, and I consider the egg of the Nighthawk one of the most difficult ones known to me to describe satisfactorily.

The average measurement of eighty-one specimens in the United States National Museum collection is 29.97 by 21.84 millimetres, or 1.18 by 0.86 inches. The largest egg of this series measures 33.53 by 22.86 millimetres, or 1.32 by 0.90 inches; the smallest, 27.68 by 20.57 millimetres, or 1.09 by 0.81 inches.

The type specimen, No. 9813 (Pl. 3, Fig. 1), from a set of two taken near Dubuque, Iowa, on May 28, 1865, by the Messrs. Blackburn, represents one of the larger and heavier marked specimens. No. 24968 (Pl. 3, Fig. 2), Ralph collection, from a set of two taken by Dr. William L. Ralph in Herkimer County, New York, on June 24, 1891, represents a small specimen with an olive-gray ground color and rather dark markings; while No. 20457 (Pl. 3, Fig. 3), likewise from a set of two, Bendire collection, was taken by the writer near Fort Klamath Oregon, on July 6, 1882, and represents one of the lighter-colored types.

59. *Chordeiles virginianus henryi* (CASSIN).

WESTERN NIGHTHAWK.

Chordeiles henryi CASSIN, Illustrations of the Birds of California, Texas, etc., I, 1855, 233.
Chordeiles virginianus var. *henryi* COUES, Key, 1872, 181.

(B 115, C 267a, R 357a, C 400, U 420a.)

GEOGRAPHICAL RANGE: Western North America; north to central British Columbia to about latitude 55° and through the prairie districts of southern Alberta, Assiniboia, and western Manitoba; east in the United States to western Minnesota, Iowa, northern and central Illinois, Kansas, the Indian Territory, western and southern Texas; south over the table-lands of Mexico, and in winter through Central America, over the greater part of South America to Patagonia.

The Western Nighthawk, a lighter-colored subspecies than the preceding, is a common summer resident throughout a considerable portion of western North America, but its range is likewise a rather irregular one. On the whole, it is more of a prairie bird than the former, but it is by no means confined to the plains alone; it appears to be equally at home on the more open, barren

mountain ranges throughout the West, where it is found as a summer resident up to altitudes of 10,000 feet. None of these birds appear to winter within the limits of the United States. It usually makes its appearance along our southern border about April 1, and returns to its winter haunts again late in September. Occasionally a few stragglers may arrive somewhat earlier in the spring, as Mr. H. P. Lawrence writes me: "I am sure I heard the cry of a Nighthawk at Olympia, Washington, on March 29, 1890. They are common here in the summer. I have often seen them take dust baths in the evening in the paths near an adjacent cottage." Mr. R. MacFarlane reports this subspecies as a common summer resident in the vicinity of Forts St. James and St. George, in the interior of British Columbia, in about latitude 55° , and he sent two sets of eggs and a skin from there to the United States National Museum collection in 1889. These points mark, as far as known, the northern limits of its range. I know it to be common throughout the sagebrush plains and the prairie regions of northern Washington, Idaho, and Montana, and there is no doubt that it also occurs in similar regions throughout eastern Alberta, Assiniboia, and western Manitoba; it is likely to be found farther north as well. The eastern limits of its range extend well into Minnesota, Iowa, northern and central Illinois, where it is the prevailing form found throughout the prairie regions of these States. It is also common throughout the middle and western portions of Kansas, the Indian Territory, and southwestern Texas. Along our southern border it appears to be rather rare, and I observed but very few of these birds in the lower valleys and desert regions in southern Arizona. Here they appear to be mainly confined to the barren mountain ranges, and only breed sparingly at the lower altitudes. Dr. Edgar A. Mearns reports it, however, to be the common form of Nighthawk in the Animas Valley, near the international boundary line, in southwestern New Mexico, and he took a set of eggs here on July 3, 1892, which are now in the United States National Museum collection. In his interesting paper, "Observations on the Avifauna of portions of Arizona," the Doctor makes the following remarks on this subspecies:

"I have never known this species to infringe on the territory of the Texan Nighthawk during the breeding season; each keeps to its own ground, the latter being confined to the region below the pines, and the former residing in the pines and spruces, breeding in great numbers in these limited areas. A single migrant was taken at Fort Verde on May 9, 1885. Two fresh eggs were taken at Flagstaff on June 18, 1887, in a level place, bestrewn with volcanic scoria, beneath the pines. In our summer camp, near the summit of the Mogollon Mountains, a small beetle was annoyingly abundant, flying into our tents in great numbers during the day and swarming around our log fires at night. As the twilight gathered, hundreds of these Nighthawks appeared upon the scene, preying upon the troublesome insects. Careless of our presence at the fires and of the noisy hilarity of camp, they flitted through the smoke with astonishing freedom from diffidence, capturing myriads of the hated beetles as they passed and repassed above, between, and around us, until their flickering forms

were as familiar as the stirring of the pine boughs overhead, and the fanning of their wings almost as little heeded. A couple of young, recently hatched, were found near the camp on July 27, 1887, showing that two broods are reared the same year, or that its season of reproduction is quite protracted. The voice of this species is quite unlike that of *Chordeiles texensis*.¹

In southern California it is a somewhat rare summer resident, but in the middle and northern portions of this State it is not uncommon. In the lower Rio Grande Valley, throughout western Texas, the Plains, and the Great Basin regions it seems to be generally distributed, and appears to be equally at home in the hottest desert districts—like Death Valley, for instance, below sea level—as on the higher mountain summits in the Sierra Nevadas and the Rocky mountains. I found the Western Nighthawk fairly common in the vicinity of all the military Posts where I have been stationed in the West, and I have not observed the slightest difference in its general habits, call notes, etc. from those of its eastern relatives.

In the lower Rio Grande Valley, in Texas, nidification commences occasionally in the last week in April and lasts well into July, and here two broods are undoubtedly raised in a season, while in the more northern portions I believe one is the rule, and here eggs are rarely found before the middle of June, and frequently not before the first week in July. Its nesting habits are also similar; it breeds in corresponding situations, excepting, as far as I know, the flat roofs of houses. I have not yet heard of their breeding on housetops in any part of their range. A set of eggs of this subspecies was found by me on July 3, 1875, in the foothills of the Blue Mountains, some 6 miles northeast of Camp Harney, Oregon, laid among some pebbles on the bare ground under a little sage bush. The sitting bird allowed me almost to touch it, and was very reluctant to abandon its eggs, which were but slightly incubated. On my approach, it ruffled its feathers and emitted a hissing sound, resembling somewhat the spitting of a cat when mad. Their favorite nesting places in that vicinity were the crests of gravelly ridges, always selecting a well-drained spot, where the rains could not chill the young or eggs. Bare, rocky table-lands are also frequently resorted to for similar purposes, and less often the flat tops of boulders. Extensive burnt tracts also furnish favorite abiding places for them in the more northern portions of their range; in fact, in such localities they are fully as abundant as on the more open sagebrush plains. They are very devoted parents. Mr. W. G. Smith, of Loveland, Colorado, writes me: "I had one swoop down several times at a dog that used to accompany me, finally driving it away. I think the bird had a nest close by and resorted to this means to protect its young or sitting mate."

The eggs of the Western Nighthawk, both in shape and markings, are scarcely distinguishable from those of the eastern bird, and the same description will answer for both; on the whole, however, the lighter-colored types seem to predominate over the darker ones. The eggs figured of the preceding species will also answer for this, and the single egg figured of this subspecies can likewise be matched among the series of the former.

¹ The Auk, Vol. VII, 1890, pp. 254, 255.

The average measurement of a series of sixty-three eggs in the United States National Museum collection is also practically the same, being 29.97 by 21.61 millimetres, or 1.18 by 0.85 inches. The largest egg of the series measures 32.51 by 22.86 millimetres, or 1.28 by 0.90 inches; the smallest, 27.43 by 20.83 millimetres, or 1.08 by 0.82 inches.

The type specimen selected, No. 26125 (Pl. 3, Fig. 4), from a set of two eggs, was taken by Dr. Edgar A. Mearns, United States Army, in the Animas Valley, near San Luis Springs, New Mexico, on July 3, 1892, and represents a very finely and profusely marked specimen, in which the ground color is not very readily perceptible.

60. *Chordeiles virginianus chapmani* (SENNETT).

FLORIDA NIGHTHAWK.

(*Chordeiles popetue*) *chapmani* (SENNETT MS.) Coues, Auk, V, January, 1888, 37.

Chordeiles virginianus chapmani SCOTT, Auk, V, April, 1888, 186.

(B —; C —; R 357*b*, C 401, U 420*b*.)

GEOGRAPHICAL RANGE: Florida and the Gulf coast; west to southern Texas; in winter south to the Bahama Islands and through eastern Mexico to Central America. Casually north to North Carolina (Macon).

The range of the Florida Nighthawk, also commonly called "Bull-bat" or simply "Bat," a somewhat smaller and darker-colored bird than the common Nighthawk, is confined, as far as known, to Florida and the Gulf coast westward to southern Texas. I have no positive breeding records from outside of Florida, but it is more than likely that it breeds along the entire Gulf coast as far west at least as Aransas County, Texas. Mr. H. P. Attwater kindly sent me several skins taken near Rockport, in the above county (fall specimens), which are undoubtedly referable to this subspecies. There is also a skin in the United States National Museum collection taken by Dr. Elliott Coues near Fort Macon, North Carolina, on June 10, 1869, and I have no doubt that it will yet be found as a regular summer visitor along the south Atlantic coast of Georgia and South Carolina. There is not sufficient material available, excepting from Florida, to enable me to define its breeding range more definitely outside of this State. The Florida Nighthawk is only a summer resident of the United States, usually arriving from its winter haunts in the south about the middle of April and returning again late in October. Mr. Attwater informs me that this Nighthawk remains later in the fall in the vicinity of Rockport than the Western Nighthawk, and that its favorite haunts there are the oak openings, while the latter more often frequents the open prairie.

Its general habits, call notes, food, etc., seem to be similar to the two preceding species in almost every respect. Mr. W. E. D. Scott describes a young bird, apparently five or six days old, as follows: "The down is dirty white beneath, and on all other parts is the same dirty white, mixed with spots

of black, giving the bird an appearance above not unlike the young of *Aegialitis wilsonia*, save that the down is longer."¹

Mr. Frank M. Chapman, in his "List of Birds Observed at Gainesville, Florida," speaking of this subspecies, states: "Bull-bat or (as it is more commonly termed) 'Bat' shooting is here a popular pastime, great numbers being killed for food, and in August, when the birds have gathered in flocks, favorite fields may be occupied at nightfall by as many as a dozen gunners."²

Dr. William L. Ralph has taken several nests and eggs, with the parents, in Putnam County, Florida, which are now in the United States National Museum collection. Here, during the breeding season at least, the Florida Nighthawk frequents mainly low, flat pine woods, especially such as have recently been burnt over, the eggs generally lying on the bare ground. Sandy soil seems to be preferred for nesting places. One set of eggs was found by him under a small orange tree in an orange grove on the side of a sandy hill; three others were taken in flat pine woods, and in one instance the eggs laid on a few fragments of charcoal left where a fallen tree had been partly burnt, between the remaining part of the tree and the stump, about 3 feet from each. Nidification appears to be at its height in Putnam County, Florida, during May, and probably two broods are raised in a season.

The eggs of the Florida Nighthawk resemble those of the two preceding species closely, both in shape and in their ground color; but the markings, as a rule, are much darker and bolder, and the eggs are also somewhat smaller. The difference between them and those of their near relative, *Chordeiles virginianus minor*, is still greater, the latter being on the whole much lighter colored than those of the Western Nighthawk, resembling the eggs of *Chordeiles texensis* far more in this respect.

The average measurement of fifteen specimens in the United States National Museum collection, all from Florida, is 29.03 by 20.89 millimetres, or about 1.14 by 0.82 inches. The largest egg measures 30.94 by 20.57 millimetres, or 1.22 by 0.81 inches; the smallest, 27.43 by 20.32 millimetres, or 1.08 by 0.80 inches.

Of the type specimens, both from the Ralph collection, No. 24969 (Pl. 3, Fig. 5), from a set of two eggs taken near San Mateo, Florida, on May 9, 1885, represents one of the finer-marked examples, while No. 25823 (Pl. 3, Fig. 6), also from a set of two taken near Tomoka, Florida, on May 8, 1892, shows one of the darker-colored patterns.

¹ *The Auk*, Vol. V, 1888, p. 186.

² *Ibid.*, p. 272.

61. *Chordeiles acutipennis texensis* LAWRENCE.

TEXAN NIGHTHAWK.

Chordeiles acutipennis var. *texensis* BAIRD, BREWER, and RIDGWAY, History of North American Birds, II, 1874, 406.

(Cf. Hartert, Catalogue Birds British Museum, XVI, 192, 616.)

(B 116, C 268, R 358, C 402, U 421.)

GEOGRAPHICAL RANGE: Southwestern United States, from southern and western Texas, southern New Mexico, and Arizona; north to latitude 38° in California (to San Joaquin and Stanislaus counties), southern Nevada, and southern Utah; east (casually?) to southwestern Louisiana; south to Lower California and over the table-lands of northern Mexico; in winter to Costa Rica and Veragua, Central America.

Within the last few years the range of the Texan Nighthawk in the United States has been greatly extended. In California it is now known to occur as far north as San Joaquin and Stanislaus counties, in about latitude 38°, Mr. L. Belding having observed about a dozen of these birds on June 5, 1891, at Knight's Ferry, in the latter county, and one of these was secured by him. East of the Sierra Nevadas this species was met with by Dr. C. Hart Merriam and other members of his exploring party as far north as Bishop, in Inyo County, California, as well as at several points in southern Nevada and in the lower Santa Clara Valley, in Utah. In the latter valley Dr. Merriam found it breeding near St. George, securing a set of fresh eggs on May 13, 1891. It appears to be generally distributed throughout the arid desert regions of Arizona, and it is common in suitable localities throughout this Territory as well as through the southern portions of New Mexico, and it is also an abundant summer resident in the southern and western portions of Texas. Mr. E. A. McIlhenny has taken it in southwestern Louisiana, where it probably occurs only as a straggler. It also appears to be generally distributed throughout the greater part of Lower California.

Some of the habits of the Texan Nighthawk, the smallest representative of this genus found within the United States, are very similar to those of its somewhat larger relative, the Western Nighthawk. Like the last-named species, it is a very sociable bird at times; in suitable localities, for instance on the bottom lands bordering some of the larger streams within its range, it is very abundant, and I never saw so many Nighthawks anywhere as I did of this species one evening while camped near a slough close to the Gila River, while in route from Fort Yuma to old Fort McDowell, southwestern Arizona, in July, 1871. There were certainly several hundred making their evening meal on the numerous insects which abounded in that vicinity. Its flight is equally as graceful as that of the other Nighthawks, but it rarely soars as high as the former, and generally skims just over the tops of the bushes or close to the surface of the water. In fact, I have repeatedly seen them touch the surface, as if drinking or

catching insects, probably the latter. The ordinary call note uttered by it while on the wing, however, is quite different; it is still more squeaky than that of the Nighthawk, not so loud, and reminds me somewhat of the sounds made by a very young kitten in distress. It apparently does not indulge in the peculiar aërial performances, causing the booming sounds made by the other members of this genus so frequently heard during the mating and breeding season; and it is also more crepuscular, and unless accidentally flushed is rarely seen flying about in the daytime. Dr. James C. Merrill, United States Army, in his "List of Birds Observed in the Vicinity of Fort Brown, Texas," writes of this species as follows:

"Common summer visitor, arriving early in April. While *Chordeiles virginianus henryi* is usually found about prairies at some distance from houses, the present species is most plentiful just outside of Brownsville, and I have found several sets of eggs within the fort. These are usually deposited in exposed situations, among sparse chaparral, on ground baked almost as hard as brick by the intense heat of the sun. One set of eggs was placed on a small piece of tin, within a foot or two of a frequented path. The female sits close, and when flushed flies a few feet and speedily returns to its eggs. They make no attempt to decoy an intruder away. I have ridden up to within five feet of a female on her eggs, dismounted, tied my horse, and put my hand on the bird before she would move. This species is more strictly crepuscular than *Chordeiles virginianus henryi* or *Chordeiles virginianus*, and is very seldom seen on the wing during the day. The notes are a mewling call, and a very curious call that is with difficulty described. It is somewhat like the distant and very rapid tapping of a large Woodpecker, accompanied by a humming sound, and it is almost impossible to tell in what direction or at what distance the bird is that makes the noise. Both these notes are uttered on the wing or on the ground, and by both sexes."¹

In some respects its habits resemble those of the Poor-will more than the Nighthawks. I have more than once seen several of these birds alight on the bare ground in front of my camp on Rillito Creek, near Tucson, Arizona, after sundown, and watched them hopping after insects or dusting themselves. They were very tame, often allowing me to walk to within four feet of them, when they would only fly a few yards and resume their feeding again.

The Texan Nighthawk usually arrives along the southern border of its range in the United States about the first week in April, and returns south again in the latter part of October. Throughout the more southern portions of its habitat it undoubtedly raises two broods in a season. The earliest breeding records I have (April 27 and 28) are from the lower Rio Grande Valley, in Texas; the latest (one of my own) is August 6, 1872, when I found a strongly incubated set of eggs near Tucson, Arizona.

Like the other members of the *Caprimulgidae*, the Texan Nighthawk makes no nest, but deposits its two eggs on the bare ground, where they are fully

¹Proceedings United States National Museum, Vol. I, 1878, p. 146.

exposed to the rays of the sun, or near the base of some desert shrub, which at best furnishes but little protection from the intense heat, and I have found its eggs on the parched gravelly mesas of southern Arizona, miles from the nearest water. Their favorite breeding resorts here are the dry, barren table-lands, the sides of canyons, and the crests of rocky hills. Although not absolutely certain, I believe the two eggs are deposited on alternate days, and incubation begins with the first egg laid. They are exceedingly difficult to detect on account of their similarity in color to their general surroundings, which usually harmonize very closely. The shell is strong, close grained, and rather glossy, while in shape the eggs are more variable than those of our other Nighthawks, ranging from oval to elliptical oval, and again to elliptical ovate. The ground color varies from pale gray (a sort of clay color) to pale creamy white, with a faint pinkish tint. This latter phase of coloration is rather unusual however. The whole surface is minutely marbled, speckled, or rather peppered, with fine dots of different shades of grays, lilac, and a few darker and coarser markings of fawn color, slate, and drab. Occasionally a specimen is found which, to the naked eye, appears entirely unmarked; but on more careful examination a few dark spots, mere pin points, can readily be noticed. They are much lighter colored than the average eggs of our other Nighthawks, and readily distinguished from these on this account, as well as from their smaller size.

The average measurement of fifty-five specimens in the United States National Museum collection is 26.84 by 19.61 millimetres, or about 1.06 by 0.77 inches. The largest egg of this series measures 29.72 by 21.08 millimetres, or 1.17 by 0.83 inches; the smallest, 23.11 by 18.03 millimetres, or 0.91 by 0.71 inch.

Of the type specimens (all selected from sets of two) No. 24210 (Pl. 3, Fig. 7), taken by Dr. C. Hart Merriam, on May 13, 1891, near St. George, Utah, represents an egg with a light ground color, and a peculiar and rare style of markings. No. 24312 (Pl. 3, Fig. 8), collected near Brownsville, Texas, on May 8, 1891, shows one of the darker and heavier marked styles. No. 25299 (Pl. 3, Fig. 9), from the same locality, taken May 16, 1892, represents a very uniform and evenly colored specimen, while No. 26351 (Pl. 3, Fig. 10), likewise from the same locality, taken May 8, 1892, represents about an average-colored egg of this species. The last three types are from the Ralph collection.

Family MICROPODIDÆ. SWIFTS.

62. *Cypseloides niger* (GMELIN).

BLACK SWIFT.

Hirundo nigra GMELIN, *Systema Naturæ*, I, ii, 1788, 1025.

Cypseloides niger SCLATER, *Proceedings Zoological Society*, June 27, 1865, 615.

(B 108, C 270, R 350, C 404, U 422.)

GEOGRAPHICAL RANGE: Mountains of western North America, mainly on the Pacific coast; north to British Columbia; east to eastern Washington, Nevada, and Colorado; south to California; and in winter, through Lower California and Mexico to Costa Rica, Central America (and the West India Islands?).¹

The range of the Black Swift, also known as "Cloud Swift," is still rather imperfectly defined. As far as yet known it has only been observed in the Rocky Mountain region in Colorado, where it seems to be mainly confined to San Juan County, in the southwestern part of the State. Mr. A. W. Anthony writes me: "Here I found the Black Swift very abundant in the summer of 1883, nesting in all of the highest crags, but never in places accessible to anything not provided with wings. About Silverton, Colorado, a large colony had taken possession of a very high cliff, making their appearance about June 20; during most of the day they could be seen cruising about over the valley at a height of from 1,000 to 2,000 feet, but toward evening or at the approach of a shower they descended frequently to within 100 feet of the ground. At such times an occasional shot was to be had at some unwary straggler, and a series of about twenty was taken between June 25 and July 10. Females shot between July 5 and 10 contained ova nearly ready to deposit."

Dr. A. K. Fisher tells me that he saw a number of these birds about the cliffs near Trinidad, in Las Animas County, Colorado, about the middle of July, 1892.

Mr. Robert Ridgway met with it in Nevada, where several hundred were observed one morning hovering over the Carson River, below Fort Churchill, and he also found the remains of one on the Truckee River, near Pyramid Lake.²

The Black Swift undoubtedly occurs also in suitable localities in the intervening regions, the mountains of Utah, for instance. Throughout the Sierra Nevadas, the Cascade Mountains, and the coast ranges of California, Oregon, Washington, and British Columbia, it appears to be more generally distributed than in the more eastern portions of its range, and wherever high perpendicular cliffs are found one may reasonably hope to meet with flocks of this large Swift. They are extremely social birds, and are rarely seen singly even during the

¹ Although the West Indian Swift, the type of *Cypseloides niger*, is, according to the American Ornithologists' Union check list, considered identical with our bird, I believe the larger size of the latter, especially the marked difference in the length of the wing and its somewhat paler coloration, is sufficient reason for separating the two, as had been done by Dr. Elliott Coues, and more recently by Mr. Ernest Hartert, in vol. 16, pp. 494, 495, *Catalogue of Birds in the British Museum*. I find the average wing measurements of the nine West Indian specimens to which I had access to be 6.09 inches, while that of fifteen North American skins is 6.55 inches, and I consider it well entitled to subspecific rank.

² *History of North American Birds*, Vol. II, 1874, p. 430.

breeding season. They usually arrive from their winter homes in Central America during the latter part of April or the beginning of May, and return south again in September. They breed throughout their summer range, and probably only a single brood is raised in a season, as they nest rather late. The only locality where I have observed this species was on the upper Columbia River, opposite Lake Chelan, Washington, in July, 1879. Here quite a colony nested in a high perpendicular cliff on the south side of and about a mile back from the river, and numbers of them flew to and from the valley below, where they were feeding. The day was a cloudy one, and a slow, drizzling rain was falling nearly the entire time I was there; this caused the birds to fly low, and they were easily identified. They evidently had young, and the twitterings of the latter could readily be heard as soon as a bird entered one of the numerous crevices in the cliff above. This was utterly inaccessible, being fully 300 feet high and almost perpendicular; and without suitable ropes to lower one from above it was both useless and impracticable to make an attempt to reach the nests. These were evidently placed well back in the fissures, as nothing bearing a resemblance to one was visible from either above or below. In this locality I believe fresh eggs may be looked for about June 25.

Dr. C. Hart Merriam's exploring parties found the Black Swift fairly common in various localities in Inyo County, California, during June, 1891, and a number of specimens were secured there. Dr. A. K. Fisher, in his Report on the Ornithology of the Death Valley Expedition of 1891, makes the following remarks on this species: "The Black Swift was first observed at Owens Lake, near Keeler, California, where a number were seen flying back and forth over the salt meadows on May 31. On June 2 twenty or more were seen feeding over the same meadows, and five specimens were collected. From the condition of the ovaries of the female secured it was evident that the eggs had been laid. When the flock left the marsh it rose high in the air, and went in the direction of the cliffs in the Inyo Mountains, near Cerro Gordo, where a colony evidently was breeding."¹

Mr. F. Stephens writes me: "Mr. R. B. Herron has taken this species in the San Bernardino Mountains, California, where they appeared to be breeding. They were flying in behind a waterfall that poured over a perpendicular cliff, and he found one drowned in the basin at the foot of the fall."

Mr. S. F. Rathbun, of Seattle, Washington, informs me that the Black Swift is quite abundant at Lake Samish, three miles east of the north end of Lake Washington. The shores of the lake are well settled, but the birds evidently find Samish a good feeding ground. His earliest record of the arrival of this species there is May 15. Mr. Rollo H. Beck, while hunting near the rocky coast of Monterey County, California, in the summer of 1894, shot a female Black Swift on June 29, containing a nearly developed egg in the oviduct, which he thinks would have been laid next day and would probably have completed a set, as the remaining eggs were very small. The shell was not formed

¹ North American Fauna, No. 7, 1893, p. 54.

yet, and he had no means of measuring it at hand. It resembled the egg of a Chimney Swift in shape, but was somewhat larger.

The food of the Black Swift consists entirely of insects, which are caught on the wing, and its flight is, if possible, still more graceful and rapid than that of the Chimney Swift. It is a rather silent bird, and seldom utters any call notes while on the wing or when feeding. I believe it rarely, if ever, lights on the ground.

As yet there is nothing positively known about the construction of the nest of this species, and the eggs still remain unknown. I am aware that an account of the finding of the supposed nest and eggs has been published in "The Auk" (Vol. V, 1888, pp. 424, 425), but I am quite positive that this is a case of misidentification. I visited the same region in May, 1894, and found the Western Martin, *Progne subis hesperia*, not uncommon in that very locality, and the nest and eggs described as those of the Black Swift are unquestionably referable to this subspecies.

63. *Chætura pelagica* (LINNÆUS).

CHIMNEY SWIFT.

Hirundo pelagica LINNÆUS, Systema Naturæ, ed. 10, I, 1758, 192.

Chætura pelagica STEPHENS, General Zoology, XIII, part ii, 1825, 76.

(B 109, C 271, R 351, C 405, U 423.)

GEOGRAPHICAL RANGE: Eastern North America; north in the southern portions of the Dominion of Canada to about latitude 50°; in the interior, in northwestern Manitoba to about latitude 52° 30' and probably still farther; west in the United States to eastern North and South Dakota, eastern Nebraska and Kansas, the Indian Territory, and Texas; south in winter to Jalapa, Vera Cruz, Cozumel Island, and Yucatan, Mexico, and probably still farther.

The breeding range of the Chimney Swift, also known as "Chimney Swallow" and "Chimney Sweep," is coextensive with its distribution in the Dominion of Canada and the United States, it being only a summer visitor, spending the winter in a milder climate. It usually re-enters the United States from the south in the latter part of March or early in April, and its return migration from its more northern breeding grounds begins early in September, while in our Middle States it lingers sometimes well into October. The northernmost record for this species which I have been able to find is Swan Lake, in northwestern Manitoba, where Prof. J. Macoun met with it on July 8, 1881. Its western range appears to be gradually extending, and at present includes about the eastern half of the States of North and South Dakota, Nebraska, Kansas, the Indian Territory, and Texas. It is an eminently social bird, and with the settlement of the country has changed its nesting habits very materially. Formerly the Chimney Swift nested exclusively in hollow tree trunks; now it generally uses chimneys for such purposes, and less often the interior of barns and other outbuildings, attaching its nest to the rough, unplanned boards inside, on the gable end and near the peak of the roof.

In a letter from Dr. William L. Ralph, dated San Mateo, Florida, May 19, 1895, he says: "One of my men brought me the eggs of a Chimney Swift that he said he took from a nest attached to the sides of a well, 4 feet below the surface of the ground. He says they often nest in such places in this vicinity." I consider this as a very unusual nesting site for this species.

The Chimney Swift is both diurnal and crepuscular in its habits, and spends a good deal of time on the wing. In appearance while flying it resembles a bat more than a bird, and its long, attenuated, saber-shaped wings look entirely out of proportion to its short, stubby body. During the mating season the Chimney Swift is particularly active, and small parties may be seen chasing each other throughout the day, and even after the birds are paired they are nearly always seen in parties of three or more, pursuing each other in a good-natured way, uttering at the same time almost continuously their twittering and sharp-sounding call notes of "zig-zig," or "tzig-tzig," rapidly repeated for minutes at a time. Few birds appear to be more sociable and more devoted to each other than the Chimney Swift, and as they consume an immense number of insect pests, and do absolutely no harm, they deserve our fullest protection. Their food consists entirely of insects, such as small beetles, flies, mosquitoes, etc.

Mr. Otto Widmann, of Old Orchard, Missouri, who is well known as one of our most painstaking and reliable ornithologists and a close observer, has kindly furnished me with the following observations on the nesting habits of this species. He writes:

"On the flat roof of my tower I set up a wooden shaft, 18 inches square and 6 feet high, for Swifts. It was ready for occupancy April 18, 1891, and was entered by a Swift the next day. I had the pleasure of seeing one pair build a nest and raise a brood in the shaft in 1891 and again in 1892. My experience, thus restricted to two seasons, is too limited to be of much value, but some points are so much at variance with current statements that I consider them worthy of your notice.

"It is stated that the Swift makes two broods south of Pennsylvania. This is very improbable, since the successful rearing of a brood of Swifts takes not less than two months, which is much longer than the authors who make the statement allow for the process.

"Although the first Swifts appear in our latitude ($38^{\circ} 40'$) as early as the beginning of April, and are seen to pair and select a chimney soon after their arrival, the species is too much dependent on continuously warm weather for a regular food supply to begin nest building before the second week in May.

"Nest building, too, takes more time than is generally supposed. Many birds can build in rainy weather; some even choose such times, and one reason for the preference of the early morning hours for building is certainly the circumstance that most of the material used has the necessary pliability only when in a moist state. With our Swift it is quite different; he can not proceed with his structure while the atmosphere remains saturated with moisture; his secre-

tion is not a cement, but a glue, which hardens by drying, and our warm days in early summer are generally accompanied by more or less rain.

"It took my Swifts two days to lay the foundation; that is, to besmear the wall and fasten thereto the first few sticks. On the tenth day, when the first egg was laid, the nest was only half done, 2 inches wide, $2\frac{1}{2}$ long, and only one-half inch deep. This was May 24. In the evening the egg was lying under the nest, on the bottom of the shaft. On the next day a second egg was lying on the bottom. Then came a cold, rainy day and no egg was laid. After this they went on building and laying until May 30, when four eggs were in the nest and its dimensions were now 3 by $3\frac{1}{2}$ inches and 1 inch deep. Incubation lasted until June 18, when one egg was hatched in the forenoon and the other three in the afternoon.

"The young remained in the shaft until July 17, after which they were brought back by the parents several nights, and then roosted elsewhere in the neighborhood. During the first week the blind and almost naked young were placed so that the four heads came together in the center of the nest and the anal regions were near to its rim; this arrangement is important for the cleanliness of the home, since the parents do not seem to trouble themselves with removing the excrement. The second week, when the young were fast outgrowing the little home, a different arrangement was necessary; all four heads were now lying flat against the shaft, the anterior part of the body covering and protecting the base of the nest and the posterior part protruding over its rim. At the beginning of the third week I was greatly astonished to find my young Swifts gone; the nest was empty and no Swift to be seen in the shaft. I was still wondering what had become of them when the parent came to feed. Young Swifts are very noisy when fed, and I was glad to hear that they were still inside; all four were huddling side by side, hanging on the wall immediately below the nest and entirely hidden from view above. At the beginning of the fourth week I was still more surprised when, bending my head over the shaft, the youngsters jumped right against my face with a strong, hissing noise, which I believe must be a very effective means of frightening unsuspecting visitors. The fourth week was spent entirely inside the shaft, hanging against its sides, but not higher up than the nest, that is, $3\frac{1}{2}$ feet from the mouth; so the clambering up to the top of the chimney does not seem to be the style any more.

"Last year's experience was essentially the same, with the following variations: May being rainy throughout, they did not begin to build until the first week of June. They attached the nest to the same spot where the nest of the previous year had been washed off, and deposited five eggs, all of which were hatched and all five young brought up. Three left the shaft for the first time on August 1, and the others the next day. The whole process occupied eight weeks and two days, which is six days less than in 1891, in consequence of the more favorable weather while building. The family roosted in the shaft until October 14, when the last left.

"Taking all together, my observations may, in brief, be set forth as follows: In spite of preceding favorable weather, the Swift of St. Louis County, Missouri,

does not begin nest building before the second week of May, and unfavorable weather may delay it until the 1st of June. Only a small quantity of glue is secreted daily, and therefore the completion of the entire structure requires about eighteen days. After two-fifths of the nest is completed (the work of one week) the laying of eggs begins. The process of construction may be retarded by cool weather (lack of food) and by continued rains (softening of glue). The bird can control the laying of eggs; can discontinue for one or more days, if she thinks necessary. Incubation begins before the last egg is laid and lasts eighteen days. The setting parent shields the structure by habitually covering its base with the breast and pressing the head against the wall above. After the young are eight days old they arrange themselves in the same manner. When the sitting bird is disturbed, it at first seeks to frighten the intruder by fluttering and then hides below the nest. The young, when a fortnight old, also hide under the nest, where they can not be seen from above. When three weeks old, they flutter and try to frighten the intruder with a hissing noise, and always remain 2 to 3 feet below the mouth of the chimney (shaft), where they are fed by the parents. The young do not leave the chimney before they are four weeks old. Under the most favorable conditions a late brood can not be brought to a successful end in less than fifty-eight (five eggs) to sixty (six eggs) days, while an early brood (begun the middle of May) may consume from sixty-five to seventy days."

In a subsequent letter, dated August 20, 1894, Mr. Widmann writes me as follows:

"Another season confirmed my former statements in regard to the breeding habits of the Swifts. The pair began building and laying at the regular time; but after the second egg was laid, on May 23, some misfortune happened, and next day the eggs were found on the floor below, and no more were laid until June 10, when laying began anew. Within eight days (June 10 to 17, inclusive) five eggs were laid. On the 14th, after the third egg had been laid, the bird began to set. On the 24th one egg had rolled out, leaving four in the nest. July 1, on the eighteenth day of incubation, the eggs began to hatch, but the last of the four young did not leave the shell until July 3. This bird remained much behind in development, while one of the three others always kept a little in advance. The latter left the shaft for the first time July 26, but the youngest did not get ready to go out until August 7, a difference of eleven days.

"The event of a young Swift leaving the chimney for the first time is made known all over the neighborhood by great excitement and noise. While the species for some weeks before have been quiet and inconspicuous, great activity and noise is suddenly noticed, and numbers are seen chasing through the air. This indicates the event, and it occurred for the first time again on July 17 being the first young raised in the neighborhood. It was particularly noticed that the young Swift is entirely naked when it leaves the shell, and not only the eyes but also the ears are, or appear to be, closed for the first few days. The eyes open by degrees. The best developed specimen of the four had the eyes open for occasional brief

periods on July 11, while two others had them partly open, and the eyes of the smallest remained entirely closed until about the 15th. In the case of the youngest bird, which was a very weak creature at first and could not swallow all the parent put in its throat, I saw minute winged insects crawl out of its mouth. This shows that some of the insects are still alive when brought, and accounts for the peculiar mouth-cleaning motions after feeding. What the misfortune was that befell the first eggs, and why they made a pause of seventeen days before laying again, I do not know. It was not the weather, but it may possibly have been the Red-headed Woodpeckers and Flickers, which did a great deal of drumming and playing about the shaft in those days."

While at Wilmurt, New York, in June, 1892, I found a nest of the Chimney Swift attached to a board in a hayloft, about 2 feet from the peak of the roof. One of the birds was setting on the nest, which was a very small one, while its mate hung against the side of one of the boards, about a foot below and a little to the right of the nest. The male assists in incubation. I saw one of these birds, at a subsequent visit, fly in the loft while I was there, hook himself to the board below the nest, and shortly afterwards he uttered a low twitter; the one on the nest left at once on hearing the note, and flew out, while the newcomer perched on the rim of the nest and rearranged the eggs first before covering them. It changed its position twice before it seemed suited; at least one-half of its length projected outside of the nest, and it is certainly puzzling to know how they manage to rear a family of four or five young in so small a space.

Their semicircular, half-saucer-shaped nest is a most interesting structure, and varies considerably in size and depth, as well as in the manner in which it is attached to the wall or board to which it is glued. Some are exceedingly shallow, barely one-fourth inch in depth, while others are nearly an inch deep, and also much more roomy. An average nest is about 3 inches in outer diameter by 2 inches in width. One of the handsomest specimens I have ever seen was taken by Mr. C. J. Pennock, at Kennett Square, Pennsylvania, on June 16, 1887, and presented to me. This measures $4\frac{1}{2}$ inches in outer diameter by 3 inches in width, and the outer edges, where attached to the wall, are carried completely around on the top, so that it can be hung upon a peg, like a wall pocket; this naturally gave it much more strength, by increasing the surface which is glued to the wall, and lessened the chances of its becoming detached. The nests are entirely built up of small dry twigs, averaging from one-tenth to one-sixteenth inch in diameter and from 1 to $2\frac{1}{2}$ inches in length. One or two somewhat longer twigs project usually from the side, possibly to be used as a perch while the young are being fed.

The amount of saliva used to glue them together also varies greatly in different specimens; in some this is very plainly perceptible, and occasionally forms a thin coating on the inside of the nest; in others hardly a trace can be seen, but nevertheless the twigs hold well together. There is no inner lining of any kind used, the eggs lying on the bare twigs. The latter are gathered on

the wing, the bird breaking them off with its beak while flying past. Before the country was well settled the Chimney Swift built in hollow trees, attaching its nest to the inside walls, and in sparsely settled regions it does so still to some extent; but now, wherever they can avail themselves of an unused chimney, no matter of what material it is constructed, they do so, both for nesting and roosting purposes. It seems to me that they are gradually changing again more and more from the chimney to the inside of barns and outhouses, attaching their nests to the sides of rough, unplanned boards, near the roof. Such sites are more protected from storms, and certainly much cleaner, and the birds appear to have found this out, and act accordingly.

Several pairs frequently nest in company, and it is amusing to see them, after circling over the top of the chimney, suddenly drop down perpendicularly, often from considerable heights, and disappear within. Hundreds are known to roost in the taller chimneys of some abandoned factories in many of our large cities. I have also seen it stated that this species occasionally nests in chimneys which are in use, but no such instance has come under my own observations. Throughout the more northern portions of its range the Chimney Swift rarely commences laying before the second week in June; four or five eggs are generally laid to a set (rarely six) and usually an egg is deposited each day. In chimneys the nests are ordinarily glued to the sides, from 5 to 12 feet below the top.

Few birds are more devoted to their young than the Chimney Swift, and instances have been recorded where the parent was seen to enter chimneys in burning houses, even after the entire roof was a mass of flames, preferring to perish with its offspring rather than to forsake them. I have recently seen in "Forest and Stream" (September 15, 1894, p. 224), another most remarkable proof of affection for its young; want of space prevents me from quoting it entire. The writer states that fully a month after the Chimney Swifts had departed on their southern migration he heard a familiar twitter in the chimney, and taking out the old-fashioned fireboard found a full-grown bird lying upon the hearth. Looking more closely, he discovered that it was fastened by a horsehair wrapped around its leg to the nest, which had fallen down with it. He says: "His anxious mother, who had cast in her lot with him, to remain and to die with him, for the time of insects was about gone, came into the chimney and actually waited beside me while I snipped the strong hair and released him. It was an hour or more before he gained the use of his legs and learned what his mother was teaching him by flying up and down in the chimney, and then they both started on their lonesome flight to the far south." This instance certainly shows a tender side of bird nature, and such instances are far more common than they appear to be, if we could only see them. The young are fed by regurgitation.

The eggs of the Chimney Swift are pure white in color and unspotted; they are cylindrical ovate in shape; the shell is fine grained, rather thin, and moderately glossy.

The average measurement of fifty-six eggs in the United States National Museum collection is 20.09 by 13.22 millimetres, or 0.79 by 0.52 inch. The largest egg of the series measures 21.34 by 13.72 millimetres, or 0.84 by 0.54 inch; the smallest, 17.53 by 13.72 millimetres, or 0.69 by 0.54 inch.

The type specimen, No. 24019 (Pl. 1, Fig. 25), from a set of four eggs, was taken by Mr. J. C. Pennock, near Kennett Square, Pennsylvania, on June 16, 1887, and represents about an average egg of this species.

64. *Chætura vauxii* (TOWNSEND).

VAUX'S SWIFT.

Cypselus vauxii TOWNSEND, Journal Academy Natural Sciences, Phila., VIII, 1839, 148.

Chætura vauxii DE KAY, Zoology of New York, II, 1844, 36.

(B 110, C 272, R 352, C 406, U 424.)

GEOGRAPHICAL RANGE: Western North America; chiefly west of the Sierra Nevada and Cascade mountains; north in British Columbia to about latitude 52° and probably farther; east to western Montana and southern Arizona; south to northern Lower California, and in winter through Mexico to Honduras, Central America.

Vaux's, or the "Oregon" Swift, a somewhat smaller and paler-colored bird than the preceding, is principally confined to the Pacific Coast regions, and appears to be much rarer and more sporadically distributed in the interior, east of the Sierra Nevadas, and in the Cascade mountains of California, Oregon, Washington, and British Columbia. The most northern record I have been able to find is one by Mr. Samuel N. Rhoads, published in the "Proceedings of the Academy of Natural Sciences of Philadelphia, 1893" (p. 44), where he reports seeing this species near Lac la Hache, British Columbia, on July 1, 1892. He also met with it at Goldstream, on Vancouver Island, on May 13. It reaches the eastern limits of its range, as far as it at present known, in western Montana, where Mr. C. P. Streater took a specimen at Silver, in Missoula County, on June 25, 1891. Mr. W. E. D. Scott met with it early in October, 1884, on the San Pedro slope of the Santa Catalina Mountains, in southern Arizona, at an altitude of from 3,000 to 4,000 feet.¹ These birds were probably migrating. Mr. F. Stephens observed it daily, and secured a specimen at Olancho, California, on the eastern slopes of the Sierra Nevadas, in the latter part of May, 1891. He believes they were migrating.²

The limits of its breeding range are not well defined as yet. Mr. F. Stephens considers it only a migrant in southern California. The only breeding records I have are both from Santa Cruz County, in this State, in about latitude 37°, and it appears reasonable to suppose that it breeds from there northward. But very few nests and eggs of Vaux's Swift have, as far as I am aware, found their way into collections. It possibly breeds also in the more moun-

¹The Auk, Vol. III, 1886, p. 429.

²Birds of the Death Valley Expedition, North American Fauna, No. 7, 1893, p. 55.

tainous parts of northern Lower California. In all of my travels through our Northwestern States I have failed to see this species excepting at Fort Klamath, Oregon, where it was fairly common near Upper Klamath Lake. Dr. James C. Merrill, United States Army, who also met with this species at the same Post, and with whose observations I fully agree, says:

“While the flight of Vaux’s Swift is usually higher than that of the eastern species and it is generally more difficult to obtain, yet if their habits are closely studied it will be observed that there are times and places where they may be shot without especial difficulty. The height at which they fly depending on that of the insects upon which they feed, they may be most readily secured soon after sunrise; as the day grows warmer and the insects fly higher, they follow them and are soon out of gunshot range for the rest of the day, unless a change in the weather should occur. Had I made a specialty of collecting these Swifts, I could readily have shot several dozen during the season. As observed at Fort Klamath, this bird is not at all crepuscular. The notes differ somewhat from those of *Chaetura pelagica*, though of the same character, and are less frequently uttered.”¹

Vaux’s Swift usually reenters the United States from its winter home in Central America about the middle of April, and goes south again during October. Although portions of California where this Swift is known to be a summer resident have been well settled for some time, it does not appear that it has changed its breeding habits to any extent, like the Chimney Swift has in the East, as it still seems to nest entirely in hollow trees, and it is principally due to this reason that so few of the nests and eggs have yet been taken.

Mr. A. W. Anthony, in his paper on “Birds of Washington County, Oregon,” writes of Vaux’s Swift as follows: “Common summer resident; hunts in flocks of fifteen to twenty. A pair were found nesting in a very large stub late in May; the nest, however, was inaccessible. The birds would circle about, fully 200 feet above the stub, until directly over the opening; then, darting down like a flash, would disappear with a sharp twitter.”²

A letter received from Mr. Chase Littlejohn, of Redwood City, California, dated August 8, 1893, says: “I took a pair of Swifts in town, birds I had never seen here until last fall, and from their very strong, smoky odor, there can be little doubt that they were living in some chimney, something they are not known to do.” Mr. Littlejohn has since then sent me one of the skins for examination, which proved to be Vaux’s Swift, as he surmised, and it is possible that this species is just beginning to resort to chimneys for nesting purposes.

Dr. C. T. Cooke writes me from Salem, Oregon, that on May 29, 1891, he discovered one of their roosting and probably also breeding trees in the Willamette Valley—a large, inaccessible, dead, and hollow cottonwood, which also contained a Wood-duck’s nest lower down, but likewise inaccessible. The only eggs of Vaux’s Swift I have seen were taken in June, 1874, near Santa Cruz,

¹ The Auk, Vol. V, 1888, pp. 256, 257.

² The Auk, Vol. III, 1886, pp. 165, 166.

California. The nest is described as composed of small twigs, glued together with the saliva of the bird, and fastened to the side of a burned-out and hollow sycamore tree. It was not lined, and evidently was quite similar to the nest of the Chimney Swift. I have never seen a specimen, and therefore can not give measurements. From three to five eggs are deposited to a set, and only one brood appears to be raised in a season. The eggs resemble those of the Chimney Swifts both in shape and color, but they are considerably smaller.

The only specimens in the United States National Museum collection measure 18.29 by 12.19, 17.78 by 12.70, and 17.53 by 12.45 millimetres, or 0.72 by 0.48, 0.70 by 0.50, and 0.69 by 0.49 inch, respectively.

The type specimen, No. 21005 (Pl. 1, Fig. 26, a single egg), was taken near Santa Cruz, California, in June, 1874, and presented to the collection by Dr. James C. Merrill, United States Army.

65. *Aëronautes melanoleucus* (BAIRD).

WHITE-THROATED SWIFT.

Cypselus melanoleucus BAIRD, Proceedings Academy Natural Sciences, Phila. June, 1854, 118.

Aëronautes melanoleucus HARTERT, Catalogue Birds in British Museum, XVI, 1892, 459.
(B 107, C 269, R 349, C 403, U 425.)

GEOGRAPHICAL RANGE: Mountain regions of the western United States; north to Montana; east to western South Dakota (Black Hills), western Nebraska, and Colorado; south through Arizona, New Mexico, western Texas, and Lower California to Guatemala, Central America.

The range of the White-throated or "Rock" Swift does not appear to extend nearly as far north in the mountains of the Pacific Coast districts as it does in the Rocky Mountain region, where it is generally distributed, throughout suitable localities, from southern Arizona and New Mexico northward through Colorado and Wyoming to Montana, which, as far as known, marks the northern limits of its range. Here Mr. R. S. Williams found this species breeding in small numbers in holes in a limestone cliff on Belt River, about the middle of July, 1881. He says: "A small opening in the rock, which a bird of this species was seen to enter and reappear from several times, I approached near enough to hear a vigorous twittering at each visit of the parent bird, from which I presume the young were well advanced."¹

On the Pacific coast in California I have not been able to trace it north of Alameda, Contra Costa, and Mariposa counties, in about latitude 38°, and somewhat farther north in Nevada, where Mr. Robert Ridgway found this species extremely numerous in the Ruby Mountains, about the high limestone cliffs, as well as in the East Humboldt range, in about latitude 40°, and less abundantly in the Wasatch Mountains in Utah. I have been unable to find a single record of its capture in either Oregon or Washington, and this is the more

¹Bulletin of the Nuttall Ornithological Club, vol. 7, 1882, p. 123.

strange as these States abound in suitable cliffs, and the White-throated Swift appears to be the hardiest member of this family found in the United States and winters to some extent within our borders. Throughout the more northern portions of its range it is only a summer visitor, but in southern California and Arizona it is found throughout the year. Mr. F. Stephens writes me:

“The White-throated Swift is a rather common resident in southern California. In winter it is somewhat less common, and disappears in stormy weather. In the Colorado Desert, however, it is usually common all winter. It breeds in small colonies in cliffs, usually in the lower parts of the mountains, during May and June. On March 28, 1890, at Boregas Spring, on the border of the Colorado Desert, I saw several White-throated Swifts flying in and out of crevices of a sandstone cliff. I succeeded in climbing to one of these crevices, and chopped away a part of the soft sandstone or indurated clay and found two birds, evidently a pair, in the extreme back end of a narrow crevice. They were sitting on a small bunch of short twigs and weed stems, glued together into a nearly solid mass, evidently an old nest. The female, on dissection, proved to be not nearly ready for laying, as the ovaries were in the normal winter condition.”

There are numerous records of the occurrence of the White-throated Swift in Arizona, New Mexico, and Colorado. I have seen hundreds of these birds near Tucson, Arizona, some throughout nearly every month in the year, and they evidently breed in the vicinity, in the numerous cliffs in the Catalina and Rincon mountains. Mr. W. G. Smith and Mr. A. W. Anthony met with it in Colorado, where it was quite common in suitable localities. The latter writes me: “A few nest in the high cliffs above Silverton, Colorado, with *Cypseloides niger*. A female was shot by Mr. F. M. Drew on June 20, at an elevation of about 13,000 feet, and upon skinning her an egg was found ready for extrusion, but it was unfortunately broken. A flock of these Swifts were apparently trying to winter at Hatchita, New Mexico, as I saw them constantly as late as December 15. At San Diego, California, they winter in abundance, and are frequently seen feeding along the beach north of Point Loma. A colony was also found by me nesting on Coronado Island on May 20, but the nests were inaccessible; they were placed behind loose slabs of rock that had become partly detached from the face of the cliff, and from 20 to 30 feet above the water level. At Guadalupe Island this Swift was very abundant; the ragged, precipitous sides of the island, composed of lava and perforated with thousands of holes and crevices, furnish an abundance of nesting sites, and it is quite probable that this species is resident there throughout the year. At the time of my visit, in May, I found White-throated Swifts everywhere, from the top of the island, at 4,000 feet elevation, to the beach, and birds were constantly seen to enter holes in the crags; but in every case the nests were as inaccessible as it is possible for a nest to be. On May 18 a Swift was seen to enter a hole in the face of a bluff, within 8 feet of its base; even this proved to be as safe as any of the rest, as the nest was found to be out of sight and several feet back, in a narrow crack in the lava. I

also found it nesting at San Fernando, Lower California, nearly at sea level, and on top of San Pedro Martir, at 10,000 feet elevation, in May."

Messrs. Vernon Bailey and J. A. Loring, while collecting for the United States Department of Agriculture, met with the White-throated Swift in the Wind River and Sweet Water mountains, Wyoming, during August and September, 1893, and Mr. J. B. White has taken it at Harrison, Nebraska, which marks the eastern limits of its known range.

Its general habits, food, etc., do not differ much from those of the other members of this family found within the United States, and, like them, it usually flies high during clear, sunny weather, while on cloudy days, as well as in the early mornings and again about sundown, it hunts lower down, and is then more readily obtained. In its mode of nidification it differs from both the Chimney and Vaux's Swift, while the Black Swift probably nests in a similar manner. Mr. F. Stephens's description of its nesting habits are fully confirmed by more recent observations made by Mr. W. B. Judson in Los Angeles County, California, who found a nest of this species during the summer of 1894. He writes me: "It was situated about 80 feet from the top of a large cliff and about 125 feet from the ground, in a cave about 7 feet high, 10 feet wide, and extending some 7 feet in the face of the cliff. The nest was placed in a small hole in the roof of the cave, almost too small to get my hand in without enlarging it, and extended about a foot up in the rock, and then there was a small cleft in which it was placed. It was so firmly glued to the rock that it could not be pulled off without tearing it to pieces. The materials of which it was constructed felt soft and spongy; there were apparently no sticks or twigs in it, and it was lined with a few feathers." White-throated Swifts were seen to enter this cave in May, but Mr. Judson did not visit the locality again until late in summer, by which time the birds had reared their young and left the vicinity.

Since the above was written, Mr. Judson has kindly obtained this nest for me, and I am able, therefore, to give a fuller description, as well as measurements of it. Evidently it has been in use during more than one season, as the vegetable matter composing the base of the nest is quite disintegrated; while a number of good-sized feathers, including some of the California and Turkey Vulture, Red-shafted Flicker, and other species, which are mixed throughout the walls of the structure, are in a somewhat better state of preservation. It measures 5 inches in outer diameter by 2 inches in depth. The inner cup is shallow and appears not to have been over three-fourths of an inch deep. Mixed throughout the nesting material are small pieces of the wing coverts of beetles. The skeleton of a young Swift was also found in the nest. The inner lining consists of fine bark fiber and a few feathers, and apparently no twigs enter into its composition; the shafts of the feathers used, evidently took the place of the ordinary small twigs and weed stems. The call notes of this species are rather louder and shriller than those of the Chimney Swift, but otherwise resemble the rattling twitter of the latter. In speaking of their song

Dr. Fisher says: "The males uttered at short intervals a series of notes which, when a number joined in the performance, produced a not unpleasant impression."

The eggs of this species still remain among the special desiderata in oölogical collections. I have never seen any, and there are none in the United States National Museum. Mr. Walter E. Bryant gives the following description of them: "More than a dozen years ago an imperfect set of five fresh, unblown eggs of the White-throated Swift were presented to me by a young man in Contra Costa County, California. They were taken from a nest in a crevice in the back of a tunnel-shaped cave in the side of a cliff, about 20 feet above the base. In color the eggs are pure white, narrowly elliptical in form, but rather smaller at one end. They measured 0.87 by 0.53, 0.88 by 0.53, 0.88 by 0.52, and 0.86 by 0.50 inch (or 22.10 by 13.46, 22.35 by 13.46, 22.35 by 13.21, and 21.84 by 12.70 millimetres); the fifth was too much damaged to measure accurately. The eggs were collected on June 6, 1876."¹

From four to five eggs appear to be laid to a set, and probably only a single brood is reared in a season.

Family TROCHILIDÆ. HUMMINGBIRDS.

66. *Eugenes fulgens* (SWAINSON).

RIVOLI HUMMINGBIRD.

Trochilus fulgens SWAINSON, Philosophical Magazine, 1827, 441.

Eugenes fulgens GOULD, Monograph of the Trochilidæ, Part XII, 1856, Pl. 7, and Vol. II, 1861, Pl. 59.

(B —, C 274 bis, R 334, C 408, U 426.)

GEOGRAPHICAL RANGE: Mountains of southeastern Arizona, southwestern New Mexico, and over the table-lands of Mexico; south to Nicaragua, Central America.

The Rivoli Hummingbird, also known as "Refulgent Hummingbird," one of the largest as well as one of the handsomest members of this family found within the limits of the United States, is a moderately common summer resident in suitable localities, but has as yet been obtained only in the mountains near the Mexican border, in southeastern Arizona, and in the extreme southwestern corner of New Mexico, in the San Luis range. It was first added to our fauna by Mr. H. W. Henshaw, who took a single specimen in the vicinity of Camp Grant, Arizona, on September 24, 1873; he also met with others in the following year. Since then it has been ascertained to be a summer resident throughout all the higher pine-clad mountains in southeastern Arizona. Mr. F. Stephens met with it in the Santa Rita and Santa Catalina mountains. Dr. A. K. Fisher, Messrs. F. H. Fowler, W. W. Price, and others took specimens in the Chiricahua and Huachuca ranges, while Dr. Edgar A. Mearns obtained it in the

¹The Nidologist, Vol. II, Sept. 1894, pp. 7, 8.

San Luis Mountains, New Mexico. I believe Mr. Henshaw's record from near Fort Grant still remains the most northern one, and it is not likely that it will be found much beyond latitude 33°. Its range seems to be restricted to the mountain regions between altitudes of from 5,000 to 10,000 feet, and it breeds throughout its summer range in the United States.

Dr. A. K. Fisher has kindly furnished me with the following notes on this handsome Hummingbird:

"The Rivoli Hummer was not met with by us in the Chiricahua Mountains until we made camp in the upper part of Ruckers Canyon, among the yellow pines (*Pinus ponderosa*). On the morning of June 5, 1894, an adult male dashed through the camp, paused a moment over a flower spike of a scarlet *Pentstemon*, and then disappeared up the canyon as rapidly as it had come. No more were seen until we reached the high mountains at Fly Park. On the evening of June 7, Mr. Fred. H. Fowler killed an adult male, and on the following day the writer secured a female and two males, and subsequently others were taken. They were usually found in the more open parts of the forest where fire had killed a portion of the evergreens, and a deciduous undergrowth of aspens and shrubs thrived about the cool springs and little rivulets. A boreal honeysuckle (*Lonicera involucrata*) was abundant and just coming into bloom. All the Hummers in the vicinity, the Rivoli Hummer among them, delighted to glean from the flowers and to sit half concealed among the large leaves of this shrub. If the large Hummer was startled from one of the clumps, it would fly to the lower branches of a neighboring evergreen and settle on a dead twig and remain motionless. They were not very shy and could be approached within 20 feet.

"It is the opinion of the writer that all the birds seen were migrants, for after the first few days the species became quite rare, and during the three or four days subsequent to June 15 none were seen. Moreover, the testes of all the males secured were still undeveloped. It is probable that they spent a few days after their migration in feeding, and then separated and retired to the more secluded forest to hunt up nesting places. No note was heard."

They are said to be especially fond of hovering about the blossoms of the mesal (*Agave americana*); these are generally infested by numerous small insects, on which they feed, and, like all our Hummingbirds, they are exceedingly greedy and quarrelsome, chasing each other constantly from one flower stalk to another.

Comparatively little is still known about the breeding habits of this species. Mr. O. C. Poling published an account of its supposed nest and eggs in "The Auk" (Vol. VII, 1890, pp. 402 and 403), but the measurements of the latter, as given by him, show clearly that they can not belong to this bird, and are much more likely to be those of one of the smaller Hummers breeding in the same locality. The Rivoli Hummer is fully as large as the succeeding species, whose eggs are known, and these are considerably larger than the measurements given by Mr. Poling, and there are absolutely identified eggs of the Ruby-throated Hummingbird now in the United States National Museum collection

which are larger than the supposed eggs of this species. The great difference in the size of these two birds proves conclusively that there must be a mistake either in identification or in the measurements of the eggs as described by him.

I am indebted to Mr. W. W. Price for a couple of nests of this species and a broken egg, which, however, is so badly crushed that it is impossible to restore it and give accurate measurements. Both of these nests were taken in the Huachuca Mountains, in southern Arizona. The best preserved one of the two measures $2\frac{1}{4}$ inches in outer diameter by 2 inches in depth; its inner diameter is $1\frac{1}{2}$ by $1\frac{1}{4}$ inches in depth. It is composed of soft, silky plant fibers, and is thickly coated exteriorly with small pieces of lichen, and lined with fine down and one or two soft, fluffy feathers, apparently those of a species of Titmouse. It resembles the nest of the Ruby-throated Hummingbird very closely in its general make up, but is naturally considerably larger. It was found by Mr. L. Miller on June 22, 1894, at an elevation of about 7,000 feet, saddled on a walnut branch about 10 feet from the ground, and contained one young nearly able to fly. The other, which is not quite so well preserved, was found by Mr. Price in the same mountains on June 4, 1893, placed on a slender branch of a maple over running water, in a deep, narrow canyon, at about 6,000 feet elevation. The male was seen a short distance away from the nest; the female hovered about while the branch was being cut off, and was secured. The single fresh egg the nest contained was accidentally broken.

Mr. Price writes me: "*Eugenes fulgens* is found all through the pine regions of southern Arizona. It was not rare in the Huachuca and Chiricahua mountains, but I have never seen it below 6,500 feet elevation, and I have found it above 9,500 feet. During the flowering season it feeds extensively in the flowers of the *Agave parryi* in the Huachuca Mountains. In the Chiricahuas I have found it early in the mornings in open glades, feeding on the flowers of an iris. It delights in open woods more than in damp ones, as is the habit of the Blue-throat, *Cœligena clemenciæ*."

There are no eggs of the Rivoli Hummingbird in the United States National Museum collection.

67. *Cœligena clemenciæ* LESSON

BLUE-THROATED HUMMINGBIRD.

Ornisyma clemencia LESSON, Oiseaux Mouches, 1829, 216, Pl. 80.

Cœligena clemenciæ LESSON, Index General et Synoptique des Oiseaux du Genre Trochilus, 1832, p. XVIII.

(B —, C —, R —, C —, U 427.)

GEOGRAPHICAL RANGE: Mountains of southeastern Arizona, southwestern New Mexico, and the table-lands of Mexico; south to Guerrero and Oaxaca.

The geographical range of the Blue-throated Hummingbird, also sometimes called "Blue-throated Casique," a slightly larger species than the preceding, is very similar, and, like the Rivoli Hummer, it is only a summer resident in the

United States, and breeds wherever found. As far as known it arrives within our borders early in May, and returns south again about the beginning of October. This large and rather dull-colored Hummer was first added to our fauna by Mr. F. Stephens, who secured an adult male in the Santa Catalina Mountains on May 14, 1884. Since then it has been taken by Mr. E. W. Nelson in the Santa Rita Mountains; by Dr. A. K. Fisher, Messrs. W. W. Price, F. H. Fowler, and others, in both the Chiricahua and Huachuca mountains, in southeastern Arizona, and by Dr. Edgar A. Mearns, United States Army, in the San Luis Mountains, in southwestern New Mexico. Like the preceding, it is a mountain-loving species, frequenting similar regions; and, judging from the number of specimens that have been taken within our borders, it appears to be more common than the Rivoli Hummer.

Dr. A. K. Fisher has kindly furnished me with the following notes:

"The Blue-throated Hummingbird was common in the higher Chiricahua Mountains, where it was observed at Fly Park during the early part of June, 1894. Like the Rivoli Hummer, it was very partial to the flowers of the shrubby honeysuckle (*Lonicera involucrata*), among which six were secured June 8 and three on June 10. It is probable the flowers attract large numbers of insects, which in their turn attract the birds, for the gullets of the Hummers secured were filled with them. On several occasions the male was heard to utter a simple little song, consisting of three or four syllables, which were repeated at short intervals. While delivering this song the bird sat upright, with head more or less thrown back. No signs of mating were observed, and the genitalia of the specimens secured were undeveloped. From June 10 to June 15 the species became gradually rarer, and it is probable they had dispersed among the wilder parts of the mountains, preparatory to nesting."

I am also indebted to Mr. E. W. Nelson for the little we know relating to the nesting habits of the Blue-throated Hummingbird. He writes me as follows:

"*Caeligena clemenciæ* is a sparingly distributed summer resident of all the mountain regions of south central Mexico, between 7,500 and 12,000 feet. They are rather quiet birds, often found perched on the tips of large maguey leaves. In the forests of pines of the higher slopes they are not often seen except as they dash by among the trees. On the 9th of September, 1893, a nest containing two eggs was found at an altitude of 11,500 feet on the north slope of the volcano of Toluca, in the State of Mexico. At this time the nights had already become quite frosty here. The nest was built in the fork of a small shrub, growing out of the face of a cliff about 30 feet above its base, on the side of a canyon, in the pine and fir forest. The nest was discovered by seeing the parent approach its vicinity. She flew quietly close up to the nest, and then, turning so that she faced out from the cliff and away from the nest, she moved backward several inches and settled lightly on the eggs. She was easily alarmed, darting away through the forest, and was not seen again. The nest was nearly inaccessible, and one egg was thrown out and broken in securing it."

This nest, No. 26332, United States National Museum collection, now before me, is a handsome and rather bulky structure, which is apparently composed

entirely of fine mosses, the whole evenly quilted together into a smooth, homogeneous mass, and bound firmly together with silk from cocoons and spiders' webs. It is saddled in a tripronged fork of a small twig, the three stems being incorporated in the walls of the nest, holding it firmly in position, the main stem being only one-twelfth of an inch in diameter. It measures $2\frac{3}{4}$ inches in outer diameter by 3 inches in depth; the inner cup is $1\frac{1}{4}$ inches in diameter by three-fourths of an inch deep. The walls of the nest are three-fourths of an inch thick, and the inner cup appears very small for the large size of the nest. It looks like a warm and cozy structure, and it needs to be so. As the eggs were only slightly incubated when found, the young would probably have hatched by September 20, and would scarcely have been large enough to leave the nest before October 12, by which time one might reasonably look for snowstorms at such an altitude. There is but very little inner lining, not enough to hide the moss, which looks to me like the down from willow catkins. Two eggs are laid to a set, and probably two broods are raised in a season.

The single egg before me is elliptical oval in shape, dull white in color. The shell is close-grained and shows no luster. It measures 16.26 by 9.91 millimetres, or 0.64 by 0.39 inch. As there is but a trifling difference in the size of most of our Hummingbirds' eggs, and apparently none in their shape and color, I have, therefore, only figured the egg of a single species.

The type specimen, No. 26332 (not figured), was taken by Mr. E. W. Nelson on September 9, 1893, as already described.

68. *Trochilus colubris* LINNÆUS.

RUBY-THROATED HUMMINGBIRD.

Trochilus colubris LINNÆUS, Systema Naturæ, ed. 10, I, 1758, 120.
(B 101, C 275, R 335, C 409, U 428.)

GEOGRAPHICAL RANGE: Eastern North America; north in the more southern parts of the Dominion of Canada to about latitude 52° , in the interior in the Northwest Territory to about latitude 57° and probably still farther; west in the United States to eastern North and South Dakota, eastern Nebraska and Kansas, the Indian Territory and Texas; south in winter to the West India Islands and through eastern Mexico to Veragua, Central America. Casually to Labrador.

The Ruby-throated or Northern Hummingbird, the sole representative of this family in eastern North America, is only a summer visitor in the Dominion of Canada and throughout the greater part of its range in the United States, excepting the southern portions of the Florida peninsula, where it winters to some extent. By far the greater number of these birds, however, migrate farther south, spending the winter in some of the West India Islands, while others pass through eastern Mexico into Central America, as far south as Veragua. It usually arrives along our southern border in the latter part of March, and moves leisurely northward, rarely reaching the more northern States before the middle of May, or about the time the early and hardier flowers begin to

blossom, and it usually goes south again about the latter part of September, the males preceding the females, I believe, in both migrations. Its breeding range is coextensive with its geographical distribution. Along the Atlantic coast it has been met with by Mr. Lucien M. Turner as far north as Davis Inlet, Labrador, in latitude $55^{\circ} 37'$, but this may have been only a casual straggler, as few birds of this species appear to breed north of latitude 52° . In the interior, in the so-called fur countries, it reaches farther north, however. Sir John Richardson met it here up to the fifty-seventh parallel, which appears to be the northernmost known limits of its range; but it is quite possible that it reaches still higher latitudes. None of the numerous gentlemen connected with the Hudson Bay Company, interested in ornithological investigations in the far north, appear to have met with it in the lower Mackenzie basin or along the shores of Great Slave Lake. Westward its range extends well into the eastern borders of the Great Plains; it is a fairly common summer resident here in suitable localities, in eastern Saskatchewan, and in Manitoba, as well as throughout the eastern parts of North and South Dakota, Nebraska, Kansas, the Indian Territory, and about the eastern half of Texas. In many parts of Florida it seems to be a rather rare breeder, but north of this State it is mostly a common summer resident.

The Ruby-throated Hummingbird prefers rather open and cultivated country, interspersed here and there with mixed or deciduous woods overrun with flowering masses of vines and creepers, extensive orchards, etc., and it is not at all adverse to taking up its home in flower gardens, in close proximity to man. Its flight is extremely swift, and the rapid motions of its wings in passing back and forth from one cluster of flowers to another causes a humming or buzzing sound, from which the numerous members of this family derive their name of Hummingbirds. Notwithstanding the very small size of most of our Hummers, they are all extremely pugnacious, especially the males, and are constantly quarreling and chasing each other, as well as other birds, some of which are many times larger than themselves. Mr. Manly Hardy writes me that he once saw a male Ruby-throat chasing a Robin out of his garden and following it up until lost to sight.

There appears to be considerable difference of opinion among various observers regarding the nature of their food, some contending that this consists principally of nectar sipped from flowers, as well as the sweet sap of certain trees, to which they help themselves at the drinking places of the Yellow-bellied Sapsucker, *Sphyrapicus varius*, while others, myself included, believe that they subsist mainly on minute insects and small spiders, the latter forming quite an important article of food with them. Mr. Edwin H. Eames, of Bridgeport, Connecticut, mentions finding sixteen young spiders of uniform size in the throat of a young Hummingbird which was about two days old.¹

¹The Auk, Vol. VII, 1890, pp. 286-288. I also refer the reader to Mr. Frederick A. Lucas's interesting paper in the same periodical (Vol. X, 1893, pp. 311-315), and to another by the same author, "On the structure of the tongue in Hummingbirds," in the "Proceedings of the United States National Museum" (Vol. XIV, 1891, pp. 169-172), all of which bear on this subject, but want of space prevents me from quoting them.

That our Hummingbirds live to some extent on the sap of certain trees is undoubtedly true, but that they could exist for any length of time on such food alone is very questionable, to say the least. They are particularly fond of the sap of the sugar maple, and only slightly less so of that of different species of oak, birch, poplar, sycamore, and willow, as well as of the nectar secreted in the flowers of the lilac, honeysuckle, jasmine, begonia, horse chestnut, and many others

Mr. E. A. McIlhenny writes me from Avery, Louisiana: "It is quite a common occurrence here for the Ruby-throated Hummer to get drunk on the nectar of the flowers of the china tree (*Melia azedarach*). It sometimes imbibes so much of the nectar that it becomes stupefied and falls from the tree, when it can be readily taken in the hand, and offers no resistance. I have also taken them by putting a little brandy and honey in honeysuckle and jasmine blossoms; they readily take this, and become so intoxicated that they are easily caught."

While stationed at the former cavalry depot at St. Louis, Missouri, in 1873-'74, I occupied a set of quarters that were completely overrun with large trumpet vines (*Tecoma radicans*), and when these were in bloom the place fairly swarmed with Ruby-throats. They were exceedingly inquisitive, and often poised themselves before an open window and looked in my rooms full of curiosity, their bright little eyes sparkling like black beads. I have caught several, while busily engaged sipping nectar in these large, showy flowers, by simply placing my hand over them, and while so imprisoned they never moved, and feigned death, but as soon as I opened my hand they were off like a flash. They seem to be especially partial to anything red.

Mr. Manly Hardy writes: "I was once camping on one of the many islands along the coast of Maine during a dense fog, which had held us prisoners for several days, as it was so thick that we could not find our way. We had been living on lobsters, and lots of their red shells lay near the fire in front of our tent, when suddenly a Hummer came out of the fog and darted down at the shells, moving from one to another, seemingly loath to leave them."

Mr. W. N. Clute, of Binghamton, New York, writes: "The swamp thistle (*Cirsium muticum*), which blooms in August, seems to have great attractions for the Ruby-throated Hummingbirds. I have seen more than a hundred birds about these plants in the course of an hour. Since it has been stated that the bee gets pollen but not honey from the thistle, it would appear that these birds visit these flowers for insects. There is scarcely a flower that contains so many minute insects as a thistle head. Examine one with a lens and it will be found to contain many insects that can hardly be seen with the unaided eye, and if the Ruby-throat eats insects at all, these are the ones it would take; and because the larger ones remained the observer might conclude that none were eaten. The jewel weed (*Impatiens*) also receives much of their attention, and nowhere do I find these birds so abundant as about these two flowers."

I could quote considerable more testimony showing that the Hummingbirds live to a great extent on minute spiders and insects, but consider it unnecessary. Hummingbirds are readily tamed and make interesting pets, but do not seem to

live long in captivity. Something seems to be lacking, probably the required quantity of insects which they are able to obtain in a wild state, and sirup alone does not appear to enable them to survive such changed conditions for any length of time. All of our Hummingbirds are very fond of bathing, and I have seen one fly repeatedly through the spray of a fountain in one of the numerous parks in Washington, District of Columbia.

Mr. Otto Widmann, of Old Orchard, Missouri, has kindly furnished me with the following notes on this species:

"While in the St. Francis region, Missouri, I was not a little surprised to meet, on the forenoon of May 10, a great number of Ruby-throats in the garb of the female, but with beautiful red throats, in shape exactly like the patch of the male, but the color a plain solferino, without any metallic or golden hue. At first I did not know what to make of it, until I found out that the pollen of *Æsculus pavia*, the red shrub buckeye, is of the identical color and stains the fingers with solferino at the touch. These Ruby-throats were a wandering army of females; among the large number of birds present only a few (one or two, I think) males were seen, and they were probably summer sojourners in these woods. Next day I visited the same forest again at the same hour, but all the female Hummers were gone.

"The first Hummers appear in St. Louis County about the last week in April, but in southeast Missouri (Pemiscot County) I found them already present on April 11, 1893. Male Hummers do not become numerous in St. Louis County before May 5, and females about May 12. Fresh eggs are to be looked for about the 1st of June. Southward migration is well under way by the middle of September, when Hummers are very plentiful. After the 1st of October they are less frequently seen, but the last ones do not leave us before October 11 or 12. Migration in this species has much in common with that of the Swift, from which fact I conclude that their insect food may be somewhat similar, and that both species may feed on nearly related insects. A peculiarity of the Ruby-throat, which I have only once seen mentioned in print, is the pendulum play of the male Hummer. In time it coincides with the period of sexual excitement; it begins here about May 12, with the arrival of the bulk of the females, and lasts until incubation has commenced. In this play the bird is swinging to and fro, as if suspended from a fixed point; it describes one-fourth of a circle, and travels about a rod. This pendulum movement is continued about a dozen times, the bird emitting chirps all the time."

Shortly after their arrival in the spring they are continually chasing each other about; considerable of this is undoubtedly done in play, but occasionally they act like perfect little furies, and try to injure each other as much as possible. At such times they utter rather shrill, squealing sounds, like "chic-we-we-a," which are frequently and rapidly repeated; at other times they utter low, chipping sounds that can only be heard when close by, intermixed now and then with a somewhat louder chirp. After one has driven its rival away it generally returns to one of its favorite perches, some little dry twig of a shrub or tree, from where it commands a good outlook, and commences at once to

rearrange and smooth out its plumage, usually beginning with the primaries, which are dexterously passed through its bill by raising and extending the wing on a level with the head. It is rarely seen entirely at rest for any length of time, and, when not busy preening its feathers, it darts about from one place to another. Although such a small, tiny creature, it is full of energy, and never seems to tire. During the mating season the male is very devoted to his mate, following her constantly about, and fiercely attacks any rival that may approach too near her.

In our Southern States nidification begins usually about the first week in May, occasionally a little earlier or later, according to the season, and correspondingly later in the more northern portions of its range. A suitable nesting site having been selected (and this appears to be an easy task), preparations for building are soon begun. During this time the male may frequently be noticed indulging in the pendulum play already described, and both sexes will frequently dart straight up into the air for some 50 feet, and as quickly drop down again in the vicinity of the chosen nesting site. The nest is generally saddled on a horizontal or a somewhat drooping limb of a tree, about half an inch or a little more in thickness, or it may be placed at the junction of a little fork where one side of the nest is supported by one of the branches, and less often in bushes or vines, varying from 6 to 50 feet high, usually from 10 to 20 feet from the ground. Its favorite breeding resorts are second-growth timber along river bluffs, hillsides, the borders of forests, in shade trees along country roads, orchards, gardens, etc. I believe the different species of oak, where they are found, are preferred for nesting sites to all other trees, while hickory, tulip, poplar, maple, horse-chestnut, beech, sycamore, dogwood, black gum, buckeye, birch, apple, pear, orange, pine, red cedar, and other trees, rose bushes, and creeping vines are also more or less used. In the Adirondacks, in New York, I believe birch trees are the favorites. I have seen one of its nests saddled on the top of and between two old pine cones, on a slender, dry limb, which I consider a rather unusual nesting site for this species.

The nest of our Ruby-throated Hummingbird is one of the most exquisite pieces of bird architecture to be found anywhere. The circular foundation is composed of bits of lichens, mixed with fine vegetable fibers, which are apparently firmly glued to the twig on which the nest is saddled, presumably with saliva secreted by the bird for this purpose, and the structure is built upon this, the inner portions of it being composed of soft, downy plant fibers, such as the silky down of different species of willows and poplars, that found on the young and unexpanded leaves of the oaks and various kinds of ferns (*Filices*), especially that from the young stalks of the common brake (*Pteris aquilina*), the silky down of the milkweed (*Asclepias*), and similar materials from other sources. After these have been well worked together in a sort of vegetable felt, the outer walls of the nest are profusely covered with a coating of bits of lichens obtained from the trunks and limbs of trees in the vicinity, and then are firmly fastened in place with spider webs, giving the nest the appearance of a small, lichen-covered knot, which for this reason is rather difficult to detect. In nearly every

instance the nest is placed so that its contents are protected from above by the leaves of the tree or a limb directly over it, and it is rare to find one in a perfectly open and unsheltered situation. The location of the beautiful little structure certainly shows considerable intelligence on the part of the builder.

The nests vary somewhat in size and bulk, according to the thickness of the limb or twig on which they are saddled. An average-sized specimen measures about $1\frac{1}{2}$ inches in outer diameter by $1\frac{1}{4}$ inches in depth. The inner cup is about an inch in width by five-eighths of an inch in depth. I believe that the female performs about all the labor required in the construction of the nest, the male simply following her around while she is gathering the necessary materials and protecting her, although he may occasionally assist to some extent. As nearly as I can judge, it takes about ten days to complete the structure.

Mr. H. W. Flint, of New Haven, Connecticut, sends me the following interesting note on this subject:

"On May 30, 1890, I noticed an interesting fact in connection with this species. I was watching a Downy Woodpecker excavating a home in the top of a lofty maple on the edge of heavy timber, when suddenly a male Hummer, closely followed by his mate, darted toward the trunk of a large oak, at the height of at least 35 feet from the ground, and were immediately attacked by some kind of beetle, which attempted to drive them from the tree. The birds would, after an apparent struggle with the beetle, cling to the trunk of the tree a moment, pull off a bit of lichen, and then suddenly leave the spot like a flash. I watched this pair over two hours before I succeeded in locating the nest, which was at least 10 rods distant, and each time they returned to the tree the beetle met them and fought them off, frequently driving them from the trunk after they had succeeded in alighting. The male showed great anger, and his sharp, rapid chirping was almost incessant while in the vicinity of the tree. The beetle did not attempt to follow the birds, but tried to prevent their alighting upon or approaching the tree. I was very much interested, and can not now understand what was the cause of the antagonism existing between them. The nest, which I afterwards secured, was beautifully decorated, and the eggs somewhat incubated, usually the case where the nest is well covered, as much of the exterior decoration is done after the eggs are laid, and even after the young are hatched."

In the Southern States fresh eggs may be looked for during the first two weeks in May, in the vicinity of Washington, District of Columbia, about June 10, and in New England and our Northern States in the latter part of this month or during the first half of July. Two eggs are laid to a set, one every other day, and these are frequently deposited before the nest is more than half completed, the female finishing it gradually after incubation has commenced, and sometimes adding additional lichens on the outside, even after the young have been hatched. Incubation lasts about fourteen days, and the female not only attends to this duty alone, but also appears to care for the young exclusively, which are large enough to leave the nest in about sixteen days. They are born blind, and do not open their eyes until they are about a week old. As soon as incubation commences the male appears to lose all interest in his spouse for the time being,

and lets her attend to her family duties alone, leading an easy, careless life in the meantime. Although I have watched several nests of Hummingbirds containing young for hours at a time, I have never yet seen a male feeding them. They grow amazingly fast, and when about ten days old they are about as large as the parents. Their bills, however, grow proportionally much slower than their bodies. The young are fed by regurgitation. I have satisfied myself fully on this point, and have seen the female insert her bill almost for its full length in the throat of the nestlings, and watched her, with the aid of a strong glass, doing so repeatedly. When not in search of food she broods the young or sits on the rim of the nest preening her feathers. I believe two broods are frequently raised in a season, occasionally three perhaps, as fresh eggs have been found as late as August 7. An old nest is sometimes occupied for several seasons and remodeled each year; and should the nest and eggs be taken or destroyed, a second and occasionally even a third and fourth attempt at nesting is made within about a week, and sometimes these subsequent nests are built in the same tree again, or in others close by. The birds become very much attached to a locality once chosen for a home, and will return to it from year to year, not infrequently building a new nest on the top of the last year's one, or alongside of it. The female is very devoted to her young, and will occasionally resent an intruder's presence by darting at his face.

The eggs of the Ruby-throated Hummingbird are pure white in color; the shell is close-grained, rather frail, and without luster. They are mostly elliptical oval in shape, but occasionally a specimen approaches an elliptical ovate, one end being somewhat smaller than the other.

The average measurement of twenty-nine specimens in the United States National Museum collection is 12.95 by 8.50 millimetres, or about 0.51 by 0.33 inch. The largest egg of this series measures 14.48 by 9.14 millimetres, or 0.57 by 0.36 inch; the smallest, 12.19 by 8.38 millimetres, or 0.48 by 0.33 inch.

The type specimen, No. 26914 (Pl. 1, Fig. 27), from a set of two eggs, was taken by Dr. William L. Ralph, near Holland Patent, New York, on June 21, 1888, and represents an average egg of this species.

69. *Trochilus alexandri* BOURCIER and Mulsant.

BLACK-CHINNED HUMMINGBIRD.

Trochilus alexandri BOURCIER and Mulsant, Annales Société d'Agriculture de Lyon, IX, 1846, 330.

(B 102, C 276, R 336, C 410, U 429.)

GEOGRAPHICAL RANGE: Western North America; from the Pacific coast to the Rocky Mountains; north to southern British Columbia, on both sides of the Cascades and southern Alberta?; east to western Montana, western Colorado, New Mexico, and western Texas; south through California and Arizona into northern Mexico; in winter to Lower California, the valley of Mexico, and the State of Guerrero, Mexico.

The Black-chinned Hummingbird, also known as the "Purple-throated" and "Alexandre's" Hummingbird, is rather irregularly distributed throughout the western United States, and, while exceedingly abundant in some localities, in

others, apparently equally well suited, it is comparatively rare. It has not yet been recorded, so far as I am aware, from any point west of the Cascade Mountains in Oregon and Washington, and, in fact, it must be considered as rather rare throughout the eastern portion of these States and Idaho.

Mr. John Fannin, curator of the Provincial Museum at Victoria, British Columbia, in his "Check List of British Columbia Birds," says: "Confined to the mainland; both slopes of the Cascades."

Mr. R. S. Williams took a single specimen at Columbia Falls, Montana, on May 27, 1893, and a few others were seen subsequently. He writes me: "In this State they do not appear to breed east of the Rocky Mountains."

Mr. Frank M. Drew records it from Colorado, where it has been observed up to 6,000 feet, and Mr. C. F. Morrison, in a list of birds of La Plata County, in the same State, reports it as common and breeding, saying: "A nest shown me contained three eggs."¹

There are specimens in the United States National Museum collection from New Mexico, Arizona, California, Nevada, Utah, and Texas. In the latter State Mr. H. P. Attwater has found it nesting at San Antonio, and Mr. William Lloyd in Tom Green and Concho counties, which places mark about the eastern limits of its breeding range. It is only a summer visitor in the United States and British Columbia, and breeds wherever found. Throughout the greater portions of Arizona, southern Utah, and southern and southeastern California it breeds abundantly, and is apparently as much at home in the hot valleys bordering the Colorado Desert as in the higher Sierra Nevadas, where Lieut. H. C. Benson, Fourth Cavalry, United States Army, took four of its nests and eggs on May 29, 1892, in the Sequoia National Park, at an altitude of over 9,000 feet; while in semitropical San Diego County, California, judging from the number of breeding records I have, it is, if anything, still more common.

Mr. F. Stephens writes me: "I have taken the nest and eggs of the Black-chinned Hummingbird near Fort Bayard, New Mexico, in 1876, where this species is rather common, and it is an abundant summer resident of southern California, below the pine zone. I have also found a set of eggs of this species near San Bernardino, California, laid in a nest of the House Finch, *Carpodacus mexicanus frontalis*. No lining had been added, or any other changes made; the bird evidently was in haste to lay, her nest, perhaps, having been suddenly destroyed."

The general habits of the Black-chinned Hummingbird are very similar to those of the eastern Ruby-throat. Ordinarily it makes its appearance along our southern border early in March, returning south about the 1st of October. Its call notes and actions during the mating season resemble those of the former, and, like it, the bulk of its food consists of minute insects.

Mr. R. H. Lawrence writes me: "On June 18 and 19, 1894, in Los Angeles County, California, the Black-chinned as well as Anna's and Costa's Hummingbirds were very common in a little tract of wild tobacco, *Nicotiana glauca*, of

¹The Ornithologist and Oologist, Vol. XIII, 1888, p. 107.

about $2\frac{1}{2}$ acres in extent, situated at the southern slope of a swale or draw on Angelano Heights. These trees bear clusters of slender, yellow, tube-shaped flowers, and are from 12 to 20 feet in height; the tract is known as 'Hummer's Patch.' I saw from seventy to eighty Hummingbirds here in less than two hours, during the hottest part of the day. Many are killed by the boys with spring and air guns in pure wantonness. No nests were found, and males appeared to be more abundant than females. I also found these three species very common in the dry wash of Saw-Pit River, in the same county. Here they were attracted by a bright red flower (*Delphinium cardinalis*) growing on a clean, slender, juicy stalk, from 2 to 6 feet high. This plant was abundantly scattered among the low bushes of a level tract of a few acres, and appeared to be a favorite feeding place for different species."

In the vicinity of Tucson, Arizona, where this species is common, I have frequently seen it feeding in the flowers of the mescal (*Agave americana*), as well as in those of several species of yuccas, undoubtedly attracted by the numerous small insects harbored by them. Two nests, with young, probably three or four days old, were found by me saddled on willow branches, on the banks of Rillito Creek, on May 30, 1872, one 4, the other 7 feet from the ground.

In southern California nidification commences ordinarily about the latter part of April or the beginning of May, but I have seen it stated that a set of eggs has been found near Los Angeles, California, as early as February 6, possibly a misidentification, the nest really belonging to *Calypste anna*, which is well known to occasionally breed this early. Throughout the greater part of their range, however, it rarely begins laying before May 1, and the season is at its height through this month, while second or possibly third sets are found up to the latter part of July, and occasionally still later. The nest is readily distinguishable from that of the Ruby-throated Hummingbird by not being covered on the outside with lichens. It is composed of plant down, varying in color from white to buff; the latter is obtained from the under side of the young leaves of the sycamore, the former probably from willows, milkweed, or thistles. These materials are well worked together, and the outside of the nest is thickly coated with spider web. In an occasional specimen a small leaf or two, or a few flower blossoms of the oak are worked in the outer walls. In a specimen from Marfa, Texas, the outside is well covered with small flower spikes, the male aments of a species of oak, hiding the inner lining completely.

A beautiful nest now before me, taken by Mr. F. Stephens, near Owens Lake, Inyo County, California, No. 24329, United States National Museum collection, is mainly composed of white willow down, mixed on the outside with a few small leaves and the scales from the willow buds; these are firmly held in place by an abundance of spider web, with which it is also securely attached to the little fork in which it is saddled. The outer diameter of this nest is about $1\frac{3}{8}$ inches by 1 inch in depth; the inner cup is 1 inch in diameter by five-eighths of an inch deep; and while some specimens before me are a trifle larger, others are considerably smaller. Nests taken in the Sequoia National Park, in

Tulare County, California, have perceptibly thicker walls than those from the warmer lowlands, and are also correspondingly larger. The nests are either saddled on a small, drooping branch or on a fork, one or two of the smaller twigs composing this usually being incorporated in the walls and holding it securely in place. Many of the nests resemble small, fine sponges, and are equally elastic, readily regaining their shape after being squeezed together. They are generally placed from 4 to 8 feet from the ground, mostly in the shrubbery found near small creeks or springs, and frequently their nests overhang the water or the dry creek bed. Alders, cottonwoods, oak, sycamore, laurel, and willows are most often selected for nesting sites, as well as young orchards, especially apple and orange trees, where they are available.

In the more southern portions of the range of the Black-chinned Hummingbird fresh eggs are occasionally found by May 1, and as late as the beginning of August. Although most of our Hummingbirds invariably lay but two eggs to a set, nests of this species now and then contain three, all evidently laid by the same female, and such instances do not appear to be especially rare. Three such cases have come to my knowledge within the last few years. Dr. C. Hart Merriam found a set of three in the lower Santa Clara Valley, Utah, in May, 1891. Mr. F. Stephens took another at Olancho, Inyo County, California, on May 16, 1891, which is now in the United States National Museum collection, and Mr. Fred. H. Fowler obtained still another near Fort Bowie, Arizona, in the spring of 1893.

The eggs of the Black-chinned Hummingbird resemble those of the Ruby-throat in shape and color, but average a trifle smaller.

The average measurement of fifty-three specimens in the United States National Museum collection is 12.67 by 8.31 millimetres, or about 0.50 by 0.33 inch. The largest egg of the series measures 13.72 by 8.64 millimetres, or 0.54 by 0.34 inch; the smallest, 11.94 by 8.13 millimetres, or 0.47 by 0.32 inch.

The type specimen, No. 24257 (not figured), from a set of three eggs, was taken by Mr. F. Stephens, on May 16, 1891, near Olancho, Inyo County, California, the nest being saddled on a small twig of an apple tree in a young orchard, about 7 feet from the ground.

70. *Trochilus violajugulum* JEFFRIES.

VIOLET-THROATED HUMMINGBIRD.

Trochilus violajugulum JEFFRIES, Auk, V, April, 1888, 168.

(B —, C —, R —, C —, U 429.1.)

GEOGRAPHICAL RANGE: Southern California (Santa Barbara County).

The Violet-throated Hummingbird was first described by the late J. Amory Jeffries in "The Auk" (Vol. V, 1888, pp. 168, 169), from a specimen, a male, shot near Santa Barbara, California, on April 5, 1883, and the type, I believe, still remains unique. Nothing whatever is known regarding its habits or the extent of its range. It appears to be a perfectly good species, and was probably a straggler from the south.

71. *Calypte costæ* (BOURCIER).

COSTA'S HUMMINGBIRD.

Ornismya costæ BOURCIER, Revue Zoologique, ii, 1839, 294.*Calypte costæ* GOULD, Monograph of the Trochilidæ, Part XI, 1856, and Vol. III, 1861, Pl. 134.
(B 106, C 280, R 337, C 415, U 430.)

GEOGRAPHICAL RANGE: Western North America; north to southern California, southern Nevada, and southwestern Utah; east to western and through southern Arizona to southwestern New Mexico; south to Lower California and northwestern Mexico to Mazatlan, Sinaloa, Mexico.

The northern limits of the range of Costa's Hummingbird have recently been considerably extended, and it is now known to be a common summer resident in southeastern California, at least as far north as Owens Valley, Inyo County, in about latitude $36^{\circ} 20'$; it reaches a slightly higher latitude in southern Nevada, while the northernmost point of its range, as far as known, is to be found in the extreme southwestern corner of Utah, on the eastern slopes of the Beaverdam Mountains, where Dr. C. Hart Merriam found it common among the junipers, somewhat north of the thirty-seventh parallel.¹

On the west coast of California it has as yet only been taken as far north as Ventura County, and it is evidently rare there. In Arizona it seems to be distributed over the western half of the territory, as well as over most of the southern sections. Its breeding range is coextensive with its geographical distribution in the United States. The majority of Costa's Hummingbirds appear to be only summer residents within the United States. Mr. W. W. Price, a careful and reliable observer, states, however, that it winters in limited numbers in southern California; and the fact that he found a nest of this Hummingbird containing young as early as January 28, 1887, near Riverside, in San Bernardino County, seems to confirm this, and I have no doubt that other species also winter in suitable localities in the Colorado Desert, in the vicinity of the few springs and water holes found there. Dr. Edgar A. Mearns, United States Army, found this Hummer quite common at Tinachas, in southwestern Arizona, near the head of the Gulf of California, between February 16 and 21, 1894, and collected a number of specimens there. Its general habits do not differ much from those of the other members of this family found within our borders, excepting that it is somewhat more of a desert-loving species, and it seems to show a special preference for the few water holes and springs in the barren mountain ranges in southeastern California east of the Sierra Nevadas. In such localities it appears to be far more common than in the better watered and more fertile portions of the southwestern parts of the State.

Dr. A. K. Fisher says: "Costa's Hummingbird is the common species of the desert valleys and mountains of southern California and Nevada. * * * In the Argus Range, California, the species was very common at Maturango

¹ North American Fauna, No. 7, 1893, pp. 56-58.

Spring, and in Shepherd Canyon, where several nests were found in low bushes along the edges of the canyon. * * * At Coso the species was also very abundant, and several of its nests were found. Various kinds of plants were used as nesting sites, though the branching cactus (*Opuntia echinocarpa*) was most commonly chosen. Usually the structure was placed on the top of a lower branch, a foot or so from the ground, and under an overhanging mass of thick, spiny branches, which formed a protection for the parent bird from the sun and weather as well as its enemies. At Coso one of these Hummers was seen on a bright moonlight evening hovering about a bunch of flowers, and was heard again later in the same night. * * * Just at daylight, on the morning of June 25, before the shadow had risen out of Wild Rose Canyon, a Costa's Hummingbird came and hovered within a foot of our camp fire, probably mistaking it, from the distance, for a bunch of bright-colored flowers. It was observed on several occasions that any bright-colored object placed in a conspicuous position attracted this bird."¹

Mr. F. Stephens writes me regarding Costa's Hummer as follows: "I have found this species breeding in a gulch at the edge of the river bottom near the Gila River, New Mexico, a few miles below old Fort West. In this case I saw the male assisting in building the nest. I distinctly saw him fly to a spider web and gather it in or on his bill while on the wing. He appeared to be winding it about his bill, but I can not be certain of this. When no more of the web was left in sight, he flew a few yards across the gulch, and I saw he was busy at the nest, which I had not seen before. The date was about the end of May, 1876. In southern California this species breeds on the desert side as early as February, but on the coast side not until May. They range and nest up into the pines, but are most common in the foothills. They prefer certain canyons for nesting, and I know at least one canyon where I could be reasonably certain of getting half a dozen or more sets in two hours' search in the latter part of May. The nests of this species are not as compactly built as those of *Trochilus alexandri*."

Mr. R. H. Lawrence writes me from Los Angeles, California, as follows:

"On May 21, 1893, I found a half-finished nest of what I took to be *Calypte costæ*, with the female working on it. On the 25th, at 9 a. m., it contained one egg, and on May 26, at dusk, it held two. On June 9 the eggs were still unhatched; the young hatched on the 11th. On June 23, 1894, in the mouth of Saw-Pit Canyon, I found a nest of this Hummer on the end of the lower branch of a sycamore. It was about 4 feet from the ground and near running water, well hidden under a thick canopy of sycamore leaves, which came down to within 2 inches of it, so close as to several times give the female some trouble to perch upon the nest. The nest was placed on the forks of a branch, and made of the down of sycamore leaves and of cobwebs. It held two very young birds. On June 25 I again visited it, and waited to see the mother feed the young ones. I finally found I could stand within 4 feet of the nest, and removed several of the leaves of the canopy for a better view. It was then

¹North American Fauna, No. 7, 1893, pp. 56-58.

about 12.45 p. m.; the day was warm. The parent's trips were not frequent. She fed the young by touching the point of her bill to the tips and sides of the bills of her youngsters, as if to urge or invite them to stir and open their mouths, not inserting her bill over one-fifth or one-fourth of its length. Once she thrust it down half its length into the throat of one nestling, who then clung to it to the very last moment of its withdrawal, apparently reluctant to let the very smallest particle of the regurgitated food miss its way or remain on the parent's bill. The performance was rather ludicrous, as both old and young, especially the youngsters, went through many wriggling and squirming motions. The parent certainly once, upon returning to the nest, brooded the young ones for a little while, and then fed one before leaving the nest. It was interesting to watch the female raise her crown feathers when settled into a more comfortable position in the nest, and then, upon being alarmed by me, flatten the feathers down, her eyes sparkling with fright. If I winked an eye she was startled, as I stood so near. Once, upon her return, settling down to brood the youngsters, she kept up for some moments a kind of paddling motion, as if she were giving them a little massage treatment. Her respiration was very rapid after this exertion. Life with these atoms of sensitiveness must be at white heat always. The young were lying side by side, but headed in opposite directions. Both had voided excrement in one case, but the parent did not remove either deposit while I was there. Except for this and a piece of eggshell, the nest appeared clean. The young had a narrow strip of long hairs down the center of their backs. Their skins were a dark, dirty brown; bills were very short, tipped with a point, and light colored; eyes were shut. No male parent was seen. The nest and contents were left undisturbed for future observations, if it is possible to visit it soon again."

Mr. A. W. Anthony found Costa's Hummingbird common in Lower California, and writes me: "Just before I left the higher benches of the San Pedro Martir Mountains, on May 29, 1893, *Calypste anna* became rather common, and *Calypste costae* still more so; both showed signs of early breeding. Valley birds had raised one or more broods by that time. Could it be that these had bred in lower altitudes before coming here?" Mr. Anthony's surmise that these birds might have already reared one or even two broods in the lower and hotter valley regions is undoubtedly correct, as Mr. Walter E. Bryant, in his paper on the "Birds of Lower California," mentions finding a nest of this species on Santa Margarita Island, on January 17, 1888. This was placed on an almost leafless branch, 3 feet high, far from the water, and contained large young.

Mr. B. T. Gault, in a recent letter says: "It may be a peculiarity of Hummers in general, but I found these birds to be exceedingly tame; indeed, it was almost impossible to keep them off their nests after they had been frightened from them; the female would persist in alighting on the nest even when an attempt was being made to sever the twig on which it was placed from the larger branch. Their extreme disregard for the presence of man was a little ahead of anything I had expected to see."¹

¹For a more detailed account of the nesting habits of Costa's Hummer I refer the reader to Mr. Gault's article in *The Auk*, Vol. II, 1885, pp. 309-311.

In Inyo County, California, Costa's Hummer seems to be very commonly found about the flowers of the squaw cabbage, a species of *Stanleya*, also about wild rose, plum, or cherry bushes (*Prunus*) growing in the canyons, as well as about other shrubs and plants found in these desert regions. Nidification commences sometimes early in January; several of its nests and eggs have been taken in Los Angeles County, California, in February; throughout the greater portion of its range, however, it is at its height during April and May, and at least two broods are regularly raised in a season. Considering the small size of most of our Hummingbirds, sixteen days, or even fourteen only, appears to be an unusually long time to be required to hatch such a small egg, and it seems to be entirely out of proportion when compared with many larger birds, and in this respect this family shows its close relationship to the Swifts (*Cypseli*), where incubation lasts still longer.

The nests of Costa's Hummingbird do not compare favorably in architectural beauty with those of the preceding species; the materials used are not so thoroughly felted or quilted together, and the inner cup has ordinarily a rather slovenly appearance. It is externally composed of plant down or fine shreds of plant fiber; the outer walls are thatched more or less profusely, in different specimens before me, with bits of gray lichens, fine shreds of bark, and small dry leaves, and these are securely fastened in place by spider web and silk obtained from cocoons. The inside is lined with plant down, and occasionally with finely shredded plant fibers and small, fluffy feathers. In some examples feathers are very prominent among the inner lining. An average specimen measures $1\frac{3}{8}$ inches in outer diameter by 1 inch in depth. The inner cup is about seven-eighths of an inch in diameter by one-half inch in depth. They are usually placed in low situations, from 1 to 6 feet from the ground, rarely higher, although Mr. W. E. D. Scott records one taken on May 5, 1882, near Riverside, in southern Arizona, from the extremity of a cottonwood branch 35 feet from the ground. In the desert regions of southeastern California various cacti, the different species of sage (*Artemisia*) and greasewood bushes (*Larrea*), while in the canyons ash, sycamore, scrub oak, palo verde, cottonwoods, and willows, furnish their favorite nesting sites. The eggs resemble those of the preceding species in shape and color, but they are somewhat smaller.

The average measurement of twenty-three specimens in the United States National Museum collection is 12.19 by 7.87 millimetres, or 0.48 by 0.31 inch. The largest egg measures 12.95 by 8.13 millimetres, or 0.51 by 0.32 inch; the smallest, 11.68 by 7.62 millimetres, or 0.46 by 0.30 inch.

The type specimen, No. 24250 (not figured), from a set of two eggs, was taken by Dr. A. K. Fisher in Shepherd Canyon, in the Argus Mountains, California, on May 7, 1891, and the nest from which these eggs were obtained was placed on a little fork of a greasewood bush, 2 feet from the ground, very poorly built, and probably an old one from the previous year.

72. *Calypte anna* (LESSON)

ANNA'S HUMMINGBIRD.

Ornismya anna LESSON, Supplement des Oiseaux Mouches, 1831, 115, Pl. 7.*Calypte anna* GOULD, Monograph of the Trochilidæ, Pt. XI, 1856, Pl. 5; and Vol. III, 1861, Pl. 135.

(B 105, C 279, R 338, C 415, U 431.)

GEOGRAPHICAL RANGE: Western North America; north through southern and middle California to about latitude 41°; east to the Sierra Nevada; south to northern Lower California and Cerros Island, and through southern Arizona; in winter to northern Mexico. Casually? to Guadalupe Island, Mexico.

The breeding range of Anna's Hummingbird, one of the handsomest species found in the United States, appears to be a rather restricted one, and, as far as known at present, seems to be confined to those regions of California situated between the coast and the Sierra Nevadas, and to the northern half of Lower California. Quite a number of these birds winter regularly in southern California, while others pass, during their fall migration, through southern Arizona, and likely also through southwestern New Mexico, en route to their winter haunts in northern Mexico. Mr. H. W. Henshaw met with Anna's Hummingbird in the vicinity of Camp Grant, Arizona, during the last week of September, 1873, while they were evidently migrating, and Mr. W. E. D. Scott obtained a single specimen in the Santa Catalina Mountains, in the same territory, on October 1, 1883. If it should prove to be a summer resident in Arizona, its nests and eggs must be looked for in the canyons of the mountains at altitudes of from 5,000 to 7,000 feet. It usually returns to its breeding grounds very early in the spring. Its general habits, food, etc., resemble those of the other species already rather fully described, and the breeding season begins occasionally in February and lasts into July, during which time two, if not three broods are raised.

Mr. Charles A. Allen, of Nicasio, California, writes me: "The male Anna's Hummingbird has a very nice little song; it may often be seen perched on some prominent twig or a telegraph wire singing away for dear life. Its simple little lay sounds like 'te-uit, te-uit, te-wieu, wieu, wieu,' repeated over and over again, and when angry it utters a very harsh, rasping screech. In this vicinity it is migratory, usually arriving about the second week in February."

Mr. F. Stephens sent me the following notes on this species: "When I first came to California I confused the females of this species with those of *Trochilus alexandri*, and thought that *Calypte anna* was a summer resident in the valleys. Others appear to have made the same mistake. My present belief is that *Calypte anna* seldom or never breeds below the pine region of the mountains of southern California, except possibly immediately along the coast, and of this I have no certain knowledge. I do know the species is found, though rather rarely, in the pines in May and June. It is an abundant winter resident in the valleys.

Lately (September 27, 1892, at San Diego) I heard the song of this species. It was harsher than the song of *Trochilus alexandri* or *Calypte costæ* and could be heard further."

Mr. Rollo H. Beck, of Berryessa, California, says: "Anna's Hummingbird is a common summer resident here, and a few remain through the winter. I often notice these birds hunting for spiders among the evergreen trees near my home; they frequently visit the flowers about the houses in the valleys, and they also have an abundance of wild ones to select from in the hills, from the time they arrive in the spring until they leave in the fall. In March, when the Australian or blue gum trees begin to blossom, this Hummer and the Rufus are very numerous, chasing each other from tree to tree all day long; all the time uttering their notes of defiance or hatred. Although somewhat larger in size than the Rufus, I believe the latter generally gets the best of it."

Mr. A. W. Anthony has kindly sent me the following notes on *Calypte anna*: "A nest of this species was found at San Quentin, Lower California, in a cholla cactus growing within a few feet of the bay. A piece of cotton was pushed down over the eggs to prevent their rolling out, and nest and all transferred to a box in my game bag. Upon arriving at my tent, an hour later, I was somewhat disgusted to find one of the eggs pipped, and realizing the difficulty of making a presentable specimen of it, was on the point of throwing it away, when a movement on the part of the tiny creature within the shell suggested to my mind that I hatch the egg and find out for myself how baby Hummingbirds come into the world. So far there was but a pin point broken, the rest of the shell being intact; and it was several minutes before the warmth of my hand, aided by my breath, produced another movement upon the part of the prospective Hummer; first a feeble struggle, followed by an interval of rest; another squirm, and the point of the bill came in view and was withdrawn; after a moment's rest a new system was adopted, which consisted of turning around in the shell from right to left, and cutting a clean, smooth opening with the sharp, horny tip on the upper mandible; this operation was evidently hard work, and required all the strength of the little mite, and frequent rests were necessary to recruit. Sometimes an interval of twisting seemed to accomplish nothing, and it would look as if all its struggles would be in vain, and I wondered whether the parent would not render a little much-needed assistance at this stage; but after an interval of rest the work would be continued with renewed vigor and another millimetre cut toward the outer world. The cutting was all done in the same direction, and after about ten minutes I was obliged to turn the egg over in my hand in order to watch the proceedings, as by that time the opening had been cut about half way around, bringing the chick's bill nearly underneath and in the palm of my hand. When the shell had been cut four-fifths around, the chick succeeded in getting one claw hooked over the edge of the break, and by one or two vigorous pushes broke the remaining shell, leaving in my hand two nearly equal parts of what had been a Hummingbird's egg, and a squirming something that bore no semblance whatever to one of the peerless members of

the genus *Calypte*. The entire operation of hatching, from the time I discovered that the egg was pipped, consumed about fifteen minutes.

"In Lower California the nesting season extended from January to June, and perhaps longer. One of the nests found by me near my camp at Valladares, Lower California, was built within 8 feet of a blacksmith's forge, where the smoke constantly obscured nest, bird, and all; but the structure was finished and the eggs laid in spite of the noise and confusion."

Besides spiders, small insects, etc., and the nectar of different kinds of flowers, Anna's Hummingbird is said to be extremely fond of the sap of the willow (*Salix lariolepis*), and it has also been observed hovering about the punctures made by the Red-breasted Sapsucker (*Sphyrapicus ruber*) in fruit orchards.

Nidification, as already stated, begins very early in California, occasionally in January, but more often in February, and, as a rule, but few of the first nests are found. The second sets find their way into collections more frequently, however, and the season for these is at its height in April or the first half of May. At this time they retire farther into the foothills and nest mostly among the shrubbery along the numerous small creeks found in the canyons of the mountains, following up the flowers, in which they find a considerable portion of their daily food, and which usually bloom somewhat later in such localities.

The nests of Anna's Hummingbird also differ somewhat from those of the previously described species in their general make-up, and can in most cases be readily distinguished from them. The inner walls are likewise composed of various kinds of plant down, that found on the under side of the leaves of sycamore being perhaps most frequently used, while willow and thistle down enters less often into their composition. Some of the early nests are almost entirely composed of the flowers of the *Eucalyptus*, the Australian gum tree. The outer walls are covered with soft green tree mosses and lichens, principally the former, and these are held firmly in place by spider webs and cocoons. The inner cup is lined with fine plant down and a few soft, fluffy feathers (apparently those of the female) and occasionally with fur. A well-preserved, average-sized specimen, taken near Santa Cruz, California, on May 14, 1872, measures about $1\frac{3}{8}$ inches in outer diameter by $1\frac{1}{4}$ inches in height; the inner cup is 1 inch in diameter by five-eighths of an inch in depth; while one kindly sent me by Mr. C. Barlow, of Santa Clara, California, taken by him on February 11, 1894, containing two slightly incubated eggs, has much thicker walls and is profusely lined with soft feathers of the Western Bluebird. It was saddled on a horizontal twig of a cypress about half an inch thick and 15 feet from the ground. He writes: "This was the first Anna's Hummingbird's nest found by me in 1894. On the same day several pairs were seen and one pair was found to be building on the remains of a last year's nest, which contained fresh eggs on February 21. At this season of the year it is usually rainy; the sun generally rises bright, but is soon obscured by clouds. I noticed that a large majority of these early nests were built on the east side of the trees, which appeared to me as being done perhaps so as to catch the rays of the sun while it shone for per-

haps an hour. Later on the nests were built almost anywhere. As a rule, the early Hummers here build in cypress (often called 'cedar') trees, and the nests are usually lined with feathers. I suppose this is due to the lack of vegetable down, which is plentiful later, for I have never found a late nest lined with feathers. A nest found on February 22 was lined with red cow hair and looked quite odd. Other of these early nests were lined with Western Bluebird's or Western Robin's feathers, while one contained a large feather of some Owl."

The nests are most often placed on low branches or twigs overhanging water courses, in sycamore, maple, cottonwood, alder, or sumach trees or bushes, at no great distance from the water; and again they may be found in cypress, Australian blue gum, elder, box elder, and in orchard trees, such as orange, peach, and plum. In Lower California Mr. A. W. Anthony found it also nesting in cholla cactus. Nests are sometimes placed within a foot of the ground, and others fully 35 feet up, the average being from 8 to 15 feet. They may be saddled on a small, drooping limb, or placed in the forks of small twigs; in either case they are substantially built structures and well secured to their surroundings.

Only two eggs are laid to a set, and these, like all Hummingbird's eggs, are dull white in color and elliptical oval in shape. Incubation lasts from fourteen to sixteen days, and the male does not assist in this duty.

The average measurement of twenty-four specimens is 13.29 by 8.76 millimetres, or about 0.52 by 0.34 inch. The largest egg measures 14.22 by 8.89 millimetres, or 0.56 by 0.35 inch; the smallest, 12.70 by 8.38 millimetres, or 0.50 by 0.33 inch.

The type specimen, No. 21748 (not figured), from a set of two eggs, Bendire collection, was taken by Mr. William A. Cooper, near Santa Cruz, California, on May 14, 1872.

73. *Selasphorus floresii* GOULD.

FLORESI'S HUMMINGBIRD.

Selasphorus floresii GOULD, Monograph of the Trochilidæ, Pt. XXIII, September 1, 1861, Pl. 10; and Vol. 3, 1861, Pl. 139.

(B —, C —, R —, C —, U 431.1.)

GEOGRAPHICAL RANGE: Southwestern Mexico, Jalisco, and Oaxaca; accidental to California.

Floresi's Hummingbird or Flame-bearer, an exquisitely plumaged species, can be considered only as an accidental straggler within the borders of the United States, and still remains very rare in collections. It was obtained at Bolanos, Oaxaca, Mexico, in 1845, and remained unique for some time. More recently it has been reported from the State of Jalisco, and Mr. Walter E. Bryant found a specimen in a taxidermist's shop in San Francisco, California,

which had been mounted as a hat bird; he was assured that it had been killed near that city, which entitles it to a place in our fauna.¹

Nothing appears to be known as yet regarding the life history of this handsome species.

74. *Selasphorus platycercus* (SWAINSON).

BROAD-TAILED HUMMINGBIRD.

Trochilus platycercus SWAINSON, Philosophical Magazine, I, 1827, 441.

Selasphorus platycercus BONAPARTE, Conspectus Avium, I, 1850, p. 82.

(B 104, C 278, R 339, C 413, U 432.)

GEOGRAPHICAL RANGE: Mountain regions of western North America; north in the United States to Wyoming and Idaho; east to the eastern slopes of the Rocky Mountains and adjacent ranges in Colorado and New Mexico; west to the Sierra Nevada and western Arizona, as well as in the intervening regions; south through Arizona, southern New Mexico, and western Texas, over the Mexican table-lands to Guatemala, Central America.

The Broad-tailed or Rocky Mountain Hummingbird is pretty generally distributed throughout the various mountain systems between the eastern slopes of the Rocky Mountains and the Sierra Nevadas. It can only be considered as a summer resident in the United States, retiring over the table-lands of Mexico southward to Guatemala in winter. It usually makes its appearance along our southern border in Arizona and New Mexico early in March, and returns south in the latter part of September or the beginning of October. As far as yet known, it reaches the northern limits of its range in southern Wyoming and Idaho, and is an exceedingly abundant species throughout the mountains of Nevada, Utah, Colorado, New Mexico, and Arizona. The Sierra Nevadas seem to form the western boundary of its range, and it apparently does not occur west of these mountains in California. In June, 1876, while en route from Camp McDermitt, Nevada, to Camp Harney, Oregon, I observed several Hummingbirds among the willows beside a little brook along the southern slopes of Steen's Mountain, in southern Oregon, which I am almost certain belonged to this species, but not being prepared for collecting, I was unable to secure specimens. Dr. C. Hart Merriam records a specimen taken at Big Butte, Idaho, which is located in about the same latitude, on July 19, 1890, and I have no doubt that its range will yet be extended into southeastern Oregon. I also met with this species as a rare summer resident in the foothills of the Santa Catalina Mountains, in southern Arizona, and obtained a single nest containing two nearly fresh eggs, placed on a small cottonwood twig in a canyon, about 3 feet from the ground, at an altitude of about 4,800 feet, on June 11, 1872. It did not appear to breed in the valley of Rillito Creek.

In eastern Colorado it appears to be the only representative of this family, and is exceedingly abundant. Mr. W. G. Smith writes me from Larimer County, in this State: "The Broad-tailed Hummer is common in the mountains from

¹ Forest and Stream, Vol. 26, p. 426.

7,000 feet up to timber line, nesting almost everywhere between these points; and a large pine tree seems to answer equally well for a nesting site as a small bush. In trees the nest is frequently saddled on a large limb, but it is more often placed in low bushes, particularly on willow branches overhanging water. The male has a curious habit of flying up almost perpendicularly, 100 feet or more, in the vicinity of the selected nesting site, and he frequently repeats this performance three or four times in succession before alighting on some dead limb. The female is very loath to leave her eggs, and if driven off will return again directly, even though the intruder's hand is placed within a few inches of the nest."

As far as my limited observations go, all of our Hummingbirds indulge in this perpendicular flight during the nesting season, and not a few of the nests were found by me while watching these birds go through this performance, which is not alone confined to the male; the female also does it. On the first arrival of this species in the spring it is comparatively common in the lower foothills and valleys, and unquestionably breeds here. By the time the young are large enough to leave the nest the majority of the flowers have ceased blooming, and as the country begins to dry up more and more these Hummingbirds retire to higher altitudes in the mountain parks, where everything is now as green and bright looking as it was in the lower valleys two or three months earlier. Here they raise their second broods under nearly similar conditions as the first; the former are by this time well able to take care of themselves and can be seen frolicking about everywhere. These vertical migrations, if they can be called such, frequently account for the entire disappearance of certain species in summer from localities where they may have been exceedingly numerous a couple of months earlier, and the gradual diminution or actual scarcity of the food supply plainly accounts for the sudden change in their habitat.

Mr. Robert Ridgway writes: "The flight of this Hummingbird is unusually rapid, and that of the male is accompanied by a curious screeching buzz while it is followed through an undulating course. Long before the author of this curious sound was detected its source was a mystery to us. This shrill, screeching note is heard only when the bird is passing rapidly through the air, for when hovering among the flowers its flight is accompanied by only the usual muffled hum common to all the species of the family."¹

According to Dr. C. Hart Merriam, the Broad-tailed Hummer is very abundant in the balsam belt and the upper parts of the pine belt in the San Francisco Mountain region in Arizona. In "North America Fauna," No. 3, 1890 (p. 93), he says: "A nest containing two nearly fledged young was found on the limb of a Douglas fir, about 4 feet from the ground, July 31. The principal food plant of this Hummingbird is the beautiful scarlet trumpet flower of *Pentstemon barbatus torreyi*. During the latter part of August and early September, after it had ceased flowering, these birds were most often seen in the beds of the large Blue Larkspur (*Delphinium scopulorum*). They wake up early in the morning

¹U. S. Geological Explorations of the 40th Parallel, 1877, p. 561.

and go to water at daylight, no matter how cold the weather is. During the month of August, and particularly the first half of the month, when the mornings were often frosty, hundreds of them came to the spring to drink and bathe at break of day. They were like a swarm of bees, buzzing about one's head and darting to and fro in every direction. The air was full of them. They would drop down to the water, dip their feet and bellies, and rise and shoot away as if propelled by an unseen power. They would often dart at the face of an intruder as if bent on piercing the eye with their needle-like bill, and then poise for a moment almost within reach before turning, when they were again lost in the busy throng. Whether this act was prompted by curiosity or resentment I was not able to ascertain. Several were seen at the summit of the mountain during the latter part of August. They were found also at the Grand Canyon of the Colorado September 12 to 15. They began to leave the mountain during the first week in September, and none were seen after the middle of the month."

The flowers of the *Scrophularia*, *Ocotilla*, *Agave americana*, and numerous others, have great attractions for them owing to the quantities of small insects which they harbor. In the more southern portions of their range nidification commences late in April or the beginning of May, but most of these early sets are generally overlooked, while the second sets are usually laid about the first two weeks in June, and nesting continues throughout July in portions of their range. Mr. Robert Ridgway obtained two nests of this species with eggs in Parley's Park, Utah, on July 23, 1869; they were placed in willows growing beside a stream.

Nests from different localities vary considerably in make-up as well as in size. Nests saddled on good-sized limbs, like those often found in the mountains of Colorado, are occasionally almost as large again as others placed on small twigs. One now before me, from the Ralph collection, taken by Mr. William G. Smith, at Pinewood, Colorado, on June 23, 1892, measures 2 inches in outer diameter by $1\frac{3}{8}$ inches in depth, while one taken by Mr. Ridgway, in Parley's Park, Utah, on July 23, 1869, measures only $1\frac{5}{8}$ by 1 inch outside measurement. The difference in size of the inner cups of these two nests is even more noticeable, the former measuring 1 inch by three-fourths of an inch, the latter three-fourths by one-half of an inch. While the walls of both of these nests are mainly composed of willow or cottonwood down, their outer covering is entirely dissimilar. The outside of the larger one is profusely covered with small bits of lichens, like the nest of the Ruby-throat; the smaller one is decorated with shreds of bark, fine leaves, and dry plant fibers, resembling more the nests of Costa's Hummingbird in this respect. The radical difference in the appearance of the nests is far greater than my simple description would indicate, and the specimens themselves must be seen to have this difference fully appreciated. There is no doubt whatever of the correct identification of both, but their nests evidently vary greatly in different localities, and while frequently one can form a pretty good guess as to what species certain Hummingbirds'

nests belong, in this instance at least it would be impossible to form a correct idea from the nest and eggs alone, without obtaining the parent. The inner lining appears to be composed entirely of willow or cottonwood down, and none of the specimens before me contain even a single feather. The outer covering or thatching is firmly secured to the walls of the nest with spider webs or silk from cocoons. The majority of the nests of the Broad-tailed Hummingbird are placed on low, horizontal branches of willows, alders, cottonwoods, etc., at no great height from the ground, or overhanging small mountain streams, while others are saddled on boughs or limbs of pine, fir, spruce, or aspens, from 4 to 15 feet from the ground, rarely higher. Occasionally a nest may be placed on a curled-up piece of bark or on a splinter of a broken limb. The length of incubation is probably the same as that of our other species about which somewhat more is known, and two if not three broods are regularly raised in a season. The eggs, two in number, resemble those of the Ruby-throat in every respect, but are a trifle shorter.

The average measurement of fifteen specimens in the United States National Museum collection is 12.70 by 8.33 millimetres, or about 0.50 by 0.33 inch. The largest egg measures 13.21 by 8.38 millimetres, or 0.52 by 0.33 inch; the smallest, 12.19 by 8.13 millimetres, or 0.48 by 0.32 inch.

The type specimen, No. 26793 (not figured), from a set of two eggs, Ralph collection, was taken in Estes Park, Colorado, on June 10, 1892. The nest was placed in the forks of a willow twig, 4 feet from the ground, near the banks of a little mountain brook.

75. *Selasphorus rufus* (GMELIN).

RUFOUS HUMMINGBIRD.

Trochilus rufus GMELIN, Systema Naturæ, I, i, 1788, 497.

Selasphorus rufus GOULD, Monograph of the Trochilidæ, III, 1852, Pl. 137.

(B 103, C 277, R 340, C 411, U 433.)

GEOGRAPHICAL RANGE: Western North America; north through British Columbia to about latitude 61° in southern Alaska; east, in the United States, to the eastern slopes of the Rocky Mountains from Montana through Colorado to New Mexico, as well as in the intervening regions; south through California, Arizona, southern New Mexico, western Texas, and the table-lands of Mexico; in winter to Vera Cruz and Oaxaca, Mexico, and Lower California.

The Rufous Hummingbird, also occasionally called "Rufous-backed," "Cinnamon," and "Nootka" Hummingbird, appears to be the most widely distributed species of the *Trochilidæ* found on the North American continent, extending at least over 40° of latitude. It reaches somewhat farther north than the Ruby-throated Hummingbird, and appears to be a tolerably common summer resident in southern Alaska, where Dr. T. H. Bean found it nesting in the vicinity of Sitka on June 9. It has also been observed somewhat farther north on the Alaskan coast, in the vicinity of Mount St. Elias, in about latitude 61°; but

how far it reaches into the interior of this territory is still unknown. In British Columbia it ranges well into the central parts of this province. Mr. R. MacFarlane, to whom we are indebted for so much information regarding North American ornithology in the far north, forwarded a nest and eggs, with the parent, to the United States National Museum. These were taken by him in the vicinity of Fort St. James on June 10, 1889, while en route to the Hudson Bay Company's Post, on Stewart's Lake, in about latitude $54^{\circ} 40'$. It is quite likely that it also reaches the province of Alberta, as it is a moderately common summer resident in northern Idaho, where I found it breeding near Fort Lapwai on June 27, 1871, and Mr. R. S. Williams writes me from Columbia Falls, Montana, that he has found the Rufous Hummer in the valley of the upper Missouri River. Along the eastern slopes of the Rocky Mountains it appears to occur somewhat irregularly. Mr. Denis Gale writes me that he saw a single specimen of this Hummer in Boulder County, Colorado, while Mr. William G. Smith reports it as rare in Larimer County, but tolerably common in Arapahoe County, in the same State. Mr. Frank M. Drew reports it as breeding in the Rocky Mountains up to altitudes of 10,500 feet, while in the southern Sierra Nevadas it is even common above timber line. In our Northwestern States, in Oregon and Washington, especially west of the Cascades, as well as in some of the mountain regions of California, northern Arizona, and New Mexico, the Rufous Hummingbird is a very common summer resident. I have never seen anything like such numbers of Hummingbirds as I met in the vicinity of Fort Klamath, Oregon, about the time this species and the Calliope Hummer passed through there on their spring migration. From the time the wild currant and gooseberry bushes (*Ribes*) begin to flower (and they grow in great abundance among the open pine woods along all the streams in Klamath Valley) they swarm everywhere, and if they had only stayed quiet long enough to count them, I am sure as many as a thousand to the acre could have been found here; they remain very abundant as long as these flowers last. I never saw anything like the numbers anywhere else. Their constant buzzing while flying from bush to bush, about each of which as many as a dozer were perhaps already hovering, and the glitter of their brilliant plumage as they flashed by, chasing each other, was a sight long to be remembered. Few of this species appeared to remain to breed; at any rate, I failed in finding a single one of their nests here, although I searched carefully for them. At Camp Harney, Oregon, along the southern slopes of the Blue Mountains, I found this species a rather rare summer resident along the outskirts of the pine forests.

The Rufous Hummer generally reenters our southern border early in March, passing leisurely northward, and commences its winter migration again from the more northern parts of its range about the 1st of September. I do not believe that any remain within our borders throughout the year.

In Oregon nidification begins occasionally by the second week in April, and a nest containing slightly incubated eggs was found by Dr. Clinton T. Cooke, near Salem, Oregon, on April 18, 1888, while in middle California it

nests now and then nearly a month earlier. A specimen in my collection, taken by Mr. G. H. Ready, at Woods Lagoon, near Santa Cruz, California, contained fresh eggs on March 25, 1875. Throughout the greater part of their range, excepting the more northern portions, the breeding season is at its height during the first two weeks in May and lasts well into July, and two broods are probably raised regularly, excepting perhaps in northern British Columbia and southern Alaska. The nesting habits of the Rufous Hummingbird are very similar to those of the preceding species, and their nesting sites may be looked for in low bushes as well as on horizontal limbs of trees at various distances from the ground.

One of the most complete and interesting articles on the life history of this species is that of Mr. H. W. Henshaw, in "The Auk" (Vol. III, 1886, pp. 76-78), who inclines to the belief that the majority of these birds on the upper Pecos River, New Mexico, breed in the upper limbs of the pines, and, although they were exceedingly abundant there, he only found a single nest, and this only after it had been deserted. I am also of the belief that in certain localities they nest farther from the ground than Hummingbirds usually do. The only nest found by me in the West was at Fort Lapwai, Idaho, as already stated. This was saddled on a little fork of a dry cottonwood twig, overhanging a creek, about 15 feet above the water.

Mr. A. W. Anthony writes me: "I found the Rufous Hummingbird very abundant at Beaverton, Oregon. Here they nested to some extent in oaks, blackberry vines, and on dry roots projecting from upturned trees. One nest hung from the end of a tall fern, while others, drooping over it from above, hid the beautiful structure from all but accidental discovery. Their favorite sites, however, seemed to be the long, trailing vines overhanging embankments and upturned trees. A number were found in railroad cuts; frequently several nests were situated within a few feet of each other, a slight preference being shown to embankments having a southern exposure. One nest was found that had been placed on top of a last year's habitation, a mere rim being built to raise the sides, and a flooring being added to cover up a large pebble that could be plainly felt under the cotton lining. Fresh eggs were found here from May 1 to June 16."

Dr. Clinton T. Cooke found one of their nests, near Salem, Oregon, on a drooping limb of an ash tree, 20 feet from the ground; others were found in waxberry and blackberry bushes. At Table Rock, in the Cascade Mountains, they were very abundant on July 5, 1887, feeding on a *Costelleya*, in blossom at the time.

Mr. R. H. Lawrence met with the Rufous Hummingbird in various parts of Washington, and writes me that it is very common there. His earliest record was March 9, when they had already reached Ilwaco, in the southwestern part of the State. In southern California this species was noticed by him near Monrovia, on March 8, 1894, and at Duarte he often saw Rufous Hummers flitting about the blossom-laden orange trees, in company with other Hummers, in an orchard situated near the foothills.

According to my observations, this Hummer seems to be especially pugnacious, and is apparently more than a match for the other species with which it comes in contact, even if a trifle larger than itself.

The nests of the Rufous Hummingbird resemble those of Anna's very closely in the general make-up, being lined inside with cotton down, while the outside is more or less profusely covered with fine mosses, shreds of bark, and occasionally a few lichens. An average nest measures $1\frac{1}{2}$ inches in outer diameter by $1\frac{1}{4}$ inches in depth; the inner cup is about seven-eighths of an inch in width by one-half inch deep. No feathers, however, are used in the inner lining in any of the specimens before me, as is frequently the case in the nests of Anna's Hummingbirds. Beside the trees, shrubs, etc., already mentioned, they are also occasionally placed in cypress, fir, and other conifers, wild currant, and salmonberry bushes. Mr. Clyde L. Keller, of Salem, Oregon, reports taking a set of three eggs of this species from a nest in a blackberry bush, the only other instance known to me where this number has been found in a Hummingbird's nest, excepting those recorded under *Trochilus alexandri*.

The eggs resemble those of our other Hummingbirds in color and shape. The average measurement of seventeen specimens in the United States National Museum collection is 12.61 by 8.40 millimetres, or about 0.50 by 0.33 inch. The largest egg measures 13.46 by 8.64 millimetres, or 0.53 by 0.34 inch; the smallest, 11.94 by 8.13 millimetres, or 0.47 by 0.32 inch.

The type specimen, No. 21745 (not figured), from a set of two eggs, Bendire collection, was taken by the writer near Fort Lapwai, Idaho, on June 27, 1871.

76. *Selasphorus alleni* HENSHAW.

ALLEN'S HUMMINGBIRD.

Selasphorus alleni HENSHAW, Bulletin Nuttall Ornithological Club, II, 1877, 53.
(B —, C —, R 341, C 412, U 434.)

GEOGRAPHICAL RANGE: Western North America; north to southern British Columbia; south through Washington, Oregon, California, and southern Arizona; in winter to northern Mexico and Lower California ?.

The range of Allen's, also known as the "Green-backed," Hummingbird is not very well defined as yet; this is mainly caused by its strong resemblance to the preceding species, making it a very difficult matter to distinguish it positively on the wing, and Allen's Hummingbird is undoubtedly frequently mistaken for the Rufous. It appears to be only a summer resident in the United States and British Columbia, and its breeding range is coextensive with its distribution. Allen's Hummingbird was first discovered by Mr. Charles A. Allen, at Nicasio, California, and was subsequently described by Mr. H. W. Henshaw in the "Bulletin of the Nuttall Ornithological Club" (Vol. II, 1877, p. 53). It is apparently not nearly as common as the Rufous Hummingbird, and comparatively few specimens have been taken outside of California. Mr. R. H. Lawrence records it

from Gray's Harbor, Washington, as a summer resident, perhaps as common as *Selasphorus rufus*, and frequenting similar places. He first noticed it on the east Humptulips River, on April 30, 1891, among salmonberry and other flowering bushes. He writes me that the Edwards Brothers, taxidermists, of Tacoma, Washington, exhibited a mounted pair of these birds and their young in the nest, taken in that vicinity, at the exposition there in October, 1891. He also met with it in different localities in southern California. On August 11, 1894, he shot an adult female about 600 feet below the summit of Mount Wilson, which he kindly forwarded to the United States National Museum, and it was noticed by him as early as March 8 in the vicinity of Monrovia, California.

In southern California it appears to be more a bird of the coast districts than of the interior, and here it is also somewhat irregularly distributed, being fairly abundant in some localities and apparently absent in others. Mr. W. E. D. Scott records a single specimen (an adult male) taken in the Santa Catalina Mountains, in southern Arizona, on July 23, 1884, at an altitude of 4,500 feet. How far south it ranges into Mexico or Lower California during its migrations is still unknown, as no specimens have as far as I have been able to ascertain, yet been obtained from any points in these regions.

In its general habits, food, etc., it resembles our other Hummingbirds. Mr. F. Stephens writes me from San Diego County, California: "The migrating season of *Selasphorus alleni* in spring is rather brief. Possibly a few of these birds breed in the pine region, as I have taken adults and immature birds there at the end of June."

Mr. Charles A. Allen, who discovered this species, and in whose honor it has been named, writes me: "Allen's Hummingbird arrives in the vicinity of Nicasio, California, about the middle of February, and commences to nest soon after arrival. The earliest date on which I found one was February 27, 1879; this was then about half finished, when a heavy storm set in which lasted about five days, and I did not visit the locality again until March 8, when the nest was completed and contained two fresh eggs. I have taken their nests as late as July 3, and am well convinced that two broods are raised in a season, at least by all of the earlier breeding birds. They select all sorts of situations and various kinds of trees and bushes to nest in. I have found their nests as low as 10 inches and again as high as 90 feet from the ground. Their courage is beyond question; I once saw two of these little warriors start after a Western Red-tailed Hawk, and they attacked it so vigorously that the Hawk was glad to get out of their way. But these little scamps were even then not satisfied, but helped him along after he had decided to go. Each male seems to claim a particular range, which he occupies for feeding and breeding purposes, and every other bird seen by him encroaching on his preserve is at once so determinedly set upon and harrassed that he is only too glad to beat a hasty retreat. During their quarrels these birds keep up an incessant, sharp chirping, and a harsh, rasping buzzing with their wings, which sounds very different from the low, soft humming they make with these while feeding. Every action and motion at such times indicates

that they are as mad as can be; the poor Anna Hummers have to get out of their way pretty quickly at any time, but especially when they encroach on their breeding grounds. The males very often have quarrels among themselves, and are then very noisy, while the females are more orderly and quiet; but even they have occasional little misunderstandings with each other, especially when a pair meet while feeding on the same bush; one generally vacates the premises very quickly, and as soon as she does all becomes quiet again. During the mating and breeding season the male frequently shoots straight up into the air and nearly out of sight, only to turn suddenly and rush headlong down until within a few feet of the ground. The wings during the downward rushes cut the air and cause a sharp, whistling screech, as they descend with frightful velocity, and should they strike anything on their downward course I believe they would be instantly killed."¹

All the nests and eggs of this species in the United States National Museum were taken by Mr. Allen near Nicasio, California; one of these, now before me, is attached to the side of a small oak limb which turns abruptly at an angle of about 45° directly over the cup of the nest, protecting it above; another is likewise attached to the side of a small pendant oak twig, its base being supported by a bunch of moss. Some are securely saddled on small twigs of raspberry bushes, and several of these are usually incorporated in the walls of the nest. Occasionally they nest in hedges, on weed stalks, or on bushes overhanging water.

The nests are well and compactly built, the inside being lined with vegetable down, while the outer walls are composed of green tree mosses and a few bits of lichens, securely fastened in place with a spider web. Nests built on trees seem to be generally somewhat larger than those found in bushes. The average measurements of one of the former is 1½ inches outer diameter and the same in depth; the inner cup is seven-eighths of an inch in width by three-fourths of an inch in depth. On the whole they resemble the nests of Anna's Hummingbird more than those of the Rufous, and appear to me to be better and more neatly built than either.

The eggs of Allen's Hummingbird resemble those of the other members of this family in color and shape, and are a trifle larger than those of the Rufous Hummingbird.

The average measurement of fifteen specimens in the United States National Museum collection is 12.76 by 8.50 millimetres, or about 0.50 by 0.33 inch. The largest egg measures 13.97 by 8.89 millimetres, or 0.55 by 0.35 inch; the smallest, 12.45 by 8.13 millimetres, or 0.49 by 0.32 inch.

The type specimen, No. 27009 (not figured), Ralph collection, from a set of two eggs, was taken near Nicasio, California, on April 13, 1893.

¹ A very interesting account of the habits of this species in captivity can be found in an article by Mrs. C. M. Crowell in the *Ornithologist and Oölogist* (Vol. 7, 1882, pp. 126-128).

77. *Stellula calliope* (GOULD).

CALLIOPE HUMMINGBIRD.

Trochilus (Calothorax) calliope GOULD, Proceedings Zoological Society, 1847, 11.*Stellula calliope* GOULD, Introduction to the Trochilidæ, 1861, 90.

(B —, C 282, R 343, C 417, U 436.)

GEOGRAPHICAL RANGE: Mountainous regions of western North America; north to British Columbia, Idaho, and Montana; east to the Rocky Mountains; south, through California, Arizona, and New Mexico, over the table-lands, to the Valley of Mexico and the State of Guerrero, Mexico.

The Calliope Hummingbird is the smallest of the *Trochilidæ* found within the United States; but, notwithstanding its diminutive size, it is quite hardy, and, on the Pacific Coast at least, it is found 3° or 4° north of our boundary. In British Columbia, according to Mr. John Fannin, it is said to occur on both slopes of the Cascades, and it will undoubtedly yet be recorded from the Province of Alberta, as it is found both in northern Washington, Idaho, and Montana. I have taken it at Fort Colville, Washington, near the line; and have seen it on Pond d'Oreille Lake, in Idaho; while Dr. C. Hart Merriam took an adult female near Fort Ellis, Montana, on July 3, 1872, where it was undoubtedly breeding. Messrs. Richmond and Knowlton obtained an immature bird on August 12, 1888, at Bear Creek, and Mr. R. S. Williams records a specimen from Gold Run, in the Belt Mountains, on May 24, 1882; he writes me that he has also observed it near Columbia Falls, thus showing that this species is pretty generally distributed over the more mountainous and western portions of the State of Montana. These points, according to our present knowledge, mark the northern limits of its known range. I have been unable to find any records of its occurrence in either Wyoming or Colorado; but as it is known to be a summer resident in various parts of both Utah and northern New Mexico, it will probably yet be found along the western slopes of the Rocky Mountains in these two States. It is known to occur in the mountains of California, Arizona, and New Mexico, as well as in suitable localities in the intervening regions, and as already stated extends southward over the table-lands of Mexico. Its breeding range is coextensive with its geographical distribution in the United States.

The Calliope Hummingbird is a mountain-loving species, and during the breeding season is rarely met with below altitudes of 4,000 feet, and much more frequently between 6,500 to 8,000 feet. Its favorite resorts are the open timber found about the edges of mountain meadows and parks, and the rocky hillsides covered here and there with straggling pines and small aspen groves.

Mr. F. Stephens writes me: "*Stellula calliope* is a rare summer resident in California, at least as far south as the San Bernardino Mountains, where I found two nests in 1885. Each contained young recently hatched. The first nest was found May 24, in the canyon of the Santa Anna River, at about 3,000 feet altitude, which must be exceptionally low. The female was seen on the nest; it was driven off and shot, and the skin preserved, so that the identification is unquestionable.

“The nest was built on an old nest of *Trochilus costæ*, which is normal in composition and location. The second nest was found June 23, at about 8,000 feet altitude, on the southern side of Mount Grayback, the highest peak of the San Bernardino range. It was built on a splinter of a knot, or short, broken branch, projecting from the side of a large cedar, about 20 feet from the ground, and also contained young birds. The parent was shot as she flew from the nest, and preserved. This nest is different from the other, and is probably of the normal type. This species is not common even in the migrations.”

These are the most southern breeding records of which I have any knowledge. Mr. Charles A. Allen has taken its nests near Nicasio, California, and Mr. Charles H. Townsend found it a common summer resident on the McCloud River; the first nest and eggs of this species were taken by the late Capt. John Feilner, First Dragoons, United States Army, on June 4, 1859, near Pitt River, California, and these are now in the United States National Museum collection. Captain Feilner, who was an ardent ornithologist and oölogist, was subsequently killed by hostile Indians while in the pursuit of his favorite study. Although the Calliope Hummingbird is quite a common summer resident in suitable localities, its nests and eggs are still comparatively rare in collections. Both Dr. James C. Merrill, United States Army, and the writer found this Hummingbird quite common at Fort Klamath, Oregon, where I took several of its nests and eggs. Two of the former have been figured in Mr. Robert Ridgway's paper, “The Hummingbirds,” in the “Report of the National Museum for 1890” (Pls. 2 and 3), and a quadruple nest of the same species taken by Mr. Charles H. Townsend, near Baird, California, a most remarkable structure, is figured on Pl. 1 in the same publication.

The Calliope Hummer made its appearance at Fort Klamath in 1883 about May 9, possibly a few days earlier, or about the time the wild currant and gooseberry bushes began to blossom, and by the middle of the month I have seen hundreds in a morning's walk. While *Selasphorus rufus* was also quite common at the same time, I believe this species outnumbered it about three to one. Although I searched for their nests most carefully, several weeks passed before I succeeded in finding one, and then its discovery was accidental. I had taken quite a long walk along the banks of Fort Creek on June 10, and, the day being a hot one, sat down with my back resting against the trunk of a bushy black pine whose lower limbs had been killed by fire; while resting thus one of these Hummers buzzed repeatedly about my head for a few seconds at a time, and then rose perpendicularly in the air, only to repeat the performance again. I had no idea then that this species nested in pines, but in order to give me an opportunity to watch its performance better I moved out from under the tree, and a few minutes later saw the bird settle on what I at first supposed to be an old clump of pine cones. On looking closer, however, I noticed its nest, which was ingeniously saddled on two small cones, and its outward appearance resembled a cone very closely. The nest contained two eggs, which were considerably advanced in incubation, and were not disturbed. Knowing now where to look

for them, I had no further difficulty in finding their nests, and all of those observed by me were built in exactly similar situations. I succeeded in obtaining three sets of nearly fresh eggs, and found a number of other nests containing young during the next few days. They were usually placed on or against a dry cone on small dead limbs of *Pinus contorta*, from 8 to 15 feet from the ground, and on account of the brittle nature of these limbs they were rather hard to secure. The nests, while outwardly not as handsome as those of the majority of our Hummers, are nevertheless marvels of ingenuity, all those I have seen mimicking a small dead pine cone so perfectly as to almost defy detection unless one sees the bird fly on or off the nest. The majority found were saddled on one or two such cones, or on a small limb and resting against the sides of a cone. The outer walls are composed of bits of bark and small shreds of cone, and the interior cup is softly lined with willow down. An average nest measures about $1\frac{1}{4}$ inches in outer diameter by the same in depth; the inner cup being three-quarters of an inch in width by one-half inch in depth. The nests were generally so placed that the contents were protected by larger limbs or green boughs above, and at distances varying from 5 to 12 feet from the ground. One I found had a flattened cone projecting directly over it, resembling an opened umbrella. While bushy pines seem to constitute their favorite nesting sites in northern California and Oregon at least, they do not invariably confine themselves to such trees. Mr. Shelly W. Denton took a nest of the Calliope Hummer at Franktown, Washoe County, Nevada, which is now in Mr. William Brewster's collection at Cambridge, Massachusetts. Mr. Denton watched the bird while building it. This is composed interiorly of fine moss and willow down, and the outer walls are decorated with tiny shreds of bark, fine flakes of wood, and flakes of whitewash, fastened securely with cobwebs; it was placed on a knot in a rope hanging from the roof of a woodshed and within 5 feet of an occupied dwelling house. The materials out of which the nest is composed closely assimilate the rope and knot on which it is placed. This nest contained two eggs on June 8, 1887, these being deposited on alternate days. The male was never seen about the nest. The rope (one-third of an inch thick) hung down about 4 feet, so that every time the female settled on the rim of the nest while building she caused it to swing back and forth like a pendulum. This specimen, which I have seen, does not resemble the nests taken by me very closely, and the Calliope Hummer evidently attempts to mimic the immediate surroundings as nearly as practicable. Mr. Walter E. Bryant records another, built upon a projecting splinter of a woodpile, at a height of 5 feet.¹

The only eggs of this species in the United States National Museum collection are those taken by the late Capt. John Feilner, United States Army, near Pitt River, California, in June, 1859, and three sets collected by myself near Fort Klamath, Oregon. They resemble the eggs of our better known Hummingbirds in shape and color, but are smaller.

¹Bulletin of the California Academy of Sciences, 1887, p. 452.

The average measurement of eight eggs in the United States National Museum collection is 11.71 by 7.94 millimetres, or about 0.46 by 0.31 inch. The largest egg measures 12.19 by 8.38 millimetres, or 0.48 by 0.33 inch; the smallest, 10.67 by 7.37 millimetres, or 0.42 by 0.29 inch.

The type specimen, No. 21737 (not figured), from a set of two eggs, Bendire collection, was taken by the writer near Fort Klamath, Oregon, on June 11, 1883.

78. *Calothorax lucifer* (SWAINSON).

LUCIFER HUMMINGBIRD.

Cynanthus lucifer SWAINSON, Philosophical Magazine, 1827, 442.

Calothorax lucifer GRAY, Genera of Birds, 1848, I, p. 110.

(B —, C —, R 344, C 418, U 437.)

GEOGRAPHICAL RANGE: Table-lands of Mexico, from Puebla and the Valley of Mexico north to southern Arizona.

We are indebted to Mr. H. W. Henshaw for the addition of the Lucifer Hummingbird to our fauna. He took a female of this species on August 7, 1874, near Camp Bowie, Arizona, where it appeared to be rare, and, as far as I am aware, no other specimens have since then been taken within our borders. The male resembles Costa's Hummingbird somewhat in size and general coloration, so that it can scarcely be recognized from it on the wing, and might therefore be readily overlooked by the average collector. It appears to be a common species in the more southern portions of Mexico, among the table-lands of Puebla and on the borders of the Valley of Mexico.

The late Mr. Bullock, in his "Six Months in Mexico," gives a description of the nest and eggs of this species, and says: "They breed in Mexico in June and July, and the nest is a beautiful specimen of the architectural talent of these birds; it is neatly constructed of cotton or the down of the thistle, to which is fastened on the outside, by some glutinous substance, a white, flat lichen resembling ours.

"The female lays two eggs, perfectly white, and large for the size of the bird, and the Indians informed me they were hatched in three weeks by the male and female sitting alternately. * * * In sleeping they frequently suspend themselves by the feet, with their heads downward, in the manner of some parrots."¹

The general habits of this species seem to resemble those of our better-known Hummingbirds very closely. There are no nests and eggs of the Lucifer Hummingbird in the collection, and I am therefore unable to give measurements; but, judging from the size of the bird, its eggs should correspond closely with those of *Calypte costæ*

¹A fuller account of Mr. Bullock's paper on this species can be found in Mr. Robert Ridgway's paper on the Hummingbirds, in the Report of the National Museum, 1890 (pp. 360-362).

79. *Amazilia fuscicaudata* (FRASER).

RIEFFER'S HUMMINGBIRD.

Trochilus fuscicaudatus FRASER, Proceedings Zoological Society, 1840, 17.*Amazilia fuscicaudata* RIDGWAY, Proceedings U. S. National Museum, I, 1878, 147.

(B —, C —, R 345, C 419, U 438.)

GEOGRAPHICAL RANGE: Northern South America, from Ecuador and Colombia, north through Central America and eastern Mexico, to the lower Rio Grande Valley, Texas.

Rieffer's Hummingbird, a common Central American species, claims a place in our fauna from the fact that a single specimen has been taken at Fort Brown, Texas. This was brought alive to Dr. James C. Merrill, United States Army, for examination, in June, 1876, by one of the soldiers, and a careful description of it was made by the Doctor at the time, as the man wanted to keep it; but it shortly afterwards escaped from him. As it has not been obtained since then in the lower Rio Grande Valley, notwithstanding the fact that considerable collecting has been done there, it can only be considered as a straggler within our borders.

Mr. Charles W. Richmond has kindly furnished me with the following interesting notes on this species:

"*Amazilia fuscicaudata* is extremely abundant in the lowlands of eastern Nicaragua. It outnumbers in individuals all of the other (five) species of Hummingbirds found in the same region. On the Escondido River this species is confined to the banana plantations and the shrubbery around the houses, where it finds an abundance of food and good nesting sites. It is the plantation Hummer, only two other species occasionally wandering into the plantations from the forest, which is the home of the other species. This Hummingbird is inquisitive, like some other Hummers, and often poises 2 or 3 feet from one, changing its position on any conspicuous movement from the object of its curiosity, and when satisfied darts off at great speed, uttering a succession of shrill chirps. Its nest is frequently placed in small orange, lemon, or lime trees, near houses, 4 or 5 feet from the ground. The bird selects any desirable site for a nest, in fact often building it close to the end of the limb of a bamboo hanging out over the river or creek, and in this case usually 6 or more feet above the water. The exterior of the nest is often covered with moss, which in this damp region remains green during the occupancy of the nest and for a long time afterwards, giving it a very pretty appearance. A nest found in October had just been deserted by the young birds, one found late in November contained fresh eggs, one found about the middle of January contained eggs nearly fresh, and another one found the same day was in course of construction. The Spaniards here call Hummingbirds 'garrion.'"

Mr. George K. Cherrie, in his Preliminary List of the Birds of San Jose, Costa Rica, in speaking of Rieffer's Hummingbird, says: "The most abundant species about San Jose, and, indeed, the most abundant species found on either

coast, and up to an altitude of about 6,000 feet. I believe that this species is nesting in every month of the year. Nests are usually placed about 15 feet from the ground, in either orange or lemon trees. A nest before me is constructed of some soft fiber much resembling hemp tow. There are a few lichens covering the outside, and an inner lining of a little native cotton. The nest, somewhat elliptical in form, measures $1\frac{1}{2}$ inches deep by 2 inches long and $1\frac{1}{2}$ wide; inside, $1\frac{1}{4}$ by seven-eighths by one-half inch deep. The two eggs, white in color and elliptical ovate in form, measure 0.53 by 0.37 inch."¹

The general habits of Rieffer's Hummingbird are very similar to those of our better-known species. The nests differ somewhat in make-up; of the two specimens before me, both taken by Mr. Charles W. Richmond, on December 24, 1892, and January 16, 1893, the first was saddled on the end of a small, drooping twig of an alligator pear tree, $4\frac{1}{2}$ feet up, the nest being partly supported by the ends of a bunch of leaves. The base of this nest is constructed of bits of dry grass, and the walls of shreds of fine vegetable fiber. The outer walls of this specimen are well covered with green moss and with a few bits of lichens, the whole being securely fastened with spider webs. The inside is lined with soft, brownish down. The structure is a neat piece of bird architecture, and contained two broken eggs when found. It measures $1\frac{1}{2}$ inches in outer diameter, and the same in height. The inner cup measures seven-eighths of an inch in width by three-fourths of an inch in depth. The base of the second specimen is composed of shreds of rotten wood fibers; the walls are built up of apparently similar but finer material, and they are very sparingly covered with shreds of green moss, but more profusely with small pellets of white plant down, held in place by spider webs, while the interior is lined with fine vegetable down. This nest resembles specimens of the Black-chinned Hummingbird somewhat, but is considerably larger. The outside measurements are the same as those of the preceding, but the inner cup is somewhat more roomy; the outer walls are thinner and the cavity is shallower; it was fastened to a fork of a drooping bamboo twig hanging about 4 feet above the water of a creek. It contained two nearly fresh eggs on January 16, 1893; these are now in the United States National Museum collection. They resemble the eggs of our better-known Hummingbirds, both in shape and color; and measure 13.46 by 9.14 and 13.72 by 8.64 millimetres, or 0.53 by 0.36 and 0.54 by 0.34 inch.

The type specimen, No. 25813 (not figured), from a set of two eggs, was taken by Mr. Charles W. Richmond on January 16, 1893, from the last described nest, on the Escondido River, near Bluefields, Nicaragua, and it would appear as if this species actually nested in nearly every month of the year.

¹The Auk, Vol. IX, 1892, p. 325.

80. *Amazilia cerviniventris* GOULD.

BUFF-BELLIED HUMMINGBIRD.

Amaziliaus cerviniventris GOULD, Proceedings Zoological Society, 1856, 150.
(B —, C —, R 346, C 420, U 439.)

GEOGRAPHICAL RANGE: Valley of the lower Rio Grande in Texas; south through eastern Mexico to Nicaragua, Central America.

The Buff-bellied Hummingbird was also added to our fauna by Dr. James C. Merrill, United States Army, who took the first specimen within our borders on the military reservation of Fort Brown, Texas, on August 17, 1876. Since then it has been ascertained to be quite a common summer visitor in the lower Rio Grande Valley, and a number of its nests have been taken there. It arrives in southern Texas about April 1, and returns south in the latter part of September or the beginning of October. It is one of our plainest-colored Hummingbirds, and its general habits, food, etc., are undoubtedly similar to those of the better-known members of this family found in the United States.

Dr. James C. Merrill says: "The Buff-bellied Hummingbird proves to be an abundant summer visitor, and I have nowhere found it so abundant as on the military reservation at Fort Brown. Here it seems perfectly at home among the dense, tangled thickets, darting rapidly among the bushes and creeping vines, and is with difficulty obtained. A rather noisy bird, its shrill cries usually first attract one's attention to its presence. A Hummer's nest, undoubtedly made by this species, was found in September, 1877, within the fort. It was placed on the fork of a dead, drooping twig of a small tree on the edge of a path through a thicket; it was about 7 feet from the ground, and contained the shriveled body of a young bird. The nest is made of the downy blossoms of the tree on which it is placed, bound on the outside with cobwebs, and rather sparingly covered with lichens. Internally, it is somewhat less than 1 inch in depth by one-half inch in diameter. The external depth is $1\frac{1}{2}$ inches."¹

I have eight of these nests before me, all taken in Cameron County, Texas, which are readily distinguishable from those of other species breeding in the United States whose nests are known. They are composed of shreds of vegetable fiber, thistle down, and an occasional specimen is lined with a vegetable substance resembling brown cattle hair; but the majority are lined with thistle down. The outside is covered with bits of dry flower blossoms, shreds of bark, and small pieces of light-colored lichens, securely fastened in place by spider webs. The nests are neatly built, and are usually saddled on a small, drooping limb, or placed on a fork of a horizontal twig, at distances of from 3 to 8 feet from the ground. Small trees or bushes of the Anachuita (*Cordia boissieri*) ebony and hackberry seem to furnish their favorite nesting sites, though occasionally a nest is found in a willow. An average-sized nest measures $1\frac{3}{8}$ inches in outer diameter by $1\frac{1}{4}$ inches in height; the inner cup is seven-eighths

¹ Proceedings United States National Museum, Vol. I, 1878, pp. 149, 150.
16896—No. 3—15

of an inch in width by five-eighths of an inch in depth. Open woods and the edges of chaparral thickets near roads or paths seem to be preferred for purposes of nidification. Probably two broods are raised in a season. The earliest nesting record I have is April 23; the latest, June 16. The eggs resemble those of our better-known Hummers in color and shape, and appear rather small for the size of the bird.

The average measurement of eighteen specimens in the United States National Museum collection is 13.23 by 8.57 millimetres, or about 0.52 by 0.34 inch. The largest egg measures 14.22 by 8.89 millimetres, or 0.56 by 0.35 inch; the smallest, 12.19 by 8.64 millimetres, or 0.48 by 0.34 inch.

The type specimen, No. 26800 (not figured), from a set of two eggs, Ralph collection, was taken near Brownsville, Texas, on May 9, 1892.

81. *Basilinna xantusi* (LAWRENCE).

XANTUS'S HUMMINGBIRD.

Amazilia xantusi LAWRENCE, Annals Lyceum, New York, 1860, 109.

Basilinna xanthusi ELLIOTT, Classification and Synopsis of the Trochilidæ, March, 1879, 227.

(B —, C 273, R 347, C 407, U 440.)

GEOGRAPHICAL RANGE: Southern Lower California, north to about latitude 29°.

Xantus's Hummingbird appears to be confined to the southern half of the peninsula of Lower California, where it was first discovered by Mr. J. Xantus in the fall of 1859. It was described by Mr. George N. Lawrence in April, 1860, who named it in honor of its discoverer. Mr. Xantus did not communicate anything regarding the general habits of this species, and nothing further was learned about it until Mr. L. Belding visited the same regions and obtained its nests and eggs, in the spring of 1882. According to this gentleman, it is a mountain-loving species, in winter frequenting the canyons in close proximity to water, while in summer it is distributed through the orchards and gardens, where it nests.

Mr. Walter E. Bryant, in his "Catalogue of Birds of Lower California," states: "I have found them only in mountainous country where there was abundance of water, from Comondu as far north as latitude 29°. None were seen on the islands."¹

Mr. Belding, in speaking of this species, says: "It was common at the western base of Cacachiles Mountains in February; more so, in fact, than *Calypte costæ*. It was not observed at San Jose until some time after my arrival, though it occurred in canyons only 2 or 3 miles to the westward. About the last of April it was common in orchards at San Jose. While incubating this species is very confiding and courageous, sometimes remaining upon the nest until removed from it by the hand. A nest taken April 23, 1882, at San Jose,

¹Proceedings of the California Academy of Sciences, second series, Vol. II, 1889, pp. 289, 290.

was placed underneath an awning or shade of boughs and weeds in front of a farmhouse. It was surrounded by downy heads of composite plants, and could scarcely be distinguished from them, having, as usual, been made of raw cotton."

This nest, which is now before me (No. 18563, United States National Museum collection) is composed exteriorly of fine plant fibers, thistle down, and shreds of moss, and these are securely fastened into place by spider webs; the interior is lined with thistle down and raw cotton; it measures about $1\frac{3}{4}$ inches in outer diameter by 1 inch in height. The inner cavity is large for the size of the nest, measuring 1 inch in width by one-half inch in depth. The second nest, No. 18564, taken by Mr. Belding on May 7, 1882, in a canyon near Santiago Peak, Lower California, resembles the nest of the Black-chinned Hummingbird somewhat, being principally composed of plant down, covered on the outside with a few scales of buds, seed capsules, fine shreds of bark fiber, leaf stems, and an empty cocoon, and these decorations are fastened with spider webs, while the inner cup is lined with plant down and other fine fibrous material. This nest was saddled on the fork of a small twig. Its dimensions are about the same as those of the first nest described, and like it is rather shallow.

The eggs resemble those of our better-known Hummingbirds in shape and color. The two taken from the first nest measure respectively 12.19 by 7.87 and 11.94 by 7.87 millimetres, or 0.48 by 0.31 and 0.47 by 0.31 inch; and those of the second nest, 11.94 by 8.13 and 12.19 by 7.87 millimetres, or 0.47 by 0.32 and 0.48 by 0.31 inch.

The type specimen, No. 18564 (not figured), from a set of two eggs, was taken by Mr. L. Belding on May 7, 1882, near Santiago Peak, Lower California, as already stated.

82. *Basilinna leucotis* (VIEILLOT).

WHITE-EARED HUMMINGBIRD.

Trochilus leucotis VIEILLOT, Encyclopédie Méthodique II, 559.

Basilinna leucotis BOIE, Isis, 1831, 546.

(B —, C —, R —, C —, U 441.1.)

GEOGRAPHICAL RANGE: Table-lands of Mexico and Central America; north in the United States to the higher mountain ranges in southern Arizona; south to Nicaragua, Central America.

This handsome Hummingbird has only very recently been added to our fauna, Dr. A. K. Fisher obtaining a specimen on June 9, 1894, in the Chiricahua Mountains, in southeastern Arizona. In writing of this capture he says:

"During the early part of June a camp was made at Fly Park, a well-wooded area southeast of the head of Pinery Canyon, at an altitude of about 10,000 feet. A boreal honeysuckle (*Lonicera involucrata*) grows commonly through the scattered woods of spruce (*Picea engelmanni*), fir (*Pseudotsuga taxifolia*), pine (*Pinus ayacahuite*), and aspen (*Populus tremuloides*). The flowers of the honeysuckle attract great numbers of Hummers, and hundreds of *Selas-*

phorus platycercus and many *Eugenes fulgens* and *Coeligena clemenciæ* were seen daily about the clumps. Early on the morning of June 9, in company with Mr. Fred. Hall Fowler, the writer saw a female *Basilinna leucotis* sitting on a dead twig of a *Lonicera* bush, close to the ground, warming itself in the rays of the rising sun. The white stripe on the side of the head was plainly visible, and led to its speedy capture. Subsequently others were looked for, but none were seen."¹

Messrs. Salvin and Godman say: "This is one of the commonest and most characteristic of the Hummingbirds of the highlands of Mexico and Guatemala, its range extending from the States of Sonora and Tamaulipas to the uplands of Nicaragua, birds from these widely separated districts presenting no appreciable difference. Its range in altitude is considerable. It does not occur much below 4,000 feet above sea level, and thence reaches as high as 7,000 or 8,000 feet. On the slopes of the Volcan de Fuego we used to find it not uncommonly in open glades of the oak forests, where it took its food from any plants that happened to be in flower. Of the breeding habits of this species we have no account, but a three parts grown bird from Sierra de Victoria was shot by Mr. Richardson in April; so that the nesting time in that district would commence in March or the end of February. But the nesting season probably extends over a considerable period, for De Oca says he once found a nest in December, though the usual nesting time in the Valley of Mexico, where the bird is more common than at Jalapa, is in July and August. According to Villada it feeds from the flowers of *Cacti* and *Agave*, and also from those of *Bouvardia* and *Salvia*."

I have been unable to find a detailed description of the nest and eggs of this species, and there are no specimens in the United States National Museum collection.

83. *Iache latirostris* (SWAINSON).

BROAD-BILLED HUMMINGBIRD.

Cynanthus latirostris SWAINSON, Philosophical Magazine, 1827, 441.

Iache latirostris ELLIOTT, Classification and Synopsis of the Trochilidæ, March, 1879, 235.
(B —, C —, R 348, C 421, U 441.)

GEOGRAPHICAL RANGE: Mountains of southern Arizona and southwestern New Mexico; south to the Valley of Mexico and Michoacan, Mexico.

The Broad-billed or Circe Hummingbird appears to be a moderately common summer resident in suitable localities in southern Arizona and southwestern New Mexico, at altitudes from 3,500 to 5,000 feet. It was first added to our fauna by Mr. H. W. Henshaw, who took two adult males in the Santa Rita Mountains, a few miles from old Camp Crittenden, Arizona, on August 23, 1874. Since then it has also been taken by Mr. F. Stephens in the same locality, where he secured five specimens, which are now in Mr. William Brewster's collection.

¹ The Auk, Vol. XI, 1894, p. 325-326.

² Biologia Centrali Americana, Aves, Vol. II, July, 1892, pp. 313, 314.

In speaking of their habits he says: "They were always found near water, and usually along the streams which flowed through canyons, high among the mountains. They seemed to prefer sycamores to other trees, and invariably perched on dead twigs where they could command an open view. Their notes were flat, and differed from those of other Hummers."¹

Mr. W. E. D. Scott subsequently extended its range northward to the Santa Catalina Mountains. In his notes on the birds of Arizona he makes the following remarks about this species:

"During the spring, summer, and early fall of 1884 this was a rather common species in the Catalina Mountains, from an altitude of 3,500 to 5,000 feet, but in the corresponding season of 1885 the birds were apparently rare. The birds arrive at this point early in April, the 5th of that month being my earliest record, when I took two adult males. They remain throughout the spring and summer, leaving from the middle to the last of September. I took an adult female on June 26, 1884, that contained an unlaied egg, with shell nearly formed, so that there can be little doubt that the birds breed at this point. Besides, I have the young birds in first plumage from July 1 until late in August."

There are also a number of specimens of this species in the United States National Museum collection, taken by Mr. E. W. Nelson in the Santa Rita Mountains and near Tucson, Arizona; and Dr. Edgar A. Mearns took a specimen in a canyon of the Guadalupe Mountains, in southwestern New Mexico, close to the international boundary line, on August 31, 1893, and another on the Santa Cruz River, west of the Patagonia Mountains, near the Sonora line, on July 4, 1893, both of which are now in the collection here.

Dr. A. K. Fisher failed to find this species in the Chiricahua Mountains, Arizona, in the spring of 1894, but it undoubtedly occurs there also. There is a nest of this species, No. 17890, in the United States National Museum collection, taken by Prof. A. Dugès at Guanajuato, Mexico, and received from him in July, 1879, which measures $1\frac{1}{2}$ inches in outer diameter by $1\frac{3}{4}$ inches in height. The inner cup measures 1 inch in width by three-fourths of an inch in depth. For a Hummer's nest it is composed of rather coarse materials throughout. These consist of fine shreds of bark and plant fibers, mixed with a little finer vegetable down; the outside is decorated with narrow strips of bark, fine plant stems, bits of lichens, and a piece of white cotton thread, these materials being covered with a coating of spider webs, which hold them securely in place. The inner lining consists of finer materials of a similar nature, and the entire nest is rather loosely put together. This nest was saddled on a fork of a slender and drooping twig.

Messrs. Salvin and Godman mention another specimen, stating: "Señor A. Herrera describes a nest of this species which he found at Chimalcoyoc, in the Valley of Mexico, as composed of the seeds of *Asclepias linaria*, and placed in a plant of an *Opuntia* in such a manner that a section of the plant shaded it from sun and rain."²

¹ Bulletin Nuttall Ornithological Club, Vol. VII, 1882, p. 211.

² Biologia Centrali Americana, Aves, Vol. II, May, 1892, pp. 257, 258.

There are no eggs of this species in the United States National Museum collection, and I have been unable to find a description or measurements of the same; but they undoubtedly resemble those of our smaller Hummers very closely.

Family COTINGIDÆ. COTINGAS.

84. *Platypsaris albiventris* (LAWRENCE).

XANTUS'S BECARD.

Hadrostomus albiventris LAWRENCE, Annals Lyceum, New York, VIII, 1867, 475.

Platypsaris albiventris RIDGWAY, Manual of North American Birds, 1887, 325.

(B —, C —, R —, C —, U 441.1)

GEOGRAPHICAL RANGE: Western and southern Mexico; south to Yucatan. Casually north to the southern border of the United States in southern Arizona.

Xantus's Becard, the only representative of this family in the United States, claims a place in our fauna from the fact that a single specimen, an adult male, was taken by Mr. W. W. Price in southern Arizona, close to the Sonora line. Mr. Price makes the following remarks on this subject:

"On June 20, 1888, I secured an adult male, in breeding plumage, of this species, in the pine forests of the Huachuca Mountains, at an elevation of about 7,500 feet, and 7 miles north of the Mexican boundary. (See Ridgway's 'Manual of North American Birds,' p. 325.) I am certain there were a pair of these birds, as I heard their very peculiar notes in different places at the same time; but the locality being so extremely rough and broken, I only secured the one above recorded. Several times while collecting at high altitudes I have heard bird notes that I thought were these, but they were always on almost inaccessible mountain sides. Their note reminds one of the song of Stephens's Vireo (*Vireo huttoni stephensi*), but is not so long continued and is harsher. From observing the actions of the bird I killed, I am sure its mate was in the vicinity, and probably nesting, although I have since carefully searched the place without success. This species will doubtless be found breeding in Arizona, as was *Trogon ambiguus*."¹

From the fact that no other specimens of this species have been taken in that vicinity, which has since then been visited by several good collectors, I am inclined to believe that this bird can only be considered as a very rare summer visitor in southern Arizona. The late Col. A. J. Grayson met with this species at Mazatlan, where he obtained a male in February, and Mr. J. Xantus also found it on the plains of Colima, Mexico.

Messrs. Salvin and Godman do not recognize this as a good species, and place it under the older name of *Hadrostomus aglaiae* (Lafresnaye), stating however: "This species, taken as a whole, is subject to a great amount of variation, not only as regards the intensity of the color of the back and under surface, but

¹ The Auk, Vol. V, 1888, p. 425.

also as regards to the rosy spot on the throat, etc." Further on, in speaking of the habits of *H. aglaia*, they say: "In all parts of our region the range in altitude of this species is very considerable, and extends from the sea level to an altitude of at least 8,000 feet. In the Tres Marias Grayson found it only in thick woods, where it was seen searching for insects, sometimes darting after them when on the wing, at other times looking for them among the leaves and branches, not unlike the Warblers. Its notes are feeble and but seldom uttered, and its habits are solitary. This island bird has been separated by Mr. Ridgway as *Platypsaris insularis*.

"Mr. Robert Owen found a nest of this bird on May 15, 1860, at Chuacusin, Guatemala, and sent us the female, its nest, and two eggs. The nest was entirely composed of tendrils, strips of bark, and grass, so as to form a hanging nest, open at the top and about 2 inches deep. It was built between and hung from the forked branch of a sapling at the foot of a mountain. The egg is white, beautifully marked with pencilings of pinkish red and scattered spots of the same color; these markings are much blended and concentrated at the larger end."¹

There is nothing recorded as yet regarding the nesting habits and eggs of Xantus's Becard; but they are not likely to differ very much from the nest and eggs of *Hadrostomus aglaia*, to which it is closely allied. As far as I can learn the eggs still remain unknown.

Family TYRANNIDÆ. TYRANT FLYCATCHERS.

85. *Milvulus tyrannus* (LINNÆUS).

FORK-TAILED FLYCATCHER.

Muscicapa tyrannus LINNÆUS, Systema Naturæ, ed. 12, I, 1766, 325.

Milvulus tyrannus BONAPARTE, Geographical and Comparative List, 1838, 25.

(B 122, C 240, R 302, C 366, U [442].)

GEOGRAPHICAL RANGE: From northern Patagonia north through South and Central America to southern Mexico and the Lesser Antilles. Within the United States accidentally in Mississippi, Kentucky, New Jersey, and southern California.

The Fork-tailed Flycatcher can only be considered an accidental straggler within our borders. It is a common bird throughout the more level and open portions of Central America, and also throughout the greater part of South America.

The Scissor-tail Tyrant, or "Tijereta," as this species is called by Sclater and Hudson, "is migratory, and arrives, already mated, at Buenos Ayres at the end of September, and takes its departure at the end of February in families, old and young birds together. In disposition and general habits it resembles the

¹ Biologia Centrali Americana, Aves, Vol. II, December, 1890, pp. 121-124.

true Tyrant-birds, but differs from them in language, its various chirping and twittering notes having a hard, percussive sound, which Azara well compares to the snapping of castanets. It prefers open situations, with scattered trees and bushes, and is also partial to marshy grounds, where it takes up a position on an elevated stalk to watch for insects, and seizes them in the air, like the Flycatcher. It also greedily devours elderberries and other small fruits.

“The nest is not deep, but is much more elaborately constructed than is usual with the Tyrants. Soft materials are preferred, and in many cases the nests are composed almost exclusively of wool. The inside is cup-shaped, with a flat bottom, and is smooth and hard, the thistle down with which it is lined being cemented with gum. The eggs are four, sharply pointed, light cream color, and spotted, chiefly at the large end, with chocolate. In the breeding time these Tyrants attack other birds approaching the nest with great spirit, and have a particular hatred to the *Chimango*, pursuing it with the greatest violence through the air, with angry notes, resembling in sound the whetting of a scythe, but uttered with great rapidity and emphasis. How greatly this species is imposed upon by the Cow-bird, notwithstanding its pugnacious temper, we have already seen in my account of that bird.

“The Scissor-tails have one remarkable habit; they are not gregarious, but once every day, just before the sun sets, all the birds living near together rise to the tops of the trees, calling to one another with loud, excited chirps, and then mount upward like rockets to a great height in the air; then, after whirling about for a few moments, they precipitate themselves downward with the greatest violence, opening and shutting their tails during their wild zigzag flight, and uttering a succession of sharp, grinding notes. After this curious performance they separate in pairs, and, perching on the tree tops, each couple utters together its rattling castanet notes, after which the company breaks up.”¹

Mr. George K. Cherrie, in his List of Birds of San Jose, Costa Rica, speaks of this species as follows:

“Resident, but much more abundant at some seasons than at others—that is, immediately after the breeding season (from the latter part of April until the first of July) they become quite common about the suburbs of the city, and remain so until the middle of December.

“At a slightly lower altitude it nests abundantly. A nest with three fresh eggs, taken by Don Anastasio Alfaro at Tambor, Alajuela, May 2, 1889, was placed in a small tree, about 10 feet from the ground. The parent bird left the nest only very reluctantly and not until almost within the grasp of the collector. The nest is constructed of a mixture of small dry grass and weed stems and soft dry grass, rather compactly woven together, with a lining of a few fine rootlets. It measures outside 5 inches in diameter by $2\frac{3}{4}$ deep; inside, $2\frac{1}{4}$ in diameter by $2\frac{1}{4}$ deep. The eggs are white, sparsely spotted and blotched, chiefly about the larger end, with chestnut of slightly varying shades. In form the

¹ Argentine Ornithology, Vol. I, pp. 160, 161.

eggs are ovate, and they measure 0.88 by 0.66, 0.88 by 0.65, and 0.89 by 0.63 inch" (equal to 22.35 by 16.76, 22.35 by 16.51, and 22.61 by 16 millimetres).¹

There are no eggs of this species in the United States National Museum collection, and I have been unable to obtain a fully identified specimen for illustration.

86. *Milvulus forficatus* (GMELIN).

SCISSOR-TAILED FLYCATCHER.

Muscicapa forficata GMELIN, Systema Naturæ I, i, 1788, 931.

Milvulus forficatus SWAINSON, Classification of Birds, II, 1827, 225.

(B 123, C 241, R 301, C 367, U 443.)

GEOGRAPHICAL RANGE: From Nicaragua, Central America, north through eastern Mexico and in the United States, regularly through Texas and the Indian Territory to southern Kansas. Occasional in southwestern Missouri, western Arkansas, and Louisiana. Accidental in Florida, Virginia, Illinois, New Jersey, the New England States, Manitoba, and even north to York Factory, Hudson Bay, and the Mackenzie River Valley, Northwest Territory, Dominion of Canada.

The Scissor-tailed, also known as "Swallow-tailed," Flycatcher, and more frequently as the "Texan Bird of Paradise," is a common summer resident throughout the greater portion of Texas and the Indian Territory, and extends its breeding range northward into southern Kansas. It usually arrives in the southwestern portions of Texas about the middle of March, and returns to its winter homes in Central America in October. Mr. W. E. Grover, of Galveston, Texas, informs me that some of these birds remain in that vicinity throughout the year, moving about from place to place in small flocks from five to six, and occasionally as many as a dozen may be seen together. Its breeding range is coincident with its distribution in the United States.

The Scissor-tailed Flycatcher is the most graceful and attractive species of this family found within our borders, and is certain to be noticed by everyone wherever it occurs. Its long outer tail feathers, which it can open and close at will, and its pinkish flanks make it a conspicuous object among the Texan birds. In all of its movements on the wing it is extremely graceful and pleasing to the eye, especially when fluttering slowly from tree to tree on the rather open prairie, uttering its twittering notes, which sound like the syllables "psee-psee" frequently repeated, and which resemble those of the Kingbird, but are neither as loud nor as shrill; again, when chasing each other in play or anger, in swift flight from tree to tree, when it utters a harsh note like "thish-thish." It is essentially a bird of the more open country, and shuns extensive timbered tracts, although it is frequently observed on the outskirts of these. It rarely lights on the ground, and its long tail makes it then appear rather awkward in its movements. Although included among the Tyrant Flycatchers, it is rather amiable and social in disposition; and after the birds are once mated several

¹The Auk, Vol. IX, 1892, pp. 251 and 322.

pairs may frequently breed close to each other, apparently in perfect harmony. It rarely molests or chases birds which are smaller than itself, but boldly attacks Hawks, Ravens, Crows, Jays, and other marauders with the utmost fury, when they come too close to its nesting site.

The Scissor-tailed Flycatcher is rather restless, and rarely remains in one place for any length of time. It is constantly on the lookout for passing insects, nearly all of which are caught on the wing and carried to some perch, where they are beaten into suitable pieces and swallowed at leisure. Its food consists principally of moths, butterflies, beetles, grasshoppers, locusts, and cotton worms; while berries of various kinds are also eaten to some extent. Considered from an economic point of view, they are among our most useful birds, and, as they are rarely molested, they seem to be steadily increasing in numbers, being far more common in many parts of Texas today than they were twenty years ago. They do not begin housekeeping at once after their arrival from their winter quarters in Central America, but dally for several weeks in courting and love-making and having a good time generally before they begin their more serious duties of reproduction. They are not hard to please in the selection of a suitable nesting site, and almost any tree standing by itself is preferred to a more secluded situation.

Mr. H. P. Attwater, of Aransas County, Texas, writes me as follows on this subject: "The bold, fearless character of the Scissor-tail is shown in the manner in which he builds his nest, which is a bulky structure, generally placed on a horizontal limb in an exposed position, and his careless disposition is also well exemplified by his choosing for materials anything that comes handy, frequently leaving long pieces hanging from the nest. I have found nests lined with feathers, and others with horse and cow manure."

They nest by preference in mesquite trees, less frequently in live and post oaks, the thorny hackberry or granjeno (*Celtis pallida*), the huisache (*Acacia farnesiana*), honey locust, mulberry, pecan, and the magnolia, as well as in various small, thorny shrubs. Their nests are placed at various distances of 5 to 40 feet from the ground, but on an average not over 15 feet, and often in very exposed situations, where they can readily be seen. Occasionally, when placed in trees whose limbs are well covered with long streamers of the gray Spanish moss, or in shrubs overrun with vines, they are rather more difficult to discover. As these birds are rarely molested, they become quite tame, and nest not infrequently in gardens and in close proximity to the ranches.

Nests of this species from different localities vary greatly in size and materials from which constructed. The base and sides of the nest are usually composed of small twigs or rootlets, cotton and weed stems (those of a low floccose, woolly annual, *Evax prolifera* and *Evax multicaulis*, the former growing on dry and the latter on low ground, being nearly always present); in some sections the gray Spanish moss forms the bulk of the nest, in others raw cotton, and again sheep's wool; while rags, hair, twine, feathers, bits of paper, dry grass, and even seaweeds may be incorporated in the mass. One that I consider

a typical nest, is now before me; it is externally constructed of fine rootlets, mixed with stems of *Evax multicaulis*, which are well worked into the outer walls. The inner cup of the nest is lined with fine plant fibers, with a little wool, and a few feathers. This nest is symmetrical in outline and compactly built; it was securely fastened on the forks of a small oak limb, and was presented to the United States National Museum collection by Mr. H. P. Attwater, Rockport, Texas. Externally it measures 6 inches in diameter by $2\frac{3}{4}$ in depth; its inner diameter is 3 inches by 2 in depth. Other nests in the collection are much more loosely constructed and fully twice as bulky, due no doubt to the character of the materials used in their construction; and again, some birds are much neater and better builders and housekeepers than others.

A nest taken by Dr. E. A. Mearns, United States Army, on April 29, 1893, from an oak tree situated on the edge of the parade ground at Fort Clarke, Texas, is mainly composed of strong cotton twine, mixed with a few twigs, weed stems, and rags; even the inner lining consists mostly of twine. How the female managed to use this without getting hopelessly entangled is astonishing. The previous season's nest still remained in the same tree, and a considerable quantity of twine entered also into its composition. The earliest nesting record I have is April 19, at Brownsville, Texas, where fresh eggs have also been found as late as July 6; and it appears more than probable that two broods are raised in many instances, at least in the southern portions of their breeding range. After the nest, which is constructed in about a week, is ready for occupancy, an egg is deposited daily until the clutch is completed; this usually consists of five eggs, occasionally of four or six. Incubation lasts about twelve days, and the female appears to perform this duty alone, while the male remains in the vicinity, and promptly chases away every suspicious intruder who may venture too close to the nest. The young are fed exclusively on an insect diet, and are able to leave the nest in about two weeks. Both parents assist in their care. In the late summer they congregate in considerable numbers in the cotton fields and open prairies preparatory to their migration south.

The shell of the egg of the Scissor-tailed Flycatcher is smooth to the touch, strong, compact, and moderately glossy. The eggs are usually clear white, occasionally pale creamy white, and rarely of a very pale pinkish ground color. The markings consist of claret brown, heliotrope purple, and lavender spots, and elongated blotches, varying in size and abundance in different specimens; the larger end of the egg is generally the heaviest spotted; but few of these eggs can be called heavily marked, and occasionally a specimen is found which is almost immaculate, the few markings on it being confined to the larger end only. In shape they vary from an ovate to a rounded ovate.

The average measurement of one hundred and seven eggs in the United States National Museum collection is 22.51 by 16.96 millimetres, or about 0.89 by 0.67 inch. The largest egg of the series measures 23.88 by 18.29 millimetres, or 0.94 by 0.72 inch; the smallest, 20.32 by 15.49 millimetres, or 0.80 by 0.61 inch.

Of the type specimens, No. 25574 (Pl. 1, Fig. 12), from a set of six eggs, Ralph collection, was taken near Brownsville, Texas, on April 20, 1892, and measures a trifle above the average size, while No. 26292 (Pl. 1, Fig. 13), from a set of four eggs, taken June 5, 1893, near Rockport, Aransas County, Texas, by Mr. H. P. Attwater, represents one of the least marked and smallest specimens in the series.

87. *Tyrannus tyrannus* (LINNÆUS).

KINGBIRD.

Lanius tyrannus LINNÆUS, *Systema Naturæ*, ed. 10, I, 1758, 94.

Tyrannus tyrannus JORDAN, *Manual of Vertebrates*, ed. 4, 1884, 96.

(B 124, C 242, R 304, C 368, U 444.)

GEOGRAPHICAL RANGE: Temperate North America, chiefly east of the Rocky Mountains; rarer and more locally distributed westward, in portions of Utah, Idaho, Nevada, eastern California, Oregon, Washington, and southern British Columbia; north in the eastern British Provinces to about latitude 50°, and from Manitoba westward to about latitude 57° north; south in winter through central and western South America to Bolivia, the Island of Cuba, and the Bahamas.

The Kingbird, also called "Bee Bird" and "Bee Martin," is a common summer resident, and breeds throughout all of our Eastern and Middle States, and the southern portions of the Dominion of Canada, from Nova Scotia and adjacent regions, south of about latitude 50°, and west to about longitude 90°, whence it ranges north through Manitoba and Saskatchewan into Athabasca, beyond latitude 57°. In the South it breeds from Florida and the Gulf Coast to eastern Texas, but not nearly as commonly as in the Middle and Northern States. Thence it ranges in a northwesterly direction through the Indian Territory and Kansas to the eastern slopes of the Rocky Mountains, where it is rarely found at higher altitudes than 7,000 feet. It enters through some of the lower passes of these mountains into Utah, Idaho, Nevada, Oregon, Washington, and British Columbia, where in certain localities it is not uncommon. I believe it has not yet been observed in northwestern Texas, New Mexico, or Arizona; and in California it can only be considered as a straggler. While a few winter in southern Florida and the Gulf Coast, the bulk of these birds migrate south into Central America, and some even into Bolivia, as well as to the Island of Cuba and the Bahamas. They leave the northern portions of their range about the middle of August, and linger in the south for some weeks before passing our borders.

Few of our birds are better known throughout the United States than the Kingbird. Bold and fearless in character, yet tame and confiding in man, often preferring to live in close proximity to dwellings, in gardens and orchards, they are prime favorites with the majority of our farming population, and they well deserve their fullest protection. Few birds are more useful to the farmer; their reputation for pugnacity and reckless courage is so well established that

it is almost needless to dwell on it, as it is well known that they will boldly attack and drive off the largest of our Raptores, should one venture too near to their chosen nesting sites. Where a pair or more of these birds make their home in the vicinity of a farmhouse, the poultry yard is not likely to suffer much through feathered marauders at least; they are a perfect terror to all hawks, instantly darting at and rising above them, alighting on their shoulders or necks, and picking away at them most unmercifully until they are only too willing to beat a hasty retreat. The male is seemingly always on the lookout from his perch on the top branches of a tree or post for such enemies, and no matter how large they may be, a pair of Kingbirds is more than a match for any of them, our larger Falcons and Eagles not excepted. Crows and Blue Jays seem to be especially obnoxious to them, and instances are on record where they have done them material injury.

From the foregoing it must not be assumed that our Kingbirds are generally quarrelsome and that they bully all other birds, as this is by no means the case. As a rule they live in perfect harmony with all their smaller relatives, and some of the latter's nests are not infrequently placed within a few feet of one of theirs, in the same tree, like that of the Orchard Oriole, for instance; and they are not content with protecting their own young and eggs, but watch over those of their neighbors as well. The only species I have observed as being on bad terms with the Kingbird is our little Ruby-throated Hummingbird, which is well known to be, if possible, even more aggressive and pugnacious than the former, and it would seem as if, small though he may be, he is a match for the average Kingbird, and probably always the aggressor. I have on two occasions seen a Ruby-throated Hummingbird put the other to flight.

They arrive in our Southern States from their winter homes about the first two weeks in April, and move gradually northward, generally making their appearance in the more northern States about the middle of May. The return migration from the far north commences in the beginning of August, and from our Northern States usually in the latter part of this month. While by no means uncommon in many localities west of the Rocky Mountains, here this species is rather irregularly distributed, and while fairly abundant in certain sections, it is entirely absent in others which seem equally well adapted to it. I found the Kingbird rather common on the Malheur and John Day rivers, in Grant County, Oregon, while in closely adjacent sections (as in the vicinity of Camp Harney) I failed to observe a single specimen. I also met with it on Snake River, near old Fort Boise, Idaho. It appears to me to be gradually extending its range westward, and in Washington and southern British Columbia it already reaches the Pacific coast in places.

The Kingbirds are rather noisy on their first arrival in the spring, and give free vent to their exuberance of spirits; they are very restless at this time, now hovering or fluttering slowly from one tree to another, or from fence post to fence post, the male following his mate with a peculiar, quivering movement of the wings and expanded tail, uttering at the same time a succession of shrill,

twittering notes like "pthsee, pthsee," varied now and then with other calls which are rather difficult to express in print; one of these sounds like "twip-ip-ip-ip." Occasionally their flight is apparently accomplished without perceptible movement of the wings, as if gliding along in the air, and again they speed away with the swiftness of an arrow in pursuit of an insect or an enemy, doubling on it with the greatest ease. The males are especially pugnacious during the mating season, and fierce combats ensue between rivals for the possession of the coveted female; but after they are mated they rarely fight among themselves, but quickly come to each other's assistance against a common enemy.

From the observations made in the United States Department of Agriculture, about 90 per cent of the food of this species consists of animal matter, principally beetles, grasshoppers, butterflies, spiders, wild bees, wasps, and millipeds; to this list can be added caterpillars, different species of flies, like the large black gadfly, so annoying to horses and cattle during the summer months, and small minnows. The greater portion of the food is taken on the wing, although it feeds also to some extent on the ground. The bird may usually be seen perched on a low limb of a solitary tree or bush in a pasture, on a fence post, a telegraph wire along some country road, or even on a weed stalk in a field, whence it darts after any passing insect. The snapping together of its mandibles after catching its prey can be heard quite a little distance away. With a few bee keepers the Kingbird does not stand in the best repute, as it is supposed to destroy many bees; but I believe that the damage done in this respect is greatly exaggerated, and on closer examination I am of the opinion that very few working bees will be found among the contents of their stomachs, and that the majority taken by them are drones, which do not store honey, and that the bee keeper is actually benefited by their destruction. The vegetable matter found in their stomachs consists mainly of sassafras and spicebush berries, wild chokecherries, juniper and dogwood berries, mulberries, blackberries, huckleberries, elderberries, pokeberries, and frost grapes. In southern Louisiana, Mr. E. A. McIlhenny tells me, the Kingbird feeds extensively on the berries of the prickly ash and Tabasco peppers, becoming a great nuisance on the pepper plantations. The flesh becomes quite pungent from this food; the bird is considered a delicacy there, and numbers are shot and command a good price in the local markets. It gathers in large flocks in the fall, and is locally known there as "Gross Grasset." The indigestible portions, like the wing covers of beetles, the legs of grasshoppers, and seeds of berries, are ejected in pellets. The Kingbird loves a rather open country, and is rarely found nesting at any great distance from water, and it shuns densely timbered tracts.

In the more southern sections of its breeding range nidification begins usually in the first half of May, while in northern New York and our North-western States it rarely nests before June, more generally in the latter part of this month, and still later in the extreme northern parts of its range. The nests are placed in various kinds of trees, such as apple, pear, tulip, chestnut, elm, poplar, cottonwood, willow, oak, sycamore, osage orange, cedar, maple, birch,

hawthorn, locust, wild plum, orange, and lemon, as well as in shrubs and bushes of different kinds, generally at a distance of from 4 to 40 feet from the ground. They are usually placed in a fork or crotch on a horizontal branch, and frequently well out on the limb. They are not at all particular in the selection of a nesting site; I have seen nests placed on a fence rail (sometimes on top of one) and again between the rails not over 2 feet from the ground, in the hollow tops of stumps, and in abandoned nests of the Robin and the Bronzed Grackle. Dr. A. K. Fisher informs me that at Red Cloud, Nebraska, on July 3, 1893, a female was found sitting on a nest placed on top of a fence post, near the railroad track. It is not evident why this site was chosen, as plenty of trees grew in the vicinity. There was no shelter above to protect the nest from the sun, and when seen the female was panting from the heat.

Mr. Elmer T. Judd, of Cando, North Dakota, writes: "A pair of these birds were noticed building a nest on a sulky plow, and after the nest was nearly completed the plow was required and used, but the nest was not disturbed. On finishing the work I put the plow back in about the same place, and after a day or two of consideration the birds finished the nest, laid their eggs, and raised a brood of young. Two little girls used to visit the place every day, and the bird would almost let them put their hands on it before leaving the nest. In this section they usually lay our eggs, and the earliest date of nesting is June 29; the latest, the third week in July. Their favorite nesting sites here are in wild plum bushes, from 4 to 6 feet from the ground, and I have also noticed them nesting in eave troughs and binders."

The Kingbird, like many other species, after selecting a suitable nesting site and raising its young unmolested, will generally return to it from year to year. The nest is usually well and compactly built, and varies more or less in size and bulk, according to the site. A typical nest now before me, taken by Dr. Edgar A. Mearns, United States Army, near Fort Snelling, Minnesota, measures about $5\frac{1}{2}$ inches in outer diameter by $3\frac{1}{4}$ inches in depth; its inner diameter is 3 inches by $1\frac{3}{4}$ inches deep. Its exterior is constructed of small twigs and dry weed stems, mixed with cottonwood down, pieces of twine, and a little hair. The inner cup is lined with fine dry grass, a few rootlets, and a small quantity of horsehair. In other specimens bits of wool, strips of bark, thistle down, cattle hair, and fine rootlets are incorporated in the body of the nest. In the South the gray Spanish moss frequently forms the bulk of the outer walls, while in the Adirondack mountains, in Herkimer County, New York, in June, 1892, Dr. Ralph and the writer took a nest of this species from a crotch formed by the trunk and two broken branches of a small dead birch stump, about 8 feet from the ground, which was externally constructed of the long, green tree moss of that region, mixed with a few fine roots and twigs, milkweed down, weeds, and grasses, and lined with fine roots, hair, milkweed down, a little tree-moss, *Ursnea*, and a few blades of fine grass. The stump stood by itself on the edge of a small swamp, and the nest could be plainly seen for some distance. Mr. E. A. McIlhenny tells me that in the willow swamps in southern Louisiana these birds

construct their nests entirely out of willow catkins, without any sticks whatever, and that the nests can be squeezed together in the hand like a ball.

The male assists in the construction of the nest, and to some extent in the duties of incubation. He relieves the female from time to time to allow her to feed, guards the nesting site, and is usually perched on a limb close by, where he has a good view of the surroundings. Even when so engaged he rarely sits entirely quiet, but every few minutes elevates his crest and looks around for a possible enemy. An egg is deposited daily, and incubation lasts from twelve to thirteen days. The young while in the nest are fed entirely on animal food and are able to leave it in about two weeks after hatching, and soon learn to provide for themselves. A second brood is occasionally raised in the more southern portions of their breeding range.

The Kingbird is not particularly sociable, each pair keeping pretty much to themselves during the breeding season, and later in family parties, until the winter migration commences, when they gather in flocks and depart for the south.

Three or four eggs are laid to a set; in some localities three seems to be the rule. This is especially the case in the more southern portions of their breeding range, while farther north they generally lay four. Although the Kingbird is credited by several writers as laying from three to five eggs, and sometimes even six, I have never seen a larger set than four among the many examined, and sets of even five eggs must be considered as very unusual. The ground color of these eggs varies from white or pale creamy white to a very faint rose pink, and they are spotted and blotched with chestnut, claret brown, cinnamon, rufous, heliotrope purple, and lavender. The markings vary greatly, both in size and quantity, but are generally heaviest about the larger end of the egg. In the more finely marked specimens the spots are usually more profuse and evenly distributed, and occasionally an almost unmarked egg is found. The shell is rather smooth, close-grained, moderately strong, and slightly glossy. The eggs are mostly ovate in shape, ranging from this to short and rounded ovate, and a few are elongate ovate.

The average measurement of one hundred and forty eggs in the United States National Museum collection is 24.06 by 18.21 millimetres, or about 0.95 by 0.72 inch. The largest egg of the series measures 26.92 by 19.30 millimetres, or 1.06 by 0.76 inches; the smallest, 20.83 by 17.27 millimetres, or 0.82 by 0.68 inch.

The type specimen, No. 22299 (Pl. 1, Fig. 14), from a set of four eggs taken by Mr. Denis Gale, near Gold Hill, Boulder County, Colorado, on June 25, 1884, shows one of the less marked examples; and No. 25052 (Pl. 1, Fig. 15), from a set of three eggs taken by Dr. Edgar A. Mearns, United States Army, near Fort Snelling, Minnesota, on June 13, 1890, represents a well-marked specimen.

88. *Tyrannus dominicensis* (GMELIN).

GRAY KINGBIRD.

Lanius tyrannus β . *dominicensis* GMELIN, Systema Naturæ, I, 1788, 302.*Tyrannus dominicensis* RICHARDSON, Report Sixth Meeting of the British Association, V, 1837, 170.

(B 125, C 243, R 303, C 369, U 445.)

GEOGRAPHICAL RANGE: West Indies, coasts of Carribean Sea, and Gulf of Mexico; north to Florida, Georgia, and South Carolina. Accidental in Massachusetts and British Columbia.

The Gray Kingbird is a moderately common visitor to and breeds along the southern border of the United States, and its habitat is mainly confined to the immediate vicinity of the seacoast and the banks of the larger streams flowing into the Gulf of Mexico. Audubon, who called this bird the Pipiry Flycatcher, reported it as quite common on most of the Florida Keys, and Dr. Bachman observed a pair breeding in the college yard at Charleston, South Carolina, which returned for at least three years in succession and raised two broods in a season.¹ Mr. Arthur T. Wayne took a nest and eggs of this species on Sullivan Island, near Charleston, South Carolina, in June, 1893. Mr. C. J. Maynard found them rather common on some of the Florida Keys, and writes about them as follows: "The Gray Kingbirds appear to prefer the outer or higher keys, and visit them in great numbers, especially during the spring migration. In order to give some idea of the home of these birds, I will describe Bamboo Key, where I found them particularly common. This little island, which contains nearly 2 acres of land, lies about midway between Key West and Cape Florida. It is one of a line of outer keys which have an old coral reef for a foundation, and as the present reef, which extends parallel with the keys, but which lies 5 miles at sea, is clearly visible, this is used as a wrecking station, and has a lookout erected on it. There were two families living there; but, with the characteristic improvidence of the poorer class in Florida, they did not attempt to cultivate the soil, choosing rather to depend upon a precarious livelihood gained by wrecking. Thus the vegetation of the place was, in a great degree, in a primitive condition. Nearly the whole key was surrounded by a belt of mangroves, but these grew on very low ground, over which the tide rose every day; higher on the dry land were bushes, among which two or three species of cacti grew in profusion, and as the whole was overgrown by a tangled mass of vines it formed an impenetrable thicket. The wreckers had formed a small clearing in the midst of this jungle and erected two or three wretched houses.

"I landed on the 1st of May, and remained there several days, during which time I saw hundreds of Gray Kingbirds. They appeared to be migrating, for numbers were constantly arriving from seaward; yet, unlike many other species, they invariably came in pairs, and were evidently mated, as they were constantly pursuing each other through the air in a playful manner, at the same

¹ History of North American Birds, 1874, Vol. II, p. 320.

time vociferating loudly. They exhibit a decided preference for mangroves, and later, by the middle of the month, build their nests in them, usually selecting bushes which overhang the water. These birds inhabit all of the higher keys from Key West to Cape Florida. They also occur on the west coast in suitable localities, but I do not think that they are as abundant on the east side of the peninsula. They must migrate early, as I never found them in autumn."¹

Mr. W. E. D. Scott says: "The earliest record I have of its arrival about Tarpon Springs, Florida, is April 23, 1887, and the birds are common till late in September. The eggs are laid in this vicinity from about the middle to the last of May, and but one brood appears to be reared."

Mr. Atkins' notes are as follows: "Arrives at Punta Rassa middle of April; nests commonly on the islands and along the shore in mangrove bushes; seems to prefer an isolated tree or bush near the water. Last noted at Punta Rassa September 13. Arrives at Key West about April 11. A few breed here."²

First Lieut. Wirt Robinson, Fourth Artillery, United States Army, found this species not at all uncommon at Matanzas Inlet, Florida, and took three sets of eggs, which are now in the United States National Museum collection, on May 18 and 23, 1894. Here they nested in the low mangroves.

The Gray Kingbird is far more abundant in the West India Islands, especially in Cuba, Jamaica, Dominica, and the Bahamas, where it is one of the most conspicuous birds. Its general habits, food, and manner of flight appear to be very similar to those of our common Kingbird, and, like it, it is fearless and pugnacious in the defense of its chosen nesting site, boldly attacking birds much larger than itself.

Mr. Richard Hill, of Spanish Town, Jamaica, in some interesting notes furnished to Mr. Gosse, says: "The Jamaica bird is not exclusively an insect feeder, but eats very freely of the sweet wild berries, especially those of the pimento. These ripen in September, and in groves of these this bird may always be found in abundance. By the end of September most of the migrant birds have left the island. * * *

"This is among the earliest of the birds to breed in Jamaica. As early as January the mated pair is said to be in possession of some lofty tree, sounding at day dawn a ceaseless shriek, which is composed of a repetition of three or four notes sounding like 'pe-chee-ry,' from which they derive their local name. * * * In feeding, just before sunset, they usually sit eight or ten in a row, on some exposed twig, darting from it in pursuit of their prey, and returning to it to devour whatever they have caught. They are rapid in their movements, ever constantly and hurriedly changing their positions in flight. As they fly they are able to check their speed suddenly and to turn at the smallest imaginable angle. At times they move with motionless wings from one tree to another. When one descends to pick up an insect from the surface of the water, it has the appearance of tumbling, and, in rising again, ascends with a singular motion

¹ Birds of Florida and eastern North America, 1881, p. 176.

² The Auk, VI, 1889, p. 318.

of the wings, as if hurled into the air and endeavoring to recover itself. * * * This Flycatcher is also charged by Mr. Hill with seizing upon the Humming-birds as they hover over the blossoms in the gardens, killing its prey by repeated blows struck on the branch and then devouring them."¹

In Florida nidification rarely commences before the third week in May, and sometimes not before June. The nests are most frequently found in mangrove bushes, in different species of palms, and less often in live oaks; they are usually placed on horizontal limbs overhanging the water, and at no great distance above it. A nest now before me, taken by Lieut. Wirt Robinson, at Matanzas Inlet, on May 18, 1894, measures 6 inches in outer diameter by $2\frac{1}{4}$ inches in depth; its inner diameter is 4 inches by $1\frac{1}{4}$ in depth. It is externally composed of small twigs and rootlets, and lined with finer material of the same kind. It is a very loosely and carelessly built structure, resembling a Mourning Dove's nest more than anything else; it contained four fresh eggs when found. The number of eggs to a set varies from three to four, although it is said that occasionally as many as five are found. These are among the handsomest of our Flycatchers; their ground color varies from a creamy to a pinkish or flesh-colored tint, and they are profusely spotted and blotched with different shades of chocolate, burnt umber, claret brown, mixed with lighter shades of lavender and heliotrope purple, the markings are usually heaviest about the larger end of the egg, and often form an irregular wreath. The shell is close grained and rather firm; the shape is usually elliptical ovate, less often elongate ovate.

The average measurement of a series of forty eggs in the United States National Museum collection is 25.91 by 18.50 millimetres, or about 1.02 by 0.73 inches. The largest egg of the series measures 27.68 by 19.30 millimetres, or 1.09 by 0.76 inches; the smallest, 22.61 by 17.53 millimetres, or 0.89 by 0.69 inch.

The type specimen, No. 16844 (Pl. 2, Fig. 3), was taken by Mr. N. B. Moore, near Manatee, Florida, in June, 1873, and represents a well-marked specimen, while No. 20405 (Pl. 2, Fig. 4), Bendire collection, taken by Mr. C. H. Nauman, in May, 1875, in southern Florida, represents an average-marked egg of this species.

89. *Tyrannus melancholicus ouchii* (BAIRD)

COUCH'S KINGBIRD.

Tyrannus couchii BAIRD, Birds of North America, 1858, 175.

Tyrannus melancholicus var. *couchii* COUËS, Check List, ed. I, Dec., 1873, 51.

(B 128, 129, C 246, R 305, C 372, U 446.)

GEOGRAPHICAL RANGE: From Guatemala north through Mexico, to the lower Rio Grande Valley, in southern Texas.

Couch's Kingbird is a common summer resident throughout a considerable portion of Mexico, but within our borders it appears to be rather rare, and has so far only been observed in the lower Rio Grande Valley, where it breeds spar-

¹History of North American Birds, 1874, Vol. II, pp. 321, 322.

ingly. I have been quoted in the "History of North American Birds, 1874" (Vol. II, p. 329), as having taken this subspecies near Tucson, Arizona; this is evidently a mistake, as I can not find any reference to such a capture among my notes on Arizona birds.

For what little we know about Couch's Kingbird we are indebted to Mr. George B. Sennett, who first met with it on May 8, 1877, at Lomita Ranch, near Hidalgo, Texas. He says: "At this point is the finest grove of ebonies (*Acacia flexicaulis*) I saw on the river. On the hillside, back of the buildings, they overlook the large resaca, then filled with tasseled corn. It was the tops of these grand old trees that these Flycatchers loved, and so persistent were they in staying there that I thought they were going to settle in the neighborhood for the season. There was a company of some six or eight scattered about. I did not find them shy, for after our firing they would almost immediately return to the same trees. They were readily distinguishable from *Tyrannus carolinensis*, which were shot in their company; their greater size and bright yellow under parts can be seen at gunshot range."¹

A nest taken by one of Mr. Sennett's collectors in 1881 is described by him as follows: "The nest was situated some 20 feet from the ground, on a small lateral branch of a large elm, in a fine grove not far from the houses of the ranch. It is composed of small elm twigs, with a little Spanish moss and a few branchlets and leaves of the growing elm intermixed. The sides of the nest are lined with fine rootlets; the bottom with the black, hair-like heart of the Spanish moss. The outside diameter is 6 inches and the depth 2 inches. The inside diameter is 3 inches and the depth 1.25 inches."²

There is as yet but little known about the general habits, food, and call notes of this subspecies; but it is presumable that they do not differ very materially from those of the other members of this family. The number of eggs varies from three to four, and the nests appear generally to be placed near the end of a horizontal limb, on a good-sized tree, at no very great distance from the ground, and preferably near water.

All the eggs of this subspecies in the United States National Museum collection were taken in the vicinity of Brownsville, Texas, where these birds usually commence nesting during the first two weeks in May.

The ground color of the eggs is a delicate creamy pink, and they are moderately well blotched and spotted with chocolate, claret brown, heliotrope purple, and lavender. These markings are, in some instances, scattered pretty evenly over the entire surface of the egg; in others they are mainly confined to the larger end. They are readily distinguishable from the eggs of the balance of our Kingbirds by their peculiar ground color, while their markings are very similar to those found on the eggs of the other species of this family. The shell is close-grained and rather strong, and in shape the eggs are generally ovate or elongate ovate.

¹ Bulletin of the U. S. Geological and Geographical Survey, 1878, Vol. IV, No. 1, p. 31.

² The Auk, Vol. I, 1884, p. 93.

The average size of thirteen eggs in the United States National Museum collection is 24.38 by 18.45 millimetres, or about 0.96 by 0.73 inch. The largest egg measures 24.89 by 18.80 millimetres, or 0.98 by 0.74 inch; the smallest, 23.62 by 17.53 millimetres, or 0.93 by 0.69 inch.

The type specimens, Nos. 24313 and 26345 (Pl. 2, Figs. 5 and 6), both from the Ralph collection, were obtained near Brownsville, Texas, the former on May 13, 1891, the latter on May 16, 1893, and show the different styles of markings.

90. *Tyrannus verticalis* SAY.

ARKANSAS KINGBIRD.

Tyrannus verticalis SAY, Long's Expedition, II, 1823, 60.

(B 126, C 244, R 306, C 370, U 447.)

GEOGRAPHICAL RANGE: Western North America; from the Pacific coast east to western Texas, western Indian Territory, middle Kansas, Nebraska, and western Minnesota; north to North Dakota, southern Assiniboia, Alberta?, and southern British Columbia; south to Lower California, and in the winter through Mexico to Guatemala. Accidental in Iowa, Maine, New Jersey, New York, and Maryland.

The Arkansas Kingbird, for which the name of "Western Kingbird" seems to be better suited, is pretty generally distributed as a summer resident throughout the middle and western portions of the United States, and it breeds in suitable localities throughout these regions. The northern limit of its breeding range extends, as far as is at present known, into southern Assiniboia (the valley of the Souris River), and probably westward through southern Alberta, as well as along the southern borders of British Columbia, where it appears to be fairly common, excepting in the immediate vicinity of the coast. In the United States it reaches its northern limits in North Dakota and southern Minnesota, where it is rare, and thence it is found south through Nebraska, middle and western Kansas, western Indian Territory to northwestern Texas, and in all of the intervening regions westward to the Pacific Ocean.

In Lower California the Arkansas Kingbird appears to be rare, though a few breed in the northern portions of this peninsula. Dr. Edgar A. Mearns, United States Army, found a nest of this species at St. Ysidora ranch on July 2, 1894, containing three eggs, which are now in the collection here. This species arrives from its winter home in Mexico and Guatemala, along the southern border of its breeding range, about the latter part of March, and passes leisurely northward, reaching our more northern States about the beginning of May, and returning early in September. By the middle of October all, or nearly all, have passed our borders, and I do not believe that any winter within the United States.

The Arkansas Kingbird is pretty generally distributed throughout most of our Western States, and is especially abundant in the Great Basin region. It is essentially a bird of the more open country, especially of the river valleys, and is not generally found in the higher mountain systems, where it rarely reaches higher altitudes than 7,500 feet. I have observed this species as common in

southern Arizona as in northern Washington and Idaho, and wherever water and a few willows are to be found, no matter if the surrounding country may otherwise be a perfect desert, some of these birds are sure to be seen. This Flycatcher is, if anything, more noisy than our common eastern Kingbird, and utters also a greater variety of notes; some of these resemble the squeaking sounds of our Grackles; others are indifferent efforts at song—a low, warbling kind of twitter—while occasionally it gives utterance to shrill, metallic-sounding notes with more force to them than those of the Kingbird. During the mating season they are especially noisy, and begin their love songs, if they may be called such, at the earliest dawn, and keep up their concerts with but slight intermission during the greater part of the day; but after they are mated and nidification commences they are more quiet.

Mr. R. H. Lawrence writes me from Monrovia, California, that the Arkansas Flycatcher also utters very peculiar notes at times during the night. He says: "On the night of July 30, 1893, I frequently heard a queer cry; sometimes only a single note, and again this was repeated three or four times, followed by a crying or wailing sound, as if made by a very young kitten. I heard these notes on successive nights. On August 2, about 4.30 a. m., I succeeded in shooting the performer out of a pepper tree standing close to the house, and it proved to be an Arkansas Flycatcher."

The males precede their mates a few days in the migration, and as soon as the latter arrive constant quarrels between rivals for the favors of the coveted female ensue. Frequently half a dozen of these birds may be seen chasing each other about, pecking at and tumbling over each other in mid-air, keeping up an incessant chatter and scolding in the meantime; but very rarely have I seen feathers fly during these ostensible combats, and I am inclined to think that the majority of such performances are indulged in more in fun than in anger. They are undoubtedly more social than the common Kingbird, as I have seen two pairs nesting in the same tree, apparently living in perfect harmony with each other. While they are by no means devoid of courage, they appear to me to be much less quarrelsome on the whole than the former, and they are far more tolerant toward some of the larger Raptores. For instance, in the vicinity of Camp Harney, Oregon, I found a pair of these birds nesting in the same tree (a medium-sized pine) with Bullock's Oriole and Swainson's Hawk, and, as far as I could see, all were on excellent terms.

Their food consists of animal matter, principally grasshoppers where these are abundant, as well as of moths, butterflies, different species of flies, winged ants, caterpillars, and the large black crickets of the West. Most of their prey is caught on the wing, and they rarely fail in capturing it. They are extremely dexterous, and their flight is powerful and swift. During the summer they feed occasionally on wild berries, and among these the service berry seems to be more often eaten than any other. Like our common Kingbird, they are often credited with feeding to a considerable extent on bees, and are therefore in bad repute with bee keepers. This accusation, like many others made about some of our most useful and beneficial birds, seems to be entirely unfounded.

Mr. Walter E. Bryant makes the following remarks relating to this subject in "Zoe" (Vol. IV, 1893, p. 57):

"Mr. A. Barnett, of San Diego County, California, has 300 swarms of bees, which attracted the Flycatchers to such an extent that he made some investigations to ascertain to what degree they might be damaging to the bee industry. Over one hundred Arkansas Flycatchers and Phœbes (Black and Say's) were dissected. In all of the Arkansas Flycatchers only drones were found, but no working bees, although in many cases the birds were gorged. In most of the Phœbes drone bees were also found; the only exception was that of a Phœbe (Say's?) in which a bee sting was found in the base of the tongue. The birds were all shot about apiaries, and were seen darting upon and catching bees. The examinations were made with a hand lens. Mr. Barnett regards the occurrence of the sting found in the Phœbe as accidental, and concluded that Flycatchers are beneficial in reducing the numbers of drones."

The Arkansas Kingbird, like all of our Flycatchers, is extremely beneficial and deserves the fullest protection, and where not molested becomes quite tame and will readily nest about houses. They are not at all particular in the choice of nesting sites and build in various situations, but generally in trees in creek bottoms, near water, though I have occasionally found one of their nests fully a mile away in an isolated tree in the foothills. Cottonwoods and willows seem to be more often selected than other trees, but perhaps only because they are the commonest kinds throughout most of their breeding range. Oaks, sycamores, Australian blue gum, junipers, elms, and orchard trees are also made use of to a certain extent, while pines are rarely occupied.

Mr. William G. Smith informs me that in Colorado they nest occasionally on ledges. Dr. C. T. Cooke writes me that a pair of these birds nested in the summer of 1891 in a church steeple in Salem, Oregon, and Mr. Elmer T. Judd, of Cando, North Dakota, informs me that he found a nest on a beam of a railroad windmill pump, about 6 feet from the ground, where trains passed close by the nest constantly; another was found by him on a grainbinder which was standing within a couple of rods of a public schoolhouse.

I have examined many of their nests in various parts of the West. The majority of these were placed in forks of trees, and generally close to the trunk; others were saddled on horizontal limbs. One nest was placed in the top of a hollow cottonwood stump, the rim of the nest being flush with the top; another pair made use of an old nest of the Western Robin; and still another built on the sill of one of the attic windows of my quarters at Fort Lapwai, Idaho. They probably would not have succeeded in keeping this nest in place had I not nailed a piece of board along the outside to prevent the wind from blowing the materials away as fast as the birds could bring them. They were persistent, however, and not easily discouraged, working hard for a couple of days in trying to secure a firm foundation before I came to their assistance. Both birds were equally diligent in the construction of their home until it was nearly finished, when the female did most of the arranging of the inner lining, and many

a consultation was evidently indulged in between the pair before the nest was finally ready for occupation, a low twittering being kept up almost constantly. It took just a week to build it, and an egg was deposited each morning afterwards until the set, which consisted of four eggs, was completed. After incubation had commenced, I noticed that the female left her eggs for an hour or more at a time, during the middle of the day, when the sun was shining on that part of the house, and sat panting on the window sill or on a little cottonwood tree close by, keeping watch over her treasures. I also observed her turning the eggs over and rearranging them occasionally when she returned to the nest.

The nests of the Arkansas Kingbird vary greatly in bulk and size according to the situation, and are usually placed at no great height from the ground. Generally they are compactly built structures, the foundation and outer walls being composed of weed stems, fine twigs, plant fibers, and rootlets, intermixed with wool, cocoons, hair, feathers, bits of string, cottonwood, milkweed, and thistle down, or pieces of paper, and lined with finer materials of the same kind.

A typical nest, No. 26036, United States National Museum collection, taken by Mr. H. W. Henshaw, near St. Ysabel, California, measures 6 inches in outer diameter by 3 in depth; the inner cup is 3 inches wide by $1\frac{3}{4}$ deep. It is principally composed of the stalks of *Stylocline arizonica* and *Micropus californicus*, mixed and lined with cocoons and a little down.

Nidification, even in the more southern parts of their range, rarely commences much before the middle of May, more generally during June, and near the northern limits not before the first week in July. From three to five eggs are laid to a set, four being the usual number. I have taken two sets of five each near Fort Walla Walla, Washington, but such large sets are rather rare. Incubation lasts from twelve to thirteen days; this duty is mostly performed by the female, but I have also seen the male on the nest, and he can generally be observed close by, on the lookout for danger. Both parents are exceedingly courageous in the defense of their nest and young, and every bird of this species in the neighborhood will quickly come to the rescue and help to drive intruders off as soon as one gives the alarm. The young grow rapidly and are able to leave the nest in about two weeks. They consume an immense amount of food, certainly fully their own weight in a day. I have often watched the family previously referred to, raised on the sill of my attic window, and also fed them with the bodies of the large black crickets while one of the parents was looking on, and apparently approvingly, within a few feet of me. I have stuffed them until it seemed impossible for them to hold any more, but there was no satisfying them; it certainly keeps the parents busy from early morning till late at night to supply their always hungry family. They are readily tamed when taken young, and are very intelligent, making interesting pets. I believe that only one brood, as a rule, is raised in a season, excepting possibly in the extreme southern portions of their range, in southern Arizona and California, as I found fresh eggs on Rillito Creek, near Tucson, as late as July 20, in a locality where these birds

had not been previously disturbed, which seems to indicate that they occasionally may rear a second brood.

The eggs of the Arkansas Kingbird do not differ in shape or coloration from those of the Kingbird, and the same description will answer for both; but they are a trifle smaller as a rule.

The average measurement of one hundred and four eggs in the United States National Museum collection is 23.62 by 17.42 millimetres, or about 0.93 by 0.69 inch. The largest egg of the series measures 25.91 by 18.54 millimetres, or 1.02 by 0.73 inches; the smallest, 19.81 by 15.75 millimetres, or 0.78 by 0.62 inch.

One of the type specimens, No. 20392 (Pl. 1, Fig. 16), from a set of three eggs, shows rather heavy and handsome markings, and also a slightly pinkish ground color, while No. 20399 (Pl. 1, Fig. 17), from a set of four (one of the largest specimens in the series) represents about an average-marked egg; both are from the Bendire collection; the former was taken at Fort Lapwai, Idaho, June 16, 1871, and the latter at Fort Walla Walla, Washington, May 25, 1881.

91. *Tyrannus vociferans* SWAINSON.

CASSIN'S KINGBIRD.

Tyrannus vociferans SWAINSON, Quarterly Journal of Science, XX, 1826, 273.

(B 127, C 245, R 307, C 371, U 448.)

GEOGRAPHICAL RANGE: Western United States; from the eastern slopes of the Rocky Mountains west to California; north to southern Wyoming; south through Colorado, New Mexico, northwestern Texas, Arizona, to Lower California, Mexico, and in winter to Guatemala and Costa Rica. Accidental in Oregon.

Cassin's Kingbird, while fairly common in certain sections of its range, appears to be entirely absent in some of the intermediate regions. Eastward, so far as is known at present, its breeding range extends to the eastern bases of the Rocky Mountains in Colorado, and possibly to southeastern Wyoming, where Dr. C. Hart Merriam obtained a single specimen on May 27, 1872, near Cheyenne. In the Great Basin region, through Utah and Nevada to the eastern slopes of the Sierra Nevadas in California, it has not yet been met with, but it probably occurs in southern Utah; while in the coast districts of southern California and through the greater portion of Arizona and New Mexico it is a common summer resident, and it also probably breeds in limited numbers in northwestern Texas. In Oregon it can only be considered as a straggler, though Mr. A. W. Anthony observed a few specimens on May 5, 1885, in Washington County, in the northwestern part of the State. While the Arkansas Kingbird appears to shun the immediate coast districts, Cassin's Kingbird seems to prefer them. It is said to be quite common in many parts of Mexico during the breeding season, and in southern California it is partly resident.

Mr. F. Stephens writes me: "Cassin's Kingbird is a winter resident in southern California, but it is not very common. I have failed to find them here during the breeding season, even in the mountains."

It has not as yet been reported from southern Arizona as a winter resident. I failed to notice them after October in the vicinity of Tucson, and believe they migrate regularly, returning from their winter homes in the south in March.

Cassin's Kingbird is neither as noisy nor as quarrelsome as the preceding species, and appears to be more of a mountain-loving bird and to nest at higher altitudes.

Dr. Edgar A. Mearns, United States Army, in his notes on Arizona Mountain Birds, says: "Cassin's Kingbird breeds commonly throughout the pine forests. I found it in the uppermost timber on San Francisco Mountain in June, the altitude being nearly 12,000 feet. This conspicuous species likewise breeds in the low valleys of Arizona, together with the Arkansas Kingbird (*Tyrannus verticalis*), nests of both species having been found at the same time in one cottonwood tree in the Verde Valley. On the Mogollon Mountains I saw them attack Crows and Western Red-tailed Hawks, and drive them from the neighborhood of their nests after the spirited fashion of the eastern Kingbird."¹

Their food, like that of the other members of this family, consists principally of insects, and is obtained in a similar manner.

Their call notes do not differ very much from those of the other Kingbirds, but on the whole are perhaps less shrill and a trifle more melodious. While they are possibly more common in the oak and pine belts in Arizona, I found them by no means rare in the lowlands along the Santa Cruz River and Rillito Creek, near Tucson, Arizona, during the summer of 1872, where I took a number of their nests. I consider them very late breeders, my earliest record being June 14, when I took a set of four fresh eggs; but it is possible that I may have overlooked the first broods entirely, as most all the nests found by me during the month of June (about a dozen) contained fresh eggs. The season of 1872 was a very backward one, however, and this may account for the late nesting, especially as Dr. Cooper is quoted in "History of North American Birds, 1874" (Vol. II, p. 328), as finding Cassin's Kingbird breeding at San Diego, California, as early as March 28. The earliest record I have is May 27, 1892—a set of three eggs containing large embryos, taken at Dog Spring, Grant County, New Mexico, by Dr. E. A. Mearns, United States Army, and now in the United States National Museum collection. This nest was located in a hackberry tree, near a nest of Swainson's Hawk, containing two eggs.

The trees generally selected by this species for nesting sites are pines, oaks, cottonwood, walnut, hackberry, and sycamores, and the nests are almost invariably placed near the end of a horizontal limb, usually from 20 to 40 feet from the ground, in positions where they are not easily reached. All of the nests examined by me were placed in large cottonwoods, with long spreading limbs, and were saddled on one of these, well out toward the extremity. The majority

¹ The Auk, Vol. VII, 1890, p. 255.

could only be reached by placing a pole against the limb and climbing to it. They are fully as demonstrative as the Arkansas Kingbird when their nests are disturbed, and are equally courageous in the defense of their eggs and young. The nests are large, bulky structures, larger than those of the preceding species, but composed of similar materials. An average nest measures 8 inches in outer diameter by 3 inches in depth. The inner cup is $3\frac{1}{2}$ inches wide by $1\frac{3}{4}$ deep. Sometimes they are pretty well concealed to view from below, but they can usually be readily seen at a distance.

From two to five eggs are laid to a set. Sets of three or four are most frequently found, while sets of two and five are rare, but I have found both, incubation having already commenced in the smaller set. This lasts from twelve to fourteen days, and is almost always, if not exclusively, performed by the female. I have never noticed the male on the nest. The eggs are similar in color and markings to those of the Kingbird and Arkansas Kingbird, and about the same size as the latter, but on the whole they are not quite as heavily spotted.

The average measurement of forty-four eggs in the United States National Museum collection is 23.62 by 17.47 millimetres, or about 0.93 by 0.69 inch. The largest egg of the series measures 27.94 by 19.30 millimetres, or 1.10 by 0.76 inches; the smallest 22.61 by 16.26 millimetres, or 0.89 by 0.64 inch.

The type specimen, No. 20413 (Pl. 1, Fig. 18), from the Bendire collection, was taken by the writer on Rillito Creek, Arizona, on July 15, 1872, and is a rather large-sized egg, while No. 26146 (Pl. 1, Fig. 19) was collected by Dr. Edgar A. Mearns, United States Army, on the east side of the San Luis Mountains, New Mexico, on June 17, 1892. The two specimens represent about average-marked eggs of this species.

92. *Pitangus derbianus* (KAUP).

DERBY FLYCATCHER.

Saurophagus derbianus KAUP, Proceedings Zoological Society, 1851, 44, Pl. XXXVI.

Pitangus derbianus SCLATER, Proceedings Zoological Society, 1856, 297.

(B —, C —, R 308, C 364, U 449.)

GEOGRAPHICAL RANGE: North to the lower Rio Grande Valley in Texas; south through Mexico and Central America to Colombia, Venezuela, and Trinidad, South America.

The Derby Flycatcher, also locally known as the "Bull-headed Flycatcher," "Mexican Pitangus," and "Rio Grande Flycatcher," can only be considered as a rather uncommon summer visitor in the lower Rio Grande Valley, in southern Texas, where it breeds in very limited numbers, though in the adjoining States of Tamaulipas and Nuevo Leon, in eastern Mexico, it appears to be fairly common, and it is equally so throughout the greater portion of the Mexican Republic, both in hot and temperate zones, where it sometimes reaches an altitude of 5,000 feet. It also breeds throughout Central America in suitable localities.

Mr. G. B. Sennett, to whom we are indebted for a great deal of valuable information about the birds of the lower Rio Grande Valley, added this large and conspicuous Flycatcher to our fauna, and says: "On April 23, 1878, a male and female of this species were shot at Lake San Jose, a few miles from Lomita. Both were shot about 4 feet up on the trunks of small retama trees standing in the water, and were clinging to them and working their way down to the water, possibly to drink. They were not particularly shy. On May 3 another female was shot in a tree bordering the lake, yet not over the water. One or two more were observed in timber about water holes. In flight this Flycatcher resembles the Kingfishers. Dissection indicated the approach of the breeding season, and it undoubtedly nests in the large trees of the locality."¹

Mr. E. W. Nelson writes me that he found the Derby Flycatcher rather common about reed patches bordering the salt lagoons, near Manzanillo, in Colima, Mexico. They usually perched on the tops of dead bushes or stout reeds, from which vantage points they made excursions in various directions after passing insects. He also met with them near Jalapa, Vera Cruz, where they frequented the scattered bushes on the borders of fields and along streams flowing through cultivated or inclosed lands.

Mr. Charles W. Richmond has kindly furnished the following notes on this large Flycatcher, as observed by him in Nicaragua:

"The name given this bird in Nicaragua refers to its note, which sounds like 'kiskadee,' several times repeated. They have another note, which they utter on some occasions, and also a note of distress, very different from either of the others. Although the food consists of insects, I have seen one specimen that had its mouth and throat full of ripe banana. The Derby Flycatcher is common along the streams, and almost invariably travels in pairs. The bird appears to be evenly distributed along the water courses, and two or three pairs may occupy perhaps a mile along the river front, which territory they go over every day. At the International Planting Company's Headquarters, where I collected for over eight months, there were two pairs on the river, one on each side, and another pair located on a creek close by. After shooting the two pairs on our side of the river, no others came about for a long time, although the pair on the opposite side of the river (about 300 yards wide at this point) passed up and down each day on their rounds. Their flight ordinarily is short, the birds stopping a short time in each place, picking up food as they move along."

The most complete and interesting account of the general habits of the Derby Flycatcher is that published by the late George N. Lawrence, based upon collections and notes on the "Birds of Western and Northwestern Mexico," made by the late Col. A. J. Grayson, and published in the "Memoirs of the Boston Society of Natural History" (Vol. II, p. 286). These are as follows:

"This is a common and abundant species, inhabiting the western and north-western parts of Mexico; I found it equally as common in Tehuantepec as in the region of Mazatlan, where its loud, shrill notes of 'hip-se-dee, hip-se-dee'

¹ Bulletin of the U. S. Geological and Geographical Survey, Vol. V, No. 3, 1879, pp. 407, 408.

may be heard at all seasons of the year, but more particularly during the breeding season, when it is excessively garrulous. It is more frequently met with in the neighborhood of fresh-water streams and lagoons, and I have often observed them dart into the water after water insects and minnows that were swimming near the surface, not unlike the Kingfisher; but they usually pursue and capture on the wing the larger kinds of *Coleoptera* and *Neuroptera*, swallowing their prey entire after first beating it a few times against their perch. They are usually in pairs, but I have also seen as many as twenty about a stagnant pool, watching its turbid water for insects and small fish, for which they seem to have a great partiality.

“The nest of this species is very large, and its construction differs from all the *Tyrannidæ* of which I have any knowledge excepting *M. texensis*. It is dome-shaped or covered, with the entrance on the side, while the other species build a saucer-shaped nest. The nest of the Bull-headed Flycatcher is usually placed in the forks of the branches of very thorny trees, 25 or 30 feet from the ground. It is composed of very coarse materials, of either straw or lichens, sometimes of both, the lining, however, is of firmer and more elastic fibers. Other birds sometimes make their nests in the same or nearest tree, such as *M. texensis*, *C. melanicterus*, and *I. pustulatus*. The eggs of this Flycatcher are usually five in number; they are of moderate size, rather lengthened, of a light cream color, with a small reddish speck; the shell is delicate and easily broken.”

Messrs. Salvin and Godman make the following remarks about this species: “In Guatemala *Pitangus derbianus* builds its nest in April and May; one found at Duenas was a large, loose structure with a great deal of superfluous matter about it, its entrance being on one side; it was composed entirely of small twigs and placed at the end of a branch about 20 feet from the ground; another taken at San Geronimo had two openings, but one seems to be the rule. A favorite haunt is the banana groves, where the nest may be found wedged in among the clusters of fruit. The eggs are slightly pear-shaped, of a pale creamy-white color, spotted and blotched with brick red. They vary considerably in size and color, especially as to the magnitude and density of the spots.

“We never noticed *P. derbianus* feeding on fish and water insects, as described by Grayson, but Mr. Hudson ascribes similar habits to *P. sulphuratus* in the Argentine Republic.”¹

There are three sets of eggs in the Ralph collection, taken in Cameron County, Texas, on May 9, May 27, and June 23, 1893, respectively. Each of these contained four fresh eggs when found; the last set was probably a second laying, the first having been destroyed. Two of these nests were located in a thicket of huisache trees (*Acacia farnesiana*), about 10 feet from the ground; the other in a large bunch of Spanish moss, pending from the limb of a large tree, about 14 feet up. The last-named is now in the collection here. The nest proper is an unusually bulky structure, composed principally of gray Spanish moss, dry weed stems, pieces of vines, and swamp grasses, and lined with finer

¹Biologia Centrali Americani, Aves, Vol. II, 1889, p. 45.

materials of the same kinds. It measures 11 inches in outer diameter by 5 inches in height. The inner cup measures 5 inches in diameter by 2 inches in depth. The various materials are well interwoven and make a compact mass. The walls of the nest are unusually thick. The other nests were lined with wool, feathers, plant down, and Spanish moss.

The number of eggs to a set is four or five, and probably only one brood is raised in a season. They vary considerably in shape; the majority may be called short ovate, others are ovate and elongate ovate; the shell is close grained and but slightly glossy. The ground color is pale creamy white, and is sparingly spotted, principally about the larger end, with irregularly shaped splashes and minute specks of seal or liver-brown and different shades of lavender.

The average measurement of eighteen eggs in the United States National Museum collection is 29.46 by 21.34 millimetres, or 1.16 by 0.84 inches. The largest egg measures 30.48 by 22.10 millimetres, or 1.20 by 0.87 inches; the smallest, 26.16 by 21.34 millimetres, or 1.03 by 0.84 inches.

The type specimens, Nos. 26342 and 26343 (Pl. 1, Figs. 20 and 21), both from sets of four eggs, Ralph collection, were taken in Cameron County, Texas, on May 27 and June 23, 1893, respectively, and represent the heavier and finer marked types of these eggs.

93. *Myiozetetes texensis* (GIRAUD).

GIRAUD'S FLYCATCHER.

Muscicapa texensis GIRAUD, Sixteen Texas Birds, 1841, Pl. I.

Myiozetetes texensis SCLATER, Proceedings Zoological Society, 1859, 5f
(B —, C —, R 309, C —, U [450].)

GEOGRAPHICAL RANGE: Central America; south to Colombia, South America, north to northern Mexico (and southern Texas?).

Giraud's Flycatcher is included in our fauna on Giraud's Texas record, but no other specimens have since been secured, and if it occurs at all in the lower Rio Grande Valley, in Texas, it can only be considered as an accidental straggler, and it is not probable that it breeds within our borders.

Mr. Charles W. Richmond has kindly furnished me the following notes on this bird: "It is very abundant in Nicaragua. It is confined to the vicinity of water courses, and is evenly distributed in such localities. It is quite a stationary bird; pairs occupying a certain precinct may be found in the same place week after week, seldom wandering far away, according to my observations. The bird usually selects a tree overhanging the water for its perch, where it often sits for a considerable length of time, uttering its peculiar cry, which resembles that of a young chicken, only louder. The bird has other notes which it makes use of at different times. Occasionally it prospects around the outer branches of the tree for insects, making short flights from branch to branch in a leisurely manner, looking carefully about before proceeding to the next branch, and

stretching its neck out, after the manner of a Dove. It frequently flies out from its perch after passing insects, like a Wood Pewee or Kingbird. This bird bathes frequently during the day if the sun is shining, flying down into the water with a splash, then up to its perch again, where it dresses its feathers. This style of bathing I have noticed only in Giraud's Flycatcher.

"The nest is a beautiful structure, roofed over, with the entrance at one side. It is usually profusely covered with living moss, and is generally placed in a bush or tree over the water, from 5 to 15 feet up as a rule. Nests are often placed in bunches of bananas, and I have found them in young lime trees, 4 feet from the ground. One nest, found in a clump of vines, was fully 30 feet from the ground. I found a nest May 13, containing three young birds fully fledged. The parent birds were very much excited while I remained in the vicinity. The species is known as 'Little Kiskadee' by the English-speaking people here, on account of its resemblance to the Derby Flycatcher."

Mr. E. W. Nelson writes me: "I found Giraud's Flycatcher common along tall hedges bordering fields near Jico, Vera Cruz, Mexico, during June and July, 1893. They were also particularly common along streams bordered by a more or less straggling growth of tall bushes. They appeared to nest only in the latter situations—a dozen or more of their nests were found here, all similarly situated. They were placed in forks near the tops of tall, slender, and generally overhanging bushes, from 12 to 15 feet from the ground. In several instances the nests were placed in the tops of bushes overhanging streams. There was not the slightest attempt at concealment, and the nests were usually visible at a considerable distance, appearing like large, ragged handfuls of dry grass thrust carelessly into the forks of the bushes. They were still more conspicuous from the fact that they were usually built in the tops of bushes somewhat taller than the average, or apart from the general mass of surrounding vegetation.

"Unfortunately, all of the nests examined were either occupied by young or had already been deserted; they were all lined with fine grass stems. The old birds were not at all shy, but watched my approach with considerable anxiety, hovering about from the top of one bush to another, in the vicinity of nests containing young, uttering clear, plaintive, whistling notes of alarm, with occasional harsher, chattering cries. When undisturbed these birds perch quietly on conspicuous points, whence they dart off after passing insects or utter occasional mellow, whistling call notes. They are usually rather quiet birds, although always conspicuous from the nature of their surroundings. The upper limit of their range, near Jalapa, Vera Cruz, appears to be about 4,500 feet."

Mr. G. K. Cherrie, of San Jose, Costa Rica, has kindly presented the United States National Museum with a well-preserved nest of this species, and also a handsome set of eggs, the first fully identified specimens in the collection. Since these have been received I find that the late Col. A. J. Grayson had taken the nest and eggs of Giraud's Flycatcher near Mazatlan, Mexico, years previously, and a short but correct description of the nest is given in the Memoirs

of the Boston Society of Natural History (Vol. II, p. 286). An egg taken by him at the time is now in the collection here, and undoubtedly belongs to this species.

Giraud's Flycatcher begins nesting in Costa Rica about the first of April, and probably rears two broods in a season. The set of eggs presented by Mr. Cherrie was taken on June 30, 1890, and was, more than likely from a second laying. This gentleman describes a nest taken by him near Talamanca, Costa Rica, on April 1, 1890, as follows: "It was placed in a thorny shrub, about 5 feet from the ground, the shrub growing in a clearing by the side of a river. It is composed entirely of dry grass, externally of rather coarse stems, and lined with very fine, soft tops. It is somewhat retort shaped, resting in the forks of the limb, but is also bound to one of the branches of the fork for almost the entire length of the nest. Long grass stems hang from the front of the nest for 12 inches below the bottom; the nest measures externally 10 inches in depth by 6 inches in horizontal diameter."

The one sent to the United States National Museum, taken at the same place on April 8, 1890, is similarly constructed; it resembles the nests of our Cactus Wren very much, and might readily be mistaken for one of them.

The eggs are two or three in number, ovate in shape, rather thin shelled, and without luster; their ground color is a delicate creamy white with a faint pinkish tint, and they are sparingly marked, especially about the larger end of the egg, with minute spots of prune and heliotrope-purple and lavender.

The average measurement of five eggs in the United States National Museum collection is 23.11 by 16.76 millimetres, or 0.91 by 0.66 inch. The largest egg measures 25.91 by 16.76 millimetres, or 1.02 by 0.66 inches; the smallest, 21.34 by 16.51 millimetres, or 0.84 by 0.65 inch.

The type specimen, No. 25283 (Pl. 1, Fig. 22), from a set of three eggs, was taken by Mr. George K. Cherrie, near San Jose, Costa Rica, on June 30, 1890, and represents an average-marked egg.

94. *Myiodynastes luteiventris* SCLATER.

SULPHUR-BELLIED FLYCATCHER.

Myiodynastes luteiventris SCLATER, Proceedings Zoological Society, 1859, 42 (ex Bonaparte Compte Rendu XXXVIII, 1854, 657, nomen nudum).

(B—, C—, R 310, C 365, U 451.)

GEOGRAPHICAL RANGE: Mexico and Central America; north to southern Arizona; south to Panama.

We are indebted to Mr. W. H. Henshaw for the addition of this handsome Flycatcher to our avifauna. He says:

"This peculiar Flycatcher appears to be a summer resident of the Chiricahua Mountains in southern Arizona, where I obtained a pair of old birds, together with three young, August 24, 1874. These, though indistinguishable in size

and perfection of plumage from the adult pair, were still the objects of their solicitous care, and were dependent upon them for food. Indeed, their presence might have remained unnoticed by me had I not been greeted, as I entered the mouth of one of the deep, narrow canyons intersecting the mountains in every direction, by the shrill notes and angry cries of the old birds, who hovered in the air at a short distance, or flew restlessly from tree to tree endeavoring to distract my attention from the young, till, taking the alarm, they flew over into an adjoining ravine, where soon after I found the whole family assembled, the old birds having immediately rejoined their charges. The following day Dr. Rothrock, while out botanizing, saw what he supposed to be a second family of six or seven of these birds, so that the occurrence of the species here is probably to be regarded as by no means accidental."¹

Since then Lieut. Harry C. Benson, United States Army, and Dr. A. K. Fisher have both taken this species among the oaks in some of the canyons near Fort Huachuca, and it undoubtedly occurs regularly throughout the mountain regions of southern Arizona during the breeding season. Mr. E. W. Nelson found it not uncommon about Jalapa and Jico, in Vera Cruz, where they were noted during June and July. They were found along hedges bordering the roadsides and fields, and also among bushes on the more open parts of the slopes of hills and canyons. In their general habits they closely resemble *Myiozetetes texensis*.

Mr. Richard D. Lusk has recently sent me the following notes on the nesting of this species in southern Arizona, under date of October 14, 1894. He writes: "After watching every pair of Sulphur-bellied Flycatchers that came to my notice, all through the season, in the hope of discovering some actions that looked like nesting, I had given it up as useless, when, on the morning of August 1, I saw one in the distance fly to a hole in the main stem of a sycamore tree, about 40 feet from the ground. The bird flew first to an outer branch of the tree and made a careful reconnoiter of the vicinity. I waited and watched quietly until the programme was repeated twice, and then, after going close to the tree and ascertaining the hole to be a natural knot hole, came to the conclusion that the bird must be building, for there had been none of the species in that vicinity a few days previous when I remained there for some time hunting. Two weeks later I returned to the tree and succeeded in reaching the hole, after some difficulty. It was about 4 inches in diameter, straight in, scarcely extending below the margin of the entrance, so that the bird, sitting on the eggs, could have easily looked out of the hole. Within was a nest, which, though exceedingly simple in construction, was certainly unique in material of composition, for there was not a vestige of anything in its structure except the stems of walnut leaves, with which the bottom of the hole was lined for a depth of about half an inch.

"Three years ago Mr. O. C. Poling shot a specimen of this species of Flycatcher which had a fully developed egg in its ovary, as late as the last of July,

¹ Geographical Surveys West of 100th Meridian, Vol. V, 1875, p. 347.

and last year, about the middle of July, I shot a female that was obviously laying. I conclude from these circumstances, coupled with my experience this season, that the bird is an exceptionally late breeder, which possibly may account for no one getting on the track of their nests before, as the bird is not very uncommon in some localities in this section. Regarding their notes, I think I have noted but two distinct kinds, their discordant screech and a single call. The screech, it seems to me, is not to be compared to any bird voice I have ever heard, but might perhaps be compared to the protest of a wagon wheel that needs oiling, varying in length, but always of the same incomparable quality of tone. Once heard, it is certain to live in the memory and be recognized even after the lapse of years. I could hardly describe their single note or call without hearing it again. I only know that it does not closely resemble that of any other Flycatcher, though it might not impress one as peculiar in itself, as does their other note. I do not think it is uttered nearly as frequently as the screech.

“They are fully as quarrelsome as the average Flycatcher, at least about their nesting tree, always keeping up their discordant notes while so engaged, though if a man is about they are apt to make themselves scarce. They are much less inclined to seek an exposed, dead branch than some of the other members of this family, and seem to me at least to be much less actively engaged in their legitimate calling of catching flies than any other Flycatcher. Moreover, I have seen them repeatedly flying into wild-cherry trees, loaded with ripe fruit, and though I have not happened to be close enough at the time to see them eating the fruit, I concluded that that was what they were doing. They frequent streams bordered with large trees, seeming always to prefer sycamores, and I have rarely seen one more than 50 yards from a stream. The extreme width and size of their bills, together with their short necks, give them a peculiar appearance even at a distance.”

This nest, when taken on August 15, 1894, contained three well incubated eggs, these being the first ones actually found within our borders. They were obtained in Ramsey's Canyon, in the Huachuca Mountains, and are now in the United States National Museum collection.

As the plates for this volume had already been made up and were then in the lithographer's hands, none of them can be figured. They are broad, elliptical ovate in shape; the shell is close-grained, strong, and only slightly glossy. Their ground color is rich, creamy buff, and they are profusely blotched and spotted, principally about their larger ends, with dark pansy purple and lighter shades of lavender; these markings do not resemble the streaky pattern found in the eggs of the genus *Myiarchus*. They measure 27.18 by 19.05, 26.42 by 18.80, and 24.64 by 18.54 millimetres, or 1.07 by 0.75, 1.04 by 0.74, and 0.97 by 0.73 inches.

The specimen figured on Pl. 2, Fig. 7, was kindly loaned by Mr. William Brewster, as there were no eggs of this species in the collection at the time the plates were made up. It was taken by Mr. R. R. McLeod, near Carmen, Chihuahua, Mexico, on May 26, 1885, from a cavity in a tree.

It resembles the eggs previously described in shape and ground color, but the markings are somewhat brighter and lighter colored, and it measures only 24.89 by 19.56 millimetres, or 0.98 by 0.77 inch. The female parent, No. 23643, Brewster collection, was secured at the same time.

95 *Myiarchus crinitus* (LINNÆUS).

CRESTED FLYCATCHER.

Muscicapa crinita LINNÆUS, *Systema Naturæ*, ed. 12, I, 1766, 325.

Myiarchus crinitus LICHTENSTEIN, *Nomenclator Museo Berolinensis*, 1854, 16.

(B 130, C 247, R 312, C 373, U 452.)

GEOGRAPHICAL RANGE: Eastern United States; north to the Provinces of New Brunswick, Quebec, Ontario, and Manitoba, Dominion of Canada; west to Minnesota, eastern Nebraska, eastern Kansas, eastern Indian Territory, and slightly beyond the eastern half of Texas; south in winter through eastern Mexico to Panama and Colombia, South America.

The Crested or Great Crested Flycatcher is a common summer resident in suitable localities throughout the eastern United States, and breeds from Florida and the Gulf Coast northward, including the southern portions of the Dominion of Canada. The western limit of its breeding range in Texas extends somewhat beyond the eastern half of the State into Tom Green County, and thence in a northeasterly direction to Minnesota and southern Manitoba. While the majority of these birds pass beyond our borders in winter, not a few remain on the Florida peninsula and the adjacent keys throughout this season, probably birds from the extreme northern portions of their breeding range. The majority reenter the United States between March 25 and April 10, moving leisurely along, and usually arriving on their breeding grounds in the Middle States about the latter part of April, and correspondingly later farther northward. In northern New York and thence west to Minnesota they are rarely noticed before the middle of May. The return migration from their breeding grounds in the extreme northern limits of their range commences in the latter part of August, and few of these birds remain into September.

The Crested Flycatcher, though not particularly rare along our northern border, is far more common in our Middle and Southern States, though perhaps not as often observed as its abundance would warrant. Its characteristic call notes may generally be heard in any piece of woods containing some dead timber and situated not too far from water. During the mating season it is one of the noisiest of our Flycatchers, and its loud, ringing call notes can be heard quite a distance. It utters a variety of sounds; the most common is a clear whistle like "e-whit-huit," or "wit-whit, wit-whit," repeated five or six times in a somewhat lower key, and varied to "whuir, whuree," or "puree," accompanied by various turnings and twisting of the head. Its alarm note is a penetrating and far-reaching "whēek, whēek," and it took me some time to make sure that it was made by this species. I had previously attributed it to a Shrike; but one

morning, while making observations, I found a brood of young Crested Flycatchers, barely able to fly, which the parents vainly tried to coax away from the neighborhood, and I identified the makers of this note fully. The depressed crest was raised while uttering it, and the calls were repeated for minutes at a time, as the young were not inclined to leave the trees they were in.

Mr. J. W. Preston writes me: "I heard a peculiar note of this Flycatcher one evening at sunset. The singer was perched in the top of a tall tree, and along with the ordinary song it uttered a clear, liquid 'birdie-birdie,' with much the same tone and energy of the Cardinal's song."

I consider this Flycatcher much shyer and generally more retiring than other species of this family, like the Kingbird, Wood Pewee, Phœbe, etc., and, although probably equally abundant in some sections as the species mentioned, it is not nearly as often noticed. It appears to me to be rather unsocial in its habits, and one will rarely see more than a pair together excepting during the migrations. From my own observations, I take it also to be more intolerant toward smaller birds generally than other Flycatchers, but not as pugnacious as the Kingbird toward larger birds. Among each other they are rather quarrelsome, and after a pair has selected a nesting site no intruders are allowed to encroach on their range.

The late Colonel Goss says: "They fight fiercely for a mate, and they have a habit that I have not noticed in other birds, of plucking, if possible, the tail feathers of a rival, in order to disfigure him, so that he will not be looked upon with favor by the opposite sex; and when lucky enough to pull a feather, it is amusing to see them fuss over it, picking, pulling, in fact fighting it, forgetting for the time the owner in their exultation over the capture."¹

Its favorite haunts are the heavily timbered bottom lands along the banks of streams and the borders of timbered tracts contiguous to water, and generally at some little distance from human habitations. Sometimes an exception is found to this rule, and pairs of these Flycatchers have been known to nest in close proximity to dwellings, and even in such artificial nesting sites as martin boxes, etc.

From an economic point of view the Crested Flycatcher must be considered an extremely useful bird. Its food consists mainly of insects, such as beetles, various species of flies, grasshoppers, butterflies, moths, and larvæ, varied in the late summer with wild berries of different kinds. Its flight is strong, swift, and graceful, but rarely protracted. Each bird has a few favorite perches within its range, generally a dead limb near the top of a tree on the edge of a wood, whence it darts after passing insects, which seldom escape capture; these are then carried to the nearest perch and devoured at leisure. I have seen it double in the chase with as much ease as a Falcon, and the sharp snapping of its mandibles indicated plainly that its sudden dash was successful.

Nidification commences ordinarily some two or three weeks after its arrival on the breeding grounds, each pair of birds selecting a suitable nesting

¹ History of the Birds of Kansas, 1891, p. 360.

site, consisting usually of a natural cavity in some tree near the borders of a forest, in an old orchard, or in a dead stump leaning over water, and frequently an abandoned excavation of one of the larger Woodpeckers is used. Natural cavities are preferred, however, where such are obtainable, even should these be much more extensive than are really needed, as instances are known where openings in hollow limbs fully 6 feet deep have been filled up with rubbish to within 18 inches of the top before the nest proper was begun. Both sexes assist in nest-building, and it takes sometimes fully two weeks before their task is completed. The finishing and lining of the nest is generally completed by the female. In Florida and other Southern States nidification begins ordinarily during the first two weeks in May; in the Middle States, in the latter half of this month and the first week in June; and in the more northern portions of its breeding range, rarely before the middle of this month, or not until the weather has become quite warm.

The nests of the Crested Flycatcher vary greatly in bulk and composition according to the localities in which they are placed. The trees most frequently used for nesting sites are old apple or pear trees, different species of oaks, maple, ash, cottonwood, and pines. A nest taken by Mr. J. W. Preston on June 3, 1881, near Eldora, Iowa, from a dead stump about 6 inches in diameter, standing on the banks of the Iowa River, and which filled 8 inches of the cavity, began with a base of coarse trash and was finished with fine twigs, bunches of cattle hair, pine needles, dry leaves and grasses, the tail of a rabbit, pieces of Catbirds' eggshells, exuviae of snakes, owl and hawk feathers, tufts of woodchucks' hair, and fine grass roots. Another nest, taken by Dr. W. L. Ralph, near San Mateo, Florida, on May 16, 1892, was placed in a hole in the side of a rotten stump in low, flat pine woods, and was composed of dry cypress leaves, pine needles, grasses, sphagnum moss, dead leaves, bunches of hair, snake exuviae, strips of cypress bark, weeds, grass roots, palmetto fiber, and feathers; it was lined with bunches of hair, feathers, strips of cypress bark, and pieces of snake skin.

Exuviae of snakes seem to be present in the majority of the nests of this species; they are sometimes incorporated in the nest proper, and again they are placed around the sides of it, in all probability for protective purposes, and are changed and rearranged from time to time. But few nests are found which do not contain more or less of this material, and occasionally whole skins enter into their composition.

Mr. W. E. Loucks, of Peoria, Illinois, writes me: "I found a very remarkable nest of the Crested Flycatcher some years ago. The curious feature about it was that the birds had taken an enormous snake skin, probably that of a black-snake, and had so arranged it within the entrance of the cavity that the greater part of it hung outside. What other motives could the birds have had than that of alarming intruders? Although usually a bird of the woods, I have found their nests in a summerhouse on a picnic ground. The house was quite large and frequented nearly every day by crowds of people; nevertheless this did not disturb

the birds in the least. They had selected a corner inside under the eaves, and on a shelf-like projection reared their young in perfect safety." I know of an instance where a pair built their nest in the open end of a stovepipe running out from the side of a cabin near Washington, District of Columbia, and also where these birds built in a stack of railroad ties close to the track over which a number of trains passed daily.

The Crested Flycatcher builds at various heights ranging from 2 to 60 feet, but usually not much over 20 feet from the ground. The nesting cavities selected are ordinarily from 18 to 30 inches deep and others are considerably deeper, while occasionally one is quite shallow. The inner cup of the nest varies from $2\frac{3}{4}$ to $3\frac{1}{2}$ inches in diameter and from $1\frac{1}{2}$ to 2 inches in depth.

The eggs vary from four to eight in number, sets of five being perhaps most often found, while those of six are not particularly rare. Mr. J. W. Preston, of Baxter, Iowa, writes me that he took a set of seven eggs on June 6, 1886, from a hollow in a dead limb which had been broken off, and in falling lodged against some small saplings. The eggs were fresh and warmly covered with duck feathers. The oölogical collection in the Academy of Natural Sciences, Philadelphia, Pennsylvania, contains a set of eight eggs, which I have personally examined. The parents are usually not very demonstrative when their nests are disturbed, and but rarely scold at the intruder. As a rule but one brood is reared in a season, and incubation lasts about fifteen days; the female attends to these duties almost exclusively, but is not a very close setter, and it is not uncommon to find addled eggs in the nests of this species. An egg is deposited daily until the set is completed. The young are fed principally on insects of various kinds, and are able to leave the nest in about two weeks; they are cared for by both parents until expert enough to care for themselves.

The eggs of the Crested Flycatcher and those of the remaining members of the genus *Myiarchus* are most peculiarly marked, and differ in this respect from all other North American species, excepting the White-necked Raven, whose eggs resemble these somewhat in the style of markings, but not otherwise. Their ground color varies from creamy to vinaceous buff, and this is overlaid with irregular blotches, longitudinal streaks and scratches, fine hair lines of different shades of claret, liver brown, purple, and lavender, as if done with a pen, giving the egg a unique appearance. In the majority of specimens these markings are heaviest about the larger axis of the egg; in others they are more evenly distributed, and in an occasional set the smaller two-thirds of the eggs are nearly unspotted, and but few streaks and scratches are noticeable, as shown in one of the figured types; but such instances are rare. They are mostly ovate or short ovate in shape, varying occasionally to elliptical or elongate ovate. The shell is close grained, rather firm, and slightly glossy.

The average measurement of ninety-one eggs in the United States National Museum collection is 22.54 by 17.47 millimetres, or about 0.89 by 0.69 inch. The largest egg of the series measures 24.38 by 17.78 millimetres, or 0.96 by 0.70 inch; the smallest, 20.57 by 15.24 millimetres, or 0.81 by 0.60 inch.

The type specimen, No. 20436 (Pl. 2, Fig. 8), from a set of four eggs, Bendire collection, was taken in Black Hawk County, Iowa, June 19, 1876; and No. 26262 (Pl. 2, Fig. 9), also from a set of four, near Richmond, Virginia, June 7, 1879, by First Lieut. Wirt Robinson, United States Army. The first represents one of the heavier, the latter one of the least marked types.

96. *Myiarchus mexicanus* (KAUP).

MEXICAN CRESTED FLYCATCHER.

Tyr[annula] mexicana KAUP, Proceedings Zoological Society, 1851, 51.

Myiarchus mexicanus LAWRENCE, Annals Lyceum, New York, IX, May, 1869, 202.

(B 132, C —, R 311, C 374, U 453.)

GEOGRAPHICAL RANGE: Lower Rio Grande Valley in Texas; south through eastern and southern Mexico, and in winter to Guatemala and Salvador, Central America.

The Mexican Crested Flycatcher is a common summer resident of the table-lands of eastern and southern Mexico, and reaches the northern limits of its breeding range in the lower Rio Grande Valley, in Texas, beyond which it apparently does not pass, but here it is not at all rare in suitable localities.

Dr. James C. Merrill, United States Army, while stationed at Fort Brown, Texas, first discovered this species as a summer resident of our fauna, and described its nest and eggs in the Bulletin of the Nuttall Ornithological Club (Vol. III, 1878, p. 100), from specimens taken on May 10, 1877. The nest was placed in the end of a broken branch of an anacahuite tree, about 10 feet from the ground. It was made of locks of wool and hairs, and contained five eggs, slightly advanced. He informs me that there is but little difference in the general habits, food, and call notes of this species from those of the better-known Crested Flycatcher of the eastern United States. Like this, it is only a summer resident within our border, arriving in the lower Rio Grande Valley about the beginning of April and returning to its winter home in Central America the latter part of September. It nests mainly in natural cavities in mesquite trees or in old rotten stumps, and occasionally in abandoned holes of some of the larger Woodpeckers, in telegraph poles, and in open woods, from 5 to 20 feet from the ground. The nests, according to Sennett, are composed of a matted felt consisting of soft strips of bark, feathers, hair, and wool, with sometimes bits of snake skins intermingled, but this material is apparently not nearly as generally used by this species as seems to be the case with our eastern bird.

Nidification commences sometimes before the middle of April and lasts through May. The latest date I have is June 5; the earliest, April 18, when a set of five fresh eggs was taken. Probably but one brood is raised in a season. Mr. G. B. Sennett flushed a male from a nest containing six eggs on May 16, 1878, which shows that it assists, occasionally at least, in the duties of incubation. The number of eggs laid to a set varies from four to six, sets of five being most frequently found. They resemble the eggs of the Crested Flycatcher very

closely in size, shape, and style of markings, and can not be positively distinguished from them; on the whole, however, they are not quite so heavily marked, and the ground color is frequently more of a light cream tint than a cream buff.

The average measurement of seventy-seven eggs in the United States National Museum collection is 22.35 by 17.53 millimetres, or 0.88 by 0.69 inch. The largest egg of the series measures 23.88 by 18.29 millimetres, or 0.94 by 0.72 inch; the smallest, 19.81 by 17.02 millimetres, or 0.78 by 0.67 inch.

The type specimens, Nos. 24939 and 25318 (Pl. 2, Figs. 10 and 11), both from sets of five eggs, Ralph collection, were taken near Brownsville, Texas, the former on June 5, 1891, the latter on May 7, 1892, and represent the average and lighter styles of coloration.

97. *Myiarchus mexicanus magister* RIDGWAY.

ARIZONA CRESTED FLYCATCHER.

Myiarchus mexicanus magister RIDGWAY, Proceedings Biological Society, Washington, II, April 10, 1884, 90.

(B —, C —, R —, C —, U 453a.)

GEOGRAPHICAL RANGE: Western Mexico; north to southern Arizona and southwestern New Mexico; south in winter to Tehuantepec, Mexico.

The Arizona Crested Flycatcher is the largest representative of the genus *Myiarchus* found within our borders, and its breeding range seems to be confined mainly to the giant cactus belt of southern Arizona, where it appears to be a rather irregular summer resident, not uncommon in some seasons and rare in others. I failed to notice it while collecting in the vicinity of Tucson, in the spring and summer of 1872, and Mr. Herbert Brown, who tried to secure the nest and eggs for the United States National Museum, in 1893, was equally unsuccessful, while Mr. F. Stephens reported them as rather common in the same locality in the latter part of May and throughout June, 1881, securing over a dozen specimens during the time. Mr. William Brewster, in a paper on "A Collection of Arizona Birds," makes the following remarks on this subspecies:

"The collector's notes (F. Stephens) relating to the habits of this Flycatcher are disappointingly brief. It frequented low mesquites, and was tame and rather noisy, having a variety of loud calls, some of which resembled those of *Myiarchus cinerascens*, while others were 'almost Thrasher-like.' Its food seemed to consist largely of beetles. On June 27 a nest was found at Camp Lowell. 'Both parents were distinctly seen and positively identified. The nest was in an old Woodpecker's hole in a giant cactus, about 18 feet from the ground. It was lined with soft, downy weed seeds, and contained two young just hatched and an addled egg.' The egg, unfortunately, is so badly broken that accurate measurements are impossible, but an approximation would be 1.04 by 0.74 inches. In ground color and markings it closely resembles the eggs of *Myiarchus crinitus*,

the shell being a dull, clayey buff, over which are numerous longitudinal lines and dashes of purplish brown or lavender. These markings are pretty evenly distributed, but are coarsest at the larger end of the egg."¹

Mr. Stephens has kindly furnished me with some additional notes on this subspecies, and says: "The Arizona Crested Flycatcher seems to breed only in the giant cactus, and is rather common in certain localities. A set of five eggs, taken May 24, 1884, near Camp Lowell, was found in an old Woodpecker's hole in an arm of a giant cactus, 20 feet from the ground. The female was on the nest, and was shot. Incubation had just commenced. The nest was lined with hair of various kinds, mixed with bits of snake and lizard skin."

Mr. W. E. D. Scott also met with this Flycatcher about Tucson, Florence, Riverside, and in the foothills of the Catalina Mountains, up to about 4,500 feet. He states: "In the Catalinas, altitude 4,000 feet, this subspecies arrives about April 20, and remains until late in August or early in September. I found a nest at this point built in a deserted Woodpecker's hole in a dead sycamore stub. It was entirely similar in construction to that of *Muscicapa crinitus*, even to the traditional snake skins, and contained five eggs nearly ready to be hatched, very similar to those of *Muscicapa crinitus*, save that they are a little larger. But one brood is reared in the Catalina region."²

From three to five eggs seem to constitute a set. Nidification commences sometimes during the latter part of May, but more frequently in the beginning of June. Judging from the only specimen in the United States National Museum, the egg of the Arizona Crested Flycatcher resembles that of *Myiarchus mexicanus* closer than that of *Myiarchus crinitus*. It is not as heavily marked as the average eggs of the latter; the ground color is more of a creamy buff; the markings are not quite so profuse, and resemble those of the first more.

The only egg of this subspecies in the United States National Museum collection is the figured type, No. 25195 (Pl. 2, Fig. 12). This was taken by Dr. A. K. Fisher, June 12, 1892, on Rillito Creek, near Tucson, Arizona, from an old Woodpecker's hole in a giant cactus, about 8 feet from the ground. The nest contained one young bird just out of the shell, three eggs on the point of hatching, and an addled egg, the only one that could be saved; this measures 25.65 by 18.03 millimetres, or 1.01 by 0.71 inches, and is elliptical ovate in shape. The shell is strong, feels smooth to the touch, and is somewhat glossy.

¹ Bulletin Nuttall Ornithological Club, Vol. VII, 1882, p. 203.

² The Auk, Vol. IV, 1887, pp. 17, 18.

98. *Myiarchus cinerascens* LAWRENCE.

ASH-THROATED FLYCATCHER.

Tyrannula cinerascens LAWRENCE, Annals Lyceum of Natural History, New York, V, 1851, 121.

Myiarchus cinerascens LAWRENCE, Annals Lyceum of Natural History, New York, VII, May, 1860, 285.

(B 131, C 248, R 313, C 375, U 454.)

GEOGRAPHICAL RANGE: Western United States; north to southern Oregon, Nevada, Utah, and southern Colorado; east to New Mexico and southwestern Texas; south through Arizona and Lower California, and over the table-lands of Mexico; in winter to Guatemala, Central America.

Within the United States the Ash-throated Flycatcher is only a summer resident, and its breeding and geographical range correspond. It returns from its winter haunts in Guatemala and southern Mexico to southwestern Texas and southern Arizona about the beginning of March, and reaches the more northern points of its range about a month later. Climatic conditions do not seem to affect the Ash-throated Flycatcher to any extent, for it is as much at home in the mountain fastnesses of the southern Sierra Nevadas, where Lieutenant Benson found it breeding commonly in the Sequoia National Park, in Tulare County, California, at an altitude of 9,000 feet, as in Death Valley, probably the hottest place in the United States, where a pair of these birds were seen at Furnace Creek, on June 21, 1891, by Dr. A. K. Fisher. It is fairly common at Redding and Baird, in Shasta County, and at Red Bluff, Tehama County, California, and reaches about the northern limits of its breeding range in southern Oregon, where it is rare. I found a single nest of this species containing five young birds about ten days old, in a natural cavity in a juniper tree near Camp Harney, Oregon, on June 20, 1876, but they appear to be very rare there, as no others were noticed.

The Ash-throated Flycatcher is rather retiring in its habits, and is oftener heard than seen. In the vicinity of Tucson, Arizona, in the season of 1872, I found it quite common and examined a number of nests. Their favorite haunts were the denser mesquite thickets in the creek bottoms, oak groves along hill-sides, and the shrubbery in canyons leading down from the mountains, but I also saw them occasionally on the more open plains covered with straggling mesquite trees and patches of cholla and other species of cacti. It is not nearly as noisy a bird as *Myiarchus crinitus*, but otherwise resembles it in its general habits. Its principal call note is a clear "huit, huit," a number of times repeated, which sounds very much like the ordinary call of the *Phainopepla*; it also utters some low, whistling notes which are not at all disagreeable to the ear. In the spring of 1872 it became abundant about the latter half of March, and several of these birds might be seen chasing each other through the mesquite forests in almost every direction, within a few hundred yards of my camp on Rillito Creek, but nidification did not appear to begin till near the end of May.

The Ash-throated Flycatcher is quite expert on the wing, but never indulges in protracted flights if it can help it. It seems to be rather quarrelsome and intolerant in its disposition toward other birds, and will not allow any to nest in close proximity; in fact, I am inclined to believe that it not infrequently dispossesses some of the smaller Woodpeckers, like *Dryobates scalaris bairdi*, of its nesting sites, as I have found its nests on two occasions in newly excavated holes, the fresh chips lying at the base of the tree, showing plainly that they had only recently been removed.

Its food consists mainly of beetles, butterflies, grasshoppers, flies, moths, and occasionally of berries, especially those of a species of mistletoe (a parasitic plant) growing abundantly on many of the trees found in southern Arizona.

By the beginning of May most of the birds are mated, and nidification begins shortly afterwards. The nests are usually placed in knot holes of mesquite, ash, oak, sycamore, juniper, and cottonwood trees, as well as in cavities of old stumps, in Woodpeckers' holes, and occasionally behind loose pieces of bark, in the manner of the Creepers. On two occasions, near Tucson, I found the Ash-throated Flycatcher using abandoned nests of the Cactus Wren, and Mr. A. W. Anthony found them nesting in the dry blossom stalks of the yucca and *Agave americana* in southwestern New Mexico. They also nested in similar localities in Lower California, in the San Pedro Martir Mountains, where he observed them at altitudes of 9,000 feet. In a letter dated July 8, 1894, he informs me that this Flycatcher was the most common species about his camp south of San Quentin, Lower California, and that many nested there, as well as about the Mission of San Fernando, in holes made by Woodpeckers in the giant cactus. Mr. H. P. Attwater reports this bird as common about San Antonio, Texas, and in this locality it reaches about the eastern limit of its range in the United States. Mr. Robert Ridgway met with it in various places in Nevada, and as far east as the Wasatch Mountains in Utah.

The Ash-throated Flycatcher nests at various heights from the ground, rarely, however, at greater distances than 20 feet. The nest varies considerably in bulk according to the size of the cavity used. Where this is large, the bottom is filled up with small weed stems, rootlets, grass, and bits of dry cow or horse manure, and on this foundation the nest proper is built. This consists principally of a felted mass of hair and fur from different animals, and occasionally of exuviae of snakes and small lizards; but these materials are not nearly as generally used as in the nests of our eastern Crested Flycatcher—in fact, it is the exception and not the rule to find such remains in their nests. Among about fifteen nests of this species examined by myself I only found it in three cases. As nearly as I have been able to observe, I think the female does most of the work on the nest, but the male follows her around while in search of material, and apparently guards and sings to her. I have known a pair of these birds to finish a nest in one day. This was placed in a knot hole in a mesquite stump, about 8 feet from the ground, and composed entirely of deer hair. Some of my Indian guides had dressed a couple of skins near by, and this furnished the

birds an abundant supply of suitable building material, of which they promptly availed themselves. While the walls in some nests are thick and well lined, in others there is but little attempt at lining the sides of the cavity, and only a small amount of hair is placed in the bottom of the hole on which the eggs are deposited. It depends entirely on the amount of room, and it is surprising how little space is really required by them in which to rear a family. The inner cup of a well-preserved nest of this Flycatcher, placed behind a loose piece of bark of an old cottonwood stump, measures about $2\frac{1}{2}$ inches in diameter by 2 inches in depth. The walls of this nest are composed exclusively of cattle hair, which is well quilted together and forms a fairly strong felt. The base is formed of dry grass roots, and it was placed between the soft inner and the outer bark of the tree, which kept it intact and held it firmly in position.

I discovered the first nest of this species in a dense piece of mesquite woods on May 26, 1872, and between this date and June 24 I found fifteen others, with eggs, and several with young birds, some of these being fully fledged. Not one of these nests contained more than four eggs, quite a number only three, and I do not believe that more than one brood is raised in a season. The female, I think, attends to the duties of incubation exclusively, which lasts about fifteen days. She is not a close sitter, and often leaves the nest for hours, especially during the heat of the day, but remains close by. The young are fed on the soft portions of insects, and leave the nest in about two weeks, following the parents about for some time before they are able to care for themselves. This Flycatcher leaves for its winter home about the latter part of September.

The number of eggs to a set ranges from three to six, but sets of the latter number are very rare; four are more frequently found; and an egg is deposited daily. The ground color varies from a light cream to a pinkish buff, and this is covered more or less profusely with fine longitudinal streaks and hair lines of dark purple and lavender, rarely with large, irregularly shaped blotches. The general pattern of these markings is finer than in the eggs of *Myiarchus crinitus*, and the majority can be readily distinguished from those of the latter, but not so easily from the lighter-colored types of *Myiarchus mexicanus*. In shape they vary from ovate to elliptical ovate. The shell is fine-grained, rather strong, and slightly glossy.

The average measurement of fifty-four eggs in the United States National Museum collection is 22.40 by 16.51 millimetres, or about 0.88 by 0.65 inch. The largest egg of the series measures 23.88 by 17.78 millimetres, or 0.94 by 0.70 inch; the smallest, 20.32 by 15.24 millimetres, or 0.80 by 0.60 inch.

The type specimen, No. 25218 (Pl. 2, Fig. 13), is from a set of five eggs, and was taken by First Lieut. Harry C. Benson, United States Army, in Sequoia National Park, Tulare County, California, on May 25, 1892.

99. *Myiarchus cinerascens nuttingi* (RIDGWAY).

NUTTING'S FLYCATCHER.

Myiarchus nuttingi RIDGWAY, Proceedings U. S. National Museum, V, 1882, 394.*Myiarchus cinerascens nuttingi* ALLEN, Bulletin American Museum Natural History, IV, December, 1892, 346.

(B 131, part; C 248, part; R 313, part; C 375, part; U 454a.)

GEOGRAPHICAL RANGE: Arizona and southward through western Mexico; in winter to Costa Rica, Central America.

Nutting's Flycatcher has only recently been added to our avifauna. Dr. A. K. Fisher, while on a collecting trip through Arizona, for the United States Department of Agriculture, in the spring and summer of 1892, stopped a few days at Tucson and visited Rillito Creek, on June 12, 1892, in company with Mr. Herbert Brown, who acted as guide. While driving about among the groves of mesquite and giant cactus a Flycatcher was flushed from an old Woodpecker's hole in a giant cactus. The bird was secured, as well as a set of four fresh eggs. On comparing the specimen with the type in the United States National Museum, it proved to be *Myiarchus cinerascens nuttingi*, a small southern representative of *Myiarchus cinerascens*, not yet recorded from the United States.

Subsequently Mr. J. Alden Loring took another female at Prescott, Arizona, on June 22; and in the U. S. Department of Agriculture collection there is still another specimen, taken by Mr. Vernon Bailey at Oracle, Arizona, June 15, 1889.¹

As yet little is known about the range and general habits of this subspecies, but it would appear from the above that it is pretty generally distributed over at least the southern half of this territory, and the most surprising thing is that it has been overlooked so long. It probably differs but slightly in its food and call notes from the other members of the genus *Myiarchus*, and its nesting habits seem likewise to be similar.

Its nest, which in construction resembles that of the preceding species, was placed in an old Woodpecker's hole in a giant cactus, about 4 feet from the ground, and contained four fresh eggs. These do not materially differ in appearance from the eggs of the Ash-throated Flycatcher. They are elliptical ovate in shape, and measure 24.38 by 17.02, 24.13 by 16.76, 24.89 by 17.02, and 23.88 by 17.53 millimeters, or 0.96 by 0.67, 0.95 by 0.66, 0.98 by 0.67, and 0.94 by 0.69 inch.

The type specimen, No. 25194 (Pl. 2, Fig. 14), is the last one whose measurement is given, and was taken as already stated.

¹ See *The Auk*, Vol. IX, 1892, p. 394.

100. *Myiarchus lawrenceii* (GIRAUD).

LAWRENCE'S FLYCATCHER.

Muscicapa lawrenceii GIRAUD, Sixteen Species of Texas Birds, 1841, 9 (by actual counting, the text not being paged).

Myiarchus lawrenceii BAIRD, Birds of North America, 1858, 181.
(B 133, C 248, R 314, C 376, U [455].)

GEOGRAPHICAL RANGE: Eastern Mexico; north to the lower Rio Grande Valley, in Texas; south to Guatemala, Central America.

Lawrence's Flycatcher holds a place in our avifauna on Giraud's record from the lower Rio Grande, in Texas, but it has not since been obtained there by any of the numerous collectors who have visited this region. At best it can only be regarded as a rare straggler within our borders. Although a common species in many parts of eastern Mexico, very little has been written about its general habits, which probably differ but slightly from those of its somewhat better-known western representative, *Myiarchus lawrencei olivascens*.

There is a short reference to the eggs of this species in the "Proceedings of the Zoological Society of London, 1859" (p. 384), based on specimens taken by M. A. Boucard, at Talca, Oaxaca, Mexico. They are described as pure white, with spots of two shades of brown, principally toward the larger end, where they form a ring, and measure 0.70 by 0.525 inch.

I doubt this identification, for so far as known none of the genus *Myiarchus* lay eggs in which the ground color can be called pure white, and their small size also renders it probable that they are not of this species.

101. *Myiarchus lawrencei olivascens* RIDGWAY.

OLIVACEOUS FLYCATCHER.

Myiarchus lawrencei olivascens RIDGWAY, Proceedings Biological Society, Washington, II, April 10, 1884, 91.

(B —, C —, R —, C —, U 455a.)

GEOGRAPHICAL RANGE: Western Mexico; north to southern Arizona; south in winter to southern Mexico, including Yucatan. Accidental in Colorado.

This interesting subspecies, which is the smallest of the *Myiarchi* found within our borders, was first discovered as a summer resident in the Santa Rita Mountains, Arizona, close to the Mexican boundary line, by Mr. F. Stephens, in the spring of 1881, and added to our fauna by Mr. William Brewster shortly afterwards.¹

Mr. Stephens sent me the following notes on the Olivaceous Flycatcher: "I have seen this bird only in the Santa Rita Mountains, where it is common. I have taken incubating females in May and June, but never saw their eggs.

¹ Bulletin of the Nuttall Ornithological Club, Vol. VI, 1881, p. 252.

I suppose they breed in knot holes, Woodpecker's holes, etc., and I opened many such where they were present, but found no eggs, and but one hole that seemed to be occupied by them; this was an old Woodpecker hole well lined with hair."

Mr. William Brewster, in a paper on Arizona birds, based on material collected by Mr. Stephens, makes the following observations: "This pretty *Myiarchus*, scarcely larger than our common Phoebe, was met with only among the Santa Rita Mountains, where it was apparently not uncommon, although its distribution seemed to be very local, most of Stephens's specimens being taken in a single canyon. They haunted the banks of streams, perching on dead limbs, and taking frequent flights after insects. The only note heard was a short, mournful 'peeur.' No nests were found, but a female, shot May 17, was laying."¹

Since then the Olivaceous Flycatcher has also been taken in the Huachuca Mountains by Lieut. H. C. Benson, United States Army, as well as by Dr. A. K. Fisher, who tells me that they frequent the low scrub oaks in the canyon bottoms, where they are moderately common in both these and the Chiricahua Mountains. Mr. W. E. D. Scott likewise obtained specimens in a canyon of the Catalina Mountains, at an altitude of 5,000 feet, on June 13, 1884; and a straggler has also been recorded from Colorado, taken by Capt. P. M. Thorne, Twenty-second Infantry, United States Army, near Fort Lyon, May 11, 1884. Its breeding range evidently extends through the mountain regions of southern Arizona, where it appears to be confined to the numerous canyons, whose bottoms and sides are covered with low shrubbery; it seems to avoid the larger river valleys and the open cactus and mesquite covered plains.

The late Col. A. J. Grayson says: "This little Flycatcher is very abundant in the Marias, where I met with them every day in all parts of the woods. The islands must be their most natural and favorite abode."²

Nothing positive seems to be known about the eggs of the Olivaceous Flycatcher. There is a set of four eggs in the United States National Museum collection, No. 13327, taken by Dr. E. Palmer, near Camp Grant, Arizona, in 1867, entered as *Myiarchus mexicanus*, which I believe belong to this subspecies. They resemble the eggs of the Ash-throated Flycatcher very closely, but are somewhat smaller than the average egg of this species.

¹Bulletin Nuttall Ornithological Club, Vol. VII, 1882, pp. 204, 205.

²Proceedings Boston Society of Natural History, 1871, p. 278.

102. *Sayornis phœbe* (LATHAM).

PHŒBE.

Muscicapa phœbe LATHAM, Index Ornithological, II, 1790, 489.

Sayornis phœbe STEJNEGER, Auk, II, Jan., 1885, 51.

(B 135, C 252, R 315, C 379, U 456.)

GEOGRAPHICAL RANGE: Eastern North America; north to New Brunswick and the Provinces of Quebec, Ontario, Manitoba, Saskatchewan, and southern Athabasca to Great Slave Lake, Forts Rae, Simpson, and Resolution, Northwest Territory, Dominion of Canada; west to eastern North and South Dakota, eastern Nebraska, Kansas, the Indian Territory, and western Texas; casual to eastern Colorado and British Columbia; south in winter to eastern Mexico and Cuba.

The Phœbe, also locally known as the "Phœbe Bird," "Pewee," "Bridge," "Barn," or "House" Pewee, "Pewit Flycatcher," and in the Piedmont region of South Carolina as "Gnatcatcher," is pretty generally distributed as a summer resident, and breeds throughout all the States east of the Mississippi River, excepting Florida and the southern portions of South Carolina, Georgia, Alabama, and Mississippi, where it is only found in the mountainous parts. It has been recorded as breeding in southern Louisiana and portions of Texas. The most southern breeding records I have been able to find are those given by Dr. Leverett M. Loomis, in Pickens and Greenville counties, South Carolina, in "The Auk" (Vol. VII, 1890, p. 39, and Vol. VIII, 1891, p. 328); by Mr. Frank M. Cooms, in St. Mary's Parish, Louisiana, in "The Auk" (Vol. IX, 1892, p. 205); and by Mr. H. P. Attwater, in canyons along the mountain streams in the hilly country west of San Antonio, Texas, in "The Auk" (Vol. IX, 1892, p. 236).

Longitude 100° (west of Greenwich) marks about the western limits of its breeding range in the United States, but in the Northwest Territory it reaches west to nearly 122° at Fort Simpson, on the Mackenzie River, in latitude 62° 12' N., where Mr. B. R. Ross, of the Hudson Bay Company, obtained a female, No. 22613, in May, 1861, which is now in the United States National Museum collection. This point, as far as yet known, marks both the western and northernmost limits of its range. Its nests and eggs have also been taken on Lesser Slave Lake, in southern Athabasca, by Mr. S. Jones; and near Fort Rae, Great Slave Lake, by Mr. R. MacFarlane; it has also been obtained by Mr. James Lockhart, at Fort Resolution; and Mr. A. McKay found the Phœbe common about Pelican Narrows, Keewatin, in June, 1891, sending several sets of eggs from there to the United States National Museum collection. He says in his notes accompanying them that "here they build in natural cavities in trees and in crevices of rocks. The Indians call them 'Moose-birds,' as they often use moose hair in lining their nests; they lay in June, and are very bold for their size, often chasing Hawks and Crows."

Many of these birds remain in Florida and the Southern States bordering the Gulf coast during winter, but the majority pass beyond to Cuba and eastern Mexico. Their flight is swift and strong when in pursuit of an enemy or while

in quest of food, but ordinarily it consists of slow, fluttering movements from point to point, especially during the mating season, and it is then never protracted.

The Phœbe, like our equally well-known Robin and Bluebird, is one of the first migrants to return from its winter home, and is quite as well known and fully as popular. It usually arrives in our Middle States during the first half of March, and a little later farther north, although occasional stragglers have been observed in Maine and northern New York during the first week in this month. The males precede the females by about a week or ten days, and move direct to their breeding grounds; mating and nest building usually beginning about a month later. Few of our native birds are more esteemed than the homely and plainly colored Phœbe, and its return to the old haunts is generally looked for with pleasure. No bird is more attached to a locality once chosen for a nesting site, and no reasonable amount of annoyance and disturbance will cause it to forsake its old home. It may possibly change the location for good cause, but if it does, it will usually select another in the immediate vicinity. It would be difficult to name many native birds who do more good in a general way and less harm than the Phœbe. Its food consists mainly of small beetles, flies, moths, butterflies, etc., of which it destroys an enormous number, as it is scarcely ever at rest, darting after passing insects and catching them both on the wing and on the ground. It seems to be always hungry, and invariably finds room for another choice morsel. It is said to help itself occasionally to trout fry, but the damage caused in this respect must be very trifling, and is fully compensated for by the good it does through the destruction of many noxious insects; and, in my opinion, it deserves the fullest protection. After the berry season commences it also feeds to some extent in summer on raspberries, strawberries, mulberries, and pokeberries, and in winter on cedar berries, palmetto berries, smilax berries, and wild grapes. It is one of the most restless little creatures I know; even while perching on a fence post, the gable of an outbuilding, or a weed stalk, its crest is often raised and lowered, its tail is forever twitching, and it appears to be unable to remain motionless for more than a minute at a time.

Dr. Ralph tells me that in Florida the Phœbe frequently alights on the backs of cattle and follows them around, catching the flies on these animals, and fluttering above them in search of insects. Their rather plaintive call notes, given by most writers as "phœbe, pe-wee, phe-be," and "pe-weet," do not sound to me in that way; they appear rather to approach the words "see-héé, see-héé," and are sometimes varied to "see-béé," or "see-whéé," with the accent on the last syllable; this call is occasionally followed by a rattling note. Its alarm note sounds like "tchäk-tchäk," and during the mating season the male indulges now and then in a low, twittering warble. It utters its calls very frequently and persistently in the early spring and for some time after its arrival, but less often during the breeding season, when the cares of housekeeping absorb more of its time.

Mr. Eugene P. Bicknell makes the following pertinent comments on its song: "It is one of those which appeal to the sympathies rather than to the ear,

fully making up in sincerity what it lacks of music. Still it must be reluctantly admitted that later, when more graceful and gifted songsters are with us, the plain Phoebe does appear a trifle unsophisticated and its notes may grow monotonous. Nevertheless, their jerky character seems to be held in high opinion by their author, and is admirably seconded by its tail."¹

In well-settled sections it loves to frequent outhouses, barns, etc., in close proximity to human habitations situated near springs, etc.; here it becomes very gentle, tame, and confiding when not molested. I have frequently seen one alight within a few feet of my head and fly back and forth from its perch after passing insects, as undisturbed as if I had not been there. In mountain regions and thinly populated tracts it is often found about rocky cliffs, along water courses, and almost invariably near the point where a bridge spans a stream. The Phoebe is the earliest of our Flycatchers to breed, nidification beginning sometimes in the first week in April, but ordinarily not much before May 1, and in the northern parts of its range rarely before June. While generally of an amiable disposition toward other birds, often nesting in close proximity to the Barn Swallow, Robin, and Chimney Swift, it will not allow any of its own kind to occupy a site close to its own, fighting them persistently until driven off, and should one of the earlier arrivals presume to appropriate its old nest, war is at once declared. Such a case is recorded in the "Scientific American" (April 22, 1882, p. 245), by Mr. E. H. Davis, of Avon, New York, who writes as follows: "I have noticed communications in late issues of your journal upon the subject of two and three storied birds' nests. Permit me to relate the following, which I will personally vouch for. Some years ago a Phoebe Bird had built her nest on a small projection under a piazza of my father's house, and occupied the place for several successive years unmolested. One spring a Robin took possession of it before the arrival of the rightful owner, and would not give it up. The quarrel between the birds was noted by the members of the family, but nothing more was thought about it until fall, when the peculiar shape of the nest attracted attention. Upon examination it proved to be a double nest, one built upon the other, and in the lower one was found the vandal Robin, dead. The Phoebe Bird had built another nest, completely inclosing the Robin, and reared her young upon the grave of her enemy."

The same pair of birds, apparently, return to their old haunts from year to year, and if they do not always occupy the same nesting site, they usually select one near by. Occasionally they build a new nest on the top of the old one, and this is sometimes done to get rid of Cowbirds' eggs that may have been deposited by these intruders, but ordinarily they do not appear to object much to such additions, and care for them as faithfully as if they were their own. Their favorite nesting sites are under bridges and culverts, even when they are barely large enough for a person to crawl through, provided a suitable place can be found on which to place the nest; next, outbuildings, such as barns, sheds, etc., are frequently made use of; porches of houses, window sills,

¹ The Auk, Vol. II, 1885, p. 254.

etc., occasionally furnish suitable sites; overhanging rocky shelves, especially in quarries, upturned roots of trees in woods, projecting banks of small streams, caves, and more rarely the sides of open wells are likewise utilized for such purposes.

Their nests vary considerably in shape as well as in the manner of construction. If attached to the side of an overhanging rock, it is necessarily semicircular, and mainly composed of mud pellets mixed with moss, a little grass, and occasionally a few feathers, somewhat resembling the nest of our well-known Barn Swallow. If placed on a flat beam, or rafter, or on top of a post, it is circular, and sometimes but little or no mud is used in its construction.

A well-preserved nest, No. 25587, taken by Dr. William L. Ralph, near Floyd, Oneida County, New York, on May 17, 1890, was found in a swampy part of a large wooded tract, about 5 feet above the ground, and underneath the roots of a partly overturned tree; the upper parts of the roots had fallen over and the nest was behind this, placed on two small, swing-like roots that crossed each other at right angles. It is mostly composed of mud and partly covered on the outside with moss, dead leaves, a little fern down, and a few pieces of grass, and lined with horsehairs, fine roots, dry mosses, grasses, etc. It measures $4\frac{1}{2}$ inches in outer diameter by 4 inches in height, the inner cup being $2\frac{1}{2}$ inches across by $1\frac{3}{4}$ inches in depth. It is a neat, symmetrical, and compactly built structure.

Mr. J. W. Preston, of Baxter, Iowa, writes me: "A pair of Phœbes have a nest on a post in our barn, just below the hay, over the feed room, to which they return year after year, having varying success and exhibiting a rare persistence of purpose. One season the eggs were destroyed by mice, and yet a second attempt was made, and the brood came off rather late. Then another season the young died in the nest from some cause, or were killed, and the parents crowded them onto the outer walls, where they hung for more than a year, seemingly not at all in the way of the old birds." When the nest is repeatedly used, the old inner lining is mostly removed and replaced by new material.

Incubation lasts about twelve days, and the female performs the greater part of this duty, while the male remains in the vicinity of the nest on the watch for possible intruders. The female is a close sitter and is loath to leave her nest. Dr. Ralph tells me of an instance where he found a Phœbe sitting on a couple of eggs and a small pebble, which had accidentally fallen into the nest and cracked some of the eggs. The young are large enough to leave the nest in about two weeks, and a second brood is usually reared throughout the greater part of their range.

The nestlings are fed entirely on insect food, and consume an enormous quantity daily. The female rarely leaves the nest to go any considerable distance to gather the necessary supplies, but the male makes more extended excursions. I have observed a pair of these birds feeding their young; one seemed to require considerable coaxing to take the proffered morsel, and although some of the others clamored loudly for it the parent would not let them have it, and gently touched the sides of the bill of the sleepy youngster several times until it finally

opened its mandibles to be fed. I was standing within 4 feet of the nest all the time. The moth of the cutworm seems to be one of the favorite foods of the young.

The Phœbe is one of the last of our Flycatchers to leave its summer home, usually remaining in our Northern States till the latter part of September, and in favorable seasons even later. Mr. R. M. Kirby Smith writes me from Sewanee, Tennessee, that he noticed this species at different times during the months of January, February, and March, and believes that some winter there, which is quite probable, as numbers remain in Florida and the Gulf Coast generally throughout this season.

The number of eggs to a set varies from three to eight; sets of five are most commonly found, while the extremes are very rare; an egg is deposited daily, and the Phœbe is not infrequently imposed upon by the Cowbird, where this pest is common. There are several sets in the United States National Museum collection containing one or two of these parasitic eggs. The Phœbe's egg is usually pure white in color; the shell is close-grained, smooth, and moderately glossy, which gradually disappears in time, leaving the shell a dull chalky white. Occasionally some of these eggs are more or less perceptibly spotted, with a few specks of reddish brown about the larger end, but usually only one or two in a clutch are so marked, while the majority of sets are immaculate. The eggs are mostly ovate in shape.

The average measurement of one hundred and twelve eggs in the United States National Museum collection is 19.05 by 14.48 millimetres, or 0.75 by 0.57 inch. The largest egg of the series measures 20.32 by 14.99 millimetres, or 0.80 by 0.59 inch; the smallest, 16.76 by 13.72 millimetres, or 0.66 by 0.54 inch.

The type specimen, No. 25587 (Pl. 1, Fig. 28), from a set of five eggs from the Ralph collection, slightly spotted, was taken near Floyd, Oneida County, New York, May 17, 1890, and the nest, of which measurements and a detailed description have been given above, is the one from which this egg was taken.

103. *Sayornis saya* (BONAPARTE).

SAY'S PHŒBE.

Muscicapa saya BONAPARTE, American Ornithology, I, 1825, 20.

Sayornis sayus BAIRD, Birds of North America, 1858, 185.

(B 136, C 250, R 316, C 377, U 457.)

GEOGRAPHICAL RANGE: Western North America; eastward to western Saskatchewan and Assiniboia, Dominion of Canada, and in the United States to eastern Montana, western South Dakota (?), western Nebraska, western Kansas, and western Texas; north to Fort Yukon, Alaska, and Fort Simpson, Northwest Territory, Dominion of Canada; south to Lower California and through Arizona, New Mexico, and western Texas; in winter to Puebla and Vera Cruz, Mexico. Accidental in Massachusetts.

Say's Phœbe, a somewhat larger bird than the eastern representative of this genus, and which it replaces in western North America, has likewise a wide distribution, the northern limits of its breeding range in Alaska reaching within

the Arctic Circle. Mr. Lucien M. Turner obtained several specimens near Fort Yukon, in about latitude 67° north, in the latter part of May, 1876, and Mr. B. R. Ross, of the Hudson Bay Company, took it at Fort Simpson, on the Mackenzie River, in July, 1861, where our common Phœbe was also found by him. Skins from both places, where both of these species are known to breed, are now in the United States National Museum collection. It will undoubtedly be found in the vast intervening territory north of our border and east of the Rocky Mountains, in Athabasca and Alberta, as it is recorded from western Saskatchewan and from British Columbia. In the United States it has been taken at various points on the eastern slopes of the Rocky Mountains, but there it appears to be considerably rarer than farther west. Its breeding range in the United States is coextensive with its geographical range, excepting the southwestern parts of Texas.

Say's Phœbe seems to be more at home in rather open country, and is rarely found in heavily timbered regions; still it occurs in such localities at times, as I took a male near Fort Klamath, Oregon, on March 28, 1883, and saw a few others subsequently. During my various wanderings in our Western States and Territories I generally found Say's Phœbe rather uncommon, excepting at Fort Lapwai, Idaho, where several pairs were breeding within the limits of the garrison, as well as at the adjoining Nez Perce Indian Agency, and I met with it also at Fort Custer, Montana; Camp Harney, Oregon; Forts Colville and Walla Walla, Washington; Camp Independence, California; and near Tucson, Arizona.

Its general habits and actions resemble those of the eastern Phœbe; like it, it is one of the earliest spring migrants to return from its winter haunts, and it is equally attached to its old home, to which it regularly returns from year to year. It appears to be much more tolerant in its disposition toward other members of its kind than the Phœbe, as I have found several pairs breeding within 100 yards of each other, apparently in perfect harmony. Its manner of flight is also similar, but its ordinary call note differs somewhat, and sounds really pathetic; a plaintive "phee-ur," frequently repeated, expresses it tolerably well, always accompanied with a twitch of the tail and a raising and lowering of the crest. Besides this note, during the mating season it gives vent occasionally to a short, plaintive, twittering warble. I consider it a more restless bird than the Phœbe, if that is possible; for it is never idle, but constantly darting back and forth from its perch after passing insects, which form the bulk of its food and of which it never seems to get enough. I have repeatedly seen it catching good-sized grasshoppers on the wing, as well as different species of beetles, flies, moths, and butterflies. It has a habit similar to the Owls of ejecting the indigestible portions of its food in the shape of pellets. My attention was drawn to this fact by observing several such lying on the porch of my quarters at Fort Lapwai, Idaho, where a pair of these birds nested over the door. It is not nearly as partial to localities near water as is our Phœbe, and it is not unusual to find it nesting fully a mile from such places. At this Post they

generally arrived during the third week in March, the males preceding the females about a week, and nest repairing or building commenced about the latter part of this month. I have taken a full set of eggs, containing small embryos, on April 17, 1871. Here they nested mostly under the eaves of outhouses and stables; but one pair selected the plate or rail over the main door of my quarters, and another a corner on the hospital porch. In this vicinity I also found a pair occupying an old Cliff Swallow's nest attached to an overhanging ledge of rock in Soldiers' Canyon, on the road to Lewiston, Idaho, and another in a very unusual position in the same canyon, in an old Robin's nest, placed in a syringa bush, about 4 feet from the ground.

Mr. R. S. Williams found Say's Phoebe nesting in a deep canyon near the Crooked Falls of the Missouri, Montana, and sent two sets of eggs to the United States National Museum from there. These nests were placed on a slightly projecting ledge of rocks, and were well protected by overhanging walls. The first, containing six eggs, was taken May 21, 1888; the other was obtained on June 3, 1889.

Mr. W. G. Smith reports Say's Phoebe as common in Larimer County, Colorado, where it usually nests under bridges and in sheds and barns. He says it builds a bulky nest, mostly composed of wool, and if its eggs are taken or destroyed it often lays three clutches during a season, and not infrequently in the same place.

In Colorado it reaches an altitude of about 7,000 feet, and here Mr. J. Alden Loring reports it as not uncommon at Grand Junction, and Mr. Denis Gale found it breeding near Gold Hill on June 25, 1885; but it is evidently much more common throughout the Great Basin region in southern Idaho, Utah, Nevada, and eastern California, where its center of abundance occurs. While Say's Phoebe is fairly common in suitable localities in northern California, as in the vicinity of Red Bluff, Tehama County, Mr. F. Stephens reports it as a rare summer resident in the southern parts of this State, and says: "It is more common in winter, though scarcely common then. It breeds early along the western borders of the Colorado Desert, where I have found nests containing young in the latter part of March. The nests were placed on shelves under overhanging parts of cliffs, in shallow caves and similar places; the eggs usually numbered four; the nests were built of soft fibers; no mud was used; and I have seen none near water. These birds are generally seen singly except in the breeding season; they inhabit open country and are never seen in forests. On June 1, 1893, I flushed a Say's Phoebe from a nest containing fresh eggs near Witch Creek, California. The nest was placed under a shelf of rock on a small cliff over a brook. The nest, of mud, looked like the nest of *Sayornis nigricans*, and perhaps was an old one of that species relined. This is the first time I have found this species nesting on the west side of the mountains, while on the desert side they breed regularly."

Mr. John Swinburne found this species nesting at St. Johns, Apache County, and Mr. W. E. D. Scott gives it as a rather rare summer resident in the Catalina Mountains, Arizona, while I observed it in the vicinity of Tucson in winter only.

Mr. A. W. Anthony writes me: "I found Say's Phoebe breeding in comparative abundance near Apache, in the extreme southwestern corner of New Mexico, in the midst of a very dry and barren range of hills, in May, migrating after the first brood was raised, about June 20, and not seen again until September. Old tunnels and abandoned mining shafts are favorite nesting sites with them, nests having been found by me in Lower California, 25 feet from the surface, in prospect holes. At Apache I took a nest with four fresh eggs on May 23, 1886, and near San Diego, California, I found one in an old embankment, on August 8, containing young and eggs." A nest taken by Mr. J. A. Loring, in Nephi, Utah, July 1, 1893, was placed in the top of an old straw hat.

Both Mr. L. Belding and Mr. A. W. Anthony have met with this species in Lower California, during the breeding season; and it probably breeds also in northwestern Texas and northern Mexico. It returns from its summer haunts in the northern parts of its range usually about September, and winters to some extent in the southwestern parts of the United States; the majority, however, pass south into Mexico. In the more southern portions of its breeding range Say's Phoebe begins nesting early in March; in the middle parts rarely before May 1, and in the extreme northern limits of its range not until June.

Two broods are usually raised in a season, and, under favorable circumstances, possibly even three. This species is fully as much at home about human habitations, and seems to adapt itself even more readily to the changed conditions of its surroundings than its eastern relative, and about every cattle ranch, stage station, or mining camp a pair or more of these birds will surely select a nesting site, if a suitable location can be found.

Besides the various localities already mentioned in which Say's Phoebe has been found nesting, burrows of Bank Swallows are also occasionally occupied. Ordinarily mud is not used in the construction of their nests; which are rather flat structures; the base usually consists of weed stems, dry grasses, moss, plant fibers of different kinds, wool, empty cocoons, spider webs and hair, the inner lining being generally composed of wool or hair alone. A well-preserved nest, now before me, from the Crooked Falls of the Missouri, Montana, taken by Mr. R. S. Williams, June 3, 1889, measures $5\frac{1}{2}$ inches in outer diameter by $2\frac{1}{4}$ inches in height, the inner cup being $2\frac{1}{2}$ inches by $1\frac{1}{4}$ inches in depth. This is a compactly built structure, the materials composing it being well worked together, and it is warmly lined with cattle hair.

The number of eggs to a set varies from three to six; usually four or five are found, and one is deposited daily. Incubation lasts about twelve days; the young are fed entirely on insects, mainly on small butterflies, which are abundant about that time, and they are ready to leave the nest in about two weeks, when the male takes charge of them, the female in the meantime getting ready for a second brood. The eggs are ovate and short ovate in shape, and resemble those of the common Phoebe in every respect excepting that they are a trifle larger in size.

The average measurement of forty-four eggs in the United States National Museum collection is 19.50 by 14.90 millimetres, or about 0.77 by 0.59 inch.

The largest egg of the series measures 21.59 by 15.49 millimetres, or 0.85 by 0.61 inch; the smallest, 18.03 by 13.97 millimetres, or 0.71 by 0.55 inch.

The type specimen, No. 20553 (Pl. 1, Fig. 29), from a set of four eggs, Bendire collection, taken by the writer at Fort Lapwai, Idaho, April 24, 1871, is an average-sized egg, and one of the usual unspotted types.

104. *Sayornis nigricans* (SWAINSON).

BLACK PHŒBE.

Tyrannula nigricans SWAINSON, Philosophical Magazine, I, May, 1827, 367.

Sayornis nigricans BONAPARTE, Collection Delattre, 1854, 87.

(B'134, C 251, R 317, C 378, U 458.)

GEOGRAPHICAL RANGE: From Mexico and Lower California north through western Texas, New Mexico, Arizona, and California into southwestern Oregon, west of the Cascade Mountains; east to western Texas, southern New Mexico, Arizona, and southern California. Casually to Washington.

The breeding range of the Black Phœbe, also known as the "Black Flycatcher," is much more restricted within the United States than that of the two preceding species, but in Mexico it has a widely extended distribution. In southwestern Oregon it has been observed in the Umpqua Valley by Dr. J. S. Newberry; and Prof. O. B. Johnson reports seeing a single specimen near Salem in July, 1879. These points mark about the northwestern limits of its range, and none have as yet been observed east of the Cascade Mountains at points farther south in this State. Its center of abundance is evidently that part of California west of the Sierra Nevadas, where it has been recorded from many places throughout the year. Mr. Lyman Belding reports it as a common and constant resident at Stockton, Murphys, and Marysville, and as a summer resident near Big Trees, Calaveras County, where it frequents the willows near streams. Mr. Charles H. Townsend found it breeding near Baird, Shasta County, and it seems to be pretty generally distributed throughout southern California as well. While apparently not reaching the eastern slopes of the Sierra Nevadas in the northern parts of this State, it has been observed as far east as Furnace Creek, Death Valley, Hot Springs, in the Panamint Valley, and Shepherd Canyon, in the Argus Range, in southeastern California, by different members of Dr. C. Hart Merriam's exploring party in the Death Valley country, in the spring of 1891; but it appears to be somewhat rare everywhere east of the Sierra Nevadas.

Mr. A. W. Anthony writes me: "The Black Phœbe breeds throughout Lower California, from latitude 28° northward wherever water is found, building under the eaves of adobe houses when near human habitations, and on the sides of ledges along streams in the unsettled parts."

In southern Arizona this species is resident throughout the year, and I have observed it at all seasons. It is, however, more common in winter than in summer, the majority of these birds evidently retiring to the canyons in the foothills of the mountains to breed. I found but a single nest; this was placed

in an abandoned well, in a small cavity in the side, caused by a boulder dropping out, about 4 feet below the surface of the ground. It contained young, nearly full grown, on April 24, 1872. Mr. W. E. D. Scott reports this species as not uncommon in the Santa Catalina Mountains to an altitude of 4,000 feet. Dr. Edgar A. Mearns, United States Army, informs me that he found a pair breeding at the reservoir from which the town of Tombstone derives its water supply, in Millers Canyon, Huachuca Mountains, southern Arizona, on July 31, 1894. This is located in the Douglass spruce zone (*Pseudotsuya taxifolia*), at an altitude of about 8,000 feet. I also met with the Black Phoebe in southwestern New Mexico, on the Mimbres River, and Mr. William Lloyd gives it as a rare summer visitor in Tom Green County, Texas, where he found it breeding on April 4. Although a good many of these birds winter within our borders, even in localities where snow occasionally falls, the majority migrate south into Mexico in October, and return again early in March.

In its general habits the Black Phoebe resembles the common Phoebe more than Say's; like the former, it is usually only found near water, and its call notes are also very similar. Mud seems to enter largely into the construction of its nests, and I believe is invariably used. These are located in similar situations to those of the two preceding species. It is equally attached to a locality once chosen for a nesting site; and instances are recorded where four clutches of eggs have been laid in one season, the three previously laid having been taken. Two broods are generally reared in a year, and perhaps three. The exterior of the nest consists of small pellets of mud mixed with bits of dry grass, weed fibers, or hair, and somewhat resembles that of a Barn Swallow; the outer mud wall is carried up to the rim. Inside it is lined with weed fibers, fine roots, strips of bark, grass tops, hair, wool, and occasionally feathers. If their eggs are taken, they generally lay another set within two weeks. A nest now before me, taken by Mr. H. W. Henshaw, at Santa Ysabel, California, on April 28, 1893, measures 5 inches in outer diameter and $3\frac{1}{2}$ inches in height; the inner cup is $2\frac{3}{4}$ inches in diameter and $1\frac{1}{2}$ inches in depth, and is lined with plant fibers and fine grass tops. In the southern part of its breeding range nidification begins usually in the first half of April, rarely before, and correspondingly later farther northward.

The number of eggs to a set varies from three to six, usually four or five. They resemble the eggs of the two preceding species in color, but generally average a trifle smaller. Judging from those before me, the markings on the spotted specimens are coarser and more pronounced, but the proportion of spotted eggs is no greater. The eggs are generally ovate in shape.

The average measurement of fifty-nine specimens in the United States National Museum collection is 18.73 by 14.36 millimetres, or about 0.74 by 0.57 inch. The largest egg of the series measures 20.32 by 15.24 millimetres, or 0.80 by 0.60 inch; the smallest, 17.78 by 13.21 millimetres, or 0.70 by 0.52 inch.

The type specimen, No. 20556 (Pl. 1, Fig. 30), from a set of three eggs, Bendire collection, was taken at Nicasio, California, May 5, 1877; this represents a well-spotted and average-sized specimen.

105. *Contopus borealis* (SWAINSON).

OLIVE-SIDED FLYCATCHER.

Tyrannus borealis SWAINSON, Fauna Boreali Americana, II, 1831, 141, Pl. 35.*Contopus borealis* BAIRD, Birds of North America, 1858, 188.

(B 137, C 253, R 318, C 380, U 459.)

GEOGRAPHICAL RANGE: North America; north in the eastern parts of the Dominion of Canada to about latitude 50°, in the interior of the Hudson Bay country to about latitude 61°, and in Alaska to latitude 63° N.; south in winter through the higher mountains of Central America to Colombia, South America. Accidental in Greenland.

The breeding range of the Olive-sided Flycatcher in the eastern parts of the United States is confined to the coniferous forest regions of our northern border from northern Massachusetts and northern New York westward to Minnesota, and probably also to some of the higher mountain peaks south of these States; in Connecticut, Pennsylvania, the Virginias, and western North Carolina, etc., where it has occasionally been taken during the breeding season and possibly nests in limited numbers in suitable localities. It has also been observed in the mountains of western Missouri by Mr. W. E. D. Scott in the spring, and possibly breeds there; and the late Col. N. S. Goss reports that he found it nesting near Wallace, Kansas, on May 27, 1883, an unusually early date for this species. In the eastern provinces of the Dominion of Canada it breeds up to about latitude 50° N., while in the interior it appears to be fairly common in the provinces of Manitoba and Saskatchewan, the type coming from Cumberland House, in latitude 54°. It extends north at least to Fort Resolution, Great Slave Lake, in latitude 61°, where Mr. R. Kennicott took a male on June 20, which is now in the United States National Museum collection. On the Pacific Slope it has been taken by Mr. F. Bishoff at Fort Kenay, Alaska, in latitude 61°, and Mr. E. W. Nelson obtained a single bird on the Lower Yukon, in latitude 63°, which marks, as far as known, the northern limit of its range. Mr. J. E. McGrath also took a specimen at Camp Davidson, Alaska, on May 18, 1891, which, together with the Bishoff skin, is now in the United States National Museum collection. These records show that the Olive-sided Flycatcher is pretty generally distributed over the southern coast districts of this territory. From Alaska its breeding range extends southward through British Columbia, Alberta, the forest and mountain regions of the western United States, including the Rocky, Cascade, and Sierra Nevada mountains, with their tributary spurs and outlying ranges, to southern Colorado, New Mexico, Arizona, the San Pedro Martir Mountains in Lower California, the Sierra Madre in northern Mexico. It passes thence south in winter through the higher mountains of Central America to Colombia, South America.

West of the Rocky Mountains the Olive-sided Flycatcher seems to be generally distributed throughout the forest and mountainous regions to the Pacific coast, although it is nowhere very common. Mr. S. F. Rathbun, of Seattle,

Washington, writes me: "This Flycatcher may be called common around Seattle as a summer resident, arriving about May 1 and remaining into September. It is very evenly distributed, not indiscriminately scattered, as are some species, but along the shores of Lake Washington about every one-half to three-fourths of a mile you can hear these birds and find a pair. They evince a fondness for the watered regions in preference to the high lands, not necessarily along the water's edge, but only a short way back in the woods, and prefer the rather open timber where most of the original forest has been cut away."

In northern and central California it appears to be moderately common throughout the mountainous portions, judging from the numerous records. Mr. L. Belding found it breeding in Calaveras County, and took a nest and three eggs on June 17, 1883, these being now in the United States National Museum collection; while from southern California Mr. F. Stephens writes me: "It is a somewhat rare summer resident in coniferous forests, seeming to prefer the firs. I found a nest on June 5, 1889, in a large fir, at about 7,500 feet altitude in the Cuyamaca Mountains; it was placed about 40 feet from the ground and 8 feet from the trunk near the extremity of a limb. It consisted of little more than a lining of stiff moss, laid in a thick bunch of living leaves, and contained three eggs. While taking these the parent came repeatedly, almost within reach of my hand, snapping her bill and scolding me. Lower down in the same tree was a nest of the Louisiana Tanager containing young."

There are also records from Arizona and New Mexico showing that the Olive-sided Flycatcher breeds, to some extent at least, in the higher mountain regions there, and in Colorado it may be called fairly common. Mr. Denis Gale writes me from Gold Hill, Colorado, in 1889: "I have found a nest or two of *Contopus borealis* almost every season, but always with young, until this year. Their nests are very small and fragile in appearance for so large a bird, but the wiry character of the material used in their composition is so deftly fitted and fastened to and about the rasping sprays of our spruce trees that you could scarcely displace the nest if you should thrash the ground with the bough upon which it is placed." A nest with three eggs, taken on July 3, 1889, was kindly presented to the United States National Museum collection by Mr. Gale, and this is the frailest-built structure I have yet seen of these birds. In Colorado the Olive-sided Flycatcher reaches an altitude of 9,000 or 10,000 feet in summer. In the San Pedro Martir Mountains, in Lower California, Mr. A. W. Anthony informs me that this Flycatcher was occasionally observed by him up to 11,000 feet, and evidently nesting.

I have met with this species in the pine forests of the Bitter Root Mountains in Montana and Idaho, in the numerous parks in the Blue Mountains, and at Fort Klamath, Oregon, where several pairs nested within a couple of miles from the Post, in large spruce and pine trees which were practically inaccessible. In suitable localities in the southwestern parts of the Adirondacks, in Herkimer County, New York, they are not uncommon, and I observed several pairs in this vicinity. Their habits seem everywhere to be alike.

Although the Olive-sided Flycatcher is rather evenly and widely distributed, it can not be called a very common bird anywhere during the breeding season, which is due perhaps more to its unsocial and quarrelsome habits than to anything else. While it appears tolerant enough toward other species, it will not allow any of its own kind to nest in close proximity to its chosen home, to which it returns from year to year. Each pair seems to claim a certain range, which is rarely less than half a mile in extent, and is usually located along some stream, near the shore of a lake, or by some little pond; generally coniferous forests seem to be preferred, but mixed ones answer their purposes almost equally well as long as they border on a body of water or a beaver meadow and have a few clumps of hemlock or spruce trees scattered through them, which furnish suitable perches and points of lookout. In such situations one is reasonably certain to find this species.

Like all Flycatchers, their food consists almost exclusively of winged insects, such as beetles, butterflies, moths, and the numerous gaddies which abound in the places frequented by these birds. A dead limb or the decayed top of some tall tree giving a good outlook close to the nesting site, is usually selected for a perch, from which excursions are made in different directions after passing insects, which are often chased for quite a distance. This Flycatcher usually arrives on its breeding grounds in the northern parts of the United States about the middle of May, and its far-reaching call notes can then be heard almost constantly in the early morning hours and again in the evening. Unless close to the bird, this note sounds much like that of the Wood Pewee, which utters a note of only two syllables, like "pee-wee," while that of the Olive-sided Flycatcher really consists of three, like "hip-pui-whee." The first part is uttered short and quick, while the latter two are so accented and drawn out, that at a distance the call sounds as if likewise composed of only two notes, but this is not the case. Their alarm note sounds like "puip-puip-puip," several times repeated, or "puill-puill-puill;" this is usually given only when the nest is approached, and occasionally a purring sound is also uttered.

Nidification rarely begins anywhere throughout their range before June 1, usually not before June 10, and in some seasons not before July. Tall ever-green trees, such as pines, hemlocks, spruces, firs, and cedars, situated near the edge of an opening or clearing in the forest, not too far from water and commanding a good outlook, or on a bluff along a stream, a hillside, the shore of a lake or pond, are usually selected as nesting sites by this species, and the nest is generally saddled well out on one of the limbs, where it is difficult to see and still more so to get at. Only on rare occasions will this species nest in a deciduous tree; one instance has been recorded of a pair nesting in an apple and another in a cottonwood tree, but these must be considered as exceptional cases.

While on a collecting expedition with Dr. William L. Ralph, in Herkimer County, New York, a nest of this species was found on June 18, 1892, in a spruce tree, 45 feet from the ground, containing three eggs about one-third incubated. The nest was placed on a horizontal limb, on some thick, leaf-covered twigs,

about 5 feet from the trunk; the tree grew on a hillside near a little swamp, and several tall dead stumps were still standing on the partly cleared hills in the vicinity. The birds betrayed the location of the nest by their excited actions and incessant scolding. They were very bold, flying close around the climber's head, snapping their bills at him, and uttering angry notes of defiance rather than of distress, sounding like "puy-pip-pip" or "wüp-wüp-wüp." They could not possibly have been more pugnacious. This nest, which is now before me, is a well-built structure, and measures $4\frac{3}{4}$ inches in outer diameter by $1\frac{3}{4}$ inches in depth; the inner cup is very shallow, measuring $2\frac{3}{4}$ inches in diameter by 1 inch in depth. It is outwardly composed of fine, wiry roots and small twigs, mixed with long, green moss (*Usnea*), and lined with fine roots and moss. It is securely fixed among a mass of fine twigs growing out at that point of the limb, which is only half an inch thick under the nest. During the first week of June, 1893, we visited the same locality again, but these birds did not make their appearance at the old nesting site until about June 15, and showed no desire to nest up to the time we left, June 28. Two other pairs were also located, but no nests were found. I am of the opinion that, as the season was unusually late, they postponed nidification until at least three weeks later than usual.

Mr. Belding states: "In California its nests are usually 40 or 50 feet from the ground, rarely as low as 20 in cone-bearing trees, and are mostly composed of yellow lichen (*Evernia vulpina*), lined sparingly, in several instances, with fine, wiry rootlets."¹

The nest is usually placed at a considerable height from the ground, say from 40 to 60 feet, and always out on a limb; occasionally one is found not over 20 feet up, but such instances so far as I know are not common. The nests are generally hard to get at, and as they are so shallow the contents are frequently lost in trying to secure them. The Olive-sided Flycatcher usually nests late, rarely before the middle of June, and sometimes not until the beginning of July. Only a single brood is reared in a season; but if the eggs are taken a second set is laid, and not infrequently in the same nest, if this has been left. They are very much attached to localities once selected, and are loath to leave them. The return migration to their winter haunts begins in the latter part of August, and, as far as known, all of these birds pass beyond our border.

It does not take very long to build the nest, and incubation lasts probably not over fourteen days. The young are said to remain in the nest about three weeks. The eggs are usually three in number, rarely more or less. Possibly about one set in twenty will contain four eggs, and although it has been stated that from three to five are laid, I do not believe that a set of five has ever been taken. The shape of these eggs is mostly ovate; the shell is delicate and not lustrous. The ground color varies from a pale to a rich cream, with a pinkish tint, and they are usually spotted and blotched with different shades of chestnut, ferruginous, heliotrope purple, and lavender, these markings generally forming an irregular wreath about the larger end of the egg.

¹ Land Birds of the Pacific District, 1890, p. 97.

The average measurement of thirty-two eggs in the United States National Museum collection is 21.51 by 16.10 millimetres, or about 0.85 by 0.63 inch. The largest egg of the series measures 23.11 by 17.27 millimetres, or 0.91 by 0.68 inch; the smallest, 20.32 by 15.24 millimetres, or 0.80 by 0.60 inch.

The type specimen, No. 23891 (Pl. 2, Fig. 15), from a set of three eggs taken by Mr. Gale, near Gold Hill, Boulder County, Colorado, on July 3, 1889, represents one of the richer-colored eggs, while No. 25685 (Pl. 2, Fig. 16), from a set of three, Ralph collection, also from Colorado, taken June 16, 1892, shows a paler-colored example; they also show the difference in size.

106. *Contopus pertinax* CABANIS.

COUES'S FLYCATCHER.

Myiarchus pertinax LICHTENSTEIN, Nomenclator Museo Berolinensis, 1854, 16 (nomen nudum).

Contopus pertinax CABANIS, Museum Heineanum, II, Sept. 30, 1859, 72.
(B—, C 254, R 319, C 381, U 460.)

GEOGRAPHICAL RANGE: Highlands of Guatemala and Mexico; north to Arizona and southwestern New Mexico. Accidental in Colorado.

The breeding range of Coues's Flycatcher is coextensive with its geographical distribution in the United States, where it is only a summer visitor. It was added to our avifauna by Dr. Elliott Coues, who took a specimen near Fort Whipple, Arizona, on August 20, 1864; and since then it has been found to be generally distributed throughout the mountains of the southern half of Arizona and southwestern New Mexico, although nowhere very common.

The best account of its general habits is that of Mr. H. W. Henshaw, who says: "In 1873 I obtained a pair of old birds, which were accompanied by several young, in the White Mountains, near Camp Apache, and, not meeting with it elsewhere, supposed it to be rare. Such, however, proves not to be the case, as the past season it was found to be one of the most numerous and characteristic of the Flycatcher tribe, being seen everywhere in the mountainous districts from Camp Apache to the border line.

"In general appearance as well as habits it is quite similar to the Olive-sided Flycatcher, and shows the same proclivities for inhabiting the pineries, often on the edge of an opening, or where the country is diversified and cut up by rocky ravines and the pines are interspersed with oak woods. In such places the species is sure to be present, and may be seen circling about the high pine stubs or descending to the lower trees, as the oaks, and launching itself out from the branches in vigorous pursuit of flies or beetles, which it hunts with the greatest energy and perseverance. The notes are loud and very forcibly given, possessing the same character as the call of the Olive-sided Flycatcher, but are readily distinguishable. They resemble the syllables 'pe-wee-ee,' great emphasis being laid on the middle syllable, while the last is quite prolonged and in a slightly raised key. Each pair apparently takes

possession of a large area, and allows no intrusion of their kind within the limits. Having spent a few moments in one spot, the bird makes a hurried dash, and in a few moments its voice can be just distinguished as it is sent back from afar in answer to the mate near by. A short interval elapsing, it will suddenly reappear from among the trees, and, with an exultant whistle, settle firmly down on some perching place, giving short, nervous jerks of its long tail and turning its head quickly here and there, every motion betraying the nervous activity of its nature. These sudden erratic flights from point to point are quite characteristic of the bird. By the middle of July I found the young well fledged and quite numerous. Thus the eggs are probably deposited in the first part of June. By the latter part of September many individuals had passed to the southward, but at Mount Graham at this time the species was still present. I noticed them on several occasions on the outskirts of the flocks of Warblers and Nuthatches, which were moving slowly onward. They appeared to be migrating in their company, forming, as it seemed to me, a very incongruous element in these sociable gatherings. Their call notes at this time were given almost as incessantly as during the summer."¹

Mr. F. Stephens writes me: "I have taken this species in the mountains north of Fort Bayard, New Mexico, and in the Chiricahua and Santa Rita Mountains, in southern Arizona, in all parts of which it is a rare summer resident. The female of a pair taken June 27, 1880, in the Chiricahua Mountains, was incubating."

Mr. W. E. D. Scott also observed them in the Santa Catalina Mountains in April, and Dr. Edgar A. Mearns, United States Army, in the Mogollon Range, Arizona, during the months of July and August, where a pair were seen feeding their young on Baker's Butte. He says: "Its habits resemble those of the smaller species of this genus rather than of the Olive-sided Flycatcher."²

The nest and eggs of Coues's Flycatcher were first described by Mr. Samuel B. Ladd, West Chester, Pennsylvania, in "The Auk" (Vol. VIII, 1891, p. 315). "The nest, placed on an oak limb 20 feet from the ground, is compact, and reminds one of the nest of our *Contopus virens*, excepting in size. Outside diameter, 5 inches by 2 inches high; inside diameter, 3 inches by 1 inch deep. The body of the nest seems to consist of the web of some spider, intermingled with the exuviae of some insect, fragments of insects, and vegetable matter, such as staminate catkins of *Quercus emoryi*, a pod of *Hosackia*, and some leaves of *Quercus emoryi* and *Quercus undulata*. The interior of the nest is made up of grasses, principally of two species of *Poa*, also some fragments of a *Bontelona* and a *Stipa*. The eggs, three in number, were slightly incubated. The ground color is cream buff, spotted in a ring around the larger end with chestnut and lilac-gray. Measurements: 0.63 by 0.86, 0.62 by 0.83, 0.61 by 0.83 inch; average, 0.62 by 0.84. Collected June 17, 1890."

Through the kindness of Mr. E. W. Nelson I am enabled to figure an egg of this species and add the following information about their nesting habits.

¹United States Geographical Surveys, Vol. V, pp. 352-3.

²The Auk, Vol. VII, 1890, p. 256.

He says: "*Contopus pertinax* is a sparingly distributed summer resident in the pine-forested mountains of south central Mexico, between 8,000 and 12,000 feet altitude. At Los Vigas, Vera Cruz, on June 14, 1893, a nest containing two fresh eggs was found in a pine tree at an altitude of about 8,000 feet. The nest was about 15 feet from the ground, on the outer end of one of the lower branches. It was placed upon a small fork of the main branch. The nest is outwardly composed of grass tops, which are covered with fragments of moss and lichens, and it is lined with the fine heads (seed tops) of a species of grass growing all about under the pine trees of the vicinity. The locality was on a gentle slope at the northeast base of the Cofre de Perote, near Los Vigas, in a thick growth of small pines. The parent birds paid but little attention to the nest, but were quite shy, so that some trouble was experienced in obtaining one of them; each time, however, the birds returned to the vicinity of the nest after a long detour through the woods. So far as I saw them, these birds are very quiet during the breeding season."

The nest, which is now before me, is a compact and neatly built structure, and measures $4\frac{1}{2}$ inches in outer diameter by 2 inches in height. The inner cup is $2\frac{1}{2}$ inches wide by $1\frac{1}{4}$ inches deep.

Coues's Flycatcher leaves its summer home in southern Arizona and New Mexico about October 1, and apparently none winter within our borders. The eggs are ovate in shape; the shell is frail and without luster, of a rich cream tint, and is sparingly spotted, principally about the larger end of the egg, with different shades of chestnut, ferruginous, and lavender. They resemble very much the eggs of the Olive-sided Flycatcher, but average a trifle smaller, measuring 21.08 by 16.51 and 19.56 by 15.75 millimetres, or 0.83 by 0.65 and 0.77 by 0.62 inch, respectively.

The type specimen, No. 26222 (Pl. 2, Fig. 17), United States National Museum collection, the smallest egg of the two, was taken by Mr. Nelson, as already stated, on June 14, 1893, near Los Vigas, Vera Cruz, Mexico.

107. *Contopus virens* (LINNÆUS).

WOOD PEWEE.

Muscicapa virens LINNÆUS, Systema Naturæ, Ed. 12, I, 1766, 327.

Contopus virens CABANIS, Journal für Ornithologie, III, Nov., 1855, 479.

(B 139, C 255, R 320, C 382, U 461.)

GEOGRAPHICAL RANGE: Eastern North America; north to the southern portions of the Dominion of Canada, from New Brunswick to Manitoba; west to eastern North and South Dakota, eastern Nebraska, Kansas, the Indian Territory, and Texas; south in winter through eastern Mexico and Guatemala to Colombia and Ecuador, South America.

The breeding range of the Wood Pewee, also locally known in South Carolina as "Dead-limb bird," extends through the eastern United States north into the southern parts of the Dominion of Canada to about latitude 46° N., west to western Manitoba, the eastern parts of North and South Dakota,

Nebraska, Kansas, the Indian Territory, and somewhat beyond the eastern half of Texas, where it has been found breeding in Bexar and Tom Green counties. In the extreme southern parts of its breeding range, in Florida and the Gulf Coast, it is rather rare, and this is also the case north of latitude 45° , in southern New Brunswick and the provinces of Quebec and Ontario, while in Manitoba it appears to be tolerably common up to latitude 50° .

The Wood Pewee, as its name implies, is a common summer resident throughout all the wooded portions of its range as indicated above, and is one of the more tardy migrants to arrive on its breeding grounds, reaching them in the more southern States in the first half of April, and in Pennsylvania, New York, etc., about a month later. It shows a decided preference for open, mixed woods, free from underbrush, and frequents the edges of such as border on fields, clearings, etc., either in dry or moist situations. In Oneida and Herkimer counties, New York, I found the Wood Pewee common everywhere, both in the more extensive forests, as well as in orchards or shade trees along the country roads, and even in the villages. Its plaintive call notes could be heard at all hours of the day and often in the night as well. Its song, if it may be called such, is uttered in a sleepy, listless manner, while perched on some horizontal limb or branch, usually one of the lower dead ones of a wide-spreading tree, on which it sits very erect and alert, and from whence it darts every little while after some passing insect, in the capture of which it is as expert as any of our Flycatchers. The ordinary call note sounds like "pée-a-wée" or "sée-é-wée," long drawn out and plaintive in sound. Occasionally a short note like "pée-ээр," "phée-hée," or "hée-ээр" is also given, this, if possible, in a still more mournful strain than the former, but it is not as frequently heard. I find it very difficult to reproduce the various calls on paper, and am perfectly well aware that no two persons would put them down exactly alike. The male Wood Pewee, during the mating season, gives vent occasionally to a low, twittering warble, possibly an indication to its mate that all is well.

Its food, like that of all Flycatchers, consists almost entirely of winged insects, but I have seen now and then a Wood Pewee fluttering about a leaf or small twig, as if it was picking off minute caterpillars or plant lice. Mr. George A. Seagle, superintendent of the Wytheville (Virginia) Fish Commission station, states: "This little bird has frequently been seen to catch young trout from the ponds soon after they had been transferred from the hatching house." It is possible that it may occasionally do a little harm in this manner, but, on the whole, it certainly is an exceedingly useful bird, fairly well behaved toward its neighbors, as long as they do not encroach too close on its nesting site, and it deserves protection. It nests rather late; throughout our Middle States rarely before the first week in June, and somewhat later farther north. In the vicinity of Washington, District of Columbia, full sets of eggs may be looked for in the first half of June, while in the more northern States nidification is at its height during the latter part of this month and the first week in July.

In the choice of nesting sites the Wood Pewee is not very particular; it is equally at home among human habitations, in villages or near farmhouses, as

amidst the extensive forest regions of the Adirondacks and similar tracts. The trees most frequently selected for nesting are oak, elm, ash, maple, hickory, pine, locust, poplar, cedar, and apple, the nests being placed from 5 to 50 feet from the ground, ordinarily from 12 to 20 feet up. These are rather neat and handsome structures, consisting generally of thick side walls and very thin bottoms; they are sometimes securely saddled on a horizontal limb, but more frequently at the point of juncture of a fork on the same, and generally some distance out from the main trunk. According to my observations, decayed moss and lichen covered limbs, growing out horizontally from the trunk, appear to be their favorite nesting sites, but many of their nests are built on live limbs, especially in oak, locust, and old apple trees. The nest is not readily discovered on account of its peculiar construction giving it the appearance of a knot, and the bird is exceedingly alert and usually slips off before one sees her, and, although she remains close by, flying from place to place and uttering her plaintive calls, she will not reveal its location by returning to it while the intruder is in the neighborhood.

Mr. J. W. Preston, of Baxter, Iowa, writes me: "A pair of Wood Pewees built on a horizontal branch, 12 feet above a path over which I traveled several times each day, and, though the female became more and more accustomed to my presence, she never remained on the nest while I passed. She would fly to a certain dead snag and peer down on me with her large eyes; but the young, after leaving the nest, became quite tame."

Fine grasses, small pieces of moss, thin strips of bark, rootlets, and plant fibers constitute the body of the nest, which is coated externally with bits of lichens found on rotten limbs, and which are fastened to its sides with spider webs and cocoons, similar to those of the Blue-gray Gnatcatcher and Ruby-throated Hummingbird. All the different materials are well interwoven, and the inner cup of the nest is usually lined with finer materials of the same kind, and occasionally with a little wool, down of plants, a few horsehairs, and bits of thread. An average and typical nest of the Wood Pewee measures $2\frac{3}{4}$ inches in outer diameter by $1\frac{3}{4}$ inches in depth; the inner cup is about $1\frac{3}{4}$ inches wide by $1\frac{1}{4}$ inches deep.

Mr. J. L. Davison, of Lockport, New York, kindly sent me for examination a unique nest of this species, taken by him from a horizontal limb of an apple tree, about 8 feet from the ground, which well deserves mention. This nest, which is well preserved, is exteriorly composed entirely of wool. It measures $2\frac{1}{2}$ inches in outer diameter by $2\frac{1}{4}$ inches in depth; the inner cup is $1\frac{3}{4}$ inches wide by 1 inch deep. It is very sparingly lined with fine grass tops and a few horsehairs, while a single well-preserved apple leaf lies perfectly flat and exactly in the center and bottom of the nest. It contained three eggs when taken, and bears not the slightest resemblance to any other nest of this species I have ever seen.

I believe that ordinarily but a single brood is raised in a season; but there are probably exceptions, as Mr. Frank H. Hitchcock informs me that at Somerville, Massachusetts, on September 8, 1890, he found a pair of Wood Pewees

caring for a brood of newly hatched young in a small grove near his home. If the first nest and eggs are taken they will promptly build a new one, and even a third, frequently in the same tree. An egg is deposited daily. Incubation lasts about twelve days. I have never seen the male assist in this duty, but he stays close by the nest and guards it. The young leave the nest in about sixteen days, and are cared for by both parents. From two to four eggs are laid to a set, generally three, and sets of four I consider rare. They usually start on their return migration in September, and I do not believe that any winter within our borders.

The eggs of the Wood Pewee vary in shape from ovate to short or rounded ovate; the shell is close-grained and without gloss. The ground color varies from a pale milky white to a rich cream color, and the markings, which vary considerably in size and number in different sets, are usually disposed in the shape of an irregular wreath around the larger end of the egg, and consist of blotches and minute specks of claret brown, chestnut, vinaceous rufous, heliotrope, purple, and lavender. In some specimens the darker, in others the lighter shades predominate. In very rare instances only are the markings found on the smaller end of the egg.

The average measurements of seventy-two eggs in the United States National Museum collection is 18.24 by 13.65 millimetres, or about 0.72 by 0.54 inch. The largest egg of the series measures 20.07 by 13.97 millimetres, or 0.79 by 0.55 inch; the smallest, 16.51 by 12.95 millimetres, or 0.65 by 0.51 inch.

The type specimen, No. 25414 (Pl. 2, Fig. 18), from a set of three eggs, taken by Dr. A. K. Fisher, near Sing Sing, New York, June 15, 1879, represents one of the larger and well-marked eggs of this species, while No. 25584 (Pl. 2, Fig. 19), from a set of three eggs, Ralph collection, taken near Holland Patent, New York, June 30, 1882, represents one of the smaller-sized and oddly marked specimens.

108. *Contopus richardsonii* (SWAINSON).

WESTERN WOOD PEWEE.

Tyrannula richardsonii SWAINSON, Fauna Boreali Americana, II, 1831, 146, Pl. 46, lower fig.

Contopus richardsonii BAIRD, Birds of North America, 1858, 189.

(B 138, C 255a, R 321, C 383, U 462.)

GEOGRAPHICAL RANGE: Western North America; north to British Columbia, the Provinces of Alberta and Saskatchewan, and probably farther in this direction; east to Manitoba, western North and South Dakota, western Nebraska, Kansas and Texas; south to Lower California, and in winter through Mexico and Central America to Ecuador and Bolivia, South America.

The Western Wood Pewee, also known as "Richardson's" and "Short-legged" Pewee, is a common summer resident and breeds in suitable localities throughout the western United States from the western edge of the Great Plains

to the Pacific Ocean. It ranges northward, as far as known at present, to British Columbia, Alberta, and northern Saskatchewan, and will probably be found in still higher latitudes. Southward it is found during the breeding season in Arizona, New Mexico, and western Texas, and in the mountain regions of Lower California. In eastern Manitoba, according to Mr. Ernest E. Thompson, it overlaps the range of the Wood Pewee, both species being found in the vicinity of Winnipeg, and it is not rare in other localities in this province. None winter within our borders.

In its general habits the Western Wood Pewee resembles the preceding species very closely, but not in its call notes. These are shorter, much harsher, and are uttered with much more emphasis—not in the plaintive, listless manner of the former. They resemble the sounds “pee-ée” or “pee-ээр,” occasionally varied to “pee-ah.” Dr. James C. Merrill, United States Army, gives the note as “tweer” or “deer.” On the whole, the Western Wood Pewee is not as often found in extensive forests as the preceding species. It prefers the less heavily timbered creek bottoms, the edges of mountain parks, and generally more open country, but avoids the dry, arid plains and desert regions. It has been found at altitudes up to 11,000 feet in summer.

Its food consists of insects of different kinds, and in southern California, Mr. F. Stephens informs me, this species is occasionally very destructive to honey bees. He says: “I have known apiarists to be compelled to shoot a great many to protect their bees; one in San Diego County told me that he shot several hundred in a season. They capture both workers and drones, and I have examined many stomachs which had stings sticking in them.” Such conduct on their part is probably exceptional.

Dr. A. K. Fisher, in his Report on the Ornithology of the Death Valley Expedition, says: “One day, when the wind was very high, a number were seen sitting on the bare alkaline flats near Owens Lake, where they were picking up from the ground the flies which swarmed there, as grain-eating birds do seeds.”¹

Mr. R. H. Lawrence writes me: “At Humptulips, Washington, this Flycatcher would rarely come within proper range of my shotgun until well along in the morning, say half past 9 o'clock, when they came down lower in the trees. Probably they sought the upper stratum of air in the early hours because the sunlight set the insects stirring there before it did those of the undergrowth. This was seen to be so on my trips to the little prairies, where a comparatively extended view could be had. I noticed this in May and June, 1891.”

The Western Wood Pewee arrives rather late on its breeding grounds; even in the southern portions of its range it is rarely seen before the last half of April, and not until a month later in the more northern localities, while nidification rarely begins anywhere before June 1.

Mr. Robert Ridgway makes the following statement regarding the position of the nests of the Western Wood Pewee: “The nest of this species, as is well

¹North American Fauna, No. 7, 1893, p. 64.

known, differs very remarkably from that of *Contopus virens*, being almost invariably placed in the crotch between nearly upright forks, like that of certain *Empidonaces*, as *Empidonax minimus* and *Empidonax obscurus*, instead of being saddled upon a horizontal branch, etc."¹

My observations regarding the position of the nest of the Western Wood Pewee are radically different from the above, and all that I have seen, some twenty in number, were saddled directly on limbs, or at points where branches forked, and never in crotches; and the seventeen specimens now before me were all similarly placed. Among these is one collected by Mr. Ridgway himself, No. 15200, United States National Museum collection, collector's No. 1282, from Parley's Park, June 25, 1869, which is catalogued in the above-mentioned report as "Nest in crotch of a dead aspen along stream," but which shows distinctly that it was saddled *on* a horizontal fork and not *in* an upright crotch. If the Western Wood Pewee places its nest occasionally in a crotch, which I do not deny, it is exceptional and not the rule, and the many records I have of its nesting from Texas, Arizona, Nevada, Utah, Colorado, California, and Oregon confirm my assertions fully, and show conclusively that this species does not differ in this respect from the Wood Pewee. The nests, however, do not resemble those of the former; they are better and more solidly constructed, and are usually deeper. The outer protective coating consisting of bits of lichens is dispensed with; decayed grass, wood, plant fibers, down, fine strips of the inner bark of juniper and sage, as well as the tops of wiry grasses, enter largely into their composition. These materials are compactly interwoven, and the outside of the nest is occasionally well covered with spider webs. They are usually lined with fine grass, down, and plant fibers, and rarely with a few feathers. A handsome nest, No. 24285, United States National Museum collection, taken May 31, 1891, by Capt. W. L. Carpenter, United States Army, near Prescott, Arizona, containing two eggs of this species and one of the Dwarf Cowbird, measures $2\frac{1}{2}$ inches in outer diameter by $1\frac{3}{4}$ inches in depth; the inner cup is 2 inches wide by $1\frac{1}{4}$ inches deep. Although the walls of this nest are very thin, it is a well-built structure, and apparently stronger than many bulkier nests. It was placed on a limb of a cottonwood tree, about 10 feet from the ground.

Nests of this species may be looked for in pine, cottonwood, tamarack, aspen, alder, maple, oak, hackberry, ash, and orchard trees, from 6 to 40 feet from the ground. In the vicinity of Fort Klamath, Oregon, where it is a common summer resident, the nests were usually placed on horizontal limbs of black pine trees, both on live and dead ones, and in a single instance I found one in a small aspen. Among curious nesting sites the following are worth mentioning:

Mr. W. E. D. Scott found a nest and three eggs near Twin Lakes, Colorado, on July 11, 1878. The nest was built where three branches crossed, in a brush heap, 2 feet from the ground.²

¹ Explorations of the 40th Parallel, Vol. IV, 1877, p. 537.

² Bulletin Nuttall Ornithological Club, Vol. IV, 1879, p. 94.

Mr. Charles E. Aiken states: "I have found several settled in the angle formed by the trunk of the tree and a horizontal branch, and in one instance, where a large limb had been torn from the tree by the wind, a nest was placed flatly upon a broad, board-like splinter."¹

Mr. L. Belding, in his *Birds of the Pacific District*, 1890 (p. 99), makes the following statement: "It almost always places its nest on a dead horizontal limb, at least this is according to my observations, and I have seen many nests which were saddled on limbs. In a solitary instance, however, the nest was in or on horizontal diverging twigs in a deciduous oak, where it was partly hidden by foliage; again, one was nicely surrounded and to a great extent concealed by having been built in a bunch of yellow lichen (*Evernia*)."

Most of these birds nest in June; the earliest breeding record I have out of thirty-nine is May 31, from Prescott, Arizona. I believe that but one brood is raised in a season, although I have found nests with fresh eggs as late as July 15, probably second layings where the first had been taken or destroyed. The Western Wood Pewee is very much attached to its nesting site when one has been once chosen, and will frequently build a second nest in the same spot, or only change the location to some other limb of the same tree. It usually leaves its breeding grounds for the south in September.

The number of eggs to a set varies from two to four; sets of three are most often found, while those of four are very rare. They can not be distinguished from those of the preceding species, and the same description will answer for both, but they are a trifle smaller.

The average measurement of eighty-eight eggs in the United States National Museum collection is 17.97 by 13.61 millimetres, or about 0.71 by 0.54 inch. The largest egg of the series measures 19.05 by 15.24 millimetres, or 0.75 by 0.60 inch; the smallest, 16 by 12.95 millimetres, or 0.63 by 0.51 inch.

The type specimens, Nos. 20536 and 20541 (Pl. 2, Figs. 20 and 21), from the Bendire collection, were taken by the writer at Fort Klamath, Oregon, on July 7, 1882, and July 18, 1883, respectively, each set containing three eggs, and these represent the heavier and lighter colored patterns of markings, while No. 26063 (Pl. 2, Fig. 22), from a set of two eggs, taken near Santa Ysabel, California, by Mr. H. W. Henshaw, on June 9, 1893, represents an intermediate type of coloration.

¹ *Surveys West of the 100th Meridian*, Vol. V, 1875, pp. 354-355.

109. *Empidonax flaviventris* BAIRD.

YELLOW-BELLIED FLYCATCHER.

Tyrannula flaviventris BAIRD (W. M. & S. F.), Proceedings Academy Natural Sciences, Philadelphia, Pa., July, 1843, 283.

Empidonax flaviventris BAIRD, Birds of North America, 1858, 198.
(B 144, C 259, R 322, C 388, U 463.)

GEOGRAPHICAL RANGE: Eastern North America; north to the southern portions of Labrador and the Northeast Territory; west to Manitoba and Minnesota; south in winter through eastern Mexico and Central America to Panama. Casually to Greenland.

The Yellow-bellied Flycatcher is a summer resident in the northern forest and mountain regions of the United States, and breeds from Massachusetts and New York northward through the maritime provinces of the Dominion of Canada to southern Labrador and the Northeast Territory, where Prof. John Macoun reports this species as common about Lake Mistassinni, in latitude 51° , longitude 72° and 73° , and it probably passes beyond this point. It has also been recorded as breeding regularly in the Alleghany Mountains, in Pennsylvania, and probably will yet be found as a rare summer resident at points considerably farther south, as in the Smoky Mountains of North Carolina, etc. In the west it is recorded as a regular summer resident in eastern Manitoba and Minnesota, and probably breeds also in northern Wisconsin. It passes south in winter through eastern Mexico and Central America to Panama. Several specimens have been recorded from Greenland.

Within the limits of the United States the Yellow-bellied Flycatcher seems to be fairly common in the northern New England States, while in the Adirondacks and Catskills, in New York, it must be considered as rather rare. This apparent rarity is due perhaps more to its unobtrusive habits, its retiring nature, and favorite haunts during the breeding season; as it frequents the dark, moist recesses of the forests, which at this time of the year abound with biting insect pests of all kinds, and which for that reason are usually shunned by all but truly enthusiastic ornithologists and oölogists. As far as my observations go (and they are rather limited) I consider this species the most silent and retiring of all our Flycatchers, and, although it may be much more common in suitable localities during the breeding season than it appears to be, it is but rarely seen at this time unless accidentally flushed from its nest. In the Adirondack mountains, where I have met with it, it was observed only in primitive mixed and rather open woods, where the ground was thickly strewn with decaying, moss-covered logs and boles, and almost constantly shaded from the rays of the sun. The most gloomy-looking places, fairly reeking with moisture, where nearly every inch of ground is covered with a luxuriant carpet of spagnum moss, into which one sinks several inches at every step, regions swarming with mosquitoes and black flies, are the localities that seem to constitute their favorite summer haunts, and it is not surprising to me that the eggs of this Flycatcher are still

so rare in most oölogical collections. I have only been able to observe this species in the vicinity of its nest, and can not add much information in regard to its general habits. Its call note is a low, plaintive "peeh peeh," the last part more emphasized; another, an alarm note, sounds like "turri turri;" the same note I put down the previous season as "trehe-eh, trehe-eh," with the remark that it reminded me somewhat of the sound produced by sliding a finger over a violin string.

Its food probably consists exclusively of small insects, which certainly are abundant enough in the places frequented by it. It arrives on its breeding grounds in our Northern States during the last two weeks in May, and nidification usually begins about the second week in June, occurring somewhat later farther north.

We are indebted to Mr. H. A. Purdie for the first authentic description of the nest and eggs of the Yellow-bellied Flycatcher (see "Bulletin Nuttall Ornithological Club," Vol. III, 1873, pp. 166-168), and since then the correctness of his identification has been fully verified. Dr. A. K. Fisher took a handsome set of four eggs on June 26, 1882, in the Catskill Mountains, Ulster County, New York, near the summit of Slide Mountain, at an altitude of over 3,500 feet. These he generously presented to the United States National Museum, which was the first genuine set in this collection. The locality where it was found and the nest itself are thus described:

"On the slope whereon the birds had made their home an abundant growth of bright-green moss invested the rugged configuration of the surface and enfolded the scattered remains of trees—ancestors, perhaps, of the young growth of balsams which clustered about the spot and afforded seclusion to the little pair that had come among them. The nest was built in a cavity scooped in a bed of moss facing the side of a low rock. The cavity had been excavated to a depth of $2\frac{1}{2}$ inches and was 2 inches across. The opening, but little less than the width of the nest, was 9 inches from the ground, and, partially hidden by overhanging roots, revealed the eggs within only to close inspection.

"The primary foundation of the nest was a layer of brown rootlets; upon this rested the bulk of the structure, consisting of moss matted together with fine-broken weed stalks and other fragmentary material. The inner nest could be removed entire from the outer wall, and was composed of a loosely woven but, from its thickness, somewhat dense fabric of fine materials, consisting mainly of the bleached stems of some slender sedge and the black and shining rootlets of, apparently, ferns, closely resembling horsehair. Between the two sections of the structure, and appearing only when they were separated, was a scant layer of the glossy orange pedicels of a moss (*Polytrichum*) not a fragment of which was elsewhere visible. The walls of the internal nest were about one-half an inch in thickness, and had doubtless been accomplished with a view of protection from dampness.

"Prof. Daniel C. Eaton, of New Haven, very kindly assumed the task of determining the different species of moss which entered into the composition

of the nest and of the moss bed in which it rested, and his investigation disclosed the fact that the mosses which abounded immediately about the nest had not been utilized as building material. As determined by Professor Eaton, the species of moss composing the bed were *Hypnum umbratum*, *Hypnum splendens*, *Hypnum schreberi*, *Hypnum crista-castrensis*. Those appearing in the nest were *Hypnum mullerianum*, *Hypnum mühlenbeckii* (?), *Dicranum longifolium*, *Dicranum flagellare*, *Polytrichum commune*, and *Polytrichum formosum*. With these occurred the following Hepaticæ: *Mastigobryum trilobatum*, *Scapania albicans*, and *Cephalozia bicuspidata*. In addition there were found among the materials of construction catkin scales of the birch, leaves of the balsam, and fragments of the dried pinnæ of ferns; but, as suggested by Professor Eaton, the presence of some of these was probably accidental. Springing from the verdant moss beds immediately about the nest were scattered plants of *Oxalis acetosella*, *Trientalis americana*, *Solidago thyrsoides*, and *Clintonia borealis*.¹

I am indebted to Dr. William L. Ralph for the opportunity of studying the nesting habits of this interesting Flycatcher. While on a tour of observation in the southwestern portions of the Adirondack mountains in Herkimer County, New York, while passing through a swampy piece of mixed woods which was free from undergrowth in this particular spot, but mostly covered with dense alder thickets in the immediate vicinity, a nest and four eggs of this species was found on June 17, 1892. The nest was placed among the upturned roots of a medium-sized spruce tree, to which considerable soil, which was entirely covered with a luxuriant growth of sphagnum moss, was still attached. This perpendicular moss and fern covered surface measured about 6 by 8 feet. The nest was sunk into the moss and soil behind, about 14 inches above the ground; the entrance was partly hidden by some ferns and the growing moss around it, and, taken all in all, it was one of the neatest and most cunningly hidden pieces of bird architecture I have ever seen. I might have walked past a dozen times without noticing it. It contained four eggs, in which incubation was about one-third advanced. The entrance was nearly circular, and measured about $1\frac{1}{4}$ inches in diameter. The inner cup of the nest itself measured about 2 inches in diameter and $1\frac{1}{4}$ inches in depth. It was composed of fine grasses and a few black, hair-like rootlets and flower stems of mosses. A couple of days after finding this nest a Yellow-bellied Flycatcher was seen flitting about the upturned roots of a tree about 150 yards from where the first was taken, but a most careful search failed to reveal the location of the nest, if a second pair bred there.

On a subsequent visit to the same locality, on June 8, 1893, a second nest was found, containing two eggs; these were left until June 10, when there were four. This nest was placed not over 100 feet from the former, and was probably built by the same pair of birds which nested there the previous year. The nesting site was in a swampy wood, composed mostly of spruce and tamarack trees, in a slight hollow in the side of and at the foot of a small mound about one

¹Transactions Linnæan Society, Vol. I, 1882, pp. 161, 162.

foot high, covered with spagnum moss, *Coptis trifolia*, *Oxalis acetosella*, and there were also a few other small plants growing from it. A single stem of a small bush protruded from the top of the opening. The hollow in which the nest was placed was lined with fine, dry grass and black, hair-like rootlets.

I think only one brood is raised in a season, as a most careful search failed to reveal a second nest in the vicinity. The birds were not seen afterwards, although the locality was visited several times. The return migration commences usually in the latter part of August, and none winter in the United States. Four eggs are ordinarily laid to a set; very rarely five. Their shape is usually ovate; the shell is close grained, rather frail, and without luster. The ground color is dull white, and the fine markings, which are usually minute and generally heaviest about the larger end of the egg, vary from cinnamon rufous to walnut brown; occasionally a specimen shows a speck or two of heliotrope purple.

The average measurement of sixteen eggs in the United States National Museum collection is 16.94 by 12.91 millimetres, or about 0.67 by 0.51 inch. The largest egg measures 17.53 by 13.21 millimetres, or 0.69 by 0.52 inch; the smallest, 16.26 by 12.70 millimetres, or 0.64 by 0.50 inch.

The type specimen, No. 25597 (Pl. 2, Fig. 23), Ralph collection, from a set of four eggs, was taken by Dr. William L. Ralph, June 17, 1892, near Wilmurt, Herkimer County, New York, and represents about an average-marked egg of this species.

110. *Empidonax difficilis* BAIRD.

WESTERN FLYCATCHER.

Empidonax difficilis BAIRD, Birds of North America, 1858, 198 (in text).
(B 144a; C 259, part; R 323; C 389; U 464.)

GEOGRAPHICAL RANGE: Western North America; east to the eastern foothills of the Rocky Mountains and adjacent ranges; north to southern Alaska; south to Lower California, and in winter through western Mexico to Costa Rica, Central America.

The breeding range of the Western Flycatcher, also known as the "Western Yellow-bellied" and "Baird's" Flycatcher, extends through western North America from Hot Spring Bay in southern Alaska (where Dr. T. H. Bean took a specimen on June 5, 1880, and informs me that it is not at all uncommon), through British Columbia and the Pacific Coast States, south to northern Lower California, Arizona, New Mexico, and probably western Texas, and in the interior, through Utah, Nevada, Idaho, western Montana, Wyoming, and Colorado.

Judging from the various records, the Western Flycatcher seems to be much more common in the coast districts west of the Sierra Nevada and Cascade ranges than in the interior, but it is also fairly common in Colorado, Arizona, and portions of New Mexico. Mr. R. S. Williams found it breeding in Belt Canyon, Montana, and kindly sent to the United States National Museum collection both skins and eggs from that locality.

Personally I have never met with this species in eastern Washington or Idaho; and only once near Fort Klamath, Oregon, where I found a nest, containing four half-grown young, among the roots of a spruce tree growing close to the banks of Anna Creek, a small mountain stream some 4 miles north of the fort, on July 6, 1882.

Mr. Charles A. Allen, of Nicasio, California, has kindly furnished me the following notes on the Western Flycatcher: "I find it a very widely distributed species throughout this part of the State, both among the forests on the highest hills, where there is not a drop of water for long distances, and along the banks of brooks and streams in the lowlands; in fact, anywhere where it can find shelter and shade, of which it is very fond. I have found its nests in all sorts of situations; sometimes in a small tree, placed in the upright forks of the main stem; again on the side of the stem, where a small stub of a limb or some sprouts grew out; or in a slight cavity in a tree trunk; against an old stump or a root which had been washed down during a flood in the middle of a stream; among curled-up roots near the water, etc. I have found a number of nests, when fishing for trout, by flushing the bird from under a bank; and on stooping down and looking I found the nest nicely concealed by the deep-green moss, such as covered the surrounding stones. They always use this particular kind of moss, no matter where the nest is placed. Occasionally they nest in deserted woodcutters' huts, in outbuildings near cover, and a friend of mine has some large water tanks in the woods back of his house, where for nineteen consecutive years these birds have built under the covered roofs of these tanks. I know of no place in this locality where they do not breed, excepting in very open country.

"Its song consists of a soft, low note. It shows much distress when its nest is taken, uttering then a low, wailing note, like 'pee-eu, pee-eu,' and frequently flutters about the person taking it and snapping its mandibles together. Its food consists of insects, which are caught by darting after them from its perch on some dead twig or limb, and it seldom fails to capture its victim."

Mr. H. P. Lawrence writes me: "I occasionally met with this species on the coast. In my diary I find this description of their call notes or song: June 14, 1891, at Quinnault Lake, Washington, 'pe-wit, pe-wit,' uttered energetically, or 'we-twee-eet,' with vigor. On June 26, 1891, at Humptulips, same State, they are put down as sounding like 'per-tee-t-weet,' or 'thweet'-put'-tweet',' uttered in jerky, spiteful accents."

In Belt Canyon, Montana, on July 6, 1889, Mr. R. S. Williams found the Western Flycatcher nesting in a narrow fissure of limestone, about 7 feet above the base of the wall. A nest observed by Mr. A. W. Anthony, near Howardsville, San Juan County, Colorado, on June 25, was placed on a ledge of rock, about 10 feet above a wagon road, and looked like a large ball of green moss, with a neat little cup in the center, lined with cow and horse hair. It contained a single egg when first found, and a set of four on July 3. Nests of this species have also been taken by Mr. Denis Gale on different occasions near Gold Hill,

Colorado. A nest and four fresh eggs, kindly presented by him to the United States National Museum collection, were found at an altitude of 9,500 feet, on June 27, 1889. It was placed in dense woods, 30 inches from the ground. Mr. A. M. Ingersoll reports finding a nest of this species at the bottom of a hole 5 inches deep, made by a Red-shafted Flicker in a live oak; nests have also been taken in piles of driftwood, on beams under bridges, etc. Dr. C. T. Cooke also found several of their nests and eggs near Salem, Oregon, in willow and cottonwood thickets.

The Western Flycatcher usually arrives in the more southern parts of its breeding range about April 1, and correspondingly later farther north. In the southern half of California it nests sometimes as early as the last ten days in April, but more frequently during the first week in May, while in the mountains of Colorado and Montana it delays nidification until the last half of June, and occasionally even later. I believe that in California two broods are sometimes raised in a season, and this Flycatcher will lay as many as four sets of eggs in a year, if those previously laid are taken.

A correspondent of the *Nidologist*, writing from Alameda, California, and signing himself D. A. C[ohen], makes the following interesting statement in the December number, 1893, p. 51:

"In May of 1886 I found a nest of the Western Flycatcher, *Empidonax difficilis*, situated on a rafter in a cow barn and only 4 feet from the ground. As I approached closely to the nest four young birds of this species fluttered down to the ground and shuffled along and out of sight. In the bottom of the nest was a set of four eggs, which, upon being blown, showed that incubation had begun at different periods for each egg, but the embryos had not formed yet in any of them. Had the young birds not been disturbed they would have remained in the nest two or three days longer. The mother had deposited the eggs so the heat from the nestlings would save her about a week's time sitting on the eggs."

In the southern portions of their breeding range they rarely leave for their winter homes before the latter part of October. Mr. L. Belding states that he saw a specimen in San Diego County, California, in December, and thinks a few remain there during ordinary winters.

From what has already been stated it will be seen that the Western Flycatcher is not at all particular in the selection of a nesting site; it may be on the ground, well hidden from view, or in a tree, in a more or less exposed situation from 5 to 20 feet up.

The nest is composed of weed stems, dry grasses, plant fibers and down, strips of the inner bark of the redwood, fine rootlets, dead leaves, and bits of moss. It is usually lined with finer materials of the same kind, and occasionally with horse and cattle hair or a few feathers. The outside of the nest is usually coated with green moss when obtainable, but some nests before me show no trace of this in their composition. They are generally placed not far from water, but there are exceptions to this. A well-preserved nest now before me, taken by

Mr. R. S. Williams on July 6, 1891, in Belt River Canyon, Montana, measures 4 inches in outer diameter by 2 inches in height. The inner cup measures $2\frac{1}{4}$ inches by $1\frac{3}{4}$ inches deep. It is a rather loosely built structure, and a good deal of moss enters into its construction. Three or four eggs are laid to a set, usually four; I know of a single instance only of five having been taken.¹

The eggs vary in shape from ovate to short and rounded ovate; the shell is smooth, close grained, and without luster. The ground color is usually dull white or pale creamy white, and the eggs are blotched and spotted with cinnamon rufous and lighter shades of buff pink. In the majority of specimens these markings are heaviest about the larger end, but in a few they are more evenly distributed over the entire egg. While they resemble the eggs of the Yellow-bellied Flycatcher considerably, and are of nearly the same size, the spots are, as a rule, coarser and heavier.

The average measurement of fifty-eight eggs in the United States National Museum collection is 16.86 by 13.12 millimetres, or about 0.66 by 0.52 inch. The largest egg of the series measures 18.80 by 13.72 millimetres, or 0.74 by 0.54 inch; the smallest, 15.24 by 12.45 millimetres, or 0.60 by 0.49 inch.

The type specimen, No. 24960 (Pl. 2, Fig. 24), from a set of four eggs, Ralph collection, taken near Haywards, California, June 4, 1882, represents one of the smaller and lightly marked eggs, while No. 25072 (Pl. 2, Fig. 25), from a set of three, taken by Mr. William G. Smith, near Pinewood, Colorado, June 12, 1890, shows a larger-sized and heavier-marked specimen.

III. *Empidonax cineritius* BREWSTER.

ST. LUCAS FLYCATCHER.

Empidonax cineritius BREWSTER, Auk, V, Jan., 1888, 90.

(B —, C —, R —, C —, U 464, 1.)

GEOGRAPHICAL RANGE: Lower California.

Very little is yet known about this recently described species. It appears to occur only in the Peninsula of Lower California. The type was obtained at La Laguna, and since then specimens have also been taken on Santa Margarita Island, Comondu, and San Benito. Mr. W. A. Anthony writes me that he found the St. Lucas Flycatcher abundant along the willow-lined streams of the San Pedro Martir Mountains in the spring of 1893, and quite rare in the mesquite thickets in an *arroya* near the old mission of San Fernando, not far from San Quentin, Lower California, evidently nesting, but as no nests and eggs could be found, they still remain unknown, and nothing farther has yet been recorded about its habits, etc.

¹ See Bulletin Nuttall Ornithological Club, Vol. VI, 1881, p. 119.

112. *Empidonax acadicus* (GMELIN).

ACADIAN FLYCATCHER.

Muscicapa acadica GMELIN, Systema Naturæ, I, ii, 1788, 947.

Empidonax acadicus BAIRD, Birds of North America, 1858, 197.

(B 143, C 256, R 324, C 384, U 465.)

GEOGRAPHICAL RANGE: Eastern North America; north to southern New England, southern New York, Pennsylvania, southern Michigan, Wisconsin, and Minnesota, to southern Manitoba; west to eastern Nebraska, eastern Kansas, the eastern parts of the Indian Territory, and Texas; south in winter through eastern Mexico and Central America to Ecuador, South America, and the Island of Cuba.

The breeding range of the Acadian Flycatcher, also known as the "Green-crested Flycatcher," extends from Florida and our Southern States bordering the Gulf coast, north to southern New York, the lower Hudson River Valley, and possibly occasionally to the Connecticut River Valley in southern New England, the greater part of Pennsylvania, Ohio, southern Michigan, Wisconsin, and Minnesota, to the Province of Manitoba Dominion of Canada. In the West it reaches to eastern Nebraska, eastern Kansas, the Indian Territory, and somewhat beyond the eastern half of Texas, where Mr. H. P. Attwater found it breeding on the Medina River, 15 miles south of San Antonio, Texas, in June, 1891, and sent me the nest, which unquestionably is of this species. Mr. Frank M. Chapman found it breeding near Gainesville, Florida, taking a nest and two half-incubated eggs on May 9. Dr. Leverett M. Loomis reports it as a common summer resident in Chester, Greenville, and Pickens counties, South Carolina. The late Dr. William C. Avery stated that it is common in southern Alabama. It is known to breed in Louisiana and eastern Texas, and may be called fairly common in suitable localities throughout our Middle States. The northern limits of its breeding range are not as positively established as they might be, due to the fact that this species is often mistaken for *Empidonax pusillus trailli*, which it somewhat resembles, as do the eggs, but there is no resemblance in the nests.

Dr. A. K. Fisher found the Acadian Flycatcher a regular summer visitor in the vicinity of Sing Sing, New York, and took several nests and eggs there, which are now in the United States National Museum collection; this locality marks about the most northern point of its range in the east. I believe, however, that it occasionally breeds still farther north in this State, as Mr. W. F. Webb sent me a nest and three eggs which he identified as belonging to this species, taken July 4, 1891, near Meridian, Cayuga County, New York. The nest certainly looks like a typical one of *Empidonax acadicus*, and there is a skin now in the United States National Museum collection, taken at Amsterdam, Montgomery County, New York, June 5, 1885, which further confirms this supposition. In Pennsylvania it is a common summer resident, and also in southern Michigan, where the late Capt. B. F. Goss found it breeding, and whence

he sent a nest and a set of eggs to the Museum collection. Mr. J. W. Preston writes me that it is common in Hardin County, Iowa, describing the nest as a frail, semipensile structure, fastened to a fork near the extremity of drooping branches, 6 or 8 feet from the ground, and formed of vines of *Lathyrus*, interwoven with a few grasses and oak catkins, fastened with spider webs, in thick underbrush, but near openings. Dr. P. L. Hatch states that it is fairly common in Minnesota. Mr. Ernest E. Thompson, in his "Birds of Manitoba," gives it as quite common in the vicinity of Duck Mountain, and Col. N. S. Goss, in his "Birds of Kansas," says: "Not uncommon in the eastern part of the State," and he also records it from eastern Nebraska.

The Acadian Flycatcher is one of the later migrants to arrive on its breeding grounds, and none winter within our borders. It reenters the United States from its winter haunts usually about the middle of April, and moves leisurely northward, arriving on its breeding grounds in the more northern portions of its range during the last half of May. In the mountain regions of Pennsylvania, the Virginias, North Carolina, etc., it is rarely found above an altitude of 3,000 feet. The favorite summer haunts of this species are generally deep, shady, second-growth hard-wood forests, on rather elevated ground, especially beech woods with little undergrowth, or bottom lands not subject to periodical overflow, and not far from water. In such localities its peculiar call notes, resembling "wick-up" or "hick-up," interspersed now and then with a sharp "queep-queep" or "chier-queep," the first syllable very quickly uttered, and another, somewhat like "whoty, whoty," may be frequently heard; but the bird, although not particularly shy, is rarely seen while moving through the dense foliage of the lower limbs from tree to tree. I have several times failed to detect the bird when I was perfectly certain it was within 20 feet of me.

Like nearly all Flycatchers, the Acadian is rather unsociable and quarrelsome with its own kind, especially during the mating season. Its food consists almost entirely of small insects, which are caught on the wing and rarely missed, and to a small extent only on wild berries. It is an extremely beneficial species, doing no harm whatever, and deserves the fullest protection.

In our Northern States nidification rarely commences before June, while in the more southern States it nests sometimes during the first week in May. In the vicinity of Washington, District of Columbia, where the Acadian Flycatcher is a common summer resident, it usually breeds during the first ten days in June. Their favorite nesting sites are in drooping branches of various sorts of trees and bushes, mostly beech, witch-hazel, dogwood, sweet gum, hickory, and oak, and less often in wild crab apple, hawthorn, hemlock, pine, cypress, willow, and birch trees, at heights ranging from about 4 to 20 feet from the ground. The nests, many of which are rather shallow, open-work, sieve-like structures, are semipensile, their upper rims being attached to the fork of some slender twig, like the nests of the *Vireos*; but do not resemble these in any other respect, and show great variation in size and in the character of the materials of which they are built. In the South many are constructed almost exclusively of Spanish moss;

in the North the body of the nest is composed principally of decayed fibrous material, dark-colored rootlets interwoven with a few blades of grass, catkins, dry blossoms, and usually decorated more or less abundantly with the male aments or catkins of oak or other trees. There really is no inner lining, and the bottom of the nest is usually so thin that the eggs can very readily be seen through it from below. In some nests the outer decorations of catkins are omitted, and the walls are composed of fine weed stems, silky plant fibers, and fine strips of bark, mixed with plant down, cocoons, and spider webs. This style of nest is apparently considerable stronger than the former, and usually somewhat larger. A rather well-built specimen, taken by Mr. Charles W. Richmond, June 14, 1885, near Washington, District of Columbia, measures $2\frac{3}{4}$ inches in outer diameter by 2 inches in depth, while another, already mentioned as taken by Mr. H. P. Atwater on the Medina River, Texas, measures likewise $2\frac{3}{4}$ inches in outer diameter, but only $1\frac{1}{4}$ inches in depth; the inner cavity is only 2 inches wide and about three-quarters of an inch deep. There are several other nests in the collection equally shallow. Attached as they are to slender, drooping branches, it is surprising how the eggs are prevented from rolling out in a heavy wind storm unless the parent is on the nest. Occasionally one is found which has some of the materials of which it is built hanging down from the sides, giving it a very untidy appearance.

Mr. Witmer Stone showed me a very peculiar nest of this Flycatcher which he took on the lower Susquehanna River, in York County, Pennsylvania, in June, 1890. It was situated on the extremity of a low branch of a hemlock tree, about 6 feet from the ground, and was constructed entirely of the long, gray lichen, *Usnea barbata*. In fact, there are three distinct types of these nests; the first and most common one is more or less abundantly decorated with the male aments of different species of trees; a second, in which these exterior ornamentations are dispensed with, and the last, where the nest is built entirely, or in large part, of different kinds of tree mosses. Occasionally the Acadian Flycatcher builds a double nest—for instance, when a Cowbird has deposited an egg in one just completed, before the owner has laid in it. Mr. W. E. Loucks, of Peoria, Illinois, sends me such a record. The nest found by him contained a Cowbird's egg in the lower story and three fresh eggs in the upper one. The Acadian Flycatcher is one of the species on which this parasite imposes occasionally. I believe that but one brood is raised in a season. During the latter half of September the return migration to their winter homes commences.

The number of eggs to a set varies from two to four, while sets of three are most often found; but sets of four in certain sections of its range, in Pennsylvania for instance, are said to be not especially rare; an egg is deposited daily. In shape they range from ovate to an elliptical ovate; the shell is close grained, and occasionally slightly lustrous. The ground color varies from pale cream to buff color, and the markings consist of moderate-sized spots, and again of mere specks, ranging from liver brown and ferruginous to a light rufous tint. None of the eggs are heavily spotted, and most of these markings are generally concentrated about the larger end of the egg. Occasionally one is almost entirely unspotted.

The average measurement of seventy-six eggs in the United States National Museum collection is 18.37 by 13.53 millimetres, or about 0.72 by 0.53 inch. The largest egg of the series measures 20.07 by 14.73 millimetres, or 0.79 by 0.58 inch; the smallest, 16.76 by 12.70 millimetres, or 0.66 by 0.50 inch.

The type specimen, No. 24816 (Pl. 2, Fig. 26), from a set of three eggs, taken by Mr. G. E. Mitchell, June 13, 1888, near Washington, District of Columbia, represents one of the lighter-colored and least-marked specimens, while No. 24949 (Pl. 2, Fig. 27), also from a set of three eggs, Ralph collection, taken May 23, 1880, near Washington, Pennsylvania, represents about an average egg of this species.¹

113. *Empidonax pusillus* (SWAINSON).

LITTLE FLYCATCHER.

Platyrhynchus pusillus SWAINSON, Philosophical Magazine, I, May, 1827, 366.

Empidonax pusillus CABANIS, Journal für Ornithologie, 1855, 480.

(B 141, C 257a, R 325, C 386, U 466.)

GEOGRAPHICAL RANGE: Chiefly western and portions of eastern North America; north to southern British Columbia and the northern border of the western United States, in the drier and more open districts; east to about the eastern limits of the Great Plains and the Mississippi Valley, in Arkansas, Missouri, Illinois, Indiana, and probably still farther in this direction, as well as in most of the intervening regions; south in winter through the Mississippi Valley, Texas, and Mexico, to Central America.

The breeding range of the Little Flycatcher, also known as the "Little Western Flycatcher," extends north to the interior of southern British Columbia, and sporadically farther east to the northern border of our adjoining States, in Idaho, Montana, and western North Dakota. Still farther east it reaches the western portions of North and South Dakota, the greater part of Nebraska, portions of Kansas, Missouri, Arkansas, Illinois, and probably to southern Indiana and Ohio; while to the southward it is found in all the intervening country, including California, Arizona, New Mexico, northern and western Texas, and portions of the Indian Territory, excepting the dry and arid desert regions.

The Little Flycatcher is an abundant summer resident in all suitable localities throughout the western United States, its favorite haunts being the willow-covered islands and the shrubbery along water courses, beaver meadows, and the borders of the more open mountain parks; in such places it sometimes reaches an altitude of 8,000 feet in summer, especially in California, Colorado, and Utah. It is pretty generally distributed at this time through Washington, Oregon, Idaho, Utah, Nevada, California, Montana, Wyoming, Colorado, New Mexico, Arizona, and western Texas, and it probably also breeds in the higher mountains of Lower California. I have found this species in many

¹Mr. William Brewster has recently conclusively demonstrated that the name of *Empidonax virescens* (VICILLLOT) will have to be substituted for that of *Empidonax acadicus* (GMELIN), see "The Auk," Vol. XII, 1895, pp. 157-159.

localities in the West, but it was especially common in the vicinity of Fort Klamath, Oregon, where I took a number of its nests and eggs.

Dr. Clinton T. Cooke has kindly sent me the following notes on this species, based on observations made by him in the vicinity of Salem, Oregon, during the years 1888 to 1891. He writes: "The Little Flycatcher arrives at Salem about May 20, and for a week or two is very silent, seldom seen, and rather inclined to seek the heavy undergrowth along water courses, where I have found it silently but industriously capturing insects, much as the Western Flycatcher (*Empidonax difficilis*) does later in the season. About June 1 they begin to frequent the more open places, old pastures grown up with rosebushes, the small islands, and the gravel bars covered with a dense growth of small willows—in short, any open place near water where there is a growth of bushes from 3 to 8 feet high. Their numbers increase in the open localities until the middle of June, decreasing at the same time, and finally disappearing altogether from the woods. As their numbers increase in the open places they become pugnacious, and their shrill, sharp notes can be heard constantly. Their note, given only during the breeding season, resembles the syllables of 'pree-pe-deer,' delivered rather hurriedly and shrill. This call is quite characteristic of the energetic, aggressive disposition of the bird. In July, 1891, I heard it several evenings in the twilight, and once while out late in the night. As might be expected, the male calls incessantly in the early twilight.

"Construction of the nest begins soon after June 10, and ordinarily consumes about a week, so that one may begin to search for sets of fresh eggs by the 20th of the month. Along the Willamette River the nest is usually placed in a small clump of willow bushes, preferably a bush well covered with cotton, and it is apt to be pretty well concealed in an upright crotch, about 4 feet from the ground, sand, or gravel, as the case may be. I have found only one nest in a rose bush, on a bar where willows were common enough. One nest which I found was placed in a slender willow, fully 18 feet from the ground, in an upright crotch; another was placed in a willow bush growing in the water, and was taken from a canoe, and several were placed within a foot of the sand or gravel. The material uniformly used as a foundation for the nest is the inner bark of small dead willows which have been killed by high water and subsequently bleached by the weather, some fine rootlets, a little fine dead grass, a lining of cotton down, with occasionally a piece of string and a few horsehairs. This is often an artistic structure, but sometimes only a loose flimsy affair. Once I have seen as nice a lining of horsehair as a Lazuli Bunting could put in; twice a lining of fine rootlets, once one of green grass, and once one of fine green rushes, which were common in that locality."

Dr. Cooke's observations agree with my own; but at Fort Klamath, Oregon, the Little Flycatcher, besides nesting in willows, is also rather partial to small aspens. In California, in the Santa Clara Valley, they occasionally build in blackberry bushes, and Mr. A. W. Anthony found several nests near Beaverton, Oregon, placed in the forks of rank ferns from a foot to 20 inches above the

ground. In Colorado Mr. Denis Gale has found this species breeding in small alder bushes. A nest and five eggs, one of these being the egg of a Cowbird, were taken by him July 2, 1889, at an altitude of 5,500 feet, and presented to the United States National Museum collection; and in Colorado the Little Flycatcher seems to be not infrequently imposed upon by this parasite, as he has taken several nests containing one of their eggs.

Until quite recently the birds found breeding throughout the Mississippi Valley, in Missouri, Illinois, etc., have generally been referred to *Empidonax pusillus traillii*, and my attention was first drawn to this discrepancy by Dr. A. K. Fisher, who showed me a perfectly typical breeding female taken by Mr. W. S. Catleugh, near Canton, Illinois, on June 25, 1894, which is clearly referable to *Empidonax pusillus*, and other such instances have since then come under my observation, establishing without a doubt the correctness of the Doctor's views, and compelling me to rewrite my articles on these birds. Although not quite positive regarding the Ohio birds, I feel certain that these will also be found to be referable to this species, and the subjoined notes from some of my Eastern correspondents are all much more likely to refer to *Empidonax pusillus* than to *Empidonax pusillus traillii*, but I prefer not to alter them.

Mr. Lynds Jones, of Oberlin, Ohio, writes me: "I have lived in a locality where Traill's Flycatcher was common. I met with it first on the site of an old locust grove where the young sprouts were allowed to grow up; the ground was low and marshy, and elder and willow bushes grew in profusion, together with *Ambrosia* here it nested in willows close to the ground. Later I learned to look for this bird elsewhere, and found it also in thickets of hazel and small shrubs, often a quarter of a mile from water, where the nest was placed in the darkest parts of these thickets. I also found it nesting commonly in white-willow hedges and in the shrubbery found along the banks of streams. If possible, thickets are selected where cattle do not run, so that vines and bushes are permitted to grow in wild profusion, and in such localities wild-plum bushes are frequently used as nesting sites. The nest is usually placed from 18 inches to 5 feet from the ground and well concealed. Its call note, sounding like 'whee-chée,' is uttered at short intervals during the mating season, and at longer intervals in the summer."

Mr. W. E. Loucks, of Peoria, Illinois, writes me: "Traill's Flycatcher is a common summer resident here, very abundant in the river bottoms, but it is also found sparingly in the uplands. I consider it a somewhat silent bird, frequenting the thick growths of small trees which either grow in or near the water or in damp situations. It is most abundant in the heavy growth of willows in the bottoms, and many nest here."

Mr. Robert Ridgway tells me that in southern Illinois it frequents rather open prairie country interspersed with low shrubbery. Mr. Otto Widmann, of St. Louis, Missouri, in a letter to Dr. Elliott Coues, published in the "Bulletin of the Nuttall Ornithological Club" (Vol. V, 1880, p. 22), makes the following statement: "It is common almost everywhere outside the forest, not only along

the 'willow thickets bordering streams and swamps,' but even here in the city, in all large gardens, parks, orchards, pastures, cemeteries, etc. *Trailli* is not the shy or retiring bird of some Eastern writers; its movements are not 'hidden by the foliage of trees,' as its station is generally on a prominent point, often the very top of a shrub or tree, or a telegraph wire, a fence, or a weed stalk."

The Little Flycatcher, according to my observations in the West, is not nearly as shy a bird as its eastern representative, and while on the whole it also probably prefers moist situations, like Traill's Flycatcher, it seems to be equally as well satisfied in rather dry country, where the other is apparently never found. One of their common call notes sounds like "queet-queet," and the alarm note uttered when the nest is approached is something like that of Traill's Flycatcher, "whuish-whuish." When pursuing each other during the mating season, they sometimes give vent to a twittering note, not unlike that of the Arkansas Flycatcher, and a sharp "quéét-quéét" is often heard while these restless little beings flit about in the low willows, or when perched on some tall weed or coarse marsh-grass stalk. They never remain long in one place, but move from perch to perch, snapping up insects as they fly; they are pugnacious, quarrelsome little creatures, making up in courage and determination what they lack in size. I have seen one drive a Red-shouldered Blackbird away from the vicinity of its nest, pitching down on it angrily and pecking at its head and neck in the manner of its larger relatives when chasing Crows or Hawks. They do no harm and deserve the fullest protection.

Nidification always commences late, even in the more southern portions of their range; in the vicinity of Tucson, Arizona, for instance, I found two nests with fresh eggs on June 16 and 20, 1872, which is about the time it begins nesting at Fort Klamath and in the Willamette Valley, Oregon; and it is not unusual there to find fresh sets of eggs during the first week in July. Lieut. H. C. Benson, United States Army, took a nest of this species containing three fresh eggs at Sequoia National Park, Tulare County, California, on July 13, 1892, in a locality where it was not likely the bird had been robbed before.

The description of the nest already given by Dr. Cooke applies to a typical one, which is always built in a crotch or among young sprouts growing up from the limb, at a height of 1 to 18 feet from the ground, averaging from 4 to 8 feet. From their position these nests are usually cone shaped. Occasionally one is found which is completely covered on the outside with plant down, probably of one of the cottonwoods or some species of willow, while the inner cup of the nest is lined with fine shreds of bark, plant fibers, and fine grasses. Where this species nests in the vicinity of houses, as it frequently does in the eastern parts of its breeding range, pieces of twine, rags, newspapers, and feathers are frequently incorporated into the body and walls of the nest, while the inner cup is generally lined with the tops of fine grasses, shreds of bark, hemp-like fibers, especially those of the milkweed, horsehair, and occasionally feathers. A well-preserved nest of this species, No. 24111, United States National Museum collection, taken by Mr. Denis Gale, near Gold Hill, Colorado, on July 3, 1890,

one of the most compactly built ones, measures $3\frac{1}{2}$ inches in outer diameter by 4 inches in depth; the inner cup is 2 inches wide by 2 inches deep. In some specimens the outer walls are fully an inch thick.

The Little Flycatcher occasionally builds a double nest. Dr. Clinton T. Cooke writes me: "On June 20, 1891, I found a nest on Hammer's Island, in the Willamette River. It was situated in a willow crotch, about 4 feet from the ground; contained no eggs and presented nothing abnormal to view. I was prevented from making a second visit to the nest until July 6, when I supposed it would contain either young or badly incubated eggs. I was much surprised, however, to find that it looked abnormally deep outside. The cavity was about the usual depth, but from the bottom to the margin of this the nest measured about 5 inches, and resembled an inverted cone, presenting no irregularities from apex to base. It contained four fresh eggs. On examining it more closely I saw it was a two-storied nest, one neatly built upon the other. The lower one also contained four eggs, the contents of which were too dry to be removed, and which evidently had been abandoned for some inexplicable cause."

The number of eggs to a set varies from two to four, usually three or four; sets of the latter number are oftener found in the more northern parts of its range than the smaller number; and an egg is deposited daily. Only one brood is raised in a season, and incubation lasts about twelve days; the young are fed on insects of various kinds, and remain in the nest about two weeks. The return migration to their winter homes usually begins in the more northern portions of their range about the first week in September, and none winter within our borders.

The eggs are usually ovate in shape; the shell is strong and without luster. The ground color varies from a pale creamy white to pale buff, and this is moderately spotted with vinaceous rufous and ferruginous. The markings are principally confined to the larger end of the egg, and vary from small rounded dots to larger irregular blotches among the finer ones. In some specimens the ground color might be called dead white.

The average measurement of one hundred and twenty-nine eggs in the United States National Museum collection is 17.86 by 13.39 millimetres, or about 0.70 by 0.53 inch. The largest egg of the series measures 19.56 by 13.97 millimetres, or 0.77 by 0.55 inch; the smallest, 15.49 by 12.70 millimetres, or 0.61 by 0.50 inch.

The type specimens, Nos. 25228 and 25229 (Pl. 2, Figs. 28 and 29), both taken from sets of four eggs which were collected by Dr. Clinton T. Cooke, near Salem, Oregon, on June 22 and July 2, 1891, are selected to show the extremes in coloration and markings, and were presented for that purpose.

114. *Empidonax pusillus traillii* (AUDUBON).

TRAILL'S FLYCATCHER.

Muscicapa traillii AUDUBON, Ornithological Biography, I, 1832, 236.*Empidonax pusillus* var. *traillii* BAIRD, Brewer and Ridgway, History of North American Birds, II, 1874, 369.

(B 140, C 257, R 325a, C 385, U 466a.)

GEOGRAPHICAL RANGE: Eastern and portions of western North America; north to Nova Scotia, New Brunswick, the southern portions of Quebec, northern Ontario, and in the interior of the Dominion of Canada, from Manitoba, Assiniboia, Alberta, and British Columbia north to about latitude 63°, in the Mackenzie River Valley and southern Alaska; west in the United States to eastern North and South Dakota; south in winter through Texas and Mexico to Central America.

The breeding range of Traill's Flycatcher, the eastern race of the Little Flycatcher, but not always readily distinguishable from it, extends from southern New England, central and northern New York (the mountainous portions of northern Pennsylvania?), northern Michigan, Wisconsin, Minnesota, and eastern South Dakota, or from the southern border of the Canadian fauna northward as indicated, reaching the northern limits of its breeding range in the vicinity of Fort Simpson, Northwest Territory, and in southern Alaska, where it appears to be rare, however. I consider this subspecies as being strictly a bird of the Canadian fauna, and do not believe that it breeds south of these limits. In the southeastern portions of its breeding range, in New York and northern Connecticut, Traill's Flycatcher is mainly found among alder thickets bordering the numerous small mountain streams, or in rather wet meadows covered in places with undergrowth of willow, etc. In the Adirondack Mountains, in Herkimer County, New York, Traill's Flycatcher is not an uncommon summer resident, very shy, and much oftener heard than seen. In the vicinity of Wilmurt this subspecies was only observed in the alder swamps and in beaver meadows, was very shy and retiring, and therefore seldom seen, for instead of perching on some dead twig or branch, like most of our Flycatchers do, it kept hidden among the foliage as much as possible. One of its notes, generally uttered during the breeding season when sitting at rest on some twig in the top of a bush, resembles the "pree-pe-deer" of the Little Flycatcher very much; another, the syllables "huip, huip;" and the alarm note is something like "whuish, whuish," uttered quickly and emphatically, being difficult to reproduce on paper.

Mr. F. A. Patton found Traill's Flycatcher breeding in Miner County, South Dakota, on June 30, 1892, and sent me one of the parents for identification, which I consider to be referable to *Empidonax pusillus traillii*.

Mr. J. Lockhart, of the Hudson Bay Company, has sent several sets of its eggs, with the parents, to the United States National Museum, from Fort Resolution, Great Slave Lake, the most northern breeding record I have. It appears to be a common summer resident in British Columbia, ranging from the coast eastward throughout the intervening British provinces, excepting a few of the

more open, sagebrush-covered valleys in the interior, where it seems to be replaced by *Empidonax pusillus*, or intermediates, which are not readily referable to either form. In fact, the differences between these birds are, at best, but very slight, and the easiest solution would be to recognize only one species.

Traill's Flycatcher usually makes its appearance in the more southern parts of its breeding range about the latter part of May or during the first ten days in June, and correspondingly later farther north. While collecting in company with Dr. William L. Ralph, in the vicinity of Wilmurt, Herkimer County, New York, on June 23, 1893, we found a nest of this subspecies in a swampy pasture, placed in a small arrow-wood bush about 2½ feet from the ground.

The nest of Traill's Flycatcher resembles that of the Little Flycatcher very much, and, like it, is nearly always built in a crotch formed by two or more twigs growing out from the main stem; occasionally it is placed on a horizontal limb, at a point where several smaller twigs spring out perpendicularly from it; around these the walls of the structure are often woven. As a rule they are well constructed, the materials used varying somewhat in different localities, dry grasses, pine needles, shreds of bark, and plant fibers usually constituting the body of the nest, the inner cup being lined with fine grass tops, shreds of bark, vegetable fibers, fern down, and occasionally with a few horsehairs. A typical nest measures about 3 inches in outer diameter by 2½ inches in height; the inner cup is about 2 inches wide by 1¾ inches deep; the materials composing it are well interwoven with each other; the outer walls are thick, and, as a rule, it is well concealed.

I have seen it stated that Traill's Flycatcher occasionally builds a semipensile nest, like the Vireos, but I have never seen any, and such instances, if they really occur, must be rare. Its nest appears invariably to be placed in low shrubs or bushes near water, and rarely over 6 feet from the ground, more often from 1 to 4 feet.

Nidification begins late in the season, about a week being consumed in nest building. The eggs, from two to four in number, usually three, although sets of four are not uncommon, are deposited daily. In the more southern parts of their range fresh eggs may be looked for in the last half of June, while in the more northern portions, generally during the first two weeks in July.

A single brood is raised in a season, incubation lasting about twelve days. The Cowbird occasionally deposits an egg in the nest. The young are fed on insects, and leave the nest in about two weeks. The return migration to the south begins sometimes in the latter part of August, but usually during the first half of September, and none winter within our borders. The eggs are mostly ovate in shape; the shell is close grained and without luster. The ground color ranges from a pale creamy white to a pale pinkish buff. The markings vary considerably in size from minute dots and specks to bold spots and blotches of cinnamon rufous, ferruginous, and claret brown, and they predominate mostly about the larger end of the egg, in some cases forming an irregular wreath. A few specimens are very slightly marked and appear almost immaculate. On

the whole, they resemble very closely the eggs of the preceding species, as well as those of *Empidonax acadicus*, but they average a trifle larger.

The average measurement of fifty eggs in the United States National Museum collection is 18.54 by 13.46 millimetres, or 0.73 by 0.53 inch. The largest egg of the series measures 19.81 by 13.97 millimetres, or 0.78 by 0.55 inch; the smallest, 17.27 by 12.70 millimetres, or 0.68 by 0.50 inch.

The type specimen, No. 24992 (Pl. 2, Fig. 30), from a set of three eggs, Ralph collection, was taken by Dr. William L. Ralph, near Wilmurt, Herkimer County, New York, June 22, 1891, and represents about the ordinary style of markings found among the eggs of this subspecies.

115. *Empidonax minimus* BAIRD.

LEAST FLYCATCHER.

Tyrannula minima BAIRD (W. M. & S. F.), Proceedings Academy Natural Sciences, Philadelphia, July, 1843, 284.

Empidonax minimus BAIRD, Birds of North America, 1858, 195.
(B 142, C 258, R 326, C 387, U 467.)

GEOGRAPHICAL RANGE: Eastern North America; north in the eastern parts of the Dominion of Canada to about latitude 49° 30', and in the interior through the Provinces of Manitoba and Saskatchewan to Great Slave Lake and the southern Mackenzie River Valley, Northwest Territory, to about latitude 63°; west to the eastern slopes of the Rocky Mountains; casually to Utah; south in winter through Central America to Panama.

The breeding range of the Least Flycatcher, also known as the "Chebeck," extends through the northern parts of the eastern United States, from about latitude 40° northward into the Dominion of Canada, through Nova Scotia, Cape Breton, Prince Edward Island, New Brunswick, the southern portions of the Provinces of Quebec and Ontario, to about latitude 49° 30', and thence westward through Manitoba and Saskatchewan, in the interior, north to Great Slave Lake and the southern Mackenzie River Valley, Northwest Territory, to about latitude 63° N.

The western limits of its breeding range in the United States are not yet well defined. It is known, however, to extend to Tom Green County, Texas, where Mr. William Lloyd reports it as a "tolerably common summer visitant; abundant in fall; have shot young; no nests taken." (See "The Auk," Vol. IV, 1887, p. 193.) A young bird of the year, taken there on August 15, 1885, and now in the United States National Museum collection, seems to confirm this statement, and another specimen, taken by Dr. H. B. Butcher, on August 3, 1866, near Laredo, Texas, carries its probable breeding range still farther south and west. As far as I am aware, no records of its breeding in Kansas have been recorded, but it is said to nest occasionally in eastern Nebraska. It is known to be a common summer resident in the Dakotas, and I took a single nest and eggs on June 25, 1885, near Fort Custer, Montana; and two skins taken by me near the same place are now in the United States National Museum collection.

Mr. H. W. Henshaw also took a specimen near Denver, Colorado, on May 17, 1873, and I believe more careful investigation will yet show that the Least Flycatcher is an occasional summer resident as far west as the eastern foothills of the Rocky Mountains.

The most southern breeding record in the eastern United States I have been able to find is one by Mr. John C. Cairns, in Buncombe County, North Carolina, where he reports it as rare, stating: "I have seen but one pair, and found their nest. It was placed in the fork of a persimmon tree, 20 feet from the ground, and contained four fresh eggs." It also breeds sparingly throughout the mountain regions of southern Pennsylvania, the Virginias, etc.

Mr. Witmer Stone writes me from Philadelphia, Pennsylvania, under date of April 21, 1892: "I recently received a nest and eggs of *Empidonax minimus* from near Trenton, New Jersey, which I believe is the most southern record of the breeding of this species in New Jersey."

Mr. S. N. Rhoads also records this species as nesting in Delaware County, Pennsylvania, on June 1, 1881, securing the parents.¹

It is a common summer resident throughout the whole of New England, New York, northern Pennsylvania, northern Illinois, Indiana, Iowa, Michigan, Wisconsin, and Minnesota, as well as in the southern portions of the Provinces of Ontario and Saskatchewan. Neither does it appear to be rare still farther north, as there are several breeding records by Messrs. R. Kennicott and J. Lockhart from Fort Resolution, Great Slave Lake; by Mr. B. R. Ross, from Fort Simpson, and by Miss Elizabeth Taylor, near Lake Athabasca, all in the Northwest Territory.

The Least Flycatcher arrives at its summer haunts in the more southern parts of its range about the second week in May, and is the commonest of our smaller *Tyrannidae*. It prefers the more open and cultivated country to the forests, and is only found on the outskirts of these. Like many other species, it readily adapts itself to the changed conditions of things, and is equally well contented in the immediate vicinity of human habitations, and even in villages, as in more retired places. Its favorite resorts are orchards, hedgerows, the shade trees and shrubbery along country roads, small streams, pastures, etc. A person will not have to search long in such places to find it, or at least to hear its familiar "che-beck," which in an early morning's walk can be heard in every orchard and from almost every clump of trees bordering the roads and lanes. It is a most restless little creature, now flitting from branch to branch of an apple tree, peering here and there, then suddenly darting after some insect which it has disturbed by its movements, uttering constantly a sharp "twit, twit, twit" as it moves about, varied with its ordinary call of "che-beck," which it never seems to tire of uttering; another one of its notes sounds something like "s-lick, s-lick." During the mating season the male may sometimes be seen hovering over a tree in which its mate is hidden, uttering at the same time a low, twittering warble, like "whit-we-we;" at this time it is scarcely ever at

¹ Bulletin Nuttall Ornithological Club, Vol. V11, 1882, p. 55.

rest, and either its wings or tail are in constant motion. Where not molested it soon becomes very tame and fearless.

Mr. Manly Hardy writes me: "A pair of these birds or their descendants have nested regularly in or near my garden, usually building in a maple. These birds know me, and, what is more, I believe remember me from one year to another. They often sat on a dry twig, or on a bean pole near by, and watched me hoe, and suddenly one would dart down and catch a moth or other insect which I had disturbed, flying so close to me that I could distinctly hear the sharp snap of its bill. It then almost invariably returned to the place it darted from to eat its prey. Both birds often came close to the window and watched my family inside."

Although small and insignificant in size, our Least Flycatcher is by no means a coward, and will boldly attack animals much larger than itself in the defense of its nest and young. I have seen one give chase to an inquisitive red squirrel, which is one of the greatest enemies our small birds have during the nesting season, drive it promptly out of the tree in which its nest was placed, and follow it persistently until it had left the neighborhood. Although quarrelsome enough among themselves, they rarely molest other small birds, and breed in apparent harmony among them.

Its food consists principally of small insects of various kinds, and occasionally of berries; it does no harm, and deserves the fullest protection. Nidification in the southern portions of its breeding range begins usually about the first week in June, and somewhat later farther north; at Fort Custer, Montana, for instance, the single nest I found there contained but slightly incubated eggs on June 25, 1885.

Apple orchards seem to furnish their favorite nesting sites in New England and central New York; maple, oak, willow, alder, tamarack, spruce, locust, beech, and other trees are also more or less used. The nest, a neat and compact structure, is usually placed in an upright fork of a small tree or sapling, from 8 to 25 feet from the ground, and is outwardly composed of shreds of bark, plant fibers, dry grass, weeds, thistle, cottonwood and fern down, pieces of string, feathers, shreds of rope, spider webs, and empty cocoons; the inner lining usually consists of fine plant fibers, especially those of the milkweed, horsehair, fine grass, shreds of the inner bark of willow, cottonwood, cedar, and other trees, feathers, thistle, willow, and cottonwood down, etc. Occasionally a nest is saddled on a horizontal limb of a tree. While out with Dr. William L. Ralph, in the vicinity of Wilmurt, New York, on June 10, 1893, we found a nest of this Flycatcher saddled on a limb of a young spruce, about 10 feet from the ground and 6 inches from the trunk, in a small swamp. The nest contained four nearly fresh eggs, and the female had commenced sitting. She seemed but little concerned at our intrusion, and remained in the vicinity, uttering the usual "che-beck" and now and then a low "twit."

An average nest measures about 3 inches in outer diameter by $2\frac{1}{2}$ inches in depth; the inner cup, about 2 inches in diameter by $1\frac{1}{2}$ inches deep. It seems

to take fully a week or more to complete the nest. The female performs the duties of incubation almost exclusively, and this, as nearly as I have been able to determine, occupies about twelve days. The return migration to their winter home in Central America usually begins about the middle of September, none remaining in our Southern States.

The eggs vary from three to six in number, usually four, and one is deposited daily. They are short and rounded ovate in shape; the shell is strong and thick for its size, and without lustre. The ground color is pale creamy white, and they are unspotted. The Cowbird imposes its eggs on several of our smaller Flycatchers, including occasionally the one now under consideration.

The average measurement of eighty-five eggs in the United States National Museum collection is 16.14 by 12.70 millimetres, or about 0.64 by 0.50 inch. The largest egg of the series measures 17.02 by 12.95 millimetres, or 0.67 by 0.51 inch; the smallest, 15.24 by 11.43 millimetres, or 0.60 by 0.45 inch.

The type specimen, No. 24993 (Pl. 2, Fig. 31), from a set of four eggs, from the Ralph collection, was taken by Dr. William L. Ralph, near Holland Patent, New York, on June 3, 1882, and represents an average egg of this species.

116. *Empidonax hammondi* (XANTUS).

HAMMOND'S FLYCATCHER.

Tyrannula hammondi XANTUS, Proceedings Academy Natural Sciences, Philadelphia, May, 1858, 117.

Empidonax hammondi BAIRD, Birds of North America, 1858, 199.
(B 145, C 260, R 327, C 390, U 468.)

GEOGRAPHICAL RANGE: Western North America; east to the eastern slopes of the Rocky Mountains and adjacent ranges; north through British Columbia to Alaska, and to Little Slave Lake, southern Athabasca, latitude 55° 20' (as far as known), and probably still farther in this direction; south in winter to Lower California and southern Mexico.

The breeding range of Hammond's Flycatcher, which appears to be the western representative of *Empidonax minimus*, is still very indifferently defined. It is only known positively to breed in Colorado, California, Washington, British Columbia, and southern Athabasca, in the Dominion of Canada, but its summer range undoubtedly also extends through the higher mountain regions of New Mexico, Arizona, Utah, Wyoming, Montana, Nevada, Oregon, and Idaho. Throughout our Western States it has thus far been met with chiefly during its migrations, and comparatively few thoroughly identified nests and eggs have yet been taken. I have seen this species in May near Fort Klamath and Camp Harney, Oregon, but I am almost sure none remained in the vicinity to breed. The birds which stay with us during the summer appear to retire mostly to the higher mountain valleys, at altitudes of from 5,000 to 10,000 feet. This accounts for the few nests and eggs which have thus far been discovered within our borders; and the fact that it is also a very shy and silent bird partly accounts for its rarity as well.

Mr. H. W. Henshaw says: "Hammond's Flycatcher, in the west, is one of the most silent and retiring of birds, leaving the low country entirely in summer, and finding in the glens and recesses of the pine woods of the mountains or the alpine streams, with their fringes of alders, its chosen retreats. As I have noticed them, nearly all of the dash and spirit characterizing this group is wanting, though, of course, the difference is merely one of degree. After snapping up a passing insect it resumes its perch upon some low limb and remains nearly motionless for a time, giving an occasional listless jerk of the tail. The notes are very feeble, the most so of any Flycatcher I am acquainted with, and consist of a soft 'pit,' varied with a low, lisping whistle."¹

Mr. Denis Gale, of Gold Hill, Colorado, kindly sent to the United States National Museum a handsome nest and four eggs (No. 24112) of this species, taken near the above locality, at an altitude of 10,000 feet, on June 27, 1890. These eggs were slightly incubated; the female was also secured, and is now in the same collection. The nest was saddled on a horizontal limb of a spruce tree, 3 feet from the trunk and 14 feet from the ground. It is outwardly composed of old weed stems, decayed plant fibers, shreds of bark, and a little plant down, and is lined with fine grass tops, shreds of bark, plant down, hair, and a few feathers. The outer diameter is $4\frac{1}{2}$ inches by $1\frac{3}{4}$ inches deep; the inner cup measures $2\frac{1}{4}$ inches in width by $1\frac{1}{4}$ inches in depth. It is a compact and well-built structure, and does not resemble any of the nests of the other members of this genus. It was placed among a lot of smaller twigs growing out of a limb, among which it is well secured. From its position and general make-up it resembles a nest of the genus *Contopus* much more than one of *Empidonax*. Another nest, also from Mr. Gale (No. 23695), containing young when found on July 24, 1888, and taken in the same locality, was placed near the top of a tall spruce, about 30 feet from the ground, and was not concealed. The nest is a compact one and saddled on a fork; it is composed externally of decayed vegetable fiber, and lined with finer materials of the same description, plant down, and fur. It is shallow, being about $1\frac{3}{4}$ inches deep by $2\frac{1}{2}$ inches wide; the inner cavity is very large, while the sides of the nest are exceedingly thin; it is fully 2 inches wide inside by 1 inch deep.

Mr. L. Belding, writing of this species, says: "By no means rare during the migrations. Instead of being a common summer resident of the pine forests of the Sierra, as I stated in the 'Proceedings of the United States National Museum, 1879,' I now think it a rare summer resident. The only nest I found was on June 6, 1880, at Big Trees, Calaveras County, California. This was on a horizontal limb of a living pine, 40 or 50 feet from the ground and partly hidden by foliage. It was very wide in proportion to its depth. By shooting it down the eggs were destroyed. The female was shot as she flew from the nest, and was sent to the Smithsonian Institution. A few remain in this latitude as late as September 15, arriving from the South about May 1."²

¹ Surveys West of the 100th Meridian, Vol. V, 1875, p. 362.

² Land Birds of the Pacific District, 1890, p. 103.

Among Mr. Belding's field notes, which he kindly placed at my disposal, I find the following description of this nest:

"It appeared to be nicely made of much the same materials as are used by *Contopus richardsoni*, but is much wider than the nest of the latter species, having a width of not less than 4 inches. The outer wall was noticeably convex."

While on a visit to Seattle, Washington, in May, 1894, Mr. S. F. Rathbun told me of finding a nest situated on a small limb of a fir near Lake Washington, during the previous season, which he thought belonged to this species, but he did not secure one of the birds. He found a similar nest this season, on July 1, 1894, also placed on a small limb of a fir about 50 feet from the ground. It was built at a point on the limb where a small twig branched out, being partly saddled and partly crotched. After watching the bird go several times to the nest, he shot it and sent it to me for fuller identification; it proved to be a Hammond's Flycatcher beyond a doubt, as he had previously surmised.

Hammond's Flycatcher is evidently a very common summer resident in central British Columbia, where Mr. R. MacFarlane took a number of its nests in the vicinity of Stewart's Lake, in June, 1889, and the United States National Museum was favored with several sets of eggs, nests, and the parents belonging to them, all of which proved to belong to this species. Some of these nests were apparently placed in upright crotches of willows, and others on horizontal limbs close to the trunks of small conifers, at no great distance from the ground. The earliest of six breeding records from this vicinity is June 4; the latest, June 22. The nests differ somewhat from those previously described as far as the inner lining is concerned. In three of these the bottoms are covered with scales of buds of conifers, and the sides are lined with fine plant fibers, shreds of bark, plant down, and bits of hypnum moss in fruit.

Mr. Charles A. Allen writes me that he found Hammond's Flycatcher nesting in Blue Canyon, Placer County, California, at an altitude of about 5,000 feet, the nests were placed on horizontal limbs, well out, in shady places in the pine forests of the Sierra Nevadas.

The number of eggs laid to a set is usually three or four. The shell is strong, close-grained, and without luster. They vary in shape from short ovate to elongate ovate. The ground color is pale, creamy white, and the majority of the eggs are unspotted. In the small series before me there are, however, two sets which are spotted. In the set of four eggs taken by Mr. Gale every egg is marked, and the same is the case with a set of three eggs taken by Mr. R. MacFarlane. Mr. Gale made the following remarks about the set taken by him: "The eggs are very interesting; a decided light-yellow ground, with a slight powdering of dark specks, with larger shell markings of lavender tints." The spots or specks on all the specimens are exceedingly minute, and are also few in number, well rounded in outline, and mostly distributed about the larger end of the egg; they are of a liver-brown color. The lighter lavender-colored shell markings referred to by Mr. Gale are barely visible now, having faded out.

The average measurement of sixteen eggs in the United States National Museum collection is 16.84 by 12.90 millimetres, or about 0.66 by 0.51 inch.

The largest egg measures 17.78 by 13.72 millimetres, or 0.70 by 0.54 inch; the smallest, 15.24 by 12.70 millimetres, or 0.60 by 0.50 inch.

The type specimen, No. 24112 (Pl. 2, Fig. 32), from a set of four eggs from Boulder County, Colorado, was taken by Mr. Denis Gale on June 27, 1890, and presented to the Museum collection; it represents a spotted specimen.

117. *Empidonax wrightii* BAIRD.

WRIGHT'S FLYCATCHER.

Empidonax wrightii BAIRD, Birds of North America, 1858, 200 (in text). Cf. Brewster, Auk, VI, April, 1889, 89.

(B 146, C 261, R 328, C 391, U 469.)

GEOGRAPHICAL RANGE: Western United States; north to Montana, Idaho, Oregon, and probably Washington; east to the eastern slopes of the Rocky Mountains and adjacent ranges; south in winter to Lower California and southern Mexico.

The breeding range of Wright's Flycatcher extends through the mountainous portions of Arizona, New Mexico, and California, northward through the mountains of Colorado, Utah, Nevada, Idaho, and Wyoming to Montana, Oregon, and probably Washington. Like the preceding species Wright's Flycatcher retires to the higher mountain parks during the season of reproduction, and rarely breeds below an altitude of 4,000 feet; in Colorado it has been found nesting up to 10,000 feet. Its favorite resorts at this time are the shrubbery near mountain brooks, the aspen and pine groves usually found at the borders of mountain prairies, rather wet beaver meadows, and the edges of swamps. In northeastern Arizona Mr. H. W. Henshaw found it among the oak openings during the summer, and in the vicinity of Santa Fe, New Mexico, he met with it on the barren piñon-clad hills, where no deciduous vegetation was found; but such a summer habitat must be considered as rather an exceptional one.

Wright's Flycatcher is a very common summer resident in the mountain valleys and parks of the Cascade Range, in southern Oregon, and I have found many nests of this species at Fort Klamath, also in the Des Chutes River Valley and along the tributaries of this stream. It arrives on its breeding grounds at Fort Klamath about May 15, and nidification usually begins a month later. I do not consider this species as noisy as the Little Flycatcher, which was nearly as common, but its notes are very similar; in fact they are not easily distinguishable, but are given with less vigor than those of the former, while in its actions it is fully as energetic and sprightly as any of the species of the genus *Empidonax*.

Mr. R. S. Williams writes from Columbia Falls, Montana: "Wright's Flycatcher is very common here, being by far the most abundant Flycatcher observed. The first arrival this spring was noted May 7, and the next day they were abundant. They seem to be about equally distributed in all kinds of timber, and their notes are more frequently heard all through the day than those of any other bird."

Mr. F. Stephens informs me that he considers this species only as a migrant in southern California, but possibly a few may breed in the pine regions.

In Calaveras County, California, Messrs. L. Belding and J. Clarence Sperry found it common and breeding in the fir forests of the Sierra Nevada Mountains, the nests usually being placed in manzanita, hazel, dogwood, and other shrubs; and both have sent nests and eggs to the National Museum. Mr. Robert Ridgway collected several nests and eggs in the East Humboldt Mountains, and near Austin, Nevada, as well as in Parley's Park, in the Wasatch Mountains, Utah, where this species was very common. The nests were all placed in aspens, excepting one taken near Austin, Nevada, on July 3, 1868, which was found in a mountain mahogany bush on the extreme summit of a hill, at an altitude of about 9,000 feet, and another in Parley's Park, on June 28, 1869, in a service-berry bush. In New Mexico, Arizona, and Colorado it appears to be somewhat rarer during the breeding season.

Mr. Denis Gale found a nest and four eggs, on July 22, 1888, in Boulder County, Colorado, at an altitude of about 10,000 feet; these he presented to the United States National Museum collection. The nest was placed about 30 inches from the ground, against the trunk of a spruce bush, at the edge of a small clump of these trees. Mr. A. W. Anthony took one near Silverton, San Juan County, Colorado, on June 27, which also contained four fresh eggs, and describes the nest as composed of silvery-white strips of the inner bark of a willow, lined with fine grass stems and cattle hair. The nest looked like an inverted cone, and was fully 8 inches in length by 4 in diameter at the largest part. It was fastened about 4 feet from the ground to an almost upright willow, apparently tied on with spiders' silk alone, but was partly supported by a fork at the top.

I found my first nest of this species near the banks of the Des Chutes River, Oregon, on June 12, 1882; it was placed close to the trunk of a small pine sapling, about 5 feet from the ground. It contained three eggs, in which incubation had commenced. The female remained on the nest until I almost touched her with my hand, she then flew off and alighted in another small pine a few feet away, and uttered a few low notes like "tweer-tweer." Subsequently, during this and the season of 1883, I found some twenty-five nests, which were nearly all placed in similar situations, against the trunks of small saplings, such as pine, aspen, alder, or willow, the first two being seemingly preferred, or in upright forks in bushes, such as laurel or service berry, and from 2 to 18 feet from the ground. It also nests occasionally in wild-plum bushes and in buck brush.

One of the neatest nests I have seen of this species was taken by me July 5, 1882, on the side of the mountain east of Fort Klamath, Oregon, this being the only one I did not find in the valley. It was placed in a good-sized laurel bush (*Kalmia*), in a stout three-pronged fork, about 2 feet from the ground. It measures $3\frac{1}{2}$ inches in outer diameter by $2\frac{1}{2}$ inches in depth; the inner cup is $1\frac{7}{8}$ inches wide by $1\frac{1}{3}$ inches deep. Exteriorly it was composed entirely of decayed plant fibers, which were compactly interwoven with each other, and the inside was warmly lined with feathers of the Sooty Grouse, Yellow Warbler, and other

birds. Some of these nests resemble a blunt inverted cone; these usually measure about 3 inches in outer diameter and about $3\frac{1}{2}$ inches in depth; the inner cup is about $1\frac{7}{8}$ inches in diameter by $1\frac{1}{2}$ inches in depth. Nearly every one is partially lined with feathers and cattle hair, and occasionally bits of fine tree moss enter into the composition of the nest. They are always well built and securely fastened to the twigs among which they are placed.

Although Wright's Flycatcher appears to have not yet been taken in Washington, I am quite confident that it will be found there in suitable localities, such as the Blue Mountains, for instance, where scarcely any collecting has yet been done.

Nidification rarely commences before the middle of June, more frequently during the last third of this month, and sometimes not before the first week in July. It takes fully a week to construct the nest, and I believe the male assists in incubation, which lasts about twelve days. The food consists, at this time of the year at least, entirely of insects. Only one brood is raised in a season, and the return migration usually begins in the vicinity of Fort Klamath, Oregon, in the latter part of August, when it commences to leave for the warmer lowlands. Some remain in portions of southern California throughout the winter. The number of eggs to a set is three or four; about one set in three, according to my observations, contained four eggs, one being deposited daily. A second set is frequently laid when the first is taken, and the new nest is often placed close to the former site. The eggs are usually short or rounded ovate in shape; the shell is strong, close grained, and without luster, dull white or pale creamy white in color, and unspotted.

The average measurement of one hundred and eleven eggs in the United States National Museum collection is 17.22 by 13.27 millimetres, or about 0.68 by 0.52 inch. The largest egg of the series measures 18.54 by 14.22 millimetres, or 0.73 by 0.56 inch; the smallest, 15.24 by 12.19 millimetres, or 0.60 by 0.48 inch.

The type specimen, No. 20480 (Pl. 2, Fig. 33), from a set of three eggs, Bendire collection, was taken by the writer near Fort Klamath, Oregon, June 24, 1882, and represents an average egg of this species.

118. *Empidonax griseus* BREWSTER.

GRAY FLYCATCHER.

Empidonax griseus BREWSTER, *Aux*, VI, April, 1889, 87.

(B —, C —, R —, C —, U 469 1.)

GEOGRAPHICAL RANGE: Lower California and southern Sonora, Mexico.

Very little is yet known about the range of the Gray Flycatcher, recently described by Mr. William Brewster from specimens taken by Mr. M. Abbott Frazar, near La Paz, Lower California. It is a somewhat larger and grayer

bird than Wright's Flycatcher, and appears to replace this in the regions where it is found. Nothing is as yet known about its breeding habits, nest, or eggs. It has been taken at Triunfo, San Jose del Cabo, and on Santa Margarita Island, Lower California, at Alamos, in southern Sonora, and it probably also occurs in the mountains of southern Arizona.

119. *Empidonax fulvifrons* (GIRAUD).

FULVOUS FLYCATCHER.

Muscicapa fulvifrons GIRAUD, Sixteen Texas Birds, 1841, Pl. II.

Empidonax fulvifrons SCLATER, Proceedings Zoological Society, 1858, 301.

(B —, C —, R 329, C —, U [470].)

GEOGRAPHICAL RANGE: Eastern Mexico and southern Texas.

Since Giraud's description of the Fulvous Flycatcher, in his paper on "Sixteen Texas Birds," published in 1841, no other specimens, as far as I have been able to learn, have been taken either in eastern Mexico or along our southern border, in the lower Rio Grande Valley of Texas. The type still remains unique, and nothing is known about its nesting habits.

120. *Empidonax fulvifrons pygmæus* (COUES).

BUFF-BREASTED FLYCATCHER.

Empidonax pygmæus COUES, Ibis, 1865, 537.

Empidonax fulvifrons pygmæus RIDGWAY, Proceedings U. S. National Museum, VIII, 1885, 356.

(B —, C 262, R 329a, C 392, U 470a.)

GEOGRAPHICAL RANGE: Northern Mexico; north to southwestern New Mexico and Arizona.

The breeding range of the Buff-breasted Flycatcher appears to extend through northern Mexico northward into southwestern New Mexico and the southern half of Arizona. This subspecies was first added to our fauna by Dr. Elliott Coues, who obtained it near Fort Whipple, Arizona, on May 9, 1865, which point probably marks the northern limits of its range in the United States. Since then it has been taken near Inscription Rock, New Mexico, and at Camp Apache, Arizona, by Mr. H. W. Henshaw, who published the following: "Apparently a very rare species, as it was met with on but two occasions. At Inscription Rock, New Mexico, July 24, 1873, I observed a pair of old birds feeding the young. These latter were nearly full fledged and had evidently been raised in the immediate vicinity. In September a single immature bird was taken near Camp Apache, Arizona, on a small brush-lined stream in a heavy pine forest. Judging from the individuals seen, their habits differ in no noteworthy respect from those of the small Flycatchers generally. * * *

"During the past season I saw several individuals of this species, but not till well down into the southern part of Arizona. I am inclined to think that it will not be found to occur much, if any, north of the thirty-fourth parallel, and that south of this it is a regular summer resident, though certainly far from common. In all its motions it is a perfect *Empidonax*."¹

Dr. A. K. Fisher, who met with the subspecies among the scrub oaks in the Chiricahua Mountains, in June, 1894, informs me that one of the notes resembles closely the chirp of Audubon's Warbler.

Mr. F. Stephens obtained this Flycatcher in the Santa Rita and Chiricahua mountains, Arizona, and in the mountains north of Fort Bayard, New Mexico, in 1876 and 1880, but was unable to find either the nest or eggs, both of which, as far as I am aware, still remain unknown.

121. *Pyrocephalus rubineus mexicanus* (SCLATER).

VERMILION FLYCATCHER.

Pyrocephalus mexicanus SCLATER, Proceedings Zoological Society, 1859, 45.

Pyrocephalus rubineus var. *mexicanus* COUES, Key, 1872, 177.

(B 147, C 263, R 330, C 394, U 471.)

GEOGRAPHICAL RANGE: From Guatemala through Mexico and Lower California to the southern border of the United States, including southern Texas, southwestern New Mexico, Arizona, and southern California; north to southwestern Utah, and probably southern Nevada.

The breeding range of the Vermilion Flycatcher is coextensive with its distribution in the United States, excepting possibly southern California, where I believe it has not yet been found nesting, though several specimens have been taken there during the winter. Mr. F. Stephens met with this handsome Flycatcher in the San Gorgonio Pass, and others are known to have been taken near the Santa Anna River, in Los Angeles County, and at the mouth of the Santa Clara River, in the vicinity of Santa Buenaventura, California, which are the most western records I have been able to find for this species. Mr. Stephens writes me as follows on this subject: "I consider all birds of this species found west of the immediate neighborhood of the Colorado River as stragglers, and do not know of a breeding record west of the Colorado River bottom."

It seems rather strange that it should be found only as a rare winter visitor in southern California, but from present information this seems to be the case.

The northern range of the Vermilion Flycatcher has recently been extended into southwestern Utah, where Dr. C. Hart Merriam shot an adult female at St. George, in the lower Santa Clara Valley, on May 13, 1891. In "North American Fauna, No. 7" (p. 66), he states: "She was killed in an orchard at Dodge Spring, about a mile from the settlement, and contained large ova nearly ready

¹ Surveys West of the 100th Meridian, Vol. V, 1874, p. 364.

for the shell. This record extends the known range of the species very materially, since it had not previously been recorded north of Fort Mohave, Arizona."

The Vermilion Flycatcher appears not to be particularly rare in the lower Rio Grande Valley, in the vicinity of Brownsville, Texas, where Dr. James C. Merrill, United States Army, found several of their nests and eggs, which are now in the United States National Museum collection; it also occurs in other places along our southwestern frontier. Its center of abundance within our borders, however, must be looked for in southern Arizona. Here, in the vicinity of Tucson, along the banks of Rillito Creek (one of the many dry streams of this country, where the water flows above ground for about one month in the year, and digging has to be resorted to to lead it out of its sandy bed, and where, unless this is done, small stagnant pools are only occasionally met with) I found this pretty and conspicuous little Flycatcher to be a rather common summer resident, and located some two dozen of its nests and eggs during the season of 1872. Although an occasional specimen can be found here throughout every month of the year, comparatively few of these birds remain during the winter. The first migrants usually return about March 1, the males preceding the females about a week, and by the 10th of the month both sexes are common.

The mating season commences shortly afterwards, and the males, in their handsome red plumage, may be seen hovering in the air, some 20 to 30 feet above the ground, poised and fluttering their wings in the manner of a Sparrow Hawk. During this performance every feather of the body, and even the tail, is raised, and it seems a difficult matter for the bird to keep itself properly balanced. At this time it repeatedly utters a shrill note like "zi-brée, zi-brée," and snaps its mandibles together, slowly descending to its perch again, usually on some small limb of a mesquite or other tree near water. It is a very comical-looking little object at such times, and is evidently proud of its handsome appearance. When at rest, perched on some twig overhanging the creek bed, it utters a whining sort of note occasionally, not unlike that of the Western Wood Pewee.

Its food consists of insects, which are mostly caught on the wing; but I have also seen it alight on the ground to pick up a grasshopper or small beetle, returning to its perch afterwards, beating its prey against it, and devouring it at leisure. Its favorite resorts are the shrubbery found along water courses in the more level, open country, but it also follows the canyons into the foothills of the mountains, up to an altitude of between 4,000 and 5,000 feet. I have rarely found it at any great distance away from water. In southern Arizona nidification seldom begins before April 20, and usually not until May 1.

The nest is a rather frail, shallow, and flimsy affair, and is always saddled on a horizontal fork, well out from the trunk of the tree, as is that of the Wood Pewee. The foundation is composed of a thin layer of twigs from 2 to 3 inches in length; the sides are constructed of small weed tops, a species of *Evax*, plant fibers, empty cocoons, spider webs, plant down, etc. The whole is rather loosely held together. The inner lining consists most frequently of feathers, sometimes of a little wool, cattle hair, fur, or plant down. The rims of some nests are

decorated with a few lichens, but such ornamentations are rather unusual, as far as my observations go. The outer diameter of an average-sized nest is about $3\frac{1}{4}$ inches by $1\frac{1}{4}$ inches in depth; the inner, 2 inches by three-fourths of an inch in depth, barely deep enough to keep the eggs from rolling out.

In southern Arizona their nests may be looked for in mesquite trees, cottonwoods, oaks, and rarely in willows, all the nests examined by me being placed on forks of horizontal limbs, from 8 to 50 feet from the ground, generally from 10 to 18 feet up. Dr. J. C. Merrill found it nesting in retama bushes, *Parkinsonia aculeata*, in Texas, rarely over 6 feet from the ground. I found my first nest of three fresh eggs on April 27, 1872, and the latest on July 16. This contained two fresh eggs, and one of the Dwarf Cowbird, which occasionally lays in the nest of this species, two such instances having come under my observation.

Dr. J. C. Merrill, in his notes on the "Ornithology of Southern Texas," says: "A nest of this species, found May 10, 1877, contained a young Dwarf Cowbird and three addled eggs, which latter I removed. On revisiting the same nest ten days later I found three fresh eggs, on which the female was sitting. As the young Cowbird could not have been fledged by this time, it would seem as if the Flycatchers, on finding that their eggs had been removed, had thrown out the parasite egg and laid again."¹

An egg is deposited daily, and incubation lasts about twelve days; in this the male assists to some extent, as I have on two occasions seen one sitting on the eggs. I believe two broods are occasionally raised in a season. On June 6 I found a nest of the Vermilion Flycatcher in a small grove of cottonwood trees, with no other shrubbery nearer than 600 yards; it was placed on a horizontal fork of one of these trees, about 20 feet from the ground, and contained three fresh eggs; close by the male was feeding a full-grown young bird; no other pair appeared to occupy this grove, and it seems very probable that it belonged to these birds. The fact that I also found fresh eggs as late as July 16 further strengthens this supposition. The majority of these Flycatchers return to their winter homes in Mexico during the latter part of October.

From two to three eggs are laid, generally three. I never found more in a nest. They are usually short and rounded ovate in shape; the shell is close grained and lusterless. The ground color varies from pale cream to buff, and the markings, which are generally heaviest about the larger end of the egg, consist mostly of bold, irregular blotches and spots of clove and sepia brown, drab, and lavender gray. The egg does not resemble that of any of our Flycatchers, and is a handsome and striking one. Occasionally a specimen is found in which the markings are small and nearly evenly distributed over the entire surface, and in others they form a well-defined wreath, leaving both ends almost immaculate.

The average measurement of fifty eggs in the United States National Museum collection is 17.48 by 13.05 millimetres, or about 0.69 by 0.51 inch. The largest egg of the series measures 18.54 by 13.97 millimetres, or 0.73 by 0.55 inch; the smallest, 15.75 by 12.70 millimeters, or 0.62 by 0.50 inch.

¹ Proceedings U. S. National Museum, Vol. I, 1878, p. 142.

The type specimen, No. 20423 (Pl. 2, Fig. 34), from a set of three eggs, Bendire collection, one of the smaller and lighter-marked eggs, was taken by the writer near Tucson, Arizona, June 1, 1872; No. 21036 (Pl. 2, Fig. 35), also from a set of three eggs, represents one of the larger and more heavily marked specimens. It was taken by Dr. James C. Merrill, United States Army, near Brownsville, Texas, May 29, 1877.

122. *Ornithion imberbe* (SCLATER).

BEARDLESS FLYCATCHER.

Camptostoma imberbe SCLATER, Proceedings Zoological Society, 1857, 203.

Ornithion imberbe LAWRENCE, Ibis, 1876, 497.

(B —, C —, R 331, C 393, U 472.)

GEOGRAPHICAL RANGE: Central America and eastern Mexico; north to the lower Rio Grande Valley, Texas.

The Beardless Flycatcher, one of the smallest of the *Tyrannidae* found within the borders of the United States, was added to our fauna by Mr. G. B. Sennett, who took a specimen near Lomita Ranch, Texas, on April 24, 1879, where it appears to be a rather rare summer visitor. Mr. Sennett makes the following remarks: "I have little to say of the habits of this species. My single specimen was shot on April 24 in a low bush distant from woods. No others were observed. It was an adult male, in fine plumage, and its testes showed the breeding season to be close at hand. Its diminutive size and yellow commissure led me at first to think it the young of some other species, but I fortunately perceived my error, and was careful to preserve what proves to be the best find of the trip, one which adds to our fauna a new genus and species never suspected to occur so far north."¹

I believe the nest and eggs of this interesting little Flycatcher still remain unknown.

123. *Ornithion imberbe ridgwayi* BREWSTER.

RIDGWAY'S FLYCATCHER.

Ornithion imberbe ridgwayi BREWSTER, Bulletin Nuttall Ornithological Club, VII, October, 1882, 208.

(B —, C —, R —, C —, U 472a.)

GEOGRAPHICAL RANGE: Northern Mexico, from Puebla and Jalisco; north to southern Arizona.

Ridgway's Flycatcher is another comparatively recent addition to our fauna, and was first described by Mr. William Brewster in the "Bulletin of the Nuttall Ornithological Club" (Vol. VII, 1882, pp. 208, 209), from specimens

¹ Bulletin U. S. Geological and Geographical Survey, Vol. V, No. 3, p. 406.

collected by Mr. F. Stephens in the vicinity of Tucson, Arizona, in the spring of 1881. I quote him in full:

"The detection of this Flycatcher in Arizona is perhaps the most interesting discovery resulting from Mr. Stephens's late trip. *Ornithion imberbe* has only recently been added to our fauna by Mr. Sennett, and the locality of his single specimen—Lomita, Texas—was so far beyond the previously known range of the species that its occurrence seemed hardly likely to prove more than a mere accident. In 1880, however, Mr. M. A. Frazar secured additional specimens at Lomita, and now an allied but apparently distinct race turns up in Arizona.

"Mr. Stephens found the curious little bird only at Tucson, where his first specimen was taken April 28. Afterwards others were shot in the same locality, but they were by no means common. The males had a habit of perching on the tops of the tallest trees in the vicinity of their haunts, and at sunrise occasionally uttered a singular song which Mr. Stephens transcribes as 'yooop-yooop-yooopédeedledeè,' the first half given very deliberately, the remainder rapidly. A commoner cry, used by both sexes in calling to each other, was a shrill 'pièr, pièr, pièr, pièr,' beginning in a high key and falling a note each time. They were very shy, and specimens were obtained only at the expense of much trouble and perseverance. Their loud calls were frequently heard, but when the spot was approached the bird either relapsed into silence or took a long flight to resume its calling in another direction. In their motions they resembled other small Flycatchers, but their tails were less frequently jerked.

"On May 28 Mr. Stephens met with a young bird which had but just left the nest. It was accompanied by the female parent, who showed much solicitude, and frequently uttered her shrill cries, to which the offspring responded in nearly similar tones. Both individuals were secured, but neither the nest nor the remainder of the brood—if, indeed, there were any more—could be found. On the following day this episode was repeated, a second female being found in attendance on another young bird of nearly the same age as that obtained on the previous occasion."

Mr. Stephens writes me that he took another specimen in April, 1884, also near Tucson, and considers this subspecies as very rare. Additional specimens have recently been taken by Mr. E. W. Nelson, at Etzatlan, Jalisco, on June 22, 1892, and at Tehucan, Puebla, Mexico, on May 4, 1893; these are now in the ornithological collection of the United States Department of Agriculture, but nothing appears to be known regarding the breeding habits, nest, or eggs of this subspecies.

Family ALAUDIDÆ. LARKS.

124. *Alauda arvensis* LINNÆUS.

SKYLARK

Alauda arvensis LINNÆUS, Systema Naturæ, ed. 10, I, 1758, 165.
(B —, C 55 bis, R 299, C 88, U [473].)

GEOGRAPHICAL RANGE: Europe and portions of Asia and Africa; accidental in Greenland and the Bermuda Islands. Introduced, though not successfully, in the United States, on Long Island, New York; near Cincinnati, Ohio; St. Louis, Missonri, and Portland, Oregon.¹

The popular Skylark of Europe claims a place in our fauna, being a casual visitor in Greenland, and it also occurs occasionally in the Bermuda Islands. Several attempts have been made at various times to introduce this favorite European songster in different parts of the United States, and though some of these were apparently successful for a time, eventually, as far as known, they all failed. Up to March, 1888, the Skylark was evidently fairly well established in suitable localities on Long Island, New York, and nested there; but since the occurrence of the severe blizzard in the middle of that month none have been observed, and it is presumed that the entire colony was destroyed, the last date on which any have actually been taken there being February 22, 1888, according to Mr. William Dutcher.

Still, it seems to be a hardy bird, as Mr. Henry Seebohm states: "In western Europe it breeds up to latitude 70° (although it is comparatively rare north of the Arctic Circle)." In speaking about the general habits of this species he says: "No bird is better known or more frequently kept in confinement than the Skylark. It is easily caught, readily tamed, and bears its captivity well, singing as sweetly on the sod in its little cage as when soaring in boundless freedom high up amongst the clouds. It is found in all kinds of places, from the coast to the inland moors and mountains, but is perhaps most abundant in well-cultivated districts. It delights to frequent arable land, rich meadows, and commons, but is never seen in woods or places where trees are very close together. It is also very partial to the most elevated pastures, and often deserts a sheltered valley to remain on them throughout the year. During winter the Skylark is gregarious, but very early in the spring the large flocks break up and it retires to its breeding grounds. In March, when the cold winds are drying up the fallows, and the first spring flowers are appearing in the hedges, the Skylark pairs. At this season several males may often be seen chasing a female with great rapidity through the air, and every now and then bursting out into sweetest song. Sometimes a male will hover above the female, who crouches low among the herbage, and in various ways he will seek to display his charms.

¹ It has been reported that the colony of Skylarks set out near Portland, Oregon, some years ago, was in a flourishing condition, but on inquiry during a recent visit there, in May, 1894, I failed to have this statement confirmed.

She will then often rise into the air, when several males will toy with her and flutter round and round, or dart hither and thither with great speed, singing all the time. Sometimes the males will chase each other, and even fight for the possession of the prize.

“At this season of the year the Skylark’s song is particularly loud and charming. A few birds will often be tempted to sing by an unusually mild day in winter, but the song is seldom fully resumed before March. The manner in which the Skylark sings, in the full view of all observers, is probably the secret of the bird’s popularity. Who has not seen this somber little bird rise from the meadow grass or the heath, and has not watched its soaring flight as upward and upward it goes until it appears but a speck or is entirely lost in the sky? He bounds up from the cover on fluttering wings and with outstretched tail, rising a little way in silence, then, bursting into song, he pursues his upward course. At first the wings are beaten very rapidly, in a fluttering way; but when the bird gets higher the movements are more regular. Sometimes it rises directly upward, but very often goes far away from the place of its first ascent, sailing over the fields, but in an ever-rising course. When the zenith of its flight is reached it will sometimes fly about for a short time, singing; but more usually it comes down again directly. The song is continued until the ground is neared, when the bird usually drops like a stone, or flutters off over the grass ere seeking the cover. These aerial movements are not essential to the bird’s song; it will sing quite as sweetly when perched on a clod of earth or on the ground, and it often warbles a few notes when running about amongst the grass or over the fallows. The height of the song flights also varies considerably. Sometimes the bird may be seen fluttering at a moderate height, singing very sweetly, and remaining in the air for some considerable time; and it will occasionally sit and sing on a small bush or a wall. When engaged in his soaring flights the little songster will cease his strains and drop to the ground if a Merlin makes its appearance, and if a Sparrow Hawk does so, he soars still higher; but a Kestrel is never regarded as an enemy.

“The Skylark has no great variety of notes—his compass is small—nor are those he possesses either powerful or rich in tone; but he pours forth his song so industriously, so continuously, and arranges his notes so harmoniously that the songs of few birds are listened to with more pleasure. The song of the Skylark is pre-eminently cheerful; and if the monotony and continuousness of the music reminds you of that of a bagpipe, it has at least no melancholy in its tone. It is not continued for so long a time as is generally supposed, ranging from two minutes to about a quarter of an hour. The call note of the Skylark can not be expressed on paper; it may best be described as a liquid, musical, double note, somewhat resembling the sound made by a whistle half full of water.

“The Skylark is not very shy, and will often allow the observer to watch it within a distance of a few yards. It runs about with great ease, often pausing for a moment to look warily around, stretching out its neck and standing as high on its legs as possible; but it often skulks very closely in the herbage. Its flight

is quick and powerful, and when passing from place to place is straight or only very slightly undulating. The Skylark is very fond of dusting itself for the purpose of getting rid of troublesome parasites; it may often be seen on a sandy road, or in a little bare patch in the fields, lying on its side, shaking its wings, and thoroughly dusting its plumage. It always roosts upon the ground, amongst tall herbage, and is seldom or never seen to perch in a tree.

“Although the Skylark often pairs early in March, nesting duties do not generally commence before the middle of April. In exceptional cases eggs may be found as early as the first week in April. The nest is always built upon the ground, amongst herbage, and is usually well concealed; generally it is placed amongst the meadow grass or the growing corn, but sometimes it is built in the coarse herbage on commons and weedy pastures, or amongst the wiry heath branches on the moors. It is often built behind a tuft of herbage, and is usually placed in a little depression, often scratched out by the bird. The nest is a simple little structure, made externally of dry, coarse grass and a scrap or two of moss, and it is lined with finer grass, rootlets, and sometimes a few hairs. These materials are very loosely put together, as is usually the case in most nests built on the ground. The eggs of the Skylark are four or five in number, sometimes only three. The ground color varies from dull white to white with just a tinge of olive, and the markings are olive brown or neutral brown, the underlying ones being pale gray. The spots are generally so thickly distributed over the entire surface as to conceal most of the ground color, and on the large end they are often confluent and form an irregular zone. On those eggs where the markings are not so thickly dispersed the zone is much broader and darker. A rare but very beautiful variety of the egg of this bird is white in ground color, thickly mottled and spotted with brownish red, and with numerous underlying markings of gray. The eggs are not subject to any great variation in color, but differ somewhat in shape, some specimens being very round, others pyriform, and many oval; they vary in length from 1 to 0.87 inch, and in breadth from 0.72 to 0.63 inch. The Skylark usually rears two broods in the year, the young of the first being generally abroad by the middle of June, and those of the second in August. The female performs most of the duties of incubation, and is a very close sitter, usually allowing herself to be almost trodden upon before quitting the nest. In returning to the nest both birds usually drop into the herbage some little distance from it, and run through the grass the remainder of the distance. During the whole period of incubation the male bird is incessantly soaring upward to warble his song, from the first streak of morning till dusk.”¹

As a rule the eggs of the Skylark are more heavily spotted and consequently darker colored than those of our Horned Larks, but they do not differ much in shape. The average measurement of eighteen specimens in the United States National Museum collection is 22.23 by 16.76 millimetres, or about 0.88

¹ History of British Birds, Vol. II, 1884, pp. 267-270.

by 0.66 inch. The largest egg in the series measures 25.65 by 17.27 millimetres, or 1.01 by 0.68 inches; the smallest, 21.08 by 16.26 millimetres, or 0.83 by 0.64 inch.

The type specimen, No. 21833 (Pl. 5, Fig. 23), Bendire collection, from a set of four eggs, was taken in Saxony, Europe, on April 20, 1859, and represents one of the darker-colored types of this species.

125. *Otocoris alpestris* (LINNÆUS).

HORNED LARK.

Alauda alpestris LINNÆUS, Systema Naturæ, ed. 10, I, 1758, 166.

Otocoris alpestris BONAPARTE, Fauna Italiana Uccelli, 1839 (not paged).
(B 302, C 53, R 300, C 82, U 474.)

GEOGRAPHICAL RANGE: Northeastern North America, from the Province of Keewatin, Dominion of Canada, both sides of Hudson Bay, east to Labrador, and south to Newfoundland; also to Greenland and to northern Europe; south in winter to about latitude 38°, and casually somewhat farther south.¹

The breeding range of the Horned or Shore Lark, the second largest representative of this genus found in North America, is confined, as far as known at present, to the Province of Keewatin, Dominion of Canada, both shores of Hudson Bay, and the coasts of Labrador and Newfoundland. In the latter province it has been met with during the breeding season near its southeastern extremity, at Cape St. Mary, in about latitude 47°, which probably marks about the southern limits of its breeding range. Mr. William Palmer, during the cruise of the United States Fish Commission schooner "Grampus" in the summer of 1887, met with Horned Larks at the Penguin Islands, west of Cape Freels, and at Canada Bay, Newfoundland, and says: "At the former place (a low, flat, grassy island) several old birds were seen, who during our visit perched on the bowlders that surround the island; and two young birds, which were evidently bred on the island, were collected. At Canada Bay a few old birds were found at the Cloud Hills, at an elevation of nearly 1,000 feet."²

Mr. L. M. Turner, in his manuscript notes on the "Birds of Labrador and Ungava," says: "The first individuals of this Lark were seen July 9, 1882, on the top of a high hill on Black Island, in Hamilton Inlet. The birds were

¹In the general treatment of our numerous races of Horned Larks I mainly follow the classification of Mr. Jonathan Dwight, jr., who recently published an excellent synopsis of the genus *Otocoris* in the *Auk* (Vol. VII, 1890, pp. 138-158), to which I refer the reader, and which can not be readily improved upon until considerably more material becomes available, especially from the interior and practically unexplored regions lying to the northwest of Hudson Bay, in order to enable anyone to define the geographical ranges of each recognized subspecies more accurately. I am inclined to believe, however, that the range of the present species under consideration will have to be considerably extended to the westward, but with the material now at hand nothing very positive can be determined. Where the ranges of the different subspecies approach each other the birds intergrade and intermediate forms are found which can not be referred to a particular race with any certainty, and as the eggs of the numerous races of the genus *Otocoris* are practically similar, I have endeavored as far as possible to represent the different styles and markings found in the various subspecies among the types figured.

²Proceedings of the U. S. National Museum, Vol. XIII, 1890, p. 262.

evidently breeding, as indicated by their actions when they flew from point to point, but always out of range, and returning to the place whence they started. At the mouth of George's River (Ungava Bay) I procured a single bird of three which I found among the mosses of a dry, level tract near the seashore. In the vicinity of Fort Chimo these birds are common in the spring migration only, arriving just after the middle of May and remaining until the middle of September. They scatter over the treeless tracts and breed near the coast. Several specimens were procured near the mouth of the Koksoak River, and of these some had the abdomen quite denuded of feathers, proving them to be incubating in the latter ten days of June. I could not find the eggs and nest, although on several occasions I had every reason to suspect I was quite near them. I have never heard these birds make an attempt at song; the only note ever heard was a chirp, rather easily imitated, but difficult to describe."

Mr. E. A. McIlhenny has kindly furnished me with the following notes on this species:

"I found this bird breeding quite commonly on the Labrador coast at Cape Charles and vicinity, during my stay there from the 17th to the 22d of July, 1894. On the afternoon of the 17th, while in search of specimens on the high, rocky islands around Cape Charles Harbor, I saw two pairs of these birds, and, as they showed great uneasiness at my presence, I concluded they were nesting near by, but a long search failed to reveal their nests. The next morning, by sunrise, I was on the island where I had seen the first pair, and, after walking around the place where I had observed the birds the evening before without seeing anything, I fired my gun, when a short distance off to my right up got a bird, which I promptly shot, and upon going to the place it flew from I found the nest without any trouble. The bird proved to be a female Horned Lark. The nest was embedded in a slightly inclining bank of moss and entirely below the surface of the moss; it contained five richly marked eggs, slightly incubated. When I found the nest it gave me the impression of being very small for the bird; but this was due to the fact that the entrance was small, and the hollow was enlarged under the moss. The nest was deeply cupped, having a thickness of about 1 inch of fine dry grass; it was lined with the down from reindeer moss and the white feathers of Ptarmigans. The male bird did not come around.

"Later in the day I found another nest containing five heavily incubated eggs. The nest and position were very similar to the one found in the morning. Subsequently I found these birds numerous on the mainland, but no more of their nests were obtained. On September 2, while at Henly Harbor, Labrador, I found a deserted nest of this species containing three eggs. The nest was placed on a little knoll, in a marshy spot, on the bank of a small lake. On August 10, 11, and 16 I saw Horned Larks near Sukkertoppen, Greenland, but did not get a specimen; I suppose they belonged to this species."¹

¹No measurements of the eggs of this species taken by Mr. McIlhenny can be given, as he lost his entire collection of specimens by the foundering of the ill-fated steamer *Miranda*, while returning from Greenland.

This Horned Lark seems to be identical with the one found in northern Europe, which, according to Mr. Henry Seebohm, breeds in the extreme north-eastern parts of Norway. There are no North American eggs of this species in the United States National Museum collection, and no data with the few European specimens supposed to belong to this species; judging from their size, however, they are probably correctly identified. They resemble the eggs of our better-known Horned Larks, which will be more fully described hereafter, in shape and color. There appears to be no difference in their general habits.

From three to five eggs appear to be laid to a set, and probably only a single brood is raised in a season. Their length is given by Seebohm as ranging from 0.90 to 0.95 inch, and the breadth from 0.62 to 0.70 inch, or 22.86 to 24.13 millimeters in length, and 15.75 to 17.78 millimeters in breadth.¹

126. *Otocoris alpestris leucolæma* (COUES).

PALLID HORNED LARK.

Eremophila alpestris b. *leucolæma* COUES, Birds of the Northwest, 1875, 38 (part).
Otocoris alpestris leucolæma STEJNEGER, Proceedings U. S. National Museum, V, 1882, 34.
 (B —, C 53b, R 300a, C 83, U 474a.)

GEOGRAPHICAL RANGE: Western North America from Alaska east to the Northwest Territory, British North America; south in winter, in the western United States, to about latitude 40°. Casually to Long Island, New York.

The breeding range of the Pallid Horned Lark, owing to the lack of sufficient material, is still very imperfectly defined. It appears to be confined to Alaska and to those portions of the Dominion of Canada east of the Rocky Mountains, from about latitude 54° northward to the Arctic Ocean, and there is little or nothing known about the eastern limits of its range.

Mr. E. W. Nelson says: "Throughout Alaska this species appears to be very rare. Two specimens were taken in the vicinity of St. Michaels during my residence there, and three were secured on the Upper Yukon by Mr. McQuesten, on April 3 and 30, 1879. All of these birds are spring males and typical of this variety. It is much more common on the head waters of the Yukon during spring and summer than along the shores of Bering Sea, where it can only be counted as a very rare straggler."²

In the interior of the Northwest Territory, in about latitude 68°, it appears to be a common breeding bird.

¹Since this was written Mr. Jewell D. Sornborger has deposited three of these eggs in the U. S. National Museum collection, taken by a Moravian missionary near Okak, Labrador, on June 21, 1892. These specimens appear to come from different nests. Their ground color is greenish gray and somewhat darker than that of the rest of our Horned Larks. They are profusely blotched and spotted with dark olive, olive buff, and lighter shades of pale lavender. One of the specimens is elliptical ovate in shape; the other two are ovate. They measure 24.89 by 16.76, 24.13 by 17.27, and 22.10 by 16.26 millimetres, or 0.98 by 0.66, 0.95 by 0.68, and 0.87 by 0.64 inch. As the plates had been made up before these eggs were received, none could be figured.

²Report upon Natural History Collections made in Alaska in the years 1877-1881, p. 162.

In his "Notes on and List of Birds and Eggs Collected in Arctic America, 1861-1866," Mr. R. MacFarlane says, in speaking of this species: "Nine nests of this Lark were received at Fort Anderson (established on Anderson River in 1861 and abandoned in 1866; approximate latitude $68^{\circ} 35' N.$), a few of them from the Esquimaux, and the others were collected by us in the Barrens and on the coast of Franklin Bay. The nest was usually composed of fine hay, neatly disposed, and lined with deer hair. Several of the parent birds were secured by snares placed thereon."

The southern limits of its breeding range are as yet very imperfectly known. Mr. Dwight records a breeding bird from the Saskatchewan region, and it probably breeds in small numbers from the northern half of this province northward. To the south it appears to intergrade for some distance with *Otocoris alpestris praticola*, which is really a miniature of the present subspecies, though somewhat darker and a trifle smaller in size, as well as with *Otocoris alpestris arenicola*, the Desert Horned Lark whose range it also adjoins along the eastern slopes of the Rocky Mountains. Its general habits resemble those of our better-known Prairie Horned Lark, which will be more fully described later.

From three to four eggs appear to be laid to a set, and probably only a single brood is raised in a season. The earliest breeding record I have, one from the lower Anderson River, in Arctic North America, is June 14; the latest, from the same locality, is July 9, 1864, and the breeding season appears to be at its height there during the first week in July, as all the nests found by Mr. MacFarlane, excepting the single one just mentioned, were taken in this month. The nest belonging to the earliest set of eggs, taken by Mr. R. MacFarlane (No. 10370, United States National Museum collection) on June 14, 1864, which is now before me, measures 5 inches in outer diameter by $2\frac{1}{2}$ inches in height. The inner cup is $2\frac{1}{2}$ inches in width by $1\frac{1}{4}$ inches in depth. The nest, a well-built structure, is composed of rotten grass fibers, fine roots, and pieces of willow bark, and is warmly lined with similar materials, caribou hair, and old cocoons. It was found by an Eskimo; the female was snared on the nest which contained three eggs when taken.

The eggs of the Pallid Horned Lark are mostly ovate in shape, less often elongate ovate. The shell is close grained, rather strong, and shows little or no gloss. The ground color is mostly drab gray, sometimes grayish white; in an occasional specimen a faint greenish tint is perceptible, which fades out in time. The entire surface of the egg is profusely blotched and sprinkled with different shades of pale brown. In some specimens the markings are bold and well defined; in others they are minute, giving the egg a pepper-and-salt appearance; and again they are almost confluent, causing a uniform neutral brownish appearance. In some specimens the markings are heavier and become confluent only about the larger axis of the egg, forming a wreath and leaving the ground color on the smaller end of the egg plainly visible; in fact, there appears to be an endless variation in color and markings as well as in size among these eggs and scarcely any two sets are exactly alike.

The average measurement of sixteen specimens in the United States National Museum collection, all taken by Mr. R. MacFarlane, is 23.88 by 16.76 millimetres, or 0.94 by 0.66 inch. The largest egg of this series measures 26.42 by 18.80 millimetres, or 1.04 by 0.74 inches; the smallest, 22.35 by 16 millimetres, or 0.88 by 0.63 inch.

The type specimen, No. 13941 (Pl. 5, Fig. 24), from a set of three eggs, was taken by Mr. R. MacFarlane, near Anderson River Fort, in Arctic British North America, on July 7, 1865, and represents one of the more uniformly colored types.

127. *Otocoris alpestris praticola* HENSHAW.

PRAIRIE HORNED LARK.

O[tocorys] alpestris praticola HENSHAW, Auk, I, July, 1884, 264.
(B —, C —, R —, C —, U 474b.)

GEOGRAPHICAL RANGE: Upper Mississippi Valley and the regions of the Great Lakes; north to Ontario and Manitoba; east to the New England and Atlantic Coast States; west to eastern North and South Dakota, eastern Nebraska, and Kansas; south in winter to South Carolina and westward to central Texas.¹

As far as is at present known, the southern limits of the breeding range of the Prairie Horned Lark are confined to suitable localities in eastern Kansas, northern Missouri, Illinois, northern Indiana and Ohio, northwestern Pennsylvania, and the greater part of New York, where it reaches the seashore. It is also found more or less abundantly throughout the intervening regions northward as already indicated, including the eastern portions of the New England States (excepting possibly New Hampshire and Maine), where it is still a rather rare summer resident, and where it breeds as yet only sporadically.

Within the last thirty years the Prairie Horned Lark has extended its breeding range very materially to the eastward, and in certain localities, notably in the southwestern parts of the Adirondack region, especially in Herkimer County, New York, where this bird was practically unknown twenty years ago, it is now a fairly common summer resident, and small companies may be found in every abandoned old clearing along the numerous water courses in this otherwise heavily timbered region. It is essentially a ground bird and rarely alights on fences, trees, or bushes of any kind; its favorite resorts are fallow fields, prairie tracts, pastures, and country roads, and it is seldom found in heavily wooded country. Dry and almost barren, sandy regions, grown up in places with weeds,

¹In discussing the geographical range of the Prairie Horned Lark Mr. Dwight states: "Strange as it may seem, it is a fact that several breeding birds from Carson, Nevada, must be considered of this race." In speaking with Mr. R. Ridgway regarding alleged specimens of *Otocoris alpestris praticola* from Carson City, Nevada, he says that, while conceding that the specimens referred to by Mr. Dwight are practically indistinguishable from Mississippi Valley specimens, he does not consider them as being referable to *Otocoris alpestris praticola* on account of their obviously different origin. He considers them as intermediate between *arenicola* and *merrilli*, a combination of whose characters would necessarily produce a bird similar to *praticola* in coloration. I fully agree with Mr. Ridgway's views in this matter, which apparently solve this problem.

etc., appear to be preferred by these birds to the more fertile sections, and in such localities they are generally common.

The Prairie Horned Lark is a hardy bird, and not a few are constant residents, even along our northern border, throughout the greater part of the year, going southward only during unusually heavy snowstorms in the latter part of December or the beginning of January, but frequently reappearing on their breeding grounds early in February, and by the latter part of the month most of these birds have already mated.

According to Prof. Walter B. Barrows, of the United States Department of Agriculture, the food of our Horned Lark consists principally of seeds of different grasses, like those of the pigeon, foxtail, and Hungarian (*Setaria*), also of those of different species of *Polygonum* (bindweed, knotweed, and smartweed), those of the ragweeds (*Ambrosia*), pigweed (*Chenopodium*), etc. Broken kernels of oats and other grains have also been found in their stomachs, evidently picked up in the roads and streets among the droppings of horses. During spring and summer, when small insects abound, a portion of their food consists of young locusts and grasshoppers, small beetles and their larvæ, and hairless caterpillars, and the young nestlings at least are fed to some extent on insect food. From an economic point of view, all our Horned Larks must be considered as useful birds, doing far more good than harm, and even if they do now and then pull up some young grain, or pick up newly sown grain or grass seed which may have been left uncovered, as it is asserted they occasionally do, such damage is at best but very trifling, and is far more than compensated for by the good they do in eating the seeds of many noxious weeds and the destruction of injurious insects, and in my opinion they deserve full protection. Their stomachs in most cases contain a large percentage of sand, which assists them greatly in the digestion of the small hard seeds on which they live to a great extent.

The late Mr. G. E. Harris kindly sent me the following notes on this subspecies, as observed by him in the vicinity of Buffalo, New York, for several seasons. He wrote: "The Prairie Horned Lark is a very common summer resident in this vicinity, and usually arrives here during the first thaw in February, coming in flocks which sometimes number hundreds. This season (1893) I first noted them on February 14; but owing to sickness my observations only covered what could be seen from my window. They appear to be unmated when they first arrive, but love making commences soon after, and by the 1st of March they are all mated; for the males are then in full song—an indescribable warble—and they may be seen chasing the females continually, like the Bobolinks, but they are not nearly as shy as the latter, as there are no hiding places at this season on the bare fields or pastures which they frequent. A nesting site is chosen as soon as the snow commences to disappear in March, and early in the season one is always selected on a little knoll or on a slight rise of ground in a pasture or meadow. The nests here are usually built on the east side of such a knoll, for protection from the cold west winds; they are mostly placed alongside a piece of

cow or horse dung, a stone, a piece of wood, or a clod of soil, and now and then in an old cow or horse track, made while the soil was soft from rain. The nest is usually very hard to locate, as both parents are very watchful. Early in the day the female will usually leave before you are within 50 yards of it, creeping away for some distance, crouched close to the ground, before taking wing, or the male will warn her by flying across the field, passing close by the nesting site, when she takes wing also and is then chased by him for some distance. Toward evening they are not so cautious, and very often the nest can be approached within a few feet, and when the female is suddenly surprised in this manner she will fly only a few yards, alight, and begin pecking the ground as unconcernedly as if her nest were not within a mile. In fact, the only anxiety I have ever seen these birds show when their nests contained eggs was by flying overhead while an intruder was close to it, but they never alight near it themselves. However, when the nest contains young they act quite differently and become greatly agitated, frequently uttering an alarm note, something like 'tseet, tseet,' hovering overhead or flying across the field, alighting occasionally for a few seconds on a fence post, only to take wing again the next minute, and uttering their alarm note constantly.

"The early nests are built very compactly and are warmly lined. First a circular hole is scratched in the ground, just deep enough so that the upper rim of the nest will be flush with the surface. The outer walls are composed of soft dead grass, and the inside is lined with thistle down and dry mullein leaves (*Verbascum*), picked into small pieces, wherever they can be obtained, the woolly nature of these leaves making a warm and comfortable lining; but where these are not to be had, and where railroads are near by, cotton waste is often substituted. An occasional feather and the blossoms of the mayweed (*Maruta*) are also used now and then. Later in the season, when the weather is warmer, less attention is paid to the lining of the nest.

"After the first brood is hatched and the young are able to leave the nest, they are always attended by the male, who keeps them together and guards them, while the female is busily engaged incubating a second clutch of eggs. The weather during the latter part of March is often very pleasant and warm, only to be followed by a heavy fall of snow about April 1, when a good many unfinished nests and incomplete sets of eggs are snowed under and deserted by the owners; in fact, only a few birds will cling to their nests under such circumstances, as I have found many abandoned ones in different seasons. During the latter part of April and through the summer season the birds seem to desert the meadows and pastures, and are then more frequently found in potato and cabbage fields, I suppose on account of the growth of the grass, as they prefer bare ground to nest on."

While social birds at all other times, during the breeding season the Prairie Horned Larks are rarely seen in flocks, each pair keeping to themselves. During the mating and breeding season the male indulges in frequent bursts of song, ascending into the air very much like the European Skylark, but its vocal

powers, although rather pleasing to the ear are apparently not equal to those of the latter. Early in the season the female also makes these aerial ascents occasionally, not to such great heights, however, as the male; but as soon as she begins housekeeping she becomes more quiet and retiring, her maternal duties taking up her entire time. On the whole, all of our Horned Larks are rather gentle and amiably disposed birds, rarely quarreling with each other excepting during the mating season, when suitors for the same female indulge in occasional bickerings, which never amount to anything serious, one or the other shortly giving way. Rivals generally begin by chasing each other on the ground until the pursued takes wing, when his opponent quickly follows and dashes against and fights him in the air until one or the other retreats. The victorious suitor then quickly returns to his coveted mate and struts before her with raised ear tufts and trailing wings, very much in the same manner as the English Sparrow. These small tufts of black feathers directly over the eyes are readily erected, and look, at a distance, like little horns, and the name of Horned Lark is due to this feature. They are generally raised when any suspicious object approaches. In winter, when the ground is covered with snow, these birds become very tame and gentle, and may often be seen feeding in small flocks in the streets and among the poultry in the barnyards, merely hopping a foot or two to one side to let one pass.

The Prairie Horned Lark is one of our earliest birds to nest, and I have been informed that nests containing eggs have been found in the vicinity of Milwaukee, Wisconsin, by February 23. An average nest of this species, now before me, taken near Fort Snelling, Minnesota, by Dr. E. A. Mearns, United States Army, on June 8, 1890, measures 4 inches in outer diameter by $1\frac{3}{4}$ inches in depth, and the inner cup is $2\frac{1}{2}$ inches in width by 1 inch in depth. An occasional nest is lined with a few horsehairs or fine grass roots.

Two and occasionally three broods are raised in a season, and incubation, which lasts about fourteen days, is, I believe, about equally shared by both sexes; the young are also cared for by both parents; they grow rapidly and leave the nest before they are able to fly well. The male usually takes care of them, pointing out suitable food, but does not feed them; they have to pick it up, and soon learn to provide for themselves. They utter a faint "peep-peep" while feeding, and before they can fly well they hide among the grass and weeds at the alarm note of their parents. Many nests and young are yearly destroyed by cattle stepping on them, and by prowling cats and vermin, and, although this subspecies is very prolific, it is doubtful if more than a single brood from each pair reaches maturity.

From three to five eggs are laid to a set, usually three or four, sets of five being rarely found. These eggs resemble those of the preceding subspecies in shape and color, but are somewhat smaller and usually slightly lighter colored. In a set of four eggs taken by Mr. Henry Fisher, near Maywood, Illinois, on May 24, 1879, the ground color is suffused with a pale lavender tint, and one of the eggs shows a rather large, irregular blotch of pale purple on the side.

The average measurement of sixty specimens in the United States National Museum collection is 21.65 by 15.78 millimetres, or about 0.85 by 0.62 inch. The largest egg of the series measures 24.13 by 16 millimetres, or 0.95 by 0.63 inch; the smallest, 18.29 by 14.99 millimetres, or 0.72 by 0.59 inch.

The type specimen, No. 24731 (Pl. 5, Fig. 25), from a set of three eggs, Ralph collection, was taken by the late Mr. George E. Harris, near Buffalo, New York, on March 19, 1890, and represents one of the lighter-colored and finer-marked examples found among the eggs of this subspecies.

128. *Otocoris alpestris arenicola* HENSHAW.

DESERT HORNED LARK.

O[tocorys] alpestris arenicola HENSHAW, Auk, I, July, 1884, 265.
(B —, C —, R —, C —, U 474e).

GEOGRAPHICAL RANGE: Regions of the Great Plains, the Rocky Mountains, and the Great Basin; north, as far as positively known, to about the northern boundary of the United States, and certainly also into the southern parts of the Provinces of Alberta and western Assiniboia, in the Dominion of Canada; east to western North and South Dakota, the western half of Nebraska, Kansas, the Indian and Oklahoma Territories, and northwestern Texas; west throughout the more arid portions of Idaho, Nevada, and southeastern California, east of the Sierra Nevadas, as well as through the intervening regions; south in winter through northern Arizona and New Mexico to southern Texas and eastern Mexico.

The breeding range of the Desert Horned Lark is both an extended as well as a variable one, breeding as it does on the higher Rocky Mountain plateaus of Montana, Colorado, northern New Mexico, and Arizona up to altitudes of about 10,000 feet, as well as in the hot desert valleys of southern Nevada and southeastern California, where it appears about equally common. The northern limits of its breeding range unquestionably extend well beyond our border into the Provinces of Alberta and Assiniboia. In the former province I saw Horned Larks on the outskirts of Calgary, feeding close to the Canadian Pacific Railroad tracks, in the latter part of May, 1894, which are in all probability referable to this subspecies, as the surrounding country is quite similar to that found in the vicinity of Fort Custer, Montana, where it breeds abundantly. Dr. James C. Merrill, United States Army, also found it breeding quite commonly in the vicinity of Fort Shaw, Montana, and states: "The nests are placed anywhere in the open prairie, and are little more than slight depressions in the ground, lined with a few dry blades of grass. Often there is not the slightest shelter or concealment; at other times the nest is partly hidden by a tuft of grass, a stone, or a buffalo bone; the eggs are usually three in number."

Its general habits, food, etc., are very similar to those of the Prairie Horned Lark. I have met with it as a summer resident in various parts of the West, at Fort Custer, Montana, and in many places throughout southern Idaho, Nevada, and southeastern California, where it frequents the plains or rolling country, covered with short buffalo grass or a stunted growth of sagebrush, avoiding the more luxuriant growth of the moister river valleys. I have seen scores of these

birds miles away from water, and they may frequently be observed running along the roads in search of food and engaged in taking dust baths. Many are yearly destroyed by the terrific hailstorms so prevalent along the eastern slopes of the Rocky Mountains, while others are often benumbed and smothered on the open prairies, where there is little or no shelter from sudden blizzards and fierce snowstorms; taking it all in all, they seem to have a hard fight for life, and it is a wonder that so many survive.

Mr. William G. Smith writes: "While I lived in the Platte River Canyon, 40 miles west of Denver, Colorado, a terrible snowstorm set in suddenly in April, and with it came thousands of these birds, which tried to shelter themselves under projecting banks. The majority were soon so chilled by the intensely cold wind which was blowing at the same time, that they could not move, and were quickly smothered by the drifting snow; and after this melted bushels of their dead bodies could be picked up everywhere. My children brought a great many live birds into the house. They seemed completely bewildered and made no attempt to escape capture, but seemed very thankful for their freedom next morning."

Many of these birds winter within the United States along our southern border, in the Colorado Desert and similar localities, while a few may be found in midwinter occasionally as far north as latitude 39° . Of fourteen specimens sent me in the flesh by Mr. William G. Smith, of Loveland, Colorado, shot on January 15, 1892, twelve were intermediate between *Otocoris alpestris leucolæma* and *Otocoris alpestris arenicola*, and but two were typical examples of this subspecies, probably all being migrants from the north.

The breeding season of the Desert Horned Lark commences apparently much later than that of the Prairie Horned Lark in similar latitudes, and even much farther south. The earliest breeding record I find among the series of eggs of this subspecies in the United States National Museum collection is one of my own, a set of three eggs taken near Fort Custer, Montana, on May 16, 1885, in which incubation was well advanced; the latest is from the Black Hills, in South Dakota, July 21, 1859. The majority of the records fall in June, and two are in July. Mr. Robert Ridgway found a nest of this subspecies, with four eggs, near Truckee, Nevada, on June 3, 1868. Probably two broods are raised in a season. From three to four eggs are laid to a set. They resemble those of the previously described subspecies very closely, both in shape and coloration, excepting that an occasional set is rather more evenly and lighter colored, giving the egg a uniform pale gray appearance.

The average measurement of forty-five specimens in the United States National Museum collection is 21.84 by 15.85 millimetres, or about 0.86 by 0.62 inch. The largest egg of the series measures 23.37 by 17.02 millimetres, or 0.92 by 0.67 inch; the smallest, 19.56 by 15.24 millimetres, or 0.77 by 0.60 inch.

The type specimen, No. 21971 (Pl. 5, Fig. 26), from a set of three eggs, was taken by Dr. James C. Merrill, United States Army, near Fort Custer, Montana, in June, 1881, and represents one of the pale gray types previously mentioned.

129. *Otocoris alpestris giraudi* HENSHAW.

TEXAN HORNED LARK.

Otocorys alpestris giraudi HENSHAW, Auk, I, July, 1884, 266.
(B —, C —, R —, C —, U 474*d*.)

GEOGRAPHICAL RANGE: Coast regions of southern Texas.

The breeding range of the Texan Horned Lark is coextensive with its geographical distribution in the United States. It seems to be found along the entire coast line of Texas, breeding from Galveston to Point Isabel, near the mouth of the Rio Grande. Its range does not appear to extend very far inland, and it is probably a resident throughout the year; still this is not certain, as there are, so far as I am aware, no winter specimens taken in the United States in any of our larger ornithological collections.

Mr. W. E. Grover, of Galveston, writes: "The Texan Horned Lark is locally known here as 'Chippie' and 'Road Chippie,' as it is essentially a ground bird. It frequents the level, grassy prairies along the Gulf shore, and may frequently be observed in the wagon roads; hence its local name. I do not know how early it arrives in this vicinity; I noticed a few on April 1, and by May they are abundant. The nest is built in a saucer-shaped hole scratched out by the birds, and here it is nearly always placed alongside of bunches of wild chamomile (*Matricaria coronata*) growing close to the road; it is constructed of dry prairie grass and lined with thistle down. The top of the nest is even with the surrounding ground."

All the nests of the Texan Horned Lark I have seen are much more substantially built than any of the balance of the subspecies breeding within the United States. The United States National Museum is indebted to Mr. H. P. Attwater for several of their nests and eggs—in fact, for all that are in the collection at present. One of these nests, containing three eggs, on the point of hatching when found on April 23, 1892, is an unusually bulky one. It was placed in a pile of dry cow droppings near the shore of Aransas Bay. The outer walls are chiefly constructed of salt-cedar twigs (*Monanthochloe littoralis*), and the lining consists of dry sea moss picked up on the shore. It measures 6 inches in outer diameter by 2½ inches in height. The inner cup is 3 inches in width by 2 inches in depth. An average nest from the same locality, taken May 23, 1892, containing four eggs in which incubation had commenced, measures about 4 inches in outer diameter by 1¾ in height; the inner cup is about 2¼ inches in width by 1½ inches in depth. Externally it is also composed of small twigs of salt cedar and coarse dry grass, and it is sparingly lined with blades of dry grass, and a few feathers.

Mr. Attwater writes me under date of March 20, 1893: "Quite a number of Texan Horned Larks here, are still in small flocks; a few, however, seem already to be mated, but I have thus far been unable to locate any of their nests."

All the eggs in the United States National Museum collection excepting a single set were taken in the third week in May, evidently second broods, and a nest, with three young birds about a couple of days old, was found on April 19, 1892, indicating that the breeding season commences probably about the latter part of March and lasts through April and May. The usual number of eggs laid to a set appears to be three or four, and these resemble very closely those of the other subspecies already described, both in shape and coloration. Two specimens show a couple of dark-colored hair lines about their larger ends, resembling those found on our Orioles.

The average measurement of fourteen specimens in the United States National Museum collection is 21.90 by 15.54 millimetres, or about 0.86 by 0.61 inch. The largest egg measures 23.62 by 16 millimetres, or 0.93 by 0.63 inch; the smallest, 20.83 by 14.99 millimetres, or 0.82 by 0.59 inch.

The type specimen, No. 25159 (Pl. 5, Fig. 27), from a set of four eggs, was taken and donated to the collection by Mr. H. P. Attwater, near Rockport, Aransas County, Texas, on May 19, 1892, and represents one of the lighter styles of coloration found among these eggs.

130. *Otocoris alpestris chrysolæma* (WAGLER).

MEXICAN HORNED LARK.

Alauda chrysolæma WAGLER, Isis, 1831, 530.

Otocoris alpestris chrysolæma STEJNEGER, Proceedings U. S. National Museum, V, 1882, 34.
(B —, C 53a, R 300b, C 84, U 474e.)

GEOGRAPHICAL RANGE: Table-lands of Mexico, from Vera Cruz northward, including the higher plateau regions of northern Lower California, as well as the coast districts west of the Coast Range in California, north to about latitude 39°.

The breeding range of the Mexican Horned Lark, while quite an extensive one, is still very imperfectly defined, there being but little material on hand from Mexico, and this only from about the extreme southern limits of its range where it is known to breed. Nothing is known regarding its distribution throughout central Mexico, while in Lower California it appears to be confined, during the breeding season at least, to the more northern parts of the peninsula.¹

Mr. A. W. Anthony writes me: "*Otocoris alpestris chrysolæma* nests on the San Pedro Martir Mountains at altitudes of about 8,500 feet, while on both the eastern and western slopes it is replaced during the breeding season by *Otocoris alpestris pallida*, a strikingly different race." It is also reported as breeding at San Quentin, near the coast. It is not uncommon throughout the coast districts of southern California, and apparently reaches the northern limits of its range here in Sonoma County, about latitude 39°.

¹ Since this was written the U. S. Department of Agriculture has obtained quite an extensive series of skins from the States of Puebla, Mexico, Hidalgo, Tlaxcala, and Chihuahua, Mexico, taken at different seasons, which seem to be all referable to this race, and indicate that the Mexican Horned Lark is pretty generally distributed in suitable localities throughout the greater part of the Mexican Republic.

Its general habits, food, etc., are very similar to the other subspecies of this genus. Mr. F. Stephens writes me: "The Mexican Horned Lark breeds in most of the larger valleys (if not too wet) throughout southern California, from sea level to the pines. Near Riverside they nest in the orchards and vineyards, but in other localities the nesting site is usually away from the brush. A nest containing two eggs was found by me in a salt marsh at False Bay, near San Diego, California, which was situated similarly to those of *Ammodramus beldingi*."

Mr. Rollo H. Beck writes that this subspecies is a common resident in Santa Clara County, where it breeds in considerable numbers, both in fields adjoining sloughs that connect with San Francisco Bay and in the hills on the eastern side of the valley. Mr. Charles A. Allen reports it as common in Marin County, and several males shot by him near Nicasio on April 29, 1890, sent me for examination, are referable to this subspecies. Nearly all of the eggs of this subspecies in the United States National Museum collection were taken in the vicinity of Santa Cruz, California. A set from the extreme southern limits of its range, taken by Mr. E. W. Nelson near Perote, Vera Cruz, Mexico, is probably referable to this subspecies. This nest, found on June 6, 1893, contained only two eggs, in which incubation had commenced; these are somewhat larger than eggs from southern California. The nesting habits of the Mexican Horned Lark are quite similar to those of the other subspecies of this genus. Occasionally a nest is found in a perfectly open situation; at other times it is somewhat sheltered by a bunch of grass or weeds: and again it may be placed in cultivated fields, etc. Mr. G. H. Atkinson took a nest containing four fresh eggs near Santa Clara, California, on May 18, 1894, placed beside a row of carrots, and composed entirely of dried grasses; and on June 14 another nest, containing three fresh eggs, was found in a similar situation, probably built by the same pair of birds. Nidification usually begins about the middle of April, and probably two broods are regularly raised in a season, as fresh eggs are frequently found in June. From two to four are laid in a set, generally three. These resemble those of the previously described subspecies in coloration and shape.

The average measurement of twenty eggs in the United States National Museum collection is 20.69 by 15.37 millimetres, or about 0.82 by 0.60 inch. The largest egg of the series (one of the set from Perote, Vera Cruz, Mexico) measures 23.11 by 15.24 millimetres, or 0.91 by 0.60 inch; the smallest, 19.05 by 15.24 millimetres, or 0.75 by 0.60 inch.

The type specimen, No. 21028 (Pl. 5, Fig. 28), from a set of three eggs, Merrill collection, was taken near Santa Cruz, California, in April, 1879, and has been selected as showing the ground color rather clearly.

131. *Otocoris alpestris rubea* HENSHAW.

RUDDY HORNED LARK.

O[tocorys] alpestris rubeus HENSHAW, Auk, I, July, 1884, 267.
(B —, C —, R —, C —, U 474f.)

GEOGRAPHICAL RANGE: Valleys of the interior of California, mainly those bordering the Sacramento River, north to about latitude 40°, between the coast ranges and the Sierra Nevada; south into the San Joaquin Valley in winter.

The breeding range of the Ruddy Horned Lark is confined, as far as known, to a comparatively small area of the interior of the northern half of California, the valleys of the Sacramento River and its larger tributaries, and possibly also to the northern parts of the San Joaquin Valley, but this is not yet positively known. It is generally a resident where found, excepting in unusually severe winters, when it migrates to more congenial localities in the southern part of the State.

Mr. Charles H. Townsend, in speaking of this subspecies, says: "This form of the Horned Lark is a very common inhabitant of the plains and open country everywhere in northern California. It was found in limited numbers on the sage-covered districts north of Mount Shasta in midsummer. The closely-grazed sheep pastures of the Upper Sacramento Valley were alive with them in April and May, and they were abundant in July on the grassy plains east of Mount Lassen. As I was not at Red Bluff in midsummer or midwinter, I can not affirm that they are always present there, but think it not unlikely; a few were nesting there late in May. On May 4 I found a most remarkable nest of eggs, in all probability of this species. I had secured a number of Horned Larks the same morning in a stubble field, and a nest containing one egg of the usual olive-white color, with minute dark spots, so characteristic of the egg of the species, when a plowman approached with a nest containing three eggs of similar size and pattern of marking, but so suffused with a rich reddish brown as to be unrecognizable. The man said they were those of a bird exactly like the *Otocoris* in my basket. Both nests were of equal size, loosely made of grasses and weeds, and placed among the clods and stubble. There were no other birds on the entire plain but Horned Larks, and as the eggs agree with no others, there is no alternative but to call them eggs of this species."¹

The general habits, food, etc., resemble those of the other members of this family very closely, as well as the eggs, of which there are few in the United States National Museum collection—only those taken by Mr. Townsend, mentioned already. The three reddish-colored eggs are unquestionably referable to this subspecies, and such instances of abnormal coloration are known to occur occasionally in other species as well. Two parallel cases will be found among those described of the California Jay and the Crow, in which the normal green color and darker markings are replaced by ruddy and pinkish buff tints.

¹Proceedings of the U. S. National Museum, Vol. 10, 1887, p. 210.

The measurements of the four eggs of this subspecies in the United States National Museum collection are as follows: The single normally colored egg, No. 21703, taken on May 4, 1884, measures 19.81 by 15.24 millimetres, or 0.78 by 0.60 inch; No. 21704, a set of three eggs taken on the same date and at the same place, the reddish-colored specimens, measure, respectively, 20.83 by 14.73, 18.54 by 14.48, and 19.56 by 14.48 millimetres, or 0.82 by 0.58, 0.73 by 0.57, and 0.77 by 0.57 inch.

The type specimen, No. 21704 (Pl. 5, Fig. 29), the largest egg of the set just mentioned, was obtained by Mr. Charles H. Townsend near Red Bluff, California, on May 4, 1884, and represents an abnormally colored specimen of this subspecies.

132. *Otocoris alpestris strigata* HENSHAW.

STREAKED HORNED LARK.

O[tocorys] alpestris strigata HENSHAW, Auk, I, July, 1884, 267.
(B —, C —, R —, C —, U 474g.)

GEOGRAPHICAL RANGE: Coast regions of Oregon, Washington, and southern British Columbia, west of the Cascade Mountains; south in winter to southern California.

The breeding range of the Streaked Horned Lark, as far as known, is confined to the coast districts of Oregon, Washington, and southern British Columbia, including the areas of heavy rainfall, and it probably also breeds in similar localities in northern California. In these generally heavily timbered regions it inhabits the few dry prairies and more open valleys found near the coast. Mr. H. P. Lawrence met with a single specimen near Ridgefield, Clarke County, Washington, where it appeared to be rare, on July 13, 1892. During a recent visit to Puget Sound, in May, 1894, I found it moderately common on the dry, gravelly plains between Tacoma and Steilacoom, in Pierce County. While some were still in small flocks, many were apparently already mated, and some, judging from their actions, had nests close by; but on account of the limited time at my disposal I did not succeed in finding any. Mr. John Fannin, curator of the Provincial Museum, Victoria, British Columbia, records specimens taken at Burrard Inlet, Chilliwack, and other localities west of the Cascades, in this province. Mr. A. W. Anthony met with this race at Beaverton, Oregon, where it breeds. A deserted nest containing three eggs was found by him on May 21, 1884, placed in an old cow track, consisting merely of a few grass stems and lined with a little cattle hair. These eggs measure 20.83 by 15.24, 20.57 by 15.24, and 20.07 by 14.99 millimetres, or 0.82 by 0.60, 0.81 by 0.60, and 0.79 by 0.59 inch, and are undoubtedly referable to this subspecies. On May 25 a female was shot with an egg in the oviduct ready to deposit. The ground color of the set previously mentioned shows the pale-greenish tint occasionally found in the eggs of this genus, and one of them has a few reddish-brown

hair lines scattered over its center. Not being absolutely identified, I have not figured one of them. Specimens taken in winter at Salem, Oregon, by Dr. Clinton T. Cooke, have been identified as this subspecies; the majority; however, move farther south, spending the colder part of the year in southern California.

133. *Otocoris alpestris adusta* DWIGHT.

SCORCHED HORNED LARK.

Otocoris alpestris adusta DWIGHT, Auk, VII, April, 1890, 148.

(B —, C —, R —, C —, U 474*b*.)

GEOGRAPHICAL RANGE: Southern Arizona and New Mexico, western Texas, and southward into northern Mexico.

The breeding range of the Scorched Horned Lark is confined to the southern borders of the United States through southern Arizona, the greater part of New Mexico and western Texas, south into northern Mexico. This race inhabits the more arid valleys and table-lands so common in the regions mentioned, and in suitable localities it is resident throughout the year. In New Mexico it has been found breeding as far north as Santa Fe, which probably marks the northern limits of its range. The Scorched Horned Lark is a common breeder in the vicinity of Forts Huachuca and Bowie, in southern Arizona, where Mr. Frederick Hall Fowler found a number of their nests and eggs; and the United States National Museum is indebted to him for all the sets of this subspecies in the collection.

Its general habits, nests, etc., are similar to those of the other members of this genus. The nests, according to Mr. Fowler, are sunk flush with the surface of the ground, and are usually placed beside a tussock of grass or a piece of dry cow dung in the open plain, and more rarely under a bush, as these are more or less frequented in midday by snakes and egg-eating lizards. The number of eggs laid to a set varies from two to four, sets of three being most common. The eggs resemble those of our other Horned Larks in color and markings, but are mostly short ovate in shape. The nesting season appears to be at its height in April, and probably several broods are raised in a season.

The average measurement of fifteen eggs in the United States National Museum collection is 21.27 by 16.08 millimetres, or about 0.84 by 0.63 inch. The largest egg in the series measures 23.88 by 16.26 millimetres, or 0.94 by 0.64 inch; the smallest, 19.56 by 16 millimetres, or 0.77 by 0.63 inch.

The type specimen, No. 25242 (Pl. 5, Fig. 31), from a set of three eggs, was taken by Mr. Frederick Hall Fowler, near Fort Huachuca, Arizona, on May 5, 1892, and represents one of the larger eggs of this subspecies.

134. *Otocoris alpestris merrilli* DWIGHT.

DUSKY HORNED LARK.

Otocoris alpestris merrilli DWIGHT, Auk, VII, April, 1890, 153.
(B —, C —, R —, C —, U 474i.)

GEOGRAPHICAL RANGE: From southern British Columbia south through Washington and Oregon east of the Cascade Mountains, and northern California, east of the Sierra Nevada, east to southwestern Alberta? and Idaho; south in winter to Nevada and California.

The breeding range of the Dusky Horned Lark, as far as known, extends from the eastern slopes of Mount Shasta, in northern California, through those parts of Oregon, Washington, and southern British Columbia east of the Cascade Mountains, north to about latitude 51°; eastward it ranges through the more fertile portions of Idaho, and quite likely also into the southwestern parts of the Province of Alberta, in the Dominion of Canada.

This subspecies is essentially a bird of the foothills (the so-called "bunch grass country," *Festuca* sp.?) as well as of the more open and grass-covered valleys and plains occasionally found in the mountains, while it is either rare or entirely absent in the more arid sagebrush plains found interspersed through the same regions. I have met with the Dusky Horned Lark in various parts of Oregon and Washington, where it is quite common in suitable localities. While en route from Fort Walla Walla, Washington, to Fort Klamath, Oregon, during the latter part of May and the first two weeks in June, 1882, some of these birds were almost constantly in sight wherever the road passed through open country, and many young birds had already left their nests. At Fort Klamath they were not uncommon on the gravelly prairie adjoining the Post, and Dr. James C. Merrill, United States Army, found it breeding there. In the vicinity of Camp Harney, Oregon, it was very rare in summer and only seen on the more open, grass-covered plains in the central parts of the Harney Valley, the higher portions of this being covered with a good growth of sagebrush (*Artemisia*), which they seem to avoid.

Its general habits, etc., as well as its nests and eggs, are similar to those of the other members of this genus. Undoubtedly two broods are raised in a season, as I found a set of two slightly incubated eggs in the Great Bend of the Columbia River on June 9, 1879. The nest was placed in a slight depression beside a tussock of bunch grass near the trail from Lake Chelan to Spokane Falls, Washington, and I found these birds as common here as farther south. The eggs resemble those of the other members of this family, and from two to four are usually laid to a set.

The average measurement of five specimens in the United States National Museum collection is 20.95 by 15.92 millimetres, or about 0.82 by 0.63 inch. The largest egg measures 21.84 by 16.51 millimetres, or 0.86 by 0.65 inch; the smallest, 20.32 by 15.24 millimetres, or 0.80 by 0.60 inch.

The type specimen, No. 20387 (Pl. 5, Fig. 30), Bendire collection, from a set of two eggs, was taken by the writer, and represents a rather uniform and evenly marked egg.

135. *Otocoris alpestris pallida* TOWNSEND.

SONORAN HORNED LARK.

Otocoris alpestris pallida TOWNSEND, Proceedings U. S. National Museum, XIII, 1890, 138.
(B —, C —, R —, C —, U 474j.)

GEOGRAPHICAL RANGE: Lower California and western Sonora, Mexico.

The breeding range of the Sonoran Horned Lark is probably coextensive with its geographical distribution, but comparatively little is yet known about this small pallid race.

Mr. A. W. Anthony writes me: "While *Otocoris alpestris chrysolæma* nests on the San Pedro Martir Mountains at altitudes of about 8,500 feet, the nesting form on both the lower eastern and western slopes of these mountains is Townsend's *Otocoris alpestris pallida*, a strikingly different race." In a more recent letter (July 8, 1894) he writes: "Pallid Horned Larks are common and breed somewhere not far from my camp, south of San Quentin, Lower California, where they came to the corral each day in small companies of from two to six, and over forty were shot; but their number continued about the same; they dropped down from high overhead. Skins taken in December show strong traces of intergradation with *Otocoris alpestris chrysolæma*." I believe the eggs of this subspecies still remain unknown, but they are not likely to differ materially from those of our better-known Horned Larks, and its habits are undoubtedly also similar.

136. *Otocoris alpestris insularis* TOWNSEND.

INSULAR HORNED LARK.

Otocoris alpestris insularis TOWNSEND, Proceedings U. S. National Museum, 13, 1890, 140.
(B —, C —, R —, C —, U —.)

GEOGRAPHICAL RANGE: Islands off the coast of southern California, including Santa Cruz, Santa Rosa, San Nicolas, and San Clemente.

This insular race of Horned Lark has not yet been admitted to subspecific rank by the American Ornithologists' Union, but as I believe that it is well entitled to such recognition, I enumerate it among the other numerous recognized races of this genus. Mr. Dwight, in his paper on the "Horned Larks," says, on page 152: "Mr. C. H. Townsend has kindly loaned me a series of ten male Horned Larks from the Santa Cruz group of islands, California, including the type of the race he calls '*insularis*.' I am much surprised to find his birds practically indistinguishable from Oregon specimens of *strigata*. They

are the same size, and, though averaging a little darker, the nape approaching brick red, some of them can be matched by the few specimens of *strigata* I have for comparison."

While it is quite true that this island race resembles the Streaked Horned Larks from the northwest coast very closely, still the streaks on the back of the latter, particularly on the lower back, are much darker and more sharply defined, with lighter interspaces, and the wing is also shorter. The under parts, at least on the breast, are pale buffy yellow in *strigata*, while in *insularis* they are always white, without any yellow tinge. Climatic differences must also be considered, and the greatest possible variation exists in the respective habitats of these two races. While the Streaked Horned Lark inhabits regions of excessive rainfall, the climate on the islands is exactly the reverse, being excessively dry and desert-like, and, furthermore, this insular race is a resident and breeds on these islands, and the breeding ranges of the two do not approach each other by several hundred miles; for these reasons I do not consider them to be referable to *strigata*, and they certainly can not be included among *chrysolæma*, to which Mr. H. W. Henshaw originally referred them. He found them very common residents on Santa Cruz Island and breeding there. He says: "The nests were but rude attempts, being nothing more than a small pile of dried grasses sufficiently hollowed to admit of the reception of the eggs. One (No. 17295, containing three eggs, taken on June 4, 1875, on Santa Cruz Island, California) is deserving of notice as being placed within the cavity of an abalone shell, one of a large heap lying half overgrown with herbage. The whole cavity of the shell was filled by the material, and the eggs looked very pretty as they lay contrasted with the shiny, pearly shells clustered about them."

Mr. Henshaw, in speaking of the social habits of the Horned Lark, says: "The immense flocks of these birds that gather together in the fall are well known, but I was surprised to find to what extent this sociable feeling was carried during the breeding season. Both on the mainland and on the island they were seen all through June in scattered flocks of both sexes, though nearly all, perhaps all, were at this time nesting. Both sexes incubate, and it appeared to be the habit of the birds, when off duty, to repair together in small flocks, and thus to wander in search of food. At this season they do not resort much to the sandy beaches, but keep on the upland, where among the herbage they find more easily and in greater abundance the insects and seeds which they are fond of."¹

Dr. E. A. Mearns, United States Army, found this subspecies breeding on San Clemente, the southernmost island off the coast of California, and sent some fragments of eggs found on August 28, 1894, to the United States National Museum collection. It has not yet been recorded from Santa Catalina Island, but as I have received Horned Larks' eggs from this island, they probably are also referable to this race.

¹ U. S. Geological Surveys West of the 100th Meridian, Appendix JJ, Wheeler, 1876, p. 248.

Two sets, each containing three eggs, now in the United States National Museum collection, taken by Mr. Henshaw on June 3 and 5, 1875, on Santa Cruz Island, California, measure, respectively, 22.10 by 15.49, 21.59 by 15.24, and 21.59 by 15.24 millimetres, or 0.87 by 0.61, 0.85 by 0.60, and 0.85 by 0.60 inch. The other set measures 20.32 by 15.49, 20.07 by 15.49, and 19.05 by 15.24 millimetres; or 0.80 by 0.61, 0.79 by 0.61, and 0.75 by 0.60 inch. They resemble the eggs of the other subspecies of this genus, and no specimen has been figured.

Family CORVIDÆ. CROWS, JAYS, MAGPIES, ETC.

137. *Pica pica hudsonica* (SABINE).

AMERICAN MAGPIE.

Corvus hudsonicus SABINE, Appendix Franklin's Journey, 1823, 25, 671.

Pica pica hudsonica JORDAN, Manual of Vertebrates, ed. 4, 1884, 94.

(B 432, C 233, R 286, C 347, U 475.)

GEOGRAPHICAL RANGE: Middle and western North America; from Alaska and the Alaskan Peninsula south through British Columbia, Washington, Oregon, northeastern California, northern and middle Nevada, northern Arizona, and northern New Mexico; east to eastern Colorado, western Nebraska, western South and North Dakota, and western Manitoba, as well as the intervening regions, as Utah, Wyoming, Montana, and Idaho; casually straggling in winter to western Kansas, eastern Nebraska, northwestern Iowa, Minnesota, Wisconsin, and Michigan, and the Province of Ontario, Dominion of Canada.

The American or Black-billed Magpie is one of the best known and most characteristic birds of our western avifauna. It is generally a resident and breeds wherever found, excepting perhaps in the extreme northern portions of its range in Alaska and along the eastern border (the regions of the Great Plains), where it occasionally wanders eastward in the late fall and winter, probably driven away from its usual haunts by scarcity of food or severe storms, which so frequently occur in these sections of country.

The American Magpie is a handsome and striking-looking bird, certain to be noticed by anyone, even if not ornithologically inclined. It is extremely pert in its general bearing and movements, both on the ground and in the trees, and the strongly contrasting colors of its plumage are sure to draw attention to it at once. On the wing, however, it shows to less advantage; its flight is slow and wavering, and in windy weather evidently laborious. The long, wedge-shaped tail seems then to be decidedly in the way and a positive disadvantage, causing it no little trouble in flying from point to point, and in such weather it will only leave through necessity the sheltered bottom lands it usually frequents.

Although more or less quarrelsome, it is social in disposition and likes to be in the company of its kind. I have frequently seen from twelve to thirty feeding together near a slaughterhouse or some other locality where food was abundant; but such gatherings are oftener met with in the late fall and winter

than during the season of reproduction. They are jolly, noisy scamps, nearly always chattering or scolding, even when alone. When not molested they soon lose their usual shyness, and will allow one frequently to approach them within a few feet; but notwithstanding this seeming confidence they are constantly on their guard against danger, and I know no bird more intelligent, and at the same time more saucy, impudent, and cunning than our Magpie. They appear to comprehend the difference between a shotgun and a stick from the day they are able to fly.

I have had many opportunities to observe these birds closely, and was long ago forced to the conclusion that their intelligence and reasoning powers are astonishing. I will only mention one instance of their sagacity, showing how several of these birds seemingly worked in perfect accord to accomplish an object which one bird could not have carried out alone. While stationed at Fort Lapwai, Idaho, on the Nez Perce Indian Reservation, from 1869 to 1871, where Magpies were exceedingly abundant, I possessed a fine setter dog, my constant companion on all excursions, who assisted me in finding many rare nests, and whom I regularly fed, giving him, when the more liquid portion of his meal was finished, a well-boiled soup bone, with more or less meat attached, by way of dessert. I made him carry this to the lawn in front of my quarters, while I sat on the porch watching him. I soon noticed that generally a minute or so after the dog appeared with his bone from four to six Magpies would invariably be close by, though not a single one was in sight before. These birds placed themselves in different positions around the dog, plainly showing a preconcerted arrangement, and were ready for business at once. One stationed itself directly in front of the dog's nose and about 2 feet away, another behind, within easy reach of the tail, and one or two by his side. As soon as the dog became engaged in gnawing his bone, held in place by his forepaws, the bird stationed in the rear made a vicious dash at his tail and pecked it severely; this naturally enraged "Rock," who quickly wheeled around, left the bone, and tried to catch the offender, who in the meantime flew slowly and leisurely away, toling the dog after him as far as possible by fluttering almost within his reach, and while this little ruse was being enacted the remaining birds promptly helped themselves. I saw this performance several times, and soon noticed that the different birds forming this foraging party could be readily distinguished by the variation in size, the length of the tail, or some injury to the tail or wing feathers, etc., and this led to a still more remarkable discovery in this connection. After the dog returned to resume his interrupted meal, another bird took position at the dog's tail, while the one occupying it previously moved to the best place, that in front of the dog's head, to enable it to get its share of the spoils. I observed this maneuver several times, and it did not take the dog very long to see through it as well, so that unless I forced him to stay on the lawn he would at once carry his bone under the porch, where the birds did not dare to follow him. If this incident does not show an extraordinary amount of intelligence and reasoning power, I do not know what would.

There seemed to be a perfect understanding from the start about the mode of attack by which they accomplished their purpose, which could not have been successfully done in any other way.

That they are most skillful thieves is well known to any one acquainted with these birds. How to carry off an egg larger than it could grasp in its bill might puzzle a bird of another species, but not the Magpie. If too large to carry in the ordinary way, it simply runs its beak through the shell and carries it off in this manner. If one manages to find the entrance to a henhouse, eggs will always be scarce thereafter. Aside from its thieving propensities it is also one of the most mischievous birds I know, and enjoys scaring and deceiving better-behaved members of the feathered tribe. It will mimic the cry of a Hawk as well as that of the Jay, and seems to delight in causing the poultry to run in every direction; it also imitates the cackle of a hen just after she has deposited an egg, causing the roosters to search for her; in fact, it delights in playing tricks of all kinds, and seems to enjoy them thoroughly. An enumeration of the various misdeeds and laughable performances of a pet Magpie belonging to one of the cavalry troops I served with would fill a fair-sized book, but it would be out of place here. Some of these birds are far more intelligent than others. Any bright, glittering object is sure to draw their attention, and is promptly picked up and secreted, it matters not how large it may be, if it is not too heavy to carry or drag away.

The southern and eastern range of the American Magpie has become somewhat restricted within recent years, and they are no longer found in certain localities where thirty years ago they were reported as fairly common. It prefers rather open country, shuns the heavy forests and strictly desert regions, and in the Rocky Mountains has been observed at high altitudes. The shrubbery and undergrowth found along water courses and springs in the foothill regions and the canyons in the higher mountains seem to be its favorite habitat.

Its ordinary call note is a querulous "cäck, cäck," or "chäeck, chäeck," uttered in a high key, and is disagreeable to the ear, but it frequently utters also a low, garrulous gabble, intermixed with whistling notes, not at all unpleasing, as if talking to itself, and if annoyed at anything it does not hesitate to show its displeasure by scolding in the most unmistakable manner. The Magpie spends considerable time on the ground in search of food, and while its walk is somewhat jerky, it is graceful, and in moving about the handsome wedge-shaped tail is slightly elevated and constantly twitched; occasionally, as when in a hurry, the ordinary walk is varied to a series of hops. Its flight is never very protracted, and is only resorted to when necessary.

The general habits of the American Magpie vary somewhat in different localities. In some sections, as soon as the snow disappears, birds which have spent the winter months in the vicinity of farms and cattle or sheep ranches (unquestionably attracted to such places by a more abundant food supply) leave them and retire from the immediate vicinity of settlements to take up their housekeeping duties in more secluded localities, while in other places these

birds remain the year around and breed in close proximity to man. At Fort Lapwai, Idaho, more than thirty pairs bred within a radius of a mile of the Post, and several within a hundred yards of some of the houses, in perfectly exposed situations.

Their food during the greater part of the year consists mainly of insects, especially of the large black cricket (so numerous and destructive in certain seasons in the West), grasshoppers, grubs and larvæ of different kinds, angleworms, crawfish, small mammals, birds, their young and eggs, carrion of all sorts, offal from slaughterhouses, and kitchen refuse generally. In the summer and fall fruits and berries also enter to some extent into their bill of fare. In the winter, when food becomes scarce, they are charged with pecking holes in the backs of sore-backed horses, freshly branded cattle, and scabby sheep. While this is possibly true to a limited extent in exceptionally severe winters, I have never observed it, although stationed on several Indian reservations, where sore-backed ponies were common enough; but I have seen them industriously pecking away at green hides hung out to dry. Mr. John Bucher, of Warner Valley, Oregon, states that he has observed numbers of Magpies on the backs of cattle, in the spring, eating grubs, the larvæ of *Hypoderma bovis*, which infest the backs of old and thin animals, and he is likewise of the opinion they do not confine their attention to the grub alone, but pick at the living flesh as well.

Mr. W. G. Smith, lately of Loveland, Colorado, writes me; "Among other pets I kept a tame Magpie and a lot of guinea pigs. Several of the latter died from some unknown cause. One day I caught the Magpie in the act of pecking out the eye of one; I then examined the dead ones and found that each had both eyes picked out. A charge of shot soon settled the culprit."

The American Magpie is undoubtedly more or less of a rowdy and scapegrace among its kind, but on the whole I think he is not quite as black as usually painted, and while it can not be denied that he does some harm, I must insist that he also does considerable good, and the latter compensates perhaps for all his misdeeds.

The nesting season begins early; in Colorado, northeastern California, southern Oregon, and Idaho, sometimes in the first week of April, and usually by the middle of this month; in Washington and Montana, a couple of weeks later, about the latter part of April or the beginning of May, and in the more northern portions of its range, in the last half of June and beginning of July. In Alaska these birds have been found almost at the borders of the Arctic Circle, and on the Shumagin Islands, the Alaskan Peninsula, and in the more southern portions of the territory; in the vicinity of Sitka, they are not uncommon. Mr. Chase Eittlejohn writes that he found them all along the peninsula wherever the alder bushes were large enough to afford shelter and where they could place their nests out of reach of foxes.

The Magpie, once mated, I believe remains so through life. The nest is a bulky and sometimes quite an elaborate affair, and is usually globular in shape. Outwardly it is constructed of sticks, some of which are occasionally 2 feet in

length and nearly an inch in diameter, the coarser material being used for the base of the nest. The inner cup, the nest proper, resembles a Robin's nest somewhat, only larger, and like it is plastered with a coating of wet mud reaching well up on the sides, but not quite to the rim. This coating is carefully lined with fine rootlets, dry grasses, inner bark of the cottonwood tree, and hair; and, in the vicinity of pine forests, with pine needles. The nest is domed over with smaller sticks, and the sides are likewise protected by an open latticework of similar material, thorny twigs being preferred if obtainable. The entrance hole generally opens from the main body of the tree or bush in which the nest is placed, the latter being usually found in the thickest tangle of limbs, provided they are strong enough to support the heavy structure. On good-sized trees the nests are often placed well out on a limb, where they are not readily reached. Some nests which I have seen measured nearly 3 feet in height by $2\frac{1}{2}$ feet in width; others again are much smaller and more flimsily built, scarcely half as large, and only moderately domed; occasionally one is found which is almost open at the top. Mr. B. J. Bretherton, writing from Kadiak, Alaska, mentions a nest there, placed in a dense fir thicket, about 10 feet from the ground. It was built on three saplings which grew in the shape of a triangle, the nest being built around each, the center being supported by the small branches. About 5 inches from the top of the nest a roof was built, open all around. He adds: "A remarkable fact about this bird is its inability to keep dry; in the rainy winters it may be seen day after day hopping around, literally wet to the skin, and looking as if it had been dipped in a bucket of water." The inner cup of the nest measures about 6 inches in width by 4 inches in depth. While on the nest the tail of the bird is usually held at right angles to the body. Unless the eggs are on the point of hatching it is a difficult matter to approach close enough to see the bird on the nest, as the female is exceedingly suspicious and will try to sneak quietly away at the slightest sign of danger, generally slipping out on the side opposite the intruder, as there are usually sufficiently large openings in the sides of the nest to permit the bird to scramble through.

Not infrequently two or three unoccupied nests, built probably by the same pair of birds, are found in close proximity to the one in use; but the same nest is often made use of for several seasons in succession. Two or three pairs sometimes nest close together, but as a rule each pair of birds have their own little canyon or ravine in which they may be found from year to year. Thornbushes, either *Crataegus rivularis* or *douglassi*, commonly found near springy places at the heads of canyons or smaller ravines, as well as in the creek bottoms proper, were preferred as nesting sites by these birds wherever I have observed them. Willow thickets, scrubby cottonwoods, junipers, pines, alders, and firs were also used in the order named. The height of nests from the ground ranged from 4 to 20 feet, rarely over or under this. In Colorado, however, according to Mr. Frederick M. Dille, the Magpie sometimes builds in lofty cottonwoods, from 50 to 60 feet from the ground; and I have seen it stated that occupied nests have been found on the ground, though I have never seen one so situated.

The average number of eggs to a set throughout the greater part of their range is seven; sometimes, however, eight or nine are found. At Fort Lapwai, Idaho, I found sets of nine not at all rare, and have twice taken sets of ten. An egg is deposited daily; incubation does not begin until the clutch is nearly completed, and lasts from sixteen to eighteen days. The female attends to this duty almost exclusively; I rarely saw the male on the nest, but he feeds her, and is quite attentive, being generally on the lookout in the vicinity of the nest. The young when first hatched are ugly-looking creatures, nearly all head, and are blind. They are fed on worms, the soft parts of insects, etc., and grow rapidly. They are able to leave the nest in about three weeks, and soon learn to care for themselves. Only a single brood is raised in a season; if the first set of eggs is taken, a second and even a third is sometimes laid, frequently in the same nest or in another close by. The second set rarely numbers more than five or six eggs.

These show great variation in shape, size, color, and markings, the majority inclining to ovate, while others may be called short ovate, rounded, elliptical, and elongate ovate. The prevailing ground color is a pale or dirty gray, less often a light drab, and occasionally a set is found of a decidedly greenish tinge; but such eggs are rare. They are generally heavily blotched with different shades of brown and ecru drab, these markings being often confluent, almost hiding the ground color, and are usually evenly distributed over the entire egg. In some specimens the markings predominate at the upper end of the egg, more rarely on the lower end. Some also show lavender shell markings, and occasionally a specimen is found in which the markings are well defined, not confluent, and leaving the intervening ground color distinctly visible. The shells of these eggs are close grained, moderately strong, and show little or no gloss.

The average measurement of two hundred and one eggs in the United States National Museum collection is 32.54 by 22.86 millimetres, or 1.28 by 0.90 inches. The largest egg of the series measures 37.84 by 26.42 millimetres, or 1.49 by 1.04 inches; the smallest, 27.94 by 21.59 millimetres, or 1.10 by 0.85 inches.

The type specimen, No. 20349 (Pl. 3, Fig. 11), from a set of ten eggs, Bendire collection, taken by the writer near Fort Walla Walla, Washington, on April 10, 1882, represents an average-marked egg, and No. 25872 (Pl. 3, Fig. 12), a single egg, taken by Mr. F. M. Dille, near Denver, Colorado, represents one in which the ground color shows a decided greenish tint, while No. 26678 (Pl. 3, Fig. 13), from a set of seven eggs, also taken by Mr. F. M. Dille, near Platteville, Colorado, on May 2, 1892, represents a peculiarly shaped and heavily marked specimen.

138. *Pica nuttalli* AUDUBON.

YELLOW-BILLED MAGPIE.

Pica nuttalli AUDUBON, Ornithological Biography, IV, 1838, 450, Pl. 362.
(B 433, C 233a, R 287, C 348, U 476.)

GEOGRAPHICAL RANGE: Middle California, west of the Sierra Nevada Mountains only.

The breeding range of the Yellow-billed Magpie is coextensive with its geographical distribution, and it is a constant resident where found. Its habitat, however, is much more restricted than that of its larger relative, and it is only found in the middle portions of the State of California, west of the Sierra Nevada Mountains, from Ventura County in the south to Tehama County in the north, occupying about one-half of the area of the State only. Thirty years ago it was common in many places in the immediate vicinity of the coast where it is but rarely met with now. It resembles the Black-billed Magpie in every particular excepting in the color of the bill which is yellow; this color is brighter in the birds found in the southern portions than in those approaching the range of the American Magpie in northeastern California. It also averages a trifle smaller in size, and its general habits are similar. It is a constant attendant about the various cattle and sheep ranches found scattered through the interior of California, and here it subsists mainly on the offal, carrion, etc., found in the vicinity of such places, this being in addition to its usual diet of grasshoppers, worms, grubs, etc. Small colonies are sometimes found breeding in some secluded canyon in the neighborhood of such ranches, but more often each pair occupy some gulch or ravine by themselves. Their bulky and conspicuous nests are placed in oaks by preference, next in sycamores, willows, and cottonwoods, and sometimes in very exposed situations where they can be readily noticed for quite a distance; generally however, they are well hidden, especially when placed in a thick bunch of mistletoe. They are constructed like those of the preceding species, but are more frequently placed in large trees and rarely in bushes; sometimes three or four nests will be built in the same tree if it be a large one.

Their usual height from the ground varies from 30 to 60 feet, and they are often placed on the extremity of a limb, where they are hard to reach. Some of the nests, besides the usual lining of fine roots, dry grass, pine needles, and hair, contain bits of dry cow dung and the fine inner bark of the cottonwood.

Mr. Rollo H. Beck, of Berryessa, California, writes me that he has noticed the male feeding its mate while incubating, and that the latter would flap her wings and call like a young bird, and according to him their usual call note sounds like "quē, quē, quē," or "quēēk, quēēk."

The average number of eggs laid is about seven. Sets of eight and nine are more rarely found than in the case of the American Magpie. They are indistinguishable from those of that species, but average a trifle smaller, and specimens showing a greenish tinge in the ground color appear to me to be more frequently met with.

The average measurement of sixty-two eggs in the United States National Museum collection is 31.54 by 22.54 millimetres, or about 1.24 by 0.89 inches. The largest egg of the series measures 34.29 by 22.86 millimetres, or 1.35 by 0.90 inches; the smallest, 28.45 by 21.34 millimetres, or 1.12 by 0.84 inches.

The type specimen, No. 25125 (Pl. 3, Fig. 14), Ralph collection, from a set of seven eggs, taken near Valley Springs, California, April 13, 1892, represents one of the lighter-colored types found among the eggs of this species.

139. *Cyanocitta cristata* (LINNÆUS).

BLUE JAY.

Corvus cristatus LINNÆUS, *Systema Naturæ*, ed. 10, I, 1758, 106.

Cyanocitta cristata STRICKLAND, *Annals of Natural History*, XV, 1845, 261.

(B 434, C 234, R 289, C 349, U 477.)

GEOGRAPHICAL RANGE: Eastern North America; north in the Dominion of Canada to about latitude 52°, and casually to latitude 56°; west to eastern Assiniboia, eastern North and South Dakota, eastern Nebraska and Kansas, the eastern half of the Indian Territory, and northern Texas; south through the United States, excepting Florida, the Gulf Coast, and southeastern Texas during the breeding season.

The Blue Jay, one of our best-known birds, is a resident and breeds throughout the greater portion of its range, but is usually only a summer visitor in the northern parts of the United States and southern Canada, though even there some are occasionally found in midwinter in suitable localities where beechnuts and acorns, on which they principally subsist at such times, are abundant. Few of our native birds compare in beauty of plumage and general bearing with the Blue Jay, and while one can not help admiring him on account of his amusing and interesting traits, still even his best friends can not say much in his favor, and though I have never caught one actually in mischief, so many close observers have done so that one can not very well, even if so inclined, disprove the principal charge brought against this handsome freebooter. He is accused of destroying many of the eggs and young of our smaller birds, and this is so universally admitted that there can be no doubt of its truth.

Mr. Henry Nehrling, for instance, in his charming work, gives the Blue Jay one of the worst possible reputations, based not on mere hearsay evidence, but on personal observations, and he is well known as an exceedingly accurate ornithologist.¹

Mr. R. M. Kirby Smith, of Sewanee, Tennessee, writes: "The Blue Jay is very abundant in this vicinity, and does a great deal of harm by eating the eggs of smaller birds, particularly those of the Chipping Sparrow. I have often caught them in the act of destroying their nests and eggs."

Mr. J. W. Preston, of Baxter, Iowa, writes me on the same subject as follows: "The Jay in this region has become a veritable nuisance. The smaller species of birds are utterly at its mercy in nesting time, and comparatively few

¹ Die Nordamerikanische Vogelwelt, pp. 493-497.

succeed in rearing a brood of young. It is common in the woods to hear Vireos lamenting for their young which the Jay has forcibly carried away. Vast numbers of eggs are eaten and the nests torn up. From the door of my house I have seen a Blue Jay take and devour the eggs of a Red-eyed Vireo whose nest had been suspended from the tips of a low hickory bough overhanging the pathway."

Mr. Manly Hardy, of Brewer, Maine, fully corroborates these statements, writing me as follows: "It is a great robber of birds' nests, taking both eggs and young. I also feel quite sure that in some cases it kills adult birds. I once saw one pass me with what I thought an unusually large crop. I fired, killing the bird, and found also a slate-colored Junco, which had been pecked some by the Jay, and I believe was killed by him. This occurred in the fall, during the migration of the Juncos. There is little doubt that they destroy many nests of eggs and young; all of the *small birds say so*. Let a Robin or a Pigeon come among them and you hear no outcry, and a Flicker or any other Woodpecker creates no disturbance; but let a Blue Jay, Grackle, or Crow put in an appearance, and every bird in range begins to call him a thief, and I never knew them to slander their neighbors. Just think it over and see how this agrees with your experience."

I might add more evidence to the same effect, but consider it unnecessary and think this charge fully substantiated. However, notwithstanding all his vices, I can not help admiring our Blue Jay, for he has good traits as well. Cunning, inquisitive, an admirable mimic, full of mischief; in some localities extremely shy, in others exactly the reverse, it is difficult to paint him in his true colors. Not a few writers call him a bully and a coward, and perhaps he deserves these names at times; but instances are not lacking which show that he possesses courage in the defense of his young, is a devoted parent, and will sometimes fiercely attack man himself in protecting his nestlings. But it is unfortunate that he shows so little consideration for the feelings of other birds when he despoils them of their young.

What could be more commendable than the following incident, related by Mr. Frithof Kumlien, of Milwaukee, Wisconsin?

"*Reason or instinct?*—I made some observations last summer on the habits of the Blue Jay (*Cyanocitta cristata*) which, if not showing reason, certainly show a degree of sympathy and kindness worthy of imitation by animals of a higher order. Last August (1887), on an old farm in Jefferson County, Wisconsin, my attention was attracted by the notes of a Blue Jay, not the ordinary cry, which could be heard at almost any time, as they are very numerous there, but a series of regular calls, followed by answers from a neighboring tree. There was something so peculiarly suggestive of a communication of thought about the sound that I went to the place, and saw an old Blue Jay perched on a fence, some distance from a tree where there were several others.

"On my nearing the bird the calls from the tree became more frequent and loud, changing from a low, pleasant, communicative tone to a shrill alarm, which became more frequent and intense as I approached. Thinking that he must be

injured in some way I went cautiously up to him, when I found that he was at least partially blind. The eyes were blurred and dim, and the lids nearly closed. I had little difficulty in catching him, and found him to be an old and helpless creature, with scarcely a vestige of his former beauty. The beautiful blue feathers were much faded; in fact, the general appearance of the bird was so different as to be apparent at a glance; the claws were very much worn, the bill dulled, and the primaries and tail feathers ragged. Every feature suggested old age and feebleness. Yet he was cared for and watched as tenderly as was ever a young bird in the nest. No sooner had I caught him than there were at least a dozen Jays close at hand, whose sympathy and interest were manifested as plainly as could be without words. After a thorough examination I liberated him, when he flew in the direction of the sound of the others, but did not succeed in alighting among the smaller branches of the tree, and finally settled on a large limb near the ground. I saw him every day after that (from August 10 to August 17), and never did his companions desert him, some one of them being always near and warning him of approaching danger, whereupon he would fly in the direction indicated by the sound of their voices. They guided him regularly to a spring near by, where I saw him bathe daily, always, however, with some of his companions close by. They not only watched and guided him, but they fed him. I had noticed, some days previously, some Jays carrying food, and thought it strange at that season, as there were no young then to feed, but found afterwards, to my surprise and pleasure, that the poor old blind bird was being fed by those whom he could no longer see.

"About a week after first noticing this bird I was compelled, on account of sickness in the family, to relinquish my observations. There is no doubt whatever that the bird was an old one. The young of the year are easily recognized, not alone by their plumage, but by their peculiar teasing, whining notes, unmistakable to anyone familiar with the species."¹

The notes uttered by the Blue Jay are quite varied. The ordinary call note sounds like "djäh, djäh," and again like "käh, käh," or "peedunckle, peedunckle," or "cable, cable, cable." I have also occasionally heard them utter a shrill cry resembling that of the peacock, like "piüh, piüh," or "tiüh, tiüh," varied now and then to a loud "pa-há, pa-há." Occasionally, according to Mr. Preston, it produces one like "sid-lit, sid-lit," elevating and lowering the body in unison with this peculiar musical effort. According to Dr. P. L. Hatch, in the "Birds of Minnesota" (p. 262), "it utters notes somewhat like 'hilly-hilly-hilly,' or 'p'wilhilly-p'wilhilly,' followed in a minute afterwards by 'hweeo-hweeo-hweeo,' or 'chillac-chillac-chillac,' after which comes a soft, sweet, metallic note, filled with a sad pathos."

While ordinarily a noisy bird, the careful listener may occasionally be treated to quite a pleasing effort at singing or warbling. Its remarkable powers of mimicry have often been commented on, and it is astonishing how accurately the Blue Jay is able to imitate the various calls, alarm notes, and cries of dis-

¹ The Auk, Vol. V, 1888, pp. 434, 435.

truss of other birds, and of many mammals as well. These will readily deceive anyone, and the Blue Jay seems to delight in playing tricks on its unsuspecting neighbors in this manner, apparently out of pure mischief. They are especially fond of teasing Owls, and occasionally Hawks also, but sometimes with disastrous results to themselves. While in the woods they are comparatively safe; but if one ventures into the open, and the Hawk should get tired of its tormentor and turn on him, the consequences are usually serious for the Blue Jay. His flight is laborious and accomplished only with a good deal of flapping of the wings. He is no match for our smaller Hawks; and even a Kingbird never fails to attack a Blue Jay most vigorously, should it chance to catch one while flying from one wood to another or come anywhere in the vicinity of its nesting site. The Blue Jay knows this, and stays therefore as much as possible in the timber. They are usually found about the edges of clearings, and not infrequently nest in close proximity to houses, where, if not molested, they become very tame and are soon perfectly at home.

Their food consists of all sorts of animal matter, offal, insects, grasshoppers, grubs, worms, mice, etc., and, when procurable, the eggs and young of smaller birds, varied with acorns, beechnuts, chestnuts, corn, and fruits of different kinds. They are not at all particular when hungry, but will eat almost any thing, and have been seen picking up raw potato peelings, old dried-up apples, etc. Where they are resident they lay up quite a store of acorns, corn, and nuts in various places for winter use, but where they are only summer visitors they do not resort to this practice. In the fall they congregate in large flocks preparatory to their migrations. They usually leave their summer homes in the latter part of September, returning again late in April or early in May.

Mr. W. W. Cooke states: "The Nueces Canyon, in southwestern Texas, is said to be the winter home of countless myriads. In that case they must migrate to the northeast, for all observers agree that in northwestern Texas they are rather a rare bird."¹

Throughout the greater part of the year the Blue Jay is a more or less restless, noisy, and roving bird, moving in little companies from one wood to another; during the nesting season it becomes more quiet and retiring, and is less often seen or heard. It prefers mixed woods to live in, especially oak and beech woods, but for nesting sites dense coniferous thickets are generally preferred; oaks, elms, hickories, and various fruit trees, thorn bushes, and shrubbery overrun with vines are also used, the nests being placed in various situations, sometimes in a crotch or close to the main trunk, or on the extremity of a horizontal limb, among the outer branches. They are placed at distances from the ground varying from 5 to 50 feet, but usually below 20 feet. In the more southern parts of their range nest building begins in the latter part of March, and full sets of eggs may be looked for by April 15. In our Middle States it nests a couple of weeks later, and in the northern portions frequently not before June. I believe but one brood is usually reared in a season, but in the South they may occasionally raise two.

¹ Bird Migration in the Mississippi Valley, Bulletin II, U. S. Department of Agriculture, 1888, p. 157.

The nests are generally well hidden, and are rather bulky but compactly built structures, averaging from 7 to 8 inches in outer diameter by 4 to 4½ inches in depth; the inner cup measures about 3½ to 4 inches in diameter by 2½ inches in depth. Outwardly they are composed of small twigs (thorny ones being preferred), bark, moss, lichens, paper, rags, strings, wool, leaves, and dry grasses, the various materials being well incorporated and sometimes cemented together with mud, but not always; the lining is usually composed exclusively of fine rootlets. Occasionally the Blue Jay will take the nest of another species by force.

Mr. W. E. Loucks, of Peoria, Illinois, writes: "A nest of a pair of Robins, built in an elm tree, was stolen and appropriated by a pair of these birds. It was fitted up to suit their needs, and eggs were deposited in it before the eyes of the angry Robins."

Judge J. N. Clark, of Old Saybrook, Connecticut, found a nest of the Blue Jay, in the spring of 1883, in a rather curious place. It was built among the roots of a large tree that had been prostrated by the wind, turning up a large mass of roots, with the adhering soil. Near the top of this mass, some 8 feet from the ground, under the border of the turf, which had curved over, making a screen, the nest, with its five eggs, was neatly hidden from view.¹

The number of eggs to a set varies from three to six; sets of four or five are most often found, and an egg is deposited daily. Both sexes assist in incubation, which lasts from fifteen to sixteen days. The young grow rather slowly, and are fed on insects, worms, and animal food. They often leave the nest before they are fully feathered, and when scarcely able to fly. At this time they frequently betray their presence by their incessant clamor for food, never appearing to get enough to satisfy their enormous appetites. The parents are exceedingly devoted to them, and are close sitters. Instances have been recorded where a female Blue Jay allowed her head and back to be stroked while sitting on her eggs. The eggs of the Blue Jay vary greatly in their ground color. In some this is olive green, olive buff, and pea green; in others it is plain buff color, or again cream and vinaceous buff. This is irregularly spotted and blotched with different shades of browns and lavender, the markings being generally heaviest about the larger end. A peculiar set of three eggs in the United States National Museum collection has a pale bluish-green ground color, with only a few rather large blotches of slate and lavender about the larger end, and one of these eggs is almost unspotted. The shell is smooth, close grained, rather strong, and occasionally slightly glossy. The eggs are usually ovate in shape.

The average measurement of one hundred and thirty-five eggs in the United States National Museum collection is 28.02 by 20.44 millimetres, or about 1.10 by 0.81 inches. The largest egg of the series measures 30.48 by 21.59 millimetres, or 1.20 by 0.85 inches; the smallest, 25.15 by 20.07 millimetres, or 0.99 by 0.79 inch.

¹ *Ornithologist and Oologist*, Vol. 8, 1883, p. 78.

The type specimen, No. 20372 (Pl. 5, Fig. 5), Bendire collection, from a set of three eggs, taken June 11, 1876, near Muscatine, Iowa, and No. 25883 (Pl. 5, Fig. 6), Ralph collection, from a set of five eggs, taken by Dr. William L. Ralph, near Floyd, Oneida County, New York, represent the two prevailing types of coloration of the eggs of this species.

140. *Cyanocitta cristata florincola* COUES.

FLORIDA BLUE JAY.

Cyanocitta cristata florincola COUES, Key, ed. 2, 1884, 421.

(B —, C —, R —, C —, U 477a.)

GEOGRAPHICAL RANGE: Florida and the Gulf coast to southeastern Texas; casually to southwestern Texas (Bexar County).

The Florida Blue Jay is a slightly smaller bird than its northern relative, and is a common resident in certain localities, breeding throughout its range. It is somewhat duller in plumage than the latter, the white on the tips of the secondaries and tail feathers being more restricted. It has been taken in southern Louisiana, and the late Mr. Charles W. Beckham found it at Leon Springs, some 20 miles northwest of San Antonio, in March, 1887, this being the most westerly record for this subspecies. It is evidently rare in that vicinity, as Mr. H. P. Attwater does not give it in his list of birds observed in the vicinity of San Antonio, Texas.

It is quite common in many parts of Florida, and Dr. William L. Ralph has taken several nests and eggs in the neighborhood of San Mateo, Florida. He tells me that its general habits are similar to those of the Blue Jay, and one of its favorite foods here is the seed of the cabbage palmetto. Where not much molested it becomes even tamer and more familiar than its northern relative, and breeds like it in the vicinity of houses, among the orange groves. Two nests found by Dr. Ralph were placed in low, flat pine woods, 25 and 30 feet, respectively, from the ground; these were composed of twigs, Spanish moss, pine needles, and pieces of cloth, and lined with fine roots. In some of the nests the materials were cemented together with mud. A third nest was placed in an orange tree standing within a few feet of a house, near the banks of the St. John's River, about 20 feet from the ground; it was composed of twigs, catkins, plant fibers, weeds, grasses, pieces of string, and a little Spanish moss, and these materials were cemented together with mud; the lining consisted entirely of wire grass (*Aristida*). Another nest was placed among some small branches at the end of a limb of an orange tree, about 11 feet from the ground, and was composed of similar materials outwardly, but no mud was used in its construction, and it was thickly lined with fine rootlets of the orange tree.

The average measurement of two nests is about 8 inches in outside diameter by 4 inches in depth, the inner cup measuring about 4 inches in diameter by $2\frac{1}{4}$ inches in depth.

In the vicinity of San Mateo, Florida, the only point from which I have any breeding records, nidification begins sometimes in the second week of April and lasts through this month. The earliest date on which Dr. Ralph took a set of eggs was April 17; incubation was then advanced about one-third; the latest, May 4, incubation being advanced one-fourth. Probably two broods are raised here in a season. The eggs of this subspecies are indistinguishable from those of the former, and the same description will answer equally well for both.

The average measurement of sixteen eggs in the United States National Museum collection is 27.83 by 20.63 millimetres, or about 1.10 by 0.81 inches. The largest egg measures 29.21 by 20.32 millimetres, or 1.15 by 0.80 inches; the smallest, 25.40 by 20.83 millimetres, or 1 by 0.82 inches.

The type specimens, Nos. 24990 and 25593 (Pl. 5, Figs. 7 and 8), from sets of three and four eggs, Ralph collection, were taken by Dr. William L. Ralph, near San Mateo, Florida, the first on April 30, 1891, the last on May 4, 1892, and represent average-colored eggs of this subspecies.

141. *Cyanocitta stelleri* (GMELIN).

STELLER'S JAY.

Corvus stelleri GMELIN, *Systema Naturæ*, I, 1788, 370.

Cyanocitta stelleri STRICKLAND, *Annals of Natural History*, XV, 1845, 261.

(B 435, C 235, R 290, C 350, U 478.)

GEOGRAPHICAL RANGE: Northwestern North America; from northern California north to southern Alaska; east to the Cascade Mountains of Oregon, Washington, and in western British Columbia, on both slopes.

Steller's Jay, also known locally as the "Mountain" or "Pine" Jay, is a well-known member of the fauna of the northwest coast, and is sure to be heard from wherever found. Like its relative, the common Blue Jay, it is an incessant scold, never at rest, fully as inquisitive, prying into the domestic affairs of other birds, and, I think, equally destructive. It is usually a constant resident and breeds wherever found. It is an inhabitant of the canyons and pine-clad slopes of the higher mountains, and is not as often seen in the deep forests as on their outskirts near water courses. Although rarely molested throughout its range, where collectors are few, it is exceedingly shy and more difficult to approach within shotgun range than is the Blue Jay. I found this species quite common in the vicinity of Fort Klamath, in southwestern Oregon, and I had abundant opportunities to observe it closely. This locality forms nearly the southern limit of its range, and specimens intermediate between the Blue-fronted and the Black-headed Jays are occasionally found there, but the majority of the birds are referable to this species. During the winter months, especially when heavy snows covered the ground, small parties of these Jays now and then paid visits to the back yard of my quarters in search of kitchen refuse, and most of the specimens obtained by me were killed or caught in steel traps while so

engaged. To hunt them successfully in the open takes both time and patience. Should you see one flying into the lower parts of a bushy fir or spruce and think you had your specimen located, before you could get within shooting distance you might now and then catch a glimpse of him hopping up from limb to limb, always keeping close to the trunk and moving up spirally, and by the time you were close enough you would fail to find the bird where you expected, but perhaps hear his harsh note of warning or derision from some other tree ahead. They seem to delight in teasing the would-be collector in many ways.

Like the Blue Jay, they are expert mimics, and I have been deceived by them on more than one occasion; they can imitate to perfection the notes of all the Raptores found within their range and seem to take pleasure in doing so, probably to impose on the numerous small birds in their vicinity. They are omnivorous, and while pine seeds undoubtedly form a considerable part of their daily bill of fare during the winter months, scarcely anything edible comes amiss. I have seen them, after eating their fill of kitchen refuse, carry off large pieces of meat, bread, etc., hide them somewhere near, and come back at once for more, keeping up their visits until nothing remained. Their strong feet are used in grasping and holding the food, which is torn off in pieces suitable for swallowing. On these foraging expeditions they are silent and constantly on the lookout for danger.

Their ordinary call notes are harsh and discordant, some resembling certain of those of the Magpie, and others the querulous notes of the Red-breasted Sapsucker, which they are especially fond of mimicking. A note frequently heard while flying from one tree to another sounds like "q̄erk, q̄erk," sometimes rapidly repeated; another, while at rest in some bushy thicket, resembles a shrill whistle, like "twee-ish, twee-ish." In the early spring I have occasionally heard one of these birds make a very fair attempt at singing, uttering a series of low, musical, warbling notes, intermixed sometimes with a shrill whistle. They are not as social as many other species of this family, and it is rare to see more than a dozen together at any time, this occurring only in winter, when two or three families may join together in a foraging expedition.

In the southern parts of their range nest building begins late in March or early in April, and correspondingly later northward. At Fort Klamath I noticed them gathering nesting materials during the first week in April, and all the nests I found there (five in number) were placed at the extremities of large horizontal limbs of the highest pine trees, near water, generally from 40 to 50 feet from the ground, and in positions practically inaccessible. The birds seemed to realize this, and were not at all particular about hiding their nests, as the majority could be easily seen from below. Usually they prefer bushy fir trees, which appear to be their favorite nesting sites throughout the greater part of their range; now and then a vine, a maple, or a hawthorn bush is selected.

Mr. A. W. Anthony writes me: "Steller's Jay is common about Beaverton, Oregon. A nearly finished nest was discovered on March 31, in a fir sapling, about 10 feet from the ground. The first egg was deposited on April 10, and

one on each consecutive day until the 14th, when the set of four was taken. The nests I have seen were placed close to the trunks of small firs, usually in very dense second-growth thickets, not over 25 feet from the ground."

Mud forms an important item in all the nests I have examined. They vary from 5 to 60 feet in height from the ground. A nest of this species now before me was saddled on a small limb of a leaning fir, 10 feet from the ground and 30 feet from the bottom of a bank. Outwardly it is composed of small twigs, moss, and dry grass, the whole well cemented with mud up to the rim of the nest; it is lined with a thick layer of fine roots; outer diameter, 9 inches by 6 inches deep; the inner cup of the nest is $4\frac{1}{2}$ inches in diameter by $2\frac{1}{2}$ deep. It was taken by Messrs. Cooke and Warner, near Salem, Oregon, April 26, 1891, and contained four fresh eggs. The female was on the nest, while the male kept out of sight, a short distance away, until the former left the nest, when he appeared and kept up a constant chatter until shot. The female was also taken; both parents were forwarded with the nest and eggs, and are now in the United States National Museum collection. The nest was well concealed from view from the top of the bank, but easily seen from an old road running along the foot of the bluff. Full sets of eggs may usually be looked for during the latter part of April and the first two weeks in May.

Incubation, in which the male assists to some extent, lasts about sixteen days, and I believe usually only one brood is raised in a season. The young follow the parents for some time, and are cared for several weeks after leaving the nest. The number of eggs to a set varies from three to five; sets of four are most often found. They are a dull, pale bluish-green in ground color, and are spotted and blotched over their entire surface with irregularly shaped markings of different shades of brown and lavender, which are usually most numerous about the larger end of the egg. In shape they vary from ovate to elongate ovate. The shell is finely granulated and strong, with little or no gloss.

The average measurement of ten eggs is 31.50 by 23.37 millimetres, or about 1.24 by 0.92 inches. The largest egg measures 34.04 by 23.62 millimetres, or 1.34 by 0.93 inches; the smallest, 29.46 by 22.61 millimetres, or 1.16 by 0.89 inches.

The type specimen, No. 24388 (Pl. 5, Fig. 9), from a set of four eggs, taken by Messrs. Cooke and Warner, near Salem, Oregon, on April 26, 1891, represents a typical egg of this species.

142. *Cyanocitta stelleri frontalis* (RIDGWAY).

BLUE-FRONTED JAY.

Cyanura stelleri var. *frontalis* RIDGWAY, American Journal of Sciences and Arts, 3d ser., V, Jan., 1873, 41.

Cyanocitta stelleri var. *frontalis* BOUCARD, Catalogue Aves, 1876, 279.
(B —, C 235b, R 290a, C 353, U 478a.)

GEOGRAPHICAL RANGE: Western North America; from northern Lower California north through the coast ranges of California and Oregon to northwestern Washington (and southern British Columbia?); east to both slopes of the Sierra Nevada Mountains, in California and Nevada; apparently not present in the Cascade Mountains of Oregon and Washington.

The range of the Blue-fronted Jay, also known as the "Sierra Jay" and "California Mountain Jay," has recently been extended considerably to the northward by Mr. R. H. Lawrence, who found it not at all rare in western Washington, in the Puget Sound region, and it is presumable, therefore, that it is also found throughout the coast ranges of Oregon, occupying here the same ground as the preceding species.

No typical specimens of this race from any portion of Oregon have, to my knowledge, been brought to the notice of ornithologists. It undoubtedly intergrades with Steller's Jay in northern California and southern Oregon, as at Fort Klamath, for instance, where I have found intermediates between these races. The majority of the birds found there, however, come nearer to *Cyanocitta stelleri* than to the present race.

Mr. L. Belding found the Blue-fronted Jay in the northern parts of the Peninsula of Lower California, at Valle Palmas, Vallecitas, and Guadalupe Canyon, in May, 1885.¹

It reaches its eastern limits on the eastern slopes of the Sierra Nevadas, where it is common in places up to 9,500 feet. Dr. C. Hart Merriam's parties failed to observe it in any of the desert ranges east of these mountains during their extended explorations of the Death Valley country in the summer of 1891.

While essentially a bird of the coniferous forests and rarely found any distance away from these, excepting in winter when small parties visit occasionally the more open regions at the base of the foothills, in some parts of California it is more or less a resident of the oak belt as well.

Mr. R. H. Beck writes me: "It is a common resident of the Santa Clara Valley, California, as well as of the coast ranges, from Santa Cruz to 40 miles below Monterey, wherever I have been. I have found about a dozen of their nests, placed in oaks, buckeye, laurel, and holly bushes, at various distances ranging from 7 to 40 feet from the ground. They were always found close to the water. These birds are close sitters, and I have seen them remain on the nest until I nearly touched them, when they would fly off a short distance, screaming and calling for their mates, who soon appeared and helped to make a louder

¹ Proceedings of the California Academy of Sciences, 2d series, Vol. II, 1889, p. 293

racket. On one occasion while walking up a canyon I saw a couple of Warblers darting at one of these Jays, which seemed much afraid of them. He would try to get on the under side of the limb he was on, dodge his head, call for help, and sometimes strike at them. Several times while taking their eggs I have seen these birds pecking viciously at the limb they were on, like a Woodpecker, evidently venting their spite in this manner. One of their call notes sounds like 'chuck, chuck,' another like 'ké-lup, ké-lup,' varied to 'que-quer-que' occasionally, and a note of distress or anger sounds like 'cä-räck, cä-räck.'

Mr. F. Stephens informs me that they are fond of acorns, and give the California Woodpeckers considerable employment in chasing them away from their supplies stored away in the bark of the pines.

Mr. Charles A. Allen, of Nicasio, California, says: "The notes of the Blue-fronted Jay are variable, at times harsh and rasping, and again very soft and melodious. They will imitate the call of the Western Red-tailed Hawk so perfectly that I have many times been almost deceived by them. I have satisfied myself beyond dispute that they are wonderfully sweet songsters. Many times I have seen them sitting alone in the shade of thick redwood trees singing as sweetly as any bird I ever heard. I presume the male bird is the songster; I have never shot one at such a time to find out; it always appeared to me as though the bird retired to the solitude of the heavy redwood forests to enjoy his solo undisturbed."

Like Steller's Jay, they are omnivorous, living indiscriminately on both animal and vegetable matter, while acorns, as well as pine seeds, form no inconsiderable part of their food. Like other members of this family, they are very destructive to the young and eggs of smaller birds; but they also have their enemies.

Among some manuscript notes kindly loaned me by Mr. L. Belding I find the following item:

"At Big Trees, Calaveras County, California, May 30, 1879, I found a nest of this bird in a cluster of small cedars, about 6 feet from the ground. It was composed of sticks, mixed with mud and leaves, and lined with pine needles. It contained young birds about a week old. Three days afterwards, having shot a Cooper's Hawk not far from this nest, and noticing that it had recently made a meal of young Jays, I repaired to the place, and, as I had conjectured, found they were missing. When I remembered the annoyance these Jays had caused the small birds in their neighborhood, I felt that they merited the loss of their offspring. The Blue-fronted Jay is credited with giving deer and other game notice of the hunter's approach (and doubtless this is correct as far as deer are concerned), often following them with its characteristic cries, and I have on several occasions been notified by them of the presence and approach of deer, and once found, through the instrumentality of Jays, one of these animals which I had wounded."

The Blue-fronted Jay, in some portions of its range, shows a predilection for nesting in natural cavities in trees and stubs, which is a radical departure from its ordinary mode of nesting. The late Col. N. S. Goss wrote as follows on

this subject: "While collecting birds and their eggs in company with my brother, Capt. B. F. Goss, in the spring of 1884, in the vicinity of Julian, California, we found a number of the nests of the Blue-fronted Jay, and in all cases but one in holes and trough-like cavities in trees and stubs, ranging from 4 to 50 feet from the ground, generally 10 to 20 feet up."¹

Since the construction of the Central Pacific Railroad over the Sierra Nevadas many of the Jays nest in the extensive snowsheds found along the line of this road, and numbers of their nests are yearly torn down by the railroad employees; but this does not appear to discourage them, as they continue to build new nests in similar localities. Besides the trees and shrubs already mentioned as being used for nesting sites by this subspecies, it also builds occasionally in sycamores and willow thickets, although firs, cedars, and pines are most often used. Birds breeding in the higher mountains retire in the late fall to lower altitudes, wintering usually in the foothills, from 2,000 to 4,000 feet above sea level.

The nests are similar in size and construction to those of Steller's Jay, and the same description will answer for both. Occasionally one is lined with pine needles in lieu of rootlets. Nidification commences sometimes in the latter part of April, more frequently in May, and now and then it is delayed into June. The number of eggs to a set varies from three to five, sets of four being most common. An egg is deposited daily, and incubation lasts about sixteen days. The male assists in these duties, and usually but one brood is raised in a season. The eggs resemble those of Steller's Jay, in shape, ground color, and markings, but they average a trifle smaller, and the same description will answer for them.

The average measurement of forty-eight eggs in the United States National Museum collection is 30.22 by 22.61 millimetres, or 1.19 by 0.89 inches. The largest egg of the series measures 34.04 by 23.88 millimetres, or 1.34 by 0.94 inches; the smallest, 28.19 by 22.35 millimetres, or 1.11 by 0.88 inches.

The type specimen, No. 24964 (Pl. 5, Fig. 10), Ralph collection, from a set of four eggs taken near Santa Cruz, California, on April 30, 1876, represents one of the lighter-colored types of the series.

143. *Cyanocitta stelleri macrolopha* (BAIRD).

LONG-CRESTED JAY.

Cyanocitta macrolopha BAIRD, Proceedings Academy Natural Sciences, Philadelphia, June, 1854, 118.

Cyanocitta stelleri macrolopha COUES, Bulletin of the Nuttall Ornithological Club, V, April, 1880, 98.

(B 436, C 235a, R 290b, 290c, C 352, U 478b.)

GEOGRAPHICAL RANGE: Southern Rocky Mountains; north to southern Wyoming; west to the Uintah Mountains, in eastern Utah, and the higher ranges of northwestern Arizona; south to northern Mexico.

The Long-crested Jay is a resident of the southern Rocky Mountain regions and breeds wherever found. Mr. F. Stephens reports it as common among the pine forests of the Chiricahua Mountains, in southern Arizona.

¹ The Auk, Vol. II, 1885, p. 217.

Dr. Edgar A. Mearns observed it in the San Francisco Mountains, in northern Arizona, and says: "It is a resident to the altitude of 10,000 feet, ascending still farther. On the San Francisco Mountains I found its nest, with fresh eggs, at the upper limits of the pines, in the second week in June, 1887, while the nests found in the lower Mogollons during the last third of May of the same year all contained young."¹

Mr. W. G. Smith writes: "I found these Jays very common in the mountains of Colorado at all seasons, but during winter they prefer lower altitudes, coming around the houses about the towns, and they are not particular then upon what they feed. At such times they are rather tame and noisy, and, like all Jays, very active. In Larimer County, Colorado, they begin breeding early in May, but I have taken sets of fresh eggs at an altitude of about 9,000 feet in the middle of June, and in favorable seasons I think they breed much higher still. Although their nests are bulky, yet they are rather difficult to find. The birds are very quiet during the nesting season, and are then rarely seen. The female sits very close, and will allow you almost to touch her before leaving the nest. On account of the early date on which they nest, their eggs are sometimes frozen and then abandoned. I have occasionally found one or two eggs in this condition. After the entire clutch is laid I think they are never left unprotected. During the breeding season these birds are perfect terrors to all smaller birds, incessantly hunting for their eggs and young, of which they devour great numbers. I have seen spirited combats between them and other birds, especially Robins, at whose cries of alarm all of the species within hearing distance hastened to help to fight off their common enemy, which they frequently succeeded in doing. Even the little Pigmy Nuthatches are capable of driving away these wholesale destroyers. I have noticed them hiding grains of Indian corn in cracks and under the bark of trees, providing for a possible scarcity of food in the future."

Their general habits and call notes resemble those of the preceding subspecies. Their nests are usually placed in small bushy pines or other conifers, at no great distances from the ground, varying mostly from 8 to 15 feet.

Lieut. Harry C. Benson, United States Army, found the Long-crested Jay breeding near Fort Stanton, New Mexico, in May, 1884.

A nest and four eggs, presented to the United States National Museum collection by Mr. Denis Gale, were found near Gold Hill, Boulder County, Colorado, in a black willow, 9 feet from the ground, at an altitude of 5,500 feet, on April 23, 1889, the earliest breeding record I have for this subspecies. Four sets of eggs in the Ralph collection, obtained in Estes Park, Colorado, were taken, respectively, on May 3, 9, 21, and 25; all of the eggs were fresh when found, excepting those of the last date, in which incubation had commenced. The breeding season, in Colorado at least, appears to be at its height in this month, but in the higher mountain ranges it is protracted into June, while in the mountains in southern Arizona it probably commences early in April.

¹The Auk, Vol. VII, 1890, p. 256.

The nests of the Long-crested Jay, of which several are before me, resemble those of the preceding subspecies in general construction, and mud enters largely into their composition. While they vary but little outwardly in size and bulk; the inner cup shows more variation, ranging from $3\frac{1}{2}$ to $4\frac{1}{2}$ inches in diameter, and $2\frac{1}{4}$ to $2\frac{3}{4}$ inches in depth. The inner lining consists mostly of small rootlets, in one instance considerable horsehair being intermixed, while in another the lining consists principally of grass and pine needles.

The eggs vary from three to six in number, sets of four or five being most often found. They are indistinguishable from those of Steller's Jay, with the exception of being perhaps a trifle more glossy. Their breeding habits are also similar.

The average measurement of thirty eggs in the United States National Museum collection is 30.94 by 22.35 millimetres, or 1.22 by 0.88 inches. The largest egg of the series measures 33.78 by 23.62 millimetres, or 1.33 by 0.93 inches; the smallest, 27.94 by 21.59 millimetres, or 1.10 by 0.85 inches.

The type specimen, No. 23774 (Pl. 5, Fig. 11), from a set of five eggs taken by Lieut. H. C. Benson, Fourth Cavalry, United States Army, near Fort Stanton, New Mexico, in May, 1884, represents a large and boldly marked egg, while No. 24444 (Pl. 5, Fig. 12), also from a set of five eggs, Ralph collection, taken in Estes Park, Colorado, on May 25, 1890, represents in its markings an average egg of this subspecies.

144. *Cyanocitta stelleri annectens* (BAIRD).

BLACK-HEADED JAY.

[*Cyanura stelleri*] var. *annectens* BAIRD, History of North American Birds, II, 1874, 281 in text.

Cyanocitta stelleri annectens RIDGWAY, Proceedings U. S. National Museum, III, August 24, 1880, 184.

(B 436, part; C 235a, part; R 290b; C 352, part; U 478c.)

GEOGRAPHICAL RANGE: Northern Rocky Mountains; south to southern Wyoming and northern Utah (Wasatch Range); west to Oregon and Washington, east of the Cascade Mountains.

The Black-headed Jay is a resident of the northern Rocky Mountain regions of the United States, and doubtless occurs also in corresponding localities in the southern parts of British North America, in eastern British Columbia, and in the Province of Alberta.

Mr. Robert Ridgway found it breeding in Parley's Park, in the Wasatch Mountains, Utah, June 25, 1869, which mark about the southern limits of its range. "The nest was placed in a small fir tree on the edge of a wood. It was saddled on a horizontal branch, about 15 feet from the ground, and contained six eggs. The base of the nest was composed of coarse, strong sticks, rudely put together. Upon this was constructed a solid, firm plastering of mud of a uniform concave shape, lined with fine, wiry roots. The external diameter

is about 9 inches, and the height of the nest 4 inches. The interior is 5 inches in diameter and 3 in depth."¹

I have met with this subspecies in the Bitter Root Mountains, in Montana and Idaho, as well as in the Blue Mountains of Oregon and Washington; but it appeared nowhere to be common. At Fort Walla Walla, Washington, I shot a number of these birds during the winter months, when they left the mountains and foraged about the settlements in the valleys. At such times I have frequently seen them among the willows along creek bottoms, fully 20 miles from the nearest pine timber. I sent eleven skins, taken in this locality, to Mr. William Brewster, of Cambridge, Massachusetts, who pronounced five of them typical *Cyanocitta stelleri annexens*, and two nearly typical *Cyanocitta stelleri*, and four intermediate between these two forms.

Dr. C. Hart Merriam reports this Jay as very rare in south central Idaho, but found it common, in 1872, in the Teton Basin, near the boundary line between Idaho and Wyoming.²

I failed to notice any difference in their habits from those of Steller's Jay, excepting that they appeared to be less noisy, and on this account they are perhaps less often observed.

The only eggs of this subspecies in the United States National Museum collection are three, from the set previously referred to as taken by Mr. Robert Ridgway. They resemble the eggs of the three preceding subspecies in every particular, and measure, respectively, 31.50 by 21.34, 32 by 21.84, and 32 by 22.35 millimetres; or 1.24 by 0.84, 1.26 by 0.86, and 1.26 by 0.88 inches.

The type specimen, No. 15431 (not figured), from an incomplete set of six eggs, was taken by Mr. Robert Ridgway, in Parley's Park, Utah, as previously stated.

145. *Aphelocoma floridana* (BARTRAM).

FLORIDA JAY.

Corvus floridanus BARTRAM, Travels in Carolina, 1791, 291.

Aphelocoma floridana CABANIS, Museum Heineanum, I, 1851, 221.

(B 439, C 236, R 291, C 354, U 479.)

GEOGRAPHICAL RANGE: Florida.

The range of the Florida Jay, locally known as the "Scrub" or "Bush" Jay, appears to be confined to the Florida Peninsula, and even there it is only found in certain localities. As far as I am able to learn, it has not yet been observed north of St. Augustine or south of Lake Worth, on the east coast; nor north of Pine Point and south of Punta Rassa, on the Gulf coast. It therefore occupies only a comparatively small area of the State. In certain sections of Florida, especially near the coast, and close to some of the larger rivers, sandy ridges are found which produce an almost impenetrable thicket of low, scrubby

¹ History of North American Birds, 1874, Vol. II, pp. 281, 282.

² North American Fauna, No. 5, U. S. Department of Agriculture, 1891, p. 99.

oaks, mixed here and there with stunted pines, none of these bushes attaining a height of more than 10 feet, and these "scrubs," as they are locally called, are the home of the Florida Jay. They are not found in the more open pine forests, nor in the extensive swamps so abundant in this State, and are rarely seen any distance away from the oak thickets.

Their food, like that of the rest of this family, consists of insects, grubs, wood ticks, snails, offal, and other animal matter, various seeds, fruits, and acorns, and they are likewise charged with being very destructive to the young and eggs of other birds. Their call notes are said to be somewhat similar to those of the Blue Jay, but on the whole perhaps not so loud and harsh. Where not unduly molested they become quite tame and familiar, and will allow themselves to be approached closely. Dr. Ralph says that he stopped one night at the house of a settler, near Titusville, Florida, who lived some distance from other settlers. He was evidently a friend of the feathered tribe, his only neighbors. On his calling or whistling, several Florida Jays, Cardinals, and Mockingbirds would quickly appear, alight on his head and shoulders, and take the food out of his hands. They were equally familiar with strangers, fighting and quarreling among themselves for choice places on their persons. It is astonishing how quickly some birds, as well as mammals, lose all their fear and become almost domesticated if treated kindly, and that lonely settler undoubtedly passed many a pleasant hour in company with his feathered friends. Their flight is slow, evidently laborious, and is said to resemble that of the Mockingbird somewhat. A good deal of their time is spent on the ground, where they are far more at home than on the wing, moving with the greatest ease and dexterity through the densest thickets and undergrowth.

In favorable localities they are said to breed in communities, a number of pairs nesting in close proximity to each other. In the more southern parts of their range nidification begins sometimes in March, but generally they nest more frequently in April and May, and sometimes even as late as the middle of June, which looks as if two broods might now and then be raised in a season.

The eggs of the Florida Jay range from three to five in number, and their ground color varies from pea green to pale glaucous green. They are blotched and spotted with irregularly shaped markings of cinnamon rufous and vinaceous cinnamon, these being generally heaviest about the larger end of the egg. They are usually ovate in shape, though an occasional set may be called elongate ovate; the shell is smooth and compact, and shows but little gloss.

The average measurement of thirty-six eggs in the United States National Museum collection is 27.31 by 20.32 millimetres, or about 1.07 by 0.80 inches. The largest egg of the series measures 30.78 by 20.57 millimetres, or 1.21 by 0.81 inches; the smallest, 24.64 by 20.07 millimetres, or 0.97 by 0.79 inch.

The type specimen, No. 24704 (Pl. 5, Fig. 13), Ralph collection, from a set of three eggs, was taken near Daytona, Volusia County, Florida, on May 14, 1891, and represents a small-sized but average-colored egg of the series.

146. *Aphelocoma woodhousei* (BAIRD).

WOODHOUSE'S JAY.

Cyanocitta woodhousei BAIRD, Birds of North America, 1858, Pl. 59.

Aphelocoma woodhousei RIDGWAY, Field and Forest, June, 1877, 208.

(B 438, C 236a, R 292, C 355, U 480.)

GEOGRAPHICAL RANGE: Western United States; north to southeastern Oregon, southern Idaho and Wyoming; east to Colorado and New Mexico; west to Nevada and southeastern California; south through Arizona, New Mexico, and western Texas into northern Mexico.

Woodhouse's Jay is an inhabitant of the southern Rocky Mountain regions and the ranges of the Great Basin between the former and the Sierra Nevadas. Besides the localities already mentioned, it is common in many parts of Utah. During the biological survey made under the direction of Dr. C. Hart Merriam, in the Death Valley region of southeastern California, in the spring and summer of 1891, Woodhouse's Jay was found on all of the desert ranges which furnish a growth of piñon or juniper. In California it was observed in the White Mountains, Inyo, Argus, Coso, and Panamint ranges; in Nevada, in the Charleston, Grapevine, Juniper, and Pahroc mountains, and in Utah, in the Beaverdam Mountains. In the latter part of June young which were able to fly were found among the willows along the streams in the Panamint Mountains, north of Telescope Peak.¹

Mr. Robert Ridgway found these birds very abundant in various parts of Nevada, and also met with them in Utah and at City of Rocks, Idaho. I observed this species on the southern slopes of Steens Mountain, in southeastern Oregon, in August, 1877, which locality marks about the northwestern limits of their range.

Mr. Charles E. Aiken was, I believe, the first naturalist who took the nests and eggs of this Jay, and he sent me several sets taken in El Paso County, Colorado, in 1873.

Dr. Elliott Coues, in his Birds of the Northwest, states: "It is very abundant in the upper parts of Arizona, and widely and equally distributed in all sorts of places, with the exception, perhaps, of the recesses of pine woods, which are generally relinquished in favor of the long-crested species. Its preference, however, is for oak openings, rough, broken hillsides covered with patches of juniper, manzanita, and yuccas, bushy ravines, and wooded creek bottoms."²

Mr. William Lloyd, in his List of Birds of Western Texas, says regarding this species: "Resident wherever there is shin oak, at the heads of nearly all creeks. Tolerably common. Nest with three eggs found April 19, 1885, on Spring Creek, in low underbrush; another, same date and position of nest, with three young."³

¹North American Fauna, No. 7, U. S. Department of Agriculture, 1893, p. 69.

²U. S. Geological Survey of the Territories, No. 3, 1874, p. 220.

³The Auk, Vol. IV, 1887, p. 290.

Mr. Scott found Woodhouse's Jay a common and resident species at the head waters of Mineral Creek, and also common in the foothills of the Catalina Mountains, in southern Arizona. He says: "It frequently associates with *Aphelocoma sieberii arizonæ*, but it is not so gregarious as that species. Breeds in late April and May, and I think but one brood is reared. As far as I am able to judge, this species does not range below 3,000 nor above 5,000 feet in the foothills of the Catalina Mountains. I have not met with it at other points than those indicated in the Pinal and Catalina mountains."¹

Like the rest of the Jay family, the notes of Woodhouse's Jay are quite varied and not unlike those of the California Jay. Its food also is similar, and in regions where oaks or nut pines are abundant consists principally of the fruit of these trees, various insects, and presumably also of the young and eggs of smaller birds. They are apparently equally as adept at thieving as are the better-known species of this family, and probably do fully as much damage. They range up to an altitude of 7,000 feet in summer.

Capt. W. L. Carpenter, United States Army, found it breeding near Prescott, Arizona, on June 6, 1891, and writes as follows: "The nest was placed about 5 feet from the ground, in the center of thick brush, and was difficult to reach. It was found on a brush-covered ridge, cut up by ravines, covered with oak, lemon-berry, manzanita, juniper, yucca, prickly pear, mescal, and other growths which contribute to the appearance of a northern Arizona landscape, about 100 feet above a small valley through which flowed a rivulet. The parents remained in the vicinity, screaming harshly, bounding through the juniper trees, and trying for a long while to draw me away. When I finally located the nest, finding further deception useless, the one which I took to be the female disappeared; the other then perched within 10 feet of me and peered at me silently, with his head cocked on one side, an interested spectator of further proceedings. As we watched each other so closely I could not forbear saying, 'Ah, yes, my fine fellow, you are right; we are a pair of robbers. How many birds' nests have you robbed this morning and devoured the young, too?' When I had secured the nest and packed the eggs away, he flew off with loud screams, no doubt intended for Jay-like anathemas, which I could but feel were well merited."

The nests are placed in scrub oaks, piñons, and thick shrubbery, usually but a short distance from the ground and not far from water. The nest taken by Captain Carpenter, which is before me, is composed of a slight platform of very crooked interlaced twigs, and on these is placed a lining of fine roots and some horsehair. No mud is used in its construction. The lining is about three-fourths of an inch in thickness. Compared with other Jays' nests this is a rather small structure, and not nearly as deep. It measures about 7 inches in outer diameter by 4 inches in depth, and the inner cup 3½ inches in diameter by 2 inches in depth.

In the more southern portions of their range nidification begins in the latter part of March or the first week in April, varying somewhat according to altitude.

¹The Auk, Vol. IV, 1887, p. 20.

In Colorado most of these birds appear to breed in May, while in northern Arizona well-incubated eggs have been found as late as the first week in June. Incubation lasts about sixteen days, both parents probably assisting; and I think that but one brood is raised in a season. The number of eggs laid to a set varies from three to six, usually four or five. The ground color of these eggs is a dirty pea green or a pale sage green; they are sparingly spotted and flecked over the entire surface with irregular markings of ferruginous brown, tawny, and lavender, these being usually heaviest about the larger end of the egg, but nowhere so abundant as to hide the ground color. The shell is compact, rather smooth, and but slightly glossy. They vary in shape from ovate or short ovate to elongate ovate.

The average measurement of twenty-two eggs in the United States National Museum collection is 27.57 by 20.09 millimetres, or about 1.09 by 0.79 inches. The largest egg measures 29.46 by 20.32 millimetres, or 1.16 by 0.80 inches; the smallest, 25.40 by 19.81 millimetres, or 1 by 0.78 inch.

The type specimen, No. 20359 (Pl. 5, Fig. 14), Bendire collection, from a set of six eggs, was taken by Mr. Charles E. Aiken, in El Paso County, Colorado, on May 18, 1874, and represents an average marked egg of this species.

147. *Aphelocoma californica* (VIGORS).

CALIFORNIA JAY.

Garrulus californicus VIGORS, Zoology Beechey's Voyage, 1839, 21, Pl. V.

A[phelocoma] californica CABANIS, Museum Heineanum, I, October 15, 1851, 221.

(B 437, C 236b, R 293, C 356, U 481.)

GEOGRAPHICAL RANGE: Pacific Coast regions; from northern Lower California north through California (excepting southeastern parts), western Oregon, to southwestern Washington; east to and including the eastern slopes of the Sierra Nevada, in California and western Nevada, and the eastern slopes of the Cascade Mountains, in Oregon.

The California Jay is a common resident in suitable localities throughout the greater portion of its range, its favorite haunts being the oak-covered foothill regions of the higher mountains, the brush-covered sides of the canyons leading into these, and the shrubbery along water courses. It avoids the extensive pine forests, and is rarely met with in such localities, excepting along their borders. In summer it has been found at altitudes of from 6,000 to 8,000 feet, but it is much more common in the lower agricultural districts and the oak belt. Where these trees are abundant the California Jay is sure to be also present.

Mr. A. W. Anthony found it common in the vicinity of Ensenada, in Lower California, which marks about the southern limit of its habitat. Its eastern range terminates along the eastern slopes of the Sierra Nevadas, where it is only found in isolated localities, and it was not observed in any of the desert ranges to the east of these mountains by Dr. Merriam's exploring parties. Mr. Robert Ridgway reports it as quite common in the vicinity of Carson City, Nevada.

Mr. H. W. Henshaw met with it a considerable distance north of this point, and I shot a male and saw several pairs on May 10, 1883, thirty miles south of Fort Klamath, Oregon, on the road to Linkville, on a hillside covered with mountain mahogany bushes, where they were evidently breeding. This locality is east of Klamath Lake and the Cascade Mountains. Mr. Henshaw reports a specimen taken at The Dalles, October 4, 1879, and Mr. R. H. Lawrence considers it common at Ridgefield and Vancouver, Washington, as is also the White-fronted Jay. He writes from Portland, Oregon, under date of October 19, 1892: "Eight California Jays seen, mostly in small trees at the roadside and on the ground. This species frequents the bushy strips bordering fences and the edges of fields and sloughs in the Columbia River bottom. Judging from the numbers seen at Ridgefield and the surroundings this species chooses, I should expect to find it well up in the valley of the Cowlitz River, Washington." Mr. Lawrence adds: "The call notes of the California Jay bear much resemblance to those of *Cyanocitta stelleri frontalis*, but they are not so loud and strong. One of their calls sounds like 'hi-e' or 'hee-hee, hee-hee;' another, not so harsh nor so loud, is 'whé, whé, whé.'"

Mr. Charles A. Allen, of Nicasio, California, writes: "I consider their calls fully as harsh and rasping as those of any other member of this family. One of their notes of alarm, uttered when they see something they do not like, especially an Owl asleep in a tree, sounds like 'cür, cür, cür;' as soon as this is heard by others in the vicinity they will commence to gather and join in the chorus. A sort of social note of recognition sounds like 'whüze, whüze,' given while moving about among the trees and shrubbery, and one of their common call notes sounds like 'creak, creak.'

"No bird is more destructive of the smaller species building open, uncealed nests than this Jay. I have seen one alight on a limb near a nest, eat the eggs that it contained, and, not satisfied with this, give the nest a down and inward stroke with its bill, ripping it open. They are especially destructive to the nests of the Black-chinned and Anna's Hummingbirds and the Ground Tit. They also become altogether too familiar about the poultry houses, and will eat the eggs as fast as the hens lay them. As soon as they hear a hen cackle after laying, three or four of these birds go to the spot at once. Even the chicken house affords no protection against these robbers, if they can find a way of entering it; shooting is equally ineffectual, for they are too numerous. They destroy vast quantities of fruit in apple, peach, pear, and plum orchards, as well as many smaller fruits. Shooting them by hundreds and hanging their carcasses in the fruit trees as scarecrows is of no avail; they do not know enough to be frightened at anything. I have tried to poison them, but never saw a dead one except when shot. They also destroy a great deal of young wheat when first sown, until it is 2 or 3 inches high. They pull it out of the ground and eat the soft, swelled grains; after the stalks begin to grow they will not molest it. I have never seen one Jay eat another's eggs, but they possibly may do so on rare occasions. One not familiar with these birds can not realize the amount of mischief they can do, and they are increasing in numbers from year to year."

I have received similar testimony from other correspondents in California, and there seems to be no doubt that the California Jay is one of the greatest nuisances wherever it is abundant, which seems to be the case throughout the greater portion of the State, and no one has anything good to say of it. In its general habits it resembles the Blue Jay considerably; it is an equally good mimic, but it is less shy and wary and far more familiar and impertinent. Its flight is slow and laborious, accomplished by considerable flapping of the wings, and only resorted to for short distances and through necessity. On the ground and in bushes it is quick and agile in all its movements, hopping about from limb to limb, and darting through the thickest undergrowth with great ease. It is omnivorous, and away from the settlements its food consists principally of acorns, the seeds of the nut pine, insects of various kinds, wild fruits, and berries.

Mr. R. H. Beck, of Berryessa, California, writes me that he has seen them with lizards in their claws. In the winter they mostly congregate in the shrubbery found along the creek bottoms, and among the oak groves in the lower foothills, leaving the more isolated localities in the mountain gorges where many of them spend the summers. In southern California nidification commences occasionally in the beginning of April, and correspondingly later northward, where it is generally at its height during the first two weeks in May. I think it not improbable that in favorable localities two broods are occasionally raised in a season. Mr. F. Stephens took a set of four eggs near Owen's Lake, Inyo County, California, in which incubation had just commenced, as late as June 8, 1891, and in a locality where these birds were not likely to have been previously disturbed.

The nests are usually found on brush-covered hillsides or in creek bottoms, placed in low bushes and thickets, such as blackberry, poison oak, wild gooseberry, currant, hazel, hawthorn, and scrub-oak bushes, or in osage-orange hedges; occasionally in a small piñon pine or a bushy young fir, and quite frequently on a horizontal limb of an oak, varying in height from 3 to 30 feet from the ground. In the majority of cases the nests are located near water, but sometimes one may be found fully a mile distant. Externally they are composed of a platform of interlaced twigs, mixed occasionally with moss, wheat stubble, and dry grass; on this the nest proper is placed, which consists of a lining of fine roots, sometimes mixed with horsehair. No mud enters into the composition of their nests. One now before me, taken by Mr. F. Stephens, as mentioned above, measures 9 inches in outer diameter by $3\frac{1}{2}$ inches in height; the inner cup is 4 inches in diameter by 2 inches deep. Outwardly it is composed of small twigs of sagebrush, and the lining consists entirely of fine roots; it is compactly built and well constructed. The nests are usually well concealed, and the birds are close sitters, sometimes remaining on the nests until almost touched.

The number of eggs to a set varies from three to six, sets of four or five being most common; the male assists in the construction of the nest, and to some extent in incubation, which lasts about sixteen days. The young are able to leave the nest in about eighteen days, and follow the parents for some time.

Late in the summer they congregate in straggling flocks in localities where they find subsistence most abundant, as near orchards and among the oak groves in the foothills, which at that time supply them with the bulk of their food; here they are constantly at war with the Californian Woodpeckers, whom they try to rob of their carefully hoarded winter stores whenever an opportunity presents itself, while in the winter they come around the farmhouses and steal whatever eatables they can.

The ground color of the egg of the California Jay is very variable, ranging from deep sea green to pea and sage green, and again to dull olive and vinaceous buff. The eggs with a greenish ground color usually have markings of a dark bottle-green tint, mixed sometimes with different shades of sage green. The eggs having a buffy ground color are spotted, blotched, and speckled with different shades of ferruginous, cinnamon, rufous, and occasionally lavender. The markings are generally scattered over the entire surface of the egg, and are usually heavier about the larger end, but nowhere so profuse as to hide the ground color. These markings vary considerably in size; some are irregular in shape, others are quite even in size throughout, and occasionally they are fine and profuse, resembling in style of markings the well-known eggs of some of the Thrashers (*Harporynchus*). A few instances are known where unspotted eggs have been found. The shell is close grained and lusterless. In shape the eggs are mostly ovate; a few are elongate ovate.

The average measurement of seventy-six eggs in the United States National Museum collection is 27.82 by 20.62 millimetres, or about 1.10 by 0.81 inches. The largest egg of the series measures 30.78 by 21.84 millimetres, or 1.21 by 0.86 inches; the smallest, 24.89 by 19.30 millimetres, or 0.98 by 0.76 inch.

The type specimens figured are selected to show some of the different styles of coloration found among the eggs of this species, which are subject to a great deal of variation. No. 20369 (Pl. 5, Fig. 15), Bendire collection, taken near Nicasio, Marin County, California, April 31, 1878, represents one of the rarer color phases; No. 20846 (Pl. 5, Fig. 16), presented by Dr. James C. Merrill, United States Army, from a set of three eggs taken near Santa Cruz, California, April 23, 1877, shows another rather rare style of coloration; No. 24331 (Pl. 5, Fig. 17), received from the United States Department of Agriculture, from a set of four eggs, taken by Mr. F. Stephens, near Owen's Lake, Inyo County, California, on June 8, 1891, shows one of the commoner types; and No. 26950 (Pl. 5, Fig. 18), from an incomplete set of two eggs, taken by Mr. J. Van Denburgh, near Los Gatos, California, on May 16, 1889, shows a rather light-colored and nearly immaculate specimen.

148. *Aphelocoma californica hypoleuca* RIDGWAY.

XANTUS'S JAY.

Aphelocoma californica hypoleuca RIDGWAY, Manual of North American Birds, 1887, 356.
(B 437, part; C 236b, part; R 293, part; C 356, part; U 481a.)

GEOGRAPHICAL RANGE: Southern Lower California; north to about latitude 28°.

Very little is yet known about the life history of Xantus's Jay (a somewhat smaller bird than the preceding), which inhabits the southern half of the California Peninsula. Mr. Xantus, in whose honor this subspecies is named, found it a common resident in the vicinity of Cape St. Lucas, and states that its habits are much the same as those of the California Jay. They were also met with by Mr. L. Belding in the same region. Mr. Walter E. Bryant states: "I saw a few among the mangroves of Magdalena Island, and along the mangrove-bordered *estero* to San Jorge, and northward as far as latitude 28°." Regarding its nesting habits, he says: "A single nest of this new variety was found by myself a few miles southward of San Ignacio, on April 12, 1889. The nest was built about 3 metres high, in a green acacia, near the trail. The female was sitting and did not fly until preparations for climbing the tree had commenced. The nest was in quite an exposed situation, among scant twigs on a horizontal branch. It is composed of small, loosely laid dry twigs, and is a shallow receptacle, lined with fiber and horsehair. The eggs, three in number (set No. 899, collection of W. E. Bryant), contained small embryos. They are more finely spotted than some similar Jays' eggs, with shell spots of pale lilac gray and surface spots of pale olive green. The ground color is dull glaucous green. They measure 27.5 by 20.5, 27.5 by 21, and 27 by 21 millimetres"¹(or about 1.08 by 0.79, 1.08 by 0.83, and 1.06 by 0.83 inches).

I have been unable to learn anything further about the general habits of this subspecies; they are undoubtedly very similar to those of the California Jay.

Two eggs in the United States National Museum collection, taken by Mr. Xantus in the vicinity of Cape St. Lucas, in the spring of 1860, have a pale bluish-green ground color and are spotted over the entire surface with small markings of grayish brown, which are slightly heavier about the larger end of the egg. The eggs are ovate in shape and slightly glossy, and are evidently out of different nests. One measures 28.70 by 21.34 millimetres, or 1.13 by 0.84 inches; the other, 24.13 by 17.78 millimetres, or 0.95 by 0.70 inch.

The type specimen, No. 5174 (not figured), in the United States National Museum collection, was taken as above stated, and closely resembles an average egg of the California Jay.

¹ Proceedings of the California Academy of Sciences, 2d series, Vol. II, 1889, pp. 24 and 293.

149. *Aphelocoma californica obscura* ANTHONY.

BELDING'S JAY.

Aphelocoma californica obscura ANTHONY, Proceedings California Academy of Sciences, 2d series, II, October 11, 1889, 75.

(B —, C —, R —, C —, U 481b.)

GEOGRAPHICAL RANGE: San Pedro Martir Mountains, Lower California.

Belding's Jay, another subspecies of the California Jay, was recently described by Mr. A. W. Anthony, in the "Proceedings of the California Academy of Sciences" (2d series, Vol. II, October 11, 1889, pp. 73, 75). The type, which differs from *Aphelocoma californica* in its much darker colors and weaker feet, was obtained by him at Valladores, Lower California, September 8, 1888. In describing the region where his specimens were collected, he says: "About 150 miles south of the United States boundary, and midway between the Pacific Ocean and the Gulf of California, lies a high range of mountains which is marked upon the later maps of the peninsula as 'San Pedro Martir.' The region embraces a series of small ranges which rise from an elevated mesa having a mean elevation of about 8,000 feet and an extent of 60 by 20 miles. In these mountains are born the only streams that this part of the peninsula affords, and an abundance of pine timber is found throughout the region. Many of the ranges on the eastern side of the San Pedro Martir rise to an elevation of 11,000 feet, or even in one or two places to 12,500 (?) feet.

"Rising as the region does from the dry, barren hills of the lower country to an elevation higher than any other on the peninsula or in southern California, and presenting in its alpine vegetation and clear mountain streams features so different from the dry manzanita and sage-covered hills of the surrounding country, it is not unnatural to suppose that its animal life would be found to differ in some respects from that of the surrounding hills, etc."

In these regions Belding's Jay is found, and it is to be hoped that Mr. Anthony will be able to pay another visit to these mountains and explore them more thoroughly. Nothing is yet known regarding the nesting habits and eggs of this well-marked subspecies.

150. *Aphelocoma insularis* HENSHAW.

SANTA CRUZ JAY.

Aphelocoma insularis HENSHAW, Auk, III, October, 1886, 452.

(B —, C —, R —, C —, U 481.1.)

GEOGRAPHICAL RANGE: Santa Cruz Island, southern California.

The Santa Cruz Jay, which seems to be confined to the similarly named island, one of the innermost of the Santa Barbara group, about 23 miles distant from the California coast, was first discovered by Mr. H. W. Henshaw, in June,

1875, and described by him in "The Auk" (Vol. III, 1886, pp. 452, 453). It is a larger bird than the California Jay, and generally deeper colored. Very little is yet known about the life history of this species.

Mr. Eli Whitney Blake, jr., who visited this island on two occasions in 1887, states: "It is by far the commonest land bird of the island, and familiar to the verge of impudence. General habits like those of its near relatives on the mainland. Several nests which must have belonged to this species were placed in trees or bushes, between 6 and 30 feet from the ground. They exhibited no marked peculiarity of construction."¹

The eggs of this species, as far as I am aware, remain still to be described. There is probably but little difference between them and those of the California Jay.

151. *Aphelocoma sieberii arizonæ* RIDGWAY.

ARIZONA JAY.

Cyanocitta ultramarina var. *arizonæ* RIDGWAY, Bulletin Essex Institute, V, December, 1873, 199.

Aphelocoma sieberii arizonæ RIDGWAY, Proceedings U. S. National Museum, VIII, 1885, 355.

(B 440, C 237, R 295, C 357, U 482.)

GEOGRAPHICAL RANGE: Southern New Mexico and Arizona; south into Sonora and Chihuahua, Mexico.

The Arizona Jay is a common resident throughout the oak belt of southern Arizona and New Mexico which generally fringes the foothills of the mountains and ranges well up among the pines. In suitable localities these Jays are very abundant, especially so along the slopes of the Santa Catalina, Huachuca, Santa Rita, and Chiricahua mountains, in southern Arizona, and the ranges adjacent to the Rio Mimbres, in southern New Mexico. They are rarely seen any distance out on the arid plains; but after the breeding season is over small flocks are sometimes met with among the shrubbery of the few water courses, several miles away from their regular habitat. I repeatedly noticed several of these Jays along the Rillito Creek, near my camp, in 1872-'73, in the early spring and up to the middle of May, evidently on a raid after eggs and the young of smaller birds, which breed in abundance here among the undergrowth in the creek bottoms. On such occasions they were very silent, and their presence was only betrayed by the scoldings they received from the numerous resident bird population. On their own heath they are as noisy as any of our Jays, and apparently far more sociable, a number of pairs frequently breeding in a small oak grove in close proximity to each other, in this respect resembling the Piñon Jay, which also breeds in colonies at times. They do not unite in as large flocks, however, but move about more in small family parties, from half a dozen to

¹ The Auk, Vol. IV, 1887, p. 329.

twenty or thirty, in fact it is rare to see one alone. They are exceedingly restless, constantly on the move, prying into this or that, spending a good portion of their time on the ground, now hopping on a low limb, and the next minute down again, twitching their tails almost constantly. Their call notes are harsh and far-reaching, and are somewhat similar to those of the California Jay. They are as great robbers of the eggs and young of smaller birds as the former. The other birds inhabiting the same surroundings and building open nests must certainly have a hard time of it in rearing their young.

Their food consists of grasshoppers and insects of various kinds, animal matter when obtainable, wild fruits, seeds, and especially acorns. The latter probably form the bulk of their subsistence throughout the greater portion of the year. In the Suharita Pass, between the Santa Catalina and the Rincon mountains, near Tucson, Arizona, I noticed about twenty feeding on the fig-like fruit of the suahara, of which, like many other birds, they seemed to be very fond. Their flight appears to me to be far less laborious than that of the California Jay. It reminds me of that of some of our Raptores, rising now high in the air, partly closing their wings, and then darting suddenly down, then up again, and repeating these movements for some time. In southern Arizona the mating season begins about the end of February, and nidification follows soon after.

According to observations made by Mr. W. E. D. Scott, the Arizona Jay sometimes does not commence laying until fully two weeks after the nest has been completed, and again builds an additional nest close to the first, without occupying it. A nest is described by him as follows: "It was built in an oak sapling, about 10 feet from the ground, and is composed of dry rootlets laid very loosely in concentric rings, and with little or no attempt at weaving together. There is nothing like a lining, and the walls of the structure have an average thickness of about three-quarters of an inch. The interior diameter is 5 inches, and the greatest interior depth is $1\frac{3}{4}$ inches. The whole fabric recalls to mind a rather deep saucer. The nest was not built in a crotch, but where several small branches and twigs leave the large branch ($1\frac{1}{2}$ inches in diameter) which forms the main support. All the other nests I have seen resemble this one so closely that this description will answer for them."¹

A nest of this species, taken by Lieut. H. C. Benson, United States Army, on April 6, 1887, differs somewhat from those described by Mr. Scott. It is composed outwardly of small sticks and twigs; next comes a layer of fine rootlets, well woven together—this mass is alone over half an inch in thickness—and, finally, the inner nest is lined with a liberal supply of horsehair. It is well constructed, and measures about 10 inches across externally by 4 inches in depth; the inner diameter is about $4\frac{1}{2}$ by 2 inches in depth.

The nest and eggs of the Arizona Jay were first discovered by Mr. F. Stephens, near Fort Bayard, New Mexico, on April 29, 1876, and since then he has found it breeding in the Chiricahua and Santa Rita mountains; he considers it a foothill bird, not going far into the pines and not appearing on the plains.

¹The Auk, Vol. III, 1886, p. 81.

Lieutenant Benson, United States Army, found them breeding abundantly in the vicinity of Fort Huachuca, Arizona, during April and May, 1887. All of the nests taken by him, some thirty in number, were placed in oaks, from 12 to 30 feet from the ground, usually about 15 feet high, being generally only moderately concealed. His first set was found on April 6, and the majority were taken in this month; his latest record is May 10. The breeding season seems to be at its height during the latter half of April. But one brood appears to be raised in a season, and incubation lasts about sixteen days. The number of eggs to a set varies from four to seven; sets of four eggs are more frequently found than larger ones, and in thirty-four sets now before me there is only one of six and one of seven eggs. These differ from all the known eggs of this family found within the United States by being unspotted. They are glaucous green in color, and the majority are much more glossy than Jays' eggs generally are.

In the fine series of specimens, one hundred and thirty-six in number, nearly all collected by Lieutenant Benson, I can not find a single one that shows any trace of markings; they are all perfectly immaculate. The shell is smooth and compact; in shape they vary from ovate to elongate ovate.

The average measurement of this series is 30.28 by 22.26 millimetres, or about 1.19 by 0.88 inches. The largest egg measures 35.05 by 22.10 millimetres, or 1.38 by 0.87 inches; the smallest 26.92 by 21.59 millimetres, or 1.06 by 0.85 inches.

The type specimens, Nos. 22969 and 22997 (Pl. 5, Figs. 19 and 20), from sets of four and five eggs, respectively, were collected by Lieut. H. C. Benson, Fourth Cavalry, United States Army, near Fort Huachuca, Arizona, on April 15, and 27, 1887, and represent average types of this species.

152. *Aphelocoma cyanotis* RIDGWAY.

BLUE-EARED JAY.

Aphelocoma cyanotis RIDGWAY, Manual of North American Birds, 1887, 357.

(B —, C —, R —, C —, U 480.1.)

GEOGRAPHICAL RANGE: Eastern Mexico, from the States of Puebla, Mexico, and San Luis Potosi north to western Texas.

The Blue-eared Jay, a recent addition to our fauna, was first described by Mr. Robert Ridgway from a specimen now in the United States National Museum collection, taken by Mr. John Taylor, in September, 1836, in Mexico (exact locality not known), and it was only rediscovered a few years ago by the late Mr. P. L. Jouy, near Charcas, Puebla, Mexico, which remains as yet the most southern point of its known range. Since then the United States Department of Agriculture has received a number of specimens from different localities in the States of Mexico and San Luis Potosi, where it appears to be common, and also three from Paisano, Brewster County, Texas, a station on the Southern

Pacific Railroad, and the highest point (5,082 feet) on this road.¹ These specimens were taken on July 14, 18, and 21, 1890, and it is probable that this species breeds there. The mountain slopes here, forming a southern extension of the Guadalupe range, are covered in places with scrub oak and juniper groves, and these form the home of this Jay.

Dr. A. K. Fisher, in his note in "The Auk" already mentioned, referring to these Texas specimens, says: "Through the kindness of Mr. Ridgway they were compared with the type of *Aphelocoma cyanotis* in the United States National Museum collection, and were found to be referable to that species. They differ from *cyanotis* in averaging a little smaller, and in having a more slender bill, thus grading toward *woodhousei*, as might be expected, where the range of that bird is approached. In coloration, however, allowing for the slight difference due in the wearing of the plumage, they are identical with *cyanotis*, and in no way resemble *woodhousei*."

Its nests and eggs still remain unknown, as far as I am aware, but they are not likely to differ very much from those of the other members of this genus. The mountains and hilly regions of that part of Texas where this Jay is found have been but very indifferently explored, and undoubtedly other species new to our fauna will be found here when this section becomes better known from an ornithological standpoint.²

153. *Xanthoura luxuosa* (LESSON).

GREEN JAY.

Garrulus luxuosus LESSON, Revue Zoologique, 1839, 100.

Xanthoura luxuosa BONAPARTE, Conspectus Avium, I, 1850, 380.

(B 442, C 238, R 296, C 358, U 483.)

GEOGRAPHICAL RANGE: Lower Rio Grande Valley, in Texas; south through eastern Mexico to Vera Cruz and Puebla.

The range of the Green or Rio Grande Jay is a very restricted one in the United States, including only the lower Rio Grande Valley, northwest to about Rio Grande City, Texas.

Mr. D. B. Burrows, writing me from Roma, Texas, says: "These birds are common a few miles below Rio Grande City, but are never seen above this place."

¹The Auk, Vol. XI, p. 327.

²Since this was written Mr. H. P. Attwater, of San Antonio, Texas, to whom I am indebted for a great deal of valuable information relating to Texas birds, has kindly sent me a skin of a Jay, a female, shot near the head waters of the Nueces River, in Edwards County, Texas, on December 1, 1894, which, on careful comparison with a fair series of skins of the Blue-eared Jay now in the U. S. National Museum, as well as in the collection of birds in the U. S. Department of Agriculture, does not appear to me to be referable to this species, although it resembles it rather closely. I am inclined to believe that on the whole it comes nearer to *Aphelocoma sumichrasti* Ridgway, and may prove to be a new race of this species. In the meantime I have received some additional material, consisting of an adult male and 3 adult females, as well as a young female, only a few days from the nest. One of the adults was taken on March 18, the remaining ones on May 8, 1895. Mr. Attwater obtained these species near the source of Johnson Creek, about 20 miles northwest of Kerrville, Kerr County, Texas, where this species is not uncommon and breeds. Although these skins are in rather worn plumage and in poor condition, they appear to be referable to this species instead of *Aphelocoma sumichrasti*, as was at first surmised. This extends its range somewhat farther eastward.

The "Pajaro verde," as this bird is called by the Spanish-speaking population of this region, is a common resident throughout the heavier-timbered river bottoms and the chaparral bordering the Rio Grande, especially in the vicinity of Hidalgo and Lomita, and breeds wherever found.

Dr. James C. Merrill, United States Army, in speaking of this species, says: "The Rio Grande Jay is a common resident about Fort Brown and higher up the river, but does not seem to pass much into the interior of Texas. It is a noisy and gaudy species, soon making its presence known by its harsh cries or by its green and yellow plumage, seen for a moment as it moves about. Though at times shy, it is often very tame and bold, entering tents and taking food off of plates or from the kitchen, whenever a good opportunity offers. Large numbers are caught by the soldiers in traps baited with corn, but the plumage is their only attraction as a cage bird."¹

There is little or no difference in the general habits of the Green Jay from those of the other members of this family.

Mr. George B. Sennett says: "Of all the birds on the lower Rio Grande, this is the most mischievous, robbing and despoiling other birds' nests without mercy."²

Very little has as yet been recorded regarding the food of this Jay, excepting what I have already mentioned, but it is presumable that it does not vary much from that of our better-known species. The nesting season commences early in April and lasts through May. The first nest and eggs brought to the attention of naturalists, as far as I am aware, are those taken by Dr. Merrill on May 27, 1876, near Edinburg (now Hidalgo), Texas, about 70 miles above Fort Brown, on the Rio Grande, and recorded in the "Bulletin of the Nuttall Ornithological Club, 1876" (Vol. I, p. 89). This is described as follows: "It was placed on the horizontal branch of a waican tree, about 25 feet from the ground, and was built of twigs and rootlets. The cavity was slight, and the entire structure so thin that the eggs could be seen through the bottom. They were three in number and quite fresh."

Two nests now in the United States National Museum collection resemble the above, and are frailer than any other Jays' nests I have ever seen. They do not always build such slight structures, however. Mr. Sennett describes one as follows: "The nest of the Jay was some 9 feet from the ground, on the outer branches of a small tree, and composed wholly of sticks and fine twigs. The sticks were so full of thorns that when they were crossed about among the living branches more firmness was given to the nest than usual, and by cutting off the branches I could readily take it entire. The outside diameter is 9 inches one way by 8 the other; its depth is 4 inches; inside it is 3½ inches wide by 2 inches deep."³

The nests are generally placed in dense thickets and well hidden among the branches at heights varying usually from 5 to 10 feet from the ground, and

¹ Proceedings of the U. S. National Museum, Vol. I, 1878, p. 136.

² Bulletin of the U. S. Geological Survey, 1879, Vol. V, No. 3, p. 400.

³ U. S. Geological Survey, 1878, Vol. IV, No. 1, p. 30.

rarely in large trees. They are frequently found in retama, anacahuita, brasil, and hackberry bushes or trees. The outer nest consists usually of a slight platform of small thorny twigs and branches, sparingly lined with fine rootlets, small pieces of a wire-like vine, bits of moss, and occasionally dry grass and leaves. The Green Jay apparently does not use mud in the construction of its nest. The earliest breeding record I have is April 3, and the latest is May 26. The breeding season is at its height during the last week in April and the first week in May. It is probable that two broods are sometimes raised in a season. The length of incubation is not likely to vary more than a day or so from that of our better-known Jays.

The number of eggs laid by this species is from three to five; sets of four are most often found. The prevailing ground color of these eggs is grayish white, occasionally pale greenish white or buff color. They are profusely spotted and blotched—but never heavily enough to hide the ground color—with different shades of brown, gray, and lavender; these markings are generally more abundant about the larger end of the egg. The shell is close grained, moderately strong, and shows little or no gloss. Their shape is mostly ovate, and sometimes short ovate.

The average measurement of seventy eggs in the United States National Museum collection is 27.31 by 20.43 millimetres, or about 1.08 by 0.80 inches. The largest egg of the series measures 30.78 by 21.84 millimetres, or 1.21 by 0.86 inches; the smallest, 24.89 by 19.30 millimetres, or 0.98 by 0.76 inch.

The type specimen, No. 20843 (Pl. 3, Fig. 15), from a set of four eggs, was taken by Dr. James C. Merrill, United States Army, near Fort Brown, Texas, on April 23, 1877, and represents one of the commoner types. Nos. 26359 and 26362 (Pl. 3, Figs. 16 and 17), Ralph collection, both from sets of four, taken near Brownsville, Texas, on April 3 and May 9, 1893, respectively, show different and less common styles of marking.

154. *Perisoreus canadensis* LINNÆUS.

CANADA JAY.

Corvus canadensis LINNÆUS, Systema Naturæ, ed. 12, I, 1766, 158.

Perisoreus canadensis BONAPARTE, Geographical and Comparative List, 1838, 27.

(B 443, C 239, R 297, C 359, U 484.)

GEOGRAPHICAL RANGE: From northern New England, northern New York, northern Michigan, and Minnesota, northward through the Dominion of Canada to Hudson Bay and the interior of British North America, east of the Rocky Mountains; casually south to northern Massachusetts (Berkshire County).

The Canada Jay is locally known as "Whisky Jack" and "Whisky John," a corruption of its Indian name, "Wiss-ka-chon" or "Wis-ka-tjon;" it is also sometimes called "Moose Bird," "Hudson Bay Bird," "Caribou Bird," "Meat Bird," "Grease Bird," "Camp Robber," and "Venison Hawk," by the guides and lumbermen of the Adirondack wilderness; it is only found in the more northern

parts of the United States, where it is a resident and breeds. Within our borders it is most common in northern Maine and northern Minnesota, inhabiting the extensive pine and tamarack forests found there. In the Adirondacks, in northern New York, it occurs only in the wilder portions, and it is not uncommon in sections of the White and Green Mountains, in northern New Hampshire and Vermont. It occasionally straggles a little farther south than the points mentioned, but such occurrences are rather rare. Northward it ranges through the Dominion of Canada to the western shores of Hudson Bay, to Fort Churchill, and thence throughout the interior of the fur countries to the limit of timber within the Arctic Circle, east of the Rocky Mountains.

No bird is better known to the lumbermen, trappers, and hunters along our northern border than the Canada Jay, which is a constant attendant at their camps, and affords them no little amusement during the lonely hours spent in the woods. To one not familiar with these birds it is astonishing how tame they become.

Mr. Manly Hardy writes: "The Canada Jay is a constant resident of northern Maine, but in some seasons they are far more abundant than in others, being usually found in companies of from three to ten. They are the boldest of all our birds, except the Chickadee (*Parus atricapillus*), and in cool impudence far surpass all others. They will enter tents, and often alight on the bow of a canoe where the paddle at every stroke comes within 18 inches of them. I know of nothing which can be eaten that they will not take, and I had one steal all my candles, pulling them out endwise one by one from a piece of birch bark they were rolled in, and another pecked a large hole in a cake of castile soap. A duck which I had picked and laid down for a few minutes had the entire breast eaten out by one or more of these birds. I have seen one alight in the middle of my canoe and peck away at the carcass of a beaver I had skinned. They often spoil deer saddles by pecking into them near the kidneys. They do great damage to the trappers by stealing the bait from traps set for martens and minks and by eating trapped game; they will spoil a marten in a short time. They will sit quietly and see you build a log trap and bait it, and then, almost before your back is turned, you hear their hateful 'ca-ca-ca' as they glide down and peer into it. They will work steadily carrying off meat and hiding it. I have thrown out pieces and watched one to see how much he would carry off. He flew across a wide stream and in a short time looked as bloody as a butcher from carrying large pieces; but his patience held out longer than mine. I think one would work as long as Mark Twain's California Jay did trying to fill a miner's cabin with acorns through a knot hole in the roof. They eat insects of different kinds, and I have found carrion beetles in their crops; they also eat the fungi or mushrooms growing on stumps, using these largely when other food is scarce. They are fond of the berries of the mountain ash, and, in fact, few things come amiss; and I believe they do not possess a single good quality excepting industry. They breed early in March. While on a trip to the famous Ripogenus Falls, in June, 1891, I saw many young Canada Jays; these were

slate black, about the color of a Catbird, and my guide informed me that he saw the young flying about as early as April 10."

A correspondent of "The American Field" (in Vol. 34, July 19, 1890, p. 54), under the nom de plume of "Agamak," writes about the Canada Jay as follows: "He will eat anything from soap to plug tobacco. His appetite and capacity to stow away food is beyond belief. One day we had a dozen large salmon trout hung up to dry, but being absent from camp for a few hours we returned to find four Whisky Jacks had totally annihilated our fish. They would fly off with pieces half as large as themselves and in a few minutes return for more. It is not possible they could have eaten it all. I have fed them small bits till they could hardly fly enough to get in a tree. Our pork, soap, tobacco, and other provisions were unsafe in their sight and reach. Our Indians used to say: 'Him eat moccasins, fur cap, matches, anytink.' I once snared two of them and put them in a cage made of birch bark and tamarack roots. Half an hour after their capture they would eat greedily from my hand. He is well named 'Whisky Jack,' as I never saw a more insane, drunken-acting creature in my life."

The apparent absence of all fear of man, its extreme familiarity, and the many cunning and amusing traits of our Canada Jay must certainly commend him to any lover of nature and go far toward balancing accounts for the damage he sometimes does through theft, while his absence from the silent pine, fir, and spruce forests and tamarack swamps in which he makes his home would certainly be felt, and by none more than the hardy trapper or hunter, whose only companion he is on many lonely tramps through the deep winter snows, where for days at a time not another living creature is seen.

Mr. E. A. Samuels, in his *Birds of New England* (p. 367), says: "I have had numerous opportunities for observing its habits, and I can positively affirm that it is equally rapacious and destructive with the Blue Jay, which it resembles in motions and cry. I once knew of a single pair of the birds destroying the young in four nests of the common Snowbird (*Junco hyemalis*) in a single day."

Its flight is slow and laborious, and only accomplished with a great deal of flapping of the wings, while it moves on the ground and in trees with an expertness equal to that of our better-known Blue Jay. It utters a number of peculiar notes and sounds which are utterly impossible of reproduction on paper.

The nesting season begins early, long before the snow has disappeared, and therefore comparatively little is yet known about its breeding habits.

Mr. R. MacFarlane found several nests and eggs of the Canada Jay near Anderson River Fort, British North America, during the first week in May, and reports them tolerably numerous in the wooded country, even to its northern and eastern limits; but none were observed by him in the barrens west or east of Horton River, nor on the Arctic coast. The nests found by him were placed in spruce or tamarack trees, often in the middle of a swamp, on branches, close to the trunks, and well concealed from view, and at heights of 9 or 10 feet.

The Canada Jay, like the other members of this family, is silent and retiring during the breeding season, and is then seldom seen or heard. In the

more southern portion of its range nidification begins in March, and somewhat later farther north. The nest is a bulky affair. One now before me, sent by Mr. MacFarlane, and collected near the Hudson Bay Post, at Pelican Narrows, in latitude $50^{\circ} 30'$, contained four eggs when taken, in March, 1891. It was placed in a small spruce tree, near the trunk, about 9 feet from the ground. It is composed of small twigs, plant fibers, willow bark, and quite a mass of the down and catkins of the cottonwood or aspen, this material constituting fully one-half of the nest. The inner cup is lined with finer material of the same kind, and Jays' feathers, which are easily recognized by their fluffy appearance. The nest is about 8 inches wide by 4 inches deep; the inner cavity being about 3 inches in width by $2\frac{1}{2}$ inches in depth. A nest taken near Ashland, Aroostook County, Maine, is composed externally of bits of rotten wood, mixed with tree moss, plant fibers, and catkins, and is lined with similar but finer materials. This is a symmetrical, well-built structure, much neater than the former, and measures 7 inches in outer diameter by 4 inches deep; the cavity is 3 inches wide by 2 inches deep.

The number of eggs laid, as far as known to me, is three or four, although sets of five may sometimes be found. Their ground color is generally pale gray, more rarely pearl gray. They are profusely flecked and spotted over the entire surface with different shades of brown, slate gray, and lavender. Their shape is ovate; the shell is smooth, close grained, and somewhat glossy.

The average measurement of eighteen eggs in the United States National Museum collection is 29.38 by 20.91 millimetres, or about 1.16 by 0.82 inches. The largest egg measures 30.78 by 22.35 millimetres, or 1.21 by 0.88 inches; the smallest, 26.42 by 20.32 millimetres, or 1.04 by 0.80 inches.

The type specimens, Nos. 20376 and 20377 (Pl. 3, Figs. 18 and 19), both from sets of four eggs, Bendire collection, were taken in Colchester County, Nova Scotia, on April 2 and 4, 1884, and represent the different styles of markings found among the eggs of this species in the collection, as well as the variation in size.

155. *Perisoreus canadensis capitalis* BAIRD.

ROCKY MOUNTAIN JAY.

Perisoreus canadensis var. *capitalis* "BAIRD MS.," Ridgway, Bulletin Essex Institute, V, Nov., 1873, 193.

(B —, C 239b, R 297a, C 362, U. 484a.)

GEOGRAPHICAL RANGE: Rocky Mountain regions of the United States, from New Mexico and Arizona north into British North America; west to eastern Oregon and Idaho.

The Rocky Mountain or White-headed Jay is a common resident of all the higher ranges of the Rocky Mountain system in the United States, and occurs also in the White Mountains of Arizona, which form about the southern limit of

its range. It passes north into British North America and apparently beyond, but how far in that direction has not yet been determined. It is moderately common in suitable localities in Colorado, Wyoming, and Montana.

I first met with the Rocky Mountain Jay on October 31, 1875, while on a hunting trip, on the head waters of Bear Creek, a tributary of Silvies River, in the Blue Mountains, in Grant County, Oregon, at an altitude of about 6,500 feet. It appeared to be rather rare, only two specimens being observed. These were attracted by a deer which I had killed, and were feeding on the offal. I shot one of the birds, which is now in the United States National Museum collection. I believe this point marks about the western limits of its range, the somewhat smaller Oregon Jay being also found in the same mountains, not more than 10 miles west of this locality. I also saw a few of these birds in the Bitter Root Mountains, as well as in the Yellowstone National Park, in 1877, but had no opportunity then to observe them closely. Their general habits appear to be very similar to those of the Canada Jay. Dr. James C. Merrill, United States Army, met with it near Fort Sherman, Idaho, where it appears to be a somewhat irregular visitor within a few miles of this Pass.

Mr. Frank M. Drew, in his paper on the Birds of San Juan County, Colorado, in the "Nuttall Ornithological Club Bulletin" (Vol. VI, 1881, p. 140), speaking of this bird says: "Quite abundant, in summer ranging from 10,000 feet altitude to timber line. In autumn, when on his first tour of inspection around the house, he hops along in a curious sidelong manner, just like a school-girl in a slow hurry. White-headed, grave, and sedate, he seems a very paragon of propriety, and if you appear to be a suitable personage, he will be apt to give you a bit of advice. Becoming confidential, he sputters out a lot of nonsense in a manner which causes you to think him a veritable 'Whisky Jack;' yet, whenever he is disposed, a more bland, mind-his-own-business-appearing bird will be hard to find, as will also be many small articles around camp after one of his visits, for his whimsical brain has a great fancy for anything which may be valuable to you, but perfectly useless to him."

Very little is yet known about the nests and eggs of the Rocky Mountain Jay, and they are unrepresented in the United States National Museum collection. The late Dr. T. M. Brewer received both from Mr. Edwin Carter, of Breckenridge, Colorado, and describes them as follows:

"On April 2, 1879, Mr. Carter found the nest of the Rocky Mountain Jay near Breckenridge, Colorado, at an altitude of about 10,000 feet. The nest was placed on a horizontal branch of a pine tree, 3 feet from the trunk and 40 feet from the ground. It contained three eggs, apparently its full complement, which were slightly incubated. The nest, which is now before me as I write, is warmly, strongly, and compactly interwoven of various materials, of which the feathers and down of various kinds of birds constitute the characteristic ingredient. The nest measures 4 inches in external height and 7 in diameter. The cavity is 2 inches deep and 4 in diameter at the top. The external framework of the nest is a rude but strong interweaving of twigs and small

branches of pine, inclosing a closely impacted inner nest, composed of strongly blended materials, stems of grasses, hempen fibers of plants, bark, down, feathers, etc. The walls of the nest are 2 inches thick, and the inner nest is warm and soft.

"The measurements of the eggs before me are 1.19 by 0.86, 1.16 by 0.86, and 1.10 by 0.86 inches, (or 30.22 by 21.84, 29.46 by 21.84, and 27.94 by 21.84 millimetres). Their ground color is a grayish white. In two the markings are all grouped around the larger end, the residue of the surface being nearly unmarked. In one the markings are well distributed over the entire egg, but larger and confluent at the rounded end. The markings are larger, more confluent, and not so distinct and separate as in the eggs of *Perisoreus canadensis*, and are of a distinct shade of brown. While there is an absence of slate and lilac, and while the markings are all of one color, there is a tinge of purple shading them all, and the blotches vary greatly, in the depth and intensity of the shading, from very light to a very deep color. The parent accompanying the nest and eggs is a female."¹

These eggs are now in the museum at Cambridge, Massachusetts, where I have had the opportunity of examining them. As as they do not materially differ from those of the preceding species, and as they are in a poor state of preservation, I have not figured any.

156. *Perisoreus canadensis fumifrons* RIDGWAY.

ALASKAN JAY.

Perisoreus canadensis fumifrons RIDGWAY, Proceedings U. S. National Museum, III, March 27, 1880, 5.

(B —, C —, R 297b, C 360, U 484b.)

GEOGRAPHICAL RANGE: Alaska, excepting the southern coast districts.

This subspecies is a resident and breeds wherever found. According to Mr. L. M. Turner, the Alaskan or Smoky-fronted Jay is known as the "Sójah" to the Russian-speaking element of Alaska; he writes: "It rarely occurs in the vicinity of St. Michaels. Two specimens were obtained at the Redoubt during my three and a half years' stay there. Along the Yukon River it is abundant and a permanent resident. The most of my specimens were obtained from Fort Yukon, Nulato, and Anvick, on the Yukon River."²

Mr. E. W. Nelson, in speaking of the geographical range of the Alaskan Jay, says: "Many specimens from the Upper Yukon are nearly typical *Perisoreus canadensis*, but the present form gradually replaced it lower down this stream until, near Nulato to the coast, birds approaching the *canadensis* style are almost unknown. The present form is the only *Perisoreus* found throughout the Sitkan and Kadiak region, thence north along the region bordering the Bering Sea coast, and up the wooded interior.

¹Bulletin of the Nuttall Ornithological Club, Vol. IV, 1879, pp. 239, 240.

²Contributions to the Natural History of Alaska, No. II, 1886, p. 167.

“Two nests were brought me from the mouth of the Tanana River by Mr. François Mercier, who obtained them April 1, 1880, after considerable persuasion and an offer of a large reward in flour to the natives during a time of scarcity. By these means he succeeded in getting a native to search for the nests of this bird. The young fellow returned in a few hours with two nests, each containing half-grown young. Walking into the house, he told the trader to take the nests and birds at once, for he was sure some evil would result from his act, and taking his flour he hurried away before the birds and nests were examined. All the old crones and men of the vicinity prophesied that the weather would turn cold and that a very late spring would ensue as a result of this robbery. As chance would have it, the prophecies of the old soothsayers came true in a remarkable degree, and the spring was the coldest and most backward, by nearly a month, of any year since the Americans have had possession of the country. In the following spring (of 1881) I asked the same trader to try and get eggs of this bird by sending out natives earlier in the season. He complied, and offered still greater rewards than on the first occasion, but the natives could not be bribed to risk the visitation of the birds' anger, and the old people positively forbade any of the younger ones to have anything to do with the matter; therefore the attempt was abandoned. One point was gained, however, and that was the information how the natives found the nests so readily. They told the trader that these nests could always be easily found by examining the snow at the base of each bushy-topped spruce, and whenever a number of small dry twigs were found lying near together upon the snow under a tree there was a great probability of a Jay's nest being snugly esconced in the thick branches overhead.

“The two nests, now before me, are built of a matted mass of a cotton-like down of some plant; about the upper edge and in the cavity are pieces of rabbit fur, a few Horned Owl feathers, and fine strips of bark. The entire nest rests upon a horizontal branch nearly 2 inches in diameter, and a scanty number of small dead spruce twigs, 6 to 8 inches long, loosely woven into the structure, give it consistency and prevent it from being easily damaged. This nest is $4\frac{1}{2}$ inches high by 6 broad, with a cavity $2\frac{1}{2}$ inches deep by $3\frac{3}{4}$ inches across the top. The other nest was placed in the fork of a small branch less than half an inch in diameter, and rests on a rough platform of slender spruce twigs. The main part of the nest is made of the same cottony substance as is the first, and is also interwoven with twigs. Above this is a layer of fine, fibrous black moss, such as occurs on spruce trees. The inside of the cavity is slightly lined with fine grass. This nest measures 4 inches high by 6 inches broad, and the cavity 2 inches deep by $2\frac{3}{4}$ inches across the top.”¹

Mr. W. H. Dall, of the United States Coast Survey, also took a nest of this Jay near Nulato, with four half-grown young, on April 20, showing that these birds usually nest in March, notwithstanding the intense cold which occurs occasionally at this time of the year.

The eggs of this subspecies, as far as I am aware, still remain unknown, but they are not likely to differ much from those of the Canada Jay.

¹ Report upon Natural History Collections made in Alaska, No. III, 1887, p. 165.

157. *Perisoreus canadensis nigricapillus* RIDGWAY.

LABRADOR JAY.

Perisoreus canadensis nigricapillus RIDGWAY, Proceedings U. S. National Museum, V, 1882, 15.

(B —, C —, R —, C —, U 484c.)

GEOGRAPHICAL RANGE: Coast regions of Labrador and the timbered portions of the interior; north to Hudson Strait.

The Labrador Jay is a resident and breeds wherever found. For all the knowledge we possess of the life history of this Jay we are principally indebted to Mr. L. M. Turner, from whose copious manuscript notes on the "Birds of Labrador and Ungava" I extract the most interesting portions:

"This Jay is an abundant resident throughout the entire region wherever timber is to be found. I observed the bird at Rigolet, Davis Inlet, Georges River, Whale River, Fort Chimo, and far in the interior. At certain seasons it is more plentiful than at other times; after August it is very abundant until the next May, and is then very scarce until the following September. Over one hundred and thirty specimens were preserved, and among this number are birds of nearly every month of the year. The breeding season could not be determined with exactness, as it varies according to the exigencies of the weather. An adult female procured April 9, 1883, contained ova of various sizes, the larger ones measuring, respectively, 0.50, 0.44, and 0.33 inch in diameter; the largest ovum was apparently ready to descend into the oviduct. * * * The Indians assert that April is the month in which the Jays breed, and that only one brood is reared each year. Young birds as large and actually heavier than adults were obtained, fully feathered, from June 18 to 29. From May to September these Jays are almost silent; not a sound will be heard in patches of wood frequented by them, and as they certainly attempt to conceal themselves during this period, it is extremely difficult to obtain specimens, for they sit so quietly among the thick moss and branches of the trees that detection is only rarely possible. In October they assume their winter plumage and become livelier, uttering frequent whistles which sound exactly like those made by one boy who hails another; in fact, I have often mistaken the sound for that of a person whistling to attract my attention. Their power of mimicry is also good; the notes of the American Rough-legged Hawk, for instance, are well imitated, as are also the clucking sounds of the Catbird when it enters a thicket.

"During the winter time these birds obtain a scanty supply of food, and during excessively severe periods they frequently are so reduced that a specimen will no more than equal the weight of a Redpoll (*Acanthis linaria*). They are omnivorous; nothing comes amiss. I obtained a specimen which had the dried bracts of a spruce cone in its beak. This mass was quite large and covered with a viscid saliva. Inspection proved that this substance contained no larvæ which could have tempted the bird to swallow the mass through inability to tear

it apart. They are persistent visitors to the tents of camping parties, and they appear to have the faculty of discriminating between the tents of natives, who (the Indians more especially than the Eskimo) wage war on every Whisky Jack that comes in sight.

"I was once encamped a few miles above the rapids, some 35 miles from Fort Chimo, and thought to take a nap while the other members of the party watched for caribou to cross the river. My attention was directed to a noise within the tent, and I perceived a Whisky Jack perched on a pile of meat. I carefully arose, and although the bird was within 2 yards of me it fearlessly continued to peck at the fatty portions exposed. I then went to the meat and cut off small portions and fed the bird from my hand, and in less than five minutes it was resting on one hand and feeding from the other. I was surprised at its familiarity, and continued to feed it until it could swallow no more. I then cut off a large piece, placed it in the beak of the bird, and drove it outside, when it flew to a neighboring tree, so heavily freighted that it could scarcely sustain flight.

"The Indians will not be tempted to procure the eggs of this bird under any circumstances. They believe that if a person sees the eggs in the nest, and especially if he counts them, some great misfortune will befall him. Repeated inquiry among them elicited the statement that they had never seen the eggs and knew nothing about the number laid.

"Its general habits are similar to those of the other members of this family. It is one of the greatest nuisances the trappers have to contend against, and one of these assured me that he had taken fifteen of these birds from a line of less than forty traps in a single day, and with good reason he called this bird a 'wolverine with feathers on.'

"I have never found the Labrador Jays in flocks, although several may be in the neighborhood, and on a single occasion only I saw five perched in one tree. If a gun be fired it is certain to cause a Jay to investigate it, and I think experience has taught him that food may be procured at such times."

Since the above was written I have been fortunate enough to examine a set of these eggs, taken in Labrador, in about latitude $57^{\circ} 30' N$. Mr. Jewell D. Sornborger, of Cambridge, Massachusetts, while on a visit to that region in the summer of 1892, obtained a set of five, and generously presented three of these through the writer to the United States National Museum collection, and subsequently also deposited the remaining two. They resemble the eggs of *Perisoreus canadensis* in color and in the general style of markings, but the latter are, as a rule, coarser and larger, and the eggs are more pointed. Three eggs in this set may be called pointed ovate in shape; the other two approach an ovate pyriform. They measure 30.22 by 21.08, 29.97 by 21.34, 29.97 by 21.34, 29.72 by 21.08, and 29.21 by 21.59 millimetres, or 1.19 by 0.83, 1.18 by 0.84, 1.18 by 0.84, 1.17 by 0.83, and 1.15 by 0.85 inches.

The type specimen, No. 26560 (Pl. 3, Fig. 20), represents an average-colored egg of this subspecies.

158. *Perisoreus obscurus* (RIDGWAY).

OREGON JAY.

Perisoreus canadensis var. *obscurus* RIDGWAY, Bulletin Essex Institute, November, 1873, 194.

Perisoreus obscurus SHARPE, British Museum Catalogue of Birds, III, 1877, 105.

(B —, C 239a, R 298, C 361, U 485.)

GEOGRAPHICAL RANGE: From the higher mountainous regions of northern California north through Oregon and Washington into British Columbia.

The Oregon Jay, better known throughout its range as "Meat Hawk," "Camp Robber," and "Venison Bird," is a constant resident of the higher mountains of northern California, Oregon, Washington, and a considerable portion of British Columbia, and breeds wherever found. I met with it first on the summit of the Blue Mountains, between Canyon City and Camp Harney, Oregon, on June 12, 1877, at an altitude of about 6,500 feet. I was escorting an army paymaster, and after a laborious climb to the top of the steep mountain at the foot of which nestles the little mining town from which we started, I stopped for luncheon and to rest the animals. While so engaged I heard several whistles in a large pine close by, and these were answered from other directions. Shortly after I saw one of these birds in a little fir a few feet from where I was sitting at lunch. I threw him some scraps of bread and meat, and he was by no means slow in accepting the invitation to help himself. A few minutes later three others made their appearance and fed among our party with the utmost unconcern, and almost allowed themselves to be touched. Here they are found only in the highest portions of the mountains, which attain an altitude of about 7,000 feet. I did not see any in the neighborhood of Camp Harney.

While changing station from Fort Walla Walla, Washington, to Fort Klamath, Oregon, on June 12, 1882, I met a brood of young birds, accompanied by both parents, in a grove of small pines near the banks of the Des Chutes River, Oregon, which had evidently left their nest only a day or two previously, and my men caught two alive. They were of a dark slate-black color, quite unlike the adults. A few miles north of Fort Klamath, on the Crater Lake Mountain, they were very common and I had no difficulty in obtaining all the specimens I wanted. While some of their notes are not as melodious as they might be, the majority are certainly quite pleasing to the ear, and I consider this species a very fair songster. I have listened to them frequently, and have been surprised to find so much musical ability. Like the other members of the genus *Perisoreus*, the Oregon Jay is a great thief and nothing edible comes amiss; its general habits also are similar. It is a slightly smaller and darker colored bird than the Canada Jay.

Mr. A. W. Anthony found this species a common winter resident in Washington County, Oregon, and says: "'Fearless' is an appropriate term to use in relation to this bird; it seems utterly devoid of fear. While dressing deer in the thick timber I have been almost covered with Jays flying down from the neigh-

boring trees. They would settle on my back, head, or shoulders, tugging and pulling at each loose shred of my coat until one would think that their only object was to help me in all ways possible. At such times their only note is a low, plaintive cry."¹

The nests and eggs of the Oregon Jay were first discovered by Mr. Anthony, and he has generously given both, as well as other equally rare specimens, to the United States National Museum. He writes as follows relative to the finding of the nest: "The birds were discovered building on March 4, 1885; one of them was seen clinging to the side of a dead stub, about 75 feet from the ground. He was tearing out bits of moss, which did not seem to suit, for they were dropped again as fast as gathered; but at last, finding some to his fancy, he flew off and I saw him go into a thick fir and disappear. I could as yet see nothing of a nest, but as both birds were flying in with sticks, moss, etc., I was sure one was being built there. Both birds worked hard, were very silent, and did not come very near the ground, getting nearly all of their building material from the tree tops, I think. On the 16th I again visited the place, and with the aid of a field glass discovered the nest, which was to all appearances complete, but the birds were not seen. On the 21st I took a boy with me to climb the tree, and found the nest finished, but no eggs. On March 31 we visited it again and found the set complete and the female at home. She stayed on the eggs until the climber put his hand out for her, when she darted off with a low cry and was shot by me. The eggs, five in number, were but slightly incubated; the nest was placed about 85 feet from the ground and 10 feet from the top of the tree; it was built close to the trunk, and was very well hidden."

This nest, now before me, is compactly built and rather symmetrical, measuring $7\frac{1}{2}$ inches in outer diameter by $4\frac{1}{2}$ inches deep; the inner diameter is 3 inches by $2\frac{1}{2}$ inches deep. Externally it is composed of fine twigs, dry grass, tree moss, and plant fibers, all well interlaced, and the inner cup is composed exclusively of fine, dark-looking tree moss.

The number of eggs to a set varies from four to five. Incubation begins sometimes as early as the latter part of March, and again as late as the first week in May.

Mr. C. W. Swallow writes me that he took a set of four eggs of this species in Clatsop County, Oregon, on May 8. This nest was placed in a small hemlock, about 10 feet from the ground. I believe as a rule they nest in high, bushy firs. I saw a pair of these birds evidently feeding young, in a very large fir tree, near the summit of the Cascade Mountains, on June 9, 1883, while en route from Linkville to Jacksonville, Oregon, but could not see the nest, which must have been fully 60 feet from the ground. But one brood is reared in a season. The eggs are pearl gray or light greenish gray in ground color, spotted and flecked with smoke and lavender gray, and these markings are pretty evenly distributed over the entire egg. In shape they are ovate; the shell is smooth, close grained, and only moderately glossy.

¹The Auk, Vol. III, 1886, p. 167.

They measure 26.67 by 20.07, 26.67 by 20.07, 26.67 by 19.81, 26.42 by 20.07, and 25.40 by 20.32 millimetres, or 1.05 by 0.79, 1.05 by 0.79, 1.05 by 0.78, 1.04 by 0.79, and 1 by 0.80 inches.

The type specimen, No. 22449 (Pl. 3, Fig. 21), from a set of five eggs, was taken by Mr. A. W. Anthony, near Beaverton, Oregon, on March 31, 1885, and represents an average egg of the set.

159. *Corvus corax sinuatus* (WAGLER).

AMERICAN RAVEN.

Corvus sinuatus WAGLER, Isis, 1829, 748.

Corvus corax sinuatus RIDGWAY, Proceedings U. S. National Museum, VIII, 1885, 355.
(B 423, 424, C 226, R 280, C 338, U 486.)

GEOGRAPHICAL RANGE: From British Columbia, the southern parts of the Dominion of Canada and the United States, mostly west of the Mississippi Valley, south through Mexico to Guatemala. Local and much rarer in the eastern United States; principally in mountainous regions; south to northern South Carolina, northern Georgia, and northern Alabama.

Our Ravens have recently been separated into two races; but from the information I have been able to obtain it is questionable if the alleged differences of the two forms will prove constant and marked enough to warrant this distinction. There is not at present sufficient material available for examination to determine this conclusively. I will leave this to abler ornithologists to decide, and will follow the adopted nomenclature of the American Ornithologists' Union for the present, including, however, the Ravens found in the eastern United States in this race.

The American Raven is more generally distributed throughout the western parts of the United States than in the eastern portions of its range, where it is only found locally, and principally in the more mountainous regions from New England and northern New York to northern South Carolina, and in the thinly inhabited and heavily timbered sections of some of our Northern and Middle States. It seems to make little difference to these birds how desolate the country which they inhabit may be, as long as it furnishes sufficient food to sustain life, and they are not hard to please in such matters. One is liable to meet with them singly or in pairs, and occasionally in considerable numbers, along the cliffs of the seashore, and on the adjacent islands of the Pacific coast, from Washington south to Lower California, as well as in the mountains and arid plains of the interior, even in the hottest and most barren wastes of the Colorado Desert, as the Death Valley region, and through all the States and Territories west of the Rocky Mountains. In the eastern parts of its range it is most commonly found among the numerous islands off the coast of Maine, in the Adirondack wilderness in northern New York, and especially in the extensive mountain regions of North Carolina, where it appears to be as common as in many localities in the West.

The American Raven is usually a resident wherever found, but is likely to wander considerable distances in winter, congregating in localities where food is most easily obtained. While as a rule, it is nowhere abundant, it is generally distributed over a large area, and in certain localities it may be called fairly common. I have met with them at every Post at which I have been stationed in the West, but nowhere so abundantly as at Camp Harney, Oregon, where I had excellent opportunities to observe them.

They are stately and rather sedate-looking birds, remain mated through life, and are seemingly very much attached to each other, but apparently more unsocial to others of their kind. On the ground their movements are deliberate and dignified; their walk is graceful and seldom varied with hurried hops or jumps. They appear to still better advantage on the wing, especially in winter and early spring, when pairs may be frequently seen playing with each other, performing extraordinary feats in the air, such as somersaults, trying to fly on their backs, etc. At this season they seem to enjoy life most and give vent to their usually not very exuberant spirits by a series of low chuckling and gurgling notes, evidently indifferent efforts at singing.

Their ordinary call note is a loud "craack-craak," varied sometimes by a deep, grunting "koerr-koerr," and again by a clucking, a sort of self-satisfied sound, difficult to reproduce on paper; in fact, they utter a variety of notes when at ease and undisturbed, among others a metallic-sounding "klunk," which seems to cost them considerable effort. In places where they are not molested they become reasonably tame, and I have seen Ravens occasionally alight in my yard and feed among the chickens, a thing I have never seen Crows do. Their larger size when compared with the latter bird is not so noticeable while on the wing, but on the ground, when feeding among its smaller relatives, it is very perceptible.

Although a good deal has been written reflecting on the Raven, my personal observations compel me to consider it as a rather orderly member of a somewhat disreputable family group. Among various misdeeds it is charged with killing young lambs, chickens, and turkeys, as well as with destroying the eggs and young of different species of wild fowl; and while this is true to some extent, yet where these birds can get a reasonable amount of food from other sources they rarely disturb domestic animals of any sort. I have more than once seen a Raven feeding among my poultry, apparently on friendly terms with both young and old; they never molested any to my knowledge; nor have I ever heard complaints of shepherds that their lambs were troubled, much less killed, by them. Their food consists principally of carrion, dead fish, and frogs, varied with insects of different kinds, including grasshoppers and the large black crickets so abundant at some seasons in the West; they also eat worms, mussels, snails, small rodents, including young rabbits, as well as refuse from the kitchen and slaughterhouse. While the American Raven appears to be a well-behaved bird in some localities, this is by no means the case everywhere. Mr. Charles A. Allen, writing me on this subject from Nicasio, California, says: "In the

interior of California the Raven destroys many young chickens and turkeys around the ranches. In the spring months I have frequently seen one of these birds flying overhead with a young fowl or an egg in its bill. While making off with one of the latter this is very noticeable, as the egg shows off so plainly against the shiny black of its plumage. Inland it nests in the highest redwood or fir trees, and nearly always in such as are practically inaccessible to the average collector, and on the seacoast on the face of the highest cliffs, where they prey on the eggs and young of the Gulls and Cormorants nesting there."

In the winter it was no unusual sight at Camp Harney, Oregon, to see a dozen or more Ravens and perhaps twice as many Crows searching through the fresh piles of manure which were daily carted out of the cavalry stables and dumped some distance below the Post.

The Raven is usually one of the shyest and most suspicious of birds, one of the most difficult to bring to bag, and here only have I been able to approach them at all closely; in other localities where I have observed them they remained very shy and cautious, as is their usual custom.

Camp Harney is situated on the southern slope of the Blue Mountains of Oregon, attaining here a height of between 6,000 and 7,000 feet, the foothills and canyons leading into them abounding in perpendicular cliffs varying from 30 to 50 feet in height, and furnishing many excellent nesting sites for these birds, at least six pairs breeding regularly within a radius of 3 miles and perhaps a dozen more within 8 miles of the Post. Notwithstanding their comparative abundance, I rarely managed to obtain more than three full sets of eggs in a season during the four years I was stationed there; this may have been due to their extraordinary cunning and the irregularity of their nesting, which undoubtedly in some cases was done purposely. Should a pair of these birds realize that their nest had been discovered, although finished and ready to receive the eggs, they will abandon it, sometimes for several weeks, and apparently leave the locality, only to return and begin housekeeping when presumably all chance of further disturbance has passed. I have lost more than one set of eggs in this way. In one case a pair of these birds, whose nesting site was in plain view from my window, not over 500 yards distant (the nest itself, however, could not be seen), deceived me so completely that their young were half grown before I even discovered that this particular site was again occupied, the parent birds keeping, so far as noticed, entirely out of sight during the day, probably feeding the young only early in the morning and possibly during the night, and I only discovered them by accident while passing along near the top of the cliff very early one morning, being attracted by the cawing of the young.

Out of some twenty nests examined only one was placed in a tree. It was in a good-sized dead willow, 20 feet from the ground, on an island in Sylvies River, Oregon, and easily reached; it contained five fresh eggs on April 13, 1875. The other nests were placed on cliffs, and, with few exceptions, in positions where they were comparatively secure. Usually the nest could not be seen from above, and it generally took several assistants and strong ropes to get near them, and

even then it was frequently impossible to reach the eggs without the aid of a long pole with a dipper attached to the end. A favorite site was a cliff with a southern exposure, where the nest was completely covered from above by a projecting rock. The nests found here were well constructed, and varied considerably in bulk, an average one measuring externally about 18 inches in width by 10 inches in depth. A mass of well-interlaced sticks, some of these very large, formed the groundwork; the sides were lined with and built up of somewhat finer material, and the inner cup of the nest, resembling in size and depth a large soup plate, was thickly quilted with a mass of cattle hair and sometimes the dry, fine inner bark of cottonwood. This inner lining was frequently an inch thick, and made a warm, cosy home for the young. They looked clean, but were offensive in odor, and when the nest was occupied the lining was always alive with fleas. In localities where sheep are abundant the inner lining of the nest consists principally of wool, and in mountainous regions of tree moss.

Nidification, in the vicinity of Camp Harney at least, usually begins in the first or second week in April, sometimes, however, in the latter part of March, and again not before the middle of May. I obtained a perfectly fresh set of five eggs as late as May 29, 1876, from a locality where none of these birds had been disturbed previously; it was apparently a first laying.

The American Raven becomes attached to a site when once chosen, and although its eggs or young may be taken for successive seasons, it will return and use the same nest from year to year. I have taken three sets of eggs (evidently laid by the same bird) from the same nest for successive years; they were readily recognizable by their large size and style of markings. Only one brood is raised in a season. Incubation lasts about three weeks, commencing when the set is completed, and I believe both sexes assist in this labor. When the female is sitting on the nest the male may frequently be seen perched on some small bush or a dead branch of a tree on the opposite side of the canyon from where the nest is situated, uttering an occasional "klunk-klunk" and keeping a sharp lookout. Should anyone approach in that direction, though some distance off, he will warn his mate, uttering a low alarm note while flying past the nest, when she will usually slip off and try to keep out of sight, while he endeavors to draw attention to himself, acting at the same time as utterly unconcerned as if he had no interest whatever in that particular locality.

The young are able to leave the nest about a month after they are hatched, and are cared for by both parents for some time thereafter. They disappeared shortly afterwards from the immediate vicinity of their nesting sites, and spent the summer months about the shores of Malheur Lake, in Harney Valley, where an abundance of suitable food, such as dead fish, could readily be procured.

The number of eggs laid to a set varies from five to seven, sets of five being most common and those of six not rare, while among those taken by me were two sets of seven each. These are deposited on alternate days, but sometimes, after a nest which contained one or two eggs only has been examined, no others may be added for a week or more, and then laying is resumed. The eggs vary in shape

from ovate to elongate and cylindrical ovate; the ground color is usually a pale pea green, less often a drab or greenish olive. They are usually profusely blotched and spotted with different shades of brown, lavender, and drab. In a number of specimens the markings are evenly distributed over the entire egg, in a few cases nearly hiding the ground color; in others they predominate at one of the ends, and an occasional egg is but slightly marked, showing the ground color clearly. One such light-colored egg is often found in sets otherwise heavily marked. The shell is strong and compact and shows little or no gloss. The markings in very rare instances approach the peculiar elongated style so characteristic of the eggs of the White-necked Raven.

The average measurement of fifty-four eggs in the United States National Museum collection, all but two taken by myself, is 49.53 by 32.76 millimetres, or 1.95 by 1.29 inches. The largest egg of the series measures 60.45 by 37.84 millimetres, or 2.38 by 1.49 inches; the smallest, 41.15 by 31.50 millimetres, or 1.62 by 1.24 inches.

The type specimens, Nos. 20321 and 20325 (Pl. 4, Figs. 1 and 2), both from the Bendire collection, were taken by the writer near Camp Harney, Oregon, on April 22, 1876, and April 26, 1877, respectively, the first from a set of seven eggs, the last from a set of six, and these represent the two principal styles of coloration.

160. *Corvus corax principalis* RIDGWAY.

NORTHERN RAVEN.

Corvus corax principalis RIDGWAY, Manual North American Birds, 1887, 361.
(B 423, part; C 226, part; R 280, part; U 338, part; U 486a.)

GEOGRAPHICAL RANGE: Northern North America; from Greenland west to Alaska; south to British Columbia, northern Canada, and Labrador.

The Northern Raven is admitted to subspecific rank in our avifauna mainly on the claim of having a relatively larger or stouter bill and a shorter and stouter tarsus than the southern bird, with more of the upper portions of the tarsus concealed by the feathering of the lower parts of the thighs, the plumage generally being less lustrous. Ravens are well known to attain a great age, and instances are on record of these birds having lived over a hundred years; variations in plumage may therefore depend to some extent on age. These differences may possibly prove constant in the far north, to which for the present I prefer to restrict its range.

Its general habits and call notes resemble those of the American Raven; like it, it lives to a great extent on offal and refuse of any kind, and is generally most abundant in the immediate vicinity of Indian camps and settlements, which are mostly located on the seashore, or on the banks of the larger rivers in the interior, where these birds act as scavengers. This is especially the case on the Alaskan Peninsula and on the mainland, where hundreds of these birds may

frequently be seen in the vicinity of the salmon canning stations, where they live almost entirely on the offal of this fish. Clams also form a small portion of their food; these are said to be carried some distance in the air and then dropped on the rocks to break the shells. They also prey to no small extent on the young and the eggs of the different waterfowl which nest in suitable localities in these northern regions in countless numbers. If we could believe all that is told about these birds, they certainly appear to be far more mischievous and impudent than our American Raven. They are said to show an inordinate hatred for the Indian dogs, annoying and teasing them in various ways; for instance, should they find one asleep, they are said to drop a stick or stone upon the unsuspecting animal out of pure mischief.

Mr. B. J. Bretherton, writing me about those birds from Kadiak, Alsaka, says: "I saw a native dog one day with a bone which he vainly endeavored to eat. While so engaged he was espied by a Raven, who flew down and tried to scare the dog by loud cawing, in which he was shortly afterwards assisted by another, both birds sidling up to the dog's head until they were barely out of his reach. Just at this time a third Raven appeared on the scene and surveyed the situation from an adjacent fence, but soon flew down behind the dog and advanced until within reach of his tail, which he seized so roughly that the dog turned for an instant to snap at him, and at the same moment the bone was snatched away by one of the Ravens at his head."

Mr. Chase Littlejohn writes: "In Alaska their nests are usually placed on cliffs, and generally where they can obtain the eggs of other birds with which to feed their young. They are very cunning. I remember a pair which nested on a small island, within a stone's throw of the mainland, on which many Gulls also nested. By acting in concert the latter can defend most of their eggs against these birds, but whenever I visited this island to gather some for food the Ravens took advantage of such an opportunity. They would pick up an egg, carry it to the mainland, hide it carefully in the moss, return for another, and so on until there were no more eggs or until I had left the island, when the Gulls would protect what were left. While the Ravens were on the mainland the Gulls would not molest them, and so they could eat their plunder in peace. All eggs not eaten at once were carefully buried in the moss for future use."

While nesting sites on cliffs are generally resorted to along the seashore, in the interior of Alaska on the Yukon River, as well as on the numerous streams in British North America flowing into the Arctic Ocean, they resort to some extent to trees, probably on account of the absence of the cliffs. Mr. James Lockhart found a nest in a cleft of a poplar tree, 20 feet from the ground, at Fort Yukon, Alaska, on May 29, 1862; and Mr. R. MacFarlane took a set of five eggs from a nest placed near the top of a pine, 45 feet from the ground, near Anderson River Fort, British North America, on April 30, 1864.

Their nests resemble those of the American Raven in construction. Near the seashore they are usually lined with dry grasses, mosses, and seaweed, while hair of the musk ox and moose is often used when procurable in the interior.

Nidification begins occasionally in the latter part of April, more generally, however, about the middle of May, and sometimes not until the first week in June. From four to six eggs are usually laid to a set, and only one brood is raised in a season. The eggs do not differ materially from those of the American Raven, but as a rule they are broader, more of a short ovate, and consequently somewhat larger.

The average measurement of thirty-nine eggs in the United States National Museum collection is 49.53 by 34.54 millimetres, or 1.95 by 1.36 inches. The largest egg of the series measures 53.34 by 35.56 millimetres, or 2.10 by 1.40 inches; the smallest, 41.91 by 33.02 millimetres, or 1.65 by 1.30 inches.

The type specimen, No. 18425 (Pl. 4, Fig. 3), from a set of six eggs, was obtained from Governor Fenkel, near Godthaab, Greenland, in 1880, and represents one of the lighter-colored and less heavily marked specimens of the series; the majority resemble the types of the preceding species, and the three eggs figured would answer equally well for both forms.

161. *Corvus cryptoleucus* COUCH.

WHITE-NECKED RAVEN.

Corvus cryptoleucus COUCH, Proceedings Academy Natural Sciences, Philadelphia, April, 1854, 66.

(B 425, C 227, R 281, C 339, U 487.)

GEOGRAPHICAL RANGE: Southwestern United States; from southern California southeast through Arizona, New Mexico, and western Texas; south into northern Mexico; north to Oklahoma and western Indian Territory, Colorado, and western Kansas.

The White-necked Raven, a smaller and more slender-looking bird than the American Raven, is likewise a resident and breeds wherever found. Along our southern border these two species are frequently found together, and the marked difference in size between them is then very readily observed. This bird usually inhabits the plains and foothills, and is rarely found at a higher altitude than 5,500 feet. It is far more sociable in its habits than its larger relative, and in winter fair-sized flocks may be often seen together, especially in the vicinity of slaughterhouses. On the whole, they are not as shy as the Ravens, and are much more easily obtained. Quite a number of these birds were constant visitors at my camp at Rillito Creek, near Tucson, Arizona, in 1872 and 1873, on the lookout for scraps of food, and, as they were rarely molested, some of the bolder ones became quite tame.

I remember one bird in particular (easily recognized by a white patch on the throat caused by the loss of some feathers) which visited my kitchen tent regularly, and would pick up food thrown to him, coming frequently within 15 feet of the person throwing it. When the appetite of this bird was satisfied it would still pick up any morsel in sight and hide it in the vicinity, under a piece of bark or any other suitable object. One evening I noticed him hard at work only a

short distance from my tent, evidently digging up something. He pecked away vigorously, and then removed the loosened dirt by scraping with his beak from side to side, forming a kind of trench. I watched him for some time with a field glass, but could not imagine what he was trying to do, so I waited until he had finished, noting the locality carefully. He must have worked nearly half an hour before he flew away. Upon going to the place afterwards, which I thought I could locate at once, I had considerable difficulty in finding it; for everything had been replaced so carefully and naturally that it looked as if the ground had not been disturbed, excepting that a fresh chip of wood was placed on the spot, possibly to mark it. On investigating I found that the bird had made a trench in the hard soil fully $2\frac{1}{2}$ inches deep and about twice as long, in which he had buried a croquette made of canned salmon which the cook had thrown out. I removed this, carefully replaced the soil again as naturally as possible, and marked it with a chip, in the hope of being able to watch the bird when returning for it the next day; but I failed to see him, as he came too early, and, finding the caché robbed, he left in disgust. In its movements the White-necked Raven is not as graceful as the Raven, and its call notes also vary considerably from those of the latter; they are not so loud and penetrating nor so varied. A harsh "kwank, kwank" is most often heard while the bird is on the wing. Their flight is strong and often quite protracted. I have sometimes noticed them sailing in circles like Eagles or Hawks, especially in the early spring.

The food of the White-necked Raven consists principally of animal matter, like that of its larger relatives, and, judging from their numbers in certain localities, it seems to find subsistence readily enough in even the most barren regions. This bird is very common in portions of southern Arizona and New Mexico, as well as in western Texas, on the Staked Plains, and fairly so in Starr County, on the lower Rio Grande. Mr. W. E. Grover, of Galveston, writes me that several were shot on the prairie, on the west shore of Galveston Bay, in May, 1890. Some twenty of these birds were feeding among a flock of Red-winged Blackbirds at the time. Although no longer admitted in California lists, this species undoubtedly bred formerly in that State. A set of four eggs, now in the United States National Museum collection, taken by Mr. Xantus de Vesey, near Fort Tejon, California, on May 24, 1858, and entered as those of *Corvus carnivorus*, are unquestionably referable to this species.

Mr. William G. Smith, formerly of Loveland, Colorado, writes that the White-necked Raven breeds in the mountains there, and that he obtained two very young birds of this species, which he reared. One of these remained about the house for over a year, and was often visited by a pair of wild birds, which it would accompany sometimes, and stay away for a day or two, and finally it failed to return from one of these visits.

In suitable localities these birds breed in considerable numbers, for instance, in the vicinity of Fort Huachuca, Arizona, where Lieut. Harry C. Benson, Fourth Cavalry, United States Army, found over sixty of their nests in the season of 1887 and as many as thirteen sets of their eggs in a single day.

I found them rather rare breeders in the vicinity of Tucson, and only secured two of their nests, with eggs, in 1872. In southern Arizona they breed on the dry plains, covered with a scanty growth of mesquite, creosote bushes, yucca, and cactus, often miles from any water, more frequently than among the oaks of the foothills, where I looked principally for their nests. The favorite nesting sites in southern Arizona are low, scrubby mesquite trees, next oak, ash, desert willow, and yucca, and in southern and western Texas ebony and hackberry bushes are likewise not infrequently used for this purpose.

The nests are usually poorly constructed affairs, and are a trifle larger than those of our common Crow. Outwardly they are mainly composed of thorny twigs, while the inner parts are lined with cattle hair, rabbit fur, and frequently with pieces of rabbit skin, wool, dry cottonwood bark, grass, or tree moss, according to locality. This lining is frequently well quilted, and again apparently thrown in loose. They are extremely filthy and smell horribly. Old nests are repaired from year to year, some of them being, as Lieutenant Benson expresses it, seven or eight stories high, showing use for as many years. One of the nests found by me contained a number of rags. The nests are usually placed from 7 to 20 feet from the ground, rarely higher or lower. Considering the warm climate in which these birds are usually found, they nest very late. Out of sixty-six records the earliest is May 6. I took this set, containing only three eggs, in the foothills of the Santa Catalina Mountains, near Tucson, and incubation was about one-third advanced when the eggs were found. Only twelve other sets were recorded for May, and these usually in the latter part of the month. All the remaining sets were taken in June, and fully half of these after the middle of that month. Only one brood is raised in a season. Both sexes assist in incubation, which lasts about twenty-one days; this usually begins only after the set is completed; but young birds varying in size are sometimes found in the same nest. The number of eggs to a set varies from three to eight. In the series of eggs in the United States National Museum collection sets of six and four respectively predominate, and about one set in nine contains seven eggs. Mr. F. H. Fowler, of Fort Bowie, Arizona, writes me that he has found as many as eight eggs in one of their nests. I can only account for the remarkably late nesting of this species by the fact that insects and small reptiles, which probably furnish the larger portion of the food of these birds, are much more abundant in southern Arizona after the rainy season commences, about the last of May, than before, and these birds seemingly understand this and act accordingly.

The eggs of the White-necked Raven are, in nearly every instance, readily distinguishable from those of the other species of the *Corvinæ* found in North America, and this is due to the characteristic style of their markings. The ground color varies from pale green to grayish green, and only very rarely to a light bluish green. Two distinct styles of markings are found among these eggs, the principal but usually not the most notable one consisting of a mass of longitudinal streaks and blotches of different shades of lilac, lavender gray, and drab, running from pole to pole of the egg, and these are again more or less hidden

and partly obliterated by heavier and more regularly defined spots and blotches of different shades of brown. In not a few sets these lighter and more subdued shades are wanting, and are replaced by a more conspicuous brown; but almost all of the eggs show the peculiar longitudinal streaks and hair lines so prominently characteristic of the eggs of the genus *Myiarchus*. Besides the more regularly shaped markings common to the balance of the eggs of our *Corvinæ*, they are on an average also decidedly lighter colored, and a few eggs are almost unspotted. Scarcely any two sets are exactly alike. The shell is strong and compact. In shape they are mostly ovate; a few are elliptical and elongate ovate. They vary considerably in size, and for so large a bird some of the eggs are rather small.

The average measurement of two hundred and eighty-eight eggs in the United States National Museum collection is 44.20 by 30.22 millimetres, or 1.74 by 1.19 inches. The largest egg of the series measures 48.77 by 33.78 millimetres, or 1.92 by 1.33 inches; the smallest, 38.61 by 27.68 millimetres, or 1.52 by 1.09 inches.

The type specimens, No. 23104 (Pl. 4, Figs. 4 and 5), from a set of seven eggs, taken June 4; No. 23124 (Pl. 4, Fig. 6), from a set of four eggs, taken June 18; and No. 23094 (Pl. 4, Fig. 7), also from a set of seven eggs, taken June 17, 1887, were all collected by First Lieut. Harry C. Benson, Fourth Cavalry, United States Army, near Fort Huachuca, Arizona, and represent some of the different styles of markings found among the eggs of this species.

162. *Corvus americanus* AUDUBON.

AMERICAN CROW.

Corvus americanus AUDUBON, Ornithological Biography, II, 1834, 317.
(B 426, C 228, R 282, C 340, U 488.)

GEOGRAPHICAL RANGE: Continent of North America, excepting extreme Arctic regions and Florida in summer; south to northern Mexico.

The American or Common Crow, one of the best-known birds of our avifauna, is widely but somewhat irregularly distributed over a large portion of the North American continent. While somewhat rare in the more northern parts of its range, and possibly entirely absent in certain sections, notably so throughout the greater portion of Labrador and the regions adjoining Hudson Bay, it is nevertheless found in other localities at much higher latitudes, and is known to breed even within the Arctic Circle. Mr. R. MacFarlane obtained two sets of its eggs on the lower Anderson River, in about latitude 68° 35' N. One set of five eggs was taken on May 5, 1866, and contained large embryos when found, an unusually early breeding record for that region.

In some of our Western States and Territories it is also rare in certain sections, especially so in southern Arizona, where the White-necked Raven replaces this species to a great extent. However, what it lacks in numbers in some localities is

more than made up by its abundance in others, especially in our Eastern States and the Mississippi Valley generally. I have always held that our western Crows constituted a good subspecies and still believe so, but nevertheless follow the nomenclature of the American Ornithologists' Union. While our western birds vary considerably in size, I think comparative measurements of a number of specimens taken from different localities west of the Rocky Mountains will show that they average smaller, and I find the same to be the case with a large series of the eggs. I am also of the opinion that their call notes differ to some extent, but may be mistaken in this. Their plumage is more or less variable, and is less glossy than that of eastern birds, especially during the breeding season. The western Crows, in some sections at least, seem also to be more sociable; at Fort Lapwai, Idaho, for instance, I have occasionally found them breeding in what might be called small colonies, and this was not due to scarcity of timber for nesting purposes; in fact, I once saw here three occupied nests in a single small birch tree, where a number of good-sized cottonwood trees were to be found close by and equally suitable. Such a degree of sociability I have never observed anywhere among the eastern Crows during the nesting season; but it seems also to be unusual in the West, as I noticed it nowhere else.

Some of these western birds are also said to nest occasionally on the ground, a mode of nidification seemingly entirely at variance with the habits of the eastern Crows. Such an instance is recorded by Mr. E. H. Forbush in "Forest and Stream," April 4, 1889, in an article entitled "Five Days a Savage," where he reports finding a crow's nest, containing three young, on the ground on a small barren island in the Gulf of Georgia, British Columbia, which, however, may have been one of *Corvus caurinus*, the Northwest Crow. Again, among a collection of eggs sent to the United States National Museum by Mr. R. MacFarlane, made in the vicinity of Fort St. James, British Columbia, is a set of four unmistakable Crow's eggs, brought in by an Indian for those of Franklin's Grouse, and taken on May 2, 1889, from a nest placed on the ground, under the spreading limbs of a small spruce bush.

In the United States the Crow is a regular resident south of latitude 42°, but not a few winter in suitable localities at points considerably farther north, while on the Pacific Coast they are resident throughout the year. In the late fall all the Crows in a certain section congregate and select some suitable piece of woods, generally at no great distance from some good-sized stream, where they roost in companies, often many thousands in number. From these roosts they scatter regularly every morning over the surrounding country in search of food, undoubtedly covering a radius of many miles in their daily flights, and return again in the evening, in small, scattering bodies, to their regular rendezvous. They may be seen coming in from all points of the compass, the return flight often beginning a couple of hours before the last stragglers arrive. These roosts are probably formed more from sociability than for mutual protection, as the Crow has little to fear from other enemies than man.

Throughout the Eastern States and the Mississippi River Valley generally the Crows are extremely shy and difficult to approach at all times, while in city

parks they seem to know that they will not be shot at, and here one finds them frequently not nearly so cautious. In other sections, especially on the Pacific Coast, where they are not much molested, they are more familiar and comparatively tame, allowing a person to approach them closely, both while feeding on the ground and when perched in trees. Their cunning in evading the farmer's shotgun is only too well known, and many amusing stories are told about these birds in this connection.

Opinions differ greatly as to the economic value of the Crow, and even with the most careful research it can not be accurately determined. While there is no doubt that these birds do considerable damage at times to the growing crops, and especially to Indian corn, and that they destroy the young and eggs of some of our insect-eating birds, on the other hand it is equally certain that they do much good, and it is almost safe to assert that the harm done by them in a general way is pretty nearly, if not fully, compensated for by the good they do in the destruction of numerous noxious insects of all kinds and field mice, as most of their food is obtained on the ground. While I can not enter into details as to their food as fully as these birds perhaps deserve, in justice to them I can say that from examinations made by the United States Department of Agriculture of a large number of stomachs, and covering every month in the year, the results obtained show that at least two-thirds of the food of nestlings consists of animal matter, and that this kind of food also exceeds the vegetable matter consumed by adults during the spring and summer months, while in the late fall and winter the reverse is the case. Indian corn seems to be the staple vegetable food of the Crow in winter, and it is more than probable that a considerable portion of this is of no especial economic value, and is picked up in the field after the crop has been harvested. Wheat, oats, barley, rye, and buckwheat are also eaten by them, but to a much less extent, while acorns, chestnuts, beechnuts, the berries of the poison oak or ivy (*Rhus*), the flowering dogwood (*Cornus florida*), sour gum (*Nyssa*), the cedar, and a number of smaller seeds and different kinds of wild and cultivated fruits also enter into their bill of fare.

During the spring, summer, and fall months insects of all kinds, the seventeen-year locust (*Cicada*), May beetles (*Lachnosterna*), June beetles (*Allorhina*), and especially their larvæ, the well-known white grubs so injurious to all kinds of vegetation, grasshoppers, crickets, cutworms, and angleworms, even carrion-beetles, spiders and their eggs, field mice, snakes, frogs, salamanders, lizards, small turtles, fish, snails, crawfish and other small crustaceans, carrion, and offal generally—in fact, anything washed up by the tides or found along the shores of our larger rivers—constitute the bulk of their food. In the West, where occasionally armies of the large wingless cricket (*Anabes simplex*) and hosts of locusts devour every green blade on their line of march, the Crows destroy enormous numbers of these pests; like them, they seem to be always hungry and able to find room for just one more, and although generally in poor condition throughout the greater part of the year, in such localities they soon wax fat, and they do an immense amount of good, which is rarely taken into consideration, however, by the average farmer, who sees in the Crow an enemy at all times.

Mr. Manly Hardy writes me: "I have often seen Crows, near low tide, dive from a pier, striking the water as a Swallow does, and rise with something shining in their bills. I have seen this many times in Maine, and a friend tells me that he has been near enough to see that they had seized small fish. While waiting for a train I saw one dive in this way and take up some large, white substance; he carried it across the stream and left it on the railroad track; I crossed and found it to be a large bunch of cotton waste; as it was after the time for nesting, he must have mistaken it for food, and finding his mistake abandoned it. Some seasons they destroy quantities of seed potatoes by digging them up soon after planting; they also take new potatoes from the hills, and I have seen them pick beans from the pods at Great Deer Island, Maine. This could not have been for want of food, as an abundance of shellfish could be procured in the vicinity. I have also known a Crow to come into the limits of Bangor, Maine, in a thickly settled neighborhood, and take well-grown robins out of a nest built under the eaves of a house; it would come early in the morning, swooping down like a Hawk, making no noise, taking its victim without alighting. In order to obtain the meat of the great sea snails and whelks along the seashore here, they carry them high into the air and let them fall on the ledges beneath. While in Colorado, in 1891, I saw Crows on the top of Pike's Peak, on October 8, at an altitude of 14,147 feet."

It is well known that Crows are exceedingly intelligent, and quite a variety of their cunning performances have found their way into print, a few of which I mention.

A gentleman from Brighton, New York, under date of September 4, 1882, writes: "The droll antics of a pet Crow, owned by a neighbor, have amused me not a little, and the following exhibition of its intelligence seems deserving of record. A few days since 'Jim' was given some dry crusts of bread for his breakfast. After making several unsuccessful attempts to devour them, he seized one in his beak and hopped upon a chair, then upon the sink, and, finding a basin containing some water, dipped the crust into the water until softened, then removing it, ate it, and jumped down and got the other piece, and, after softening it as before, finished his meal."¹

Mr. Abbott M. Frazar states: "A tame Crow (*Corvus americanus*) in my possession has repeatedly amused me by the novel method he adopts to rid himself of parasites. For this purpose he deliberately takes his stand upon an ant mound and permits the ants to crawl over him and carry away the troublesome vermin. The operation seems mutually agreeable to all parties, the ants quickly seizing upon the parasites and bearing them away. I have also noticed the same habit in another tame Crow that I formerly had in my possession."²

Dr. Ralph tells me that he knew of a case where a pet Crow was teased by letting it peck at a pocketknife and then rapidly withdrawing it. The bird shortly became tired of this, and the next time, instead of trying to catch the

¹ Forest and Stream, September 7, 1882.

² Bulletin of the Nuttall Ornithological Club, Vol. I, 1876, p. 76.

knife as before, it bit the person's hand so hard that it caused him to drop the knife, which was quickly picked up by the bird, who then flew away with it. This little incident plainly shows its reasoning powers.

In the mixed woods near Holland Patent, New York, a species of *Helix* is very abundant, and one finds many empty shells from which the animal has been extracted by these birds. Apparently nothing seems to afford more satisfaction to a Crow than to be able to harass every Owl it may see, as well as the larger Hawks, but occasionally it pays rather dearly for such sport.

Mr. J. W. Preston, of Baxter, Iowa, writes me about these birds as follows: "One winter morning, while on my way to a country school, where I was teaching at the time, a Crow was worrying a Red-tailed Hawk, and as it darted at the fleeing bird it made a quick grasp, turning completely over in mid-air, but succeeded in catching the Crow, which it bore down to the ground dead.

"I have seen a Crow carry a piece of meat quite a long distance in its claws. The Crow is terribly destructive to young birds and eggs in the nest. It is painful to see their havoc and hear the pitiful cries of the parent birds. One such occurrence noted was that of a pair of Red-eyed Vireos following close after the Crow, scolding and crying as their nest and young birds were being carried across the field, a choice morsel for young Crows.

"The loss occasioned to farmers from their habit of carrying away eggs is very considerable. I remember a brood of fourteen plump young chicks that were all devoured by the daring fellows. I had allowed them to nest and rear their young in a grove 10 rods from the door, and thus they repaid the kindness. I have seen them feed from the raw back of a live hog which had accidentally been left out of shelter and had been somewhat frozen.

"In a woods near our home was a famous Crow's roost. During the winter of 1891-92 the number was estimated at forty thousand birds. About sunset they came in small flocks and straggling companies from long distances away, gathering into great flocks on pastures and meadows, so thick as to look like plowed land. In the dusk of evening the trees on a whole hillside appeared like a dark bank, so vast was the rookery. We visited this resort often after dark to hear the varied sounds that ever arose from the restless, scolding birds, whose voices were easily heard a mile distant. A whistle or shout was cause for alarm, and the entire flock would rise up like a dark cloud, and the beating of wings sounded like a strong wind. Sometimes they would fly a mile off, and, returning, circle about and begin settling much as Chimney Swallows do, striking each other and the branches with their wings; the din of quarreling for places, changing, and flying up and down was terrible; some cawed loudly, others muffled the tones; some imitated the cry of a child, and some the squawk of a chicken; but the combined effect was a vast, weird wail that reverberated through the forest and died away on the night winds."

In the West I have never seen any very large Crow roosts in winter, although the birds were quite common at Fort Lapwai, Idaho; Camp Harney, Oregon, and in the Walla Walla Valley, Washington, at all seasons. In California they are also common in the larger river bottoms, but on the whole are rather irregularly

distributed, while in southern Arizona and New Mexico they are rare. Mr. F. Stephens writes me that he saw Crows on Big Sandy Creek, 60 miles east of Fort Mojave, Arizona, in February, 1880, and that he shot a specimen on the Mimbres River, southern New Mexico, in April, 1876. I shot a male near Tucson, Arizona, on April 13, 1872, but saw very few others, and failed to find it breeding there.

The longevity of the Crow has been generally admitted, and I had always thought they were extremely hardy; but this seems to be questionable. During January, 1893, large numbers perished in the vicinity of Washington, District of Columbia, from having the cornea frozen during the cold weather occurring about that time, which resulted in blindness and starvation. Mr. Robert Ridgway, of the Smithsonian Institution, showed me a number he had picked up, and assured me that hundreds could be seen laying around in the vicinity, while many others were partly blind.¹

Dr. M. G. Ellzey, writing from Cumberland, Maryland, reports the same occurrence in that vicinity, and believes many thousands perished in this manner.²

I have only once seen a wild bird partly blind. This was in 1881, while stationed at Fort Walla Walla, Washington. A Western Horned Owl was brought to me alive by one of my men, who, while out hunting, saw it and tried to get within reach to shoot it. It heard him approaching, and in attempting to fly away was stunned by striking a tree. It fell down, and before it recovered he captured it. One of its eyes was in the same condition as those of the Washington Crows, and the other was likewise affected, but it was still able to see a little out of it. The bird was in poor condition, but not near starvation. I kept it for many weeks, and it soon became remarkably tame and gentle, a very unusual thing for birds of this species, and finally I sent it alive to a friend at Johns Hopkins University, Baltimore, Maryland, for examination, and it reached its destination safely.

The only plausible reason I can assign for this affliction of the Crows found by Mr. Ridgway is that while returning from their feeding grounds they were compelled to face an extremely cold and penetrating wind, and having to keep their eyes open to see where they were going, they were frozen. A strange fact was discovered in this connection. Neither Mr. Ridgway nor his companions could discover a single dead Fish Crow among the many specimens examined, although they were well represented among those flying about.

The Crow has a variety of call notes, and is rather noisy at times. The one most frequently heard is a harsh "cawh, cawh," and again a "krah, krah," besides a number of other muffled sounds, generally uttered while at rest at the roost. They are graceful birds on the wing, especially so during the mating season, when pairs, while chasing each other around, may be seen performing all sorts of aerial evolutions, turning complete summersaults, now flying on one

¹ For a fuller account see *Science*, Feb. 10, 1893.

² See *Forest and Stream*, March 16, 1893.

side, or alternately rising one above the other and suddenly darting down again with wings completely closed, and in the meantime uttering the choicest crow talk to their prospective mates. On the ground they do not appear so prepossessing; their walk is somewhat jerky and uneven, and they do not look nearly as dignified as the Raven. I believe Crows remain mated through life.

Nest building in the more southern States begins sometimes by February 20, and correspondingly later northward. In the vicinity of Washington, District of Columbia, fresh eggs may be occasionally found in the last week in March, but more frequently during the first two weeks in April. Along our northern border they nest generally about the beginning of May; and even in the most northern portions of their range they have been known to breed equally early, but most frequently nidification here is protracted well into June. In Idaho, Washington, and Oregon it is at its height between April 15 and May 20. The nests are bulky, usually well constructed, and placed in the forks of branches, generally well up and hard to reach. Occasionally one is placed near the main trunk, this being mostly the case where bushy cedars or junipers are used. Any sort of tree may be chosen for a nesting site, providing it is one of dense foliage, which will hide the nest well. In some localities pine trees seem to be preferred, while in others oaks are often selected. In the West cottonwoods, junipers, and willows are most frequently used. Nests are usually placed at heights varying from 20 to 60 feet; but I have found some barely 6 feet from the ground, and in many localities in the West they are rarely placed over 20 feet up. Here also they are said to occasionally nest on the ground, but I have never observed this personally. Crows rarely nest in deep forests, the borders of woods and the river bottoms being preferred for such purposes. The nests are composed outwardly of sticks, weed stalks, corn husks, and other coarse material, and lined with grapevine bark, fine roots, dry grass, leaves, straw, moss, rags, wool, and hair, the lining varying in different localities. Where cattle are plenty the nests are often found lined with more or less of their hair. These finer materials are well quilted together. The outer diameter of the nest is usually about 24 inches by 9 inches in depth. The inner cup is from 4 to 6 inches deep and from 12 to 15 inches in diameter. This prevents the eggs from being thrown out of the nest during high winds when placed in slender branches in the extreme tops of trees.

The number of eggs to a set varies from four to eight. Sets of five are most commonly found, while those of seven are rare, and those of eight quite unusual. Mr. A. C. Kempton, Wolfville, Nova Scotia, writes me that he found a set of ten eggs in the spring of 1890, which he believes were laid by the same bird. In the Western States usually from three to five eggs constitute a set, and those of six, according to my observations, are much rarer than in the East. Incubation lasts about eighteen days, and both parents assist in this duty. The young are born blind and naked, and remain in the nest about three weeks. While Crows steal many of the eggs of other birds, they apparently do not molest any of their own kind, but if several pairs nest close together they will

steal nesting material from each other whenever an opportunity occurs. The old nests are resorted to for several seasons in succession where not molested. Only one brood is raised in a season; if the first eggs are taken, they usually lay a second set, but rarely in the same nest. When the young are nearly fledged, they may often be seen sitting on the rim of the nest or on branches close by, watching for the return of the parents with food, and keeping up an incessant clamor.

Crows' eggs are rather handsome, and vary greatly in shape, size, color, and markings; the majority may be called ovate, but both short and rounded ovates, and elliptical and elongated ovates are also found in good series. The ground color varies from malachite and pale bluish green to olive green, and occasionally to an olive buff. The markings usually consist of irregularly shaped blotches and spots of different shades of browns and grays. In some specimens these are large, and irregularly distributed over the egg, usually predominating about the larger end, leaving the ground color clearly visible. In others again the markings are fine, profuse, and evenly distributed, giving the egg a uniform dark olive-green color throughout. In an abnormal set of five eggs, presented by Dr. A. K. Fisher to the United States National Museum collection, four have a pinkish buff ground color, and are minutely speckled with fine dots of ecru drab, resembling somewhat in general appearance a heavily marked egg of the American Coot (*Fulica americana*); the fifth egg has a creamy white ground color, and is spotted with different shades of light brown, drab, and lavender. In another specimen, presented by Dr. Louis B. Bishop, the ground color is salmon buff, and this is blotched with pinkish vinaceous. The entire set of six eggs was similarly colored. Endless varieties may be found in a good series of these eggs. The shell is finely granulated, strong, and occasionally rather lustrous.

The average measurement of two hundred and ninety-two eggs in the United States National Museum collection is 41.40 by 29.13 millimetres, or about 1.63 by 1.15 inches. The largest egg of the series measures 46.74 by 30.78 millimetres, or 1.84 by 1.21 inches; the smallest, 36.07 by 25.91 millimetres, or 1.42 by 1.02 inches.

Of the type specimens, No. 20297 (Pl. 4, Fig. 8), No. 20300 (Pl. 4, Fig. 9), and No. 20303 (Pl. 4, Fig. 10), all from the Bendire collection, were taken by the writer near Fort Lapwai, Idaho, on May 8, 1870, and April 26, and May 4, 1871; No. 20313 (Pl. 4, Fig. 11), also from the above collection, was taken near Camp Harney, Oregon, on May 4, 1877; No. 24922 (Pl. 4, Fig. 12), from the Ralph collection, was taken near Nicasio, California, on April 21, 1883; and No. 23275 (Pl. 5, Figs. 21 and 22), both from the same set, were obtained from Dr. A. K. Fisher, and were collected near Lake George, New York, on May 14, 1883. The specimens figured represent the different styles of coloration found among the eggs of this species, as well as nearly the extremes in size. Plate 4, Figure 10, shows one of the commoner types of markings.

163. *Corvus americanus floridanus* BAIRD.

FLORIDA CROW.

Corvus americanus var. *floridanus* BAIRD, Birds North America, 1858, 568.
(B 427, C 228a, R 282a, C 341, U 488a.)

GEOGRAPHICAL RANGE: Florida.

The Florida Crow is distinguishable from its northern relative by its decidedly larger feet and bill, and its usually shorter wing and tail. It is a constant resident in Florida, and its general habits are similar to those of the American Crow. Dr. Ralph reports it common in the vicinity of San Mateo, Putnam County, Florida, and has sent both birds and eggs to the United States National Museum collection from there. Several nests were found by him in tall, slender pine trees in low, flat pine woods, usually bordering on swamps. The nests were located in the tops of trees, on horizontal limbs, and close to the trunk, at distances varying from 45 to 70 feet from the ground. They are usually composed of small sticks, lined first with Spanish moss and then with strips of cypress bark; occasionally a few feathers from the sitting bird, hair from cows' tails, bunches of fine grass, and grass with the rootlets attached entered into the composition of the linings, and in one instance the eggs were laid on about half a pint of fine rotten wood. The nests average in measurement about 24 by 9 inches in outer diameter, the inner cup being about 16 inches in width by 5 inches in depth.

The eggs vary from three to five in number to a set; they are indistinguishable from those of the American Crow, and are usually deposited in the latter part of February or the first week in March. In a set of five taken by Dr. Ralph, on March 3, 1891, incubation was advanced about two-thirds, while in a set of three taken March 31, 1892, it had just commenced.

The average measurement of twenty eggs of this subspecies in the United States National Museum collection is 41.72 by 29.72 millimetres, or about 1.64 by 1.17 inches. The largest egg measures 45.46 by 29.21 millimetres, or 1.79 by 1.15 inches; the smallest, 38.10 by 29.21 millimetres, or 1.50 by 1.15 inches. In a larger series of these eggs the average measurements would probably be somewhat reduced.

The type specimens, Nos. 24180 and 25590 (Pl. 4, Figs. 13 and 14), both from the Ralph collection, the first from a set of five, the latter from one of three eggs, were collected by Dr. William L. Ralph, near San Mateo, Florida, on March 3, 1891, and March 8, 1892, respectively. They will answer equally well for representations of some of the smaller-sized eggs of the American Crow.

164. *Corvus caurinus* BAIRD.

NORTHWEST CROW.

Corvus caurinus BAIRD, Birds North America, 1858, 569.

(B 428, C 228*b*, R 282*b*, C 342, U 489.)

GEOGRAPHICAL RANGE: Northwestern coast districts; from Oregon north to southern Alaska (Kadiak Island).

From about the mouth of the Columbia River north along the coast of Washington and British Columbia to southern Alaska a small, short-legged, and rather dull-colored Crow is found, which there holds about the same relation to the Common Crow as does the Fish Crow on the Atlantic coast, both species inhabiting the same regions, the Northwest Crow predominating, however. During a visit to the shores of Puget Sound, in May, 1894, I was able to satisfy myself of this fact, and while the somewhat larger Crows of the interior are also found as far west as the Sound, I do not believe that the true Northwest Crow ever passes inland much beyond tide water. Although I observed these birds carefully, I could not detect any very marked difference in their general habits or call notes; if such really exist, they are not nearly so noticeable as are those between the American and Fish Crow on the Atlantic coast. The statement of Mr. J. K. Lord, naturalist of the Boundary Survey between the United States and British Columbia, quoted in Volume II, "History of North American Birds," by Baird, Brewer, and Ridgway (page 251), that "this Crow retired to the interior to breed, and built a domed nest," is entirely erroneous. I have traveled a great deal over the same regions that Mr. Lord did, but my observations do not warrant me in corroborating this statement; none of our Crows build domed nests, but the American Magpie, which is common in the interior of Washington, does, and he mistook their nests for those of the Northwest Crow.

Mr. R. H. Lawrence writes me: "The Northwest Crow is very common in western Washington, and especially abundant on the coast in winter. At South Bend, Pacific County, Washington, in February, 1892, great flocks of this species could be heard when their rendezvous was several miles away on the Willapa River. These flocks had many disputes with the Gulls, large numbers of which remained in and about town. Often the greater portion of both species seemed engaged in these noisy controversies. The Gulls certainly held the town, though a few straggling Crows were now and then seen in it. At the slaughterhouses on the prairies below the town I saw a flock of Crows drive off a number of Gulls, but probably the latter were rather listless after eating heartily of the offal. A flock of about one hundred and twenty were noticed February 7, 1892; a few were perched apart on a tree or snag, uttering strange sounds, like 'koo-wow, koo-wow, koo-wow,' the last syllable drawled and accented or emphasized; then, with a slight spreading of the shoulders and the tail, the head being down and the tail drooped, they produced by a curious chattering of the bill a sound (not made in the throat, I judged) which resembled that of horny plates struck

together, and causing an odd shuddering of the head and even of the body. This was repeated a few times, varied with a noisy 'caw, caw.'

Mr. B. J. Bretherton writes me as follows: "The Northwest Crow is found at Kadiak, Alaska, in immense numbers throughout the year, but in the winter months they congregate in large flocks and therefore are more noticeable. In general appearance and manners they greatly resemble the English Jackdaw; they are easily tamed and become interesting pets, showing great fondness for their masters

"During the winter months they feed almost entirely on mussels; in summer they resort to the salmon streams and live mostly on fish; they also eat berries. Their call note is the regular 'caw' of a Crow, but they will also sit by the hour and sing in a low minor key, which is quite pleasant to hear. They are very bold, and quite fearless, and when one is shot the others will fly around the gunner, uttering cries of distress and anger, often coming within arm's length. They are very troublesome to the natives when drying salmon in the fall. In April they go into the interior of the island to nest, and but few are seen until August. I have never found their nests."

Mr. F. Bischoff found the Northwest Crow nesting near Sitka in the spring of 1866, and Mr. William H. Dall observed it near St. Paul, Kadiak Island, Alaska, on June 6, 1874. Eggs taken by both of these gentlemen are now in the United States National Museum collection. Four or five eggs are usually laid to a set, and neither these nor the nests differ materially from those of the Common Crow; they average a trifle smaller, and the same description will answer for both. In the more northern portions of the range nidification usually begins in the latter part of May or the beginning of June.

The average measurement of eight eggs from St. Paul, Kadiak Island, and Sitka, Alaska, is 39.62 by 27.43 millimetres, or 1.56 by 1.08 inches. The largest egg measures 41.66 by 27.94 millimetres, or 1.64 by 1.10 inches; the smallest, 36.07 by 27.94 millimetres, or 1.42 by 1.10 inches.

The type specimen, No. 12841 (Pl. 4, Fig. 15), from a set of five eggs taken by Mr. F. Bischoff, near Sitka, Alaska, in the early part of June, 1866, represents an average egg of the species.

165. *Corvus ossifragus* WILSON.

FISH CROW.

Corvus ossifragus WILSON, American Ornithology, V, 1812, 27, Pl. 37, Fig. 2.
(B 429, C 229, R 283, C 343, U 490.)

GEOGRAPHICAL RANGE: Atlantic and Gulf coasts of the United States; from southern Connecticut, the lower Hudson Valley, and Long Island, New York, south to Florida and Louisiana; casually to southeastern Massachusetts (Plymouth County).

The Fish Crow is a smaller bird than our Common Crow, and is readily distinguished from the latter on this account, as well as by the difference in its call notes. It is a resident throughout the year from the coast of Virginia and

Maryland southward, and occasional specimens winter somewhat farther north. In the lower Hudson Valley and along the shores of Long Island, New York, it is not uncommon in summer, but in southeastern Massachusetts it can only be considered a straggler. A few probably breed in suitable localities in southeastern Connecticut, and it only commences to be fairly common from southern New Jersey southward. In the vicinity of Washington, District of Columbia, it is found at all seasons of the year. Where both species are abundant, specimens are sometimes found which appear to be hybrids, and it is not unlikely that they interbreed occasionally. As a rule, the Fish Crow is rarely found at any great distance inland above tide water, and then usually only along the shores of the larger streams.

Its general habits are similar to those of the Common Crow, and it is often seen in company with them, especially in winter. They, however, appear to be less sociable, and on the whole are also less suspicious and more curious. Their food is also similar, though the proportions of vegetable and animal matter seem, in some localities at least, to be more equally divided than appears to be the case with the Common Crow. It is generally supposed that the Fish Crow lives more on animal food than its larger relative, which is probably the case in some places, but this does not appear to hold good in the vicinity of Washington, District of Columbia, or in some other localities. Mr. W. E. D. Scott states that on the Gulf coast of Florida they congregate in large flocks in the fall of the year, and that the berries of the palmetto constitute one of their favorite foods.

In the vicinity of Charleston, South Carolina, according to Audubon, they feed to a considerable extent on fruits, and he accuses them especially of committing great depredations upon the ripe figs; he also states that they feed on various sorts of berries, particularly those of the common holly (*Ilex cassina*), and those of the tallow tree (*Stillingia sebifera*).¹

Some stomachs sent to the United States Department of Agriculture from St. Lucie and Lake Worth, Florida, contained remnants of figs and dewberries, as well as various seeds, while some from the vicinity of Washington, District of Columbia, contained seeds and berries of the cat briar (*Smilax*), mistletoe, wild rice, hackberry, locust, mulberry, etc.

Dr. A. K. Fisher tells me that on the coasts of Georgia and South Carolina he has seen numbers of them sitting on piles of old wharves, from which they would fly over the water, pick up something, and return to the piles again to eat it at their leisure. On the seashore they probably subsist mainly on small fish, crabs, and other crustaceans, and such offal as is washed ashore. Like their larger relatives, they are also accused of destroying the young and eggs of smaller birds, and, according to Audubon, in Florida they even plunder the nests of the Cormorants and White Ibis. In the Smithsonian grounds, Washington, District of Columbia, they have been noticed repeatedly carrying off and eating the young of the English Sparrows, and Dr. Fisher saw one chasing

¹ History of North American Birds, Vol. II, p. 254.

a Willet, near Sing Sing, New York, in the spring of 1885. While the Fish Crow undoubtedly does destroy the young and eggs of some birds in certain localities, it does not do so habitually. Mr. William Palmer, of Washington, District of Columbia, tells me that he found four Fish Crows' nests, with eggs, during the first ten days in May, 1894, on a hill near Four-Mile Run, in Alexandria County, Virginia, and also four nests of the Green Heron, containing eggs, one of these nests being only 40 feet from one of the Fish Crows' nests. Notwithstanding that none of the Herons were seen close to their nests, while the Fish Crows were at home and constantly flying about, so that they could not help seeing the Herons' eggs, none were troubled and all contained full sets. Three of the Fish Crows' nests were placed in pines, and one in a wild cherry tree, about 45 feet from the ground. Fish Crows can often be seen flying up and down the Potomac River, just over the water, looking for food, and when they find anything they flutter over it like a Tern. They may often be seen resting on the stakes left in the river by fishermen.

Their call notes appear to be less harsh and are uttered in a more drawling manner than those of the Common Crow; they are also more variable. They consist of a clear "cah" or "cahk," repeated at intervals of about thirty seconds, and are usually uttered while the bird is perched on the extreme top of a tree. They also utter a querulous "maah, maah" or "whaw, whaw," varied occasionally to "aack, aack," or "waak, waak." It is almost impossible to reproduce such sounds accurately on paper, and no two persons would render them alike. Their flight is stated to be more graceful than that of the Common Crow; they are also said to soar and to elevate their wings more while circling about, especially during the mating season; but I must confess that I can not see much difference, and I have watched both species closely.

In the neighborhood of Washington, District of Columbia, they nest fully a month later than the Common Crow, nidification rarely beginning before May 5, while Audubon reports them as breeding in February in southern Florida, and correspondingly later northward. The only other Florida records I have are likewise in May, one from the Kissimmee River, on May 2, 1876, and the other from near San Mateo, Putnam County, May 13, 1892, the latter date being given by Dr. Ralph. These eggs were quite fresh, and the set was probably not completed when taken. Mr. Theodore W. Richards states that on the coast of Virginia, where this species is much more common than the American Crow, the breeding season is at its height during the first three weeks in May; and in my opinion the majority of these birds seem to nest in this month throughout the greater part of their range.

The nest itself resembles that of the Common Crow, but is, as a rule, somewhat smaller, and like that of the former varies in composition according to locality. A nest taken by Dr. Ralph near San Mateo, Florida, was composed of sticks with a little Spanish moss attached to them, and was lined with pine needles, strips of cypress bark, and old Spanish moss. It was placed in the top of a slender pine tree, in low, flat pine woods, 81 feet above the ground. Some nests

are lined with dry cow and horse dung, cattle or horse hair, dry leaves, eel-grass, and shreds of cedar bark, while pine needles seem to be present to some extent in most of them. They are mostly placed in evergreens, such as pines and cedars, and generally in the tops, either in natural forks or on horizontal limbs, close to the trunk, usually 20 to 50 feet from the ground. They prefer to nest near water, but occasionally a pair will be found making an exception to this rule, and nests have been found fully 2 miles away from the nearest stream or swamp. Both sexes assist in incubation, which lasts from sixteen to eighteen days, while the young remain in the nest about three weeks. Only one brood is raised in a season, but if the first set of eggs is taken they will lay another, and not infrequently in the same nest. The eggs number four or five to a set, very rarely more. These are miniature counterparts of those of the Common Crow, showing the same range of variation in shape and markings, and one description will answer for both species, excepting only the pinkish-colored eggs of the former. I have not seen this peculiar tint among the eggs of this species.

The average measurement of forty-six eggs in the United States National Museum collection is 37.17 by 26.97 millimetres, or about 1.46 by 1.06 inches. The largest egg of the series measures 41.66 by 25.40 millimetres, or 1.64 by 1 inches; the smallest, 35.05 by 25.65 millimetres, or 1.38 by 1.01 inches.

The type specimen, No. 23745 (Pl. 4, Fig. 16), from a set of four eggs, was taken near Washington, District of Columbia, on May 9, 1887, while No. 25271 (Pl. 4, Fig. 17), from a set of five, was taken in Northampton County, Virginia, on May 25, 1891. Both were collected by Mr. Theo. W. Richards, and represent the light and dark colored types found among the eggs of this species.

166. *Nucifraga columbiana* (WILSON).

CLARKE'S NUTCRACKER.

Corvus columbianus WILSON, American Ornithology, III, 1811, 29, Pl. 20, Fig. 3.

Nucifraga columbiana AUDUBON, Ornithological Biography, IV, 1838, 459, Pl. 362.

(B 430, C 230, R 284, C 344, U 491.)

GEOGRAPHICAL RANGE: Mountainous portions of western North America; from Arizona and New Mexico north to northern Alaska (Kowak or Putnam River); east to and along the eastern slopes of the Rocky Mountains to the Black Hills, South Dakota; casual in southeastern Dakota, Kansas, Nebraska, Missouri, and Arkansas.

Clarke's Nutcracker, more generally known as "Clarke's Crow," and in some localities as "Meat Bird," "Moose Bird," and "Camp Robber," ranges throughout the mountain regions of western North America, reaching the southern limits of its habitat in about the northern half of New Mexico and Arizona; to the eastward it reaches the eastern slopes of the Rocky Mountains and the outlying spurs of this range, as the Black Hills in western South Dakota, while to the north it has been met with by Lieut. George M. Stoney, United States

Navy, in the valley of the Kowak or Putnam River, in northern Alaska, and within the Arctic Circle. Mr. F. Stephens states: "In southern California it is never seen far from the piñon belt which extends in a series of small forests along the desert face of the higher mountains, at altitudes of from 3,000 to 6,000 feet. It is gregarious in its habits and wanders about a great deal, but can scarcely be called a migrant here. It breeds in the higher pineforests in the San Bernardino Mountains, not far from the desert side."

Mr. William G. Smith sent me the following notes about this species from Colorado: "Common at high altitudes during the fall and winter. I have never taken a nest, but have seen young birds in May. They are very tame where not much molested; one entered my tent while camped in Estes Park. By many persons this bird is called 'Camp Robber,' owing to its daring and thieving propensities around camp fires. When the young arrive here, their throats and breasts are frequently much stained with red from the juice of some berry they have been feeding on elsewhere; while here they fed mostly on the seeds of the pine, occasionally alighting on the ground after grasshoppers and other insects."

Dr. C. Hart Merriam met with it on the San Francisco Mountain, in Arizona, and says: "Breeds commonly in the spruce belt, occasionally descending to the pines in summer. In September, when the piñon nuts were ripening, it came down the mountain in flocks, and was often seen in the piñon belt with the Piñon and Woodhouse's Jays. At the same time it was common at the uppermost limit of the dwarf spruce of the subalpine zone."¹

He also met with it in the spruce belt on all the mountains visited by his party in 1890 in south central Idaho; several specimens were caught in marten traps baited with meat.²

This interesting species is quite common in suitable localities throughout its range, and excepting perhaps in the more northern parts it is an irregular resident wherever found. There is no question that they are great wanderers at times, but this propensity is more likely the result of necessity than choice, and depends mainly on the food supply. In their general habits they resemble certain Woodpeckers as much as they do the *Corvinæ*, and have many traits in common with these birds. I well remember how elated I was over my first specimen, which I obtained after a long chase through soft, slushy snow, thinking I had secured a new Woodpecker, its undulating flight resembling that of one of these birds very closely.

Excepting the breeding season, Clarke's Nutcrackers are sociable, inquisitive, and exceedingly noisy birds, and are readily detected on this account when moving about in flocks of a hundred or more in search of good feeding grounds; they are quite omnivorous, and nothing edible is rejected by them. In the winter their food consists principally of the seeds of different species of coniferous trees, while at other times it is quite varied, including berries of various kinds, beetles, and other insects and their larvæ, including butterflies (which I have seen them catch on the wing like a true Flycatcher) and grasshoppers.

¹North American Fauna, No. 3, U. S. Department of Agriculture, 1890, p. 94.

²North American Fauna, No. 5, U. S. Department of Agriculture, 1891, p. 100.

They also eat the large, wingless black crickets (*Anabus simplex*), which are exceedingly abundant and destructive wherever found, overrunning large sections of country and devouring everything green and edible in their way. I have seen flocks of these birds scattered over the sagebrush-covered mesas (table-lands) forming the southern foothills of the Blue Mountains, in Oregon, industriously engaged in catching these repulsive-looking insects and apparently eating them with a relish. They seemed to be especially noisy at such times, calling each other constantly and having a jolly good time generally. While usually rather shy and not readily approachable within gunshot, I have occasionally seen a few much bolder and more inquisitive than the rest, alighting among my chickens in the back yard, and feeding with them. They spend considerable time on the ground in search of food, hopping about from place to place like Jays, looking here and there for a choice morsel. They will hang to the bark of a tree precisely like a Woodpecker in search of grubs, and again to the under side of a pine cone, like a Crossbill, and apparently extract the seeds with equal dexterity. Their call notes are harsh and far-reaching, and consist mainly of a loud, rasping "chaar, chaar," which can be heard for a long distance, and when a number are together the noise made by them becomes rather disagreeable. They do not appear to destroy the eggs or young of smaller birds, but do far more good than harm, and on this account deserve protection.

The breeding season, considering the character of the country frequented by these birds, commences very early, and this accounts for the few nests which have as yet found their way into our oölogical collections. Mr. Denis Gale found a nest of this species, containing three fresh eggs, in Boulder County, Colorado, March 5, 1888, at an altitude of about 8,500 feet, when the mountain sides were still covered with deep snow. A second nest, also containing three fresh eggs, was found by him on April 16, 1889, and in this case he had noticed the birds building fully a month previous.¹

Capt. B. F. Goss also found Clarke's Nutcracker breeding in the vicinity of Fort Garland, Colorado, where he obtained a nest with young birds on May 21, 1879.

I am not aware of any nests and eggs of this interesting species having been taken, excepting the two found by Mr. Gale and those secured by myself near Camp Harney, Oregon, April, 1876 and 1878. I obtained the first evidence of their breeding in that vicinity on May 5, 1875, when I found several young birds, but a few days out of the nest and not yet able to fly well; they were sitting on the branches of a large juniper tree in Rattlesnake Creek Canyon, about 3 miles north of the Post. As this tree happened to contain a cavity which evidently had been used by some bird as a nesting site in previous years, I came to the erroneous conclusion that Clarke's Nutcracker nested in holes, which caused me to examine many of them without results. In March, 1876, I recommenced what looked like an almost fruitless search, in which I had

¹ For more detailed accounts of these two nests see my articles in *The Auk* (Vol. VI, 1889, pp. 226-236, and Vol. VII, 1890, p. 92).

most of the time to tramp through snow from 2 to 4 feet deep; after having examined a great many cavities, mostly in junipers, I was almost ready to give up the task, when I finally examined the pines more closely, and noticed now and then an apparently round ball on the horizontal limbs of some of these trees, which I took to be nests of Fremont's Chickaree, *Sciurus hudsonicus fremonti*, which is very common in this locality. The majority of these supposed squirrels' nests were by no means easily reached, and after trying to dislodge their occupants with sticks, stones, or occasionally with a load of shot, and invariably failing to bring anything to light, I ceased to trouble myself further about them. Being more puzzled than ever, I was about to give up the search for their nests, when, on April 22, after having made more than a dozen fruitless trips, I saw a Clarke's Nutcracker flying quietly and silently out of a large pine about 50 yards ahead of me. This tree had a rather bushy top and was full of limbs almost from the base and was easy to climb. As I could not see readily into the top from below, I climbed the tree. Failing to see any sign of a nest therein, and being completely disgusted, I was preparing to descend when, on looking around, I noticed one of these supposed squirrels' nests placed near the extremity of one of the larger limbs, near the middle of the tree, and 25 feet from the ground; it was well hidden from below, and sitting therein, in plain view from above, I saw not a squirrel, but a veritable Clarke's Nutcracker. I had found a nest at last, quite unexpectedly, and not a day too soon. As it was I was almost too late, for the nest contained a young bird just hatched, and two eggs with the shells already chipped and on the point of hatching. However, as even damaged specimens, particularly rare ones like these, were better than none, I took them, but left the young bird in the nest. The parent, trembling with fear, allowed me to almost lay my hand on her before she fluttered off, and I was scarcely 2 feet away from the nest before she was on it again. During the whole time she remained perfectly silent. Not half an hour later I found a second nest, containing three young, perhaps a week old. Between April 24 and 30 I found at least a dozen more nests; these, however, all contained young in different stages of growth, some nearly large enough to leave the nest, and none contained more than three young.

In the spring of 1877 I commenced my search for nests on March 15, but failed to see a single bird where I had found them comparatively common during the previous season. Their absence was due in this case to the lack of suitable food. No ripe pine cones were to be found, on the hulled seeds of which the young are at first exclusively fed.

During the winter of 1877-'78 a few of these birds occupied their old haunts again, and I began my search as usual in the latter part of March. On April 4, 1878, I found the first nest. It was placed near the extremity of a small limb of a pine, about 40 feet from the ground, and was very hard to get at. In trying to pull the limb down with a rope, so that it could be reached from a stronger one below, it snapped and the eggs were thrown out of the nest. This set also contained three eggs, and incubation was well advanced. On April 8

I found another nest containing two eggs with large embryos. This one was also in a pine tree near the extremity of one of the limbs, about 16 feet from the ground. The only way this could be reached was by leaning a pole against the limbs of the tree and climbing to the nest, in which I succeeded after a good deal of labor and trouble. All of the nests found were placed in nearly similar situations, on horizontal limbs of pines, *Pinus ponderosa*, from 15 to 45 feet from the ground, in rather open situations at the outskirts of the heavier forests, and usually on side hills with a southeasterly exposure, at an altitude (estimated) of from 5,000 to 5,500 feet.

Both of Mr. Gale's nests were placed in low, scrubby pines, *Pinus ponderosa*, the first in one about 20 feet high, which branched out from the ground, with a probable spread of 15 feet. The nest was situated about 30 inches from the main stem, near a bunch of scrub, and firmly saddled on a three-pronged fork of a stout limb 3 inches in diameter, with smaller ones growing around it, so that nothing save the overthrow of the tree itself could possibly dislodge it. This nest was placed about 8 feet from the ground, and is now, with the eggs it contained, in the United States National Museum collection, having been kindly presented by Mr. Gale. His second nest with eggs, taken April 16, 1889, was also found in a small, scrubby pine only 12 feet high and 6 inches in diameter; it was placed about 9 feet from the ground, and resembles the first in every particular, being a little bulkier perhaps.

He found five other nests of this species, none of them containing eggs, however; four of these were placed in spruce trees, none over 25 feet from the ground and two only 8 feet up. Mr. Gale's nest, now in the United States National Museum, was the only one found by him saddled on a branch away from the stem. The majority of sites chosen offered little concealment, but in every case especial care was observed in selecting one affording thorough protection from the assaults of the fierce March winds which prevail in this mountain region. The nests examined by me near Camp Harney, Oregon, were all found in sheltered situations on side hills where they were well protected from heavy winds, and the horizontal limbs selected for building sites were usually strong and bushy, with numerous small twigs among which the nests could be securely built. All of the nests observed were saddled on such limbs, sometimes fully 15 feet from the trunk.

An average nest of Clarke's Nutcracker may be described as follows: The nest proper is placed on a platform of dry twigs, mostly those of the western juniper, *Juniperus occidentalis*, and of the white sage, averaging about three-sixteenths of an inch in thickness, and varying from 8 inches to a foot in length. These twigs, which also help to form the sides of the nest, are deftly matted together and to the smaller twigs of the limb on which the nest is saddled; they are further held together and bound by coarse strips of the inner bark of the juniper tree; these strips are mixed among the twigs and are very suitable for this purpose. The inner nest is a mass of these same bark strips, only much finer, having been well picked into fine fiber; it is quilted together with decayed

grasses and pine straw, forming a snug and comfortable structure. No hair or feathers entered into the composition of any of these nests. The outer diameter measures from 11 to 12 inches by about 7 inches in depth; the cup is from 4 to 5 inches wide and 3 inches deep. The quilted inner walls are fully $1\frac{1}{2}$ inches thick; it is quite deep for its size, and the female while incubating is well hidden. Nest building must occasionally begin in the latter part of February, but more frequently in March, and it appears to take these birds some time to complete one of these structures. Both parents assist in this, as well as in incubation, and the male is apparently equally as attentive and helpful as the female. While they are noisy, rollicking birds at all other times, during the season of reproduction they are remarkably silent and secretive, and are rarely seen. The eggs, usually three in number but occasionally only two, are deposited during March and April, according to locality, when the mountains are still covered with considerable snow; incubation lasts, as nearly as I can judge, about sixteen or seventeen days. The young are fed exclusively on hulled pine seeds, and grow very rapidly, being able to leave the nest in about eighteen days. Their plumage generally is much darker than that of the adults, and they are readily distinguishable. They follow the parents about for some time, and when able to provide for themselves all these birds suddenly disappear from the vicinity of their breeding grounds. This happens about the latter part of May or early in June, and they are not seen again until fall, probably returning to the higher mountains about this time. Only a single brood seems to be raised in a season.

The eggs of Clarke's Nutcracker are ovate and elongate ovate in shape. The ground color is usually pale gray green, occasionally a clearer pale green. They are rather sparingly flecked, spotted, and blotched with minute markings of different shades of brown, gray, and pale lavender, usually heaviest about the larger end of the egg, and these form sometimes a fairly defined wreath. In others they are more evenly distributed over the entire egg, but never thick enough to hide the ground color. In some the lower half of the egg is almost unspotted. The shell of these eggs is close grained, smooth, rather thin, considering their size, and slightly glossy.

The average measurement of nine eggs, six of these only in the United States National Museum collection, is 33.86 by 23.31 millimetres, or about 1.33 by 0.92 inches. The largest egg measures 34.80 by 22.86 millimetres, or 1.37 by 0.90 inches; the smallest, 33.78 by 22.61 millimetres, or 1.33 by 0.89 inches.

The type specimen, No. 20384 (Pl. 3, Fig. 22), from a set of two badly incubated eggs, Bendire collection, was taken by the writer near Camp Harney, Oregon, on April 8, 1878; No. 23683 (Pl. 3, Fig. 23), is from a set of three eggs collected near Gold Hill, Colorado, on March 5, 1888, by Mr. Denis Gale.

167. *Cyanocephalus cyanocephalus* (WIED).

PIÑON JAY.

Gymnorhinus cyanocephalus WIED, Reise in das innere Nord Amerika, II, 1841, 21.*Cyanocephalus cyanocephalus* STEJNEGER, Auk, I, 1884, 230.

(B 431, C 231, R 285, C 345, U 492.) -

GEOGRAPHICAL RANGE: The plateau regions of western North America; from the Rocky Mountains west to the Pacific Coast ranges; north to southern British Columbia; south to northwestern Texas, Lower California, and northern Mexico; casually to Kansas and Nebraska.

The Piñon Jay, locally known also as "Nutcacker," "Maximilian's Jay," "Blue Crow," and as "Piñonario" by the Mexicans, is rather a common resident in suitable localities throughout the southern portions of its range, while in the northern parts it is only a summer visitor, migrating regularly. It is most abundantly found throughout the piñon and cedar-covered foothills abounding between the western slopes of the Rocky Mountains and the eastern bases of the Sierra Nevada and Cascade ranges in California, Nevada, and Oregon.

It is an eminently sociable species at all times, even during the breeding season, and is usually seen in large, compact flocks, moving about from place to place in search of feeding grounds, being on the whole rather restless and erratic in its movements; you may meet with thousands in a place to-day and perhaps to-morrow you will fail to see a single one. It is rarely met with at altitudes of over 9,000 feet in summer, and scarcely ever in the higher coniferous forests; its favorite haunts are the piñon-covered foothills of the minor mountain regions, the sweet and very palatable seeds of these trees furnishing its favorite food during a considerable portion of the year. In the summer they feed largely on insects of all kinds, especially grasshoppers, and are quite expert in catching these on the wing; cedar and juniper berries, small seeds of various kinds, and different species of wild berries also enter largely into their bill of fare. A great deal of time is spent on the ground, where they move along in compact bodies while feeding, much in the manner of Blackbirds, the rearmost birds rising from time to time, flying over the flock and alighting again in front of the main body; they are rather shy and alert when engaged in feeding. I followed a flock numbering several thousands which was feeding in the open pine forest bordering the Klamath Valley, Oregon, for more than half a mile, trying to get a shot at some of them, but in this I was unsuccessful. They would not allow me to get within range, and finally they became alarmed, took wing, and flew out of sight down the valley. On the next day, September 18, 1882, I saw a still larger flock, which revealed its presence by the noise made; these I headed off, and awaited their approach in a dense clump of small pines in which I had hidden; I had not long to wait, and easily secured several specimens. On April 4, 1883, I saw another large flock feeding in the open woods,

evidently on their return to their breeding grounds farther north, and by again getting in front of them I secured several fine males whose testes were but slightly enlarged. These birds are said to breed in large numbers in the juniper groves near the eastern slopes of the Cascade Mountains, on the head waters of the Des Chutes River, Oregon. I have also seen them in the Yakima Valley, near old Fort Simcoe, in central Washington, in June, 1881, in an oak opening, where they were quite numerous. Their center of abundance, however, is in the piñon or nut-pine belt, which does not extend north of latitude 40°, if so far, and wherever these trees are found in large numbers the Piñon Jay can likewise be looked for with confidence.

Mr. F. Stephens writes me that he saw a mixed flock of this species and Clarke's Nutcrackers within 20 miles of the line of Lower California.

Mr. L. Belding found them abundant in the piñons between Campo and Hansen's, Lower California, in May, 1884; while Mr. A. W. Anthony reports them abundant on the San Pedro Martir Mountains, in the same State, at altitudes of from 7,000 to 11,000 feet.¹

On the eastern slopes of the Rocky Mountains this species is much rarer than on the western border, but it has been found in northwestern Montana, on Marias River, and has even been recorded from eastern Kansas and Nebraska, where, however, it can only be considered a straggler.

The first nests and eggs of this species were found by Mr. Charles E. Aiken, near Colorado Springs, Colorado, on May 13, 1874, where he noticed four other nests at the same time; in all of these the young had just hatched. The set found by him contained five eggs, in which incubation was well advanced; two of these eggs he kindly gave me, and they are now in the United States National Museum collection. The first naturalist, however, who observed the nests and young of this species was Mr. Robert Ridgway, who found a colony nesting in a low range of piñon-covered hills in the vicinity of Carson City, Nevada, on April 21, 1868.

Mr. H. C. Parker, of Carson City, took two sets of eggs of this species in the same locality, on April 5, 1878, where Mr. Ridgway observed them ten years previously, and one of these is now in the United States National Museum collection. Subsequently he found another colony of these birds in another portion of the same range of hills, where he states they were breeding by thousands.

The late Capt. B. F. Goss also found this species breeding in the vicinity of Fort Garland, Colorado, at an altitude of about 8,500 feet, during the first two weeks in May, 1879, and took nine sets of their eggs, one of which is now before me. Their eggs were also taken in northern New Mexico at about the same time.

Their call notes are quite variable; some of them are almost as harsh as the "chaar" of the Clarke's Nutcracker, others partake much of the gabble of the Magpie, and still others resemble more those of the Jays. A shrill, queru-

¹ Proceedings of California Academy of Sciences, Vol. 11, 1889, pp. 293, 294.

lous "peeh, peeh," or "whee, whee," is their common call note. While feeding on the ground they keep up a constant chattering, which can be heard for quite a distance, and in this way often betray their whereabouts.

The nests are deep, bulky, and compactly built structures, measuring about 10 inches in outer diameter by 7 inches in height; the cup of the nest is about 4 inches in diameter by 3 inches in depth. Exteriorly the nests are constructed of piñon, sagebrush, or juniper twigs, and shreds of bark from the same, while the inner lining consists of finer shreds of similar materials, plant fibers, fine rootlets, and dry grass, all well woven together, the component parts of the nest varying somewhat in different localities. The nests are usually placed in forks or on horizontal limbs of piñon or juniper trees, generally from 5 to 12 feet from the ground. They are rarely well hidden from view and ordinarily can be seen for some distance.

In the middle portions of their range nidification begins early in April and possibly still earlier farther south, while to the northward and at higher altitudes it is protracted until the first week in May. From three to five eggs are laid to a set, those numbering four being most often found. Incubation lasts about sixteen days. The Piñon Jays are close sitters and, like Clarke's Nutcracker, are devoted parents. The young are able to leave the nest in about three weeks, and may easily be distinguished by their somewhat duller plumbeous blue color. They at once form in flocks and rove about from place to place in search of food.

The eggs of the Piñon Jay are quite variable in shape, ranging from ovate and short ovate to elliptical ovate. The ground color is bluish-white, this being covered all over with minute specks of different shades of brown, in some cases, and larger spots and blotches in others, these being generally heaviest about the larger end. An occasional set is blotched heavily enough to nearly hide the ground color, but this appears to be rarely the case. The shell of these eggs is close grained, finely granulated, slightly glossy, and much stronger than that of the preceding species.

The average measurement of twenty-five eggs in the United States National Museum collection is 30.11 by 22.18 millimetres, or about 1.19 by 0.87 inches. The largest egg measures 31.75 by 23.37 millimetres, or 1.25 by 0.92 inches; the smallest, 26.92 by 22.10 millimetres, or 1.06 by 0.87 inches.

The type specimens, Nos. 24712 and 25315 (Pl. 3, Figs. 24 and 25), both from sets of four eggs, from the Ralph collection, were taken near Fort Garland and Cañon City, Colorado, on May 10, 1879, and May 16, 1890, and represent the lighter and darker colored phases found among the eggs of this species.

Family STURNIDÆ. STARLINGS.

168. *Sturnus vulgaris* LINNÆUS.

STARLING.

Sturnus vulgaris LINNÆUS, *Systema Naturæ*, ed. 10, I, 1758, 167.
(B —, C —, R 279, C 363, U [493].)

GEOGRAPHICAL RANGE: Europe and northern Asia; accidental in Greenland. Introduced in the United States.

The Starling, a common European species, is admitted to our fauna from the fact that a specimen has been taken in Greenland, where it can only be considered a straggler.

Mr. Henry Seebohm says: "The Starling breeds throughout Europe north of latitude 44°, and is a resident in the Azores. In Scandinavia it is found as far north as latitude 69°, in Sweden and Finland up to latitude 65°; and in the Urals only up to latitude 57°, which appears to be its northern limit in Asia. The European birds that are migratory winter in the south of France, the Spanish Peninsula, Italy, Greece, North Africa, and Palestine. In Asia it breeds in South Siberia, Persia, and Turkistan, ranging as far east as the sources of the Amoor, passing through Mongolia, on migration, and wintering in India.

"The Starling is almost as closely associated with man as the Sparrow; but, unlike that bird, it seems to have a peculiar way of accommodating itself to its surroundings with the greatest ease. Thus we see it almost everywhere and in every variety of scenery. It will share the eaves and the dovecot with the Sparrows and Pigeons. It will nestle in the hollow trees, far away from houses, or make its home just as easily in the sides of the stupendous ocean cliffs in company with the noisy crowd of sea birds, or on the limestone rocks farther inland. After the breeding season the Starling becomes even more widely distributed, and from August until the following spring haunts fields and marshes, commons, gardens, and the low-lying shores, as its food supply may be most abundant. The Starling is a gregarious bird at all seasons of the year; but this habit is most marked after the nesting season, for in the spring the scarcity of suitable breeding places usually disperses them.

"Early in the year, sometimes as soon as the middle of January, the Starling returns almost daily to its old nesting place, and in a week or so the male begins his unpretentious song. He usually sings when perched on a chimney or on the eaves near his nesting hole, or on the tree tops near at hand, and his song is warbled forth as he ruffles the feathers of his head and throat and shakes and droops his wings, as though full of nervous excitement. Although many of the Starling's notes are harsh, still some of them are very full and pleasing, and heard as they are, at a season when every sign of returning spring is eagerly looked for and welcomed, are certainly one of the most cheerful sounds that greet the ear. Each note is uttered in seeming caprice; the harsh ones are

mingled with the sweet ones with no approach to order. It is indeed a strange song, and can not be mistaken for that of any other British bird, the Rose-colored Starling excepted. The Starling's alarm notes are very harsh and rapidly repeated, resembling somewhat those of the Missel Thrush. Its call note is a clear, long-drawn, piping cry.

"Early in April, sometimes not until the beginning of May, the Starlings have mostly mated and gone to their breeding holes. Previous to this, however, much quarreling goes on for the choice of suitable sites. The strong gain the best-located holes, while the weak seek quarters elsewhere. The Starling will build its nest almost anywhere, and it needs but slight encouragement to take up its quarters in any suitable hole or box placed for its reception. It will even dislodge large tiles and burrow considerable distances under the eaves, and its bulky nest often stops up some spout, to the dismay of the householder. A hole in the gable or inside the dovecot are also favorite places, while its partiality for holes in trees is none the less. It also commonly breeds in ruins, churches, and old masonry of every description. In the wilder portions of the country the Starling selects a hole either in a tree or a rock for its purpose, and it will often breed in great numbers in caves or in crevices of the ocean cliffs.

"The nest is sometimes but a few inches from the entrance to the hole, at others it is several feet, and in many cases, especially in trees and rocks, is absolutely inaccessible. In the outer Hebrides, where trees are absent, the Starling breeds, according to Mr. Gray, under the stones on the beach, in disused rat holes, in turf dikes, and in holes in walls. Saxby states that in Shetland it breeds in peat stacks and rabbit holes. It has also been known, in one or two instances, to build an open and exposed nest in trees, to rear its young in a hole in the ground, and to share the same nest with a Magpie.

"The Starling's nest is a somewhat slovenly structure, made of straw, dead grass, and rootlets, sometimes a twig or two, and is lined with a few feathers, a little wool, or even a scrap or two of moss, paper, rag, or twine. In many cases the birds do not trouble about a lining at all, and the cup of the nest is entirely composed of straws, arranged very evenly and smoothly, but with a lot of straggling bents around it.

"The nest is in some cases much more elaborately made than in others, and in some holes the dry and powdered wood at the bottom almost does sole duty for a bed. With great perseverance the Starling will continue to build in the same hole, although its nest is repeatedly removed, and each year the birds will return to their old quarters.

"The food of the Starling is for the greater part of the year composed of worms, slugs, and beetles; but in winter they are often seen to feed on grain and seeds. In autumn they are very fond of fruit and berries. Elderberries are part of their favorite food, and soon the trees, which had previously bent under the weight of their clustering branches of black fruit, will be totally denuded. In severe weather they will sometimes feed on hips and haws, and are often seen on coasts searching for sand worms and various small mollusks."¹

¹ History of British Birds, Seebohm, 1884, Vol. II, pp. 12-15.

Several attempts have been made to introduce this species into the United States, but until recently none have been permanently successful.

Mr. Frank M. Chapman, of the American Museum of Natural History in Central Park, New York City, writes me as follows on this subject:

“The last introduction of the Starling by Mr. Eugene Schiefflin has apparently been successful. The birds were liberated in Central Park, but the majority have left this and spread over the more northern part of the city. One pair bred under the eaves of this museum in the summer of 1893, and this year two pairs are breeding here, while still another has established itself in the roof of an apartment house close by. Mr. C. B. Isham, an assistant in the ornithological department, tells me that no less than ten pairs are passing the summer at Kingsbridge, near Spuyten Duyvel, and that he knew where five pairs nested there last year. They apparently raise two broods in a season and have become pretty well established here. They are resident, or nearly so, and as they have already experienced one of the most severe winters of recent years, it will not be the fault of the climate if they do not steadily increase in numbers.”

An attempt to introduce this species near Portland, Oregon, has apparently failed, the birds liberated there having disappeared.

From four to seven eggs are laid to a set. The eggs vary in shape from ovate to elongate ovate; the shell is rather coarsely granulated and varies considerably in color, ranging from a pale greenish-blue to pale bluish-white.

The average measurement of forty specimens in the United States National Museum collection is 29.46 by 21.34 millimetres, or 1.16 by 0.84 inches; the largest egg measures 31.75 by 22.10 millimetres, or 1.25 by 0.87 inches; the smallest, 26.67 by 19.30 millimetres, or 1.05 by 0.76 inches. None of these eggs are figured.

Family ICTERIDÆ. BLACKBIRDS, ORIOLES, etc.

169. *Dolichonyx oryzivorus* (LINNÆUS).

BOBOLINK.

Fringilla oryzivora LINNÆUS, *Systema Naturæ*, ed. 10, I, 1758, 179.

Dolichonyx oryzivorus SWAINSON, *Zoological Journal*, III, 1827, 351.

(B 399, C 210, R 257, C 312, U 494.)

GEOGRAPHICAL RANGE: North America; north in the Dominion of Canada near the Atlantic coast to about latitude 47°, in the provinces of Quebec and Ontario to about latitude 45°, in Manitoba and Assiniboia to about latitude 52° N., and thence westward to southern British Columbia. In the United States west to Utah and eastern Nevada. South in winter to the West India Islands and South America.

The breeding range of the Bobolink, known also as “Skunk Blackbird” in the Northern States, as “Ortolan” and “Reedbird” on the Atlantic coast in the fall, as “Meadow-wink” in some of our Middle States, as “Ricebird” and “Maybird” in South Carolina, Georgia, and Louisiana, and as “Butterbird” in Jamaica,

extends from about latitude 40°, and occasionally, though rarely, from a little south of latitude 39°, northward through the southern portions of the Dominion of Canada, as already defined. From recent information obtained by me, it also breeds, in small numbers at least, on the Gulf coast of Louisiana, and probably also in northern Florida. It inhabits open prairie country, cleared and cultivated districts, but is never found in forests.

The Bobolink is a well-known and prime favorite with everyone throughout New England and the other Northern States, and few of our summer visitors are more popular. It usually arrives on its more southern breeding grounds about the middle of May, and correspondingly later northward. It is far more abundant east than west of the Rocky Mountains, but in suitable localities in the Great Salt Lake and Utah Lake valleys it is not uncommon, and Mr. H. W. Henshaw found it rather common in the fields about Provo, Utah, where the parent birds were noticed feeding their young July 25, 1872.

Mr. Robert Ridgway says: "The Bobolink seems to be spreading over all the districts of the far West wherever the cultivation of cereals has extended. We found it common in August in the wheat fields at the Overland Ranch, in Ruby Valley, Nevada."¹

This last record remained the most western one for a number of years, but recently the United States National Museum collection received a skin taken by Mr. A. C. Brook, July 23, 1890, near Chilliwack, British Columbia, which extends its range across the continent. It is possible, as stated above, that this species is gradually extending its range westward, and the settling up of the country may have something to do with this; but it is equally certain that it is rapidly decreasing in numbers in many localities in our Eastern States where it was an abundant summer resident less than twenty years ago. This may be due to some extent to a gradual change of its range; but the enormous slaughter the Reedbird, or "Ortolan," as it is there called, is subjected to in the late summer, while lingering in the marshes bordering the Chesapeake Bay and similar localities on the Atlantic coast, on their migration to the south, is quite a factor in this matter, as many thousands are shipped at this season of the year to the markets of our larger cities, and Reedbirds or Ortolans on toast may be found on the menu of every first-class restaurant. In the marshes here they feed on the still soft seeds of the Indian rice or water oat (*Zizania aquatica*), which imparts a delicious flavor to their flesh; they soon become excessively fat, and the demand for Reedbirds is far greater than the supply; but fortunately the English Sparrow is nowadays extensively substituted for the genuine Ortolan, and will protract its gradual extermination for some time.

Another cause of its decrease is due to the enormous damage it does in the rice plantations of some of our Southern States, where they are very unwelcome but regular visitors both in the spring and early fall, and where many thousands are killed yearly.

¹ Explorations of the 40th Parallel, Vol. IV, 1877, pp. 500, 501.

Dr. C. Hart Merriam, chief of the Division of Ornithology and Mammalogy, United States Department of Agriculture, makes the following statement, respecting this species in his annual report for the year 1886 :

“One of the most important industries of the Southern States, the cultivation of rice, is crippled and made precarious by the semiannual attacks of birds. Many kinds of birds feed upon rice, but the bird that does more injury than all the rest combined is the Bobolink of the North (*Dolichonyx oryzivorus*), called ‘Reedbird’ along the Chesapeake and ‘Ricebird’ in the South.”

The following extracts from a letter from Capt. William Miles Hazzard, of Annandale, South Carolina, one of the largest rice growers in the State, bearing on this subject, is selected out of several in the above report:

“The Bobolinks make their appearance here during the latter part of April. At that season their plumage is white and black, and they sing merrily when at rest. Their flight is always at night. In the evening there are none. In the morning their appearance is heralded by the popping of whips and firing of musketry by the bird minders in their efforts to keep the birds from pulling up the young rice. This warfare is kept up incessantly until about the 25th of May, when they suddenly disappear at night. Their next appearance is in a dark yellow plumage, as the Ricebird. There is no song at this time, but instead a chirp which means ruin to any rice found in the milk. My plantation record will show that for the past ten years, except when prevented by stormy south or southwest winds, the Ricebirds have come punctually on the night of the 21st of August, apparently coming from seaward. All night their chirp can be heard passing over our summer homes on South Island, which is situated 6 miles to the east of our rice plantations, in full view of the ocean. Curious to say, we have never seen this flight during the day. During the nights of August 21, 22, 23, and 24, millions of these birds make their appearance and settle in the rice fields. From the 21st of August to the 25th of September our every effort is to save the crop. Men, boys, and women, with guns and ammunition, are posted on every 4 or 5 acres, and shoot daily an average of about 1 quart of powder to the gun. This firing commences at first dawn of day and is kept up until sunset. After all this expense and trouble our loss of rice per acre seldom falls under 5 bushels, and if from any cause there is a check to the crop during its growth which prevents the grain from being hard, but in milky condition, the destruction of such fields is complete, it not paying to cut and bring the rice out of the field. We have tried every plan to keep these pests off our crops at less expense and manual labor than we now incur, but have been unsuccessful. Our present mode is expensive, imperfect, and thoroughly unsatisfactory; yet it is the best we can do. I consider these birds as destructive to rice as the caterpillar is to cotton, with this difference, that these Ricebirds never fail to come.”

From this it can readily be seen that our Southern planters have excellent reasons for destroying the Bobolink by all the available means in their power. The persistent warfare carried on against it must undoubtedly finally diminish its numbers very materially, and the present rarity of this species in many

localities in New England and other Northern States is, in my opinion, far more attributable to wholesale destruction than to change of breeding range.

Mr. E. A. McIlhenny, of New Iberia, Louisiana, tells me that it is a well-known fact among the rice planters of his State that the Bobolink, when feeding on the rice while still in the milky state, requires to wash its bill frequently to free it from the gummy matter accumulating on it from the rice milk. Knowing this, many planters, instead of keeping the rice fields flooded, as formerly, now draw off all the water about this time, making it necessary for the birds to go some distance to procure it, thereby lessening the destruction to some extent, while this treatment does not appear to injure the crop in the least.

After the Bobolink returns to his chosen summer home he is safe enough, at least from his most merciless enemy, man, as there no one looks on him as a nuisance. The males usually precede the females a few days, and generally return to the same localities from year to year. In its handsome spring dress of black and white the male forms one of the conspicuous features of a rural landscape, while its bubbling, metallic song, almost constantly uttered during the mating season, either while fluttering or hovering above the female in the air, or when perched on a fence, a shade tree by the roadside, or a weed stalk in a meadow or clover field, is certain to attract attention to the happy and joyous performer. No other bird seems to be in such exuberant, rollicking spirits at this time of the year as our male Bobolink. The females, however, are much less in evidence at all times, and are rarely seen unless especially looked for, keeping in the meadows; where the young grass hides them quite effectually from view. I have several times attempted to imitate their notes on paper, but have failed. During the first few weeks after its arrival the male is full of song; one of its call notes sounds like "träck, träck," another like "tchäe-tchäe," and another like "killink, killink." By the middle of July they are almost silent again, and in some sections seem to disappear altogether. The Bobolink is still fairly common in all the dairy regions of central New York, and while at Holland Patent, in June and July, 1893, I saw but few of these birds after July 15, although quite a number of pairs breed there regularly; they had all apparently disappeared.

Their food consists mainly of seeds and grains of different kinds, and during the summer months also of insects, including grasshoppers, small caterpillars, etc., and on their breeding grounds they certainly do little or no damage.

In the more southern portions of its breeding range nidification begins usually about the last week in May or the first week in June, and the young have mostly left the nest by the time haying begins. In late seasons undoubtedly many nests are uncovered and destroyed by mowing machines, which are the principal factors of destruction of these birds in the north.

The nest is usually placed in a meadow or clover field, and sometimes several pairs nest close together. It is a gregarious and social bird, even during the season of reproduction, and loves company at all times. It is equally at home on the uplands as in the lower river bottoms, as long as these are sown to grass. As a rule the nest is hard to find; the female will rarely fly directly from it, but

runs for some distance through the grass before she takes flight, and approaches it in the same way. It is a frail structure, outwardly composed of dry weed stems and grasses, lined with finer materials of the same kind, and is usually placed in a slight natural depression of the ground and well concealed by a luxurious growth of grass or clover. An average nest measures about 4 inches in outer diameter by 2 inches in depth; the inner cup is about $2\frac{1}{2}$ inches in diameter by $1\frac{1}{4}$ inches deep. Sometimes a nest may be attached to several weed stems a little distance from the ground. Two such instances are recorded by Mr. Elisha Slate, of Somerset, Massachusetts, in the "Bulletin of the Nuttall Ornithological Club" (Vol. VI, 1881, pp. 117, 118). Want of space prevents me from quoting these here.

Mr. E. A. McIlhenny, of New Iberia, Louisiana, tells me that this species breeds in small numbers on Petite Anse Island, on the Gulf coast of Louisiana; and that he has taken two nests with eggs (one on April 18, 1891, and another on April 9, 1892). To set all doubts at rest, he kindly sent me the last-mentioned set, which contained five heavily incubated eggs, one of which was broken in blowing, and one of these is figured. He wrote at the same time: "I believe many of the Bobolinks breed here before they go north; the young birds are here all summer, but an old bird is never seen after the last of April, or after the oats are harvested. They nest in these fields. We shoot the young birds here in May, and again in September, in which months they are very fat and are considered very good eating."

On mentioning this to my friend, Dr. Ralph, who visits Florida every winter, he told me that he had noticed two pairs of Bobolinks almost daily, near San Mateo, Florida, from about the middle of May until the day of his departure, on June 4, 1892. These birds were most frequently seen near the banks of the St. John's River, close to an oat field, and probably were breeding there.

From five to seven eggs (usually five or six) are laid to a set, and only one brood is raised in a season. In the more southern parts of their breeding range the young are generally large enough to fly by July 1. They gather then in little flocks with the parents (the male assuming the garb of the female about this time) and are soon thereafter led by them to the marshes, near the seashore, in quest of their favorite food, which at this time of the year is Indian rice; and by August 15 they begin to assemble in the rice fields of the South, remaining there until near the end of September before moving on to their winter homes in South America. Their traveling is mostly done at night. The majority pass through Florida and the West India Islands on their way south, and not through Mexico via Texas.

The eggs are ovate or short ovate in shape. The shell is close grained and somewhat glossy. The ground color varies from pearl gray or pale ecru drab to a pale reddish brown or pale cinnamon rufous. They are irregularly blotched and spotted with different shades of claret brown, chocolate, heliotrope purple, and lavender markings, intermingled with each other, and varying greatly in size and intensity. Almost every set is differently marked, and it is extremely difficult to give a fair average description. In some specimens the ground color

is almost hidden, the markings being nearly evenly distributed in the shape of large blotches over the entire surface of the egg. In the majority, however, the darker markings are mainly confined to the larger end of the egg, while the paler ones are more noticeable in the middle and about the smaller end.

The average measurement of seventy-seven specimens in the United States National Museum collection is 21.08 by 15.71 millimetres, or 0.83 by 0.62 inch. The largest egg in this series measures 22.35 by 16.26 millimetres, or 0.88 by 0.64 inch; the smallest, 17.53 by 15.24 millimetres, or 0.69 by 0.60 inch.

The type specimen, No. 25338 (Pl. 6, Fig. 1), from a set of five eggs, Ralph collection, was taken on Shelter Island, New York, June 8, 1882, and represents one of the heaviest marked eggs of the series; and No. 25740 (Pl. 6, Fig. 2), from a set of five eggs, taken by Mr. E. A. McIlhenny, on Petite Anse Island, Louisiana, on April 9, 1892, represents one of the paler-colored specimens in the series.

170. *Molothrus ater* (BODDAERT)

COWBIRD.

Oriolus ater BODDAERT, Table des planches enluminées d'histoire naturelle, 1783, 37.

Molothrus ater GRAY, Hand List of Birds, II, 1870, 36.

(B 400, C 211, R 258, C 313, U 495.)

GEOGRAPHICAL RANGE: United States and the southern parts of the Dominion of Canada, in the eastern portions to about latitude 49° N.; in the interior to Little Slave Lake, southern Athabasca, latitude 55° 30', and probably still farther north; west to British Columbia, eastern Washington, eastern Oregon, Nevada, and southeastern California; south in winter to southern Mexico.

The breeding range of the Cowbird, also known as "Cow Bunting," "Cow Blackbird," "Shinyeye," "Blackbird," "Lazy Bird," "Clodhopper," and in former years on the plains as "Buffalo Bird," extends from our Southern States, excepting Florida, southern and western Texas, north into the southern parts of the Dominion of Canada. Westward its breeding range extends to eastern British Columbia, eastern Washington, eastern Oregon, Nevada, and probably southeastern California, where Dr. A. K. Fisher shot an adult male at Furnace Creek, in Death Valley, June 20, 1891. East of the Rocky Mountains the Cowbird is pretty generally distributed over the greater part of its range, excepting the extensive forest regions and some of the more southern States, where it appears to occur only sparingly. Its center of abundance is found in the States bordering the Upper Mississippi River and its numerous tributaries. West of the one hundred and thirteenth meridian (Greenwich), in the United States at least, it must be considered as a rare summer visitor, and, as far as I have been able to ascertain, it has not yet been found anywhere on the Pacific Coast west of the Cascade and the Sierra Nevada mountains except as a straggler. In the southern portions of the Provinces of Alberta and Assiniboia, Dominion of Canada, as far west as Calgary, I found this species remarkably abundant in the

latter part of May, 1894, along the line of the Canadian Pacific Railway, small parties of from six to twelve being almost constantly in sight, evidently on their way to their breeding grounds.

The most northern point where its eggs have been taken appears to be in the vicinity of Little Slave Lake, in southern Athabasca, in latitude $55^{\circ} 30'$ N. Mr. S. Jones, of the Hudson Bay Company, forwarded specimens from there to the Smithsonian Institution in 1868, but it is quite probable that this species ranges farther north.

Although I have traveled extensively over our westernmost States and Territories, I noticed the Cowbird on but very few occasions, and only found its eggs there twice; once on June 21, 1871, near Fort Lapwai, Idaho, in the nest of the Long-tailed Chat, *Icteria virens longicauda*, and again near Palouse Falls, in southeastern Washington, on June 18, 1878, in a nest of the Slate-colored Sparrow, *Passerella iliaca schistacea*. This I believe is the most western breeding record known.

Both of these specimens are now in the United States National Museum collection.

The most southern breeding records I have knowledge of are from Wayne and McIntosh counties, Georgia; Petite Anse Island, Louisiana, and Harris County, Texas. It does not appear to breed anywhere in the immediate vicinity of the Gulf coast in Texas, where it is replaced by its smaller relative, the Dwarf Cowbird. While the majority of these birds pass beyond our borders in the late fall and winter, mainly to southern Mexico, still a good many remain in our Southern States, and a few even winter occasionally as far north as New England, Michigan, etc.

Dr. G. Brown Goode tells me that while on the German Lloyd steamer *Neckar*, in April, 1880, a Cowbird flew on board, fully 1,000 miles east of Newfoundland, and was captured.

The Cowbird ordinarily arrives in good-sized flocks in the Middle States, from its winter home in the South, during the last half of March; in the more northern States, rarely before the first week in April, and more frequently after the middle of this month, the males predominating in numbers over the more plainly colored females, and generally precede them several days. Soon after, these flocks commence to break up and scatter in small companies of from six to twelve individuals and disperse generally over the country. It prefers more or less cultivated districts, river valleys, etc., where other birds are abundant, and rarely penetrates far into heavily timbered sections or mountainous regions, excepting in Colorado, where it has been met with at altitudes up to 8,000 feet.

The food of the Cowbird consists principally of vegetable matter, such as seeds of different kinds of noxious weeds, like ragweed, smartweed, foxtail or pigeon grass, wild rice and the smaller species of grains, berries of different kinds, as well as of grasshoppers, beetles, ticks, flies, and other insects, worms, etc. Taking its food alone into consideration it does perhaps more good than harm.

While the Cowbird is fairly common in most of the States east of the Mississippi River, it is far more noticeable in the regions west of this stream,

although perhaps not much more abundant. In the prairie States this is especially the case, and one will rarely see a bunch of cattle there without an attending flock of Cowbirds, who perch on their backs, searching for parasites, or follow them along on the ground, hunting for suitable food among their droppings. They generally act in concert; when one settles on the ground the others follow shortly afterwards, and if one starts to fly, the remainder take wing also. Their flight resembles that of the Red-winged Blackbird. When the nesting season approaches, the males become very demonstrative in their actions toward the females, but do not appear to mind the attentions paid by other males to the same female, as other birds usually do, and rarely fight for her possession. Free lovers as they are, they do not object to such trifles.

At this time of the year several males may frequently be seen perched on some fence rail or the limb of a tree, with the feathers of their throats raised, tails spread, and wings trailing, each endeavoring to pour out his choicest song to one of his prospective mates. This consists of various unreproducible guttural sounds, uttered while all the feathers are puffed out, the head lowered, and evidently produced only by considerable effort on the part of the performer. One of their call notes sounds somewhat like "spreele," others resemble the various squeaks of the Red-winged Blackbird, and all are difficult to reproduce on paper.

It is a well-known fact that the Cowbird is a parasite, building no nest, but inflicting its eggs usually on smaller birds, leaving to them the labor and care of rearing its young. It appears to be entirely devoid of conjugal affection and practices polyandry, the small flocks in which it is found during the season of reproduction generally containing several more males than females.

It is at all times more or less gregarious, especially so in the fall and winter, when it often forms large flocks, and associates then with the other Blackbirds, like Brewer's and the Red-winged.

The laying season rarely begins before May 15, and continues for about two months. During this time probably from eight to twelve eggs are laid by each female, or the equivalent of two broods, and I believe that several days elapse between the laying of the eggs. It is not likely (and this is very fortunate indeed) that more than half of these eggs are hatched, as some are occasionally dropped in old and abandoned nests, or, when the female is hard pressed, even on the ground; others in just completed nests in which the rightful owner had not yet laid, who, seeing the parasitic egg in its nest, either abandons it entirely or constructs another over the first, burying the stranger egg among the building materials.

When the Cowbird is ready to deposit her eggs, she quietly leaves her associates and begins her search for a suitable nest, usually selecting one of a species smaller than herself; but if such is not readily found, a nest of a larger bird will answer equally well, especially if the full complement of eggs has not been deposited in it. She does not forcibly drive the owner from her nest, but watches her opportunity to drop her egg in it when it is unguarded. In rare instances only will a fresh Cowbird's egg be found among incubated ones of the rightful owner. I have observed this only on a single occasion. From one to seven of these

parasitic eggs have been found in a nest, the larger numbers usually in those of ground-building species, especially in that of the Ovenbird, where from three to five, with perhaps two or three eggs of the owner, are not especially uncommon. I know of one instance where not less than seven Cowbird's eggs were found in a nest of this species with a single one of its own. Not infrequently two or more eggs (in all probability laid by the same bird) will be found in one nest. There is so much variation in their eggs, both in size and markings, that the close resemblance of any two eggs at once attracts attention. It is not unusual to find some of the eggs of the rightful owner thrown out of the nest to make room for those of the parasite, or to find minute punctures in the shells of some of the remaining eggs. This is possibly done purposely by the Cowbird with her beak or with her sharp claws while sitting on the nest and depositing her own egg, to keep the eggs from hatching. I am inclined to attribute this puncturing to the latter cause, but there is no doubt that the Cowbird sometimes throws the eggs of the rightful owner out of the nest purposely to enhance the chances of its offspring coming to maturity. I have yet to see a punctured Cowbird's egg. It is astonishing how many different species are thus imposed upon by the Cowbird. One would naturally suppose that birds breeding in holes in trees or under rocks would be exempt from this infliction, but this is not the case. Perhaps among the strangest and most unlikely of foster parents selected are the Red-headed Woodpecker and the Rock Wren.

Mr. William G. Smith, formerly of Loveland, Colorado, writes me that he found a Cowbird's egg in a Rock Wren's nest, under a ledge of rock, fully 2 feet from the entrance, which was barely large enough for the Wren to squeeze through. It seems almost impossible that a bird of this size would be able to enter the small, pendent nest of the Parula Warbler and deposit its egg therein in the usual way. However, as this species is occasionally imposed on, it is possible that the egg is dropped in the nest with the beak.

The following is a list of species in whose nests eggs of the Cowbird have been found, and undoubtedly a number of others yet remain to be added to it:

<i>Zenaidura macroura</i> , Mourning Dove.	<i>Agelaius phœniceus</i> , Red-winged Blackbird.
<i>Coccyzus americanus</i> , Yellow-billed Cuckoo.	<i>Sturnella magna</i> , Meadow Lark.
<i>Melanerpes erythrocephalus</i> , Red-headed Woodpecker.	<i>Sturnella magna neglecta</i> , Western Meadow Lark.
<i>Tyrannus tyrannus</i> , Kingbird.	<i>Icterus spurius</i> , Orchard Oriole.
<i>Sayornis phœbe</i> , Phœbe.	<i>Icterus galbula</i> , Baltimore Oriole.
<i>Contopus virens</i> , Wood Pewee.	<i>Icterus bullocki</i> , Bullock's Oriole.
<i>Empidonax acadicus</i> , Arcadian Flycatcher.	<i>Scolecophagus cyanocephalus</i> , Brewer's Blackbird.
<i>Empidonax pusillus</i> , Little Flycatcher.	<i>Carpodacus purpureus</i> , Purple Finch.
<i>Empidonax pusillus traillii</i> , Traill's Flycatcher.	<i>Spinus tristis</i> , American Goldfinch.
<i>Empidonax minimus</i> , Least Flycatcher.	<i>Calcarius ornatus</i> , Chestnut-collared Longspur.
<i>Otocoris alpestris praticola</i> , Prairie Horned Lark.	<i>Rhynchophanes mccownii</i> , McCown's Longspur.
<i>Dolichonyx oryzivorus</i> , Bobolink.	<i>Pooecetes gramineus</i> , Vesper Sparrow.
<i>Xanthocephalus xanthocephalus</i> , Yellow-headed Blackbird.	

- Pooecetes gramineus confinis*, Western Vesper Sparrow.
Chondestes grammacus, Lark Sparrow.
Chondestes grammacus strigatus, Western Lark Sparrow.
Zonotrichia leucophrys, White-crowned Sparrow.
Spizella socialis, Chipping Sparrow.
Spizella pusilla, Field Sparrow.
Spizella pallida, Clay-colored Sparrow.
Junco hyemalis, Slate-colored Junco.
Melospiza fasciata, Song Sparrow.
Melospiza fasciata montana, Mountain Song Sparrow.
Melospiza georgiana, Swamp Sparrow.
Passerella iliaca schistacea, Slate-colored Sparrow.
Pipilo erythrophthalmus, Towhee.
Cardinalis cardinalis, Cardinal.
Habia ludoviciana, Rose-breasted Grosbeak.
Guiraca caerulea, Blue Grosbeak.
Passerina cyanea, Indigo Bunting.
Passerina amœna, Lazuli Bunting.
Passerina ciris, Painted Bunting.
Spiza americana, Dickcissel.
Calamospiza melanocorys, Lark Bunting.
Piranga erythromelas, Scarlet Tanager.
Piranga rubra, Summer Tanager.
Petrochelidon lunifrons, Cliff Swallow.
Ampelis cedrorum, Cedar Waxwing.
Vireo olivaceus, Red-eyed Vireo.
Vireo gilvus, Warbling Vireo.
Vireo flavifrons, Yellow-throated Vireo.
Vireo solitarius, Blue-headed Vireo.
Vireo noveboracensis, White-eyed Vireo.
Vireo belli, Bell's Vireo.
Mniotilta varia, Black and White Warbler.
Protonotaria citrea, Prothonotary Warbler.
Helmitherus vermivorus, Worm-eating Warbler.
Helminthophila pinus, Blue-winged Warbler.
Helminthophila chrysoptera, Golden-winged Warbler.
Helminthophila ruficapilla, Nashville Warbler.
Compothlypis americana, Parula Warbler.
Dendroica œstiva, Yellow Warbler.
Dendroica œrulescens, Black-throated Blue Warbler.
Dendroica œrulea, Cerulean Warbler.
Dendroica blackburnia, Blackburnian Warbler.
Dendroica virens, Black-throated Green Warbler.
Dendroica discolor, Prairie Warbler.
Seiurus aurocapillus, Ovenbird.
Seiurus noveboracensis, Water Thrush.
Seiurus motacilla, Louisiana Water Thrush.
Geothlypis formosa, Kentucky Warbler.
Geothlypis trichas, Maryland Yellowthroat.
Geothlypis trichas occidentalis, Western Yellowthroat.
Icteria virens, Yellow-breasted Chat.
Icteria virens longicauda, Long-tailed Chat.
Sylvania mitrata, Hooded Warbler.
Setophaga ruticilla, American Redstart.
Galeoscoptes carolinensis, Catbird.
Harporhynchus rufus, Brown Thrasher.
Salpinctes obsoletus, Rock Wren.
Troglodytes œdon, House Wren.
Parus bicolor, Tufted Titmouse.
Poliophtila œrulea, Blue-gray Gnatcatcher.
Turdus mustelinus, Wood Thrush.
Turdus fuscescens, Wilson's Thrush.
Turdus ustulatus swainsonii, Olive-backed Thrush.
Turdus aonalaschke auduboni, Audubon's Hermit Thrush.
Merula migratoria, American Robin.
Sialia sialis, Bluebird.

Among the birds mentioned above the nests of the Phoebe, Song Sparrow, Towhee, Indigo Bunting, Ovenbird, and Yellow-breasted Chat seem to be most frequently selected by the Cowbird, and these usually contain also more of the parasitic eggs than the majority of the others.

The egg of the Cowbird usually hatches in from ten to eleven days, generally in advance of those of the foster parent, and the growth of the young interloper is rapid. Mr. M. A. White, of Mathews, Virginia, whose observations correspond fairly well with my own, writes on this subject as follows:

"It was on the 9th of June, 1891, that I placed a fresh egg of the Cowbird in the nest of a Chipping Sparrow containing two of her own that had an advance of one and a half days' incubation. I watched results. About the 19th

Mr. Cowbird emerged from his prison walls, large and vigorous. A day later a little sparrow came forth from his delicate shell, but much smaller, and exhibiting less strength than his foster brother. The other egg failed to hatch.

"The daily increase in size of the Cowbird was something immense, while his younger companion seemed to diminish rather than enlarge, until finally, at the end of three days, he died, evidently for want of food, as the Cowbird, being larger, greedily devoured everything that came in contact with his capacious mouth. The untimely end of the rightful heir was but gain to this usurper, as he now received the whole attention of the parent birds. Nature having now, at the early age of seven days, provided him with a respectable dress, he was no longer contented to remain within the small compass of the nest, and he took to the branches of the tree in which the nest had been placed. But soon this area became too limited for his ambitious spirit, for at the end of his second week he was flitting from bush to bush, exploring the fields and hedges, his foster parents providing for him all the while. Two weeks more and he was a full-fledged bird. About July 20 I saw him for the last time."¹

Such seems to be the fate of nearly all the young which have the misfortune to be hatched with a Cowbird for a companion. I have yet to see a nest containing young birds of both species more than a few days old; by that time the rightful offspring are either smothered or crowded out of the nest by their stronger foster brother, or they are starved, and he then absorbs the entire attention of the parents. Only in cases where the true offspring is as large or larger than the imposter is there any likelihood of exception to this rule. It can readily be seen what an immense amount of harm a Cowbird causes in the economy of nature, granting that only a single one of its eggs is hatched in a season. A brood of insectivorous and useful birds is almost invariably sacrificed for every Cowbird raised, and they are certainly not diminishing in numbers.

While a few of the selected foster parents resent the addition of a parasitic egg in their nest, either by abandoning it entirely or by building a new one over it, and occasionally even a third one, the majority do not appear to be much disturbed by such an event, and after a short time go on as if nothing had happened. A few species, like the Indigo Bunting for instance, will sometimes abandon their own eggs should the stranger egg be removed, but apparently do not mind the loss of one or two of their own, and continue incubating just the same.

Almost invariably the nest in which one or more of these parasitic eggs have been deposited contains an incomplete set of the eggs of its rightful owners. Where the Cowbird drops an egg in the nest of a species considerably smaller than itself, as the Gnatcatcher, etc., its much larger size seems to be a positive advantage to the more rapid development of the embryo, as the egg must necessarily receive more animal heat than the smaller ones, which can scarcely come much in contact with the body of the sitting bird, and the development of the embryos in these must be more or less retarded thereby.

¹ The Oologist, Vol. X, Aug., 1893, pp. 230, 231.

It is ludicrous to see a fat, fully fledged young Cowbird following a pair of Chipping Sparrows, or some small Warbler, clamoring incessantly for food, and uttering its begging call of "seerr-seerr" most persistently, only keeping quiet while its gaping beak is filled with some suitable morsel, and stranger still to note how devoted the diminutive nurses are to their foster child. One would think that they might see through the fraud, at least after the young interloper leaves the nest, if not before, and abandon him to his fate; but the greatest attachment seems to exist between them until the Cowbird is able to shift for himself, when he leaves and joins his own kind.

It has been asserted that Cowbirds occasionally build nests and rear their own young in the West, but this is undoubtedly incorrect, and on proper investigation it will probably be found that the supposed Cowbird is really Brewer's Blackbird.

When the laying season is over they collect again in larger flocks and frequent the marshes, in company with the Blackbirds, where at that time of the year they find an abundance of food, and the return migration to their winter homes begins usually in the latter half of October.

The shell of the Cowbird's egg is compact, granulated, moderately glossy, and relatively much stronger than that of its near allies, the *Icteridæ*. The ground color varies from an almost pure white to grayish white, and less often to pale bluish or milky white, and the entire surface is usually covered with specks and blotches varying in color from chocolate to claret brown, tawny, and cinnamon rufous. In an occasional specimen the markings are confluent and the ground color is almost entirely hidden by them; in the majority, however, it is distinctly visible. These markings are usually heaviest about the larger end of the egg, and in rare instances they form an irregular wreath. The eggs vary greatly in shape, ranging from ovate to short, rounded, and elongate ovate, the first predominating.

The average measurement of one hundred and twenty-seven specimens in the United States National Museum collection is 21.45 by 16.42 millimetres, or 0.84 by 0.65 inch; the largest egg measures 25.40 by 16.76 millimetres, or 1 by 0.66 inch; the smallest, 18.03 by 15.49 millimetres, or 0.71 by 0.61 inch.

The type specimen, No. 20157 (Pl. 6, Fig. 3), represents one of the lighter-marked types, and was taken by the writer near St. Louis, Missouri, on June 24, 1873, from a nest of the Yellow-breasted Chat; this contained three other eggs, one of which was deposited by the Cowbird and two by the other species. No. 20160 (Pl. 6, Fig. 4), also from the Bendire collection, represents one of the more finely spotted eggs of this species. It was taken from a nest of the Mountain Song Sparrow, in El Paso County, Colorado, on July 2, 1874; this also contained another Cowbird's egg and three eggs of the rightful owner. Both of these are large specimens. No. 25463 (Pl. 6, Fig. 5) represents an average-sized and a heavily marked specimen in which the ground color is pretty well hidden, and was taken by Dr. A. K. Fisher, near Sing Sing, New York, from a nest of the Red-eyed Vireo, containing two eggs of its own in addition to that of the parasite, on June 6, 1880; and No. 25721 (Pl. 6, Fig. 6), in the

Ralph collection, represents one of the smaller-sized specimens, with lighter-colored markings, and was taken near Holland Patent, New York, on May 31, 1884, from a nest of a Phœbe containing four of its own eggs and two of those of the Cowbird. The two last named were evidently both laid by the same bird.

171. *Molothrus ater obscurus* (GMELIN).

DWARF COWBIRD.

Sturnus obscurus GMELIN, *Systema Naturæ*, I, ii, 1788, 804.

M[olothrus] ater var. *obscurus* COUES, *Birds of the Northwest*, 1874, 180, in text.

(B —, C 211a, R 258a, C 314, U 495a.)

GEOGRAPHICAL RANGE: Mexico and adjoining portions of the United States from southern Texas to southwestern Arizona and Lower California.

The breeding range of the Dwarf Cowbird in the United States is coincident with its geographical distribution. It can only be considered a summer resident in southern Arizona, although a few appear to winter there, as I shot an adult male on Rillito Creek, near Tucson, on January 24, 1873. It usually arrives from its winter home in southern Mexico about the middle of March, and is then found associating with different species of Blackbirds, especially Brewer's Blackbird, frequenting the vicinity of cattle ranches, roads, and cultivated fields. By April 15 the flocks have scattered, and small parties of from five to twelve may now be seen in suitable localities, such as the shrubbery along water courses, springs, etc., where other small birds are abundant. The character of its food, and its general habits as well, are similar to those of the common Cowbird, which it closely resembles, being only a trifle smaller. In middle Texas the two races intergrade to some extent, and it is claimed both breed there. In the lower Rio Grande Valley, Texas, the typical Dwarf Cowbird is common, and I found it equally so in the vicinity of Tucson, Arizona, where I have taken quite a number of its eggs.

Mr. F. Stephens writes me that it is a common summer resident as far west as the Colorado River, beyond the immediate vicinity of which he has never seen it. Mr. L. Belding found it common in the streets of San Jose del Carbo, Lower California, associating with Brewer's Blackbirds, during April, but he rarely saw it later. It is questionable if it breeds there.

Like its eastern relative, the Dwarf Cowbird drops its eggs in the nests of other birds, principally in those of species which are smaller than itself. The following is a list of those in which they have thus far been found:

<i>Contopus richardsoni</i> , Western Wood Pewee.	<i>Icterus spurius</i> , Orchard Oriole.
<i>Pyrocephalus rubineus mexicanus</i> Vermilion Flycatcher.	<i>Icterus bullocki</i> , Bullock's Oriole.
<i>Agelaius phœniceus</i> , Red-winged Blackbird.	<i>Chondestes grammacus strigatus</i> , Western Lark Sparrow.
<i>Icterus cucullatus</i> , Hooded Oriole.	<i>Amphispiza bilineata</i> , Black-throated Sparrow.
<i>Icterus cucullatus nelsoni</i> , Arizona Hooded Oriole.	<i>Peuceea carpalis</i> , Rufous-winged Sparrow.

<i>Melospiza fasciata fallax</i> , Desert Song Sparrow.	<i>Helminthophila luciae</i> , Lucy's Warbler.
<i>Embernagra rufivirgata</i> , Texas Sparrow.	<i>Dendroica aestiva sonorana</i> , Sonora Yellow Warbler.
<i>Piranga rubra cooperi</i> , Cooper's Tanager.	<i>Dendroica chrysoparia</i> , Golden-cheeked Warbler.
<i>Cardinalis cardinalis canicaudus</i> , Gray-tailed Cardinal.	<i>Geothlypis trichas occidentalis</i> , Western Maryland Yellowthroat.
<i>Sporophila moreletii sharpii</i> , Sharpe's Seed-eater.	<i>Icteria virens longicauda</i> , Long-tailed Chat.
<i>Vireo noveboracensis</i> , White-eyed Vireo.	<i>Mimus polyglottus</i> , Mockingbird.
<i>Vireo bellii</i> , Bell's Vireo.	<i>Poliophtila plumbea</i> , Plumbeous Gnatcatcher.
<i>Vireo bellii pusillus</i> , Least Vireo.	<i>Sialia mexicana</i> , Western Bluebird.

Doubtless a number of other names still remain to be added.

According to my observations, the Least Vireo seems to be oftener imposed upon, in southern Arizona at least, than any other bird, the Desert Song Sparrow, Black-throated Sparrow, and Vermilion Flycatcher following in the order named.

The earliest date known by me on which an egg of this subspecies was found is April 18, the latest August 2, showing that the laying season lasts apparently considerably longer than with *Molothrus ater*, and it appears to be at its height during the month of June.

I found it almost impossible to obtain a full set of the eggs of the Least Vireo, nearly every nest containing one or two eggs of this parasite, and usually only one or two of its own, and the latter were frequently punctured. In fact, this was so often the case that I am inclined to believe that it is done purposely and not by accident; but whether made by the beak or the claws of the bird I will not venture to say; believe, however, it is done by the latter. In many nests I found one or two of the owners' eggs thrown out and broken, and occasionally every one, the foster parent sitting on the parasite's eggs alone. Among other instances I found this to be the case in a nest of the Plumbeous Gnatcatcher, which was placed in a thick mistletoe bunch growing from a limb of a mesquite tree, about 15 feet from the ground and well hidden. I first observed the nest on June 10, 1872, when it contained a single egg; on visiting it again on the 17th the female was sitting on a couple of Dwarf Cowbird's eggs alone, and on looking on the ground I found the remnants of three eggs, which evidently had been thrown out. Bullock's Oriole may occasionally rid herself of the parasitic egg; at any rate I noticed the remains of one lying under a nest of this species, with portions of one of her own. This nest contained only three eggs of the rightful owner, and the bird was sitting on these. The largest number of Dwarf Cowbird's eggs found by me in one nest was three, that of a Desert Song Sparrow, and all of its own eggs were missing. I several times found nests containing single eggs of this parasite abandoned, and also picked up two uninjured from the ground, where they evidently had been dropped by the bird, not finding a suitable nest in time to deposit them. None of the young of the foster parents seem to survive the advent of a young Cowbird in their nest longer than two or three days, as they are soon starved by their more vigorous and voracious foster brother. After the young Dwarf Cowbird is old enough to care for itself it abandons its

foster parents and seeks the company of its own kind, which gather in small bands and rove from place to place. Later in the season, about the latter part of October, these gather into larger flocks, associating at this time with other congenial species, and shortly after they return to their winter homes in Mexico.

In general appearance and shape the eggs of the Dwarf Cowbird resemble those of the preceding species, and the same description will answer for both; but they appear on an average to be somewhat less heavily spotted, which gives them a lighter appearance, and they are also considerably smaller.

The average measurement of thirty-seven specimens in the United States National Museum collection is 19.30 by 14.99 millimetres, or 0.76 by 0.59 inch. The largest egg in this series measures 20.57 by 15.49 millimetres, or 0.81 by 0.61 inch; the smallest, 18.03 by 13.74 millimetres, or 0.71 by 0.54 inch.

The type specimens, No. 20178 and 20179 (Pl. 6, Figs. 7 and 8), both in the Bendire collection, were taken by the writer on Rillito Creek, near Tucson, Arizona, the first and smaller on June 20, 1872, from a nest of the Black-throated Sparrow, with only a single egg of its own, incubation having commenced; the second, on July 19, 1872, from a nest of the Least Vireo, containing also two of its own eggs, which were fresh. They represent about the usual amount of markings, and the last-mentioned specimen is above the average size.

172. *Calliothrus robustus* (Cabanis).

RED-EYED COWBIRD.

Psarocolinus aeneus WAGLER, Isis, 1829, 758.

Calliothrus robustus RIDGWAY, Manual of North American Birds, 1887, 589.

(B —, C —, R 259, C 315, U 496.)

GEOGRAPHICAL RANGE: Mexico and Central America, north to southern Texas, south to Panama.

The breeding range of the Red-eyed or Bronzed Cowbird, a larger and darker-colored species than the two preceding, coincides with its geographical distribution in the United States, and extends, as far as known, northward and eastward only to Bexar County, Texas, where Mr. H. P. Attwater reports it as a rare summer resident near San Antonio, and where he found one of its eggs in the nest of a Bullock's Oriole.

We are indebted to Dr. James C. Merrill, United States Army, for the addition of this interesting species to our fauna. He first recorded it in the Bulletin of the Nuttall Ornithological Club (Vol. I, 1876, p. 88), as an abundant summer resident in the vicinity of Fort Brown, Texas. A full account of the breeding habits of this species by Dr. Merrill may be found in the above-mentioned Bulletin (Vol. II, 1877, pp. 85-87), from which I extract the most interesting notes:

"My first specimens were taken at Hidalgo, on the Rio Grande, 70 miles northwest of Fort Brown, where, however, they are not so abundant as lower down the river. Here they are common throughout the year, a small propor-

tion going south in winter. Those that remain gather in large flocks with the Long-tailed Grackles, common Cowbirds, and Brewer's, Red-winged, and Yellow-headed Blackbirds; they become very tame, and the abundance of food about the picket lines attracts them for miles around. *Calliothrus robustus* is readily distinguishable in these mixed gatherings from the other species by its blood-red iris and its peculiar top-heavy appearance, caused by its habit of puffing out the feathers of the head and neck. This habit is most marked during the breeding season and in the male, but is seen throughout the year.

"About the middle of April the common Cowbird and Brewer's and the Yellow-headed Blackbirds leave for the north; the Long-tailed Grackles have formed their colonies in favorite clumps of mesquite trees; the Redwings that remain to breed have selected sites for their nests; the Dwarf Cowbirds, *Molothrus pecoris obscurus*, arrive from the south, and *Calliothrus robustus* gather in flocks by themselves and wait for their victims to build. The males have now a variety of notes, somewhat resembling those of the common Cowbird, *Molothrus pecoris*, but more harsh. During the day they scatter over the surrounding country in little companies of one or two females and half a dozen males, returning at nightfall to the vicinity of the picket lines. While the females are feeding or resting in the shade of a bush the males are eagerly paying their addresses by puffing out their feathers, as above noted, strutting up and down, and nodding and bowing in a very odd manner. Every now and then one of the males rises in the air, and, poising himself two or three feet above the female, flutters for a minute or two, following her if she moves away, and then descends to resume his puffing and bowing. This habit of fluttering in the air was what first attracted my attention to the species. In other respects their habits seem to be like those of the eastern Cowbird (*Molothrus pecoris*).

"My first egg of *Calliothrus robustus* was taken on May 14, 1876, in a Cardinal's nest. A few days before this a soldier brought me a similar egg, saying he found it in a Scissors-tail's (*Milvulus*) nest. Not recognizing it at the time, I paid little attention to him, and did not keep the egg. I soon found several others, and have taken in all twenty-two specimens the past season. All but two of these were found in nests of the Bullock's, Hooded, and Orchard Orioles. It is a curious fact that although Yellow-breasted Chats and Red-winged Blackbirds breed abundantly in places most frequented by these Cowbirds, I have but once found the latter's egg in a Chat's nest, and never in a Redwing's, though I have looked in very many of them. Perhaps they feel that the line should be drawn somewhere, and select their cousins, the Blackbirds, as coming within it. The Dwarf Cowbirds are not troubled by this scruple, however. Several of these parasitic eggs were found under interesting conditions. On six occasions I have found an egg of both Cowbirds in the same nest. In four of these there were eggs of the rightful owner,¹ who was sitting. In the other two the Cowbird's eggs were alone in the nests, which were deserted. But I have known the

¹It would be interesting to know what would have become of the three species in one nest, and had the latter been near the fort, where I could have visited them daily, I should not have taken the eggs. It is probable, however, that *Calliothrus robustus* would have disposed of the young Dwarf Cowbird as easily as of the young Orioles.

Hooded Oriole to set on an egg of *Callothrus robustus* which was on the point of hatching when found. How its own disappeared I can not say. Once two eggs of *Callothrus robustus* were found in a nest of the small Orchard Oriole (var. *affinis*). Twice I have seen a broken egg of *Callothrus robustus* under nests of Bullock's Oriole on which the owner was sitting.

"Early in June a nest of the Hooded Oriole was found, with four eggs, and one of *Callothrus robustus*, all of which I removed, leaving the nest. Happening to pass by it a few days later, I looked in, and to my surprise found two eggs of *robustus*, which were broken. These were so unlike that they were probably laid by different birds. Still another egg, and the last, was laid in the same nest within ten days. But the most remarkable instance was a nest of the small Orchard Oriole found June 20, containing three eggs of *Callothrus robustus*, while just beneath it was a whole egg of this parasite; also a broken one of this and the Dwarf Cowbirds *Molothrus obscurus*. Two of the eggs in the nest were rotten. The third, strange to say, contained a living embryo. As the nest was certainly deserted, I can only account for this by supposing that the two rotten ones were laid about the first week of June, when there was considerable rain, and that the other was deposited soon after, since which time the weather had been clear and very hot. On one occasion I found a female *Callothrus robustus* suspended from a nest of the Bullock's Oriole by a stout thread around its neck. The nest contained one young of this Cowbird, and it is probable that its parent, after depositing the egg, became entangled in the thread on hurriedly leaving the nest, and there died. It had apparently been dead about two weeks. This case supports the view that the eggs or young of the owner are thrown out by the young parasite and not removed by its parent, though I could find no trace of them beneath the nest."

Among the species imposed on by the Red-eyed Cowbird are the following:

<i>Milvulus forficatus</i> , Scissor-tailed Flycatcher.	<i>Cardinalis cardinalis canicaudus</i> , Gray-tailed Cardinal.
<i>Icterus auduboni</i> , Audubon's Oriole.	<i>Guiraca caerulea eurhyncha</i> , Western Blue Grosbeak.
<i>Icterus cucullatus</i> , Hooded Oriole.	<i>Icterus virens longicauda</i> , Long-tailed Chat.
<i>Icterus spurius</i> , Orchard Oriole.	
<i>Icterus bullocki</i> , Bullock's Oriole.	

Other species will undoubtedly have to be added to this list.

The Orioles appear to be the special victims of the Red-eyed Cowbird, and among these Audubon's seems to be the worst sufferer. In nine sets of this species in the United States National Museum collection there are only two which contain the normal number of eggs, four. In each of the other seven there are from one to three of those parasitic eggs, with one or two of their owners', and usually some of these are punctured. In none of these nests were eggs of the Dwarf Cowbird found in addition to those of the *Callothrus robustus*. The former appears to deposit its eggs in nests of the smaller Orioles only.

The eggs of the Red-eyed Cowbird are rather glossy; the shell is finely granulated and strong. Their shape varies from ovate to short and rounded

ovate. They are pale bluish green in color and unspotted, resembling the eggs of the Black-throated Sparrow and Blue Grosbeak in this respect, but are much larger.

The average measurement of thirty-eight specimens in the United States National Museum collection is 23.11 by 18.29 millimetres, or 0.91 by 0.72 inch. The largest egg of the series measures 24.64 by 18.80 millimetres, or 0.97 by 0.74 inch; the smallest, 21.84 by 16.76 millimetres, or 0.86 by 0.66 inch.

The type specimen, No. 26349 (Pl. 6, Fig. 9), from the Ralph collection, taken from a nest of Audubon's Oriole containing three eggs and also three of the Red-eyed Cowbird's, was obtained on May 8, 1893, in Cameron County, Texas, and represents about an average egg of this species.

173. *Xanthocephalus xanthocephalus* (BONAPARTE).

YELLOW-HEADED BLACKBIRD.

Icterus xanthocephalus BONAPARTE, Journal Academy Natural Sciences, Phila., V, 1826, 223.

Xanthocephalus xanthocephalus JORDAN, Manual of Vertebrates, ed. 4, 1884, 92.

(B 404, C 213, R 260, C 319, U 497.)

GEOGRAPHICAL RANGE: Western North America; from northern Mexico and Lower California, through Texas, New Mexico, Arizona, and California, north to southern British Columbia, and in the interior of the Dominion of Canada, in the Provinces of Athabasca and Keewatin, to about latitude 58° 30' N.; east to Manitoba, and in the United States regularly to Wisconsin, northern Illinois, northwestern Indiana, Missouri, and the Indian Territory. Casually to Ontario and Quebec, Canada, Pennsylvania, New York, the New England States, the District of Columbia, South Carolina, Florida, and Louisiana. Accidental in the Island of Cuba and in Greenland.

The breeding range of the Yellow-headed Blackbird is, I believe, coextensive with its regular geographical distribution, although we have no positive information that it breeds in Texas and in the Indian Territory. It is a well-known and abundant winter resident, however, along the Gulf coast and in the lower Rio Grande Valley, in Texas, and it has been observed there up to the latter part of April. In looking over the series of eggs of this species I find that the United States National Museum contains a set of three, originally part of Dr. Berlandier's collection, made in the vicinity of Matamoras, Mexico, and received from Lieutenant Couch, in 1858, which, although in a poor state of preservation, can readily be identified as belonging to this bird. But in the almost impenetrable tangle and undergrowth with which many of the lagoons in that section of country are surrounded, which localities are mainly resorted to by these birds during the breeding season, it is an easy matter to overlook even such extensive colonies as are occasionally found at that time of year on its regular breeding grounds farther north, and I therefore believe that it will yet be found nesting in Texas.

The Yellow-headed Blackbird, while common in suitable localities during the breeding season throughout portions of our Northern and Western States, is

entirely absent in many others. It is a bird of the prairies, especially such as are covered here and there with lakes, sloughs, and extensive marshes, and avoids the more arid desert tracts, extensive forests, and timber-covered mountain ranges, although in Colorado it has been observed in summer at altitudes up to 9,000 feet.

Besides the numerous localities mentioned in previous works on this subject, Dr. E. A. Mearns, United States Army, found it breeding in large numbers at Mormon Lake, in the Mogollon Mountains in Arizona. Mr. A. W. Anthony reports it as common throughout the summer in southwestern New Mexico. It is exceedingly common in the vicinity of Fort Bidwell, California, among the tules of Goose Lake, and, if possible, still more so along the low, marshy shores of Lakes Malheur and Harney, in southeastern Oregon, where I have seen it in immense numbers and examined many nests. It is likewise very common along the shores of Klamath Lake, and especially in the extensive Klamath marshes. I have also noticed it in different parts of Nevada, Idaho, and Washington, and, in fact, it seems to be generally distributed in favorable localities throughout the entire Northwest, excepting perhaps in the immediate vicinity of the seashore. Along the shores of the numerous lakes in Manitoba and Saskatchewan it seems to be equally common. Mr. R. MacFarlane forwarded a nest and a set of eggs from Cumberland House, Saskatchewan, and a skin from the Hudson Bay Post at Du Brochet, situated at the northern extremity of Reindeer Lake, in about latitude $58^{\circ} 30'$ and longitude 101° west of Greenwich, where it is said to be a moderately common summer resident. This locality marks, as far as is yet known, the most northern point of its range.

The Yellow-headed Blackbird is eminently sociable in its habits, scarcely ever seen singly, and usually breeds in large colonies. It is apparently, however, not very tolerant toward the other species of Blackbirds which frequent similar localities, and therefore rarely nests near or among them. Its notes are harsh and rasping, and when a colony of these birds is disturbed on its breeding grounds by an unwelcome intruder, and gives vent to its displeasure, the noise and commotion produced are something startling. The male, when at ease and clinging to some swaying reed or rice stalk, often indulges in a sort of song, turning and twisting its head in all sorts of unusual positions during this performance; but with all these efforts he does not succeed in uttering much else than a series of utterly indescribable squeaks. Its ordinary call note is a shrill "chäck, chäck."

It usually arrives on its breeding grounds in our Northern States during the first half of April, and correspondingly later farther north.

The food of the Yellow-headed Blackbird consists of various kinds of small seeds, such as wild rice, etc., and in farming districts it occasionally does some damage to young corn, as well as to corn in the milk, and to oat and wheat fields. This is more than compensated for, however, by the immense number of insects, including their eggs and larvæ, which it destroys, especially young locusts and grasshoppers. In the spring and fall flocks of these birds may be seen following

the plow, cleaning up everything as they go. I believe that, on the whole it does far more good than harm.

Mr. B. T. Gault writes me: "In northeastern Illinois the marshes of the Calumet and Fox Lake regions used to be favorite resorts of these birds. I have always found them nesting in the tall wild rice growing abundantly in these localities. Each nest was attached to several such stalks, at a height of 2 or 3 feet above the surface of the water, and usually in a place where it was almost out of the question to use a boat to good advantage and quite dangerous if not impossible to wade."

Mr. J. W. Preston makes the following remarks: "These birds swarm in the numerous swamps of northwestern Iowa. In one small tract of water cane I have seen over a thousand nests built among the stalks, and sometimes so closely as to touch each other. These nests are cunningly woven into clumps of last season's cane, and are choice bits of bird architecture. The materials utilized are old blades of sedges and grasses brought from shallow water and used wet. I have concealed myself among them and watched the female gathering the materials, which she does in a leisurely manner, discarding such as do not suit her. The nest is placed from 6 inches to 3 feet above the water."

Among the extensive tule marshes bordering Malheur Lake, Oregon, I have seen hundreds of these birds nesting. Here the nests were all securely fastened to several tall tule stems, or to rushes from 10 to 30 inches above the water level. Some resembled inverted cones, and measured as much as 8 or 10 inches in outer depth; the majority, however, were not nearly so deep. A well-preserved nest now before me, No. 20233, United States National Museum collection, taken on June 3, 1876, near Malheur Lake, measures exteriorly 5 inches in depth by $5\frac{1}{2}$ inches in outer diameter. The inner cup is $2\frac{1}{2}$ inches deep by $2\frac{3}{4}$ inches in diameter. The outside of the nest is composed of coarse marsh grasses and pieces of tule reeds and rushes, which are woven together while wet, but no mud is used to bind these materials together; the inner cup is lined with finer grasses, these being utilized in a dry state. The nest, although large and bulky, with walls over an inch thick, is quite light, but still strong and durable enough to withstand the heavy gales which occasionally sweep over these shallow inland lakes. I have seen only the female building, and doubt if the male assists to any great extent in this labor, but he does not abandon his mate during the season of incubation, as I have seen it stated; for, although he may not assist in these duties, he is never far away. It takes about a week to build a nest, and they are frequently not used for a week or more after being finished. In the more southern parts of its breeding range nidification usually begins during the last ten days in May, and is at its height by the middle of June, while in Saskatchewan and still farther north it is protracted to the latter part of this month. Mr. R. MacFarlane took fresh eggs in the vicinity of Cumberland House on June 30, 1890.

From two to five eggs are laid to a set, usually four; and I believe, throughout the northern parts of its range at least, only a single brood is raised in a season; an egg is deposited daily.

Incubation, as nearly as I have been able to ascertain, lasts about fourteen days, and the young are able to leave the nest in about sixteen days after hatching.

By the 1st of August the Yellow-headed Blackbirds have gathered into large flocks and then roam about in search of good feeding grounds. They fly in compact masses and at this time associate to some extent with Brewer's and the Red-winged Blackbirds. By the middle of October they gradually disappear along the northern borders of their range and move southward, wintering in our southwestern States and in northern Mexico.

The eggs of the Yellow-headed Blackbird vary in shape from ovate to elliptical and elongate ovate; the shell is finely granulated, strong, and rather glossy. The ground color varies from grayish white to pale greenish white, and this is profusely and pretty evenly blotched and speckled over the entire surface with different shades of browns, cinnamon rufous, ecru drab, and pearl gray. The markings are usually heaviest about the larger end of the egg, and sometimes a specimen is met with which shows a few fine, hair-like tracings, like those found on the eggs of the Orioles.

The average measurement of one hundred and thirty-four eggs in the United States National Museum collection is 25.83 by 17.92 millimetres, or about 1.02 by 0.71 inches. The largest egg in the series measures 28.96 by 19.81 millimetres, or 1.14 by 0.78 inches; the smallest, 23.11 by 17.53 millimetres, or 0.91 by 0.69 inch.

The type specimen, No. 20233 (Pl. 6, Fig. 10), from a set of three, was taken by the writer at Malheur Lake, near Camp Harney, Oregon, on June 3, 1876, and represents one of the coarser marked and larger eggs; Nos. 25028 and 25030 (Pl. 6, Figs. 11 and 12), both from sets of four, taken by Dr. Edgar A. Mearns, United States Army, near Fort Snelling, Minnesota, May 27, 1891, represent the finer and more common styles of markings, and show the variations in size as well, the former showing also a few hair lines which are not often found on the eggs of this species.

174. *Agelaius phœniceus* (LINNÆUS).

RED-WINGED BLACKBIRD.

Oriolus phœniceus LINNÆUS, *Systema Naturæ*, ed. 12, I, 1766, 161.

Agelaius phœniceus SWAINSON, *Fauna Boreali Americana*, II, 1831, 280.

(B 401, C 212, R 261, C 316, U 498.)

GEOGRAPHICAL RANGE: Temperate North America; north in the eastern parts of the Dominion of Canada to about latitude 49°; in the interior to Great Slave Lake and Fort Simpson, Northwest Territory to about latitude 62° N.; and on the Pacific Coast, as far as known, to southern British Columbia. South in winter to Costa Rica, Central America. Accidental in England, Italy, etc.

The breeding range of the Red-winged Blackbird, also known as the "Swamp" and "Marsh" Blackbird, is nearly coextensive with its geographical distribution both in the United States and the Dominion of Canada. It is one of

the commonest and best-known birds within our borders, breeding in all suitable localities throughout the entire country, excepting the extreme southern portions of the Florida peninsula and adjacent keys, the lower Rio Grande Valley in Texas, the lower Colorado Valley, the southern portions of Arizona, and the greater part of California west of the Sierra Nevadas, where it is replaced by closely allied forms. Beyond our northern border it breeds throughout the more temperate portions of the Dominion of Canada, attaining the most northern points of its range in the vicinity of Fort Simpson, on the Mackenzie River, and along the shores of Great Slave Lake, in the Northwest Territory; while on the Pacific Coast, as far as I am aware, it has not been noted farther north than in the southern portions of British Columbia, which seems to mark the limit of its range in this direction. Enormous flocks of these birds winter in the Southern and some of the Middle States, but the majority perhaps pass farther south, extending their migrations into Mexico, and sometimes to Costa Rica, Central America.

The Red-winged Blackbird is eminently sociable in its habits, and generally moves about in large, compact flocks, except during the breeding season, when it scatters into small colonies, and sometimes into single pairs.

It usually arrives in the Middle States about March 15, moving slowly northward, and by the last of April most of the birds are established on their breeding grounds, the males preceding the females several days.

Its favorite haunts are moist meadows adjoining the banks of small creeks and streams, boggy spring holes and ponds bordered by clumps of cat-tails, flags, rushes, and rank weeds, low islands covered with marsh grasses and a few willow and alder bushes, and particularly the large and extensive tule-bordered lakes of the interior. As the mating season arrives the males become very demonstrative in their attentions to their prospective mates, and their not unmelodious "conk-que-reeh, conk-que-reeh" may be heard in all directions. A call note like "tch-ewee, tch-ewee," an energetic "tchäck, tchäck," or "däck, däck," and a long-drawn-out, clear whistle like "zhēē-hēē, zhēē-hēē," are also frequently uttered at this time.

While the food of the Red-winged Blackbird consists to some extent of Indian corn, rice, wheat, and oats, it also feeds on many of the seeds of noxious weeds, like the ragweed and smartweed; and it destroys large numbers of cutworms and injurious insects and their larvæ. In many of the prairie States it does an immense amount of good by feeding on the myriads of locusts which overrun the country at times, as well as on their eggs when turned up by the plow. Small mollusks and newts also enter into their bill of fare, as well as wild berries in their season, and in some of the Southern States they are said to feed on the seeds of the pine. In southeastern Oregon I have seen them feed on an Ephemera locally called "May" or "salmon" fly, which makes its appearance there about June 1 in countless numbers.

While the Red-winged Blackbird undoubtedly does more or less damage in some of our farming regions—for instance, to young corn just sprouting, and

again when it is in the milk, and in the rice plantations in the South—it likewise does a great deal of good, and, excepting sections where it congregates in large numbers, it is safe to assert that the good done by it throughout the year far overbalances the harm. The young are fed almost exclusively on insects, and enormous numbers are required to feed them.

The nesting season varies somewhat in different sections of its range. In some parts of the South full sets of eggs have been found as early as the first week in April, while in others nidification begins fully a month later. In the northern half of the United States it is at its height from May 15 to June 15, and occasionally fresh eggs are found more than a month later, these probably being second broods. At Fort Resolution, on Great Slave Lake, full sets have been taken on June 7 by Messrs. Robert Kennicott and James Lockhart. In the West I found the Red-winged Blackbird common throughout Washington, Oregon, Idaho, Montana, and Nevada, and it breeds more or less abundantly in all suitable localities throughout this region.

Mr. H. P. Lawrence observed large flocks of Blackbirds, consisting of this species, the Bicolored, and Brewer's Blackbirds, near the Columbia River, below Vancouver, Washington, but they appear to become rarer near the coast. At Fort Walla Walla, Washington, a little colony nested in a swampy thicket close to the Post, at an unusually early date, April 20, 1881, and the majority of the nests contained full sets of eggs at that time, while at Camp Harney, Oregon, about 250 miles farther south, nidification began about a month later.

The nests resemble those of the preceding species in general construction, but average a trifle smaller. They are usually placed in bunches of reeds, rushes, or small bushes, from a few inches to several feet above the ground, and occasionally in a tussock of rank grass directly on the ground, mostly in swampy places close to water, and rarely any great distance away. Now and then a nest may be found placed in the forks of willow, elder, and alder bushes, from 10 to 15 feet from the ground. The nest is always securely attached to several of last year's reed and grass stems or to small branches of bushes; the materials composing it vary considerably in bulk, they are used in a wet state, and consist of different kinds of coarse marsh grass, eel grass, and strips of rotten willow and sagebrush bark, as well as of finer grasses. They are usually lined with fine grass tops, and occasionally with horsehair.

An average nest measures from $4\frac{1}{2}$ to 5 inches in outer diameter, and from $3\frac{1}{2}$ to 6 inches in depth; the inner cup is from $2\frac{1}{2}$ to 3 inches in diameter, and about the same in depth; it takes about a week to complete a nest and for it to become sufficiently dry to be used. Mr. W. E. Grover found the Red-winged Blackbirds breeding in considerable numbers on Galveston Island, Texas, the nests being generally placed in salt cedars or in Cherokee rosebushes. One of the nests sent by him to the United States National Museum collection had quite a quantity of snake exuvia incorporated in its walls, a rather unusual building material for this species.

Mr. D. C. Beard sent me a photograph of a nest of this species taken near Flushing, Long Island, New York, which was built directly on one of the Long-billed Marsh Wren, *Cistothorus palustris*; both nests were occupied and contained eggs when taken. The Cowbird imposes occasionally on this species. The number of eggs laid to a set varies from two to six, and one is laid daily until the set is completed. Sets of three and four are most often found; in the more southern portions of its range three predominate, while farther north four are the usual complement. Sets of five are uncommon, and those of six are very rare. Only a single brood is usually reared throughout the greater portion of their range.

Incubation lasts about two weeks, and the young are able to leave the nest in about sixteen days. As soon as they are large enough to provide for themselves they gather into small companies and roam over the country. In August and September they congregate in large flocks, containing many thousands, and at which time they frequently do considerable damage in certain favorite resorts.

The eggs of the Red-winged Blackbird are mostly ovate in shape; the shell is strong, finely granulated, and moderately glossy. The ground color is usually pale bluish green, and this is occasionally more or less clouded with a pale smoke-gray suffusion. They are spotted, blotched, marbled, and streaked, mostly about the larger end, with different shades of black, brown, drab, and heliotrope purple, presenting great variation in the amount, character, and style of markings. Occasionally an entirely unspotted egg is found.

The average measurement of three hundred and eighty eggs in the United States National Museum collection is 24.80 by 17.55 millimetres, or about 0.98 by 0.69 inch. The largest egg in the series measures 27.94 by 19.05 millimetres, or 1.10 by 0.75 inches; the smallest, 20.57 by 15.75 millimetres, or 0.81 by 0.62 inch.

The type specimen, No. 15037 (Pl. 6, Fig. 13), collected by Dr. Elliott Coues near Fort Macon, North Carolina, June 12, 1869, represents an egg in which the ground color is almost hidden, while No. 20199 (Pl. 6, Fig. 14), from a set of four eggs, Bendire collection, taken by the writer on April 27, 1881, near Fort Walla Walla, Washington, represents a handsome and well-marked egg. No. 26160 (Pl. 6, Fig. 15), from a set of three eggs taken by Dr. E. A. Mearns, United States Army, near Fort Clark, Texas, on July 5, 1893, represents another type, intermediate between the two previously mentioned.

The style of markings selected for the types of *Agelaius gubernator* and *Agelaius tricolor* apply likewise to eggs of this species and would answer equally well for them.

175. *Agelaius phœniceus sonoriensis* RIDGWAY.

SONORAN REDWING.

Agelaius phœnicus sonorensis RIDGWAY, Manual North American Birds, 1887, 370.
(B 401, part; C 212, part; R 261, part; C 316, part; U 498.^a)

GEOGRAPHICAL RANGE: Northern Mexico and contiguous borders of the United States, from the lower Rio Grande Valley, in Texas, and Southern Arizona west to the lower Colorado Valley, California.

The Sonoran Redwing is distinguishable from the common Red-winged Blackbird by the lighter colors of the female, its smaller bill, and its somewhat larger size. Its breeding range in the United States is confined to our extreme southern border.

Five specimens, three males and two females, now in the United States National Museum collection, taken by Dr. James C. Merrill, United States Army, at Fort Brown, Texas, are referable to this subspecies. The last two were taken on February 17 and March 19, 1877, but there are no dates on the labels attached to the males. There are also several sets of eggs in the United States National Museum collection, taken by the Doctor at the same place on May 1, 1877, which are presumably referable to this race. These are indistinguishable from those of the Red-winged Blackbirds, but as they are not absolutely identified I have not figured any of them; they average a trifle smaller.

A colony of Red-winged Blackbirds (in all probability of this subspecies) nested at the sink of the Santa Cruz River, among the flags and cat-tail rushes in the lagoon, 9 miles northwest of Tucson, Arizona, in the spring of 1872, but I did not take any of their eggs, supposing them to be the common eastern Red-winged Blackbird, which they closely resemble in all their habits and actions. They appear to be resident there, as I noticed some at all seasons of the year around my camp on Rillito Creek, which they often visited, in company with other birds, picking up scattered grain at the picket line to which my horses were tied at night.

There are no positively identified eggs of this subspecies in the United States National Museum collection, but they undoubtedly resemble those of the Red-winged Blackbird so closely as to be practically indistinguishable.

176. *Agelaius phœniceus bryanti* RIDGWAY.

BAHAMAN REDWING.

Agelaius phœnicus bryanti RIDGWAY, Manual North American Birds, 1887, 370.
(B 401, part; C 212, part; R 261, part; C 316, part; U 498*b*.)

GEOGRAPHICAL RANGE: The Bahama Islands, West Indies, the southern portions of the Florida peninsula and the adjacent keys; west casually? to the Gulf coast of Louisiana (Lake Borgne); south to Yucatan and Nicaragua, Central America.

The breeding range of the Bahaman Redwing in the United States extends through the southern portions of the Florida peninsula (the Everglades) and the

adjacent keys, north, as far as known, to Matanzas Inlet, and possibly along the Gulf coast to Louisiana.

There is a specimen in the United States National Museum collection, taken at Lake Borgne, Louisiana, showing all of the characteristics of this race, which is distinguishable from the common Red-winged Blackbird by its larger and sharper bill and smaller size. First Lieut. Wirt Robinson, Fourth Artillery, United States Army, found this subspecies breeding abundantly at Matanzas Inlet, and secured several skins which are referable to it.

Mr. C. J. Maynard, in his *Birds of Florida*, describes the habitat and nesting habits of the Bahaman Redwing as follows:

"The widespread marshes of the Everglades of Florida are covered with a luxuriant growth of tall grass, which attains to the height of 5 or even 6 feet. These vast plains form the homes of hundreds of Red-winged Blackbirds, and there they also breed. As the grass is submerged in at least a foot of water in the spring, the Blackbirds are obliged to suspend their nests near the tops of the stout stalks, of which they bring several together, weaving the leaves in the nests and around them in order to make them secure. The Everglades are seldom free from wind, which often blows a gale, waving the grass back and forth furiously, so that the birds are forced to build exceedingly compact structures or they will be blown to pieces. The nests are therefore made of the leaves of the coarse saw grass which abounds, neatly and firmly woven together. The swaying motion to which their domiciles are constantly subjected has a tendency to throw the eggs out, and would were it not that the birds, who have doubtlessly been taught by the experience of former generations, build their nests very deep, and, not content with this, they make them more secure by contracting the entrance so much that it is impossible for the eggs to fall out even when the grass bends so that the tops touch the water. I discovered the first nests in that locality on the 8th of April, and they each contained three eggs, which I afterwards found were all that were ever deposited. These, contrary to the rule among birds which lay a less number of eggs in the South than in the North, were proportionately smaller when compared with New England specimens.

"May 1 of that season found me standing on one of the small outer keys, about 100 miles south of the point last described. This islet, like many others, contained a small lagoon in the center, around which was a belt of land that supported a number of trees, mainly the kinds known as "buttonwood" and "mangrove." There were a large number of Red-winged Blackbirds breeding on this key; but I was puzzled to find the nests, for I could not see them in the trees, and there were no bushes or grass. After watching them attentively for a few moments I saw a female emerge from a small hole in a buttonwood tree, not far from the ground, and, climbing up to it, discovered the nest, which was built like that of a Bluebird. I afterwards found several in similar places, all containing eggs. For a time I could not understand why the birds had chosen these novel situations for homes, but the 'ha-ha' of a group of Fish Crows helped to enlighten me; for I knew that the predatory habits of the latter-named species renders the eggs of all birds unsafe if exposed, unless the owners are

sufficiently strong to protect them, and what the Redwings lack in strength they make up in cunning, as they placed their treasures where it was impossible for their enemies to get at them."¹

In the Ralph collection of eggs are three sets taken near Lake Worth, Florida, in the spring of 1894, which are undoubtedly referable to this subspecies. They are smaller than the eggs of the Red-winged Blackbird, eight specimens averaging 22.19 by 16.76 millimetres, or about 0.87 by 0.66 inch. I have not figured a specimen, as they are indistinguishable from those of the Red-winged Blackbird except by their smaller size.

177. *Agelaius gubernator* (WAGLER).

BICOLORED BLACKBIRD.

Psarocolius gubernator WAGLER, Isis, IV, 1832, 281.

Agelaius gubernator BONAPARTE, Geographical and Comprehensive List, 1838, 29.

(B 402, C 212a, R 261a, C 317, U 499.)

GEOGRAPHICAL RANGE: Pacific Coast districts, from western Washington south through western Oregon, and California, west of the Cascade Mountains and the Sierra Nevadas to Lower California and Mexico. Casually to western Nevada and southeastern California (Inyo County).

The breeding range of the Bicolored or Crimson-shouldered Blackbird seems to be a rather contracted one. This species was first obtained in the United States by Mr. J. K. Townsend, on the lower Columbia River, and its habitat appears to be mainly restricted to the regions west of the Cascade Mountains in Washington and Oregon and west of the Sierra Nevadas in California. Mr. Walter E. Bryant reports it as breeding near El Rosario, in Lower California. A few specimens have been taken at points east of the Sierra Nevadas, where it has been reported as breeding near Reno and along the Truckee River, Nevada. I have also reported it as nesting in the vicinity of Camp Harney, Oregon, but I am now fully convinced that I was mistaken in my identification of this species, and it seems more than probable that the other records are also questionable.

It is a very easy matter to make such misidentifications, especially in specimens not fully adult, and, after a careful study of the subject, I now believe that this species does not breed anywhere east of these mountains, in the so-called "Great Basin region."

The Bicolored Blackbird seems to be pretty generally distributed throughout such portions of the State of California, west of the Sierra Nevadas, as are adapted to its needs, wherever water is abundant. It appears to be more common in the interior than in the immediate vicinity of the coast. It is especially numerous in the Sacramento and San Joaquin valleys, and many of these birds winter there. Mr. Charles A. Allen writes me that it arrives on its breeding grounds in Marin County, California, early in March, where it breeds abundantly near Olema, as well as in Yolo and Lake counties.

¹ Birds of Florida, etc., 1881, p. 136.

Its general habits, food, call notes, etc., are similar to those of the Red-winged Blackbird; like this, it breeds among the tule, rushes, and coarse grass, either in single pairs or in colonies, in or near marshes, placing its nest in tufts of marsh grass and reeds, from 1 to 3 feet above the water, and similar materials are used in its construction.

The eggs, from two to four in number (very rarely more), resemble those of the Red-winged Blackbird, excepting that they are a trifle smaller and perhaps on an average less heavily marked, but otherwise the same description will answer for both. The breeding season in California begins usually in the last ten days of April, and continues throughout May.

Ordinarily, I believe, two broods are raised in a season, the young of the first broods gathering in flocks as soon as they are large enough to care for themselves.

The average measurement of forty-four specimens in the United States National Museum collection is 24.07 by 17.35 millimetres, or about 0.95 by 0.68 inch. The largest egg in the series measures 26.42 by 17.78 millimetres, or 1.04 by 0.70 inches; the smallest, 21.34 by 16.76 millimetres, or 0.84 by 0.66 inch.

The type specimen, No. 17599 (Pl. 6, Fig. 16), from a set of four, was taken by Mr. Charles A. Allen, near Nicasio, Marin County, California, on April 23, 1877, and represents a specimen with a smoky ground color, while No. 25351 (Pl. 6, Fig. 17), also from a set of four, in the Ralph collection, taken near Olema, California, on April 23, 1884, represents one of the ordinary types.

178. *Agelaius tricolor* (NUTTALL).

TRICOLORED BLACKBIRD.

Icterus tricolor NUTTALL, Audubon's Ornithological Biography, V, 1839, Pl. 388, Fig. I.

Agelaius tricolor BONAPARTE, Geographical and Comparative List, 1838, 29.

(B 403, C 212b, R 262, C 318, U 500.)

GEOGRAPHICAL RANGE: Southwestern Oregon, south through California, west of the Sierra Nevadas, to northern Lower California.

The breeding range of the Tricolored or Red and White Shouldered Blackbird is probably coextensive with its geographical distribution. It appears to be a resident wherever found, and, as far as I can learn, has not yet been reported from points farther north than Klamath Lake, in southwestern Oregon. Here it was first met with by Dr. J. S. Newberry, and later by Dr. James C. Merrill, United States Army, who noticed a few among the common Red-winged Blackbirds there, but did not find it breeding. I failed to observe it while stationed at Fort Klamath, and it is probably uncommon. It is known to breed abundantly in the interior valleys of California, especially in the southern and central portions of the State, but it is not found east of the Sierra Nevadas.

Mr. F. Stephens writes to me: "*Agelaius tricolor* is an abundant winter resident in the larger valleys of Los Angeles and Orange counties, occurring here in very large flocks. In summer it is somewhat rarer, but several colonies are

known to me to breed in tule marshes from sea level up to an altitude of 1,500 feet. I rarely noticed it in the higher foothills and mountains."

In Lower California Mr. A. W. Anthony reports the Tricolored Blackbird: "Rather common along the northwest coast, breeding in all fresh-water marshes; and in San Rafael Valley Mr. L. Belding found a large colony nesting in tules, May, 1885."¹

Mr. L. Belding, in his manuscript notes, which he kindly placed at my disposal, describes the breeding place of an immense colony of this species, found by him on May 10, 1879, near Stockton, California, as follows: "I noticed a flight of these birds, mostly females, coming and going from and to the center of an extensive tule marsh to a pasture some 3 miles distant from this place, not in compact flocks, but a straggling flight of individuals, which seemed to move independently of each other; those returning were laden with grasshoppers for their young. By following the birds I found their nests, which were placed in last year's tule and in a vigorous growth of that of the present season. They averaged about a nest to the square yard, and these were usually attached to the tule stems of this and last year's growth, about 2 feet, and occasionally only a foot, above the water. I examined nearly a hundred nests. The greatest number of eggs found in any one was three; the usual number was two, and many contained but a single egg or a young bird. None of the young were more than a week old. The colony, consisting of many hundreds, was apparently not thriving; some of the nests had slipped from their moorings and were capsized in the water, many young were dead, and a considerable number of the eggs were addled; all of the nests examined were built without mud."

Mr. H. W. Henshaw found a colony of these birds nesting in a dry pasture, in a patch of nettles and briars covering between 3 and 4 acres, in the Santa Clara Valley, California, on June 21, 1875. The nettles grew so dense and high (sometimes attaining a height of 12 feet) that he found it almost impossible to force his way into their midst, nor did he succeed in penetrating beyond a few yards. He remarks: "I speak within bounds when I say that two hundred pairs had here congregated to rear their young, and the odor arising from some portions was almost as strong as from the Cormorant rookeries. The nests were there by hundreds, nearly every bush holding several. These were, however, mostly old, showing that the place had served for a breeding resort for probably many years. A few of the nests were this season's and contained young, none that I saw having eggs, though could I have extended my search some would doubtless have been found. The nests were rather slight, flimsy structures, but in general resembled those made by the Redwing of the East, and were fastened on the bushes in the same way. My presence among them created a great disturbance, and the trees were soon covered with the parent birds, one and all resenting this intrusion on their old-time possessions in no gentle tones. A few days later I came across an immense flock of young birds in the streaked nesting plumage, able to take care of themselves; they had gathered thus together and fairly

¹ Birds of Lower California, California Academy of Natural Sciences, Vol. II, 1889, p. 294.

covered several small trees by the roadside. In all the number there was not a single adult bird."¹

The general habits, food, etc., of the Tricolored Blackbird are very similar to those of the eastern Redwing, but their notes are said to be quite different. The young seem to be fed almost entirely on grasshoppers, and an immense number of these insects must be yearly destroyed by them, which fully counterbalances the trifling damage they may occasionally commit in the grain fields.

From one to four eggs are laid, sets of three usually prevailing, and two broods are probably raised each year; the breeding season appears to be at its height during the first week in May.

The eggs resemble those of the Red-winged Blackbird in shape and general style of markings, averaging a trifle smaller, however; and both the ground color and the markings appear (at least in the majority of specimens before me) to be somewhat paler than in the eggs of the former, but there is not sufficient difference to require a special description.

The average measurement of forty-one specimens in the United States National Museum collection is 23.94 by 17.15 millimetres, or about 0.94 by 0.67 inch. The largest egg in the series measures 26.42 by 17.78 millimetres, or 1.04 by 0.70 inches; the smallest, 21.59 by 16.51 millimetres, or 0.85 by 0.65 inch.

The type specimens, Nos. 25354 and 25356 (Pl. 6, Figs. 18 and 19), both from the Ralph collection, each from a set of three eggs and representing the two prevailing styles of coloration, were taken near Lakeside, San Diego County, California, on May 4, 1890.

179. *Sturnella magna* (LINNÆUS).

MEADOWLARK.

Alauda magna LINNÆUS, *Systema Naturæ*, ed. 10, I, 1758, 167.

Sturnella magna SWAINSON, *Philosophical Magazine*, I, 1827, 436.

(B 406, C 214, R 263, C 320, U 501.)

GEOGRAPHICAL RANGE: Eastern North America; north in the Dominion of Canada to southern Nova Scotia, southern New Brunswick, Quebec, and Ontario to eastern Manitoba. West to Minnesota, Iowa, Missouri, eastern Kansas, the Indian Territory, and Texas. South to Florida and the Gulf coast. Accidental in England.

The well-known Meadow or Old Field Lark is a constant resident south of latitude 39°, and many winter farther north in favorable localities. It breeds throughout its range, excepting the western parts of the Indian Territory and western Texas, and in suitable places it is quite common. In our Northern States and the southern parts of the Dominion of Canada it is only a summer resident, arriving usually about April 1 and remaining ordinarily until the latter part of October and occasionally into November; while in the northeastern portions of its range it is nowhere common. Excepting during the breeding

¹Geographical Surveys West of the 100th Meridian, Wheeler, Appendix JJ, 1876, p. 249.

season it is more or less gregarious, and small flocks may often be seen roving about in search of good feeding grounds. This is especially true in the fall of the year, when several families unite, and as many as two dozen may occasionally be flushed in a field over which they scatter, roaming about independently of each other; but when one takes wing all the others in the vicinity generally follow. In the Eastern States the Meadowlark is a rather shy bird and not easily approached within gunshot, while in many parts of the South and in the Middle States it is quite the reverse and generally allows itself to be closely approached without taking wing. Its flight is rather laborious, at least in starting, and is accomplished by a series of rapid movements of the wings, alternating with short distances of sailing, and is rarely protracted. On alighting, which is almost invariably accompanied with a twitching of its tail, it usually settles on some fence rail, post, boulder, weed stalk, or on a hillock in a meadow from which it can get a good view of the surroundings, and but rarely on a limb of a tree. Its favorite resorts are meadows, fallow fields, pastures, and clearings, but in some sections, as in northern Florida, for instance, it also frequents the low, open pine woods, and nests in these.

Our handsome Meadowlark is a favorite with most people, but its clear, whistling notes, so frequently heard in the early spring, though melodious and pleasing to the ear, are not much varied.

One of its songs sounds like "héé-héé-héé-théé-hea," uttered in a clear, high key; a second or call note resembles "ééck, ééck," ending with a tremulous quaver. All of these notes, although short, are difficult to reproduce in type. Mr. W. E. Grover, of Galveston, Texas, writes me that one of their calls sounds like a long-drawn, whistled "laze-kill-déé."

Considered from an economic point of view, it is one of the best feathered friends the farmer has, and deserves the fullest protection, feeding, as it does, mainly on noxious insects and their larvæ, caterpillars, moths, grasshoppers, spiders, worms, etc., and only to a limited extent on small grain. In the late fall and winter it resorts sometimes to the roads and barnyards, where it may occasionally be seen searching among the droppings of horses for undigested particles of grain.

The Meadowlark spends the greater part of its time on the ground, and all of its food is procured there. It is rare to find one alone, and I believe it remains paired for life.

Nidification usually begins in the first half of May and lasts through the greater part of June, and occasionally fresh eggs are found during the first ten days in July, possibly second broods, but as a rule, in the northern parts of its range at least, only a single brood is raised in a season.

Both sexes assist in the construction of the nest, which is always placed on the ground, either in a natural depression or in a little hollow scratched out by the birds, alongside a bunch of grass or weeds. It is invariably well hidden, stalks and blades of grass being pulled and partly woven over it, forming a more or less complete dome or roof, generally concealing the eggs or young effectually from view. The nest proper consists of a slight lining of dry, wiry

grass, bits of stubble, weed stalks, and occasionally pine needles; the inner cup is finished with finer materials of the same kind. Occasionally a covered way, from 18 to 36 inches in length, leads to the nest, which in such cases is placed at the end of the tunnel, beside a tussock of rank grass, and in such situations they are difficult to find. The female is a close sitter, while the male shows considerable anxiety and flutters about the vicinity, often betraying the location of the nest in this way. Considerable additional work is sometimes done on the nest after the eggs have been deposited.

This bird is occasionally imposed on by the Cowbird, but not very often, and an instance has been recorded where a second nest was built over the one containing the parasitic egg. Most of the nests are placed in level meadows, but where side hills, especially those with a southern exposure, are available, it frequently selects them. The Meadowlark has many enemies, and numbers of its eggs and young are destroyed every season by vermin, etc., and by the agency of man as well. In dairy regions the mowing-machine uncovers and destroys numbers, and in many places in the New England States and in central New York it is becoming rarer with each year.

The nest of the Meadowlark varies somewhat in size and bulk according to the situation. An average one, now before me, No. 25093, United States National Museum collection, taken by Dr. William L. Ralph, measures 7 inches in outer diameter by 3 inches deep; the inner cup is 3 inches in diameter by 2 inches deep. It is composed exteriorly of coarse grass and lined with fine wire grass, and it is only partly domed.

The number of eggs to a set varies from three to seven, sets of five being most common, and one is deposited daily. Incubation lasts about fifteen or sixteen days, both sexes assisting in these duties. The young are able to leave the nest in about two weeks, which is some time before they are able to fly, and they are very adept in hiding at the slightest sign of danger. After they are able to provide for themselves they gather into small parties and remain in the vicinity where they were reared until the latter part of October, when they gradually move southward. None, as far as known, pass beyond the United States to winter. They find congenial homes at this time of the year in the more southern States, and are then especially abundant along the Gulf coast.

The eggs of the Meadowlark vary considerably both in shape and size; the majority are ovate, while others are short, elliptical, and elongate ovate. The shell is strong, closely granulated, and moderately glossy. The ground color is usually pure white; this is occasionally covered with a pale pinkish suffusion, and it is very rarely pale greenish white. The eggs are more or less profusely spotted, blotched, and speckled over the entire surface with different shades of brown, ferruginous, pale heliotrope purple, and lavender; these markings generally predominate about the larger end of the egg, and are rarely heavy enough to hide the ground color.

In some sets the markings consist mainly of a profusion of fine dots; in others the spots are well rounded and fewer in number; and again they occur

in the shape of irregular and coarse blotches, mixed with finer specks and dots; in fact, there is an endless variation in the style of markings.

The average measurement of a series of two hundred and one specimens in the United States National Museum collection is 27.75 by 20.35 millimetres, or 1.09 by 0.80 inches. The largest egg measures 30.78 by 22.61 millimetres, or 1.21 by 0.89 inches; the smallest, 21.59 by 18.29 millimetres, or 0.85 by 0.72 inch.

The type specimen, No. 23755 (Pl. 6, Fig. 20), from a set of four eggs, taken by Mr. C. W. Richmond, near Washington, District of Columbia, on May 12, 1889, has been selected to show the occasional variation in the ground color, being a pale green in this instance. No. 25858 (Pl. 6, Fig. 21), from a set of five eggs, Ralph collection, taken by Dr. William L. Ralph, in Oneida County, New York, on May 20, 1882, represents a normally colored and average-marked egg of this species.

180. *Sturnella magna mexicana* (SCLATER).

MEXICAN MEADOWLARK.

Sturnella mexicana SCLATER, Ibis, 1861, 179.

Sturnella magna var. *mexicana* BAIRD, Brewer and Ridgway, History of North American Birds, Vol. II, 1874, 172.

(B —, C —, R 263a, C 321, U 501a.)

GEOGRAPHICAL RANGE: Central and northern Mexico and contiguous border of the United States; from southern Arizona to the lower Rio Grande Valley, in Texas, and possibly along the Gulf coast to southern Florida; south to Costa Rica, Central America.

The breeding range of the Mexican Meadowlark, a somewhat smaller race than the preceding, with a smaller bill and larger and stouter feet, is confined to our southern border, as indicated above. It appears to be rather uncommon within the limits of the United States, unless we include the small, dark bird found in southern Florida, which Mr. Frank M. Chapman refers to this subspecies. He makes the following remarks about the Florida bird:

“Abundant. Comparison will not permit me to refer the small, dark Meadowlark, resident in Florida, to *Sturnella magna*, and while they are not fully typical of *Sturnella magna mexicana*, they approach it so closely as to apparently render subspecific separation impossible. The Florida birds are perhaps slightly darker above, the neck gorget is somewhat wider, and the yellow of the under parts has more of a sulphur tint than in Mexican specimens.”¹

Among the series of skins in the United States National Museum collection are specimens from Tennessee and southern Indiana which are about as dark and as small as the southern Florida birds; the difference, if any, is very trifling, and if the Florida bird is admitted to be *Sturnella magna mexicana*, these would also have to be included in this race. They certainly differ considerably from some skins examined by me, which were taken near Brownsville, Texas, and

¹The Auk, Vol. V, 1888, p. 273.

Matamoras, Mexico, and I believe another good subspecies exists in southern Texas which still remains to be described, and is not readily referable to either *Sturnella magna* or any of its recognized subspecies.

The Mexican Meadowlark was first added to our fauna by Dr. James C. Merrill, United States Army, who took specimens near Fort Brown, Texas, on August 21 and September 13, 1877. It appears to be only a summer visitor there, and was abundant from April to October. Its notes and habits do not seem to differ essentially from those of *Sturnella magna*.

Mr. F. Stephens also took both male and female of this subspecies near old Camp Crittenden, in Sonoita Valley, Arizona, on July 22 and 24, 1884, thus extending its range considerably westward, and showing that it overlaps that of the Western Meadowlark. Mr. Stephens writes: "I do not recall anything peculiar in their habits, and think I did not hear their song."

It is reported a common resident in Costa Rica, which appears to mark the southern boundary of its range in Central America.

A set of four eggs in the Ralph collection, taken near Fort Brown, Texas, May 3, 1892, is probably referable to this subspecies. They resemble the eggs of the common Meadowlark in coloration and markings, being short ovate in shape, and considerably smaller.

They measure 25.91 by 20.32, 25.65 by 20.57, 25.40 by 21.34, and 25.15 by 20.32 millimetres; or 1.02 by 0.80, 1.01 by 0.81, 1 by 0.84, and 0.99 by 0.80 inches.

The type specimen, No. 25733 (Pl. 6, Fig. 22), belongs to this set. The nest was found on a prairie, concealed by a bunch of grass, and was composed of dry grass. The eggs were fresh.

181. *Sturnella magna neglecta* (AUDUBON).

WESTERN MEADOWLARK.

Sturnella neglecta AUDUBON, Birds of America, VII, 1843, 339, Pl. 487.

Sturnella magna var. *neglecta* ALLEN, Bulletin Museum of Comparative Zoology, III, No. 2, July, 1872, 178.

(B 407, C 214a, R 264, C 322, U 501b.)

GEOGRAPHICAL RANGE: Western North America, north to southern British Columbia, southern Alberta, southwestern Saskatchewan, and western Manitoba, Dominion of Canada; east regularly to North and South Dakota, Nebraska, Kansas, western Indian Territory, and western Texas; irregularly or less regularly to Minnesota and Iowa, sparingly to Wisconsin and Illinois; south to Lower California and northern Mexico.

The breeding range of the Western Meadowlark, a somewhat paler and grayer bird than *Sturnella magna*, is coextensive with its distribution in the United States, excepting the lower Rio Grande Valley, in Texas, where it is replaced by the Mexican Meadowlark. Along the eastern border of its range in some localities it overlaps that of *Sturnella magna* for considerable distances, but does not appear to interbreed with it. The greatest difference between these

two birds is the entire dissimilarity of their song and call notes. Our western bird is universally and appropriately conceded to be by far the better songster. Dr. J. A. Allen expresses these differences very pertinently as follows:

"It [its song] differs from that of the Meadowlark in the Eastern States in the notes being louder and wilder, and at the same time more liquid, mellow, and far sweeter. They have a pensiveness and a general character remarkably in harmony with the half-dreary wildness of the primitive prairie, as though the bird had received from its surroundings their peculiar impress, while if less loud their songs would hardly reach their mates above the strong winds that almost constantly sweep over the prairies in the hot months. It differs, too, in the less frequency of the harsh, complaining chatter so conspicuous in the eastern birds, so much so that at first I suspected this to be wholly wanting."¹

It is almost impossible to do justice on paper to some of the exquisite strains uttered by this bird, and being no musician I shall not attempt it. I can only compare it in some respects to the matchless, clear, tinkling utterances of the finest of our western songsters, Townsend's Solitaire, and I refer the reader for further information to Mr. Charles N. Allen's paper on this subject in the Bulletin of the Nuttall Ornithological Club (Vol. 6, 1881, pp. 145-150).

Mr. R. H. Lawrence sends me an imitation of one of its songs as noted by him on October 25, 1892, near Ridgefield, Clarke County, Washington, which he renders as follows: "Hu-er-hu, whick-ée, hu-er-hu-wéer," given with spirit and ringing clearness. One of its commoner songs is said by Mr. Charles A. Keeler to resemble the syllables "twee-tweedle-tee-te-twe."

The Western Meadowlark, like its eastern relative, is a hardy bird, and many winter in some of the warmer valleys of Washington and Idaho, but in the late fall the majority retire farther south to California, Arizona, and northern Mexico, usually returning to their breeding grounds during March.

In Colorado and Arizona it has been met with in summer at altitudes of from 8,000 to 10,000 feet.

Its general habits resemble those of the eastern Meadowlark, and, like this bird, it prefers rather open country, meadow and prairie lands, and especially the vicinity of streams, where a luxuriant growth of grass is usually to be found. In the thinly settled regions in the West it is exceedingly tame and familiar, and may frequently be seen perched on the roofs of houses and outbuildings, pouring forth its clear, ringing, and melodious notes, which can be heard for considerable distances. One of its most common call notes sounds like "tchäeck," or "äeck."

Its food consists principally of small beetles, grasshoppers and their eggs, and numerous other insects; even the large, repulsive-looking black crickets, which are so numerous and destructive in some seasons in the West, are not rejected by them, and only when such food can not be obtained does it feed on small grains and different wild seeds. It is unquestionably one of the best friends the farmer has, and fully deserves his good will and protection.

¹Memoirs Boston Society of Natural History, I, Pt. IV, 1868, pp. 496, 497.

Dr. Coues, in *Birds of the Northwest*, 1874 (p. 192), writes: "In April, before pairing, hundreds used to frequent daily the parade ground of Fort Randall, where, as the grass was yet scarcely sprouted, good opportunity was offered of observing their characteristic habit—one not so generally known as it should be, since it is related to the peculiar shape of the bill. The birds may be seen scattered all over the ground, busily tugging at something; and on walking over the scene of their operations, the ground, newly softened by the spring thaw, is seen to be riddled with thousands of little holes, which the birds make in search of food. The holes are quite smooth, not a turning over of the surface of the ground, but clean borings, like those made by sinking in the end of a light walking stick, just as if the birds inserted their bills and then worked them about till the holes were of sufficient size. Whether they bored at random, or were guided by some sense in finding their prey, and what particular objects they were searching for, I did not ascertain; but the habit was so fixed and so continually persevered in as to attract general attention."

Although not quite certain, I think I can account for the actions of the birds observed by the Doctor. They were looking for and feeding on the eggs of the locust, which are deposited just below the surface of the ground. I have noticed the same thing at Camp Harney, Oregon, where these birds were likewise very abundant. One or two pairs nested every season on the edge of the parade ground, among bunches of dry grass growing beside the driveway around it, and within a few yards of the officers' quarters.

In the more northern portions of its breeding range nidification ordinarily commences about the first week in May, rarely earlier, and it takes usually about a week to complete the nest. This is generally placed in a slight natural depression, or in one made by the birds, at the base of a bunch of thick rye grass, the dry blades of the previous year hanging down from the side and hiding the nest naturally, or a number of blades are pulled down, covering the nest and forming an arch over it. Some of these structures are exceedingly well hidden, and show considerable ingenuity on the part of the builders. Occasionally where the grass is dense enough to permit it, the nest is approached by a covered way, leading to the nest proper, sometimes fully 4 feet away. The entrance resembles the runway of some small rodent. The inner lining of the nest consists ordinarily of dry grass, on which the eggs are deposited, and resembles that of the common Meadowlark in every respect.

Mr. A. W. Anthony writes that he found a nest containing six eggs in an open field, near Beaverton, Oregon, May 21, in which incubation had commenced, the nest being placed in a hole in the ground fully 8 inches deep; and at San Quentin, Lower California, he found it nesting in the salt marshes about the bay, a set of four fresh eggs being taken on March 21.

Throughout the greater part of its range full sets of eggs are usually found during the last half of May and up to the middle of June. In western Texas, in Concho and Tom Green counties, Mr. William Lloyd reports finding two fresh eggs of this subspecies on March 27, 1882, and a full set of five eggs on April 15, 1883.

The earliest dates on which eggs in the United States National Museum collection have been taken, are April 13, 1893, at Santa Ysabel, San Diego County, California, collected by Mr. H. W. Henshaw, and a set of four fresh eggs, taken by Dr. A. K. Fisher, United States Department of Agriculture, at Wilcox, Arizona, April 22, 1892; a set of three was also taken by the writer at Camp Harney, Oregon, April 22, 1877, an unusually early date for this locality. Along our southern border the Western Meadowlark nests fully a month earlier than farther north, and at least two broods are raised here in a season; but I believe that second broods are not infrequent in favorable localities considerably farther north, where fresh eggs are sometimes found as late as the second week in July. It is one of the species occasionally imposed on by the Cowbird.

Both sexes assist in the construction of the nest and also in incubation, which lasts about fifteen days. An egg is deposited daily until the set is completed. The young leave the nest before they are able to fly, depending for safety on hiding themselves in the grass, and they are cared for by the parents until they can provide for themselves. When they are able to do this they gather into small companies and roam over the surrounding country. I do not believe that any of the young of the year remain in our Northwestern States through the winter; they probably move slowly southward in the late fall.

From three to seven eggs are laid to a set, five being most commonly found. Sets of four and six are not infrequent, but sets of seven are very rare.

I can not detect any difference between the eggs of this subspecies and those of the eastern Meadowlark excepting in size. The eggs of the Western Meadowlark appear to average a trifle larger as a rule; otherwise the same description will answer for both.

The average measurement of two hundred and six specimens in the United States National Museum collection is 28.33 by 20.60 millimetres, or about 1.12 by 0.81 inches. The largest egg in the series measures 30.78 by 21.84 millimetres, or 1.21 by 0.86 inches; the smallest, 25.65 by 20.07 millimetres, or 1.01 by 0.79 inches.

The type specimens, Nos. 20275 and 20283 (Pl. 6, Figs. 23 and 24), both from sets of five, were taken by the writer, the first at Camp Harney, June 3, 1876, the last at Fort Klamath, Oregon, June 7, 1882.

Fig. 23 represents a specimen with very few fine markings, somewhat below the average size; fig. 24, a good-sized egg of the better-marked type of coloration. There are no eggs among the series of *Sturnella magna* that are as lightly marked as fig. 23; but there is a still lighter-marked set of five eggs among the series under consideration, taken near Ogden, Utah, on June 7, 1871. With these two exceptions, I can not see any difference, as the light-green ground color found now and then in the eggs of *Sturnella magna* occurs likewise, though very rarely, in the western form.

182. *Icterus icterus* (LINNÆUS).

TROUPIAL

Oriolus icterus LINNÆUS, *Systemæ Naturæ*, ed. 12, I, 1766, 161.

Icterus icterus RIDGWAY, *Proceedings U. S. National Museum*, VIII, 1885, 355.

(B 408, C —, R 265, C 323, U (502).)

GEOGRAPHICAL RANGE: Coast regions of Colombia and Venezuela, South America, and the Island of Trinidad. (West Indies; introduced.) Accidental in South Carolina (Charleston).

The Troupial, a South American species, can only be considered a straggler in the United States, and is admitted to our fauna on the strength of a single specimen shot by Mr. John H. Audubon in Charleston, South Carolina. Very little has yet been written on the life history of this bird. It is said to be a common resident of the coast districts of Colombia and Venezuela, South America, and of the Island of Trinidad, and to be an accidental visitor to some of the West India islands. Its eggs, usually four in number, are described as having a ground color of reddish drab, and as being very generally blotched with markings of a deep claret brown and faint purple, the markings being deeper and larger at one end. The nest is said to be a long, pensile structure, suspended from slender limbs of trees and difficult to reach. There are no eggs of this species in the United States National Museum collection.

183. *Icterus gularis* WAGLER.

GULAR ORIOLE.

Icterus gularis WAGLER, *Isis*, 1829, p. 754.

(B —, C —, R —, C —, U —.)

GEOGRAPHICAL RANGE: From Honduras and Guatemala, Central America, through southern Mexico; north to the State of Tamaulipas, Mexico, and southern Louisiana.

This large and handsome Oriole claims a place in our fauna from the fact that a specimen was obtained in southern Louisiana, which I recorded in "The Auk" (Vol. X, pp. 366, 367), and which I supposed at the time to be referable to *Icterus gularis yucatanensis* (Von Berlepsch), on the strength of Mr. R. Ridgway's identification. He has since changed his opinion and writes as follows: "The identification was made when the series of specimens in the National Museum collection of both forms was very meager, and was based on color alone, the intense orange being supposed to be peculiar to the Yucatan bird. A fine series of the latter, subsequently received from Dr. Gaumer, as well as a considerable number of true *gularis* from eastern Mexico, shows that the supposed color difference, while in the main reliable, is not a constant character, but that there is a constant and very decided difference in the proportions between the two forms which will serve to readily separate them. The Louisiana specimen

is true *gularis* as to proportions, and represents the maximum brightness." There is a single specimen (a very highly colored male) in the collection of the United States Department of Agriculture, taken on March 21, 1891, at Hidalgo, Tamaulipas, which, as far as I know, marks the northern limits of its range in Mexico.

The following notes on this species were originally published by me in the article above quoted:

"Mr. E. A. McIlhenny recently sent me for identification a skin of a handsome Oriole, which proves to be this subspecies, and which he kindly presented to the collection of the United States National Museum here. He shot the bird on June 3, 1893, on Avery's Island, New Iberia Parish, Louisiana, from a flock of four; and he writes that, although these birds were quite tame, he only shot the one, in the hope that the remaining ones would bring others there. His attention was first called to them by their unfamiliar whistle, which is a soft, flute-like note, expressed by the word 'whae' about as well as anything; this is repeated from time to time as the birds move from limb to limb in search of food. On dissecting the specimen he found a number of small green caterpillars and several spiders, but their principal food seemed to consist of the small purple figs, which were just ripe. While in search of food they move about exactly as the Baltimore Oriole does, swinging from slender twigs head downward, looking under limbs for insects. He observed the remaining three birds again on June 5 in some fig trees in the plantation garden.

"Although this beautiful Oriole may be an irregular, it appears to be sometimes a common summer visitor along the Gulf coast of Louisiana, and less frequently perhaps of Mississippi as well, as the following notes will show; and it seems even probable that it occasionally breeds within our borders. Mr. McIlhenny had already obtained a specimen of this Oriole two years previously, and sent me the following extracts, relating to its occurrence, copied from his handbook:

"*May 17, 1891.*—John Goffney brought me to-day a beautiful bird that he killed in the swamp back of the sugarhouse. It is undoubtedly an Oriole, but one I have never seen before. Owing to the poor condition of the plumage, I did not make a skin of it. The markings are: Head, breast, under and upper tail coverts, orange; wings, black, with orange markings at their base; back, black from base of neck to upper tail coverts. It is a male, and much larger than the Baltimore Oriole. On dissection the only food found was a few insects and three small caterpillars.

"*August 3, 1892.*—To-day I went out to Mr. Herter's rice field to try and get some of the birds I hear feed there. I met J. Mason and induced him to go with me. We arrived there quite early and saw a flock of about twenty of the birds I was after; they were feeding on the rice in company with Bobolinks and Red-winged Blackbirds. We found them very wild, and it was impossible to get a shot. The men who mind the rice told me they sometimes killed a few, and they saw some every year in these fields. I went to the house of a negro who had killed some the day before to see if I could get any, but found they

had all been used for food. I saw, however, the heads, wings, and feathers of several specimens, and think that the birds are undoubtedly the same as the one brought me by John Goffney on May 17 of last year, that it is an Oriole I do not doubt.

“On showing the specimen killed on June 3, 1893, to Mr. Allen Mehle, on the 14th of the same month, he told me that a flock of about two hundred of these birds came to his place at Mississippi City, Mississippi, in July, 1892, and remained there for some time. Numbers of them were killed and several were sent to a taxidermist in New Orleans, but he did not know his name. He is positive it is the same bird, and as no one knew what they were, he had some mounted.”

In his letter of September 12, 1893, Mr. McIlhenny writes me as follows: “I showed the skin to Capt. Jim Hare, of the Trinity Shoal light-ship, before I sent it to you, and he told me that two birds of exactly the same appearance had struck the light and had been killed this spring, in April. His ship is 60 miles out to sea and due south of here. Captain Hare tells me that he often sees large flocks of small birds flying high in the air during their migrations.”

In a more recent letter Mr. E. A. McIlhenny sent me some additional information on this species, taken from his field notes. Under date of June 3, 1894, he says: “While in search of nests to-day near the salt mine, I saw a male ? of the large Oriole I found here last year; I had a good view of him, being quite near, but unfortunately had no gun.” Under date of June 16 he made the following entry: “Derouin told me to-day that he had seen about twenty of the large Orioles (like those he killed last year) in a field, and his father, who had also seen them, confirmed his statement, but I failed to find them. I offered him a reward then for every one he brought me in good condition, but a few days after this I left for Greenland. On my return here, October 1, I found that five of these birds had been killed by this party, as near as I could learn, about August 20, and were brought to my house; but as no one there could skin them, they were thrown away.”

The fact that these birds have now been seen regularly on Avery's Island, Louisiana, for several seasons and throughout the summer, certainly indicates that they are not casual stragglers, but regular summer residents, and probably breed there, and possibly also along the Gulf coast of Texas.

The only description of the egg of this species I have been able to find is that published by Mr. R. Owen in “The Ibis” (Vol. III, 1861, pp. 62, 63), who took a female and one egg near San Geronimo, Guatemala, on June 8, 1860. The egg is described as a pale gray, blotched and streaked with very dark brown; it measures 1 by 0.70 inch.

The nest probably resembles that of Audubon's Oriole, but I have been unable to find a description of it.

184. *Icterus audubonii* GIRAUD.

AUDUBON'S ORIOLE.

Icterus audubonii GIRAUD, Sixteen Texas Birds, 1841, 3.
(B 409, C 220, R 266, C 330, U 503.)

GEOGRAPHICAL RANGE: Central and eastern Mexico, from Juguila, Oaxaca, north to southern Texas (Bexar County).

Within the borders of the United States the breeding range of Audubon's Oriole appears to be confined to the lower Rio Grande Valley, where it is not uncommon in suitable localities and a resident throughout the year. Mr. H. P. Attwater, in his List of Birds Observed in the Vicinity of San Antonio, Bexar County, Texas, makes the following remarks:

"This species may perhaps be most properly described as a rare winter wanderer. I first observed it on March 27, 1890, when I secured a fine male among the tall pecan timber on the San Antonio River, just south of the city. I was attracted by the bird's note. I did not observe it again until 1891, when I obtained three specimens out of a flock of about eight or ten, at the same place, on February 13. The next day they were all gone, and I have never come across any since. Mr. Toudouze describes some birds (to me) which were new to him, and which he noticed on the Medina River, about the same time, which, from his description, were no doubt this species."¹

Dr. James C. Merrill, United States Army, in his List of Birds Observed in the Vicinity of Fort Brown, Texas, writes as follows about this species:

"This fine Oriole is found in moderate abundance, and is the only species that is resident. During the summer months it is usually found in deep woods, at some distance from houses, but during the winter it is less shy and retiring. They are frequently captured and offered for sale by Mexicans in this vicinity, but several I have kept would not sing at all in captivity. When free their usual song is a prolonged and repeated whistle of extraordinary mellowness and sweetness, each note varying in pitch from the preceding. If once heard, it can never be forgotten."²

This is one of the sixteen new species of birds described by Mr. J. P. Giraud in the Annals of the New York Lyceum of Natural History, in 1841, from specimens collected in Texas in 1838. Some time afterwards Mr. John H. Clark, the naturalist attached to the Mexican Boundary Survey, obtained several specimens near Fort Ringgold, Texas. He reported it as not abundant, and its quiet manners and secluded habits prevented it from being very conspicuous. It was most frequently observed by him feeding on the fruit of the hackberry, but whenever approached while thus feeding it always showed signs of uneasiness, and soon after sought refuge in some place of greater concealment. Usually pairs were to be seen keeping close together, apparently preferring the thick

¹ The Auk, Vol. IX, 1892, p. 238.

² Proceedings of the U. S. National Museum, Vol. I, 1878, p. 134.

foliage found on the margins of ponds or in the old bed of the river. They did not communicate with each other by any note, and Mr. Clark was struck by their remarkable silence. Their habits seemed to him very different from those of any other Oriole with which he was acquainted.¹

Like most Orioles, this bird undoubtedly feeds to a great extent on various insects, caterpillars, etc., and probably only occasionally on berries.

The first fully authenticated nests and eggs of this species were described by Mr. George B. Sennett, from specimens taken by him near Lomita, Texas, in May, 1878; and since then the United States National Museum has received a fine series of their eggs from Dr. William L. Ralph, all taken in the vicinity of Fort Brown, Texas. The nest of this Oriole is usually placed in mesquite trees, in thickets and open woods, from 6 to 14 feet from the ground. It is a semipensile structure, woven of fine, wire-like grass used while still green, and resembles those of the Hooded and Orchard Orioles, which are much better known. The nest is firmly attached both on the top and sides, to small branches and growing twigs, and, for the size of the bird, it appears rather small. One, now before me measures 3 inches in depth inside by about the same in inner diameter. The rim of the nest is somewhat contracted to prevent the eggs from being thrown out during high winds. The inner lining consists of somewhat finer grass tops, which still retain considerable strength, and are even now, when perfectly dry, difficult to break. Only a single nest of those found was placed in a bunch of Spanish moss, and this was suspended within reach of the ground; the others were all attached to small twigs.

Audubon's Oriole seems to be greatly imposed upon by the Red-eyed Cowbird; half of the sets in the collection contain from one to three of these parasitic eggs; but none of the equally common Dwarf Cowbird have, as far as I am aware, yet been found in them.

Nidification begins sometimes early in April, but usually about the last week in this month. Fresh eggs have been taken on April 23 and as late as June 8. Attempts are probably frequently made to rear two broods in a season, but many of them are unquestionably destroyed each year by the Red-eyed Cowbird, as well as through other causes.

The number of eggs to a set varies from three to five. Sets of one or two eggs of this Oriole, with two or three Cowbirds' eggs, seem to be most frequently found, some of the first-named eggs being thrown out to make room. The eggs differ somewhat in the character of their markings from those of the remainder of our Orioles; they are ovate and elongate ovate in shape, and the shell is rather frail and lusterless. The ground color is either pale bluish or grayish white, and occasionally the egg is only slightly flecked with fine markings and a few hair lines of different shades of brown and dark purple, these being nearly evenly distributed over the surface. In others the ground color is partly obscured with a pale purple suffusion, and more profusely blotched and streaked with different shades of claret brown, purple, ferruginous, and lavender, resembling somewhat

¹ History of North American Birds, 1874, Vol. II, p. 187.

certain styles of Brewer's Blackbirds' eggs, while an occasional set is profusely blotched with coarse, heavy markings of cinnamon rufous and numerous finer spots of the same tint, these almost completely hiding the ground color. The markings are generally heaviest about the larger end of the egg.

The average measurement of twenty-eight specimens in the United States National Museum collection is 25.15 by 17.98 millimetres, or 0.99 by 0.71 inch. The largest egg of the series measures 26.42 by 18.80 millimetres, or 1.04 by 0.74 inches; the smallest, 23.62 by 17.78 millimetres, or 0.93 by 0.70 inch.

The type specimens are all from the Ralph collection. No. 25536 (Pl. 6, Fig. 25), from a set of two eggs taken in Cameron County, Texas, May 7, 1892, represents one of the lighter-marked styles of eggs; No. 25538 (Pl. 6, Fig. 26), from a set of three taken on the same date and in the same locality as the former, containing also an egg of the Red-eyed Cowbird, represents one of the more common types; and No. 26349 (Pl. 6, Fig. 27), from a set of six eggs (three eggs of the owner and three of the Red-eyed Cowbird) taken on May 8, 1893 (same place as above), represents one of the heavier-marked eggs of this species.

185. *Icterus parisorum* BONAPARTE

SCOTT'S ORIOLE.

Icterus parisorum BONAPARTE, Proceedings Zoological Society, 1837, 109.
(B 411, C 219, R 268, C 329, U 504.)

GEOGRAPHICAL RANGE: Table-lands of Mexico, from Puebla and Vera Cruz north through western Texas, New Mexico, Arizona, and southern California to southern Nevada and southwestern Utah to about latitude 38°; Lower California.

The range of Scott's or the Mountain Oriole in the United States has been very materially increased within the last few years. It has been found by Mr. E. W. Nelson in central New Mexico, in the vicinity of Santa Fe, in July, 1890, and by different members of Dr. C. Hart Merriam's exploring parties of the Death Valley Expedition, in southeastern California and southern Nevada, in the spring and summer of 1891, while Dr. Merriam himself found it in the Beaverdam Mountains, in southwestern Utah, and it appears to be generally distributed throughout these regions, being fairly common in suitable localities.

The breeding range in the United States is coincident with its geographical distribution.

In Texas it does not appear to be found in the lower Rio-Grande Valley, but seems to be restricted to the extreme western parts of the State only. Dr. A. K. Fisher, who is familiar with this species, tells me that he saw an adult male of Scott's Oriole among the yuccas at Eagle Flat, 15 miles east of Sierra Blanca, El Paso County, on May 8, 1894, this being the only positive Texas record I know of.

The skin in the United States National Museum collection on which the older Texas record is based was taken by one of the Pacific Railroad surveying parties

in 1856, and is labeled simply "Pecos." From my knowledge of the country (having been in New Mexico at the time) I am satisfied that it really came from near the head waters of the Pecos River, in central New Mexico, and in all probability from the vicinity of the place where this species has since been taken by Mr. Nelson, and not from the lower Pecos, in western Texas, as has been supposed.

Scott's Oriole is only a summer resident with us, arriving usually along our southern border about the last half of March or during the first week in April, and moving slowly northward to its breeding grounds.

Mr. F. Stephens writes: "In Arizona this species seems to be a rather rare summer resident of the foothills and lower part of the mountains, breeding up to the lower edge of the pines, but in migrating it passes well up into these. In Arizona I have seen it nest in the yucca, sycamore, oak, and pine trees; one nest found in an oak was not even semipensile, being supported at the sides and below by the upright branches between which it was placed. June and July appear to be the principal breeding months. In California Scott's Oriole is a rather rare summer resident of the deserts, principally the borders of the Mohave Desert. I found an old nest in a palm tree on the border of the Colorado Desert that I believe to have been built by this species. In the spring migration a few birds wander into the mountains, and occasionally they cross over the divide into the drainage toward the Pacific. In California the migration commences near the end of March, when this bird may be found in the foothills bordering the Colorado Desert. It is shy and restless; its song is clear, loud, and, to my ear, very musical; its greatest defect is its briefness, being about the shortest Oriole song I know."

Mr. A. W. Anthony, in a letter dated July 8, 1894, says: "*Icterus parisorum* was often seen about my camp south of San Quentin, Lower California, and it is rather common at the Mission of San Fernando. I shot one just below the United States boundary, and saw several others within 3 or 4 miles of the line, thus practically adding it to the list of San Diego County west of the range."

Personally I first met with Scott's Oriole in the spring of 1872, and found it rather rare in the foothills along the southwestern slopes of the Santa Catalina Mountains, in the vicinity of my camp on Rillito Creek, near Tucson, Arizona. In 1884 Mr. W. E. D. Scott was more fortunate and found this Oriole fairly common on the opposite slopes of the same mountains, some 50 miles northeast from where I had been located in 1872. He published a very interesting account of the breeding habits of this bird in "The Auk" (Vol. II, 1885, pp. 1-7), to which I refer readers for further information. In this vicinity he met with it at altitudes of from 3,000 to 8,000 feet.

Mr. Scott says: "Few birds sing more incessantly, and, in fact, I do not recall a species in the Eastern and Middle States that is to be heard so frequently. The males are, of course, the chief performers, but now and again, near a nest, while watching the birds, I would detect a female singing the same glad song, only more softly. At the earliest daybreak and all day long, even when the

sun is at its highest, and during the great heat of the afternoon, its very musical whistle is one of the few bird songs that are ever present."

Their food consists mainly of grasshoppers, small beetles, caterpillars, butterflies, larvæ, etc., as well as of berries and fruits. In Suharita Pass, between the Santa Catalina and Rincon mountains, near Tucson, Arizona I have seen them eating the ripe fig-like fruit of the giant cactus.

I found my first occupied nest of Scott's Oriole on June 4, 1872, on the dry plains southeast of my camp on Rillito Creek, fully 3 miles from the nearest water. I had previously observed some old nests attached to the tops of some tall tree yuccas, and passing a clump of these at this time, I noticed a fresh nest fastened to the leaves of one of the tallest trees. It was placed fully 10 feet from the ground, and the only way I could reach it was to stand on my horse, which I did, and secured the eggs, three in number, in which incubation had commenced. The nest was so securely fastened to the surrounding bayonet-shaped leaves that I could not pull it away, and only succeeded in cutting my hand severely in trying to do so. The nest was composed of yucca fibers, sacaton, and grama grass, and lined with a little horsehair. The upper rim of the nest was not contracted, and it was a strong, well-built structure.

A well-preserved nest, now before me, taken by Dr. A. K. Fisher, United States Department of Agriculture, near Shepherd's Canyon, Coso Valley, California, on May 11, 1891, was situated on the under side of a horizontal limb of a giant yucca (*Yucca arborescens*), about 6 feet from the ground. The edges of the leaves to which the nest was attached were hacked and lacerated so as to receive the threads and horsehair suspending it. The structure itself is substantially built of green grass and dry yucca fiber, and it is lined with finer hemp-like materials from the core of this plant. The walls and bottom of the nest are far thicker than in most Orioles' nests. Externally the nest measures $3\frac{1}{2}$ inches in depth by 5 inches in its longer diameter and 4 inches at the narrowest point. The inner cup is oval in shape, $2\frac{1}{2}$ inches deep and $3\frac{3}{4}$ by 3 inches wide. This nest, when first found, on May 7, contained two eggs; on a subsequent visit, May 11, they had disappeared, and the nest was partly pulled down.

Capt. W. L. Carpenter, United States Army, found a nest and two eggs of this species near Prescott, Arizona, on May 22, 1891, in a low, bushy pine, about 8 feet from the ground, fastened securely to a lot of pine needles among which it was built; while Mr. G. P. Wilcox found another, on June 28, 1892, containing three eggs, suspended from a limb of a small oak, near Fort Huachuca, Arizona.

While the different kinds of large tree yuccas unquestionably furnish the favorite nesting sites for this species within the borders of the United States, low trees of other species, as already stated, including junipers, are also used to a considerable extent. In Lower California, according to Mr. A. W. Anthony, it nests also in the thorny branches of the candlewood (*Fouquieria columnaris*), and Mr. Xantus reports it breeding there in bunches of moss and in hop and other vines suspended from cacti. He mentions finding one nest in a bunch of weeds growing out of a crevice in a perpendicular rock. According to Mr. L. Belding, it is known as the Mountain Oriole in Lower California.

From two to four eggs are laid (usually three), and probably two broods are raised in the more southern parts of their range in a season. They are ovate and elongate ovate in shape. The shell is thin, rather close grained, and without luster.

The ground color is pale blue, which fades considerably in the course of time, and this is blotched, streaked, and spotted, principally about the larger end of the egg, with different shades of black, mouse, and pearl gray in some specimens, and with fine claret brown, russet, ferruginous, and lavender dots and specks in others.

The average measurement of twenty-five specimens in the United States National Museum collection is 23.86 by 16.98 millimetres, or about 0.94 by 0.67 inch. The largest egg in this series measures 26.67 by 17.27 millimetres, or 1.05 by 0.68 inches; the smallest, 23.11 by 15.49 millimetres, or 0.91 by 0.61 inch.

Of the type specimens, No. 20228 (Pl. 6, Fig. 28), from a set of three eggs, Bendire collection, was taken by the writer, as already stated; and No. 25225 (Pl. 6, Fig. 29), also from a set of three, was taken by Mr. G. P. Wilcox, near Fort Huachuca, Arizona, on June 28, 1892.

186. *Icterus cucullatus* SWAINSON.

HOODED ORIOLE.

Icterus cucullatus SWAINSON, Philosophical Magazine, I, 1827, 436.
(B 413, C 218, R 269, C 328, U 505.)

GEOGRAPHICAL RANGE: Southern and eastern Mexico, north to the lower Rio Grande Valley, in Texas; south to Honduras, Central America.

The breeding range of the Hooded Oriole within the United States is rather a restricted one, being confined to the lower Rio Grande Valley of Texas, where it is an abundant summer resident.

Dr. James C. Merrill, United States Army, in his Notes on the Ornithology of Texas, published in the Proceedings of the United States National Museum (Vol. I, 1878, pp. 134, 135), says: "*Icterus cucullatus* is usually found in woods. The nests of this bird found here are perfectly characteristic, and can not be confounded with those of any allied species. They are usually found in one of the two following situations: The first and most frequent is in a bunch of hanging moss, usually at no great height from the ground; when so placed, the nests are formed almost entirely by hollowing out and matting the moss, with a few filaments of a dark, hair-like moss as lining; the second situation is in a bush (the name of which I do not know) growing to a height of about 6 feet, a nearly bare stem, throwing out two or three irregular masses of leaves at the top. These bunches of dark-green leaves conceal the nest admirably. It is constructed of filaments of the hair-like moss just referred to, with a little Spanish moss, wool, or a few feathers for the lining. They are rather wide and shallow

for Orioles' nests, and though strong they appear thin and delicate. A few pairs build in Spanish bayonets (*yucca*) growing on sand ridges in the salt prairies; here the nests are built chiefly of the dry, tough fibers of this plant, with a little wool or thistle down as lining; they are placed among the dead and depressed leaves, two or three of which are used as supports."

Mr. George B. Sennett likewise reports this as the most abundant of all the Orioles on the lower Rio Grande. He says: "They were continually peering about the thatched roof of our house and the arbors adjoining for insects; they were more familiar than any of the other Orioles about the ranch; the birds are very active and so full of song that the woods are filled with music all day long."¹

Their food, like that of the other species of this genus, consists mainly of insects and their larvæ. The nests are mostly placed from 6 to 12 feet from the ground, rarely farther up, but Mr. Sennett reports having found some fully 30 feet high. They are most frequently placed in the hanging moss in various kinds of trees, mesquite predominating. The nests built in yuccas are usually entirely constructed of the fiber obtained from the dry leaves of this plant, which are exceedingly well adapted for this purpose, and such nests retain their shape much better than those built of moss. One now before me, in an excellent state of preservation, measures exteriorly $3\frac{1}{2}$ inches in depth by 3 inches in width; the inner cup is $2\frac{1}{2}$ inches wide by 2 inches deep. It is built throughout of yucca fiber and contains no lining.

Nidification begins in April, and the earliest record of a full clutch of eggs having been taken is April 17, a set of five; the latest was July 5; probably two broods are raised in a season. The Hooded Oriole is considerably imposed upon by both the Red-eyed and Dwarf Cowbirds, and in a few instances parasitic eggs of both species are found in the same nest. It would be interesting to ascertain which of the Cowbirds survived. Probably the young Red-eyed Cowbird proves to be too much for the smaller Dwarf Cowbird and gradually starves it to death. None of these birds winter with us; they retire farther south in October.

The number of eggs laid to a set varies from three to five, sets of four being most common, and an egg is deposited daily. They are mostly ovate in shape; the shell is delicate, rather frail, and without luster. The ground color is dull white, occasionally this has a pale buffy and again a faint bluish tint. The eggs are blotched and spotted, principally about the larger end, with irregularly shaped markings ranging from dark seal brown to claret brown, purple, mixed with ochraceous, mouse, and pearl gray, and these rarely run into lines and tracings, so prevalent in the eggs of most of our Orioles. Some eggs are fairly well marked, others only faintly; the lighter shades mentioned largely predominate over the darker ones, and in some the latter are entirely wanting.

The average measurement of ninety-three specimens in the United States National Museum collection is 21.59 by 15.24 millimetres, or 0.85 by 0.60 inch. The largest egg in the series measures 22.86 by 16 millimetres, or 0.90 by 0.63 inch; the smallest, 18.80 by 15.24 millimetres, or 0.74 by 0.60 inch.

¹ Bulletin of the U. S. Geological and Geographical Survey, 1879, Vol. V, No. 3, p. 398.

Of the type specimens, No. 20915 (Pl. 6, Fig. 30), from a set of five, taken by Dr. James C. Merrill, United States Army, near Fort Brown, Texas, on June 16, 1877, shows the most common style of markings, but these are usually heaviest about the larger end, while in this specimen, the only one I have seen so marked, they are concentrated about the smaller end of the egg. The shape of this egg is also rather peculiar, and it is the smallest in the series. No. 25343, (Pl. 6, Fig. 31), from a set of four, taken May 13, 1889, near Hidalgo, Texas; represents a rather odd and unusual style of markings; while No. 25547 (Pl. 6, Fig. 32), from a set of five, taken near Brownsville, Texas, on May 3, 1892, represents an egg above the average size and shows some of the darker colors referred to above. The last two are from the Ralph collection. The eggs figured of the Arizona Hooded Oriole will also answer for extremely heavily colored specimens of this race.

187. *Icterus cucullatus nelsoni* RIDGWAY.

ARIZONA HOODED ORIOLE.

Icterus cucullatus nelsoni RIDGWAY, Proceedings U. S. National Museum, VIII, No. 2, April 20, 1885, 19.

(B —, C —, R —, C —, U 505a.)

GEOGRAPHICAL RANGE: Northwestern Mexico and Lower California; north to southwestern New Mexico, Arizona, and the southern half of California, west of the Sierra Nevadas only.

The breeding range of the Arizona Hooded Oriole, also locally known in southern California as the "Palmleaf Oriole," is coextensive with its geographical distribution within the United States, and is restricted to our southwestern border from the extreme southwestern corner of New Mexico (where Dr. Edgar A. Mearns, United States Army, obtained a single specimen in the Guadalupe Canyon, near the Mexican boundary line, on October 4, 1893), which marks the eastern limit of its known range in this direction, through southern Arizona and California, north in this State to about latitude $38^{\circ} 45'$, where it is known to occur sparingly as far north as Auburn, Placer County. While the range of Scott's Oriole in California seems to be confined to the eastern or desert slope of the mountains, that of the Arizona Hooded Oriole appears to be strictly limited to the western slope, and it has not yet been found anywhere in the Colorado and adjoining deserts.

According to Mr. Walter E. Bryant, it is generally distributed over the Peninsula of Lower California, particularly in the vicinity of water and of human habitations. He found them on Santa Margarita Island in January. At Comondu they were nesting in the palm trees. A young one, caged, at San Fernando, was fed by the male parent.¹

¹ Birds of Lower California, California Academy of Sciences, Vol. II, 1889, p. 295.

Within our borders it is more common in southern Arizona than anywhere else, and I found about twenty of its nests here during the spring and summer of 1872. I first noticed this handsome Oriole on April 5, when I saw several males. My attention was drawn to the bird by its peculiar, sharp, grating call, uttered while flitting through the cottonwoods and shrubbery in the Rillito Creek bottom, and I rarely saw one far away from water at any season of the year. The dense, shady groves of cottonwood and mesquite trees in the creek bottoms appeared to be its favorite haunts. It is a shy, restless creature, nearly always on the move, looking for insects of various kinds and their larvæ, including hairless caterpillars, and small grasshoppers. During the mating season, beginning about the latter part of April, several males may sometimes be seen chasing a female and scolding and fighting each other for the coveted prize.

In southern Arizona nidification begins rather late, rarely before May 20, and sometimes later. In southern California, however, it commences fully a month earlier, and a full set of eggs was taken by Mr. Theodore D. Hurd, near Riverside, California, on April 23. Mr. W. E. D. Scott found ten nests of this Oriole in a canyon in the Santa Catalina Mountains in 1884, which are fully described in "The Auk" (Vol. II, 1885, pp. 159-165). This paper gives an excellent account of its breeding habits as observed by him. His earliest nest was found on May 28 and contained three fresh eggs.

Although I searched carefully for nests of the Arizona Hooded Oriole during the entire month of May, I failed to find any until June 5, when I took the first nest, containing three fresh eggs. It was suspended from a bunch of mistletoe growing on a limb of a cottonwood tree, about 40 feet from the ground, and was hard to get at. This, like nearly all the nests found by me, was woven of a species of slender wiry grass growing in moist places, which was used in a green state. It contained a little cottonwood down for lining. Its green color, closely resembling the surrounding foliage, made it very difficult to see. It was securely fastened to several mistletoe twigs among which it was placed. Fully three-fifths of the nests found by me were placed in similar situations; the others were suspended in mesquite (excepting one found in an ash tree), at various heights from 12 to 45 feet from the ground. The majority of these nests were woven of this green wire grass, which seems admirably adapted for this purpose, and a few only were made of dry yucca fibers; the latter were much more easily seen. In some instances this material was also used for the inner lining, mixed with willow down or a little wool, rarely with a few feathers, or a small quantity of horsehair.

While some of the nests were semipensile and slung somewhat like a hammock, so that they rocked like a cradle with every breeze, in the majority some of the surrounding slender twigs among which the nest was placed were incorporated into its walls and sides, securing it almost immovably in position. None of the nests seen by me in any way resembled those of Bullock's Oriole, which was also common here. They were always much brighter colored, not nearly so deep, and were constructed of entirely different materials. Neither do the grass-woven nests of the Arizona Hooded Oriole resemble the common type of its near relative found in Texas. I refer to the nests built of tree moss, which

are usually located in bunches of the same material. But those of either form of the Hooded Oriole, when built of yucca fibers, might be readily mistaken for each other. Besides the trees already mentioned, Mr. Scott found it breeding in sycamores, and in California it nests in walnut, willow, cypress, gum, and fan palms (*Washingtonia filicera*), the fibers of which, according to Mr. Theo. D. Hurd, are almost exclusively used as nesting material in that locality.

Mr. Hurd published the following interesting notes on the nesting habits of this Oriole, as observed by him in that vicinity: "For the rearing of the first brood the nests are usually suspended in overhanging branches of the blue gum (*Eucalyptus globulus*), but it is a noticeable fact that the second nests are more commonly attached to the leaves of the palm tree. Why this is I do not know, unless they want to begin laying as soon as possible, and therefore build where material is most easily obtained. When in palms the nests are fastened directly to the under side of a large leaf, leaving a small opening on one or more often on either side, for the bird to enter."¹

Mr. R. H. Lawrence took a nest of this Oriole containing four eggs near Monrovia, California, on May 19, 1893; this nest, which he kindly sent to me, was attached to the under side of a banana leaf, about 9½ feet from the ground. Two other nests were subsequently met with in similar situations, one of these probably belonging to the pair whose eggs had been previously taken.

Two and possibly even three broods are sometimes raised in a season. I found slightly incubated eggs in Arizona on August 25. From three to five eggs are laid to a set; in Arizona usually only three or four; but Mr. Hurd reports taking a set of seven on May 6, 1890. An egg is deposited daily until the set is completed. The Arizona Hooded Oriole is imposed upon to a considerable extent by the Dwarf Cowbird, and I found several nests containing one and two eggs of this parasite with one or two only of the rightful owner.

Incubation lasts from twelve to fourteen days. I do not know whether the male assists in this duty, but have seen him carrying nesting materials. The nest is well built, it is basket or cup shaped, with a very thick bottom and strong sides. It averages about 4 inches in height externally. The inner cup is oval, about 2½ inches deep and 3 by 2 inches wide, and it takes about four or five days to complete it.

The eggs resemble those of the Hooded Oriole in general shape and ground color, but a few approach a decided elongate ovate; as a rule they are better marked, and the darker shades predominate over the lighter ones; they also show more of a tendency to run into zigzag markings, as do the majority of Oriole's eggs.

The average measurement of thirty specimens in the United States National Museum collection is 21.59 by 15.37 millimetres, or about 0.85 by 0.61 inch. The largest egg in the series measures 24.13 by 15.24 millimetres, or 0.95 by 0.60 inch; the smallest, 18.03 by 13.21 millimetres, or 0.71 by 0.52 inch.

¹Ornithologist and Oologist, Vol. XV, 1890, p. 13.

The type specimen, No. 20225 (Pl. 7, Fig. 1), from a set of three eggs, Bendire collection, was taken by the writer on Rillito Creek, near Tucson, Arizona, on July 17, 1872, and represents a well-marked specimen; while No. 20227 (Pl. 7, Fig. 2), also from a set of three, taken by the writer in the same vicinity, on August 25, 1872, represents a handsome and peculiar style of coloration, which is also occasionally found among the eggs of the Hooded Oriole, but not often among either.

188. *Icterus spurius* (LINNÆUS).

ORCHARD ORIOLE.

Oriolus spurius LINNÆUS, *Systema Naturæ*, ed. 12, I, 1766, 162.

Icterus spurius BONAPARTE, *Journal Academy Natural Sciences, Phila.*, III, 1823, 363.

(B 414, C 215, R 270, C 324, U 506.)

GEOGRAPHICAL RANGE: Eastern United States; north to the southern border of the Dominion of Canada, regularly to southern Ontario, casually to southern New Brunswick; west to eastern North and South Dakota, Nebraska, eastern Colorado, Kansas, the Indian Territory, and Texas; south in winter through Central America to Panama.

The breeding range of the Orchard Oriole is confined to the eastern and central parts of the United States, reaching from northern Florida along the Gulf coast west to the lower Rio Grande Valley, in Texas; thence north (excepting the northwestern parts of this State) through the Indian Territory, Kansas, and Nebraska, to eastern South and North Dakota. In the Mississippi Valley it reaches about the northern limits of its range in Minnesota and southern North Dakota, in about latitude 46°, while along the Atlantic coast, in the New England States and in New York, it is rarely met with north of latitude 42°. It breeds sparingly in southern Ontario, in the Dominion of Canada, and undoubtedly also to some extent, in favorable localities, somewhat farther north than the points indicated above, especially so in Minnesota; it may also breed in small numbers in eastern Colorado. Mr. Frank M. Chapman reports it as a rare summer resident at Gainesville, Florida. Its center of abundance is to be found in the States bordering the Mississippi Valley.

Throughout its range in the United States it is only a summer visitor, and none remain with us during the winter. It reenters our southern border about April 1, moving leisurely northward and reaching its more northern breeding grounds from a month to six weeks later, according to the season, the males usually preceding the females by several days.

The Orchard Oriole, though far less brilliantly colored than its eastern congener, the Baltimore Oriole, is equally well known though not quite as conspicuous. It is a restless, impulsive, but well-dispositioned bird, on good terms with its neighbors, and, though not particularly shy, it is nevertheless difficult to observe closely, as it generally conceals itself in the densest foliage while at rest, or else flits quickly about from twig to twig in search of insects, on which it lives almost exclusively throughout the summer months.

Its favorite haunts, as its name implies, are orchards, and when the apple and pear trees are in bloom and the trees have commenced to leaf one may look for the Orchard Oriole. It is generally found in rather open country, interspersed here and there with small groves; also among the shade trees along country roads, and in the prairie States among the trees and shrubbery along streams, preferring such localities to heavier-timbered sections and forest regions.

Its song, most often heard in the earlier spring, is uttered in a quick, hurried manner. Its loud, clear strains, indicating its impulsive nature, are poured forth with such rapidity as to be difficult to describe, and I shall not attempt it; but they remind me somewhat of those of the Warbling Vireo, only sounding louder and clearer. A chattering, querulous note, when disturbed or alarmed from any cause, is also uttered.

Few birds do more good and less harm than our Orchard Oriole, especially to the fruit grower. The bulk of its food consists of small beetles, plant lice, flies, hairless caterpillars, cabbage worms, grasshoppers, rose bugs, and larvæ of all kinds, while the few berries it may help itself to during the short time they last are many times paid for by the great number of noxious insects destroyed, and it certainly deserves the fullest protection.

Excepting in the extreme southern parts of its range nest building does not begin much before May 10, and even there it is often protracted till after the middle of the month. In southern New York, Pennsylvania, southern Michigan, and Minnesota full sets of fresh eggs may ordinarily be looked for from May 25 to June 10, while on the lower Rio Grande, in Texas, fresh sets are occasionally taken during the first week in May, but more frequently not until about the middle of this month. Both sexes assist in nest building, and generally finish one in from three to four days. The nests are placed in trees or bushes, from 6 to 40 feet from the ground, usually from 12 to 20 feet, in a great variety of trees, less often in conifers than in deciduous kinds. Apple, pear, sweet gum, different kinds of oaks, sycamore, elm, cottonwood, maple, walnut, mesquite, hackberry, prickly ash, cedar, and pine are a few of the many selected as nesting sites. In the South the Orchard Oriole nests occasionally in the gray moss (*Tillandsia usneoides*) so commonly found hanging from many of the trees there. The late Dr. William C. Avery, of Greensboro, Alabama, sent me a beautiful nest of this species, built in a bunch of such moss, pending from a post oak, about 25 feet from the ground, and taken on May 27, 1891. A suitable cavity was fashioned in the moss, and this is well lined with the wiry green grass which is nearly always used by the Orchard Oriole in the construction of its nests. The inside is sparingly lined with plant down. To what extent this mode of building prevails I am unable to tell, but I believe it is rather unusual, even in localities where this moss is abundant.

The location and manner of attaching its ingeniously woven, basket-like nests vary greatly. Some are set in a crotch formed by several small twigs; the bottom of the nest occasionally rests on and is supported by these, and again in similar locations it is unsupported, but the sides are securely fastened to several of the twigs among which it is placed; then again some are built in a

fork of a horizontal limb, like the nest of an Acadian Flycatcher or a Vireo, both sides of the nest being fastened to the fork in which it is placed; again it may be fastened to some suitable twigs by the rim only, in the manner of a hammock. Comparatively few, excepting those of the last style and those built in moss, can really be called pensile or even semipensile nests. They also vary greatly in bulk and depth.

A well-preserved nest from the Ralph collection, No. 25347, taken on Shelter Island, Suffolk County, New York, on June 3, 1880, contained six eggs when found. It was placed in an upright fork of a small branch in a thorn pear tree, about 10 feet from the ground, and is composed of wiry grass used while green, and is only slightly lined with plant down. The outer diameter at the widest part, a little below the middle of the nest, is $4\frac{1}{2}$ inches; the outside depth is 4 inches. The upper rim of the nest is somewhat contracted; the inner cup is 3 inches deep by $2\frac{1}{2}$ inches in diameter. The sides are thick and securely fastened to several branches, but the bottom does not come within 2 inches of the fork of the crotch in which it is placed. Another nest, No. 26294, taken by Mr. H. P. Attwater, on the St. Charles Peninsula, near Rockport, Aransas County, Texas, on May 16, 1893, contained six eggs, and was placed in an upright crotch of a mesquite tree, 8 feet from the ground, and only 25 yards from salt water. This is much slighter built, and measures only 3 by 3 inches in outer diameter; the inner cup is $2\frac{1}{2}$ inches deep and 2 inches wide; the upper rim of the nest is also somewhat contracted. This is likewise constructed of fine, wiry grass, and is apparently lined with a little thistle down. The nests taken in the South appear to be much less bulky than those from the northern parts of its breeding range.

Many of these nests retain their bright pea-green color for years. Mr. D. B. Burrows writes me that some nests of this species, which he found in Starr County, Texas, were so well lined with cotton that the interior had a beautiful, smooth, pure white appearance. In the northern parts of its range the Orchard Oriole is more or less imposed upon by the Cowbird; and Mr. Burrows informs me that on the lower Rio Grande, in Texas, its nests oftener contain parasitic eggs of both the Red-eyed and Dwarf Cowbirds than any other species noticed by him. The Orchard Oriole is a very social bird and does not object to other species nesting in the same tree with it; it seems to be on especially good terms with the Kingbird. Most of its time is spent in trees, and it is rarely seen on the ground. Its flight is swift, easy, and graceful.

From four to six eggs are usually laid to a set (mostly five) and one is deposited daily. Incubation lasts about twelve days, and I am of the opinion that this duty is exclusively performed by the female. I have never seen the male on the nest, but have seen him feed his maté while incubating. I believe as a rule only one brood is raised in a season. Both parents show equal solicitude and devotion in the care and defense of their young from prowling enemies, and will boldly and furiously attack any intruder. In the northern parts of its range the fall migration begins sometimes in the latter part of July, usually in

the beginning of August, comparatively few birds remaining at the end of this month.

The eggs are mostly ovate in shape, but occasionally a set is found which is decidedly elongate ovate. The shell is moderately strong, close grained, and without gloss. The ground color is usually pale bluish white, and this is sometimes faintly overlaid with pale pearl gray or grayish white. The markings, which are nearly always heaviest about the larger end of the egg, consist of blotches, spots, scrawls, and tracings of several shades of brown, purple, lavender, and pearl gray, varying in amount and intensity in different specimens. In the majority of the eggs before me the darker markings predominate, but the lighter-colored and more neutral tints are nearly always present to a greater or less extent.

The average measurement of one hundred and thirty-three specimens in the United States National Museum collection is 20.47 by 14.54 millimetres, or about 0.81 by 0.57 inch. The largest egg in the series measures 22.35 by 15.24 millimetres, or 0.88 by 0.60 inch; the smallest, 18.03 by 14.22 millimetres, or 0.71 by 0.56 inch.

The type specimen, No. 21670 (Pl. 7, Fig. 3), Bendire collection, from an incomplete set taken by Mr. A. J. Dayan, near New Haven, Connecticut, is a very peculiarly and oddly marked egg, and is figured on this account. No. 24864 (Pl. 7, Fig. 4), from a set of five taken in Chatham County, Georgia, May 21, 1890, and presented by Mr. W. F. Webb, represents a rather heavily marked specimen; while No. 25550 (Pl. 7, Fig. 5), Ralph collection, from a set of four, taken in Cameron County, Texas, May 10, 1892, represents a rather light-colored and an average-marked egg.

189. *Icterus galbula* (LINNÆUS).

BALTIMORE ORIOLE.

Coracias galbula LINNÆUS, *Systema Naturæ*, ed. 10, 1758, 108.

Icterus galbula COUES, *Bulletin Nuttall Ornithological Club*, V, 1880, 98.

(B 415, C 216, R 271, C 326, U 507.)

GEOGRAPHICAL RANGE: Eastern North America; north to the southern border of the Dominion of Canada, from Nova Scotia and southern New Brunswick westward through Ontario and Manitoba to Saskatchewan, where it reaches the northern known limits of its range in latitude 55°; west to eastern Assiniboia, the eastern parts of Montana, Wyoming(?), Colorado, and Texas; south in winter through eastern Mexico and Central America to Panama. Accidental at York Factory, Keewatin, Dominion of Canada, the Island of Cuba, and the Shetland Islands, Europe.

Within the borders of the United States the breeding range of the Baltimore Oriole, also variously known as "Golden Robin," "Fire-bird," "Pea-bird," "Hanging-bird," and "Hang-nest," is nearly coextensive with its geographical distribution, with the exceptions that it does not appear to breed at all in southern Florida and is generally rare in the immediate vicinity of the Gulf coast.

In Texas, during the breeding season, it is found only in the more eastern portions of the State, and appears to be rare even there, excepting in the north-eastern part. It is a common summer resident in the Indian Territory and Kansas, while in eastern Colorado and Montana it must be considered as rare. It passes beyond our border into eastern Assiniboia, and is common in Manitoba, reaching the northern limits of its range in the interior in Saskatchewan, where Capt. T. Blakiston met with it in latitude 55° N. Thence to the eastward it is common in Ontario, but becomes rarer toward the Atlantic coast, and is only met with in small numbers in southern New Brunswick, where it is reported to breed regularly near Woodstock, on the St. John's River, and it has been taken near Halifax, Nova Scotia, and also probably nests here to a limited extent.

In northern Maine the Baltimore Oriole is rather rare. Mr. Manly Hardy, of Brewer, writes under date of April 29, 1891: "We find many species of birds here now which were not found thirty years ago, and others are slowly moving this way. I find that certain species do not advance eastward faster than from 2 to 5 miles a year. The Baltimore Oriole reached here thirty-odd years ago, but was found on the Kennebec River, 50 miles west, twenty-five years previously, and I am certain that it was in Bangor three years before it crossed the river to Brewer, and, although a regular visitor here now, I have not seen it even a mile east of here as yet."

The Baltimore Oriole is a common and well-known bird throughout our Eastern, Middle, and Northern States. In the Upper Mississippi Valley it has greatly increased in numbers within the last thirty years, since the country has been settled, and it appears to be holding its own in the East where many other species are slowly decreasing. This is undoubtedly due to its great popularity in our rural districts, where its beneficial qualities are pretty generally understood. Aside from its showy plumage, its sprightly and pleasing ways, its familiarity with man, and the immense amount of good it does by the destruction of many noxious insects and their larvæ, including hairless caterpillars, spiders, cocoons, etc., it naturally and deservedly endears itself to every true lover of the beautiful in nature, and only a short-sighted churl or an ignorant fool would begrudge one the few green peas and berries it may help itself to while in season. It fully earns all it takes, and more too, and especially deserves the fullest protection of every agriculturist.

The Baltimore Oriole usually arrives in the southern New England States, in central New York, and Minnesota, with almost invariable regularity, about May 10, rarely varying a week from this date; it arrives correspondingly earlier or later farther south or north. About this time the trees have commenced to leaf, and many of the orchards are in bloom, so that their arrival coincides with the loveliest time of the year. The males usually precede the females by two or three days to their breeding grounds, and the same site is frequently occupied for several seasons, and not infrequently the same nest. It is very much attached to a locality when once chosen for a home, and is loath to leave it. Few birds are more devoted to each other than these Orioles, and I am of the opinion that they remain mated through life. Their favorite haunts in our

Eastern States are found in rather open country, along roads bordered with shade trees, creek bottoms, orchards, and the borders of small timbered tracts. It is equally at home in villages or cities of considerable size, as long as they furnish suitable trees for nesting sites. It shuns swampy and marshy tracts and extensive forests.

A very peculiar note, a long-drawn-out, chattering "chaë, chaë, chaë," is apt to draw one's attention to it on its first arrival, and this is more or less frequently uttered throughout the season. This note is difficult to reproduce exactly, and I find its songs still more so. One sounds somewhat like "hioh, hioh, tweet, tweet;" another something like "whee-he-he, whee-he-he, oh whee-he-he-woy-woy." This last is much more softly uttered than the first. Mr. T. Nuttall describes one of their songs as "tshippe-tshayia-too-too-tshippe-tshippe-too-too," and there are others impossible to render. The young, after leaving the nest, utter a note like "he-he-häe," and another like "heek-heek-he," varied occasionally by a low twittering. Shortly after their arrival they sing almost incessantly when not eating; but later in the season, when they have their always hungry family to provide for, they are more silent. Their flight is strong, swift, and graceful, and they are far more at home on the wing than on the ground, where they are seldom seen except when picking up some insect or in search of nesting material.

In the vicinity of Washington, District of Columbia, nidification commences about the middle of May, and full sets of eggs may be looked for the last week in this month, while in central New York, Connecticut, Wisconsin, southern Minnesota, etc., they usually nest from eight to fourteen days later.

Few of our native birds build a more ingeniously constructed nest than the Baltimore Oriole, and it must always be considered a most interesting example of bird architecture, taking time, intelligence, and good judgment to construct, and from five to eight days are usually required for its completion.

Some nests show a great superiority over others in general make-up and workmanship, and are perhaps the product of old and experienced birds, while the younger ones, from lack of judgment, often select poor sites, or else secure their nests carelessly to the supporting twigs, so that many are destroyed before the young reach maturity.

Ordinarily the nest of the Baltimore Oriole is pensile, and is usually suspended by the rim from the extremities of several slender branches, to which it is attached. Others, besides being fastened by the rim, which is always neat and smoothly finished, are attached to some perpendicular fork or limb by one of the sides, thus steadying the nest and preventing it from swinging too much during heavy winds. In a truly pensile nest some of the eggs are occasionally cracked by the violent swaying of the slender twigs to which it is attached, while if fastened at the side this occurs very rarely, unless the entire limb is torn off. Both sexes assist in nest building. The materials used for the framework consist principally of decayed fibers, such as those of the Indian hemp (*Apocynum androsæmifolium*), the silk of milkweed (*Asclepias*), nettles (*Urtica*), and, when located near human habitations, of horsehair, bits of twine, yarn,

strips of grapevine bark, etc. With such materials a strong purse or pouch-shaped nest is woven and firmly attached to one or more forked twigs by the slightly contracted rim, and it is usually placed in such a position that the entrance is well shaded by leafy twigs above. All sorts of materials are used in lining the bottom and sides of the nest—cotton, wool, tow, rags, cattle hair, fur, fine strips of bark, tree moss, fine grass, and plant down. They readily avail themselves of any suitable materials, such as yarn, which may be thrown out to them, but prefer plain to gaudy colored stuffs. I have a nest before me which has a couple of tassels, made of white cotton twine, pending loosely from the side of the nest. This nest, No. 25112, was taken by Mr. H. P. Attwater, near Chatham, Ontario, in June, 1886. It is firmly attached to and pendant from three small twigs, and is composed of twine, horsehair, and plant fibers; the walls, although rather thin, are greatly strengthened by the quantity of horsehair used. It is externally 5 inches deep, and the entrance, which is oval in shape, measures $3\frac{1}{4}$ by 2 inches in diameter. The cup is $4\frac{1}{2}$ inches deep by $2\frac{1}{2}$ inches wide. This is a truly pensile nest. Another, No. 25904, taken by Mr. Otto Widmann, near St. Louis, Missouri, on May 31, 1884, an exceedingly well-built example, was suspended from some small twigs growing out of an upright fork of an elm branch about half an inch thick and some 25 feet from the ground, it was also fastened to one branch of the fork for nearly the entire depth of the nest. It measures 9 inches in length by 5 inches in external diameter, and is nearly cylindrical in shape. It is fully 5 inches deep and 3 inches wide inside. The opening of the nest was well protected from above by several small, leafy twigs; a few long streamers of hemp-like fibers hang down from the sides and bottom. The inside is lined with horsehair and plant down. Although rather slovenly looking from the outside, this is by far the best built nest of this species I have seen. The color of some of the nests varies considerably according to the materials used; some look almost white, others a pale straw color, and the majority smoke gray. In the South the Baltimore Oriole, like the preceding species, builds occasionally in bunches of the gray moss (*Tillandsia usneoides*).

The nests are usually suspended from long, slender, drooping branches of elm, maple, birch, weeping willow, buttonwood, sycamore, oak, aspen, poplar, Norway spruce, apple, pear, and wild cherry trees; but in some localities they are frequently built in the very top and center of a tree, where it is almost impossible to see them. They are placed at various heights from the ground, from 8 to 50 feet and more, and frequently in utterly inaccessible positions. The Baltimore Oriole is tolerant and amiably disposed toward its smaller neighbors, and such are often allowed to nest in the same tree, and occasionally within a few feet of its own nest.

Incubation lasts about fourteen days, and I think the female attends to this duty almost exclusively. Both sexes are extremely devoted to each other, as well as to their eggs and young, defending these bravely against all intruders. From four to six eggs are laid to a set, most frequently four, though sets of five are not uncommon, while sets of six are rather rare. One is deposited daily, and only one brood is raised in a season. The young are able to leave the nest when

about two weeks old, and may then be seen sitting on some of the branches close by and clamoring for food. They are fed entirely on insects, etc., and are faithfully cared for by the parents until able to provide for themselves. The migration from the northern sections of their breeding range to their winter homes in Central America begins usually in August, but occasionally some birds linger until September. This species is rarely imposed on by the Cowbird. The eggs of the Baltimore Oriole are usually elongate ovate in shape, more rarely ovate. The shell is fine grained, moderately strong, and shows but little gloss.

The ground color is ordinarily pale grayish white, one of those subtle tints which is difficult to describe; in a few cases it is pale bluish white, and less often the ground color is clouded over in places with a faint, pale ferruginous suffusion. The egg is streaked, blotched, and covered with irregularly shaped lines and tracings, generally heaviest about the larger end of the egg, with different shades of black and brown, and more sparingly with lighter tints of smoke, lavender, and pearl gray. In a few instances the markings form an irregular wreath, and occasionally a set is found entirely unmarked.

The average measurement of fifty-six eggs in the United States National Museum collection is 23.03 by 15.45 millimetres, or about 0.91 by 0.61 inch. The largest egg of the series measures 25.91 by 16.76 millimetres, or 1.02 by 0.66 inches; the smallest, 20.83 by 14.99 millimetres, or 0.82 by 0.59 inch.

Of the type specimens, No. 22644 (Pl. 7, Fig. 6), from a set of four, taken by the late Capt. B. F. Goss, near Pewaukee, Wisconsin, on June 7, 1872, shows a rather unusual type of markings; No. 25557 (Pl. 7, Fig. 7), from a set of five, Ralph collection, taken on Shelter Island, New York, June 10, 1882, represents one of the finer and more profusely marked examples; No. 25558 (Pl. 7, Fig. 8), also from a set of five, taken by Dr. William L. Ralph, near Holland Patent, New York, June 3, 1887, shows the coarser style of markings and a rather dark ground color; and No. 25846 (Pl. 7, Fig. 9), from a set of four, taken on June 7, 1887, by the same collector and at the same place as the last, shows a specimen in which the markings are mainly confined to the center of the egg.

190. *Icterus bullocki* (SWAINSON).

BULLOCK'S ORIOLE.

Xanthornus bullocki SWAINSON, Philosophical Magazine, I, 1827, 436.

Icterus bullocki BONAPARTE, Geographical and Comparative List, 1838, 29.

(B 416, C 217, R 272, C 327, U 508.)

GEOGRAPHICAL RANGE: Western North America; north to southern British Columbia, southern Alberta, and Assiniboia, Dominion of Canada; east to western North and South Dakota, western Nebraska, eastern Colorado, and western Texas; Lower California; south in winter into the valley of Mexico and to Puebla. Accidental in Maine.

Bullock's Oriole, a species as handsome and conspicuous as the preceding one, replaces it in the western portions of the United States, and is likewise widely distributed. Its breeding range within our borders corresponds to its dis-

tribution. It is only a summer resident with us, arriving usually from its winter haunts in Mexico during the last half of March, and moving slowly northward, reaches the more northern parts of its breeding range from a month to six weeks later. It appears to be much rarer in the immediate vicinity of the seacoast than in the Great Basin regions, where it is common nearly everywhere, especially if sufficient water is found to support a few stunted cottonwoods and willows. During my extensive wanderings through nearly all of the States west of the Rocky Mountains, and extending from the Mexican to the British borders, I have met with this species almost everywhere in the lowlands, and in some localities have found it very abundant. Like the Baltimore Oriole, it avoids densely wooded regions and the higher mountains. It is especially abundant in the rolling prairie country, traversed here and there by small streams having their sources in some of the many minor mountain ranges which are such prominent features of the landscape in portions of Idaho, Washington, and Oregon. These streams are fringed with groves of cottonwood, mixed with birch, willow, and alder bushes, which are the favorite resorts of this Oriole during the breeding season. The immediate vicinity of water is, however, not considered absolutely necessary, as I have found it nesting fully a mile or more away from it on hillsides, the edges of table-lands, and in isolated trees or even in bushes. In Colorado it is said to be found at altitudes of over 8,000 feet, but as a rule it prefers much lower elevations. I also met with it at Fort Custer, Montana, where, however, it was not common, and along the eastern border of its range it overlaps that of the Baltimore Oriole for considerable distances. In western Texas it is common and breeds as far south as the mouth of the Rio Grande. It also breeds in northern Lower California and northern Mexico. In southern Arizona and New Mexico I found it not uncommon, but not nearly as abundant as in eastern Oregon and in Idaho, where it was present everywhere in suitable localities. In the vicinity of Fort Lapwai, Idaho, it was especially abundant, and, although suitable nesting sites were by no means scarce, I have seen three occupied nests of this Oriole in a small birch tree close to a nest of the Arkansas Flycatcher, showing them to be very sociable birds. Near Camp Harney, Oregon, a Swainson's Hawk, an Arkansas Flycatcher, and a pair of this species nested in the same tree, a good-sized pine. Dr. A. K. Fisher tells me that he saw hundreds of these nests in a large row of cottonwoods, east of Phoenix, Arizona, in June, 1892.

The call notes of Bullock's Oriole are very similar to those of the Baltimore, but its song is neither as pleasing to the ear nor as clear and melodious as that of the latter. Its food is similar, and consists principally of insects and a few wild berries. Nidification begins late in May, and fresh eggs may be looked for throughout the greater part of its range during the first week in June. In southern California, Arizona, and southwestern Texas a few breed sometimes by May 15, but rarely earlier.

The nest resembles that of the Baltimore Oriole, but as a rule it is not quite as pensile, and many are more or less securely fastened by the sides as well as by the rim to some of the adjoining twigs. The general make-up is

similar. As many sections where Bullock's Oriole breeds are still rather sparsely settled, less twine and such other material as may be picked up about human habitations enter into its composition. Shreds of wild flax and other fiber-bearing plants and the inner bark of the juniper and willow are more extensively utilized; these with horsehair and the down of plants, wool, and fine moss, furnish the inner lining of the nests. According to my observations, the birch, alder, cottonwood, eucalyptus, willow, sycamore, oak, pine, and juniper furnish the favorite nesting sites; and in southern Arizona and western Texas it builds frequently in bunches of mistletoe growing on cottonwood and mesquite trees.

The nests are usually placed in low situations, from 6 to 15 feet from the ground, but occasionally one is found fully 50 feet up. A very handsome nest, now before me, taken by Dr. Edgar A. Mearns, United States Army, near Fort Hancock, Texas, on June 30, 1893, just after the young had left it, is placed among six twigs of mistletoe, several of these being incorporated in the sides of the nest, which is woven entirely of horsehair and white cotton thread, making a very pretty combination. The bottom of the nest is lined with wool. Outwardly it is 6 inches deep; inside, $4\frac{1}{2}$ inches. The entrance, at the top, is oval in shape, somewhat contracted, and 4 by $2\frac{1}{2}$ inches wide. Another peculiar specimen before me, taken near Yreka, California, May 29, 1860, is woven among and fastened to a bunch of needles of the long-leaved pine; this nest resembles an inverted cone, and is quite unique in structure. I have also seen double nests, one placed beside and fastened to one previously built that had for some unknown reason been abandoned.

The number of eggs to a set varies from three to six; sets of five and four are perhaps most common, while those of six are not very rare. Bullock's Oriole is occasionally imposed upon by the Dwarf Cowbird in Arizona, and by this as well as the Red-eyed Cowbird in southern Texas. Only one brood is raised in a season, and the duties of incubation, which are performed almost exclusively by the female, last about fourteen days. I have often watched the sitting bird, and have never seen the male on the nest. At Camp Harney a number bred at the Post, within a few yards of the houses, and when not molested they soon became as familiar as the Baltimore Oriole. The sexes are extremely devoted to each other, and valiantly defend their eggs and young. I once saw a pair vigorously attack a Richardson's squirrel (*Sciurus richardsoni*), which evidently was intent on mischief, and drive it out of the tree in which they had their nest. Both birds acted with the greatest courage and dashed at it repeatedly with fury, the squirrel beating a hasty retreat from the combined attack. The young are large enough to leave the nest in about two weeks, and are diligently guarded and cared for by both parents until able to provide for themselves. The return migration in the more northern portions of their range to their winter homes in Mexico begins usually in the first half of August, and by the end of this month nearly all have departed.

The eggs are mostly elongate ovate in shape, a few are ovate, and an occasional set is almost wedge-shaped or cuneiform. The shell is close grained and

only slightly glossy. The ground color is generally of the same subtle grayish-white tint as that seen in the eggs of the Baltimore Oriole, but the proportion of the pale bluish white eggs is greater than with the latter. Occasionally the ground color is pale vinaceous buff. The markings are similar in color to those found on the eggs of the preceding species, but as a rule they are not so coarse, and the fine hair lines running in irregular tracings around the larger axis of the egg are more prevalent; they are also a trifle larger.

The average measurement of one hundred and forty-four specimens in the United States National Museum collection is 23.80 by 15.93 millimetres, or about 0.94 by 0.63 inch. The largest egg in the series measures 25.40 by 16.76 millimetres, or 1 by 0.66 inch; the smallest, 21.34 by 15.24 millimetres, or 0.84 by 0.60 inch.

Of the type specimens, No. 20208 (Pl. 7, Fig. 10), from a set of four, Bendire collection, taken by the writer at Fort Lapwai, Idaho, on June 6, 1871, shows the peculiar vinaceous buff ground color referred to above; No. 20211 (Pl. 7, Fig. 11), from a set of three, in which incubation was advanced, from the same collector and place, taken June 15, 1871, represents a peculiarly shaped and very handsomely marked egg; No. 20218 (Pl. 7, Fig. 12), from a set of five, taken by the writer at Camp Harney, Oregon, on June 10, 1877, shows some unusually heavy markings; while No. 25551 (Pl. 7, Fig. 13), from a set of four, in the Ralph collection, taken near Brownsville, Texas, May 27, 1891, represents about an average-marked egg and a rather clear ground color.

191. *Scolecophagus carolinus* (MÜLLER).

RUSTY BLACKBIRD.

Turdus carolinus MÜLLER, Systema Naturæ, Supplement, 1776, 140.

Scolecophagus carolinus RIDGWAY, Proceedings U. S. National Museum, VIII, 1885, 356.

(B 417, C 221, R 273, C 331, U 509.)

GEOGRAPHICAL RANGE: Mainly Eastern North America; from Florida and the Gulf coast north through the Eastern United States and the Dominion of Canada to Labrador, Keewatin, the Northwest Territory and northern Alaska to the shores of Bering Sea; west in the United States to Texas and the Great Plains, and occasionally to the eastern slopes of the Rocky Mountains. Accidental in Lower California and in Greenland.

The breeding range of the Rusty Blackbird, also commonly known as the "Rusty Grackle," is a rather limited one within our borders. As far as known it breeds only in portions of Vermont, New Hampshire, and Maine, and in the Adirondack wilderness, reaching the most southerly point of its breeding range in Herkimer County, New York, in about latitude 43°, where it is strictly confined to the mountainous regions and is rather rare. Somewhat farther north, in the vicinity of Big Moose Lake, Dr. C. Hart Merriam reports it as a common summer resident. It may possibly breed on the west shore of Lake Superior, in northeastern Minnesota, but there are no records at hand from there. As one advances north into the Dominion of Canada it becomes more

common in suitable localities, and its center of abundance during the breeding season must be looked for north of latitude 58° , and it extends thence to the tree limit. The most northern point at which it has yet been found is Putnam River, Alaska, where specimens were taken by Lieut. G. M. Stoney, United States Navy. Its breeding range is known to extend from Labrador in a northwesterly direction clear across the continent to the shores of Bering Sea, and as it covers such an immense tract of country, I doubt if it is very common anywhere.

The Rusty Grackle is much more of a forest-loving species than the other Blackbirds, and during the breeding season it appears to be far less gregarious. Its favorite haunts in the Adirondacks are the swampy and heavily wooded shores of the many little mountain lakes and ponds found everywhere in this region, and here it spends the season of reproduction in comparative solitude. I can state from personal experience that the oölogist who desires to study this species on its breeding grounds must make up his mind to endure all sorts of discomforts; millions of black flies, gnats, and mosquitoes make life a burden during his stay, while the bogs and swamps through which one is compelled to flounder in search of the nest render walking anything but pleasant, and I am not at all surprised that genuine eggs of this species are still desiderata in most collections.

The Rusty Blackbird spends its winters mostly in the Middle and Southern States, and is one of the earliest migrants to return to its breeding grounds. It arrives in the more southern portions of its breeding range usually late in March or early in April, before the ice in the lakes has broken up and the trees have commenced to sprout; and even on the Yukon River, Alaska, it has been seen as early as April 10. Its food during the summer months consists principally of insects of various kinds, such as caterpillars, moths, grasshoppers, etc., small mollusks, worms, wild berries, and small seeds. In winter this species feeds more on grain and may be seen occasionally about barns and stock yards and in corn and rice fields, usually in small flocks by themselves, but sometimes in company with other Blackbirds. Their mode of flight resembles that of the Red-winged Blackbirds, and when feeding, while moving along, the rearmost fly over the others and alight again in the front ranks. Their notes are much more musical than those of the Grackles or other Blackbirds. The ordinary call note sounds like "tchäck, tchäck," several times repeated; another is like "turulee, turulee, turulee," uttered in a clear tone, and varied occasionally to "trallahee, trallahee."

Mr. J. W. Preston writes: "On an early spring day, while I was waiting in a sheltered wood, a good-sized flock of Rusty Blackbirds settled in some low trees about me, and as I was standing quietly by a large tree they did not see me. The wind whistled loudly through the branches above, but these lively fellows began a serenade so joyous and full of gleeful abandon that I lingered long to hear them. In singing they opened the bill widely and the throat swelled with melody. Their notes are rich, varied, and energetic. They are almost constantly in

motion, chasing each other or flying from perch to perch, singing merrily most of the time."

In the more southern portions of its breeding range, in Herkimer County, New York, nidification commences as early as the last week in April. Dr. William L. Ralph found a nest containing four fresh eggs on May 7, 1886, but it usually commences laying here about the middle of this month, and if the first set of eggs is taken, a second one may be looked for about two weeks later. With a set of five eggs in the Ralph collection, taken on May 27, 1892, in which incubation had slightly advanced, the following remarks are entered on the data blank belonging to it: "When I reached the nest I found the female bird dallying with two males, fluttering her wings, raising her tail above her back, and calling to them. All three finally flew to the nest and made a great deal of noise in the clump of trees in which it was situated and on the mossy ground beneath. At first the female appeared to care more for the attentions of the males than she did for her nest, but as soon as I began taking the eggs she and one of the males made a great fuss and attempted to scare me away. I think the other male was one of a pair to which a deserted nest belonged, found May 12, containing two cold, wet eggs; the female had probably been killed."

Through the kindness of Dr. Ralph I had an opportunity of observing a pair of these birds, and also their nest and eggs, in the spring of 1893, the only ones nesting in that vicinity.

Dr. C. Hart Merriam found it breeding on the north branch of Moose River, near Big Moose Lake, New York, on June 15, 1883, and presented me a handsome set of four eggs taken by him there. The nest was placed in a winterberry or black elder bush (*Ilex verticillata*), 3 feet from the ground, near the edge of a stream.

Mr. W. G. Winton took a nest and eggs near the Stewiacke River, Nova Scotia, in 1860, and these eggs are now in the United States National Museum collection.

Mr. W. L. Bishop, of Kentville, Nova Scotia, informs me that he found the Rusty Blackbird breeding there as early as May 5, and that he thinks only one brood is raised in a season.

Messrs. E. W. Nelson and L. M. Turner both report it common on the Yukon River, Alaska, and several eggs taken near Fort Yukon are now in the collection here. The latter naturalist also took young birds near Fort Chimo, Ungava, on July 10, 1884. Here they frequented swampy tracts in which a few isolated spruce and larch trees grew.

Prof. Winfred A. Stearns says that in Labrador "the Rusty Blackbird had a summer breeding range all along the coast line, at least as far north as L'Anse au Loupe, at which place it was a summer resident. Mr. Fred. Davis informs me that the bird occasionally built its nest in a wood pile."¹

Mr. R. MacFarlane found it breeding on the Anderson River, British North America; Mr. James Lockhart, on the Yukon, near the mouth of the Porcupine

¹ Bird Life in Labrador, 1890, p. 53.

River, Alaska; and eggs from both of these localities are now in the United States National Museum collection.

The Rusty Blackbird has also been reported by several observers as breeding commonly in Manitoba, but it is questionable if it nests there, or even in Saskatchewan—certainly not on the open plains and on the ground, as stated. All such records apply to Brewer's Blackbird, which was wrongly identified as this species.

The nest of the Rusty Blackbird is a substantial and bulky one. It is usually placed in swampy places, near water, in small spruce saplings, from 3 to 9 feet from the ground, and occasionally in other low bushes. The base is principally composed of sphagnum moss and earth, forming a firm, hard platform on which the nest proper is built. This is thickly covered on the outside with small tamarack and spruce twigs, mixed with a few blades of grass, pieces of fern, and long, green moss, especially at the base, and the inner cup is thickly and neatly lined with fine bright-green grass.

A nest now before me, taken in Herkimer County, New York, on May 14, 1891, measures 7 inches in outer diameter by $5\frac{1}{2}$ inches in depth; the inner cup is $3\frac{1}{2}$ inches wide by $2\frac{1}{2}$ inches deep. One of these nests will last for several seasons, but a fresh one is usually built every year. These birds are very much attached to their summer homes, returning to them from year to year, and rarely more than two or three pairs nest in one locality; in fact, they are as often found singly. The eggs number four or five to a set, and one is deposited each day. Incubation lasts about two weeks, and the young are able to leave the nest in about sixteen days. They are mouse colored at first, and are carefully attended to by both parents, who are devoted to them.

The fall migration from the more northern portions of their summer range begins in the early part of September, and the species usually makes its appearance in the Upper Mississippi Valley in the last half of October.

The eggs of the Rusty Blackbird are mostly ovate in shape. The shell is strong, finely granulated, and slightly glossy. The ground color is a light bluish green, which fades somewhat with age; this is blotched and spotted more or less profusely, and generally heaviest about the larger end of the egg, with different shades of chocolate and chestnut brown and lighter shades of ecru, drab, and pearl gray. The peculiar scrawls so often met with among the eggs of our Blackbirds are rarely seen on these eggs, which are readily distinguishable from those of the other species.

The average measurement of twenty-eight specimens in the United States National Museum collection is 24.95 by 18.37 millimetres, or about 0.98 by 0.72 inch. The largest egg in the series measures 26.67 by 20.07 millimetres, or 1.05 by 0.79 inches; the smallest, 23.11 by 17.78 millimetres, or 0.91 by 0.70 inch.

Of the type specimens, No. 20266 (Pl. 7, Fig. 14), from a set of four, Bendire collection, was taken by Dr. C. Hart Merriam, near Big Moose Lake, New York, June 15, 1883, and represents a coarsely blotched specimen; No. 25598 (Pl. 7, Fig. 15), from a set of five eggs, Ralph collection, taken May 27,

1892, represents one of the ordinarily marked types; and No. 26920 (Pl. 7, Fig. 16), from a set of four, also in the Ralph collection, taken May 23, 1893, represents still another style of markings, which is not as common as the two former; the last two eggs were taken in Herkimer County, New York.

192. *Scolecophagus cyanocephalus* (WAGLER).

BREWER'S BLACKBIRD.

Psarocolius cyanocephalus WAGLER, Isis, 1829, 758.

Scolecophagus cyanocephalus CABANIS, Museum Heineanum, 1851, 193.
(B 418, C 222, R 274, C 332, U 510.)

GEOGRAPHICAL RANGE: Western North America; north to British Columbia and the Provinces of Alberta and Saskatchewan, in the Dominion of Canada; east to Manitoba, Minnesota, Nebraska, Kansas, the Indian Territory, and Texas; south to Lower California and over the Mexican table-lands to Oaxaca. Occasionally in winter to Iowa, Wisconsin, Missouri, and Illinois; casually to Louisiana and South Carolina.

Brewer's Blackbird, or the Blue-headed Grackle, is the western representative of the preceding species, and its breeding range is coextensive with its geographical distribution, excepting along its eastern border, where it is limited to northwestern Minnesota, the western parts of Nebraska, Kansas, the Indian Territory, and to nearly all of Texas, excluding only the extreme eastern portions and the immediate vicinity of the Gulf coast.

Brewer's Blackbird is common and is well known throughout the West; is found almost everywhere, in suitable localities, from the eastern slopes of the Rocky Mountains to the Pacific coast. It is equally abundant on the Great Plains, and breeds in large numbers in Manitoba and portions of Saskatchewan, where it reaches the northern limits of its range in about latitude 54° north Longitude 96° west from Greenwich marks about the eastern limits of its breeding range in the United States. Mr. Henry Nehrling reports it as breeding near Spring Creek, some 30 miles north of Houston, Texas, on May 5, 1881; and Dr. P. L. Hatch, in his "Birds of Minnesota," records it as an abundant summer resident along the Red River, in northwestern Minnesota. It is only partly migratory in the western United States, where some of these birds can be seen throughout the year. I have met with it in January, at Fort Colville, Washington; and at Fort Walla Walla a large flock, numbering fully five hundred birds, wintered regularly within the limits of the Post, feeding in the daytime on the refuse grain found about the cavalry stables, and roosting in the cottonwoods in the immediate vicinity at night. They were exceedingly tame and familiar while feeding, and although frequently shot for food and harassed daily by Prairie Falcons, Richardson's and Suckley's Merlins, and Pigeon Hawks, which subsisted almost entirely on them, they persisted in remaining, allowing a person to approach within a few feet of them while on the ground. I consider it the most confiding of all our Blackbirds. Mr. R. H. Lawrence writes that he saw a large flock at Seattle in December, 1891, and one or more

flocks in January, near Vancouver, Washington; most of these birds appeared to be males. As a rule Brewer's Blackbird likes rather open country and is not seen in extensive forest regions, and during the breeding season it shuns the swampy and tule-bordered shores of the larger inland lakes, which are the home of thousands of Yellow-headed and Red-winged Blackbirds at that time of year. Dr. E. A. Mearns, United States Army, met with it in the pine belt in Arizona, and found it common at the base of the San Francisco Mountains in June, 1887, where it was breeding.

In Colorado it has been observed up to 10,000 feet, and in the San Pedro Martir Mountains, in Lower California, Mr. A. W. Anthony found it nesting in the pines at an altitude of about 8,200 feet on May 13, 1893; while in the San Vincente Valley they nested in olive trees, and full sets of eggs were taken by him here on April 28. In western Oregon, he informs me, they often nested in old Woodpecker holes, sometimes more than 100 feet from the ground.

Brewer's Blackbird is a restless creature, and is never still for any length of time. Its manner of flight is swift, and when in flocks they generally move in a compact body; when one bird takes wing all the others follow, and a flock makes considerable noise as it passes by. On the ground, while in search of food, its walk is easy and graceful, and in walking about while feeding the birds in the rear take occasional short flights and settle down just ahead of the foremost ones; such movements are constantly taking place until startled by something, when they all take wing and settle in the nearest trees.

Their food during the summer consists mostly of caterpillars, grasshoppers, large black crickets, worms, slugs, etc., varied with small seeds, and during the winter mostly of grains of different kinds, generally refuse picked up about the stock yards and farmhouses. In the spring they may often be seen following the farmer's plow, picking up beetles, larvæ, etc., as they are uncovered, or following cattle, like Cowbirds. In the Santa Clara Valley, in California, Mr. R. H. Beck writes, a species of measuring worm attacked the apricot and prune trees in certain orchards, and had denuded many of them. When the birds discovered these worms they could be seen all day gathering them and feeding their young therewith, destroying enormous numbers; but during cherry time they helped themselves also to some cherries. Although this species may destroy some fruit at times, it certainly does far more good than harm, and deserves protection.

Their ordinary call note is a sharp "tchäck, tchäck," and in the spring of the year they are full of song, which it is utterly impossible to describe. A number of birds are usually singing, if it can be so called, at the same time, and such a concert, consisting of all sorts of sounds, must be heard to get a satisfactory idea of it. They are amiable and sociable birds, and where not molested will readily alight in the yards of houses and pick up food from the doorsteps.

Such birds as migrate usually return to their more northern breeding grounds early in April, and shortly afterwards they begin to scatter in small colonies over the surrounding country to suitable localities to breed, though

many pairs nest singly. Brewer's Blackbirds do not nest in such large bodies as do the Redwings and other species, and colonies of fifteen to twenty pairs are much less frequently found breeding together than smaller ones of from five to ten pairs; occasionally several pairs nest in the same tree. I have met with it almost everywhere in the West, from the British line to southern Arizona, but in the latter Territory only in winter. Inasmuch as it breeds in southern California, it probably breeds also in Arizona, but I did not look for its nests.

Nidification throughout the greater portion of its range usually begins about May 1; in southern California it is sometimes fully a month earlier, and the nest, in this locality at least, is generally placed in low bushes or in trees, from 2 to 30 feet from the ground, rarely higher. It nests mainly in oak, fir, cypress, juniper, pine, willow, and apple trees, and in wild-rose, service-berry, and sagebrush thickets. Ordinarily the nests are placed not over 8 feet from the ground, and in certain localities, as near Camp Harney, in southeastern Oregon, they are more frequently placed on the ground, or rather in the ground, the rim of the nest being flush with the surface. I found quite a number there in such situations, even when suitable trees and bushes were available close by, and in every such case the nest was placed close to or directly on the edge of a perpendicular bank of some small creek which might become dry by July, and never by any chance as much as a foot away from the bank. I did not find a single exception where the nest was placed on the ground, and I examined more than fifty. It puzzled me for a time to account for this, but I believe I can give the reason for it now. Cattle and Indian ponies graze close to streams in the early spring, because the grass there is generally greener and more abundant, and if the nests were not placed in the positions they are, many would undoubtedly be stepped on and the eggs or young destroyed. The birds have learned this and place them where animals will not willingly walk, that is, close to a perpendicular bank, be it ever so low.

The nest is a rather bulky structure when placed in trees or bushes, consisting of a loose platform of small sticks, mixed with weed and grass stalks, shreds of bark, rootlets, dry grass, and moss, and these materials are generally, but not always, cemented together with earth, or with cow and horse manure. Some nests are much more solidly built than others; in these well-built nests the bulk of the materials is used wet, and those built on the ground are apparently always fashioned in this way. The inner cup of the nest is neatly lined with fine rootlets, decayed shreds of bark, or horsehair, more rarely with dry grass. A nest now before me, taken near Camp Harney, Oregon, May 22, 1875, and sunk into the ground, measures 6 inches in outer diameter by 3 inches in depth; the inner cup is 4 inches wide by $2\frac{1}{2}$ inches deep. Nests built in trees are bulkier and deeper on the outside, but the inner cup measures about the same. It takes about a week to complete the nest, and both sexes assist in its construction.

Throughout the greater portion of its range nidification is at its height during the last half of May, and occasionally it is protracted into July. In California it breeds ordinarily during the last two weeks of April. Capt. W. L. Carpenter, United States Army, took a set of five eggs on July 6, 1874, near

Laramie, Wyoming, which is the latest breeding record I have of this species. Usually only one brood is raised in a season, at least in the northern portions of its range. It is occasionally imposed upon by the Cowbird.

The number of eggs laid to a set varies from four to eight. Sets of five are most often found; sets of six are not unusual, though larger ones are rare. In over two hundred nests seen by me, only a single one contained seven eggs. An egg is deposited daily until the set is completed. Incubation lasts about fourteen days, and this duty is performed almost exclusively by the female. The young are large enough to leave the nest in about sixteen days, and after they are able to care for themselves they collect into small flocks and rove about the country until the fall migration begins, when they collect into large assemblies, and about the latter part of September begin to move southward. Birds wintering along our northern border appear to be nearly all adult males.

The eggs of Brewer's Blackbird are mostly ovate, less often short ovate, and rarely elliptical ovate in shape. The shell is strong, not as finely granulated as in the preceding species, and when fresh the eggs are rather glossy. Compared with those of the Rusty Grackle, they show very little resemblance, both ground color and markings being very different, and the majority are much darker. The ground color, when plainly visible, is usually pale gray white, less often pale greenish white, a color that is difficult to exactly describe. This is mostly profusely blotched, marbled, streaked, and spotted, with irregularly shaped markings of seal, walnut, liver, and clove brown, mixed with lighter shades of russet, cinnamon rufous, fawn color, and lavender. Some specimens are more or less streaked with irregular lines and tracings, resembling those found on some eggs of the Red-winged Blackbird, while in others the markings are heavy and so uniformly distributed that the ground color is entirely hidden. In a few they are fine and minute, resembling those found on the eggs of our well-known Brown Thrasher. In fact, there is an endless variety of styles of markings, and two sets are rarely found which are marked exactly alike.

The average measurement of two hundred and forty-five specimens in the United States National Museum collection is 25.49 by 18.60 millimetres, or about 1 by 0.73 inch. The largest egg in this series measures 27.94 by 20.07 millimetres, or 1.10 by 0.79 inches; the smallest, 20.83 by 15.49 millimetres, or 0.82 by 0.61 inch.

Of the type specimens, No. 20243 (Pl. 7, Fig. 17), from a set of four eggs, represents one of the heavily marked and smaller-sized specimens; No. 20246 (Pl. 7, Fig. 18), from a set of five, represents one of the lighter-marked eggs, in which the ground color is plainly visible; No. 20252 (Pl. 7, Fig. 19), also from a set of five, shows another style of markings; and No. 20264 (Pl. 7, Fig. 20), likewise from a set of five, represents still another type. These eggs are all in the Bendire collection. The first three were taken by the writer near Camp Harney, Oregon, on May 23, 1875, May 23, 1876, and May 16, 1877, respectively, and are selected out of a large number of nests examined. The last was taken by me near Fort Klamath, Oregon, on May 22, 1883, and represents one of the more common styles of markings.

193. *Quiscalus quiscula* (LINNÆUS).

PURPLE GRACKLE.

Gracula quiscula LINNÆUS, *Systema Naturæ*, ed. 10, 1758, 109.

Quiscalus quiscula JORDAN, *Manual of the Vertebrates*, ed. 4, 1884, 93.

(B 421, C 225, R 278, C 335, U 511.)

GEOGRAPHICAL RANGE: Atlantic coast regions of the United States; from southern Connecticut and southeastern New York south to southern South Carolina; west to the eastern slopes of the Alleghany Mountains. In winter to Florida.¹

The Purple Grackle, also called the "Purple Crow Blackbird," or simply "Crow Blackbird," is one of the best known and most familiar birds of the localities which it inhabits. In the northern parts of its range it is migratory, departing usually in the beginning of October for its winter home in our Southern States, where it congregates in immense flocks in suitable localities, while in the more southern sections it is a resident throughout the year and breeds wherever found. The birds that migrate usually return to their breeding grounds early in March, and a few even in the latter part of February, when their arrival is readily noticed. Their peculiar, squeaky notes, consisting of a variety of mostly indescribable sounds, such as "dweekh, dweekh, tchäh, tchäh, quäk, quäk," or "dæ, dæ," which seem to be uttered with considerable difficulty, and are invariably accompanied by the opening of the wings and tail, may be heard any morning in early spring from the tree tops in rather open country, in pastures, as well as in city parks.

At this time of the year small companies, consisting of from twelve to fifteen birds, are usually seen together, roving from place to place and chasing each other about, in search of mates. Unfortunately, as in the case of many other species, the Purple Grackle is not looked upon with favor by the average farmer, and they are often shot in large numbers because they help themselves to a little corn when other food is scarce. Considered from an economic point of view and judged by careful examinations made by the United States Department of Agriculture of a number of stomachs of these birds killed during every month of the year, it is shown that their food consists largely of animal matter, such as grasshoppers, caterpillars, spiders, beetles, cutworms, larvæ of different insects, remains of small mammals, frogs, newts, crawfish, small mollusks, and fish. While it must be admitted that Indian corn, oats, and wheat are also eaten to some extent, much of the vegetable matter found in their stomachs consists of the seeds of noxious weeds, such as the ragweed (*Ambrosia*), smartweed (*Polygonum*), and others. Fruit is used but sparingly, and consists usually of mulberries, blackberries, and occasionally of cherries. One of the gravest

¹In defining the geographical ranges of our Grackles of the subgenus *Quiscalus* I have mainly followed Mr Frank M. Chapman's able paper on this subject, published in the "Bulletin of the American Museum of Natural History," New York (Vol. IV, No. 1), February, 1892, which contains the latest information on this subject. This is one of the cases where it is impossible to define the ranges more closely, as the different subspecies intergrade to a considerable extent where the breeding range of one race overlaps that of one of the others.

charges against them is the destruction of the young and eggs of smaller birds, especially those of the Robin. Granting that remains of eggshells are sometimes found in their stomachs, which seems to be the case about once in twenty-five times, it does not fully prove that all of these birds are guilty of such an obnoxious habit, and on the whole it can be safely asserted that the Purple Grackle does far more good than harm, and deserves to be protected, excepting in localities where they winter, and where, from their immense numbers, they may become a serious nuisance.

They spend much of their time on the ground, being essentially ground feeders; they walk along close to the heels of the farmer while plowing, picking up beetles, grubs, etc., as they are turned up by the plow, or search the meadows and pastures for worms, grasshoppers, and other insects suitable for food. They are at all times, eminently social birds, even during the breeding season; a number of pairs generally nest together, and frequently several nests will be found in one tree. Small colonies of Purple Grackles breed regularly in the public parks of Washington, District of Columbia. They also nest sometimes in company with other species, being apparently on good terms with their neighbors.

In the selection of nesting sites, thick, bushy coniferous trees, such as cedars, pines, and firs, seem to be preferred, but many other kinds are likewise used, notably such as are overrun with vines. Where suitable trees are not available, thick bushes, especially such as overhang water, are also made use of, where the nests are occasionally placed scarcely 4 feet from the ground. Sometimes natural cavities in trees or hollow stubs, as well as the excavations of the larger Woodpeckers, are also used, and along the seashore, where the Fishhawk is common, they often place their nests in the interstices of these bulky structures, notably so on Plum Island, New York. Speaking of this locality, the late Dr. Charles S. Allen says: "In every Fishhawk's nest, except those on the ground, I always found from two to eight or ten nests of the Purple Grackle. They were situated in crevices among the sticks, under the edges of the nest, or even beneath the nest itself, so as to secure protection from rain and bad weather. They were very bold in collecting fragments from the table of their powerful neighbor."¹

Mr. J. H. Pleasant, jr., of Baltimore, Maryland, writes as follows: "On May 19, 1888, I discovered a colony of Purple Grackles nesting under the eaves and rafters of a hay barn. In some instances the entrance to the nest was so small that it was extremely difficult to obtain the eggs. The crevices in which the nests were built were very much of the same character as those frequently chosen by the English Sparrow, and were situated at an average height of 25 feet from the ground; over a dozen nests were observed."

Mr. Theodore W. Richards, of Washington, District of Columbia, found a colony of these birds in Northampton County, Virginia, in May, 1891, breeding in a grove of small second-growth pines, some 20 feet in height, in company with Green Herons. The Grackles' nests were invariably placed in the very top of the trees, while their less assuming companions were content to dwell in the

¹ The Auk, Vol. IX, 1892, p. 319.

lower story, so to speak, their platforms seldom being over 10 feet from the ground, and loosely balanced on the top of a horizontal branch.¹

The nests are rather loosely constructed and bulky. The materials used vary greatly according to locality; the outer walls are usually composed of coarse grass, weed stalks, eelgrass, or seaweed, sometimes with a foundation of mud, and again without it. The inner cup of the nest is composed of similar but finer materials, and is generally lined with dry grass, among which occasionally a few feathers, bits of paper, strings, and rags may be scattered; in fact anything suitable and readily obtained is liable to be utilized. Exteriously the nests vary from 5 to 8 inches in height, and from 7 to 9 inches in diameter, according to location. They are ordinarily about 3 inches deep by 4 inches wide inside. The nests are placed at various distances from the ground, some as low as 3 feet, and others in the extreme tops of trees, or on horizontal limbs from 20 to 30 feet up, or occasionally even higher. At Washington, District of Columbia, the Purple Grackle begins to build, or to repair the old site, about the beginning of April, and in favorable seasons full sets of eggs may be looked for about the middle of this month, usually, however, not before the first week in May, about which time they begin laying generally throughout their range. Incubation, in which both parents assist, lasts about two weeks, and they are equally solicitous in the defense of their eggs or young; the latter are able to leave the nest in about eighteen days, and sometimes a second brood is raised. They are fed almost entirely on insects while in the nest.

The number of eggs to a set varies from four to six, very rarely seven, and sets of five are most often found. The shell is strong, fine grained, and slightly glossy.

The ground color of the Purple Grackle's egg varies from a pale greenish white to a light rusty brown; they are generally blotched or streaked with irregular lines and dashes of various shades of dark brown, and in an occasional set different tints of lavender markings are also noticeable. Only in rare instances are these markings so profuse and evenly distributed over the entire egg as to hide the ground color. They vary greatly in style and character in different sets.

The average measurement of eighty-five specimens is 28.53 by 20.89 millimetres, or about 1.12 by 0.82 inches. The largest egg of the series measures 32.76 by 23.11 millimetres, or 1.29 by 0.91 inches; the smallest, 25.65 by 20.57 millimetres, or 1.01 by 0.81 inches. I am aware that this does not agree with the average measurements generally given for these eggs, but it is nevertheless correct.

The type specimens, No. 23394 (Pl. 7, Fig. 21), from a set of six eggs taken by Mr. Charles W. Richmond on April 17, 1887; No. 24775 (Pl. 7, Fig. 22), from a set of five eggs, and No. 24776 (Pl. 7, Fig. 23), from a set of four eggs, both taken by Mr. Guy E. Mitchell on May 9, 1887, were all obtained near Washington, District of Columbia. These eggs, as well as those figured for the two subspecies, *Quiscalus quiscula aglæus* and *Quiscalus quiscula æneus*, represent some of the different styles of coloration found among the three recognized races of this Grackle.

¹ Oölogist, Vol. VIII, June, 1891, p. 1828.

194. *Quiscalus quiscula aglæus* (BAIRD).

FLORIDA GRACKLE.

Quiscalus aglæus BAIRD, American Journal of Science and Arts, 1866, 84.

Quiscalus quiscula aglæus STEJNEGER, Auk, II, Jan., 1885, 43, footnote.

(B 422, C —, R 278a, C 336, U 511a.)

GEOGRAPHICAL RANGE: From southern South Carolina (Charleston) south through the Florida peninsula; west through southern Georgia and the Gulf coast of Florida to southeastern Louisiana (New Orleans).

The Florida Grackle, or Florida Crow Blackbird, a slightly smaller race than the preceding, is generally resident and breeds wherever found. Its general habits are similar to those of the Purple Grackle in nearly every respect. It breeds both in swamps and on higher grounds, in pine woods and orange groves, etc.; the nesting season begins sometimes in the latter part of March, but usually about the first week in April, and occasionally as late as May.

Dr. William L. Ralph finds this subspecies common in Putnam County, Florida, and the United States National Museum is indebted to him for nearly all the eggs of this race in the collection, as well as for the nests and skins. The nests vary somewhat in composition; some are made of coarse grass, leaves, etc., taken from the ground in swamps, pressed firmly together, and thickly covered on the outside with Spanish moss, with which a few pieces of grass, twigs, etc., are mixed, and they are lined with finer dry grass. In other nests the outer walls are mainly composed of coarse grass, weeds, and but little Spanish moss; these materials are cemented together with cow manure and mud, and the nests are lined with wire grass (*Aristida*); again flags, wet sphagnum moss, pine needles, and small twigs are used to a considerable extent in these structures. Such substances as are most readily obtained near the nesting site are generally utilized, and this accounts for the variable nature of the materials used.

A nest now before me, built in an orange tree, about 8 feet from the ground, measures $5\frac{1}{2}$ inches in height and 8 inches in outer diameter. The inner cup of the nest is $3\frac{3}{4}$ inches deep by $4\frac{1}{4}$ inches in diameter. Most of the nests found by Dr. Ralph were placed in low bushes, from 2 to 7 feet above the water in cypress swamps; others were found in orange trees and small pines, at no great distance from the ground. One nest, containing four eggs, in which incubation was about one-fourth advanced, taken by him March 30, had been placed directly under an occupied nest of the Green Heron, with an interval of about 6 inches between them. It was in a bush in a cypress swamp, about 5 feet from the ground.

The number of eggs to a set varies from three to five, and these show about the same variations in color and markings as those of the Purple Grackle, and can not be distinguished from them, excepting that they are somewhat larger.

The average measurement of twenty-three eggs, all from Florida, is 30.48 by 20.97 millimetres, or 1.20 by 0.82 inches. The largest egg measures 36.32 by

21.34 millimetres, or 1.43 by 0.84 inches; the smallest, 26.92 by 19.30 millimetres, or 1.06 by 0.76 inches. As will be seen, these eggs measure considerably more on an average than do those of its larger relative, the Purple Grackle.

The type specimens, Nos. 25824 and 25825 (Pl. 7, Figs. 24 and 25), Ralph collection, from sets of five and four eggs, respectively, were both taken near San Mateo, Florida, on April 25, 1885, and April 14, 1888, by Dr. William L. Ralph, and represent the better-colored phases found among the eggs of this subspecies.

195. *Quiscalus quiscula æneus* (RIDGWAY)

BRONZED GRACKLE.

Quiscalus æneus RIDGWAY, Proceedings Academy Natural Sciences, Philadelphia, June, 1869, 134.

Quiscalus quiscula æneus STEJNEGER, Auk, II, Jan., 1885, 43, footnote.
(B —, C 225a, R 278b, C 337, U 511b.)

GEOGRAPHICAL RANGE: From northern British North America, vicinity of Great Slave Lake and the country bordering the southern half of Hudson Bay; southern Labrador and southern Newfoundland, southward through the Dominion of Canada and the United States; west to the eastern slopes of the Rocky Mountains; south to the Rio Grande Valley, in Texas, and the Gulf coast, to the mouth of the Mississippi, and thence northeasterly through Mississippi, Alabama, northern Georgia, along the western slopes of the Alleghanies, reaching the Atlantic seacoast again in Massachusetts and following it to Nova Scotia. In winter, passing, to some extent, into Mexico, and casually to the eastern slopes of the Alleghany Mountains.

The Bronzed Grackle, also known as the "Western Crow Blackbird," is far more numerous than either of the two preceding species, and breeds throughout its extensive range. Although only considered as a race in the "American Ornithologists' Union Check List," in my opinion it is a perfectly good species and entitled to specific rank.

Within the United States it is especially abundant; throughout the valleys of the Mississippi River and its larger tributaries, and particularly so along our northern border and in southern British North America, east of the Rocky Mountains, where it breeds in large colonies in favorable localities. While not so common in our prairie States, it is generally distributed throughout the region and is recorded from all of them.

In the northern portions of its range it is only a summer visitor, usually migrating southward in immense numbers in the early fall, passing through our Northern States during the latter part of October, and remaining there in favorable seasons sometimes well into November, and returning from its winter haunts in our Southern States and eastern Mexico during February and March. The majority of these birds winter south of latitude 37° N.

Mr. W. E. Loucks, of Peoria, Illinois, says: "Thousands of these birds are to be found here in the spring, and while many of them pass north, others remain to breed. At this time of the year they make the bottom lands their

rendezvous. On their first arrival they keep in flocks for a few weeks, roosting in the willows, and, together with the Red-winged Blackbirds, make a deafening noise, forming a general roost in which all the flocks from the surrounding country join, and so great are their numbers that the trees appear black. In the fall they again gather in large flocks, but betake themselves to the highlands, where they remain until their departure for the south. Oak woods and orchards are now their resorts, whence an occasional visit is made to the fields for food. In the vicinity of Peoria they nest in uplands, where an orchard or a clump of pines or occasionally a soft maple is selected for this purpose; but if one wants to see them in greater abundance he should take a boat and row into the willow swamps, where they nest in large numbers, the nests generally being placed in willow trees, at various distances from the water level, say from 4 to 25 feet, and occasionally higher."

The general habits of the Bronzed Grackle do not vary greatly from those of the preceding species, and their food is very similar. During the breeding season this consists almost entirely of insects of various kinds, while later in the summer corn is eaten to a considerable extent. In the north, where wild rice is abundant, this, as well as other small seeds, forms a considerable portion of their daily fare. Beechnuts are also eaten by them, and they have been observed catching bees.

There are two sides to every question, and while there is no doubt that the Bronzed Grackle does some harm to the matured corn crops in certain sections in the fall, due mainly to the enormous numbers of these birds that congregate in some localities during their migration, it is equally true that at all other times, especially during the breeding season, they do considerable good, subsisting and feeding their young almost entirely on noxious insects of all kinds, especially cutworms, which destroy a great deal of young corn, but whose depredations are often erroneously charged to the birds while searching for them.

The nesting season is somewhat variable, and ranges from the first week in March to the latter half of June, according to locality, although even at Fort Resolution, near Great Slave Lake, at the extreme northern point of its known range, eggs were taken by Mr. J. Lockhart, of the Hudson Bay Company, as early as May 17, 1863; while at Fort Custer, Montana, they had not even commenced breeding at that time. I took my first fresh eggs there on May 29, and others as late as June 14, 1885.

The late Dr. William C. Avery, of Greensboro, Alabama, found birds intermediate between this and the Florida Grackles nesting there on April 25, 1890. Dr. James C. Merrill, United States Army, took fresh sets at Fort Reno, Indian Territory, as late as May 31, 1890, and Dr. Ralph found them laying at Holland Patent, Oneida County, New York, in the latter part of April or the beginning of May. Climate seems to have little influence on the time of nesting.

Where coniferous trees are obtainable preference seems to be given to them as nesting sites; willows, oaks, maples, elms, sycamores, and cottonwoods are

also frequently used, especially trees covered by grapevines. In the West natural cavities and hollow stubs, as well as the excavations of the larger Woodpeckers, are often resorted to. I found several nests placed in open spaces in stacks of cord wood near Fort Custer, Montana.

Both Mr. M. Chamberlin and Mr. J. W. Banks inform me that in New Brunswick these Grackles nest frequently in hay barns. The hay is taken away from the marshy islands bordering the rivers on the ice in winter, and these birds take possession of such barns in large numbers in the spring, placing their nests in the angle of a brace or on the beams and girders, much in the same fashion as that adopted by the Robins.

Mr. J. W. Preston, of Baxter, Iowa, in referring to their nesting habits in the lake regions of northern Iowa and Minnesota, says: "A vast colony occupied a brushy flat near Cairo Lake, Hamilton County, Iowa, during the season of 1881. When I saw them the young birds were leaving the nests, and the noise and din of the scolding, squalling parents and crying young were deafening as one walked among the nests, which were crowded in the tops of wild-plum trees. I also saw a large colony in a tract of bushy land at the northern extremity of Heron Lake, Minnesota. Here the nests were placed in low shrubs and wild-gooseberry bushes, some not more than 1 foot from the ground. The construction differed somewhat from the ordinary nest. The structures were deep and heavy, and were made of dry grass, with a filling or wall of mud between the outer wall and the lining. I have seen an odd nest of this Grackle built in a bunch of common reed (*Phragmites*), which looks like broom corn at a distance and grows from 5 to 12 feet high. This nest resembled that of a Yellow-headed Blackbird, the material being evenly woven together."

There is not much difference in their nests; compared with those of the Purple and Florida Grackles, they vary like these in composition according to locality, and their nesting habits and eggs are also similar. The number of eggs to a set varies from four to six or rarely seven; sets of five are most often found, and six are not unusual.

The average measurement of a series of one hundred and forty-eight specimens in the United States National Museum collection is 29.02 by 20.90 millimetres, or about 1.14 by 0.82 inches. The largest egg measures 31.50 by 21.59 millimetres, or 1.24 by 0.85 inches; the smallest egg, 25.40 by 19.05 millimetres, or 1 by 0.75 inches.

The type specimen, No. 23206 (Pl. 7, Fig. 26), from a set of five eggs, taken by Mr. V. N. Edwards, near Woods Hole, Massachusetts, on May 27, 1887, represents one of the darkest eggs in the entire series; while No. 25889 (Pl. 7, Fig. 27), from a set of four eggs, Ralph collection, taken by Dr. William L. Ralph, on May 18, 1887, near Holland Patent, New York, shows one of the rarer types of coloration.

196. *Quiscalus macrourus* SWAINSON.

GREAT-TAILED GRACKLE.

Quiscalus macrourus SWAINSON, *Animals in Menageries*, 1838, 299.
(B 419, C 223, R 275, C 333, U 512.)

GEOGRAPHICAL RANGE: From Nicaragua, Central America, north through eastern Mexico to southern Texas.

The range of the Great-tailed Grackle within the United States is restricted to the southern portions of Texas, contiguous to the Gulf coast and the lower Rio Grande Valley. In the interior of the State it has been met with in Bexar and Harris counties, which probably mark about the northern limits of its range. Mr. H. P. Attwater considers it to be a common summer resident near San Antonio, Texas, and a few winter there. Mr. Nehrling found it nesting in scattered pairs in and about Houston, Texas, which marks about the eastern limit of its distribution in this State. It is generally a resident and breeds wherever found, and in the lower Rio Grande Valley it is very abundant.

Mr. George B. Sennett, speaking of the Great-tailed Grackle, says: "When I think of this bird it is always with a smile. It is everywhere as abundant on the Rio Grande as is *Passer domesticus*, the English Sparrow, in our Northern cities, and equally tame when about habitations. This bird is as much a part of the life of Brownsville as the *barrelero* rolling along his cask of water or the mounted beggar going his daily rounds. In the towns and about the ranches he knows no fear; is always noisy, never at rest, and in all places and positions, now making friends with the horses in the barns, or the cattle in the fields, then in some tree pouring forth his notes, which I can liken only to the scrapings of a cornstalk fiddle; now stealing from porch or open window some ribbon for his nest, then following close behind the planter, quick to see the dropping corn. With all his boldness and curiosity the boys of the streets say they can not trap or catch him in a snare. He will take every bait or grain but the right one; he will put his feet among all sorts of rags but the right ones, and the boys are completely outwitted by a bird. He performs all sorts of antics; the most curious and laughable performance is a common one with him: Two males will take position facing each other on the ground or upon some shed; then together they begin slowly raising their heads and twisting them most comically from side to side, all the time eyeing each other, until their bills not only stand perpendicular to their bodies, but sometimes are thrown over nearly to their backs. After maintaining this awkward position for a time they will gradually bring back their bills to their natural position, and the performance ends. It is a most amusing thing to witness, and seems to be mere fun for the birds, for nothing serious grows out of it."¹

Their food consists of different kinds of insects and their larvæ, small crustaceans, dead fish, seeds and grain of various kinds, and on the whole they do comparatively little injury.

¹Notes on the Ornithology of the Lower Rio Grande in Texas, U. S. Geological and Geographical Survey, Vol. IV, 1878, pp. 27 and 28.

The Great-tailed Grackles are more or less gregarious at all times, and generally breed in companies, often in considerable colonies, among the willow thickets and chaparrals bordering the streams and irrigating ditches, or in the tops of mesquite, ebony and colima trees, so common a feature in the lower Rio Grande Valley; they nest less often in hackberry, prickly ash, and oak trees, as well as in the extensive canebrakes bordering the numerous lagoons and fresh-water lakes and in the rushes in the salt marshes near the Gulf coast. Dr. Merrill, United States Army, found them very common on the military reservation in the vicinity of Brownsville, Texas, nesting in the tops of different kinds of trees, as well as in the tule reeds, in company with several species of Herons, and even among the interstices of the nests of Audubon's Caracara and on the same trees occupied by these birds.

Mr. E. Kirby Smith writes: "At Suchil, Vera Cruz, Mexico, the Great-tailed Grackle frequently nests under the eaves of houses, and I have seen as many as fifteen of their nests in one tree. Excepting during the breeding season the males and females keep in separate flocks. They fly very slowly. The local name for these birds is 'Pecho.'"

Mr. Charles W. Richmond informs me that this species is very common at Bluefields, on the east coast of Nicaragua, and at San Carlos on the lake, and that it is tame and familiar. It haunts particularly the wharves and low shores, where it finds a variety of food. It is quite bold, going out to the Carib craft anchored close by and visiting the decks for food. It is known as "Sanate" among the natives.

According to Mr. Sennett, when breeding in swamps their nests are frequently placed within 2 feet of the water, and from 4 to 30 feet from the ground when in trees. Their nests, of which I have several before me, resemble those of the rest of our eastern Grackles in size, construction, and materials; some of them are almost entirely composed of Spanish moss, while others are mainly built of small, round stems of creeping plants which are flexible enough to admit of their being securely woven together. Mud is often used to bind the materials together, and the upper rim of the nest is generally securely fastened to the surrounding branches or reed stalks among which it is placed. Some nests show no traces of mud in their composition, but the materials forming the outer walls appear to have been quite wet when gathered. The lining usually consists of dry grass and fine roots, and when near towns bits of cotton cloth, feathers, paper, etc., are often found mixed among the other materials.

Nidification usually begins during the latter part of April; it is at its height in the first half of May and lasts through June. One and sometimes two broods are reared in a season. Young birds of various sizes and fresh eggs may frequently be found in the same colony. The earliest record I have of eggs being taken is one by Dr. Merrill, United States Army, at Brownsville, Texas, on April 4. Both sexes assist in incubation, which lasts about fifteen days, and in the care of the young, for which they show a great deal of solicitude.

The number of eggs laid to a set is usually three or four. Sets of five are occasionally found, but clutches of this size are rather rare.

The ground color is usually pale greenish blue, and is often more or less clouded over with purple vinaceous and smoky pale umber tints, which are usually heaviest and most pronounced about the smaller end of the egg. The markings consist mainly of coarse, irregularly shaped lines and tracings of different shades of dark brown, black, and smoky gray, and less-defined tints of plumbeous. In rare instances an egg is found which is only faintly marked with a few indistinct lines of lavender gray about the small end, the rest of the shell being immaculate. They are mostly elongate ovate in shape; a few are blunt ovate, while others approach a cylindrical ovate.

The average measurement of ninety-three specimens in the United States National Museum collection is 32.18 by 21.75 millimetres, or about 1.27 by 0.86 inches. The largest egg in the series measures 36.58 by 22.61 millimetres, or 1.44 by 0.89 inches; the smallest, 28.19 by 20.57 millimetres, or 1.11 by 0.81 inches.

The type specimen, No. 20290 (Pl. 7, Fig. 28), from a set of three eggs, was taken by Dr. James C. Merrill, United States Army, near Fort Brown, Texas, on May 17, 1877, and represents a small-sized and dark-colored egg of this species. No. 25626 (Pl. 7, Fig. 29), also from a set of three, Ralph collection, was taken near Brownsville, Texas, on May 21, 1891, and shows a well-marked and average-sized egg.

197. *Quiscalus major* VIEILLOT.

BOAT-TAILED GRACKLE.

Quiscalus major VIEILLOT, Nouveau Dictionnaire d'Histoire Naturelle, XXVIII, 1819, 487. (B 420, C 224, R 277, C 334, U 513.)

GEOGRAPHICAL RANGE: South Atlantic and Gulf coasts of the United States, from Maryland southward; west to southeastern Texas. Casual in southern New Jersey.

The Boat-tailed Grackle, also locally known as the "Thrush Blackbird," "Boat-tailed Blackbird," and "Jackdaw," is an abundant resident in the southern portions of its range, along the coast and on the islands of South Carolina, Georgia, Florida, Mississippi, and Louisiana. In the northern parts of its range, which extends well into Maryland (Kent County), on the shores of Chesapeake Bay, it is only a summer visitor, but some of these birds winter in suitable localities in Virginia and North Carolina. It has also been observed in the vicinity of Cape May, New Jersey, in the summer, and possibly it breeds there in small numbers. It is known to breed at Pomona, Maryland, the most northern record I am aware of. It is not uncommon on several islands off the coast of Virginia, and a large colony was observed nesting on one of the small islands in Chesapeake Bay by Mr. Theodore W. Richards. Mr. H. Nehrling found it breeding in the vicinity of Houston, Texas, which marks about the western limit of its range; here it overlaps the eastern range of the preceding species.

Like the rest of the Grackles, they are gregarious and sociable in their habits, breeding together in colonies in suitable localities, and roving about

during the rest of the year in large flocks. In some sections they disappear sometimes from their usual haunts in the late summer for a month or so, for some unknown reason, probably going in search of better feeding grounds, only to return later. They spend a good deal of their time on the ground, walking along slowly and sedately while searching for food. It requires quite an effort for one of the birds to rise from the ground, and until fairly started its flight is slow, heavy, and laborious.

Their food is largely derived from the sea, and consists mainly of small mollusks and crustaceans of different kinds picked up in the salt marshes and mud flats during low tide, and of dead fish, insects, etc., carried in by the tides. They also feed, though to a small extent only, on vegetable matter, such as rice and other grains, and occasionally on fruit.

In the more northern portions of their range these birds usually arrive about the beginning of March, and are at first very restless, roving about from place to place until the nesting season commences. They are unusually noisy during this time, and their peculiar, grating notes can be constantly heard; some of these are very shrill and unpleasant to the ear, but frequently during the mating season a rather indifferent attempt at singing is made; this is somewhat less disagreeable, but impossible to describe on paper.

Mr. Frank M. Chapman describes a singular note of theirs as resembling the flapping of wings, as of a Coot tripping over the water. He says: "This sound was very familiar to me, and so excellent is the imitation that for a long time I attributed it to one of the numerous Coots which abound in most places favored by *Quiscalus major*."¹

Mr. W. E. Grover, of Galveston, Texas, writes: "One of their common call notes, when sitting at ease in a tree, is a noisy, clucking 'clac-clac-clac,' frequently followed by a long-drawn whistle like 'who-it, who-it.' In this vicinity they nest principally in tule reeds growing in fresh-water ponds, and in the thick matted grass on the edges of salt bayous, some nests being partly in the water at high tide. Some also nest in Cherokee rosebushes, and occasionally a pair will build in a tree, as much as 40 feet from the ground. The nests of birds building in trees are not so deep nor so well made as those in the canes."

Nidification appears to be somewhat irregular with this species. In southern Florida some of these birds begin laying during the first week in March, when quite a number have not even begun nest building. The nesting season lasts until June here, and probably two broods are raised regularly. In the northern portions of their range it begins in the latter part of April, and is sometimes protracted until May. The nests are usually strong, bulky structures, measuring, on an average, about 7 inches in height by 8 inches in width. The inner cup is about 3 inches deep by 4½ inches in diameter. They are constructed mainly of coarse grass, sedges, weed stalks, and fibrous roots, cemented and more or less mixed with mud. In some nests no mud is used, and these are consequently not as solid. Some are built principally of Spanish moss, others of eel-

¹ The Auk, 1888, p. 273.

grass, the materials used varying in different localities. Cotton, rags, feathers, and seaweeds are also sometimes incorporated into the walls. They are placed on various kinds of trees and bushes, such as oaks, pines, and willows, and at various heights from the ground, ranging from 3 to 40 feet up, and again in water-myrtle bushes, canebrakes, and reeds in swamps, not over 18 inches above the water level.

The number of eggs laid to a set varies from two to five. Sets of three are most common; but in certain localities sets of four are equally so, while those of five are somewhat rare.

Incubation lasts about fifteen days, and this duty seems to be mostly performed by the female. The male, however, assists in feeding the young, and after they are able to care for themselves the sexes separate in flocks and remain apart until the mating season approaches again.

The eggs of the Boat-tailed Grackle closely resemble those of the preceding species, both in shape and coloration, excepting that the cloudy purple vinaceous and pale umber tints are generally more evenly distributed over the entire shell, when present, and are not so noticeable at the small end of the egg. In some instances the lines and tracings with which they are marked are also perceptibly finer as well as more profuse, being more like the markings found in the eggs of the Baltimore and Bullock's Oriole. They also average somewhat less in size.

The average measurement of ninety-eight eggs in the United States National Museum collection is 31.60 by 22.49 millimetres, or about 1.24 by 0.89 inches. The largest egg measures 34.29 by 24.64 millimetres, or 1.35 by 0.97 inches; the smallest, 27.94 by 21.59 millimetres, or 1.10 by 0.85 inches.

The type specimens, Nos. 25632 and 25634 (Pl. 7, Figs. 30 and 31), both from sets of three eggs, from the Ralph collection, were taken in McIntosh County, Georgia, on April 26 and 29, 1890, and represent the ordinary styles of markings.

EXPLANATION TO PLATE I.

- Fig. 1. *Conurus carolinensis*, Linnæus. Carolina Paroquet.
Fig. 2. *Geococcyx californianus*, Lesson. Road-runner.
Fig. 3. *Ceryle alcyon*, Linnæus. Belted Kingfisher.
Fig. 4. *Ceryle americana septentrionalis*, Sharpe. Texan Kingfisher.
Fig. 5. *Ceophlœus pileatus*, Linnæus. Pileated Woodpecker.
Fig. 6. *Crotophaga ani*, Linnæus. Ani.
Fig. 7. *Crotophaga sulcirostris*, Swainson. Grooved-billed Ani.
Figs. 8, 9. *Antrostomus carolinensis*, Gmelin. Chuck-will's Widow.
Figs. 10, 11. *Antrostomus vociferus*, Wilson. Whip-poor-will.
Figs. 12, 13. *Milvulus forficatus*, Gmelin. Scissor-tailed Flycatcher.
Figs. 14, 15. *Tyrannus tyrannus*, Linnæus. Kingbird.
Figs. 16, 17. *Tyrannus verticalis*, Say. Arkansas Kingbird.
Figs. 18, 19. *Tyrannus vociferans*, Swainson. Cassin's Kingbird.
Figs. 20, 21. *Pitangus derbianus*, Kaup. Derby Flycatcher.
Fig. 22. *Myiozetetes texensis*, Giraud. Giraud's Flycatcher.
Fig. 23. *Phalænoptilus nuttalli*, Audubon. Poor-will.
Fig. 24. *Dryobates pubescens*, Linnæus. Downy Woodpecker.
Fig. 25. *Chætura pelagica*, Linnæus. Chimney Swift.
Fig. 26. *Chætura vauxii*, Townsend. Vaux's Swift.
Fig. 27. *Trochilus colubris*, Linnæus. Ruby-throated Hummingbird.
Fig. 28. *Sayornis phœbe*, Latham. Phœbe.
Fig. 29. *Sayornis saya*, Bonaparte. Say's Phœbe.
Fig. 30. *Sayornis nigricans*, Swainson. Black Phœbe.





EXPLANATION TO PLATE II.

- Figs. 1, 2. *Nyctidromus albicollis merrilli*, Sennett. Merrill's Parauque.
Figs. 3, 4. *Tyrannus dominicensis*, Gmelin. Gray Kingbird.
Figs. 5, 6. *Tyrannus melancholicus couchii*, Baird. Couch's Kingbird.
Fig. 7. *Myiodynastes luteiventris*, Selater. Sulphur-bellied Flycatcher.
Figs. 8, 9. *Myiarchus crinitus*, Linnæus. Crested Flycatcher.
Figs. 10, 11. *Myiarchus mexicanus*, Kaup. Mexican Crested Flycatcher.
Fig. 12. *Myiarchus mexicanus magister*, Ridgway. Arizona Crested Flycatcher.
Fig. 13. *Myiarchus cinerascens*, Lawrence. Ash-throated Flycatcher.
Fig. 14. *Myiarchus cinerascens nuttingi*, Ridgway. Nutting's Flycatcher.
Figs. 15, 16. *Contopus borealis*, Swainson. Olive-sided Flycatcher.
Fig. 17. *Contopus pertinax*, Cabanis. Coues's Flycatcher.
Figs. 18, 19. *Contopus virens*, Linnæus. Wood Pewee.
Figs. 20, 21, 22. *Contopus richardsonii*, Swainson. Western Wood Pewee.
Fig. 23. *Empidonax flaviventris*, Baird. Yellow-bellied Flycatcher.
Figs. 24, 25. *Empidonax difficilis*, Baird. Western Flycatcher.
Figs. 26, 27. *Empidonax acadicus*, Gmelin. Acadian Flycatcher.
Figs. 28, 29. *Empidonax pusillus*, Swainson. Little Flycatcher.
Fig. 30. *Empidonax pusillus traillii*, Audubon. Traill's Flycatcher.
Fig. 31. *Empidonax minimus*, Baird. Least Flycatcher.
Fig. 32. *Empidonax hammondi*, Xantus. Hammond's Flycatcher.
Fig. 33. *Empidonax wrightii*, Baird. Wright's Flycatcher.
Figs. 34, 35. *Pyrocephalus rubineus mexicanus*, Sclater. Vermilion Flycatcher.



EXPLANATION TO PLATE III.

- Figs. 1, 2, 3. *Chordeiles virginianus*, Gmelin. Nighthawk.
Fig. 4. *Chordeiles virginianus henryi*, Cassin. Western Nighthawk.
Figs. 5, 6. *Chordeiles virginianus chapmani*, Sennett. Florida Nighthawk
Figs. 7, 8, 9, 10. *Chordeiles acutipennis texensis*, Lawrence. Texan Nighthawk.
Figs. 11, 12, 13. *Pica pica hudsonica*, Sabine. American Magpie.
Fig. 14. *Pica nuttalli*, Audubon. Yellow-billed Magpie.
Figs. 15, 16, 17. *Xanthoura luxuosa*, Lesson. Green Jay.
Figs. 18, 19. *Perisoreus canadensis*, Linnæus. Canada Jay.
Fig. 20. *Perisoreus canadensis nigricapillus*, Ridgway. Labrador Jay.
Fig. 21. *Perisoreus obscurus*, Ridgway. Oregon Jay.
Figs. 22, 23. *Nucifraga columbiana*, Wilson. Clarke's Nutcracker.
Figs. 24, 25. *Cyanocephalus cyanocephalus*, Wied. Piñon Jay.



EGGS OF *Setophaga* FRILA.

EXPLANATION TO PLATE IV.

- Figs. 1, 2. *Corvus corax sinuatus*, Wagler. American Raven.
Fig. 3. *Corvus corax principalis*, Ridgway. Northern Raven.
Figs. 4, 5, 6, 7. *Corvus cryptoleucus*, Couch. White-necked Raven.
Figs. 8, 9, 10, 11, 12. *Corvus americanus*, Audubon. American Crow.¹
Figs. 13, 14. *Corvus americanus floridanus*, Baird. Florida Crow.
Fig. 15. *Corvus caurinus*, Baird. Northwest Crow.
Figs. 16, 17. *Corvus ossifragus*, Wilson. Fish Crow.

¹Figs. 21, 22. *Corvus americanus*, Audubon. See Plate V.



1



2



3



4



5



6



7



8



9



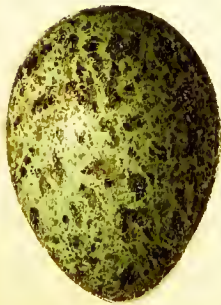
10



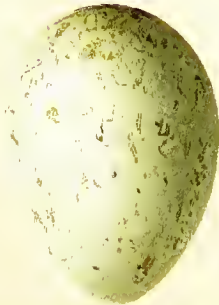
11



12



13



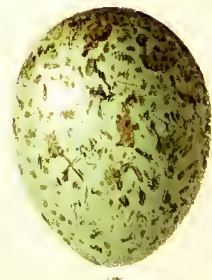
14



15



16



17



EXPLANATION TO PLATE V.

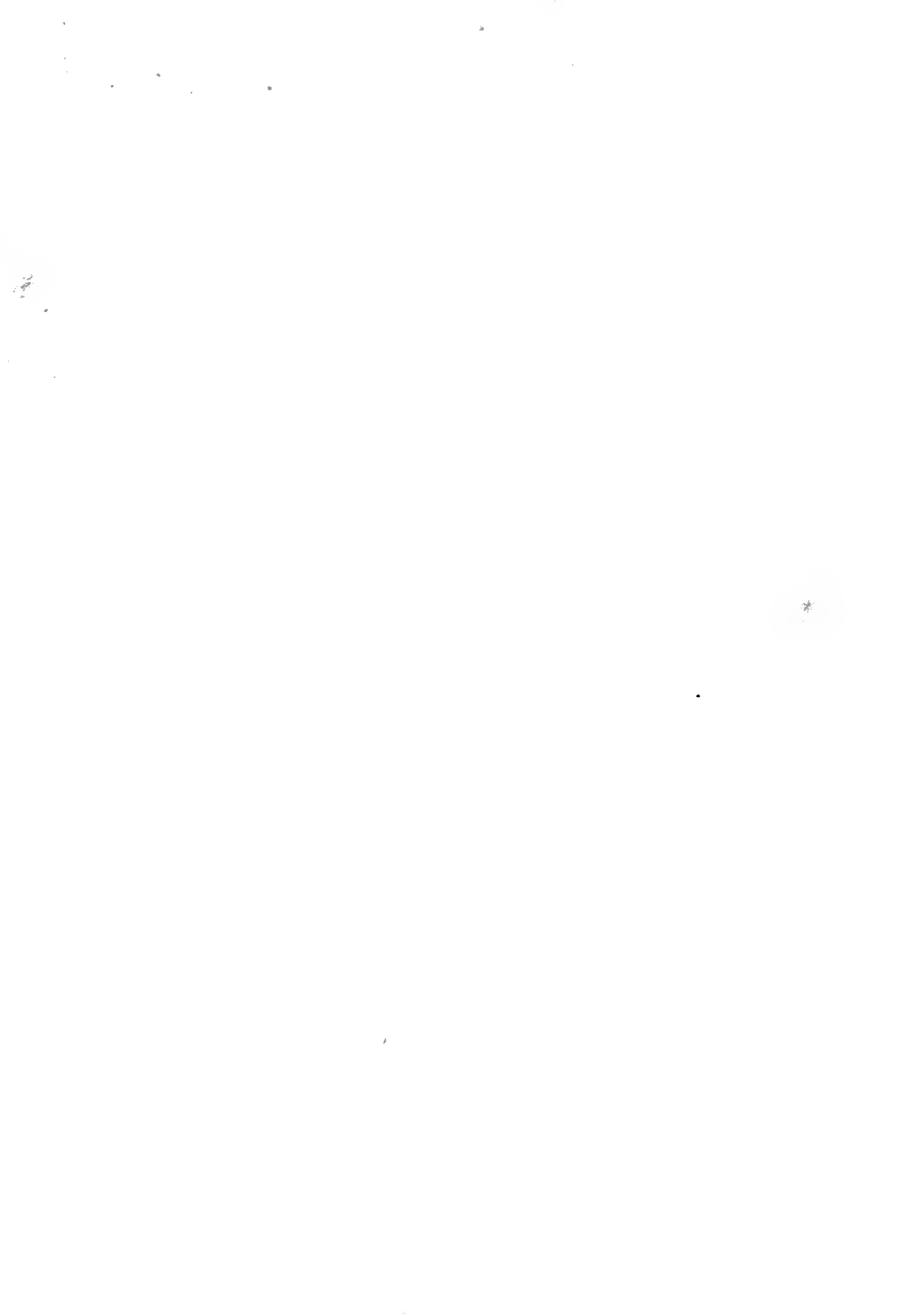
- Fig. 1. *Coccyzus americanus*, Linnæus. Yellow-billed Cuckoo.
Fig. 2. *Coccyzus americanus occidentalis*, Ridgway. California Cuckoo.
Figs. 3, 4. *Coccyzus erythrophthalmus*, Wilson. Black-billed Cuckoo.
Figs. 5, 6. *Cyanocitta cristata*, Linnæus. Blue Jay.
Figs. 7, 8. *Cyanocitta cristata florincola*, Coues. Florida Blue Jay.
Fig. 9. *Cyanocitta stelleri*, Gmelin. Steller's Jay.
Fig. 10. *Cyanocitta stelleri frontalis*, Ridgway. Blue-fronted Jay.
Figs. 11, 12. *Cyanocitta stelleri maculophya*, Baird. Long-crested Jay.
Fig. 13. *Aphelocoma floridana*, Bartram. Florida Jay.
Fig. 14. *Aphelocoma woodhousei*, Baird. Woodhouse's Jay.
Figs. 15, 16, 17, 18. *Aphelocoma californica*, Vigors. California Jay.
Figs. 19, 20. *Aphelocoma sieberii arizonæ*, Ridgway. Arizona Jay.
Figs. 21, 22. *Corvus americanus*, Audubon. American Crow.
Fig. 23. *Alauda arvensis*, Linnæus. Skylark.
Fig. 24. *Otocoris alpestris leucolæma*, Coues. Pallid Horned Lark.
Fig. 25. *Otocoris alpestris praticola*, Henshaw. Prairie Horned Lark.
Fig. 26. *Otocoris alpestris arenicola*, Henshaw. Desert Horned Lark.
Fig. 27. *Otocoris alpestris giraudi*, Henshaw. Texan Horned Lark.
Fig. 28. *Otocoris alpestris chysolæma*, Wagler. Mexican Horned Lark.
Fig. 29. *Otocoris alpestris rubea*, Henshaw. Ruddy Horned Lark.
Fig. 30. *Otocoris alpestris merrilli*, Dwight. Dusky Horned Lark.
Fig. 31. *Otocoris alpestris adusta*, Dwight. Scorched Horned Lark.



EXPLANATION TO PLATE VI.

- Figs. 1, 2. *Dolichonyx oryzivorus*, Linnæus. Bobolink.
Figs. 3, 4, 5, 6. *Molothrus ater*, Boddaert. Cowbird.
Figs. 7, 8. *Molothrus ater obscurus*, Gmelin. Dwarf Cowbird.
Fig. 9. *Callothrus robustus*, Cabanis. Red-eyed Cowbird.
Figs. 10, 11, 12. *Xanthocephalus xanthocephalus*, Bonaparte. Yellow-headed Blackbird.
Figs. 13, 14, 15. *Agelaius phoeniceus*, Linnæus. Red-winged Blackbird.
Figs. 16, 17. *Agelaius gubernator*, Wagler. Bicolored Blackbird.
Figs. 18, 19. *Agelaius tricolor*, Nuttall. Tricolored Blackbird.
Figs. 20, 21. *Sturnella magna*, Linnæus. Meadowlark.
Fig. 22. *Sturnella magna mexicana*, Sclater. Mexican Meadowlark.
Figs. 23, 24. *Sturnella magna neglecta*, Audubon. Western Meadowlark.
Figs. 25, 26, 27. *Icterus audubonii*, Giraud. Audubon's Oriole.
Figs. 28, 29. *Icterus parisorum*, Bonaparte. Scott's Oriole.
Figs. 30, 31, 32. *Icterus cucullatus*, Swainson. Hooded Oriole.





EXPLANATION TO PLATE VII.

- Figs. 1, 2. *Icterus cucullatus nelsoni*, Ridgway. Arizona Hooded Oriole.
Figs. 3, 4, 5. *Icterus spurius*, Linnæus. Orchard Oriole.
Figs. 6, 7, 8, 9. *Icterus galbula*, Linnæus. Baltimore Oriole.
Figs. 10, 11, 12, 13. *Icterus bullocki*, Swainson. Bullock's Oriole.
Figs. 14, 15, 16. *Scolecophagus carolinus*, Müller. Rusty Blackbird.
Figs. 17, 18, 19, 20. *Scolecophagus cyanocephalus*, Wagler. Brewer's Blackbird.
Figs. 21, 22, 23. *Quiscalus quiscula*, Linnæus. Purple Grackle.
Figs. 24, 25. *Quiscalus quiscula aglæus*, Baird. Florida Grackle.
Figs. 26, 27. *Quiscalus quiscula æneus*, Ridgway. Bronzed Grackle.
Figs. 28, 29. *Quiscalus macrourus*, Swainson. Great-tailed Grackle.
Figs. 30, 31. *Quiscalus major*, Vieillot. Boat-tailed Grackle.



ALPHABETICAL INDEX.

	Page.		Page.
Acadian Flycatcher.....	302	angustifrons (<i>Melanerpes formicivorus</i>).....	117
acadioux (<i>Empidonax</i>).....	302	Ani.....	6
acutipennis texensis (<i>Chordeiles</i>).....	172	Black.....	6
adusta (<i>Otocoris alpestris</i>).....	345	(<i>Crotophaga</i>).....	6
æneus (<i>Quiscalus quiscula</i>).....	501	Groove-billed.....	9
<i>Aëronautes melanoleucus</i>	185	anna (<i>Calypte</i>).....	206
<i>Agelaius gubernator</i>	455	Anna's Hummingbird.....	206
phœniceus.....	449	annectens (<i>Cyanocitta stelleri</i>).....	369
bryanti.....	453	Anthony, A. W., on the food of the Road Runner.....	14
sonoriensis.....	453	on the nesting habits of the White-	
tricolor.....	456	throated Swift in Colorado.....	186
aglaeus (<i>Quiscalus quiscula</i>).....	500	on the habits of Anna's Hummingbird..	207
alascensis (<i>Picoides americanus</i>).....	80	on the nesting habits of the Rufous	
Alaskan Jay.....	390	Hummingbird.....	215
Three-toed Woodpecker.....	80	on the nesting habits of Say's Phœbe in	
<i>A. lauda arvensis</i>	327	Lower California.....	279
albicollis merrilli (<i>Nyctidromus</i>).....	160	on the nesting habits of Steller's Jay, in	
albiventris (<i>Platypsaris</i>).....	230	Oregon.....	363
aloharvatus (<i>Xenopicus</i>).....	70	on the nesting habits of the Oregon Jay..	394
alcyon (<i>Ceryle</i>).....	34	<i>Antrostomus carolinensis</i>	142
Alexandre's Hummingbird.....	198	vociferus.....	146
alexandri (<i>Trochilus</i>).....	198	macromystax.....	151
Allen, Charles A., on the habits of the Red-breasted Sap-		<i>Aphelocoma californica</i>	374
sucker.....	92	hypoleuca.....	378
on the habits of Allen's Hummingbird..	217	obscura.....	379
on the habits of the Western Fly-		cyanotis.....	382
catcher.....	299	floridana.....	370
on the call notes of the Blue-fronted		insularis.....	379
Jay.....	366	sieberii arizonæ.....	380
on the general habits of the California		woodhousei.....	372
Jay.....	375	Arctic Three-toed Woodpecker.....	74
alleni (<i>Selasphorus</i>).....	216	arcticus (<i>Picoides</i>).....	74
Allen's Hummingbird.....	216	arenicola (<i>Otocoris alpestris</i>).....	338
alpestris adusta (<i>Otocoris</i>).....	345	Arizona Crested Flycatcher.....	264
arenicola (<i>Otocoris</i>).....	338	Hooded Oriole.....	476
chrysolæma (<i>Otocoris</i>).....	341	Jay.....	380
giraudi (<i>Otocoris</i>).....	340	Woodpecker.....	68
insularis (<i>Otocoris</i>).....	347	arizonæ (<i>Dryobates</i>).....	68
leucolæma (<i>Otocoris</i>).....	332	(<i>Aphelocoma sieberii</i>).....	380
merrilli (<i>Otocoris</i>).....	346	Arkansas Kingbird.....	245
(<i>Otocoris</i>).....	330	arvensis (<i>A. lauda</i>).....	327
pallida (<i>Otocoris</i>).....	347	Ash-throated Flycatcher.....	266
praticola (<i>Otocoris</i>).....	334	ater (<i>Molothrus</i>).....	434
rubea (<i>Otocoris</i>).....	343	obscurus (<i>Molothrus</i>).....	441
strigata (<i>Otocoris</i>).....	344	Atwater, H. P., on the nesting habits of the Golden-fronted	
Alpine Three-toed Woodpecker.....	80	Woodpecker.....	125
<i>A. mazilia cerviniventris</i>	225	audubonii (<i>Dryobates villosus</i>).....	51
fuscicaudata.....	223	(<i>Icterus</i>).....	469
ambiguus (<i>Trogon</i>).....	32	Anduhon's Oriole.....	469
American Crow.....	405	auratus (<i>Colaptes</i>).....	129
Magpie.....	349	aurifrons (<i>Melanerpes</i>).....	124
Raven.....	396	Avery, Dr. William C., on the habits of Chuck-will's-	
Three-toed Woodpecker.....	77	widow.....	143
americana septentrionalis (<i>Ceryle</i>).....	39	Bahaman, Redwing.....	453
americanus alascensis (<i>Picoides</i>).....	80	bairdi (<i>Melanerpes formicivorus</i>).....	112
(<i>Coccyzus</i>).....	19	(<i>Dryobates scalaris</i>).....	63
(<i>Corvus</i>).....	405	Baird's Flycatcher.....	298
dorsalis (<i>Picoides</i>).....	80	Woodpecker.....	63
floridanus (<i>Corvus</i>).....	413	Baltimore Oriole.....	482
occidentalis (<i>Coccyzus</i>).....	25	Banded Three-toed Woodpecker.....	77
(<i>Picoides</i>).....	77	-Backed Woodpecker.....	77

	Page.		Page.
Barlow, C., on the nests of Anna's Hummingbird.....	208	Blue-fronted Jay.....	365
Barn Phoebe.....	272	-headed Grackle.....	493
Basilinna leucotis.....	227	-throated Casique.....	190
xantusi.....	226	Hummingbird.....	190
Bat.....	170	Boat-tailed Blackbird.....	506
Batchelder's Woodpecker.....	60	Grackle.....	506
Beard, D. C., nesting of the Red-winged Blackbird on a nest of the Long-billed Marsh Wren.....	452	Boholink.....	429
Beardless Flycatcher.....	325	borealis (Contopus).....	282
Becard, Xantus's.....	230	(Dryobates).....	61
Beck, Rollo H., on the habits and nesting of Nuttall's Woodpecker.....	66	Bretherton, B. J., on a peculiar nest of the American Magpie in Alaska.....	353
on the breeding habits of the Blue-fronted Jay.....	365	on the habits of the Northern Raven ..	401
on the general habits of the California Jay ..	376	on the general habits of the Northwest Crow.....	415
Bee Bird.....	236	Brewer's Blackbird.....	493
Martin.....	236	Bridge Phoebe.....	272
Belding, L., on the general habits of the Blue-fronted Jay ..	366	Broad-billed Hummingbird.....	228
on the nesting habits of the Tricolored Black- bird.....	457	-tailed Hummingbird.....	210
Belding's Jay.....	379	Bronzed Cowbird.....	443
Belted Kingfisher.....	34	Grackle.....	501
Bicolored Blackbird.....	455	Brown Woodpecker.....	97
Big Guinea Woodpecker.....	46	Bryant, William A., on the nesting habits of the Flicker..	132
Sapsucker.....	46	bryanti (Agelaius phoeniceus).....	453
Bird, Bee.....	236	Buffalo Bird.....	434
Buffalo.....	434	Buff-bellied Hummingbird.....	225
Caribou.....	385	-breasted Flycatcher.....	321
Dead-limb.....	288	Bull-bat.....	163, 370
Grease.....	385	-headed Flycatcher.....	251
Hudson Bay.....	385	bullocki (Teterus).....	486
Lazy.....	434	Bullock's Oriole.....	486
May.....	19	Bunting, Cow.....	434
Meat.....	385, 418	Burrows, D. B., on the breeding habits of the Hairy Wood- pecker.....	49
Moose.....	385, 418	on the occurrence and nesting habits of the Red-bellied Woodpecker.....	123
of Paradise, Texan.....	233	on the habits of the Golden-fronted Wood- pecker.....	124
Phoebe.....	272	on the habits of Merrill's Paraque.....	160
Venison.....	394	Bush Jay.....	370
Zebra.....	121	Butterbird.....	429
Black Ani.....	6	Cabanis's Woodpecker.....	53
Flycatcher.....	280	Cactus Flicker.....	138
Log Cock.....	102	cafer (Colaptes).....	134
Phoebe.....	280	saturator (Colaptes).....	137
Swift.....	175	California Cuckoo.....	25
Witch.....	6	Jay.....	374
Woodcock.....	102	Mountain Jay.....	365
Blackbird.....	6, 434	Poor-will.....	158
Bicolored.....	455	Californian Woodpecker.....	112
Boat-tailed.....	506	californianus (Geococcyx).....	13
Brewer's.....	493	californica (Aphelocoma).....	374
Cow.....	434	hypoleuca (Aphelocoma).....	378
Crimson-shouldered.....	455	obscura (Aphelocoma).....	379
Crow.....	497	californicus (Phalaenoptilus nuttalli).....	158
Florida Crow.....	500	Calliope Hummingbird.....	219
Marsh.....	449	(Stellula).....	219
Purplo Crow.....	497	Calothorax lucifer.....	222
Red and White Shouldered.....	456	Calothrus robustus.....	443
Red-winged.....	449	Calypte anna.....	206
Rusty.....	489	costae.....	202
Savanna.....	6	Camp Rohber.....	385, 394, 418
Skunk.....	429	Campephilus principalis.....	42
Swamp.....	449	Canada Jay.....	385
Thrush.....	506	canadensis capitalis (Perisoreus).....	388
Tricolored.....	456	fumifrons (Perisoreus).....	390
Western Crow.....	501	nigricapillus (Perisoreus).....	392
Yellow-headed.....	446	(Perisoreus).....	385
Black-backed Three-toed Woodpecker.....	74	canorus telephonus (Cuculus).....	32
-billed Cuckoo.....	27	Cape Flicker.....	138
Magpie.....	349	capitalis (Perisoreus canadensis).....	388
-breasted Woodpecker.....	97	Caribou Bird.....	385
-chinned Hummingbird.....	198	Carolina Paroquet.....	1
-eared Cuckoo.....	17	Woodpecker.....	121
Blue Crow.....	424	carolinensis (Antrostomus).....	142
Jay.....	356	(Conurus).....	1
Florida.....	361	carolinus (Melanerpes).....	121
-eared Jay.....	382		

ALPHABETICAL INDEX.

511

	Page.		Page.
carolinus (<i>Sceloporphagus</i>)	489	Coues's Flycatcher	286
Carpenter, Capt. W. L., on the nesting habits of Wood-		couchii (<i>Tyrannus melancholicus</i>)	243
house's Jay, in Arizona	373	Couch's Kingbird	243
Casique, Blue-throated	190	Cow Blackbird	434
Cassin's Kingbird	249	Bunting	434
caurinus (<i>Corvus</i>)	414	Cowbird	434
Ceophloeus pileatus	102	Bronzed	443
cerviniventris (<i>Amazilia</i>)	225	Dwarf	441
Ceryle alcyon	34	Red-eyed	443
americana septentrionalis	39	Crested Flycatcher	259
torquata	40	Arizona	264
Chaetura pelagica	177	Mexican	263
vauxii	183	Crimson-shouldered Blackbird	455
Chaparral Cock	13	crinitus (<i>Myiarchus</i>)	259
chapmaui (<i>Chordeiles virginianus</i>)	170	cristata (<i>Cyanocitta</i>)	356
Chebeck	312	florincola (<i>Cyanocitta</i>)	361
Checked Woodpecker	121	Crotophaga ani	6
Chicua	10	sulcirostris	9
Chimney Swallow	177	Crow, American	405
Sweep	177	Blackbird	497
Swift	177	Florida	500
Chip-the-red-oak-white-oak	142	Purple	497
Chordeiles acutipennis texensis	172	Western	501
virginianus	163	Blue	424
chapmani	170	Clarke's	418
henryi	167	Fish	415
chrysoides (<i>Colaptes</i>)	138	Florida	413
chrysolæma (<i>Otocoris alpestris</i>)	341	Northwest	414
Chuck-will's-widow	142	Rain	19
cinerascens (<i>Myiarchus</i>)	266	cryptoleucus (<i>Corvus</i>)	402
nuttingi (<i>Myiarchus</i>)	269	Cuckoo, Black-billed	27
eineritius (<i>Empidonax</i>)	301	-eared	17
Cinnamon Hummingbird	213	California	25
Circe Hummingbird	228	Mangrove	17
Clape	120	Maynard's	19
Clarke's Crow	418	Siberian	32
Nutteracker	418	Western Yellow-billed	25
clemenciæ (<i>Cœligena</i>)	190	Yellow-billed	19
Clodhopper	434	cucullatus (<i>Icterus</i>)	474
Cloud Swift	175	nelsoni (<i>Icterus</i>)	476
Clute, W. N., on the food of the Ruby-throated Humming-		Cuculus canorus telephonus	32
bird	194	cycnocephalus (<i>Cyanocephalus</i>)	424
Coccyzus americanus	19	(<i>Scolecophagus</i>)	493
occidentalis	25	Cyanocephalus cyanocephalus	424
erythrophthalmus	27	Cyanocitta cristata	356
minor	17	florincola	361
maynardi	19	stelleri	362
Cock of the Woods	102	annectens	369
Cœligena clemenciæ	190	frontalis	365
Colaptes auratus	129	macrolopha	367
cafer	134	cyantotis (<i>Aphelocoma</i>)	382
saturation	137	Cypseloides niger	175
chrysoides	138	Davison, J. L., on the nesting habits of the Black-billed	
rufipileus	140	Cuckoo	28
colubris (<i>Trochilus</i>)	192	on a peculiar nest of the Wood Pewee	290
columbiana (<i>Nucifraga</i>)	418	Dead-limb Bird	288
Contopus borealis	282	derbianus (<i>Pitangus</i>)	251
pertinax	286	Derby Flycatcher	251
richardsonii	291	Desert Horned Lark	338
virens	288	difficilis (<i>Empidonax</i>)	298
Conurus carolinensis	1	Dolichonyx eryzivorus	429
Cooke, Dr. Clinton T., on the habits of the Little Fly-		dominicensis (<i>Tyrannus</i>)	241
catcher, in Oregon	306	dorsalis (<i>Picoides americanus</i>)	80
Coppery-tailed Trogon	32	Dove, Rain	19
corax principalis (<i>Corvus</i>)	400	Downy Woodpecker	55
sinuatus (<i>Corvus</i>)	396	Dryobates arizonæ	68
Correcamino	13	borealis	61
Corvus americanus	405	nuttallii	65
floridanus	413	pubescens	55
caurinus	414	gairdnerii	58
corax principalis	400	oreocus	60
sinuatus	396	scalaris bairdi	63
cryptoleucus	402	lucasanus	65
ossifragus	415	villosus	46
costæ (<i>Calypte</i>)	202	andubonii	51
Costa's Hummingbird	202	harrisii	52

	Page.		Page.
<i>Dryobates villosus hyloscopus</i>	53	Flycatcher, Nutting's	269
<i>leucomelas</i>	50	Olivaceous	270
Dusky Horned Lark	346	Olive-sided	282
Poor-will	158	Pewit	272
Dutch Whip-poor-will	142	Pipiry	241
Dwarf Cowbird	441	Ridgway's	325
<i>Empidonax acadicus</i>	302	Rio Grande	251
<i>cineritius</i>	301	Scissor-tailed	233
<i>difficilis</i>	298	Saint Lucas	301
<i>flaviventris</i>	295	Sulphur-bellied	256
<i>fulvifrons</i>	321	Swallow-tailed	233
<i>pygmaeus</i>	321	Traill's	310
<i>griseus</i>	320	Vermilion	322
<i>hammondi</i>	315	Western	298
<i>minimus</i>	312	Western Yellow-bellied	298
<i>pusillus</i>	305	Wright's	318
<i>traillii</i>	310	Yellow-bellied	295
<i>wrightii</i>	318	<i>forficatus</i> (<i>Milvulus</i>)	233
<i>erythrocephalus</i> (<i>Melanerpes</i>)	107	Fork-tailed Flycatcher	231
<i>erythrophthalmus</i> (<i>Coccyzus</i>)	27	<i>formicivorus angustifrons</i> (<i>Melanerpes</i>)	117
<i>eryzivorus</i> (<i>Dolichonyx</i>)	429	<i>bairdi</i> (<i>Melanerpes</i>)	112
<i>Eugenes fulgens</i>	188	<i>frontalis</i> (<i>Cyanocitta stelleri</i>)	365
Fire-bird	482	Frosted Poor-will	157
Fish Crow	415	<i>fulgens</i> (<i>Eugenes</i>)	188
Fisher, Dr. A. K., on the habits of the Coppery-tailed Trogon	33	<i>fulvifrons</i> (<i>Empidonax</i>)	321
on the habits of the Rivoli Humming- bird	189	<i>pygmaeus</i> (<i>Empidonax</i>)	321
on the habits of the Blue-throated Hummingbird, in Arizona	191	Fulvous Flycatcher	321
Flame-hearer	209	<i>fumifrons</i> (<i>Perisoreus canadensis</i>)	390
<i>flaviventris</i> (<i>Empidonax</i>)	295	<i>fuscicaudata</i> (<i>Amazilia</i>)	223
Flicker	129	<i>gairdnerii</i> (<i>Dryobates pubescens</i>)	58
Cactus	138	Gairdner's Woodpecker	58
Cape	138	Gale, Denis, on the nesting habits of the Red-naped Sap- sucker	90
Gilded	138	on the nesting habits of Clarke's Nutcracker	422
Guadalupe	140	<i>galbula</i> (<i>Icterus</i>)	482
Northwestern	137	Garra-patero	10
Red-shafted	134	<i>geococcyx californianus</i>	13
Yellow-shafted	129	Gila Woodpecker	127
Flint, H. W., on the habits of the Whip-poor-will	149	Gilded Flicker	138
nesting habits of the Ruby-throated Hummingbird, in Connecticut	197	<i>giraudi</i> (<i>Otocoris alpestris</i>)	340
<i>floresii</i> (<i>Selasphorus</i>)	209	<i>giraudi's</i> Flycatcher	254
Floras's Hummingbird	209	Gnatcatcher	272
Florida Blue Jay	361	Golden Robin	482
Crow	413	-fronted Woodpecker	124
Blackbird	500	-winged Woodpecker	129
Grackle	500	Good-goda	162
Jay	370	Grackle, Blue-headed	493
Nighthawk	170	Boat-tailed	506
<i>floridana</i> (<i>Aphelocoma</i>)	370	Bronzed	501
<i>floridanus</i> , (<i>Corvus americanus</i>)	413	Florida	500
<i>florincola</i> (<i>Cyanocitta cristata</i>)	361	Great-tailed	504
Flycatcher, Acadian	302	Purple	497
Ash-throated	266	Rusty	489
Baird's	298	Gray Flycatcher	320
Beardless	325	Kingbird	241
Black	280	Grease Bird	385
Buff-breasted	321	Great White-backed Sapsucker	50
Bull-headed	251	-tailed Grackle	504
Coxes's	286	Green Jay	383
Crested	259	-backed Hummingbird	216
Arizona	264	-crested Flycatcher	302
Derby	251	<i>griseus</i> (<i>Empidonax</i>)	320
Fork-tailed	231	Groove-billed Ani	9
Fulvous	321	Ground Cuckoo	13
Giraud's	254	Grover, W. E., on the call notes of the Boat-tailed Grackle	507
Gray	320	Guadalupe Flicker	140
Green-crested	302	<i>gubernator</i> (<i>Agelaius</i>)	455
Hammond's	315	Gular Oriole	466
Lawrence's	270	<i>gularis</i> (<i>Icterus</i>)	466
Least	312	Hairy Woodpecker	46
Little	305	<i>hammondi</i> (<i>Empidonax</i>)	315
Western	305	Hammond's Flycatcher	315
Mexican-crested	263	Hanging-bird	482
		Hang-nest	482
		Hardy, Manly, on the nesting habits of the Arctic Three- toed Woodpecker	75

ALPHABETICAL INDEX.

513

	Page.		Page.
Hardy, Manly, on the Yellow-bellied Sapsucker.....	86	Icterus icterus	466
on the habits of the Pileated Woodpecker.....	103	parisorum.....	471
Flicker.....	133	spurius.....	479
on the familiarity of the Least Flycatcher.....	314	imberbus (Ornithion).....	325
on the habits of the Canada Jay.....	386	ridgwayi (Ornithion).....	325
American Crow.....	408	Indian Heu.....	19
on the gradual extension of the Baltimore		Insular Horned Lark.....	347
Oriole, in Maine.....	483	insularis (Otocoris alpestris).....	347
Harris, G. E., on the habits of the Prairie Horned Lark,		(Aphelocoma).....	379
in New York.....	335	Ivory-billed Woodpecker.....	42
harrisi (Dryobates villosus).....	52	Jack, Whisky.....	385
Harris's Woodpecker.....	52	Jackdaw.....	506
Hawk, Meat.....	394	Jay, Alaskan.....	390
Mosquito.....	163	Arizona.....	380
Venison.....	385	Belding's.....	379
Hen, Indian.....	19	Black-headed.....	369
henryi (Chordeiles virginianus).....	167	Blue.....	356
Herrara, Prof. A. L., on the habits of the Groove-billed		Blue-eared.....	382
Ani.....	9	Blue-fronted.....	365
High-hole.....	120	Bush.....	370
holder.....	129	California.....	374
Hooded Oriole.....	474	Mountain.....	365
Arizona.....	476	Canada.....	385
Horned Lark.....	330	Florida.....	370
Desert.....	338	Blue.....	361
Dusky.....	346	Green.....	383
Insular.....	347	Labrador.....	392
Mexican.....	341	Long-crested.....	367
Pallid.....	332	Maximilian's.....	424
Prairie.....	334	Mountain.....	362
Ruddy.....	343	Oregon.....	394
Scorched.....	345	Pine.....	362
Sonoran.....	347	Piñon.....	424
Streaked.....	344	Rio Grande.....	383
Texan.....	340	Rocky Mountain.....	388
House Pewee.....	272	Santa Cruz.....	379
Hudson Bay Bird.....	385	Scrub.....	370
hudsonica (Pica pica).....	349	Sierra.....	365
Hummingbird, Alexandre's.....	198	Smoky-fronted.....	390
Allen's.....	216	Steller's.....	362
Aona's.....	206	White-headed.....	388
Black-chinned.....	198	Woodhouse's.....	372
Blue-throated.....	190	Xantus's.....	378
Broad-billed.....	228	Jewbird.....	9
tailed.....	210	John, Whisky.....	385
Buff-bellied.....	225	Johnny Cock.....	102
Calliope.....	219	Judd, Elmer T., on some peculiar nesting sites of the King-	
Cinnamon.....	213	bird.....	239
Circe.....	228	Judson, W. B., on the nesting habits of the White-throated	
Costa's.....	202	Swift, in California.....	187
Floresi's.....	209	Kingbird.....	236
Green-backed.....	216	Arkansas.....	245
Lucifer.....	222	Cassin's.....	249
Nootka.....	213	Couch's.....	243
Northern.....	192	Gray.....	241
Purple-throated.....	198	Western.....	245
Refulgent.....	188	Kingfisher, Belted.....	34
Riefier's.....	223	Binged.....	40
Rivoli.....	188	Rufous-breasted.....	40
Rocky Mountain.....	210	Texan.....	39
Ruby-throated.....	192	Kiskadee.....	252
Rufous.....	213	Little.....	255
Rufous-backed.....	213	Koch, Fred. W., on the habits of the Poor-will.....	155
Violet-throated.....	201	Kow-kow.....	19
White-eared.....	227	Labrador Jay.....	392
Xantus's.....	226	Ladder-backed Woodpecker.....	63
hyloscopus (Dryobates villosus).....	53	Lantz, Prof. D. E., on the breeding habits of Nuttall's	
hypoleuca (Aphelocoma californica).....	378	Poor-will.....	154
Iache latirostris.....	228	Lark, Desert Horned.....	338
icterus (Icterus).....	466	Dusky Horned.....	346
Icterus audubonii.....	460	Horned.....	330
hullocki.....	486	Insular Horned.....	347
cucullatus.....	474	Mexican Horned.....	341
nelsoni.....	476	Old Field.....	458
galbula.....	482	Pallid Horned.....	332
gularis.....	466	Prairie Horned.....	334

	Page.		Page.
Lark, Ruddy Horned	343	May Bird	19, 429
Scorched Horned	345	maynardi (Coccyzus minor)	19
Sonorsn Horned	347	Maynard's Cuckoo	19
Streaked Horned	344	Meadowlark	458
Texas Horned	340	Mexican	461
latirostris (Lache)	228	Western	462
Lawrence, R. H., on the habits of Lewis's Woodpecker ..	118	Meadow-wink	429
on the nesting habits of the Dusky Poor-		Meat Bird	385, 418
will	158	Hawk	394
on the habits of the Black-chinned Hum-		melaucholicus couchii (Tyrannus)	243
mingbird, in California	199	Melanerpes aurifrons	124
on the nesting habits of Costa's Hum-		carolinus	121
mingbird, in California	203	erythrocephalus	107
on the call-notes uttered by the Arkan-		formicivorus angustifrons	117
sas Kingbird	246	bairdi	112
on the general habits of the Northwest		torquatus	117
Crow	414	uropygialis	127
lawrencei olivascens (Myiarchus)	270	melanoleucus (Æronautes)	185
lawrenceii (Myiarchus)	270	merrilli (Nyctidromus albicollis)	160
Lawrence's Flycatcher	270	(Otocoris alpestris)	346
Lazy Bird	434	Merrill's Paraque	160
Least Flycatcher	312	Mexican Crested Flycatcher	263
leucomelas (Dryobates villosus)	50	Horned Lark	341
leucolæma (Otocoris alpestris)	332	Meadowlark	461
leucotis (Basilinna)	227	Pitangus	251
Lewis's Woodpecker	117	mexicana (Sturnella magna)	461
Little Flycatcher	305	mexicanus magister (Myiarchus)	264
Guinea Woodpecker	55	(Myiarchus)	263
Kiskadee	255	(Pyrocephalus rubineus)	322
Sapsucker	55	Milvulus forficatus	233
Western Flycatcher	305	tyrannus	231
Littlejohn, Chase, on the habits of the Northern Raven ..	401	minimus (Empidonax)	312
Lizard Bird	13	minor (Coccyzus)	17
Logcock	102	maynardi (Coccyzus)	19
White-billed	42	Molothrus ater	434
Long-crested Jay	367	obscurus	441
Loucks, W. E., on the nesting habits of the Yellow-bellied		Moose Bird	385, 418
Sapsucker	82	Mosquito Hawk	163
on the nesting habits of the Crested Fly-		Mountain Jay	362
catcher	261	Oriole	471
on the general habits of the Bronzed		Myiarchus cinerascens	266
Grackle, in Illinois	501	nuttingi	269
lucasanus (Dryobates scalaris)	65	cristatus	259
lucifer (Calothorax)	222	lawrenceii	270
Lucifer Hummingbird	222	olivaceus	270
Lusk, Richard D., on the nesting habits of the Sulphur-		mexicanus	263
bellied Flycatcher	257	magister	264
luteiventris (Myiodynastes)	256	Myiodynastes luteiventris	256
luxuosa (Xanthours)	383	Myiozetetes texensis	254
McIlhenny, E. A., on the habits of the Paroquet	3	Narrow-fronted Woodpecker	117
on the habits of the Mangrove Cuckoo ..	18	neglecta (Sturnella magna)	462
on the habits, etc., of the Ivory-billed		Nelson, E. W., on the distribution and nesting habits of	
Woodpecker	43	the Blue-throated Hummingbird, in	
on the habits of the Ruby-throated		Mexico	191
Hummer	194	on the general habits of Girsud's Fly-	
on the breeding habits of the Horned		catcher	255
Lark, in Labrador	331	on the nesting habits of Coues's Flycatcher ..	287
on the breeding of the Bobolink, in		nelsoni (Icterus cucullatus)	476
Louisiana	433	niger (Cypseloides)	175
on the occurrence of the Gular Oriole,		Nighthawk	163
in southern Louisiana	467	Florida	170
macrolopha (Cyanocitta stelleri)	367	Texan	172
macromystax (Antrostomus vociferus)	151	Western	167
macrourus (Quiscalus)	504	nigricans (Sayornis)	280
magister (Myiarchus mexicanus)	264	nigricapillus (Perisoreus canadensis)	392
magna mexicana (Sturnella)	461	nitidus (Phalænoptilus nuttalli)	157
neglecta (Sturnella)	462	Nootka Hummingbird	213
(Sturnella)	458	Northern Hairy Woodpecker	50
Magpie, American	349	Hummingbird	192
Black-billed	349	Raven	400
Yellow-billed	355	Northwest Crow	414
major (Quiscalus)	506	Northwestern Flicker	137
Mangrove Cuckoo	17	nuchalis (Sphyrapicus varius)	88
Marsh Blackbird	449	Nucifraga columbiana	418
Martin, Bee	236	Nutcracker	424
Maximilian's Jay	424	Clarke's	418

ALPHABETICAL INDEX.

515

	Page.		Page.
nuttalli californicus (Phalacroptilus)	158	Phalacroptilus nuttalli californicus	158
nitidus (Phalacroptilus)	157	nitidus	157
(Phalacroptilus)	153	Phillips's Woodpecker	50
(Pica)	355	Phebe	272
tallii (Dryobates)	65	Barn	272
Nuttall's Poor-will	153	Bird	272
Woodpecker	65	Black	280
nuttingi (Myiarchus cinerascens)	269	Bridge	272
Nutting's Flycatcher	269	(Sayornis)	272
Nyctidromus albicollis merrilli	160	Say's	276
obscura (Aphelocoma californica)	379	phœniceus (Agelaius)	449
obscurus (Molothrus ater)	441	bryanti (Agelaius)	453
(Perisoreus)	394	conoriensis (Agelaius)	453
occidentalis (Coccyzus americanus)	25	Pica nuttalli	355
Old Field Lark	458	pica hudsonica	349
Olivaceous Flycatcher	270	Picoides americanus	77
olivascens (Myiarchus lawrencei)	270	alascensis	80
Olive-sided Flycatcher	282	dorsalis	80
Orange Sapsucker	121	arcticus	74
Orchard Oriole	479	Pigeon, Wood	19
Oregon Jay	394	Pijon	10
Swift	183	Pileated Woodpecker	102
oreœcus (Dryobates pubescens)	60	pileatus (Ceophœnus)	102
Oriole, Audubon's	469	Pine Jay	362
Baltimore	482	Piñon Jay	424
Bullock's	486	Piñonario	424
Gular	466	Pipiry Flycatcher	241
Hooded	474	Piramidig	163
Arizona	476	Pisk	163
Mountain	471	Pitangus derbianus	251
Orchard	479	Mexican	251
Palmleaf	476	platycœrus (Selasphorus)	210
Scott's	471	Platypsaris albiventris	230
Ornithion imberbe	325	Pleasant, J. H., jr., on the nesting habits of the Purple Grackle	498
ridgwayi	325	Poor-will	153
Ortolan	429	California	158
ossifragus (Corvus)	415	Dusky	158
Otocoris alpestris	330	Frosted	157
adusta	345	Nuttall's	153
areuicola	338	Prairie Horned Lark	334
chrysolæma	341	praticola (Otocoris alpestris)	334
giraudi	340	Preston, J. W., on the destructive habits of the Blue Jay, in Iowa	356
insularis	347	on the general habits of the American Crow	409
leucolæma	332	on the song of the Rusty Blackbird	409
merrilli	346	on the nesting habits of the Bronzed Grackle, in northern Iowa and Minne- sota	503
pallida	347	Price, W. W., on the nests of the Rivoli Hummingbird	190
praticola	334	principalis (Campephilus)	42
rubea	343	(Corvus corax)	400
strigata	344	pubescens (Dryobates)	55
Paisano	13	gairdnerii (Dryobates)	58
Pallid Horned Lark	332	oreœcus (Dryobates)	60
pallida (Otocoris alpestris)	347	Purple Crow Blackbird	497
Palmer, William, on the general habits of the Fish Crow	417	Grackle	497
Palmleaf Oriole	476	-throated Hummingbird	198
Parauque, Merrill's	160	pusillus (Empidonax)	305
parisorum (Icterus)	471	trillii (Empidonax)	310
Paroquet	1	pygmæus (Empidonax fulvifrons)	321
Carolina	1	Pyrocephalus rubineus mexicanus	322
Parrakeet	4	Quiscalus macronurus	504
Pea-bird	482	major	506
pelagica (Chætura)	177	quiscula	497
Perisoreus canadensis	385	æneus	501
capitalis	388	aglæus	500
fumifrons	390	quiscula æneus (Quiscalus)	501
nigricapillus	392	aglæus (Quiscalus)	500
obscurus	394	(Quiscalus)	497
pertinax (Contopus)	286	Rain Crow	19
Petcho	505	Dove	19
Pewee	272	Ralph, Dr. William L., on the sagacity of the Pileated Woodpecker	106
House	272		
Richardson's	291		
Short-legged	291		
Western Wood	291		
Wood	288		
Pewit Flycatcher	272		
Phalacroptilus nuttalli	153		

	Page.		Page.
Ralph, Dr. William L., on the habits of the Red-headed Woodpecker	110	Sapsucker, Great White-backed	50
on the food of the Pewee, in Florida	273	Little	55
on the nesting habits of the Florida Blue Jay	361	Orange	121
on the tameness of the Florida Blue Jay	371	Red-breasted	92
on the reasoning powers of the American Crow	408	Red-naped	88
on the nesting habits of the Florida Crow	413	Red-throated	82
on the nesting habits of the Rusty Blackbird	491	Squealing	82
on the breeding habits of the Florida Grackle	500	Texan	63
Raven, American	396	Williamson's	97
Northern	400	Yellow-bellied	82
White-necked	402	satunator (<i>Colaptes cafer</i>)	137
Red and White-bellied Blackbird	456	Savanna Blackbird	6
Redwing, Bahaman	453	saya (<i>Sayornis</i>)	276
Sonoran	453	<i>Sayornis nigricans</i>	280
Red-bellied Woodpecker	121	phoebe	272
-breasted Sapsucker	92	saya	276
Woodpecker	92	Say's Phoebe	276
-cockaded Woodpecker	61	scalaris bairdi (<i>Dryobates</i>)	63
-eyed Cowbird	443	lucanus (<i>Dryobates</i>)	65
-headed Woodpecker	107	Scissor-tailed Flycatcher	233
-naped Sapsucker	88	Tyrant	231
-shafted Flicker	134	Scolecophagus carolinus	489
-throated Sapsucker	82	cyanocephalus	493
-winged Blackbird	449	Scorched Horned Lark	345
Reedbird	429	Scott's Oriole	471
Refulgent Hummingbird	188	Scrub Jay	370
Ricebird	429	Selasphorus alleni	216
richardsonii (<i>Contopus</i>)	291	floresii	209
Richardson's Pewee	291	platycercus	210
Richmond, Charles W., on the nesting habits of the Groove-billed Ani	11	rufus	213
on the nesting habits of Rieffer's Hummingbird	223	septentrionalis (<i>Ceryle americana</i>)	39
on the general habits of the Derby Flycatcher	252	Sham-shack	121
on the habits of Giraud's Flycatcher	254	Shinyeye	434
ridgwayi (<i>Ornithion imberbe</i>)	325	Short-legged Pewee	291
Ridgway's Flycatcher	325	Siberian Cuckoo	32
Rieffer's Hummingbird	223	siberii arizonæ (<i>Aphelocoma</i>)	380
Ringed Kingfisher	40	Sierra Jay	365
Rio Grande Flycatcher	251	sinuatus (<i>Corvus corax</i>)	396
Jay	383	Skylark	327
Rivoli Hummingbird	188	Skunk Blackbird	429
Road-runner	13	Smith, W. G., on the distribution, etc., of the Broad-tailed Hummingbird	210
Robber, Camp	385, 394, 418	on the destruction of the Desert Horned Lark in Colorado	339
Robin, Golden	462	on the general habits of the Long-crested Jay	368
robustus (<i>Calliothrus</i>)	443	Smoky-fronted Jay	390
Rock Swift	185	Snake-killer	13
Rocky Mountain Hummingbird	210	Sójah	390
Jay	388	Sonoran Horned Lark	347
Round-headed Woodpecker	97	Redwing	453
rubea (<i>Otocoris alpestris</i>)	343	sonoriensis (<i>Agelaius phoeniceus</i>)	453
ruber (<i>Sphyrapicus</i>)	92	Southern Hairy Woodpecker	51
rubineus mexicanus (<i>Pyrocephalus</i>)	322	Spanish Whip-poor-will	142
Ruby-throated Hummingbird	192	Sphyrapicus ruber	92
Ruddy Horned Lark	343	thyroidens	97
rufipileus (<i>Colaptes</i>)	140	varius	82
Rufous Hummingbird	213	nuchalis	88
-backed Hummingbird	213	spurinus (<i>Icterus</i>)	479
-breasted Kingfisher	40	Squealing Sapsucker	82
rufus (<i>Selasphorus</i>)	213	Starling	427
Rusty Blackbird	489	stelleri (<i>Cyanocitta</i>)	362
Grackle	489	annectens (<i>Cyanocitta</i>)	369
Saint Lucas Flycatcher	301	frontalis (<i>Cyanocitta</i>)	365
Woodpecker	65	macrolopha (<i>Cyanocitta</i>)	367
Sanate	505	Steller's Jay	362
Santa Cruz Jay	379	Stellula calliope	219
		Stephens, F., on the habits of the Californian Woodpecker	115
		on the geographical range of the Gila Woodpecker	127
		on the occurrence of the White-throated Swift in the Colorado Desert	186
		on the breeding habits of Costa's Hummingbird	203
		on the occurrence of Scott's Oriole in California	472

ALPHABETICAL INDEX.

517

	Page		Page
Stephens's Whip-poor-will.....	151	vociferus macromystax (Antrostomus).....	151
Streaked Horned Lark.....	344	vulgaris (Sturnus).....	427
strigata (Otocoris alpestris).....	344	Wake-up.....	129
Striped-back Three-toed Woodpecker.....	80	Western Crow Blackbird.....	501
Sturnella magna.....	458	Flycatcher.....	298
mexicana.....	461	Kingbird.....	245
neglecta.....	462	Meadowlark.....	402
Sturnus vulgaris.....	427	Nighthawk.....	167
sulcirostris (Crotophaga).....	9	Wood Pewee.....	291
Sulphur-bellied Flycatcher.....	256	Yellow-bellied Flycatcher.....	298
Swallow, Chimney.....	177	Yellow-billed Cuckoo.....	25
-tailed Flycatcher.....	233	Whining Woodpecker.....	82
Swamp Blackbird.....	449	Whip-poor-will.....	146
Sweep, Chimney.....	177	Dutch.....	142
Swift, Black.....	175	Spanish.....	142
Chimney.....	177	Stephens's.....	151
Cloud.....	175	Whisky Jack.....	385
Oregon.....	183	John.....	385
Rock.....	185	White, M. A., on the time required to hatch the eggs of	
Vsux's.....	183	the Cowbird.....	438
White-throated.....	185	White-backed Woodpecker.....	77
telephonus (Cuculus canorus).....	32	-billed Logcock.....	42
Texan Bird of Paradise.....	233	Woodpecker.....	42
Horned Lark.....	340	-eared Hummingbird.....	227
Kingfisher.....	39	-headed Jay.....	388
Nighthawk.....	172	Woodpecker.....	70
Sapsucker.....	63	-necked Raven.....	402
texensis (Chordeiles acutipentes).....	172	-throated Swift.....	185
(Myiozetetes).....	254	Widmanu, Otto, on the nesting habits of the Yellow-billed	
Three-toed Woodpecker, American.....	77	Cuckoo.....	22
Thrush Blackbird.....	506	on the habits of the Yellow-bellied Sap-	
thyroideus (Sphyrapicus).....	97	sucker.....	85
Tickbird.....	6	on the nesting habits of the Chimney	
Tijerets.....	231	Swift.....	178
torquatus (Ceryle).....	46	on the occurrence, nesting habits, and	
torquatus (Melanerpes).....	117	migration of the Ruby-throated Hum-	
traillii (Empidonax pusillus).....	310	mingbird, in Missouri.....	195
Traill's Flycatcher.....	310	Williams, R. S., on the habits of the Pileated Woodpecker.....	104
tricolor (Agelaius).....	456	Williamson's Sapsucker.....	97
Tricolored Blackbird.....	456	Will o' the Wisp.....	163
Trochilus alexandri.....	198	Witch, Black.....	6
colubris.....	192	Woodchuck.....	102, 121
violajugulum.....	201	Woodcock.....	42, 102
Trogon ambiguus.....	32	Wood-hen.....	102
Coppery-tailed.....	32	woodhousei (Aphelocoma).....	372
Troupial.....	466	Woodhouse's Jay.....	372
Turner, L. M., on the general habits of the Labrador Jay	392	Woodpecker, Alaskan Three-toed.....	80
tyrannus (Milvulus).....	231	Alpine Three-toed.....	80
(Tyrannus).....	236	Americus Three-toed.....	77
Tyrannus dominicensis.....	241	Arctic Three-toed.....	74
melancholicus couchii.....	243	Arizona.....	68
verticalis.....	245	Baird's.....	63
vociferans.....	249	Banded-backed.....	77
Tyrant, Scissor-tailed.....	231	Banded Three-toed.....	77
uropygialis (Melanerpes).....	127	Batchelder's.....	60
varius nuchalis (Sphyrapicus).....	88	Big Guinea.....	46
(Sphyrapicus).....	82	Black-backed Three-toed.....	74
vauxii (Chætura).....	183	Black-breasted.....	97
Vaux's Swift.....	183	Brown.....	97
Venison Bird.....	394	Cabanis's.....	53
Hawk.....	385	Californian.....	112
Vermilion Flycatcher.....	322	Carolina.....	121
verticalis (Tyrannus).....	245	Checkered.....	121
villosus audubonii (Dryobates).....	51	Downy.....	55
(Dryobates).....	46	Gairdner's.....	58
harrisii (Dryobates).....	52	Gills.....	127
hyloscopus (Dryobates).....	53	Golden-fronted.....	124
leucomelas (Dryobates).....	50	Golden-winged.....	129
violajugulum (Trochilus).....	201	Hairy.....	46
Violet-throated Hummingbird.....	201	Harris's.....	52
virens (Contopus).....	288	Ivory-billed.....	42
virginianus chapmani (Chordeiles).....	170	Ladder-backed.....	63
(Chordeiles).....	163	Lewis's.....	117
henryi (Chordeiles).....	167	Little Guinea.....	55
vociferans (Tyrannus).....	249	Narrow-fronted.....	117
vociferus (Antrostomus).....	146	Northern Hairy.....	50

	Page.		Page.
Woodpecker, Nuttall's	65	xanthocephalus (Xanthocephalus).....	446
Phillips's	50	Xanthocephalus xanthocephalus	446
Pileated	102	Xanthoura luxuosa	383
Red-bellied	121	xantnei (Basilinna)	226
Red-breasted	92	Xantus's Becard	230
Red-cockaded	61	Hummingbird	226
Red-headed	107	Jay	378
Round-headed	97	Xenopicus albolarvatus	70
Southern Hairy	51	Yellow-bellied Flycatcher	295
Saint Lucas	65	Sapsucker	82
Striped-back Three-toed	80	-billed Cuckoo	19
Whining	82	Magpie	355
White-backed	77	-fronted Woodpecker	124
White-billed	42	-hammer	129
White-headed	70	-headed Blackbird	446
Yellow-fronted	124	-shafted Flicker	129
Wood Pewee	288	Young Old-man Bird	17
Pigeon	19	Zebra Bird	121
wrightii (Empidonax)	318	Zopilotillo	11
Wright's Flycatcher	318		

