1939

LIFE HISTORY STUDY

OF THE

BLACK-BILLED CUCKOO

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LIFE HISTORY STUDY OF THE BLACK-BILLED CUCKOO

For several years the characteristic call of the cuckoo, combined with the fact that seldom was it possible to locate the producer of the sound, has held a fascination for me stimulating my interest and curiosity to learn of its habits and behavior. Altho two species of the cuckoo, the yellow-billed and the black-billed, are found in the University of Michigan Biological Station area the black-billed (Coccyzus erythropthalmus) is the more common hence the following observations were made in relation to this species during the summer session of 1939. Two nests were watched daily from the last few days of incubation thru the nest life of the young with additional data being obtained from two other nests. All observations were made from a blind which was set up approximately five feet from the nest.

The black-billed cuckoo is a slender, long-tailed bird with the grayish brown upper parts, wings, and tail showing a green gloss while the under parts are a dull white. The tail feathers are only slightly tipped with white and the black bill is decurved. They build their nests on lower branches of trees in wooded areas, in thick bushes or vines at a distance ranging from two to ten feet above the ground. The two nests studied were located in somewhat different situations- Nest I was built on the lowermost branch of white pine about ten feet high in a wooded area of other pines, aspens, and maple ranging in height from 10' - 40' and an almost complete

ground cover of Pteris. The platform nest with an inside diameter of 3½" and an inside depth of 2", was constructed of small twig pieces from wild cherry, maple, aspen and leaf stems of Pteris with pine needles and aspen leaf scraps making up the inner part. The stem of a Pteris plant growing against the pine branch upon which the nest was built served to give additional support (this was needed since the nest was 8" from the trunk) as well as screening the nest from sight. The nest was only 19" above the ground hence below the level of the Pteris foliage. Nest II was also built 19" above the ground in the angle formed by the lower branch and trunk of a young four foot aspen which was growing in an open second growth area. Both Pteris and blackberry plants were growing close to this aspen, thus affording an effective protection to both nest and birds. The bulk material of this nest was very similar to that of nest No. I but the lining consisted of Pteris leaf scraps, three small moth cocoons, lichen scraps, and very small twigs. When these nests were discovered by the accidental flushing of the incubating adult they contained four and three greenish blue eggs indistinctly "watered" in appearance.

Only a single observation period of three hours duration was made during the incubation of the eggs in nest No. I. During this time the adult left and returned to the nest just once, so no definite conclusions could be made on behavior for this period. While incubating the adult sat very quietly, turning

the head from time to time tho the eyes were moved more or less continuously. Contrary to the observation made by Herrick as recorded in his book, Wild Birds at Home, (p. 88) the position of the adult on the nest varied from time to time, however, in each case there did seem to be a favorite position which was more often assumed. The adults showed the cuculine habit of leaving and returning to the nest, that of running along the branch before flying or after alighting. Upon returning to the nest the adult turned the eggs with her bill before settling herself and while incubating moved the eggs from time to time tho there seemed to be no definite length to the intervals between turnings. The incubation period for the cuckoo is generally accepted as being fourteen days with both sexes probably sharing in the incubation. At nest I both adults were in evidence most of the time either incubating, brooding, or standing guard while at nest II never at the same time were both adults visible from the blind and only once was the second adult near - this last conclusion was based entirely upon the call. At all times the adult was definitely alert whether on the nest or nearby and seemed to sense that perhaps an enemy was within for at every unusually loud sound or disturbance she turned her head more directly towards the blind. On one occasion, a chipmunk in the nest area scampered thru the ground vegetation just in front of the blind, whereupon the adult which was on guard a few branches above the nest made a lunge at the sight opening

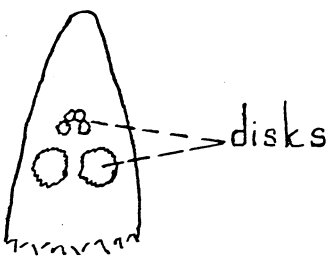
instead of down to the ground where the chipmunk had gone.

Since the laying interval of the eggs is variable, so also is the hatching interval. In Nest I the first two eggs hatched a day apart while two days elapsed before the hatching of the third egg and for some reason the fourth failed to develop. In nest II the first egg was hatched in the morning but by the end of the second day both other eggs had hatched. The skin of the cuckoo nestling was coal black, the feather tracks being sparsely covered with white thread-like hairs, the bill and feet blue-gray in color with the depth of the gape only slightly lighter. There was no appreciable color change in either bill or feet during the seven days of observation. By the third day pin feathers had made their appearance while by the sixth the young nestling was conspicuously in a "quill" or feather-tube stage. Each tube ranged in length from 17 mm. to 21 mm. with the thread-like white hairs being only a tapering tip. By the seventh day the free ends of the pin feathers on the alar, posterior part of the spinal, caudal, and ventral tracts burst, giving the nestling for the first time a somewhat fluffy juvenal plumage. Since none of the nestlings remained in the nest more than seven days, there was no opportunity to see them after all feather tubes had opened.

The weight of the one day old nestlings varied from 7.63 grams to 9.05 grams while by the seventh day the weight had increased to between 27 grams and 29.3 grams. The gain in weight was greatest during the first four days ranging from 4 to 6 grams while from the fifth thru the seventh days the

gain was only two to four grams. The proportionate weight development of the nestlings is shown by plotted curves, pp.19 +20. The decrease in daily gain was not due to change in proportionate feedings as the young were fed more often and apparently larger larvae as age increased but no doubt was due to their becoming active as well as the probable effect of fear (?) which was noted only from the fifth or sixth days. Of the six nestlings which were observed, four showed a loss in weight the last day in the nest, this loss perhaps stimulating the young to go in search of their own food.

The food of the cuckoo consisted primarily of insects. In the thirty-eight feedings observed 30 larvae of the rosy maple moth were fed, 2 luna moth larvae, and one each of the long-horned grasshopper, spider, robber fly, small noctuid moth, small smooth green larva and a yellow-green woolly larva. With each initial food trip the adult would perch on a branch for an inspection of the nest area before continuing to the nest for feeding the young, but on succeeding trips in this same period she more often flew directly to the nest. Sometimes upon approaching the nest the parent bird gave a low call whereupon the young immediately stretched their necks with open mouths displaying a so-called food target which consisted of several conspicuous snow-white disks of variable size symmetrically arranged on the palate in this manner:



The adult cuckoo carried the food crosswise in her bill and in the case of the larger larvae alighted near the nest while using her mandibles to somewhat flatten the anterior part which was put into the mouth of the nestling. When feeding the one or two day old nestling the larva was inserted far down into the throat, then held motionless for several seconds and when necessary an additional thrust was given in an effort to aid swallowing. With the older nestlings swallowing was immediate unless the food was unusually thick as was true of the luna larva, for altho the adult had used extra time and effort in preparing it for the nestling, the young tried in vain, succeeding only in swallowing the anterior half as the remainder of the body was thicker than the throat. The parent bird made two unsuccessful efforts to help before she stepped over the nest and flew away. In five minutes she returned with a robber fly which she fed to the youngest. This done, she reached into the bottom of the nest, picked up the luna larva which had been disgorged and flew away with it only to return to a nearby branch in less than two minutes where she further proceeded to soften and flatten the larva by vigorous biting with the mandibles. She then flew to the nest and fed the larva to the same nestling as before - the posterior part again caused difficulty but the combined swallowing effort of the young and the help given by the adult in three times squeezing the protruding part resulted in its finally being devoured.

The feeding intervals varied considerably and did not seem

to depend upon either the age of nestlings or the weather conditions, however, the longer the brooding time the more consecutive trips were made for food with usually not more than three minutes between trips, and often only about one to one and one half minute intervals. The brooding period was from 25 minutes to 1 hour in length with 15 to 20 minutes for feeding. As far as was observed there seemed to be no definite order for feeding the young tho more often than not the same individual was fed two and sometimes three times in rapid succession. During the observation of nest I, I noted a very definite tendency of the adult to feed larger larvae to the older nestlings and during the last three days in the nest, various sizes were still available in their feeding territory.

Following every feeding a fecal sac of variable size was voided. When a nestling was fed several times in succession the first fecal sac was large in proportion to the succeeding ones. These sacs were either carried away by the adult or eaten. In twenty-seven observations, the fecal sacs were carried away seventeen times, each time the bird flying low beneath the tops of the Pteris, while ten times the sacs were swallowed. Of these ten times the adult settled on the nest for brooding in all but three cases when she flew away again for food, which seems to indicate that the manner of fecal sac disposal is determined by the next activity of the adult, whether further feeding or brooding. By the sixth day the young nestlings made an effort to help in keeping the nest

clean - they backed to the edge of the nest before voiding the excretory sac tho the adult always picked it up and either swallowed it or carried it away.

During the first couple of days in the life of the nestling any interruption to the silence resulted in an evident food response accompanied by a sound similar to the buzzing of a bee. This buzzing sound gradually gave way to a low grating call which took on true cuckoo characteristics by the sixth or seventh day. The eyes of the cuckoo nestling were not fully open until about the third day altho they did open them from time to time on the second day. The inactivity of the first two days was broken either the third or fourth day by yawning and stretching of the wings while by the fifth day the young moved about in the nest enough to change their relative positions. On the sixth day the young picked at particles in the bottom of the nest, at each other, or at the ants crawling on the nest materials. From the first day they clung to the nest or each other when removed for weighing but from the fifth day this grasping habit was so pronounced that great care had to be taken in order to keep them from pulling apart the loosely constructed nest. About the same time (fifth day) the climbing instinct was evident as an attempt was made to climb the scale support or to climb out of the nest along any upright branch when put back. The fifth day appeared to be a crucial time in the nest life of the cuckoo for it was at this time that fear manifested itself, in loud calls, in try-

ing to escape being taken from the nest, and in voiding a brown sticky excreta rather than that enclosed normally within a sac each time it was nervously unsettled before weighing. The only times this type of waste was voided by the nestlings in either nest was following unusual disturbances and was given off when an attempt was made to release their firm grasp on the nest materials. From the fifth to the sixth day there was a proportionate rapid growth of the tail and third primary, each elongating from four to six millimeters whereas previous to that age, one to three millimeters was the average growth. It was at the conclusion of this rapid elongation that the ends of the feather tubes began to open thus producing the juvenal plumage. In general the bill growth was gradual and steady, elongating on an average of 2 mm. a day. The growth curves pp.21-23 will more definitely show the afore mentioned variations.

All of the nestlings in the two nests observed left after the seventh day when only the tips of the feathers had been unsheathed. Altho according to Herrick the process is completed in about twelve hours. In nest I on the seventh day the oldest nestling was the second one weighed. When I returned to the nest with the third nestling the oldest had climbed out on the supporting branch. I loosened its grasp and put it back. This was no sooner done than it ran out of the nest again to the end of the supporting limb where it lost its balance and while hanging by its toes gave loud cuckoo-like calls that brot the parent bird from its watching

perch on a nearby tree. As the adult cuckoo flew near the nestling lost its hold, whereupon the parent bird turned and flew directly towards me while vigorously clacking her bill and giving a mewing sound that was definitely cat-like. Since I stood motionless she soon turned and flew towards her young giving a low soothing cuckoo call but the nestling continued to run in an effort to escape. After watching these actions for several minutes, I caught the young and once more returned it to the nest holding my hand over it while it quieted down but just as soon as my hand was removed the nestling again ran along the branch and dropped to the ground. Once more I returned it to the nest where it remained quietly for only a few minutes. When I left the area the nestling was standing in a climbing position on the supporting Pteris stem and nest edge while the adult cuckoo was just a couple branches above giving her call in a soft coaxing tone. The next day when I returned to weigh and measure the nestlings this one was not found anywhere in the nest area. This was also true of all succeeding departures as in no case was any of the young birds found in the nest area even tho I returned several times to check.

Some effort was made to determine the size of both the nesting and feeding territories of the cuckoos studied but the shyness and elusiveness of the birds prevented, however it seemed quite definite that the feeding area for nest I was smaller than for nest II. In the former case the entire diet

consisted of the rosy maple moth larva which was in great abundance on two small red maple clumps about twenty feet from the nest while in the area around nest II there was no evidence of any insect infestation which probably accounted for the varied diet and a possible larger territory covered in search of food material.

That the nesting areas of these cuckoos were scenes of continuous activity is shown by the following daily record which was made on nest I July 13, 1939.

A. M.

8:00 – Adult bird brooding – air heavy due to an approaching storm

8:20 – Second adult came carrying small brown moth and alighted on branch of nearby tree

8:22 – Brooding adult left nest, perching on branch above nest – young remained quiet

8:23 – 2nd adult ate moth he had brot – at end of 7 min. flew away

8:32–8:32 – Brooding adult by series of moves from branch to branch encircled three fourths of nest area

8:34 – 2nd adult again appeared with food – this time a rosy maple moth larve which he proceeded to swallow soon after alighting on a branch. Remained 15 min. on same branch quietly watching between periods of preening feathers

8:38 – Brooding adult left nest area

A. M.

8:50 - Returned but without food

8:52 - 2nd adult left while brooding adult was perched on limb above nest

8:56 - Brooding adult again flew away

9:09 - One adult returned and descending by several branches took position on nest as the approaching storm became more evident by almost continuous thunder

9:12 - 2nd adult returned, alighted on dead limb a few feet above nest and gave the cuckoo call several times in low reassuring tones - brooding adult gave no external evidence of hearing

9:15 - Brooding adult stood up in nest - two of young immediately extended heads with opened mouths ready for food. Adult used bill to push them deeper into nest then resumed brooding position

9:45 - Adult which had been practically motionless as sentinel on nearby limb left nest area

10:10 - Brooding adult lifted body just enough to permit restless nestlings to move

10:12 - Again settled down in brooding position

10:17 - Storm broke - as it did so adult noticeably sank deeper with wings over edge of nest, tail lowered, head was elevated so bill pointed almost toward zenith

10:30 - Storm over tho leaves dripped heavily but only change brooding adult made in her position was to lower head. From time to time water could be seen dropping from feathers of tail and wings.

A. M.

11:09 - Turned head slowly from side to side as nest area was checked then twice lifted wings slightly before walking out on nest supporting branch and taking flight.

11:17 - Back with green larva, alighted on same branch and after looking about for several seconds ran down to the nest edge where all 3 young were clamouring for food. Fed nearest nestling and immediately reached for large fecal sac as it was passed, then flew away below Pteris foliage.

11:37 - Back with another green larva - went immediately to nest and fed same nestling as before. Took fecal sac and flew away.

11:39 - Back with third green larva - descended to nest by three branches on opposite side of nest than other two times. Larva placed in open mouth of youngest - adult held head motionless for 3 seconds then moved larva slightly and again held motionless for 5 seconds before the swallowing response came. Reached for fecal sac and flew away.

11:40 - Returned with green larva, went directly to nest and fed same nestling which this time swallowed the larva without delay. Picked up and swallowed the small fecal sac voided then stepped on to the nest while spreading wings to cover nestlings and with bill pushed the remaining egg under her body.

11:45 - Readjusted position on nest

A. M.

11:50 - Still in same brooding position as I left the blind.

P. M.

12:50 - The air was clear and sun was shining. Adult still in same brooding position.

12:57 - Adult left nest uttering a low call as she did so - stayed on nearby branches preening feathers and giving call from time to time. Nestlings did some moving about which consisted primarily of moving the head from nest edge to back of other nestlings.

1:05 - Adult left nest area

1:17 - Back with green larva - looked over area from near-by limb before descending to nest. Young produced a buzzing sound as they stretched opened mouths for food.

1:18 - Larva fed - fecal sac swallowed by adult after which she took position on nest.

1:50 - Left nest perched on limb and gave low call

1:53 - 2nd adult came with green larva and alighted within few inches of brooding adult who soon flew to another limb. Adult with larva swallowed it then wiped beak on branch - brooding adult flew out of sight.

2:08 - Adult back with green larva but remained on branch near nest 14 min. before descending to feed young, 2nd adult in meantime had flown away. After feeding, fecal sac was taken and carried away by adult.

P. M.

2:10 - Back with green larva, went directly to nest and fed same nestling - adult remained standing on nest edge 8 or 10 seconds before again taking brooding position.

2:50 - Left nest by running to end of supporting branch then taking wing. 2nd adult near giving call.

2:58 - Returned with same kind of green larva as all previous feedings, promptly fed to young, fecal sac carried away as adult again left nest.

3:00 - Back with another larva - fed - left nest.

3:03 - Back again with a larger larva - moved larva in bill several times then fed it to youngest nestling. A very delayed swallowing response as 14-16 seconds passed before the nestling succeeded in swallowing the large larva. Swallowed fecal sac which was passed before taking position on nest. Seven minutes passed before adult appeared settled. 2nd adult left nest area after brooding adult was quiet.

3:40 - Adult left nest and area as 2nd one came with larva which he swallowed however.

3:50 - Back with larva - descended at once to nest and fed one of older nestlings. Swallowed fecal sac before taking position on nest.

3:55 - Restless young caused adult to lift body several times to give them more freedom of movement.

4:35 - Adult left nest - young clamoured for food then continued to yawn and move about in the nest.

P. M.

4:30 - Returned with larva which was fed to youngest but no swallowing response came so larva withdrawn and fed to older nestling. Took fecal sac and flew away.

4:34 - Another larva brot - fed to oldest.

4:36 - Back with larva which adult fed to youngest and altho there was delay in the swallowing process the adult held a motionless position until young was fed. Flew away with fecal sac.

4:39 - The larva brot this time was fed to oldest and as soon as fecal sac was passed adult flew away and had not returned to the nest area when I left to get scales for weighing the nestlings, altho the guarding adult was in a nearby tree.

Conclusion

Such a life history study as this even with all its incompleteness has opened to me a whole new phase of bird life, a phase which held new thrills and gave an insight into a world of endless activity. This study consisted primarily in the observation of normal and well-ordered instinctive behavior interpreted and explained, in so far as possible, from a human standpoint. As I noted the faithfulness, courage, and persistence of the cuckoos in the face of both hazards and difficulties my admiration for members of the bird world increased daily.

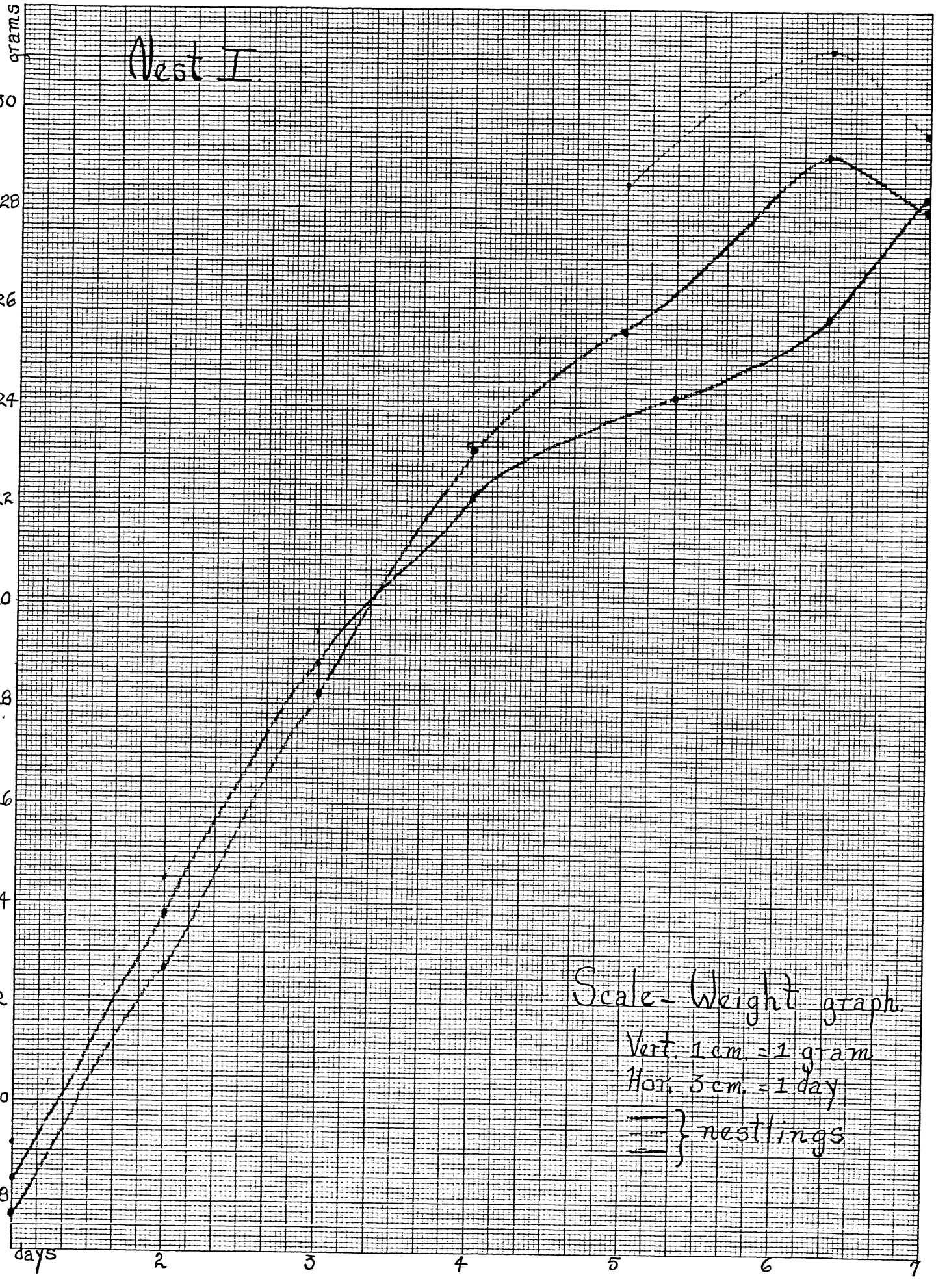
According to Dr. Allen the blind has made possible an

intimate insight into the life and character of a bird which otherwise would remain a mystery. One has only to sit quietly within such a blind for a short time to have proof for the truth of this statement. In the course of this summer's observations I have learned something of the habits and watched a few of the life experiences of the cuckoo but realize more than ever how many phases of its life are still unknown and realizing this, look forward to continuing my study.

COMPILED DATA

ON

CUCKOO NESTS AND YOUNG



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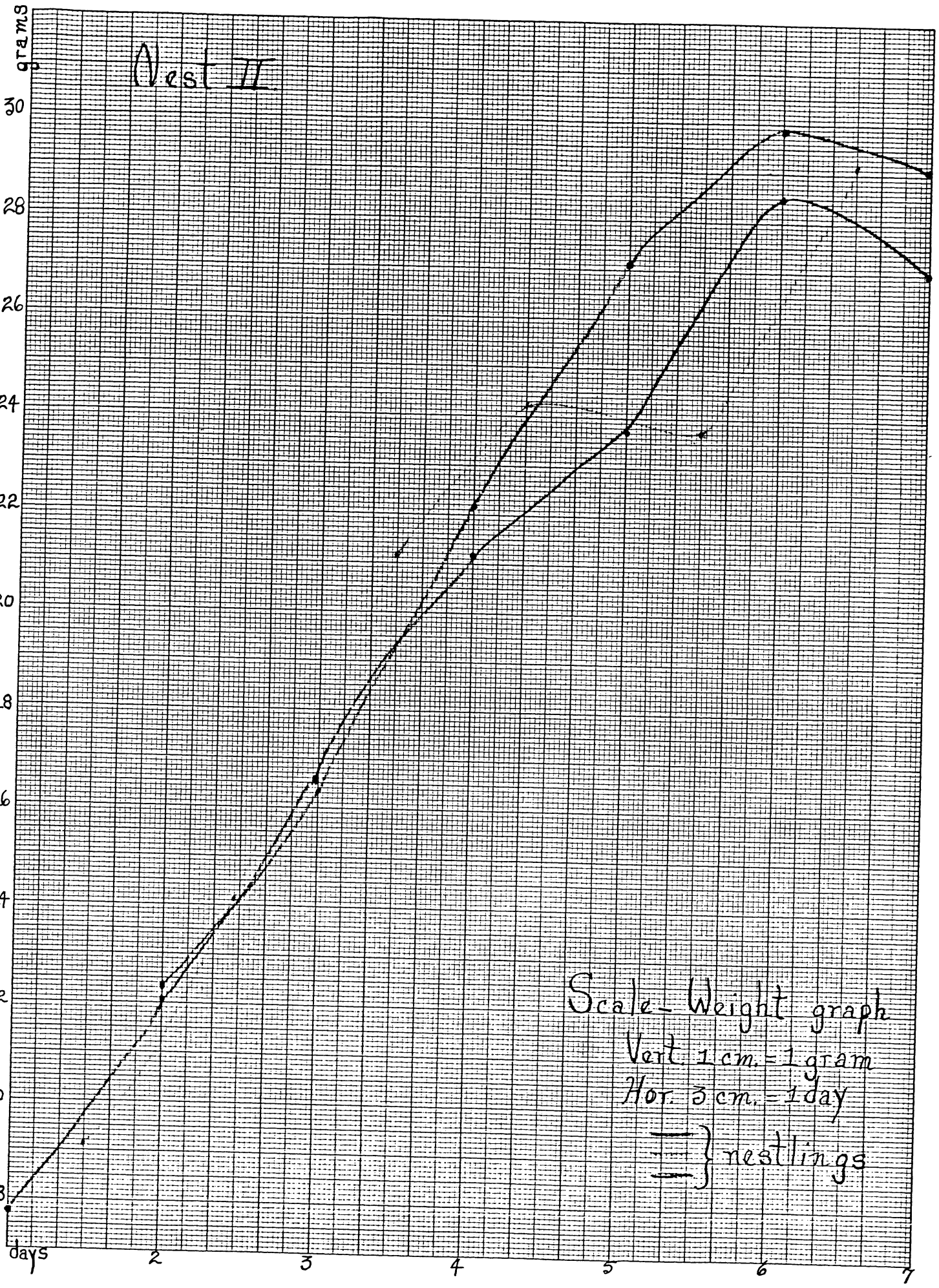

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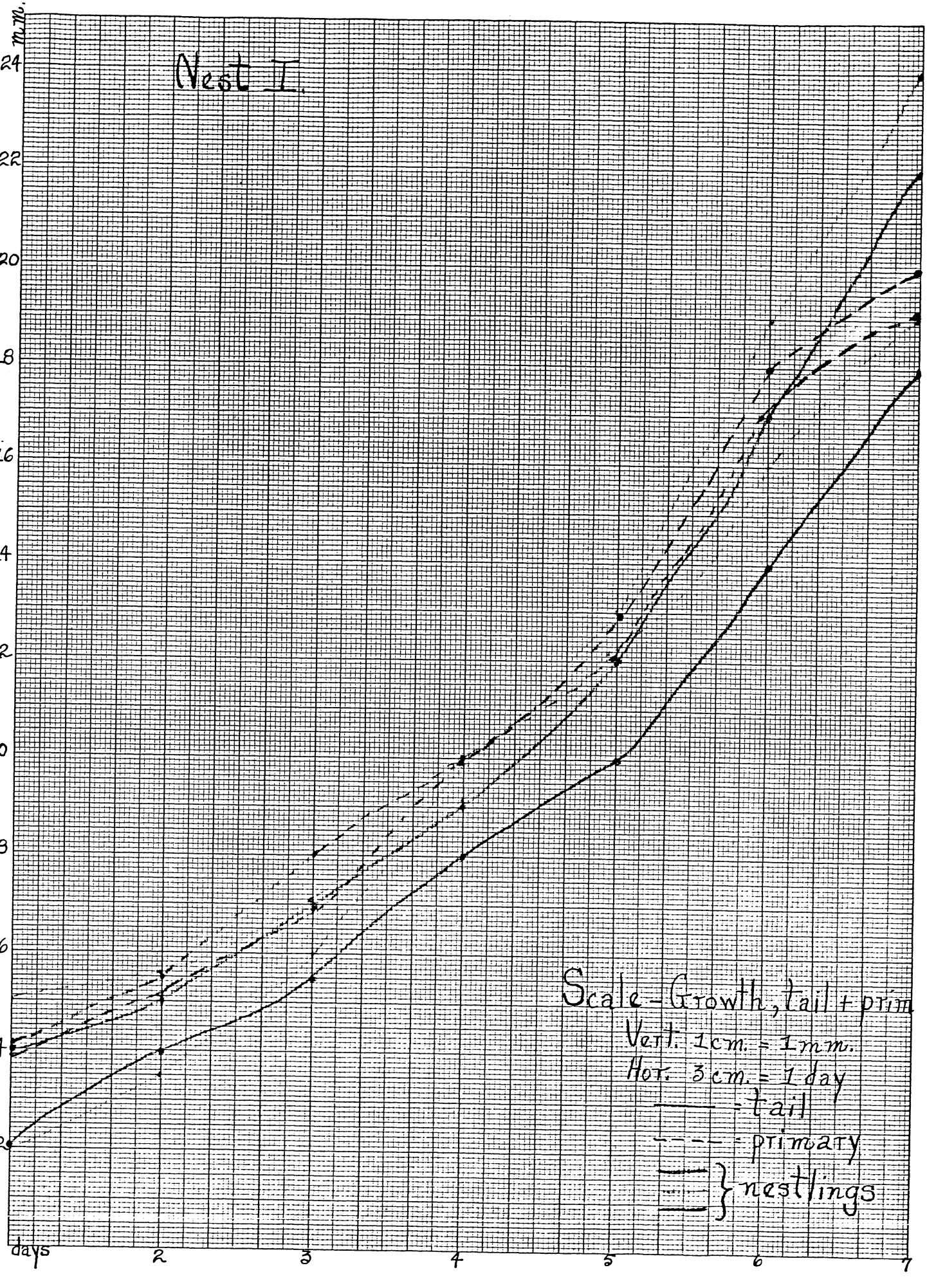

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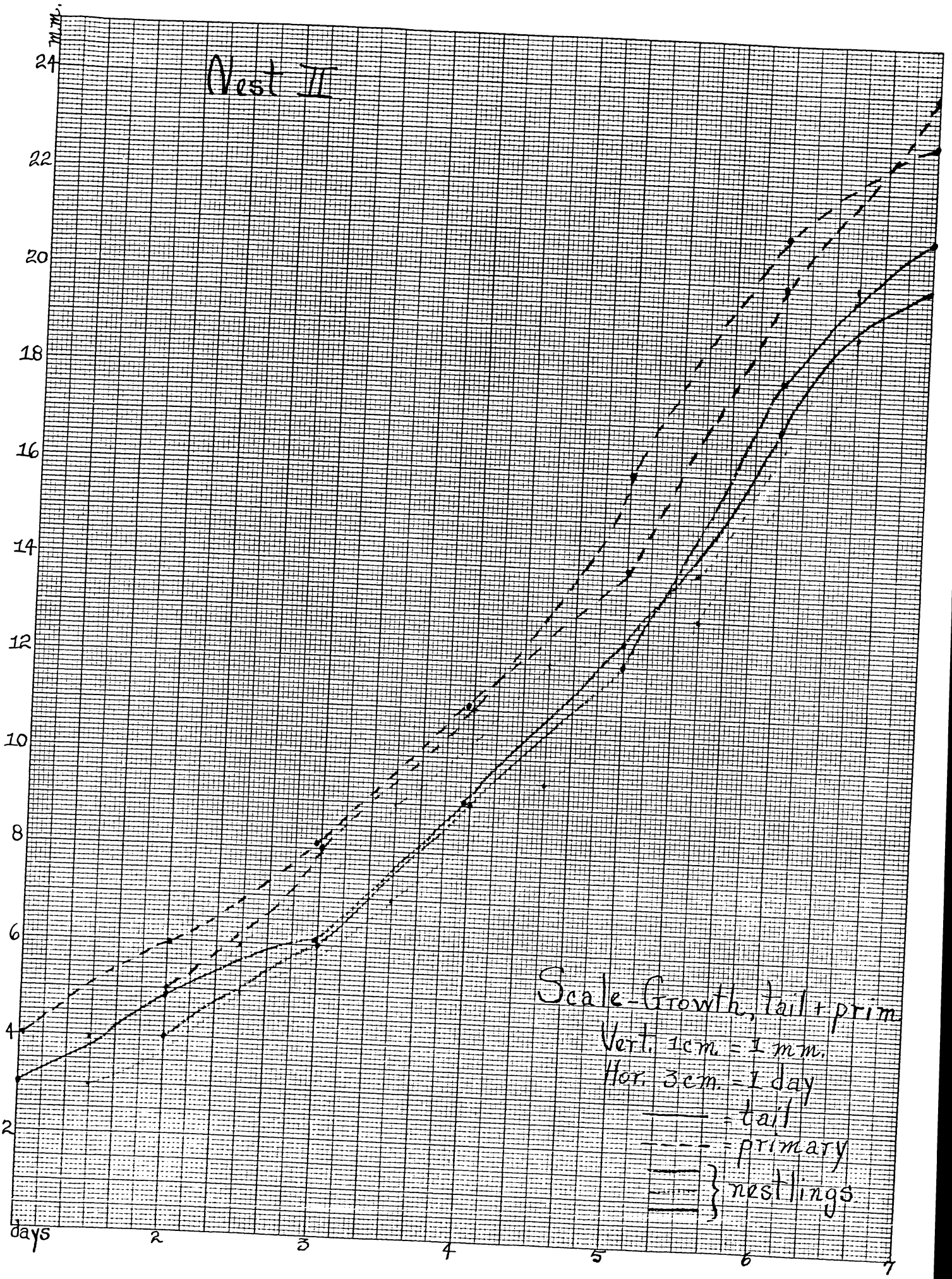

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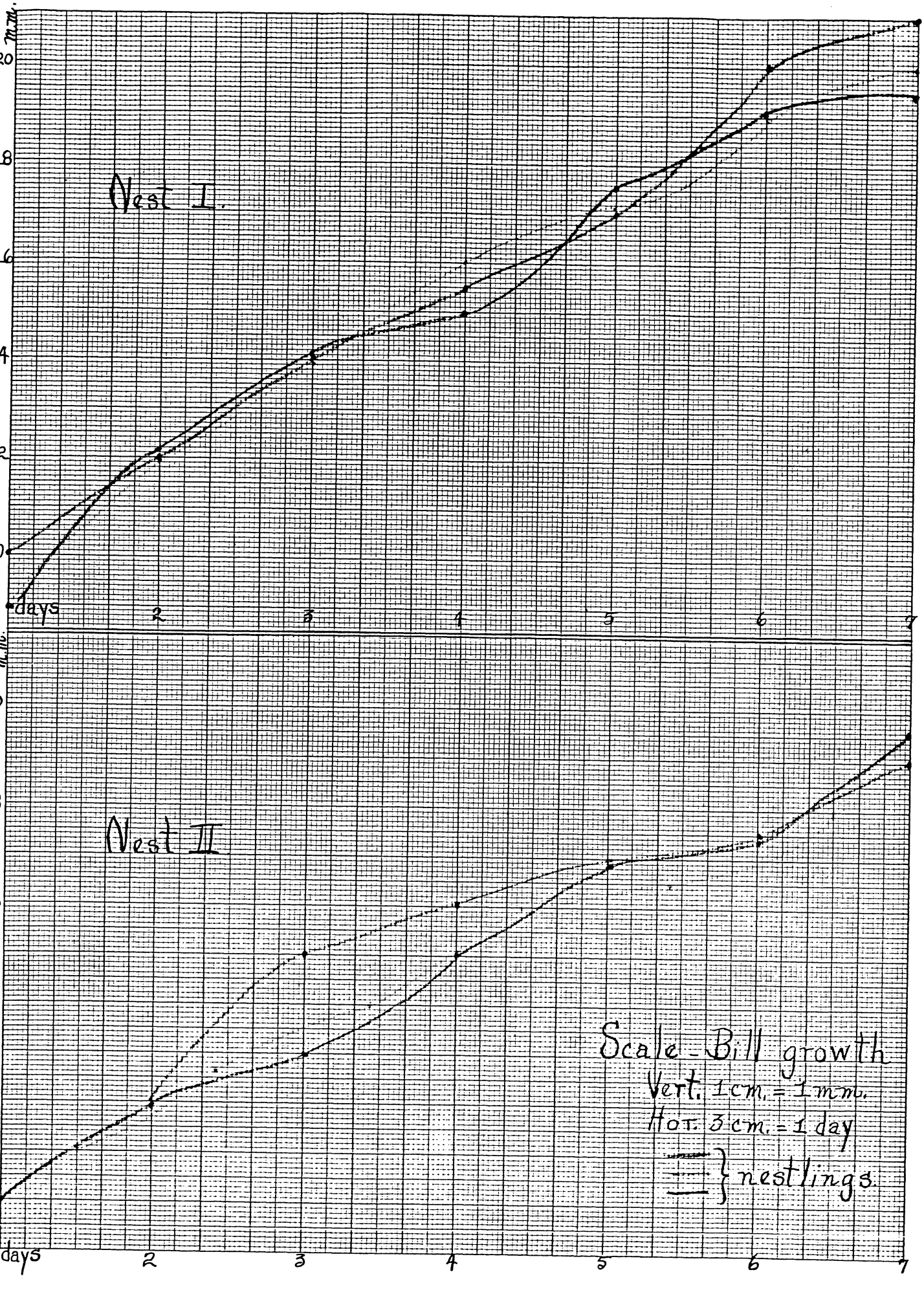

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Notes !

DATA ON CUCKOO NESTS

NEST I - Habitat - wooded area

Site of nest - lower branch of white pine 19" above ground

Materials:

Inside - pine needles with few scraps dead aspen leaves

Bulk - small twigs cherry, maple, and leaf stems of Pteris

Measurements:

Diameter - Outside $5\frac{1}{2}$" Inside $3\frac{1}{4}$"

Depth - Outside $1\frac{1}{2}$" Inside $\frac{3}{4}$"

Eggs - 4, greenish blue

NEST II - Habitat - open 2nd growth aspen area

Site of nest - angle of lower branch of small aspen $19\frac{1}{2}$" above ground

Materials:

Inside - scraps of Pteris leaves, old moth cocoons, lichen scraps

Bulk - small twigs, maple, cherry, and aspen

Measurements:

Diameter - Outside 6" Inside $3\frac{1}{2}$"

Depth - Outside 4" Inside $\frac{3}{4}$"

Eggs - 3, greenish blue

NEST III - Habitat - swamp thicket

Site of nest - between stems in red osier clump, 30" high

Materials:

Inside - remains of pistillate willow flowers

Bulk - small branches and twigs

Measurements:

Diameter - Outside 5" Inside 2½"

Depth - Outside 3½" Inside ¾"

Eggs - 2

NEST IV - Habitat - grassland at edge of woods

Site of nest - in clump of raspberry stems 12" above ground

Materials:

Inside - twigs and scraps of dead leaves

Outside - small branch pieces of nearby trees

Measurements:

Diameter - Outside 5½" Inside 3"

Depth - Outside Inside

Eggs - 4

DATA ON NESTLINGS - NEST I

Red	1st day	2nd	3rd	4th	5th	6th	7th
Wt. (gms.)	7.65	12.67	18.36	23.22	25.42	29.19	28
Tail (mm.)	4	5.1	7	9	12	17	22
Bill (mm.)	10	12	14	15.5	17	20	21
3rd Prim. (mm.)	4	5.5	8	10	12	17	19
Green							
Wt. (gms.)	9.05	14.45	19.51	23.28	28.49	31.36	29.6
Tail (mm.)	2	3.5	6	10	13	19	24
Bill (mm.)	9	12	14	16	17	19	20
3rd. Prim. (mm.)	5	5.5	7	9	12	16	19
Black							
Wt. (gms.)	8.44	13.67	18.75	22.27	24.26	25.92	28.36
Tail (mm.)	2	4	5.8	8	10	14	18
Bill (mm.)	9	12.3	14	15	17.5	19	19.5
3rd Prim. (mm.)	4	5.2	7	10	13	18	20

DATA ON NESTLINGS - NEST II

Red	1st day	2nd	3rd	4th	5th	6th	7th
Wt. (gms.)		12.	16.36	22.6	27.35	29.97	29.33
Tail (mm.)		4	6	9	12	18	21
Bill (mm.)		12	15	16	17	17.5	19
3rd Prim. (mm.)		5	8	11	16	21	23

Green	1st day	2nd	3rd	4th	5th	6th	7th
Wt. (gms.)	9.03	14.06	21.34	24.22	23.72	29.09	
Tail (mm.)	3	5	7	9.5	13	19	
Bill (mm.)	11	12.5	14	16	16.5	18	
3rd Prim. (mm.)	4	6	9	12	14	20	
Black							
Wt. (gms.)	7.63	12.02	16.64	21.37	23.62	28.62	27
Tail (mm.)	3	5	6	9	12.5	17	20
Bill (mm.)	10	12	13	15	17	17.5	19.5
3rd Prim. (mm.)	4	6	8	11	14	20	24

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