LITERATURE CITED

GRIFFIN, DONALD R. 1955. Bird navigation. Recent studies of avian biology. Univ.
   of Ill. Press, Urbana. Pp. 154-197.
GRIFFIN, DONALD R., and TIMOTHY H. GOLDSMITH. 1955. Initial flight directions
   of homing birds. *Biol. Bull.* **108**(3) : 264-276.
KRAMER, GUSTAV. 1952. Experiments on bird orientation. *Ibis* **94**(2) : 265-285.
KRAMER, GUSTAV, J. G. PRATT, and URSULA VON ST. PAUL. 1956. Directional dif-
   ferences in pigeon homing. *Science* **123**(3191) : 329-330.
MATTHEWS, G. V. T. 1953a. Sun navigation in homing pigeons. *Jour. Exp. Biol.*
   30(2) : 243-267.
——— 1953b. Navigation in the Manx shearwater. *Jour. Exp. Biol.* **30**(3) :
   370-396.
——— 1955. Bird navigation. Cambridge. University Press. 141 pp.
SAUER, FRANZ, and ELEONORE SAUER. 1955. Zur Frage der nächtlichen Zug-
   orientierung von Grasmucken. *Revue Suisse de Zoologie* **62**(2) : 250-259.
SAUER, FRANZ. 1957. Die Sternenorientierung nächtlich ziehender Grasmücken
   (Sylvia atricapilla, borin und *curruca). Zeitschrift für Tierpsychologie,* **14**(1) :
   29-70. (With English summary.)
VON SAINT-PAUL, URSULA. 1956. Compass directional training of western meadow-
   larks *(Sturnella neglecta). Auk* **73**(2) : 203-210.

Illinois Natural History Survey, Havana, Illinois.

LEG SIZES AND BAND SIZES: THIRD REPORT

BY CHARLES H. BLAKE

Introductory

If some excuse is needed for a third report on this subject, it may be grounded on the large number of additional species (nearly the total of the first two reports), some data now presented on subspecies, a further consideration of the tentative conclusions of the second report, or on an apparent relation between maximum weight and tarsal cross-section.

Many of the birds in the present report are West Indian. Descriptions and common names may be found in Bond (1936 or 1947) and dis-tribution of the particular subspecies mentioned will be found in Bond (1956a).

As before, I am indebted to others for help in accumulating data used here. Mr. and Mrs. Parker C. Reed and Mr. and Mrs. James R. Downs have given continued assistance.   Principal John H. Parry of the University College, Ibadan, Nigeria, formerly at the University College of the West Indies, Jamaica, not only added to the Jamaican data but secured a number of measurements in California.

The table of data (Table I) differs from my earlier tables in omit-ting the range of the measurements. The observed ranges seldom ex-ceed 2 σ each side of the mean. The 99 percent range can be readily calculated from the span given in Blake (1954, p. 12).   The band sizes given are the majority band size and the next most frequent size. Proportions of other band sizes are calculable by those interested.

Scientific names have been used throughout as being less confusing than common names, especially for the West Indian species, and show-ing the relationships more clearly.   The use of common names for

TABLE I

Leg sizes and band sizes

Species	Sample Size	Aver. Greater Diam. & σ	Aver. Lesser Diam.	Majority Band Size: %	Next Band Size: %
Puffinus griseus	1	9.3	3.9	7A:	
Butorides v. virescens	1	~5.5*	~5	6:	
Anas americana ♂	1	~8.5	~4	6:	
A. discors ♀	1	~7.5	~3	6:	
Aythya collaris ♀	1	~8.5	~4	6:	
Falco s. sparverius im. ♀	1	4.5	3.1	3A:	
Rallus longirostris caribaeus	1	~6.7	~3	5:	
Charadrius semipalmatus	4	2.3	1.6	1B:	
Erolia minutilla	2	1.6	1.2	0:	
Ereunetes pusillus	3	1.9	1.3	1:	
E. mauri	2	2.0	1.4	1:	
Sterna anaetheta melanoptera	1	~3.7		2:	
Thalasseus sandvicensis acuflavida	1	~4	~2	3:	
Columba leucocephala	2	~7.3		5:	
Zenaida macroura carolinensis (Reed)	42	4.4 ±0.3	3.3	3:57	3A:43
Z. m. marginella (Parry)	2	4.0	3.1	3A:	
Z. a. asiatica	1	4.8	3.7	3A:	
Columbigallina passerina jamaicensis	16	2.9 ±0.2	2.3	1A:71	2:27
C. p. insularis	4	3.3	2.4	2:	
Leptotila j. jamaicensis	3	5.4	3.5	4:	
Geotrygon m. montana ♂	1	~5.5	3.2	4:	
Coccyzus minor nesiotes	3	3.9	2.3	3:	
C. a. americanus (Reed, Blake)	5	3.6	2.1	2:	
Crotophaga ani	1	~6.3	3.6	4:	
Anthracothorax mango	1	2.0			
Trochilus p. polytmus	5	1.8			
Todus todus	7	1.3 ±0.05	0.8	0:100	
Colaptes a. auratus ♂	1	3.2	2.2	2:	
Centurus c. carolinus ♂	3	3.4	2.3	2:	
C. superciliaris caymanensis ♂	1	4.7	3.0	3A:	
Dendrocopos p. pubescens	6	2.3 ±0.1	1.5	1B:88	1:11
D. v. villosus (Reed, Downs, Blake)	4	3.1	2.1	2:	
Tyrannus tyrannus (Reed, Blake)	2	2.4	1.6	1B:	
T. caudifasciatus jamaicensis	12	2.6 ±0.15	1.7	1A:64	1B:36
Myiarchus crinitus boreus	7	2.3 ±0.2	1.5	1B:65	1:27
M. tuberculifer barbirostris	5	1.7 ±0.07	1.2	0:100	
M. validus (Parry, Blake)	3	2.6	1.7	1A:	
Empidonax mínimus (immat. Downs)	7	1.5 ±0.15	0.9	0:100	

*~ means "approximately"

TABLE I (continued)

Species		N					
Contopus v. virens		9	1.6	±0.1	0.9	0:100	
C. caribaeus pallidus (Parry)		1	1.1		0.8	0:	
Nuttalornis borealis (juv. Downs)		1	2.1		1.6	1:	
Elaenia martinica caymanensis		1	1.9		1.4	0:	
Myiopagis cotta		2	1.6		1.0	0:	
Stelgidopteryx ruficollis serripennis		4	1.5		1.1	0:	
Hirundo rustica erythrogaster (Downs, Blake)	subadult	8	1.5	±0.07	1.1	0:100	
	immat.	2	1.7		1.2	0:	
Parus carolinensis		7	2.2		0.9	0:99	
P. bicolor		4	1.7	±0.1	1.3	1B:	
Sitta canadensis (Reed)		1	1.8		1.1	1:	
Certhia familiaris americana		2	1.3		1.0	0:	
Thryothorus l. ludovicianus	adult	6	2.1		1.4	1:61	1B:27
	immat.	18	2.2	±0.2	1.4	1:50	1B:50
Mimus p. polyglottos		10	3.2	±0.1	1.8	2:88	1A:12
M. p. orpheus		12	3.1	±0.2	1.9	2:73	1A:27
Turdus migratorius achrusterus		2	2.8	±0.2	1.8	1A:	
T. jamaicensis (Parry, Blake)		5	3.1	±0.1	2.0	2:88	1A:12
T. aurantius		14	3.5	±0.15	2.3	2:97	3:3
Hylocichla mustelina		13	2.8	±0.08	1.6	1A:99	2:1
Catharus f. fuscescens		12	2.3	±0.15	1.3	1B:75	1:32
Myadestes solitarius genibarbis		2	2.2		1.4	1B:	
Polioptila c. caerulea		3	1.4		0.7	0:100	
Lanius excubitor borealis (Reed)		1	3.2		1.8	2:	
L. ludovicianus		1	3.0		2.0	1A:	
Vireo c. crassirostris		1	1.6		1.1	0:	
V. m. modestus		4	1.5		1.2	0:	
V. osburni (Parry, Blake)		2	2.1		1.4	1:	
V. o. olivaceus		15	1.9	±0.1	1.2	0:50	1:49
V. a. altiloquus		4	2.2		1.2	1:	1B:
V. a. caymanensis		1	1.7		1.1	0:	
Coereba f. flaveola		16	1.7	±0.08	1.1	0:99	1:1
C. f. sharpei		13	1.8	±0.07	1.2	0:95	1:5
Euneornis campestris		18	2.0	±0.1	1.2	1:87	0:12
Limnothlypis swainsonii		1	2.0		1.3	1:	
Helmitheros vermivorus		1	2.0		1.2	1:	
Vermivora peregrina		5	1.6	±0.16	0.9	0:93	1:2
Parula americana		10	1.5	±0.2	0.9	0:99	1:1
Dendroica petechia aestiva		2	1.7		1.2	0:	
D. p. eoa		15	1.7	±0.1	1.0	0:99	1:1
D. magnolia (Downs, Blake)		5	1.5	±0.15	0.9	0:100	

TABLE I (continued)

D. tigrina	18	1.6	±0.08	1.0	0:100	1B:12
D. c. caerulescens	16	1.6	±0.07	1.0	0:100	0:23
D. d. dominica	4	1.7		1.0	0:	1B:12
D. pensylvanica (Downs, Blake)	2	1.6		0.9	0:	
D. p. pinus	3	1.7		1.0	0:	
D. discolor	17	1.5	±0.1	1.0	0:100	
D. p. palmarum	25	1.6	±0.1	0.9	0:100	
Seiurus a. aurocapillus	31	2.1	±0.1	1.2	1:87	
S. noveboracensis	9	2.0	±0.16	1.3	1:70	
S. motacilla	5	2.1	±0.1	1.0	1:87	
Oporornis formosus	1	1.8		1.1	0:	
O. philadelphia (Downs)	1	1.9		1.0	1:	
Geothlypis trichas brachidactyla (Downs, Blake)	12	1.8	±0.1	1.4	0:88	1:12
Icteria v. virens	2	2.5		0.9	1B:	
Wilsonia citrina	2	1.6		0.8	0:	
W. p. pusilla (Downs)	1	1.5		1.0	0:	
W. canadensis	14	1.6	±0.1	0.9	0:100	
Setophaga ruticilla	25	1.5	±0.1		0:100	
Sturnella m. magna	4	3.9		2.4	3:	
Agelaius p. phoeniceus (males)	8	3.4	±0.3	2.0	2:86	3:8
Icterus l. leucopteryx (Parry, Blake)	9	3.1	±0.15	2.0	2:79	1A:21
Quiscalus niger crassirostris	1	4.2		2.2	3:	
Pyrrhuphonia jamaica	16	1.7	±0.1	1.2	0:99	1:1
Spindalis zena nigricephala (Parry, Blake)	7	2.9	±0.08	1.9	1A:93	2:7
Piranga r. rubra	11	2.2	±0.15	1.4	1B:49	1:49
Richmondena c. cardinalis	30	2.6	±0.1	1.6	1A:73	1B:27
Guiraca c. caerulea	7	2.4	±0.05	1.4	1B:100	
Passerina cyanea (Blake)	15	1.9	±0.17	1.1	0:50	1:48
(males, Reed)	5	1.7	±0.1	1.3	0:99	1:1
(imm. Downs)	3	1.9		1.1		
Passerina c. ciris (Reed)	1	1.7		1.0	0:	
Tiaris o. olivacea	16	1.6	±0.1	1.1	0:100	
T. bicolor marchi	15	1.6	±0.1	1.2	0:100	
Loxipasser anoxanthus (Parry, Blake)	23	1.9	±0.1	1.5	1:50	0:50
Loxigilla violacea ruficollis (Parry, Blake)	19	2.4	±0.15	1.2	1B:82	1A:12
Carpodacus mexicanus frontalis (Parry)	11	2.0	±0.2	1.4	1:61	0:27
Sicalis f. flaveola	14	2.3	±0.07		1B:96	1:4
Pipilo fuscus (petulans?) (Parry)	4	3.2		2.0	2:	
Ammodramus s. savannarum (Parry, Blake)	6	2.1	±0.08	1.3	1:96	1B:4
Zonotrichia leucophrys nuttalli (Parry)	6	2.5	±0.1	1.5	1B:73	1A:27
Melospiza georgiana	4	2.0		1.4	1:	
Melospiza melodia (?samuelis) (Parry)	5	2.1	±0.07	1.4	1:95	1B:5

West Indian birds is complicated by differences from island to island and by the fact that the book names are usually wholly unknown to the local people. One result is that resident bird students usually use the local vernacular names to the annoyance of the newcomer.

For some species I have advisedly departed from the nomenclature of the A.O.U. Checklist because I believe the conclusions of Bond (1956a, b, 1957) and Paynter (1955) to be justified.

Discussion of Individual species

Falco s. sparverius im. ♀ . Kirsher (1956) makes a good case for using size 3A for all western sparrow-hawks. I suggest 3A for female and 3 for male eastern individuals.

Columba leucocephala. It is not unlikely that some White-crowned Pigeons will require size 6 bands.

Zenaida macroura carolinensis. My earlier remarks (Blake 1956, p. 76) still hold. There is an indication that the western subspecies may really have more slender legs.

Columbigallina passerina insularis. This small series was measured on Grand Cayman. It is almost certain that this population has a larger tarsus than does *C. p. jamaicensis.*

Crotophaga ani. These measurements were made in Jamaica. In actual practice, size 4 is adequate.

Anthracothorax mango. Even though this hummingbird requires a band of about the same inside diameter as a size 1 band, the tarsus is so short that special bands 2 mm. high must be used.

Trochilus p. polytmus. The remarks made under *A. mango* apply here although the tarsal diameter is a little less. A further dilemma of the hummingbird bander should be noted. If the band diameter is too great by a few tenths of a millimeter, the band comes off over the toes; if it is small enough to just squeeze the tarsus, swelling of the latter will ensue. The size must be correct within about 0.2 mm. An internal diameter of 2.1 mm. is satisfactory for the two species here considered.

Todus todus. The tarsi of these extraordinary insectivorous "kingfishers" are not only slender but remarkably long. They perch with the body against the twig and the legs concealed. The rapid take-off diagonally upward is doubtless assisted by using the legs as a catapult.

Colaptes a. auratus ♂ . It seems likely that this race has a really smaller tarsus than does *C. a. luteus.*

Dendrocopos p. pubescens. Although the greater diameter is not significantly larger than in *D. p. medianus*, the proportion requiring the larger band size is much greater.

Myiarchus tuberculifer barbirostris. This is one of the smaller species in its genus, about the size of a pewee.

Parus carolinensis. The differences from the Black-capped Chickadee *(P. a. atricapillus)* may be more apparent than real. The range is greater (1.5-1.8) for the greater diameter and the tarsus is narrower. The present species was measured at Hillsboro, N. C., which is near the dividing line between the races *carolinensis* and *extimus.*

Certhia familiaris americana. The tarsus is expanded distally as in nuthatches.

Thryothorus l. ludovicianus. The tarsus is rounded behind, with the posterior lamella suppressed and is also somewhat dilated distally. Size 1 is strongly advised. About four percent will actually require 1B if size 1 is used up to exact fit.

Mimus polyglottos orpheus. The two races of mockingbird do not really differ in leg size. Compare my remarks (Blake, 1956, pp. 80, 81) under Blue Jay and Song Sparrow.

Turdus migratorius achrusterus. This small sample indicates that the tarsus of the Southern Robin is actually more slender than that of the Eastern Robin.

Turdus aurantius. This species has a stouter tarsus than has *T. jamaicensis* and appears to be more terrestrial. It is probably not a heavier bird.

Sialia s. sialis. Eight examples from Hillsboro, N. C. do not differ from my earlier measurements of Massachusetts birds.

Lanius ludovicianus. I am not certain to which race the shrikes of the northern piedmont of North Carolina should be assigned.

Vireo o. olivaceus. For practical purposes size 0 may be used for all individuals.

Vireo a. altiloquus. This subspecies clearly has a larger tarsus than does the closely related *V. olivaceus* or the Grand Cayman race of the present species.

Mniotilta varia. A sample of 22 measured in Jamaica differs in greater diameter only in a standard deviation of 0.1. This merely means that 99 percent would take size 0. In no case were samples of warblers measured in Jamaica significantly different from those of the same species measured in the United States.

Dendroica petechia eoa. All but one of these measured belong to the Grand Cayman population.

Dendroica c. caerulescens. One additional individual regarded as Cairn's Warbler *(D. c. cairnsi)* did not differ evidently in size.

Seiurus a. aurocapillus. This large sample differs from my previous figure (Blake, 1956) only in a smaller standard deviation. A single individual considered to be *furvior* was not different in tarsal size.

Seiurus noveboracensis. The one bird thought to be *notabilis* was the same as the rest in tarsal measurements.

Oporornis philadelphia. This species may prove to have really smaller tarsi than does *agilis*.

Geothlypis trichas brachidactyla. This series is from New England and may include migrants from further north. The measurements of greater diameter are 0.1 greater and slightly more consistent than those from a group of seven birds measured in Jamaica. Two others measured there and thought to be *G. t. trichas* averaged a further tenth smaller

Icteria v. virens. So far the best size for the chat is 1B.

Setophaga ruticilla. It is possible that both races are included but I have not been able to separate them in the hand. The adult males are said to be inseparable.

Sturnella m. magna. Unless one measures individuals before banding, it is safer to use size 3 even though many birds will accept size 2. The range of these four birds was from 3.5 to 4.4.

Agelaius p. phoeniceus (males). A single juvenile bird (omitted from the series) measured at Hillsboro, N. C. had a greater diameter of only 2.8. It may have been a female.

Molothrus a. ater. Some further experience with cowbirds leads to the conclusion that 1A is the best over-all size. This size will be about 0.1 mm. too small for about 10 percent of immature males.

Piranga r. rubra. Although the Summer Tanager is of about the same weight as the Scarlet Tanager, the leg appears to be actually slightly more slender. Size 1B is recommended.

Richmondena c. cardinalis. As with other large grosbeaks the proper size for all individuals is 1A. The eastern race has a slightly more slender tarsus than the Florida race (Blake, 1954). No sexual difference was detected.

Guiraca c. caerulea. The size given in the table seems safe for this relatively small grosbeak. Its bite is certainly much less severe than that of the larger species.

Passerina cyanea. The lesser diameter is rather variable; in the 15 examples banded by me in North Carolina the range is 0.9 to 1.2. Size 1 is recommended for this species.

Passerina c. ciris. It may prove that this species like the preceding is best banded with size 1.

Tiaris bicolor marchi. One example of *T. b. omissa* from Puerto Rico was 0.2 larger in each dimension but I hesitate to consider the difference real.

Loxipasser anoxanthus. Size 1 is recommended. These birds bite quite strongly.

Pipilo fuscus (petulans?). The tarsus appears to be really broader than that of the Red-eyed Towhee. Davis (1957) has shown that *fuscus* is a runner rather than a hopper and that it is a less vigorous scratcher than *P. e. megalonyx.* It may be, in effect, more arboreal.

Subspecies

Subspecies do not always differ from one another in all of their measurable characters. It is not surprising that they do not always differ significantly in tarsal diameters. In fact, only half of the pairs shown in Table II show probable differences.

Shape of the tarsus in trunk-climbing birds

I have already given measurements (Blake, 1956, p. 77) showing that in the White-breasted Nuthatch *(Sitta c. carolinensis)* the tarsus is distally enlarged. This enlargement is greater and tapers to the least diameter more gradually than in most passerine birds such as warblers or sparrows. Subsequently I have noticed a similar distal expansion in some other species: *Dendrocopos pubescens, Certhia familiaris,* and *Thryothorus ludovicianus.* It is obvious that the first two are trunk climbers, as is *Sitta,* but it may not be so well known that the Carolina Wren can travel over the trunk of a tree almost as well as a nuthatch. On the other hand, *Mniotilta varia* does not show an evident modification of the tarsus and is probably not a true trunk climber.

When climbing vertically upward *Dendrocopos, Certhia,* and *Sitta* all orient the toes the same way. The two outer toes are in an approximately transverse line and the other two in a nearly vertical line. Pre-

TABLE II. COMPARISON OF DIAMETERS OF PAIRS OF SUBSPECIES
Probably different tarsal sizes

	Greater Diameter	Lesser Diameter
Zenaida macroura carolinensis	4.4 ±0.3	3.3
marginella	4.0	3.1
Columbigallina passerina jamaicensis	2.9 ±0.2	2.3
insularis	3.3	2.4
Colaptes auratus luteus	3.9 ±0.2	2.8
auratus	3.2	2.2
Turdus migratorius migratorius	3.3 ±0.2	2.1
achrusterus	2.8	1.8
Vireo altiloquus altiloquus	2.2	1.2
caymanensis	1.7	1.1
Richmondena cardinalis cardinalis	2.6 ±0.1	1.6
floridanus	2.9	1.7

Tarsal sizes not different

	Greater Diameter	Lesser Diameter
Dendrocopos pubescens medianus	2.2 ±0.2	1.5
pubescens	2.3 ±0.1	1.5
Mimus polyglottos polyglottos	3.2 ±0.2	1.8
orpheus	3.1 ±0.2	1.9
Coereba flaveola flaveola	1.7 ±0.08	1.1
sharpei	1.8 ±0.07	1.2
Dendroica petechia aestiva	1.7	1.2
eoa	1.7 ±0.1	1.0
palmarum palmarum	1.6 ±0.1	0.9
hypochrysea	1.5	0.8
Melospiza melodia melodia	2.3 ±0.1	1.3
? samuelis	2.1 ±0.07	1.4

sumably all woodpeckers show the distal expansion of the tarsus but it is concealed by the fleshiness of the segment. As far as I have been able to observe they also place the toes as in *Dendrocopos*.

I conclude that the zygodactyl foot is not an adaptation to trunk climbing but to grasping slender twigs. A woodpecker is quite adept at moving about on thin twigs which would be avoided by a passerine bird of about the same weight. A broader conclusion is that the general structure of the foot is not an unequivocal indication of the use usually made of it.

Relative tarsal breadth

My former conclusions as to the breadth of the tarsus (Blake 1956, p. 82) are invalidated by the much larger number of species now available. The 12 species of Tyrannidae vary between 1.3 and 1.8 with mean of 1.5. There is no clear relationship to the greater diameter. The Oscines (except Hirundinidae) vary from 1.5 to 1.8 with a mean of 1.6. Again there is no relation between breadth and greater diameter nor any real difference between arboreal and terrestrial species. The four species of swallows range from 1.2 to 1.35 with a mean of 1.3. These tarsi do appear to be broader than those of other oscines.

An apparent relation between tarsal size and maximum weight

The weights of geometrically similar solids of the same material will vary as the cubes of corresponding linear dimensions. Similarly the compressive strength of similar specimens of a substance will vary

as the square of a corresponding dimension of similar cross-sections. These considerations suggest that any relation between the weight of a series of birds and the sizes of the tarsi might be examined by comparing the respective cube roots of the weights and some linear dimension of the tarsal cross-sections. For the latter I chose the square root of the product of the two mean diameters as measured. The weight used was the maximum that I could find on record. The figures for about 60 species of passerines were plotted, using weights in grams and tarsal dimensions in millimeters. If we use w as the weight^3 and d as the square root of the product of the tarsal diameters, the band covered by the plotted points falls between the following two straight lines:

$$w = 1.35d + 1.07$$
$$w = 1.37d + 0.21$$

It would probably be sufficiently accurate in the present state of our knowledge to use the average slope of 1.36. The relationship appears fairly satisfactory up to a weight of 70 gm. The line halfway between those given above is $w = 1.36d + 0.64$.

Three species of Picidae fall within the same band while two species of Columbidae have relatively stouter tarsi.

REFERENCES

BLAKE, C. H. 1954. Leg sizes and band sizes: first report. *Bird-Banding*, **25**: 11-16, 1 fig.
——— 1956. Leg sizes and band sizes: second report. *Bird-Banding*, **27**: 76-82.
BOND, JAMES. 1936. Birds of the West Indies. Acad. Nat. Sci., xxv + 456, illus.
——— 1947. Field guide to birds of the West Indies. New York, ix + 257, illus.
——— 1956a. Check-list of birds of the West Indies. Acad. Nat. Sci., [ed 4], ix + 214, 1 map.
——— 1956b. First supplement to the check-list of birds of the West Indies (1956). Acad. Nat. Sci., 1-8.
——— 1957. Second supplement to the check-list of birds of the West Indies (1956). Acad. Nat. Sci., 1-14.
DAVIS, JOHN. 1957. Comparative foraging behavior of the spotted and brown towhees. *Auk*, **74**: 129-166, 2 pl., 1 fig.
KIRSHER, W. K. 1956. Some notes on sparrowhawk banding. *News from Bird-Banders*, **31**: 36-38, 1 fig.
PAYNTER, R. A., JR. 1955. The ornithogeography of the Yucatan Peninsula. Peabody Mus. Yale, bull. **9**: 1-347, 4 pl., 2 maps.

Museum of Comparative Zoology, Cambridge, Mass.

WEIGHTS OF SOME CHIMNEY SWIFTS AT MEMPHIS

By LULA C. COFFEY

During the past twenty years I have assisted Mr. Coffey in the banding of a large number of Chimney Swifts *(Chaetura pelagica)*, chiefly here in Memphis and Shelby County, Tennessee. Since, in my work as a seed analyst, I constantly use small weights, I was long conscious of appreciable variation in the weights of the swifts in the same flock and between those in the early and the late fall flocks. From 1949 thru 1955, a total of 1893 weights were taken, which varied from 16.1 to 33.5 grams, with a mean of 22.8 grams and a standard deviation