

A NESTING STUDY  
of the  
Black-billed Cuckoo-- (*Coccyzus erythrophthalmus*)  
University Michigan Biological Station  
Cheboygan, Michigan  
July 1937  
Wm. H. Elder

### Nesting Sight and Location

As Stoner (1) and others assert cuckoos, in my experience also, prefer dense thickets in lowlands, but around the Biological Station seem equally fond of high ground. It was in such a location, in a Red Pine on the south slope of the hill south of the station, that the nest subject of these observations was located. Chapman (2) and others report the nests as located from 2-10 feet above the ground, and occasionally (Forbush) (3) on the ground, but I found no recorded nest approaching the height of this one--17 feet above the ground. It was saddled on a large limb at the junction of a smaller one, about 3 feet from the trunk, and sparsely protected on all sides by bunches of the pine's needles.

### Nesting Material

The nest was a flat, saucer--shaped structure, six inches in greatest diameter and constructed mainly of good sized twigs, loosely put together and sticking out roughly from all sides. This was lined with dried Bracken tops and this in turn with grass, ornamented with a few dry catkins. This is the ordinary run of materials listed by Roberts (4)--no pine needles being used tho plenty were available beneath the nesting tree.

### Eggs

The securing of measurements on these eggs did not seem to warrant the hazard to them which removal from this tree would have necessitated. Plenty of such data are now available. The clutch may vary from 2-8 (Forbush) (3) but this nest contained three eggs, <sup>two</sup> when first observed, July 10, the third being layed on

the 13th. This is in keeping with the three-day interval recorded by Stoner (1). One was unusual in having a black blotch a centimeter square.

Kumlein (5), Forbush (3), and Roberts (4) give many records of cuckoo eggs found in the nests of other species. While it has been postulated that is the same parasitic habit as its European cousin manifests Barrows (6) points out that several other species, such as the Robin, transgress as often as do the cuckoos. He further points out that the fact that cuckoos seem as unpopular as crows is due to their accipiterine build, color and flight and not to their egg stealing activities as reported only long ago by Audubon and Wilson. To check this I kept a record of some 23 species of birds that chanced into this nest territory, including Robins and Purple Finches and Cedar-Waxwings that came to feed on the Amalanchier berries not ten feet from the nest, but never saw any inter-species enmity of any kind.

#### Incubation

Incubation was already begun when the nest was first visited and contained but two eggs. The fact that incubation starts as soon as the first egg is layed (Stoner) (1) plus the spacing of the layings three days apart as already mentioned, accounts for the presence of eggs and well grown young in the same nest as so well shown by Herrick's<sup>(7)</sup> photographs.

An attempt to ink-mark the female was unsuccessful. The male returned first, paused on the side of the nest, and soon settled on the eggs. When the female returned he got up unmarked. But she was not as trusting, peered at the string and at once started gathering it in her bill. Since it was nearly fourteen inches long,

and ten inches of it being soaked in India ink and lying around inside the nest, it took her eight minutes to get the whole thing into her mouth. She then flapped clumsily off the nest and flew off with the string, returning in five minutes to continue brooding. Behavior differences, however, soon made it easy to separate the two sexes: the female brooded much closer, being much more difficult to flush, did most of the brooding, and called differently.

Orientation on the nest did not correlate with the position of the sun, weather, or sex of the bird brooding but usually was parallel to the limb supporting the nest--thus the long tail extending in one direction and the long bill and neck in the other made the bird very inconspicuous against the limb. This position might be toward the trunk or toward the periphery of the tree, and occasionally toward the blind.

Positions in brooding were several and very distinct. Regardless of the orientation both birds usually brooded with the tail held horizontal and the head erect, with bill at a sharp angle, which went straight up as one drew nearer in climbing the nesting tree. During a heavy rain the brooding female settled much deeper in the nest so that her tail was in a vertical position. While watching all night a new posture was observed in which the female kept her head low and horizontal. Once, while brooding over the young, the female drooped her wings onto the sides of the nest for nearly an hour.

Both sexes take part regularly in nest duties. The male called from a favorite nearby tree, the female answered with

several low kuk-kuk-kuks and slipped quietly off to be quickly replaced by the male. She was gone from 15-25 minutes, presumably to feed, before again relieving her spouse. Occasionally the frog-like exchange signals continued until the male came within three feet--when the exchange was made. Rarely, the female would respond to the male's call and they would go off together to feed for half an hour. On returning both birds had the same way of getting onto the nest, alighting on the limb within a few inches of the nest and clambering up onto it, brooding in the same direction without ever reversing.

The incubation period for both the Black and Yellow-billed Cuckoos is invariably given as 14 days, but Bergtold (8) has only three observers on which to base his period for the Black-billed Cuckoo. The third young hatched in the nest I had under observation, on July 20th--just seven days after the third egg was laid. Bergtold (8) states, "The true and specific length of incubation is a deep seated, inelastic, and persistently unchanging character." Evidently this exceedingly brief period of but seven days was due to an abnormal retention of the egg in the oviduct, thus taking the place of the first days of incubation normally spent in the nest.

#### Hatching and Succeeding Body Changes

No actual emergence from the egg was observed but full measurements were made before 24 hours had elapsed. The young were naked, except for rudimentary white down one centimeter long which was arranged along the future feather tracts and stood out contrastingly against the tough shiny black leathery skin. The young certainly lived up to its reputation as "Americas most

precocial altricial," (Herrick) (7) giving its food call continually, quickly righting itself when turned on its back, and hanging from my finger by one foot--perhaps the zygodactylous feet make this possible. It was so active I kept it on the pan of the balance with some difficulty.

On the third day the black feather sheaths of the juvenal plumage came out on the head and tail, pushing the still unfolded white rudimentary down before them; so each black sheath bore at its tip a little white strip. On the fifth day the sheaths of the tertiaries and under tail coverts appeared. By the seventh day all sheaths were present, and the next day a half dozen on each side of the neck had split off and the light juvenal plumage feathers were unfolding. This is in contradistinction to Herrick's (7) observation which showed these to appear last, all the rest being accessible to the bill and therefore removed first. When the last of the young was found dead on the tenth day these sheaths, with their white down hair, were easily brushed off.

Growth rate changes are best shown graphically, from which the following conclusions seem justified:

1. Body weight (Chart 1) rises steeply and evenly at the average increment of four grams per day until the two older young were about to leave the nest at which time we see a sharp levelling off in the curve. Concurrently the toe, wing, and mouth (bill-gape), as shown in Charts 3 and 4, curves break at the same time. This possibly indicates a physiological slowing up, due to insufficient food as the ensuing death makes more obvious. Herrick (7) says the interest of the parents

in the young that have already left the nest to the exclusion of the <sup>one</sup> left, is the cause of these mummified young often found by him in cuckoo nests.

2. Extent (Chart 2) rises evenly by equal daily increments.

3. The bill starts well developed and thus its growth rate (Charts 3 and 4) shows flat curves levelling off early.

4. Body length is the only curve differing radically--rising sharply at <sup>the</sup> fifth day. This can be accounted for by the shift from chubby new born form toward the elongate adult (Chart 2). It is here that the tail curve begins (Chart 3).

#### Progressive Behavior Changes

After the first young hatched the female became progressively more belligerent in her response to my climbing up to the nest, a marked change coming every day in the following order:

First day: she kept much tighter to nest, not leaving until my hand was nearly upon her. She then flew well away as usual.

Second day: again flushed off with difficulty but this time she stayed in the immediate vicinity, evidently much concerned.

Third day: she moved off only three feet from the nest and came toward me in full challenge pose--bill open, wings drooped, tail elevated and uttering vigorous kuk-kuks. The pose lasted but a few seconds when she retired to a nearby tree.

Fourth day: again uttered the new notes but this time alternated with a vigorous and audible bill clapping.

Fifth day: after slipping off just before I reached the nest limb she flew straight at my face in most violent manner possible but struck a limb not a foot from my head and was knocked hard to one side by the blow resulting from her own vigor.

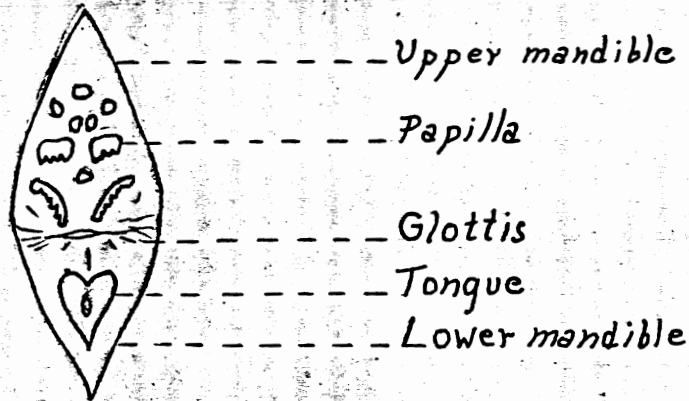
#### Care of Young and Sanitation

Both sexes share the duties of caring for the young as they shared the brooding of the eggs. The young call from the first day they hatch, even calling from beneath the brooding female long after dark. Regular brooding persists even after the last young hatches, the young seldom are left for more than a half hour. I never observed feedings more often than every twenty-five minutes but Herrick (7) found days during which feedings averaged every  $8\frac{1}{2}$  minutes. Both sexes brought food and fed the young directly, the female bringing the greater amount of food. On two occasions the male was observed bringing food, but instead of feeding the young, kept the insect in his mouth and brooded until the female returned, upon which he flew off and ate the insect himself. Once, both parent birds arrived together, each with an insect, and alighted together on the same side of the nest from which the feeding was always done. The male watched the blind with head erect as the female went thru the long task of throat feeding. In this process she thrust her bill far down into the mouth of the nestling, shaking her head as it flapped its naked wings for nearly a minute before the exchange was made. The female then



flew off and the male very quickly presented his insect by simple mouth feeding.

On the roof of the mouth of the young are a group of ten cartilaginous papillae arranged in this manner:



Herrick (7) asserts these are to aid the young in grasping the bill of the parent during throat feeding. However, I have observed this same throat feeding with its attendant difficulties in the Nighthawk, but do not know of any such papillae to aid them. Further examination of these was made impossible for maggots had eaten the roof of the mouth away before I found it after death. On the fifth day of observation of this, the smallest of the young, the largest young was gone from the nest, and while I was away weighing the littler fledgling, the second young disappeared. The two that were missing were eight and seven days old respectively. This is the age that Herrick (7) and Forbush (3) report for cuckoo young to leave--the feather sheaths splitting rapidly and the young acquiring its plumage within twelve hours, at which time it clambers from the nest to remain among nearby branches until able to fly. While some quills were beginning to break, the young--if they left by their own volition,--must have gone prior to getting their plumage. I was unable to discover them in the nearby branches,

no predators were in sight and no signs were to be found on the ground below. Neither was there any sign of either parent..... When I returned at 11:45 P. M. she was again brooding. An hour later the male called and she answered. I remained in the blind all nite observing the brooding bird every fifteen minutes by means of a powerful electric flashlight. She remained alert but did not move all nite long--so the young was not fed, even though the male apparently was active in the vicinity. Possibly the coolness of the nite had some influence, for very few Nighthawks were flying.

The next (sixth) day the nestling was left unfed in the pouring rain for two hours. His continued calls brought no response.

The seventh day being sunny she was again brooding when I arrived. On this occasion I saw her rise slightly on the nest, duck her head down and reach under to withdraw the young's fecal sack which she immediately swallowed. She remained brooding for some time, so I do not believe she was merely retaining it in her mouth. Droppings deposited by the young during the struggle to release them from the nest were always gone by the following day.

The following day it was impossible for me to visit the nest and when I returned on the next, or ninth, day of this nestling's life I found it dead, in *normal* crouched posture in the nest. No parent was in the vicinity. Very few more feathers were released from their sheaths, so I assumed that the nestling had died on the previous day. Herrick (7) reports that brooding becomes less with the hatching of the last egg; but in this nest brooding depended on the weather, for the young was left for long periods in the

rain but was brooded very closely on a sunny day after the other young had left the nest. He also asserts that the long period (3 days) between laying of each egg is fortunate and is balanced by the early leaving of the young which keeps the nest clear for the smaller nestlings; but if this usually means the abandonment of this last young to satisfy the needs of the older nestlings already having left the nest it seems a very unfortunate arrangement.

Pterylosis:

The page of sketches gives a general notion of the appearance and arrangement of the down and the feather sheaths. It is of special note that the spinal tract, branching in the scapular region as characteristic of the order, does not become complete until the sixth or seventh day.

Summary:

Generalizations from a single nest are impossible, but the following conclusions are at least suggested:

1. The Black and Yellow-billed Cuckoos are not always distinguishable by call.
2. Cuckoos are not always restricted as to habitat or height in placing their nest.
3. Both sexes share in the brooding and feeding activities. The female is the more determined, the male the more noisy.
4. The young are extremely precocious and may leave the nest long before they are able to fly.
5. The young are soon covered with down, the rudimentary down is pushed out and born upon the ends of the juvenal plumage feather sheaths.

6. Both mouth and throat feeding are commonly used.

7. The eggs are not left unattended for more than 45 minutes, the young may be left as much as the two hours, during rain.

8. The Black-billed Cuckoo is much less sensitive to sound stimuli than to visual. Neither type of stimulus from other species arouses any response.

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# Data Chart-- Black-billed Cuckoo

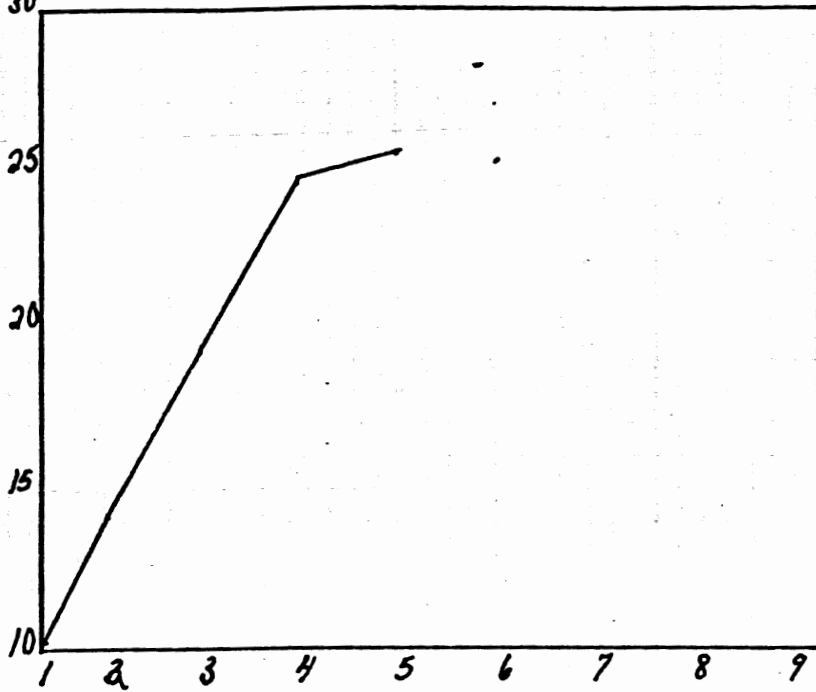
July	20	21	22	23	24	25	26	27	28	29
Weight-gr.	10.1	14.1	19.2	24.6	25.4	None Taken	107	None Taken		Bird dead for
Body length	60	68	74	80	85		107			Some Time
Tail				12	14		18		20	
Second toe	13	16	19	21	22		23		23	
Bill-to cere	9	10	11	12	13					
Bill-to eye	11.5	12.5	14.0	17.0	17.5					
Bill-gape	12.5	13.5	15.0	16.5	17.0					
Bill-nostril	4	5	6.5	7.0	7.7				9	
Eye diam.				5.0	5.0					
Extent-fleshy	60	69	80	95	105		125			
Right wing	10	12	14.5	20.0	22.0		24.0			
Primary		2	5	12	17		22		25	

↑  
First Two  
Young Left Nest

# Growth Charts

No. 1

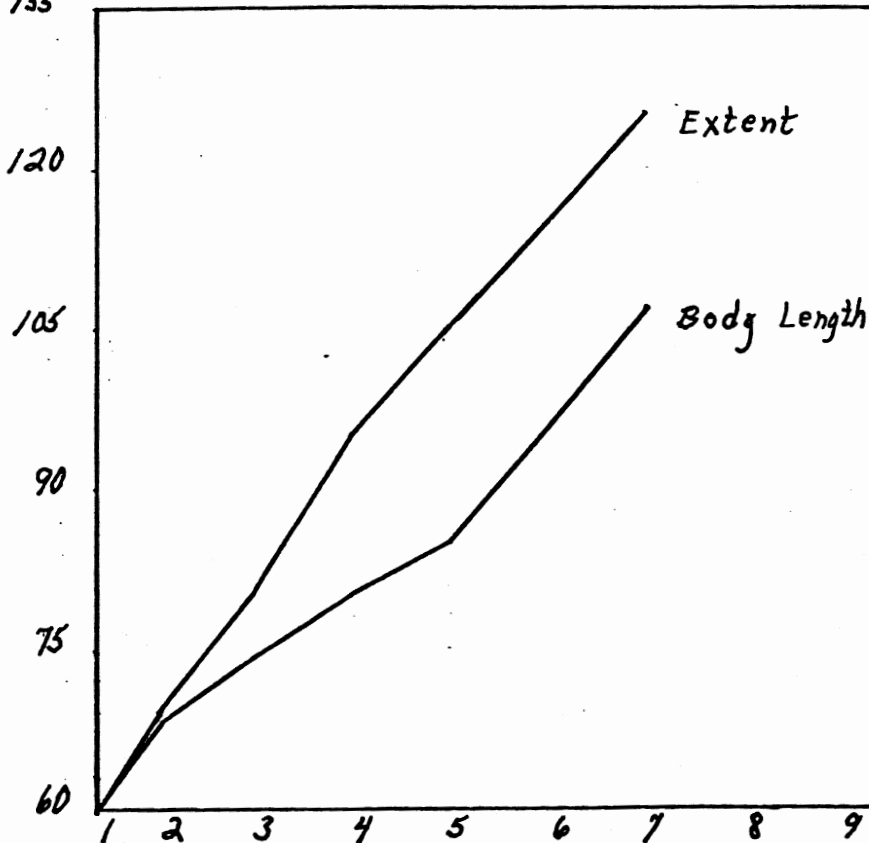
Weight  
in  
Grams



Days Old

No. 2

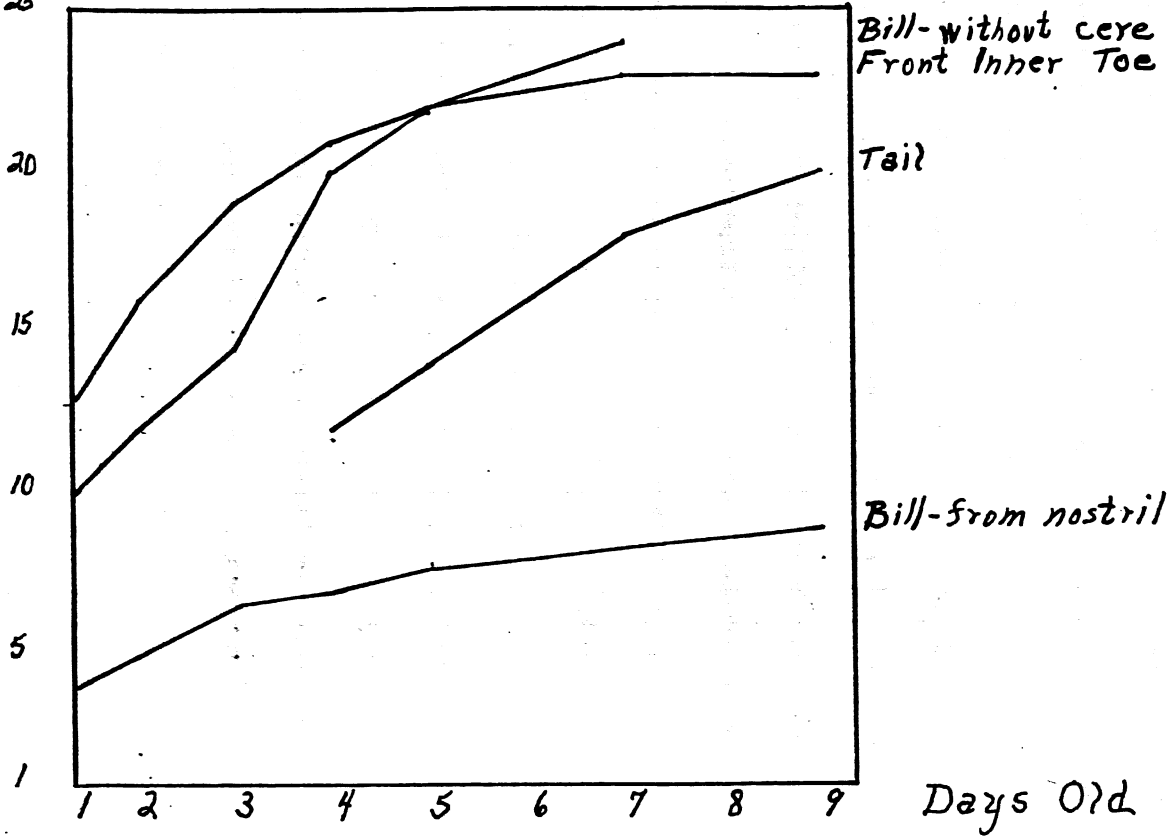
Mm. 135



Days Old

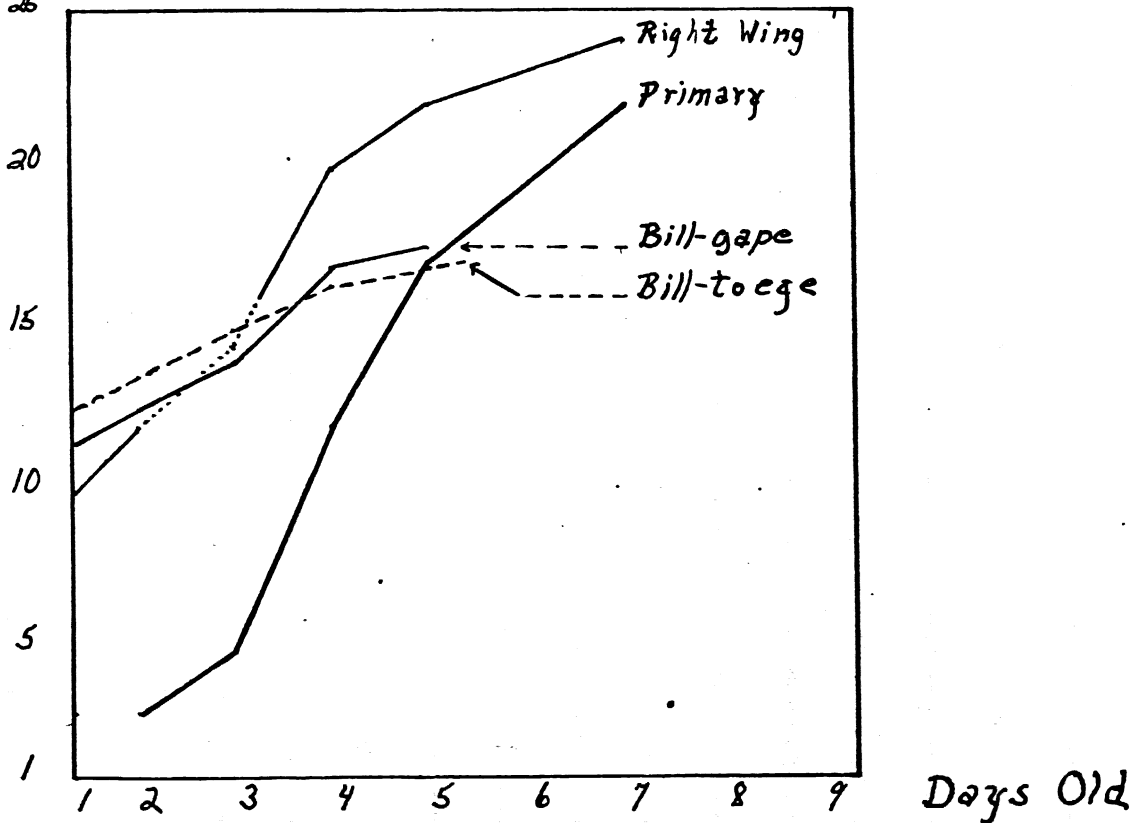
No. 3

Length 25  
in mm.



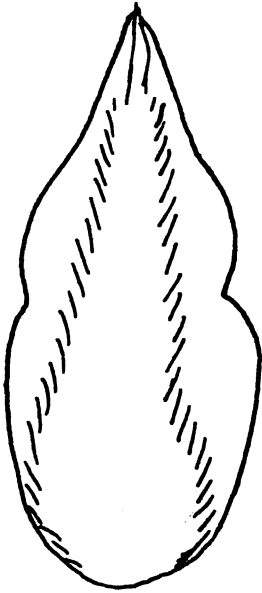
No. 4

Length 26  
in mm.

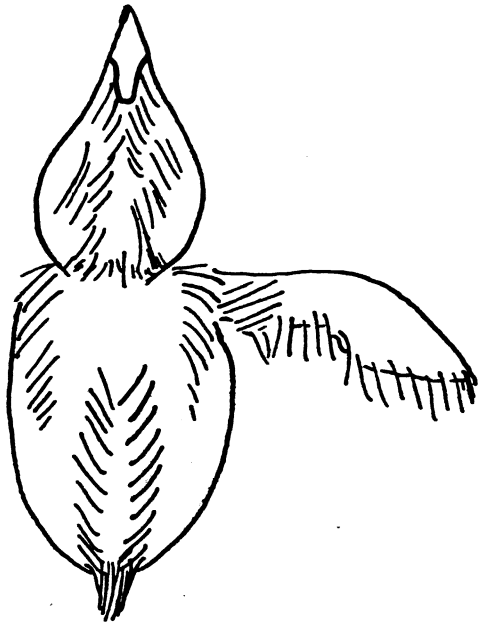




# PTERYLOSIS

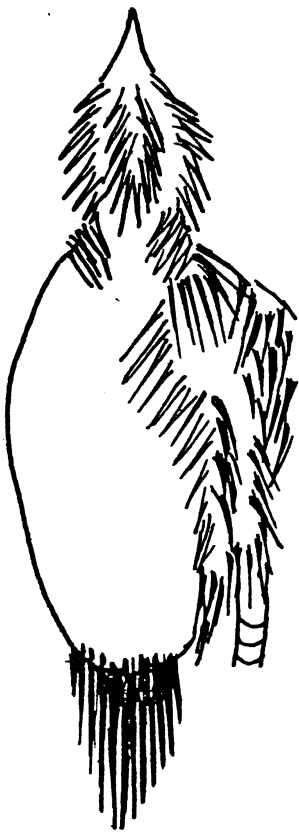


Ventral view

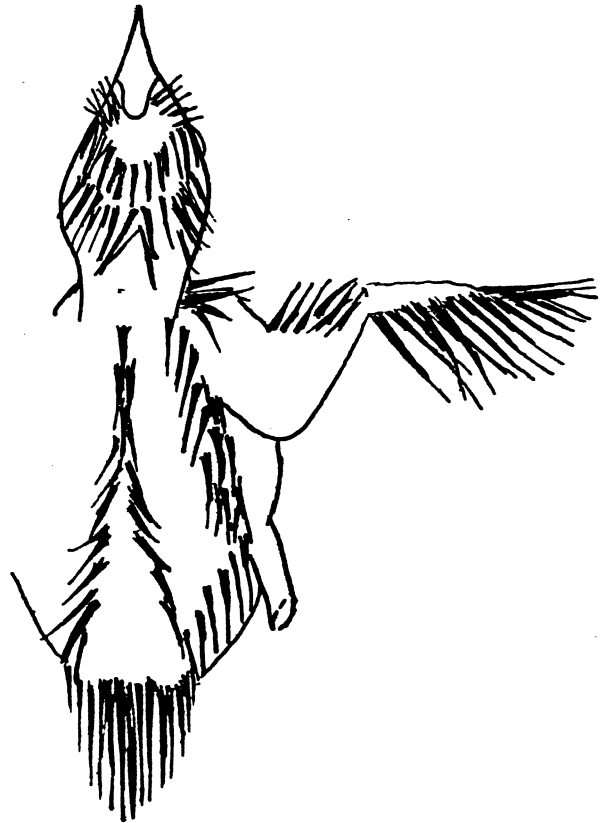


Dorsal view

Three Days Old



Ventral view



Dorsal view

Eight Days Old