

1939

A Study of the Nesting Habits of the Cedar Waxwing

Janette M. Dickson

Table of Contents

	Page
1. Introduction	1
2. Identification of Bird	2
3. Nest Building and Territory	3
4. Eggs and Incubating	5
5. Study of the Young	7
6. Feeding	8
7. Feather Development	9
8. Nest Activities	10
9. Tables of Weights and Measurements	11
10. Sketches of Feather Development	16
11. Summary	21
12. Bibliography	23

A Study of the Nesting Habits of the Cedar Waxwing

The study of the nesting habits of the cedar waxwing (*Bombycilla cedrorum*) was made at the University of Michigan Biological Station in July and August, 1939, under the direction of Dr. O. S. Pettingill, Jr. and Dr. Theodora Nelson.

Eight nests were observed in the study. No one nest was studied for the complete nesting cycle, but in all eight nests the observer made note of territory; activities of the male and female; nest building; incubation; feeding and care of the young by the adult; growth, feather development, and activities of the young; and the first flight of the nestling. The observer realizes that in the period of seven weeks' time, in which only some of that time could be devoted to watching the bird, that a great many activities have been missed. But in the time available many interesting activities and phases of the nesting cycle of the cedar waxwing were studied and enjoyed.

Location and Situation of Eight Cedar Waxwing Nests

Nest	Location	Situation
Nest 1	Head of C Street	Prunus tree, 12 ft. high
Nest 2	State Street in front of Administration Building	Acer rubrum, 11 ft. high
Nest 3	Garage on State Street	Acer rubrum, 11 ft. high
Nest 4	Corner of B and State Street	Acer rubrum, 10.8 ft. high
Nest 5	Elliott Creek Beaver Dam	Salix, 4 ft. high
Nest 6	Elliott Creek Beaver Dam	Elm, 3 ft. high
Nest 7	State Street by Hospital	Pinus Strobus, 8 ft. high
Nest 8	Corner of Newcombe Lab.	Prunus, 6 ft. high

Identification of Bird

The cedar waxwing (*Bombycilla cedrorum*) belongs to the family *Bombycillidae* and order *Passeriformes*. It is a small brown bird with the following measurements:

- length - 7.19 inches
- wing - 3.7 inches
- tail - 2.37 inches
- bill from nostril- 26 inches

The forehead, chin in the male, and line through the eye are black. A conspicuous crest is an easy silhouette identification. The upper parts are a grayish brown and the upper tail coverts, wings and tail are gray. The secondaries are tipped with red, seedshaped, sealing-wax-like tips from which characteristic the bird gets its name. The tail has a yellow band at the end. The breast is a rich grayish brown, changing gradually to yellow on the belly. The under tail coverts are white. Nestlings resemble the adults but they have a streaked breast. The red wax tips are usually absent. The male can be distinguished from the female by its very black chin.

The range of the cedar waxwing at the breeding season is from central British Columbia, northern Ontario, and the Cape Briton Islands south to California, Kansas, northern Arkansas, North Carolina and northern Georgia. It winters throughout nearly all of the United States south to Cuba, Mexico, lower California, and Panama.

They migrate in flocks, sometimes being seen with goldfinches. They feed on wild berries, sometimes cultivated berries, cankerworms, and insects. They do not have a song but they do have two calls, a low whistle and a subdued call

which Saunders* describes as a long-drawn-out, high-pitched whine, "e-e-e-e-e".

Nest Building and Territory

A pair of cedar waxwings were seen at the top of C Street on June 26, industriously taking bits of twigs and string from an old waxwing nest at the top of a *Prunus pennsylvanica* tree. They were carrying them to another tree a few feet away and building another nest about twelve feet from the ground in a *Prunus pennsylvanica* tree. On July 19, in front of the garage on State Street about eleven feet from the ground in an overhanging branch, another pair of cedar waxwings were observed building a nest. Twigs and string were used. The first activities were noticed from a blind fifteen feet away. Bits of string were dropped from this blind and both the male and female came immediately and got the string. The birds worked in the morning at the nest but in the afternoon and evening were not found near the nest. Both birds brought material but the female seemed to do most of the actual weaving and building. The outside was constructed first and, as the inside was made, the female turned and sat in it frequently, seeming to mold it to the proper shape and size.

On July 21 at six o'clock in the morning, a pair of cedar waxwings were noticed beginning a nest. This nest is located at the corner of B and State Streets in an *Acer rubrum* tree eleven feet from the ground. This pair worked for one week constructing the nest.

* A.A. Saunders - A Guide to Bird Songs

Each nest seen was the only nest in the tree. The nests in camp were in trees as close as fifteen feet. At no time during the nesting cycle did other birds of the same or different species enter the tree. This fact was observed from nests 2, 3 and 4. Several waxwings were in trees very near and many waxwings (as many as six) were seen together getting *Prunus pennsylvanicum*^{cherries} from trees twenty to thirty feet from nests 2 and 3. The male of nest 2 was seen many times in trees ten to fifteen to twenty feet from his nest in the same tree with another pair.

Analysis of materials used in cedar waxwings shows a varied selection. Materials used were those obtained from the surrounding vegetation. Materials were: dried grasses, pine needles, plant down, *Salix* twigs, dried seeds and stems of *Phleum*, string, *Pinus* and *Picea* twigs, and dried staminate catkins of *Rhus glabra borealis*. The nests are placed in crotches, on the branches and against the trunks of low bushes held in place by another trunk against it. Nests are placed from three to twelve feet from the ground. A summary of the measurements of the nests:

Outside diameter	4 3/8 inches	-	5 1/2 inches
Outside depth	4 3/4 inches	-	5 1/8 inches
Inside diameter	1 3/4 inches	-	3 1/2 inches
Inside depth	1 1/2 inches	-	2 inches

Nest 2 was measured at the beginning of incubation and after the young left. The diameter had changed from 4 3/8 inches to five inches, showing how the activity in the nest stretches and loosens the sides. The nest also became shallower—from two inches to 1 1/2 inches. This nest weighed 48.5 grams. The materials were:

Picea twigs	45%
Larriana	
Dried staminate catkins of <i>Rhus glabra borealis</i>	45%
String, <i>Pinus Strobus</i> , ^{needles} <i>Pinus resinosa</i> , ^{needles} and grass	10%

Nest 4 was built from July 21 to July 28, a period of eight days.

Eggs

(Notations were made from nests 2 and 4.)

Nest 2 was found and observed with glasses on June 26. A blind was placed in front of it on June 29 when three eggs were in the nest. This number was the clutch. The eggs were pale bluish gray, spotted and lined with black. The measurements were:

1. 23 mm. x 15 mm.
2. 25 mm. x 15 mm.
3. 22 mm. x 16 mm.

Eggs 1 and 2 had the smaller end pointed and egg 3 had the smaller end rounded. These eggs were incubated until July 9.

Eggs from nest 4 were laid one each day beginning July 29, the day after the nest was complete. These eggs were all pointed. The ground color was putty. The pointed end was clear and the rounded end splotched, spotted and lined with dark brown and purple.

	Length	Width
1.	25 mm.	16 mm.
2.	26 mm.	16 mm.
3.	24.5 mm.	16 mm.
4.	24.5 mm.	16 mm.

Incubating

The female did all the brooding in nests 2 and 4. In nest 4 the male was not seen after incubation began. In nest 2 the male fed the female and guarded the nest.

Activities of Birds during Incubation

Date	Weather	Temperature		Activity
		MAX.	MIN.	
June 29	fair calm	83	63	Female incubates-leaves nest every hour in morning for 5-10 minutes with male. Sits with back to the sun, changes position as sun gets higher. Male and female approach and leave nest from the southwest.
June 30	rain calm	71	59	Female leaves nest 5-20 minutes each hour in afternoon.
July 1	fair calm	67	53	Female has back to the sun. Male comes to tree, lights on lower branch, then hops to S.W. side of nest. Feeds female amelanchier berries.
July 4	rain	79	63	Left nest once each hour from 8-12 for 5-10 minutes. 10 P.M. female on nest asleep. Not disturbed when I entered blind and flashed light on nest.
July 5	fair wind	87	60	At noon female on nest facing wind. 7:00 P.M. on nest facing south.
July 6	hot wind	94	67	3:20 P.M. female standing in nest over eggs. Bill open, panting, facing wind. 6:00 female in <i>Betula papyrifera</i> south of nest while I measure nest. Cheeps but crest is not raised.
July 7	fair	93	72	Male on southwest edge of nest while female on nest. Male leaves as I enter blind at 7:00 P.M.
July 8	hot	79	64	Female fluffs feathers. Eggs next to powder down tract. Female very quiet at 12:30 P.M. and 3:45 P.M.
July 9	rainy	79	58	9:00 A.M. three young are hatched. No egg shells to be seen. Nest clean.

7.

In nest 4 the incubation period started on August 1, the day the third egg was laid. Incubation went on without the presence of the male until August 13 when the first egg hatched.

Eggs hatched:

two on August 13
one on August 14
one - ? did not hatch

The length of incubation is fifteen days.

Young

A. Hatching. In nest 4 the female removed the bits of shell from the egg as soon as the shell opened.

In nest 5 the process of hatching was seen in one egg. Both the male and female were at the nest, the female on the eggs and young and the male on the side. The head of the young was exposed first and the shell cracked and bits were removed by male and female as the neck became exposed. Not a trace of shell was left about egg or nest. The young cedar waxwing hatches naked and blind.

B. Growth. See growth table and graph, pages 15 and 16.

The eyes began to open on the third day. By the fifth day the eyes were entirely open.

C. Feeding. As soon as the young hatch, they open their mouths when touched. The lining of the mouth is ^{red}(yellow). Feeding is done by male and female.

Feeding Activities

Date	Weather	Temperature		Activity																																										
		max.	- min.																																											
July 9 second day	rainy	58	79	<ol style="list-style-type: none"> 1. Male brings food every $\frac{1}{2}$ hour. 2. Some food given to female. 3. Male and female feed bits of regurgitated cherries to nestlings. 4. Bill of parent thrust into throat of young. Food of cherries not always left in first mouth but passed from mouth to mouth until one swallows it. 5. Feces removed by male and female after each feeding. 																																										
July 11 fourth day	fair	52	83	<ol style="list-style-type: none"> 1. 7:45-12:00. Female leaves nest every 15-20 minutes and returns with Prunus berries, one, two, or three. Feeds part to each one. 2. 7:45-12:00. Male comes once every hour. He feeds insects. 3. Male and female not at the nest together. 																																										
July 15 seventh day	high wind	67	49	<ol style="list-style-type: none"> 1. Female feeds every 15 minutes 2 or 3 cherries. 2. Male brings insects and regurgitates about every 50 minutes. 3. Left blind at 11:00 because of very high wind. Small Acer rubrum swayed and leaves blown so nest is concealed. 																																										
July 18 tenth day	fair			<ol style="list-style-type: none"> 1. Each young waxwing swallowed a Prunus berry when I put it in mouth. 2. Young did not notice or touch berries that I placed on side of nest. Adults saw and ate them as soon as they returned to nest. 3. <table style="margin-left: 20px;"> <thead> <tr> <th>Time</th> <th>Sex</th> <th>No. of cherries to three young</th> </tr> </thead> <tbody> <tr> <td>9:12</td> <td>female</td> <td>5</td> </tr> <tr> <td>9:40</td> <td>female</td> <td>3 to 1 young</td> </tr> <tr> <td></td> <td></td> <td>1 to 1 young</td> </tr> <tr> <td></td> <td></td> <td>2 to 1 young</td> </tr> <tr> <td>10:05</td> <td>female</td> <td>6</td> </tr> <tr> <td>10:40</td> <td>male</td> <td>7</td> </tr> <tr> <td>11:00</td> <td>female</td> <td>6</td> </tr> <tr> <td>1:00</td> <td>male</td> <td>insects</td> </tr> <tr> <td>1:30</td> <td>male</td> <td>insects</td> </tr> <tr> <td>2:20</td> <td>male</td> <td>insects</td> </tr> <tr> <td>3:05</td> <td>male</td> <td>insects</td> </tr> <tr> <td>3:45</td> <td>male</td> <td>insects</td> </tr> <tr> <td>4:15</td> <td>male</td> <td>4 cherries</td> </tr> </tbody> </table> <p>male on tree near nest -does not feed but comes to nest when female is feeding.</p> <p>female on nest part of time.</p>	Time	Sex	No. of cherries to three young	9:12	female	5	9:40	female	3 to 1 young			1 to 1 young			2 to 1 young	10:05	female	6	10:40	male	7	11:00	female	6	1:00	male	insects	1:30	male	insects	2:20	male	insects	3:05	male	insects	3:45	male	insects	4:15	male	4 cherries
Time	Sex	No. of cherries to three young																																												
9:12	female	5																																												
9:40	female	3 to 1 young																																												
		1 to 1 young																																												
		2 to 1 young																																												
10:05	female	6																																												
10:40	male	7																																												
11:00	female	6																																												
1:00	male	insects																																												
1:30	male	insects																																												
2:20	male	insects																																												
3:05	male	insects																																												
3:45	male	insects																																												
4:15	male	4 cherries																																												
July 19	fair			<ol style="list-style-type: none"> 1. One young to care for. Fed by male until it left nest. As it perched on branch all afternoon was fed by male from 1-3 o'clock. 																																										

The two birds that were held in captivity were fed pin cherries and artificial food. The artificial food consisted of lettuce, carrots, hard boiled eggs, sometimes bread crumbs and bits of meat. It was impossible to tell how much of the artificial food was consumed but while they were fed cherries the number eaten were counted.

	Red band	Blue band
First day	70 cherries	67 cherries
Second day	71 "	63 "
Third day	66 "	56 "
Fourth day	24 "	28 "

The fourth day the birds were in the cage they began pulling cherries from branches, so they would only take from the forceps less than half the number of cherries they had eaten the day before. From July 27 until the time of release, August 10, they ate cherries from branches and were fed only artificial food.

D. Feather Development

Feather Tracts

Date and Day	Capital	Spinal	Humeral	Femoral	Alar	Crucal	Ventral	Caudal	Comments
July 9 1	-	-	-	-	-	-	-	-	naked
July 10 2	x	x	x	x	x	-	x	-	
July 11 3	x	*	x	x	x	x	x	-	
July 12 4	x	*	*	*	#	*	x	-	down is dark - ventral tract white tipped.
July 13 5	x	*	*	*	#	*	yellow *	x	Rectices with yellow tip show brown color. on back
July 14 6	x	*	*	*	#	*	*	x	
July 15 7	x	*	*	*	#	*	*	*	Nestlings preen feathers.
July 16 8	shows yellow line on crest	*	*	*	feather	*	apterium bare *	*	Primary and secondary feathers out of shaft.
July 17 9	Body covered with down, ventral apterium bare, breast streaked.								
July 18 10	One secondary of each wing of the bird banded <u>blue</u> shows one red wax tip.								
July 22 14	Ventral apterium covered by yellow down.								
August 18	Bird banded <u>red</u> shows two new rectices about half the length of the old ones.								

Notation -

- x - feather shaft seen
- * - feathers show down
- # - primaries shaft out of skin

E. Nest Activities

First day. The young lie on the ventral surface with head curled down. When touched they will hold up their heads and open their mouths. The adults are much more active and notice observations with more concern than they did during incubation.

Third day. Young lie on the ventral surface and turn themselves over if they are placed on their backs. After feeding each feces is removed by adult-male or female swallows it. The female settles on young when not away from the nest. Both adults perch on the side of the nest while feeding. The food is never visible when bird approaches the nest. The female makes a clucking sound as she perches on nest and the young open their mouths. The male perches on the edge of the nest for one or two minutes after feeding. Several times the male and female touch their bills together.

Fourth day. The female cannot cover the nestlings. The heads of the young come out from the sides of her body.

Fifth day. The young stretch their necks, legs, and wings.

Sixth day. The young try to stand in the nest.

Seventh day. Two of the young made cheeps when the female was near the nest but not on it. The three nestlings preen their feathers and then preen each other. They exercise by stretching wings, neck, and legs, and they walk around in the nest sometimes crawling over each other. The to^es grasp lining of the nest and pull it. They do this when being taken from the nest.

Eighth day. The nest is becoming very ragged and frayed due to the activities of the young. A piece of string shows in the nest where it has been pulled from the bulky part of the nest.

Ninth day. I heard a very high shrill-pitched note from one nestling- quite different from the first cheeps. Adults answer the call from the wire on which they are perched. The wire which holds the blind is about three feet from the nest.

Tenth day. The nest is wider due to the activity of the young that are now standing on the edge of the nest, stretching wings and legs. Adults are away from the nest except when feeding. It is hot and the young open bills and pant in the same manner that the adults do.

Eleventh day. The young are stretching far out over the nest, but they do not fall out. There is no sign of adult urging the young out of the nest in an attempt to make them fly. At 10:30 I went to the blind with a light. The young were nestled together, but there was no sign of the adult. The light did not disturb them.

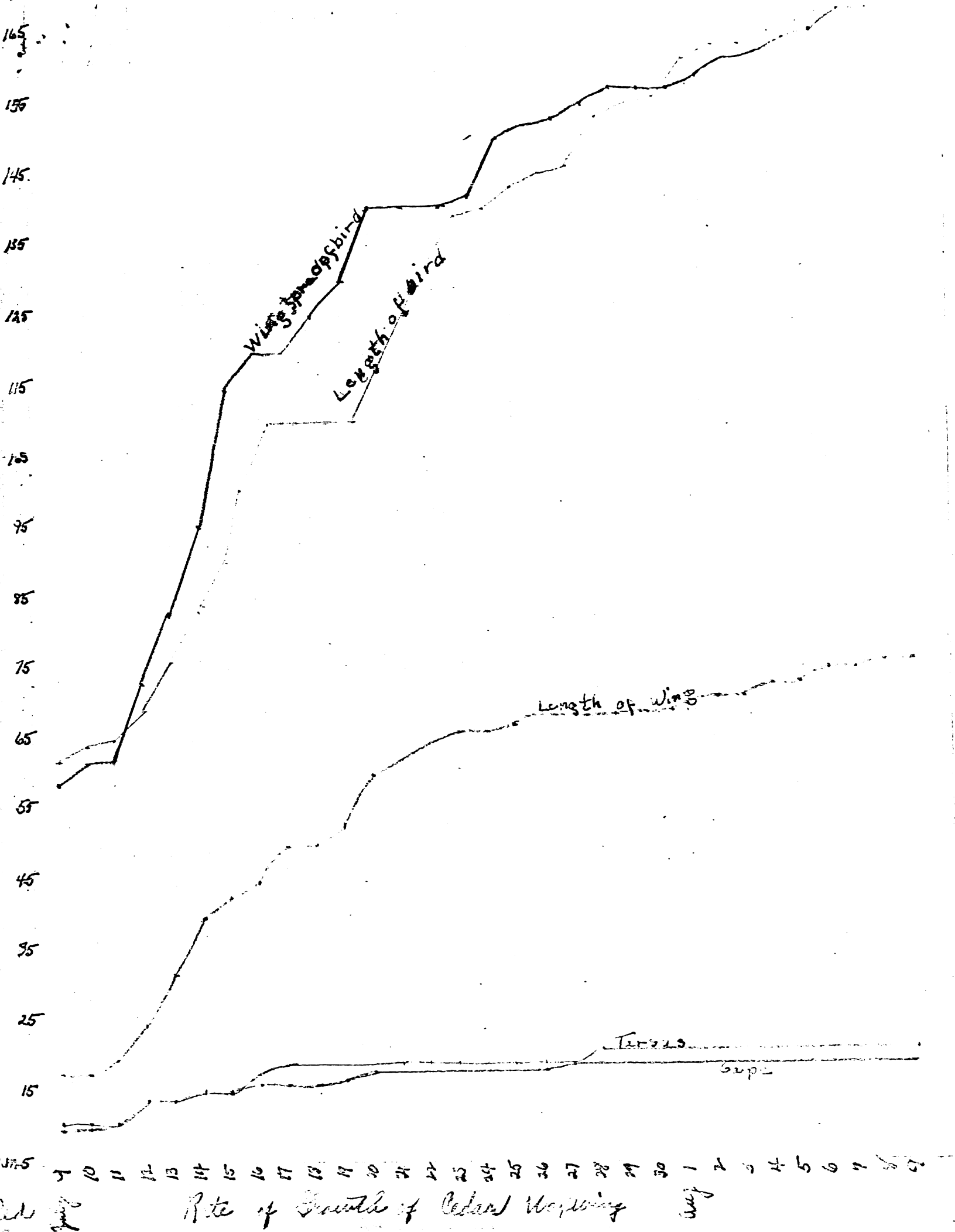
Twelfth day. I removed two young to a cage at 8:30 A.M. At 9:30 the third nestling stretched on the edge of the nest and made a clumsy flight to a branch about one foot from the nest. It remained here until the afternoon. It then moved to another limb. Before 6:00 it flew from the tree. It never returned to the nest.

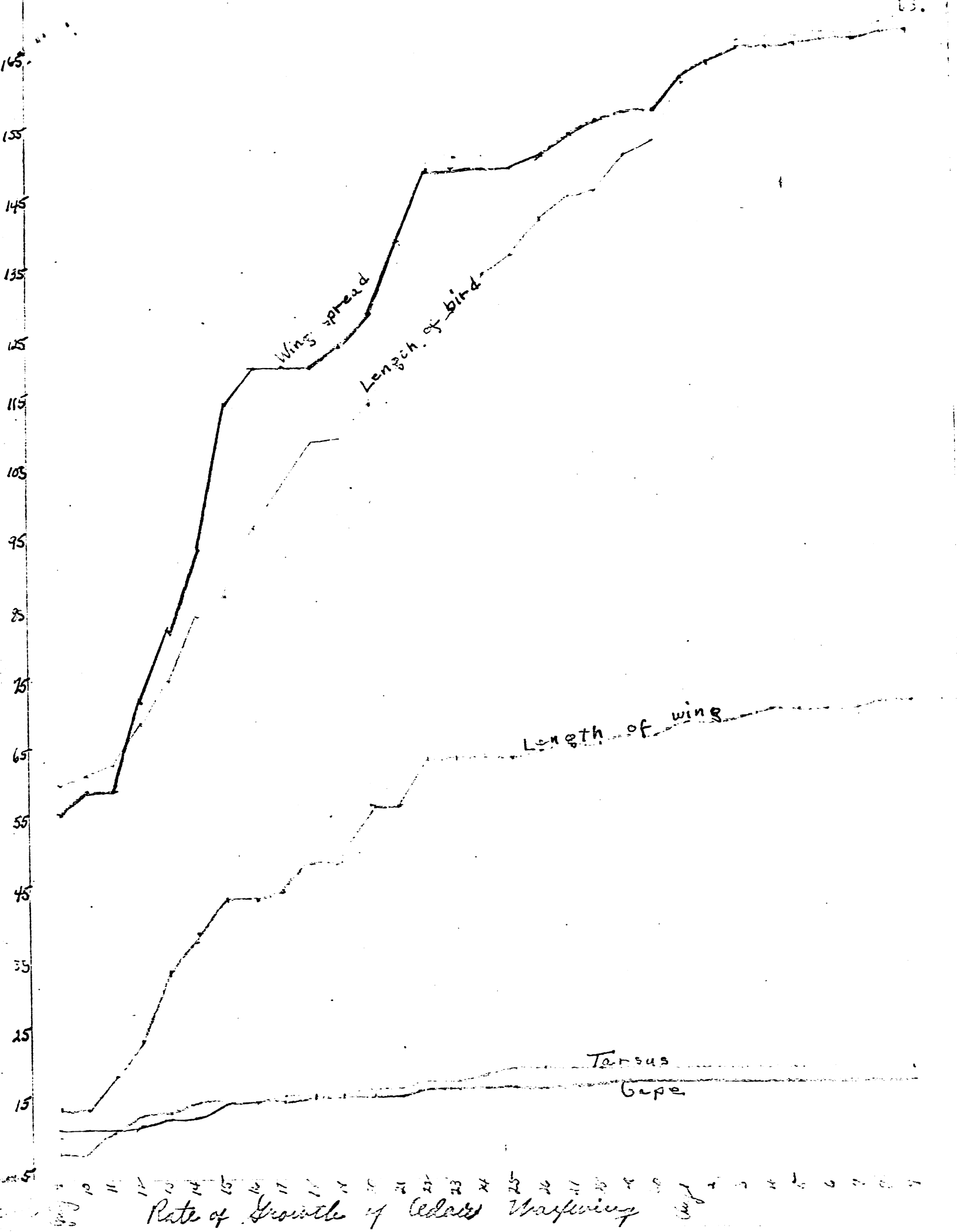
WEIGHT CHART
(in grams)

Date	<u>Red Band</u>	<u>Blue Band</u>
July		
9, A.M.	5.85	6
9, P.M.	6.7	7.9
10	10.6	11.1
11	14.3	14.9
12	18.5	17.8
13	21	19.5
14	24.3	22.2
15	27.5	25.2
16	27.2	27
17	31.1	28.4
18	31.2	27.3
19	32.1	28.5
20	29	27
21	35	29
22	32	29.5
23	33.3	28.4
24	34.9	31.3
25	35.2	30.2
26	36.2	33
27	37	34
28	36.2	32
29	37	31.5
30	37.7	32
31	36.6	33
August		
1	36	34
2	37	35
3	34	31.5
4	33.7	32.7
5	34	32.8
6	35.2	34
7	35.2	35
8	36.7	37
9	35.9	34.5

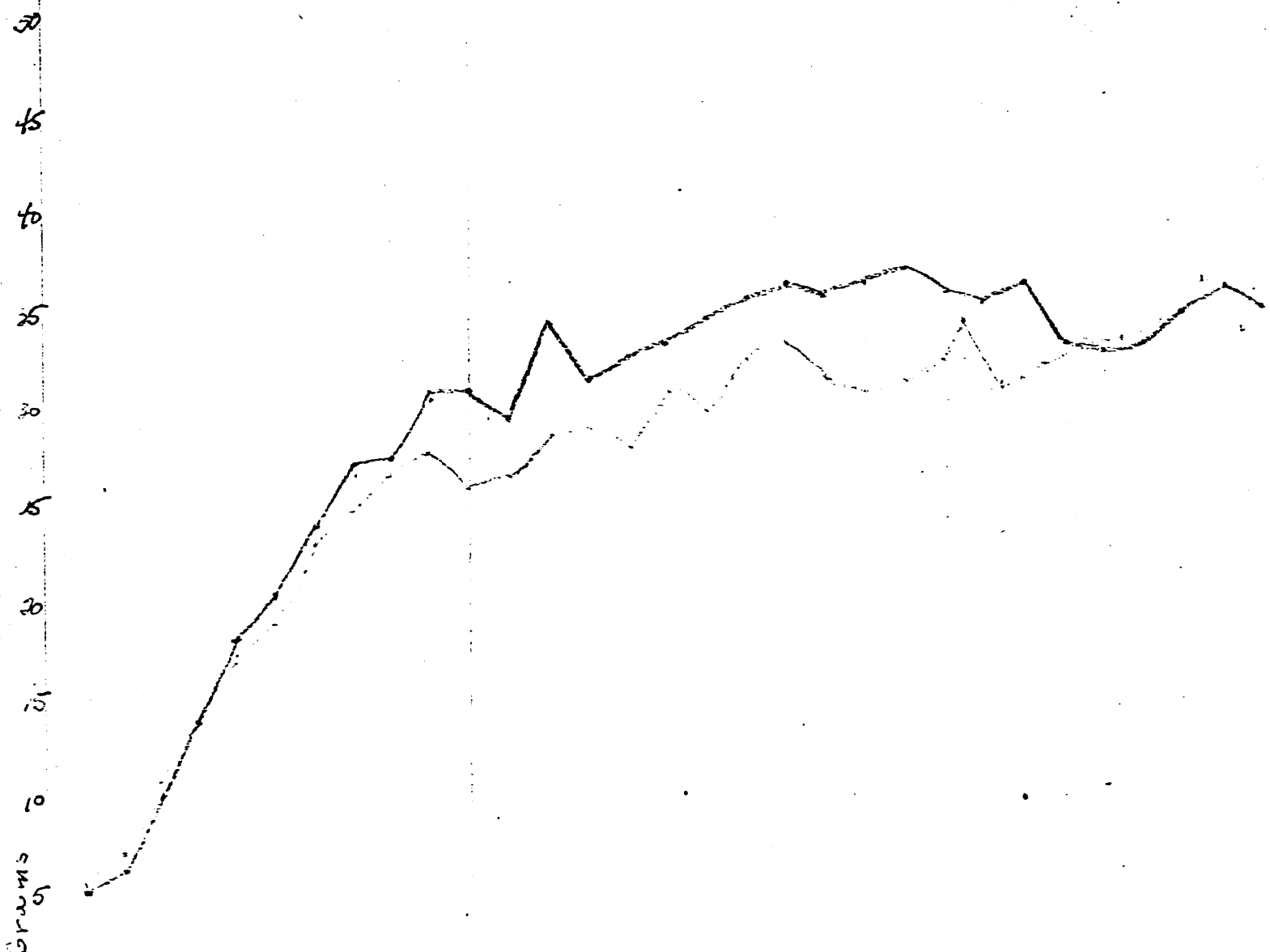
MEASUREMENTS
(in mm.)

Date	Length	Red Band Wing Spread	Gape	Tarsus	Length	Blue Band Wing Spread	Gape	Tarsus
July								
9 A.M.	60	57	10	11	59	55	12	9
9 P.M.	64	60	16	11	60	58	12	9
10	65	60	17	11	64	60	12	12
11	69	73	14	14	70	70	13	14
12	76	83	14	14	76	86	14	14
13	83	95	15	15	85	95	14	16
14	90	115	15	15	88	105	16	16
15	100	120	16	18	98	110	16	18
16	110	120	16	19	100	115	16	17
17	110	125	16	19	110	132	17	17
18	110	130	16	19	110	132	17	18
19	120	130	16	19	115	135	17.5	18
20	123	130	16	19	120	150	17	18
22	125	140	17	19	125	152	18	18
23	139	142	17	19	130	150	18	19
24	140	150	18.5	19	135	150	18	19
25	143	152	18.5	19	138	150	18	20
26	145	153	18.5	19	143	152	18.5	21
27	146	155	19	19	146	155	18.5	21
28	153	157	19	21	147	157	18.5	21
29	155	157	19	21	152	158	19	21
30	156	157	19	21	154	158	19	21
31.	164		19	21	162	163	19	21
Aug.								
1	161	159	19	21	165	165	19	21
2	163	161	19	21	165	165	19	21
3	163	162	-	-	168	167	19	21
4	165	164	-	-	168	167	19	21
5	166	165	-	-	168	167	19	21
6	168	168	19	21	169	168	19	21
7	168	168	-	-	169	168	-	-
8	170	170	-	-	170	169	-	-
9	170	170	-	-	172	169	-	-





Birds kept in cages

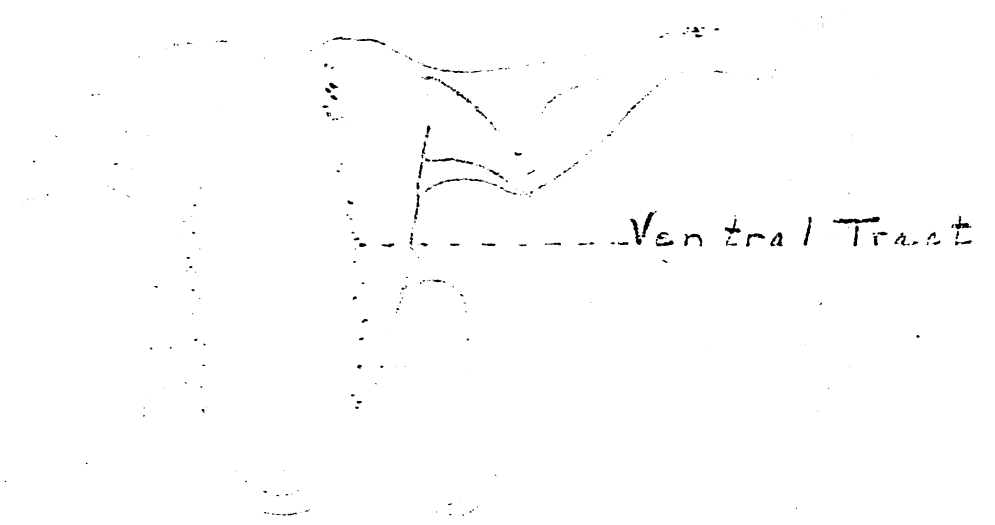


Weight of 2 Cedar Waxwings Kept in Cages - Red and Blue

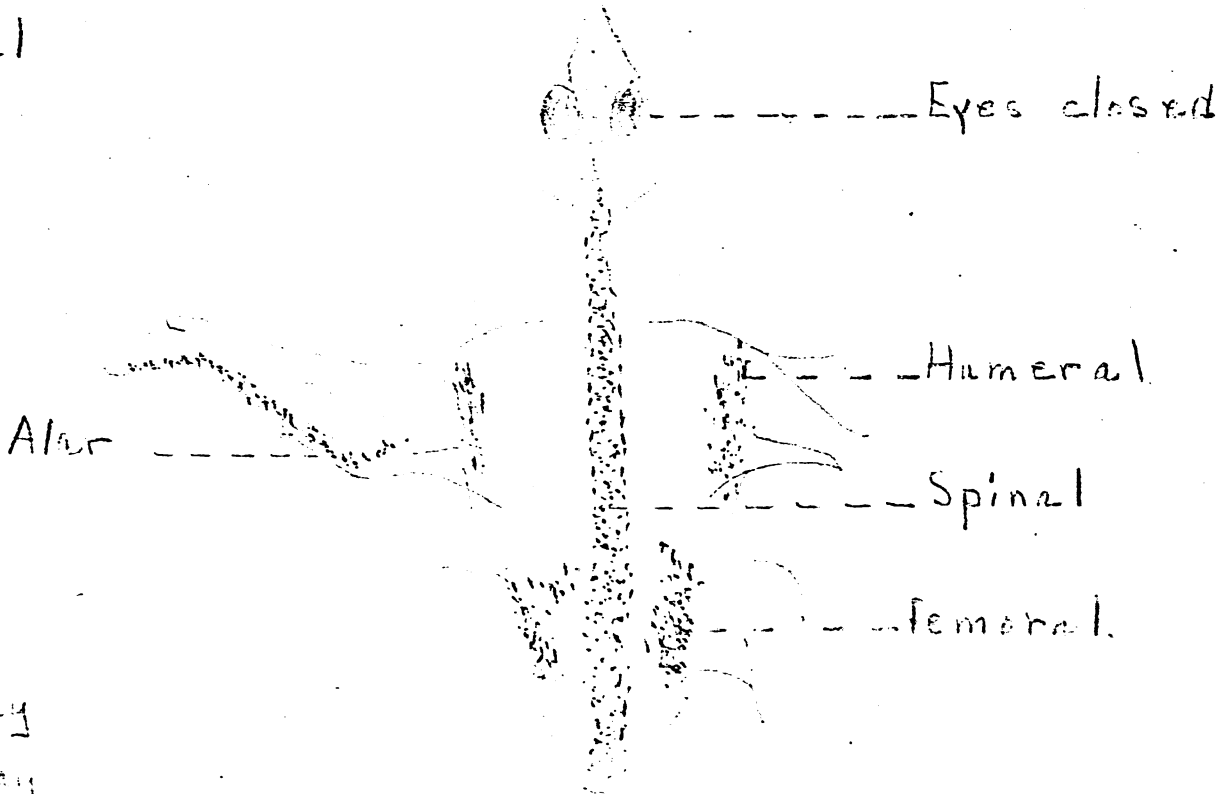
Feather Tracts of Young Cedar Waxwing

Ventral

1st + 2nd Day



Dorsal

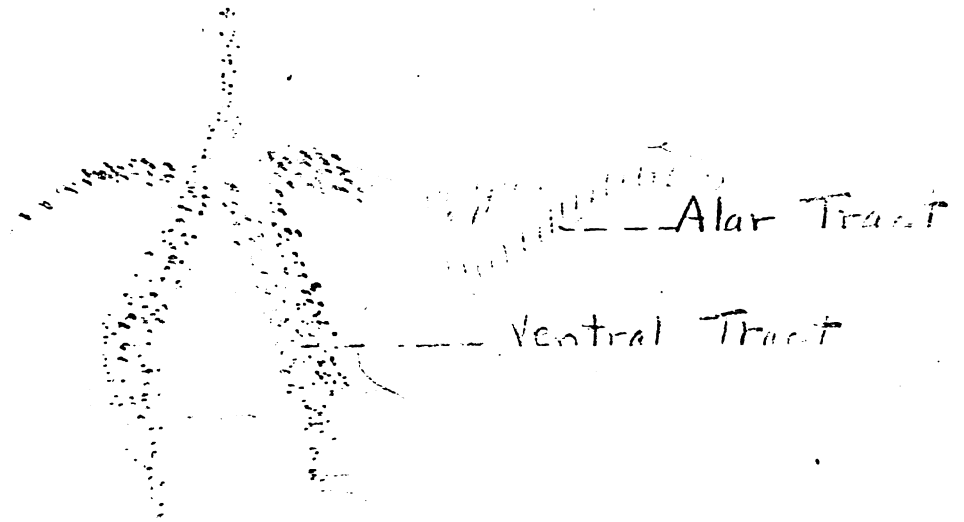


- 1st day
- 2nd day

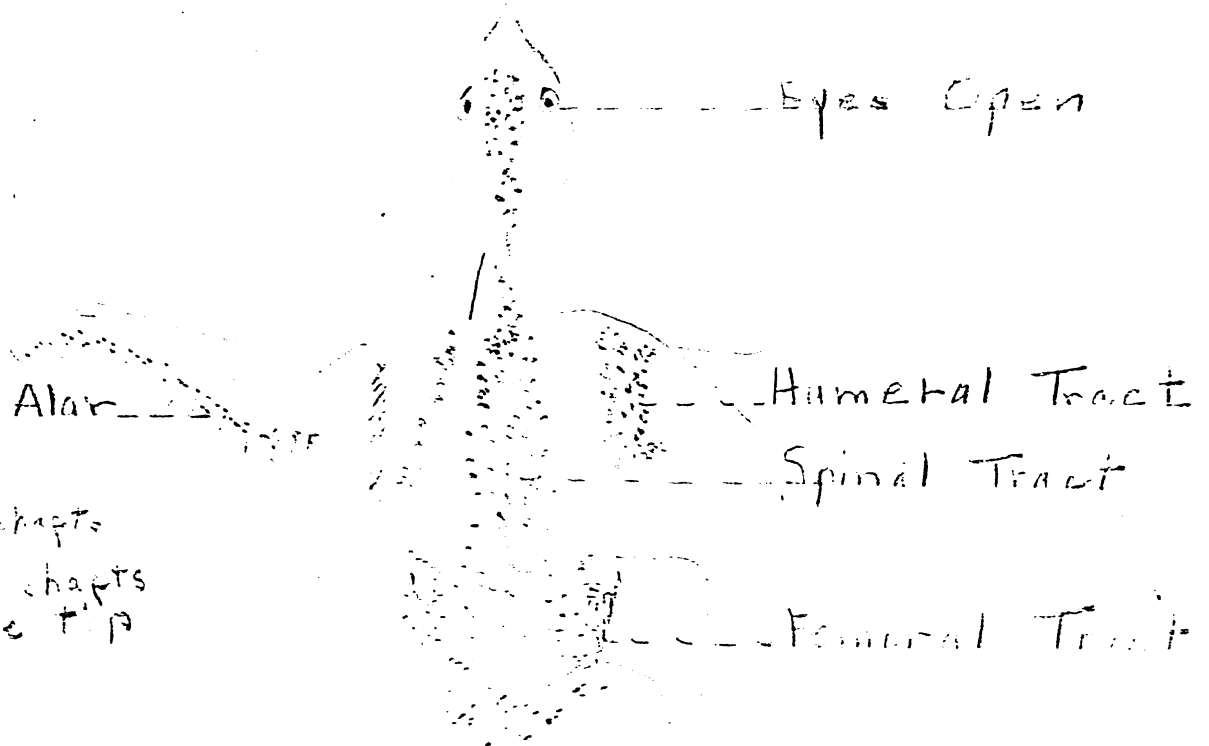
Feathers + Tract of Young Cedar Waxwing

Ventral

5th Day



Dorsal

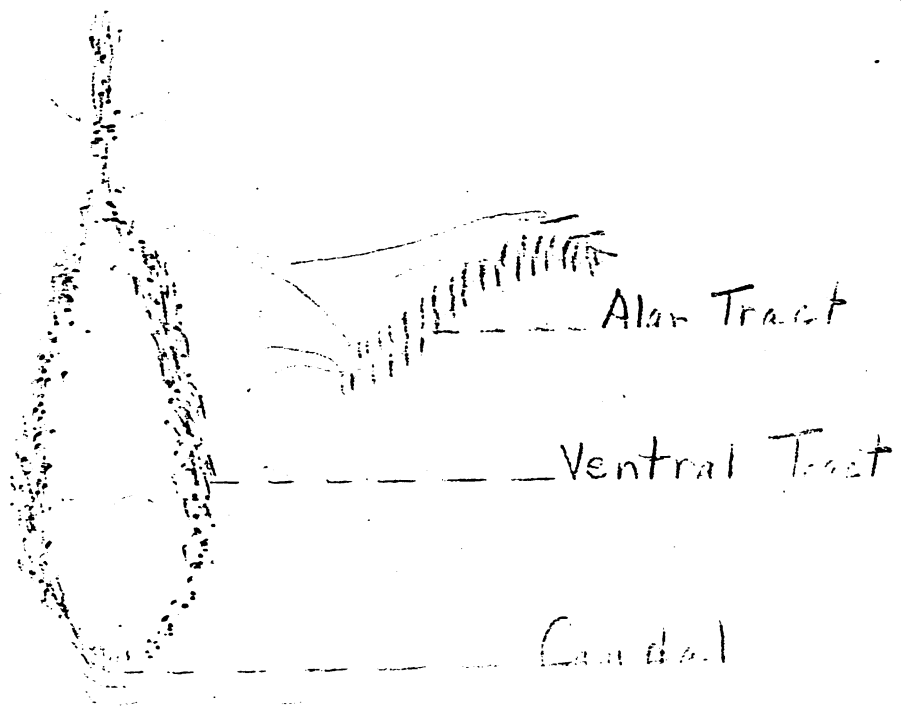


- Feather shafts
- Feather shafts with white tip
- Down

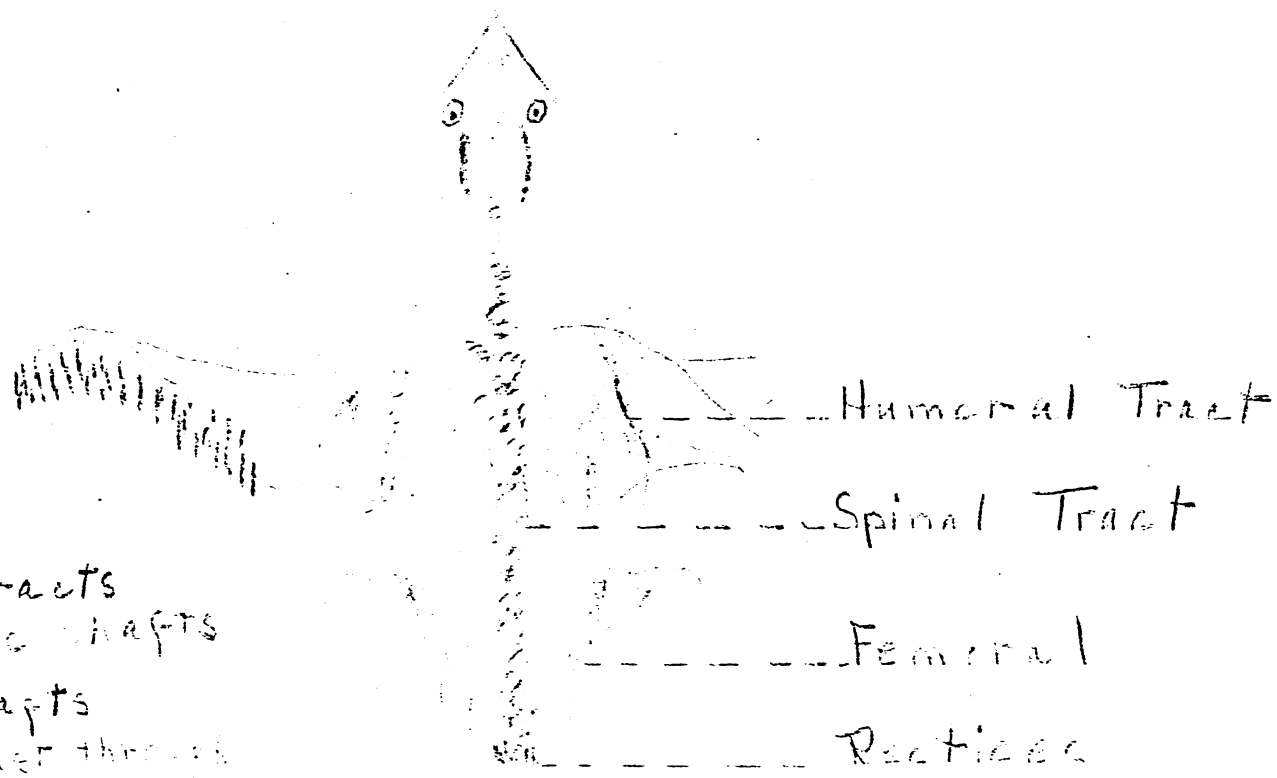
Feathers - Tracts of Young Cedar Waxwing

2th Day

Ventral



Dorsal



- Down
- Feather tracts with white shafts
- Feather shafts
- Rectrices just through skin

Summary

Cedar waxwings build nests which are completed in a week. Both the male and female carry the material, but the female does most of the building.

The territory is a small one, usually the tree where the nest is located. They feed with other pairs in trees very close to the nest.

The cedar waxwing lays from three to five putty colored eggs which are marked with brown, black, and purple splotches and lines at the rounded end. An egg is laid each day beginning the day after the nest is completed.

The female waxwing does the incubating. She is occasionally fed by the male but more often the male comes to the nest and the pair leave together to feed. During the incubation period the female is not easily disturbed.

Activities of the female at the nest:

- (1) Enters and leaves the nest from the southwest.
- (2) Sits with her back to the sun unless there is a wind.
- (3) Turns with the sun.
- (4) Faces the wind.
- (5) Holds her beak straight up when it rains.
- (6) Pants and stands in nest when the weather is hot.

The young are hatched naked and blind. The shafts for the feathers cannot be seen until the second day. The down begins to show on the spinal tract the third day. The shafts of the primaries and secondaries push through skin on the fourth day, but the feather does not appear until the eighth day. The rectrices with a small band of yellow show the fifth day. The

body is covered with down, except the ventral apertures which is bare, on the ninth day. In two weeks the young cedar waxwing is completely covered with juvenal plumage.

The young cedar waxwing begins to show signs of activity soon after hatching by stretching the neck and opening the mouth. During the first week they stand in the nest, preen feathers (down), and stretch their legs, neck, and wings. During the remaining five days they are in the nest, their toes grasp the lining of the nest, they move about more freely. On the twelfth day the young leave the nest. They remain close to the nest but do not return to it. The young are fed by the adult at least the first day after they leave the nest.

Bibliography

1. James E. Crouch - The Study of the Nesting Habits of Cedar Waxwings, The Auk, 1936.
2. Frank M. Chapman - Birds of Eastern North America
3. Edward H. Farbush - Birds of Massachusetts and other New England States
4. F. H. Herrick - Wild Birds at Home
5. Katherine C. Post - The Cedar Waxwing during July and August 1916. Wilson Bulletin 97; December 1916.
6. Thomas S. Roberts - The Birds of Minnesota