A NESTING OF THE MYRTLE WARBLER

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INTRODUCTION

Scope and Purposes

The purpose of this study was to establish through this observer's eyes those parts of the life cycle of the bird under consideration from mating through the raising of the young. The scope, unfortunately, fell short of this lofty purpose for it embraced but a portion of the objective and that portion in incomplete detail. The investigation concerned the Myrtle Warbler, Dendroica coronata coronata, and was conducted within the grounds of the University of Michigan Biological Station, Cheboygan County, Michigan. The birds were under observation from June 24 to July 19, 1949 for the greater part of the daylight hours of almost every day. It should be here recorded, however, that seven days of this period were devoted to the discouraging task of merely finding the birds, while the remaining time consisted of either watching an empty nest or a female bird passively engaged in sitting on that nest. Thus it would be both presumptuous and unnecessary to analyze graphically and statistically the actual number of hours involved in what was eventually an unsuccessful undertaking, nor would such a tabulation provide anything more than a dangerous overemphasis of unprofitably occupied time. Nevertheless I have appended two graphs to illustrate a striking detail already abundantly described by numerous other investigators.

Methods of Study

No special methods of study were involved. Following the classical method of bird watching my tools included a notebook

and field glasses, and my method, guarded silence and patient waiting. The observation blind was of necessity a part of the program. Any manifestations by the birds, from the passive to the active whether in movement or in voice, were duly observed with the binoculars and accordingly set down with hourly itemization in the notebook. It is from these notations together with their daily analyses, to be found after the Summary of this paper, that I have attempted to reconstruct an orderly succession of Myrtle Warbler nesting habits.

It is of the utmost importance to impress upon the reader that my observations were conducted upon one pair of birds which made three successive attempts at nesting. All three attempts failed. The first nest was never completed. The second nest was abandoned after incubation, the point where I discovered the nest, had already begun. The third nest, which was observed from building well into incubation, came to an untimely end. The data pertinent to any of the three nests I have incorporated, perhaps in improper sequence, to give a continuous overall account of the nesting procedure of this particular pair of individuals.

Acknowledgments

If any information of possible future application be sifted by the reader from the porous structure of this badly integrated account, it is directly attributable to the patient encouragement and inspiring advice of Dr. O. S. Pettingill, Jr., while the many failings are entirely the responsibility of the writer who is painfully aware of them.

ENVIRONMENT

Physiographical

The study area was located on the grounds of the University of Michigan Biological Station at the southeast corner of Douglas Lake, known as South Fishtail Bay, Cheboygan County, Michigan. This region lies about thirty miles south of the Straits of Mackinac, at the northern tip of the Lower Peninsula and midway across it (Figures 1 and 2). The elevation is 712 feet; the latitude between 45° and 46°. The nesting territory was located on the flat top of a low ridge sloping at an appreciable gradient to Douglas Lake on the north, and more gradually to Burt Lake on the south. There are no depressions or elevations or exposed geologic masses. There are no streams, brooks, ponds, or pools of stagnant water. Although situated behind the cabins of the Biological station, well within earshot of the louder sounds of Station activity, very few persons passed through the area. Several fire trails make it a rather simple one to penetrate while the vegetation offers no obstacles to even a casually minded investigator. The weather ranged for the most part from cool to warm, seldom being hot. There were no exceptionally long rainy or dry spells and the strength of wind may have been considered a disturbing factor only on the several occasions preceding a thunderstorm. There were no fires while floods, even if they had occurred in the neighborhood would not have affected the nesting area.

Plant Environment

The immediate plant environment included for the most part the members of an aspen-birch association in an open woodland assemblage. The commonest trees were the Aspens, Populus grandi-

dentata; White Birches, Betula alba; and Red Maples, Acer rubrum. Scattered were individual trees and small groves of White Pines, Pinus strobus, and Red Pines, Pinus resinosa, and some Red Oaks, Quercus borealis. The ground was overlain with dead leaves, decaying branches and grasses with a cover of young trees and Bracken Fern, Pteris aquilina.

Animal Environment

The immediate animal environment included a number of Chipmunks, Tamias; Red Squirrels, Tamiassciurus; and, much less obviously, a fox, a deer, and a spermophile. I saw no reptiles or amphibians. Mosquitos were not abundant. Birds formed the most conspicuous element among the unimpressive flora and otherwise undistinguished fauna. Nesting birds included the Red-eyed Vireo, Vireo olivaceus; Ovenbird, Seiurus aurocapillus; American Redstart, Setophaga ruticilla; American Robin, Turdus migratorius; Yellow-billed Cuckoo, Coccyzus americanus; Black-billed Cuckoo, Coccyzus erythrophthalmus; Brown Thrasher, Toxostoma rufum; Cedar Waxwing, Bombycilla cedrorum; Flicker, Colaptes auratus; Least Flycatcher, Empidonax minimus; Wood Pewee, Contopus virens; Chipping Sparrow, Spizella passerina; Ruby-throated Hummingbird, Archilochus colubris; Ruffed Grouse, Bonasa umbellus; Baltimore Oriole, Icterus galbula; Cowbird, Molothrus ater; Crested Flycatcher, Myiarchus crinitus; Black-capped Chickadee, Parus atricapillus. Other nesting birds of the same general area in the larger sense included the Purple Martin, Progne subis; Eastern Kingbird, Tyrannus tyrannus; Rough-winged Swallow, Stelgidopteryx ruficollis; Belted Kingfisher, Megaceryle alcyon; Purple Finch, Carpodacus purpureus; Eastern Bluebird, Sialia sialis; Hermit Thrush, Hylocichla guttata. Among birds

which may have nested in the region or at any rate passed overhead may be included the White-breasted Nuthatch, Sitta carolinensis; Common Crow, Corvus brachyrhynchus; Chimney Swift, Chaetura pelagica; Nighthawk, Chordeiles minor; Whippoorwill, Caprimulgus vociferus; Ring-billed Gull, Larus delawarensis; Tree Swallow, Iridiprocne bicolor; Blue Jay, Cyanocitta cristata; Broad-winged Hawk, Buteo platypterus; Osprey, Pandion haliaetus; Bald Eagle, Haliaeetus leucocephalus. In regard to the interrelationships with the the subject birds I never observed interference by the Red Squirrel nor any other actively engaged pest or predator. The Cowbirds, however, will receive attention in due course.

TERRITORY

The following items established themselves during the course of the investigation and by inference for personal observations began only with the commencement of nest-building after the nest site had already been selected. By connecting up the points where I had either seen the male or heard him singing I was enabled to make the territorial outline (Figure 2). In addition, by assuming that his favorite singing perches in conjunction with the location of the nest site indicated, as it were, the center of the breeding area, I had a check which showed a fair correlation. The territory extended, perhaps, 150 yards parallel with the lake shore, and a depth of 50 yards, and even this figure may be an exaggeration. The ~~paradox~~ parallel immediately suggests itself that the bird could not establish his territory without singing, while without singing I could not

establish his territory. One should be cautious, however, of expecting such assistance in any other phase of the Myrtle Warbler's existence. As will be pointed out later, his very lack of singing can be indicative of several suspicious circumstances.

The main physiographic characteristic of the territory is that of flat ground, longer than broad, sloping downward from each of the long sides of the rectangle, of which the birds of our attention occupied approximately one-half and included part of the slope towards Douglas Lake. Biologically, as has been described in the section called Environment, it is an open woodland featuring aspen, birch, and maple, with a sparse distribution of pines. Birds make up the only really apparent type of animal life.

Two pairs of Myrtle Warblers occupied the general breeding area. Only on one occasion, at the start of nest-building on June 24, did I suspect territorial interference on the part of the male of the second pair of Myrtle Warblers, but as this was purely circumstantial and did not eliminate a reasonable doubt, I am merely suggesting that there was such a possibility even at this advanced date. The estimate of the extent of the territory we are interested in was arrived at gradually and based upon the premise that there were only two pairs of birds. This premise I proved to my own satisfaction simply by running back and forth from one side of the ridge to the other where each male was, fortunately, singing uninterruptedly in his own particular cadence.

One of our Myrtles' nests had been built only about 15 yards away from where a Redstart was engaged in building its own

nest and here was displayed an example of what was undoubtedly interspecific territorialism. Suspicion was first aroused when the female Redstart seemed to join in the play animating the male and female Myrtles. On subsequent occasions it was the female Myrtle alone who disported with the female Redstart or the immature male Redstart who was her nesting partner.But this byplay intensified as the Redstarts continued in the same territory into an active defense of the nest with the female on the alert. I could see her attention, as she sat in her nest, concentrate in one direction, and she would sally forth in chase of one or both of the Redstarts. The opposing birds would pause upon a branch, for instance, and look at each other in high excitement, the Myrtle uttering some sharp "tchecks", and then she would drive the Redstarts some more. Apparently, the mere sight of a Redstart would rouse her from the nest. These exercises of hers were definitely not entered into in the spirit of play. It was a kind of active protection, much as the Germans called their invasion of Poland "defense with pursuit."

The male bird very seldom showed himself near the nest and so, in regard to feeding territory as related to breeding territory, attention must be directed to the female. No definite pattern emerged for she would feed unconcernedly close to the nest or fly off somewhere so that I immediately lost sight of her. Indeed, once I found her quite a little distance away, rummaging through the trees at what I considered the territory's limit. The male roamed as he pleased.

In short, one must conclude that the bird's territory at the time of nest-building had already been set up and that no conclusions may be drawn to characterize the species as a whole or this pair of birds in particular.

MATING

It is regrettable that I observed only a portion of the mating cycle, that which was surely the courtship or invitation to copulation. The same display of antics I noticed and came to expect both as the immediate prelude to nest-building and as an indicator of the first stages of nest-building. Coincident with the abandonment of their first nest, which was not completed, on June 25, and with the desertion of the second nest, in which incubation had already begun, on July 4, I would find the male and female together in what may be termed a "playground" or home base from which their sexual instincts sought expression. Upon these operational headquarters I stumbled by accident for the birds made no sounds whatever during these times of day by which to guide me. For instance, I found the male in a rather circumscribed area to which he returned several times. His appearance, of course, was much easier to detect than that of the female and, indeed, I discovered her far fewer times and usually as a result of the behavior of the male. He would arrive quietly and then perch silently on a limb for a few moments. Then he would move about from one branch to another as though searching for something but it was not food he was after. He would look about in all directions, search the ground with his eyes, and then, as though following the course of some object, he would dash off. After several minutes he returned to almost the identical spot. My presence, which he could not have failed to notice since at times I was no more than ten feet away feeling very self-conscious, was no deterrent to his state of excitation. Then I noticed that it was another bird after which he made his

sudden dash. Finally, this rough pattern emerged into a clear picture when both he and the female were in view at the same time. The birds would be not more than a few yards apart on different trees. The female would hop about the branches in a little world of her own. The male would peer about and peer about, search around but not find anything. It would be absurd to suppose that he was not fully aware of her distracting presence and precise location. Then, like an impulse, the female bird would shoot off, almost invariably in the general direction of the male, to be immediately gone from sight in a dipping swoop. There would be a slight pause, long enough for me to doubt that I had seen anything at all, before he would follow her ephemeral course with his head and, perhaps uttering a "tcheck," much more often in utter silence, he would be gone. After an interval, as though conjured up by my wishful thinking, the birds would be back. This occurred a number of times. Sometimes the male, who was generally perched at a lower level than the female, with his back toward her but with his eye searching in her direction, would flutter his wings in the manner of a young bird begging for food, thus exposing the yellow rump patch. Then the mad dash would repeat with the silent male in hot pursuit.

Even when, later on, the female was busily occupied in bringing materials to the nest, the male could not resist the nearness of her presence for, when she flew from the nest on her ordained errand, he would shoot off after her. Again there was a delayed action before he made his move. By watching him I would know when the female had already gone. My presence could not subdue his emotional state. At a distance of twenty yards or more from the nest where she was working he would

flutter from one branch to another with unnecessary flourishes and with nonsensical concentration examine the ground below him. Although he would abruptly dash off when I saw no other bird, I knew now the nature of his sudden departure. His absorbing desires were admirably veiled. Whether his pursuit, during nest-building, was governed by uncontrollable instinct and as such was in exact correlation with the female's procreative inclinations, or whether his single-mindedness served only to hinder the female in her task, or whether his flattering attentions inspired her to more feverish building activity, I dare not say. But I do not doubt that there was a purpose, from the perspective of Myrtle mentality, to these activities.

The second day of nest-building, which was at a slower pace, witnessed a decrease in the manifestation of his ardor although he appeared a few times right on the nest where the female was sitting. I completely failed to see the object of his visits. Only once was I clearly able to see him carrying something in his beak. The female was not in the nest, however, and when he had convinced himself ~~at length~~ of this incontrovertible fact after a rather lengthy examination of the empty nest, he promptly swallowed the object himself. Since incubation had probably not yet begun, it may have been another aspect of the mating cycle, perhaps even an attempt at courtship feeding.

During these days, before the soothing delights of incubation chained the female to the nest, I could not identify the singing of the male with an excitable response on her part. On the contrary, it was when he did not sing that the strongest evidence of mating behavior was presented. During the first few days of egg-laying and incubation the two birds would play about together, but quite respectably, feeding in

each other's company. Later, as incubation advanced, singing ceased almost entirely, but by this time most of the other birds had stopped singing also. His appearances became fewer and fewer and after several days I did not see or hear him at all.

NEST-BUILDING

Here I shall take up each of the three nests individually and compare differences and similarities. I established to my own satisfaction that they were the products of the same pair of birds. It was the same territory, there were no other Myrtle Warblers in it, and the nest, though in different sites, were of similar construction. The nest-tree in each instance stood in a rather open and unprotected solitude.

The First Nest

I discovered the first nest in process of construction in the very late afternoon of June 24. The tree selected was a White Pine; the nest height, 20 feet from the ground; the exact location, along a branch about five feet from the trunk, in a clump of needles, below and to the side of the main stem of the branch. The only support for the incipient nest was afforded by two very small branchlets and the pine needles themselves. On this day of discovery the nest consisted of a few small twigs roughly fashioned to the very beginnings of an unformed shell. It was completely invisible from the ground and even when I climbed the tree I could barely discern the crude assemblage from the clump in which it rested. Inwardly I rejoiced at the wonderful selection of the site in regard to inaccessibility

and camouflage. The female made only three more trips during the rest of the evening. The next day, undoubtedly the second day of nest-building, the female made very few appearances, but work had apparently been done for the nest could now be seen from the ground. The male appeared in the vicinity a number of times and did some singing. During the afternoon a female Cowbird came to and sat in the nest for a moment. When she left the structure seemed tilted out of position. Although the male remained in the vicinity after this, the female came to the nest only two more times for very brief visits. The next day it was obvious that the nest had been abandoned. It was still a crude affair with a poorly constructed shell and a feather lining which had not been set in place but rested, rather, in a loose heap on top of the nest. There was no Cowbird egg. The female was observed only once more, searching the ground, but oblivious of the nest. The male returned at intervals to the area. Late in the day, for the first time, I saw the two birds together and away from the nest.

This nest may have failed for any of several reasons. First, the birds may have hesitated to accept my presence as an inseparable part of the natural environment. The male approached rather closely to me several times and once, when I climbed the nest-tree, after having made certain that he was not about, he disconcertingly appeared as I was half-way up. I had had a similar experience with a Purple Finch nest, one of the birds having watched me from a lower branch as I climbed up. That nest was immediately abandoned. It, also, had been in the process of construction. Second, this may have been only a tentative effort at nest-building, having been destined to abortion from the

start. It is not too improbable that the birds had not yet swung into the full reproductive cycle. The Myrtle Warbler, it is claimed, raises only one brood a year and so the date of June 24 may have been just the slightest bit premature for this pair of birds. Also, to substantiate this, there is the possibility that the territory had not been fully established, even at this date, but the proof for this, as mentioned earlier, was merely an uncorroborated assumption based upon a fleeting suspicion. Furthermore, I do not greatly doubt now, from the perspective of further experience with this pair, that they were well within the high tide of the hot wave of courtship preparatory to or contemporaneous with serious nesting. Drawing upon the time element provided by the completion of the second nest (to be discussed shortly), it is quite conceivable that it had been begun wihtout a moment's delay following the abandonment of the first nest or, perhaps, even before. Third, the presence of a Cowbird was coincident with the cessation of building. The female Myrtle returned three minutes after the Cowbird had gone and in this, together with one more brief visit, she did no work. Although the Cowbird left no egg, her weight may have weakened the support for the nest for it did seem to be somewhat tilted after she left, which leads into the next consideration. Fourth, the nest may have been poorly constructed. As it began to take shape it became easily visible, though this in itself is a minor point. The support was weak and ill-chosen. Indeed, shortly afterward the nest fell out of the tree. This seemed like the best reason at the time. But as will be pointed out with Nest No. 3, that one also did not stand up for very long, and yet the bird proceded with egg-laying and

incubation. Fifth, that the bird was inherently incapable of constructing a good nest is inadmissable because Nest No.2 was well made. Of one thing there can be no manner of doubt and that is that the nest was unsuccessful.

The Second Nest

This nest was found on July 1, five days after the first nest had been abandoned. It was a completed nest and the bird had already begun incubating the two eggs it contained. Upon taking the two eggs into consideration, together with the fact that the bird was incubating, and allowing a maximum of only three days for nest-building, one is compelled to the conclusion that this nest had been built practically as an uninterrupted continuation of instinct carried over from the first nest. The tree chosen this time was a White Birch; the height of the nest, 12 feet from the ground; the site, against the trunk at the angle with a branch. The position was almost identical with a nest a Redstart was building in a birch only several yards away. The nest itself, however, was made of the same materials as before, spruce and grass stems on the outside, alining of feathers on the inside and, externally, presented a bulky appearance. A feature of this nest was the weaving into it of a branchlet of the tree so that a green leaf covered over the top of the nest, again similar to the arrangement in the nest the Redstart was building. This, I am certain, can only have been ~~the~~ an expression of ~~an~~ instinctive design and not of unconscious accident. The overhanging leaf served well as a sunshade but its concealment value was dubious, at least against Cowbirds.

The unfortunate fact that this nest, too, was to be shortly deserted cannot, however, have been due to faulty construction

for it was very well made and was a typical example of the classical Myrtle Warbler architecture. With this individual bird, at any rate, a deciduous tree was just as acceptable as a coniferous, and my great surprise at the choice of a birch after a pine had been used, abated only upon the realization that the bird was apparently more adaptable than I was.

The Third Nest

On July 6, two days after the previous nest had been left, I found the female bird stripping bark from a dead branch on the ground and carrying the scraps to her third nest, already under construction. The tree chosen was a slender birch about 30 feet high; the height of the nest, close to 25 feet from the ground; the site, at the very base of the crown where the attenuated trunk divided into three branches. On this day of discovery the outer shell of the nest, which it was difficult for me to see because of the surrounding foliage, was already quite well formed and bulky, but not yet complete, for I was able to see daylight through parts of it. I doubt if it could have been more than the second day of building, perhaps the first. The bird worked at a feverish pace, making frequent trips, returning every minute or two but actually working for only a fraction of a minute. She flew almost directly to and from the nest. Even while I had been trailing her to find the nest's location she did not waste more than a couple of minutes before returning to it, in spite of the fact that I was standing not more than five yards away. The male appeared in the vicinity only towards evening, took no part in building, and did not sing. Instead, he gave evidence of sexual excitement and pursued the female when she left the nest to gather material. The

next day she worked much more slowly, made many less trips, but remained in the nest, on her returns, for longer periods. She was bringing lining now. The male was very active in the vicinity, examining me, singing, even flying up to the nest, fluttering his wings, and chasing after the female. In this last, on several occasions, she took a willing part. From 4:30 P. M. until dark there was no sign of the birds. Building would appear to have been just about over. I judge, therefore, that this nest had been built in two and a half days or less. The following day, July 8, there was no carrying of material to the nest but she did do quite a bit of fussing about. The nest itself was a repetition of the other two being made up of a rather rough-looking outer shell of spruce twigs, small stems, and shreds of bark, with a lining of feathers (Grouse). The outside diameter was three inches; the outside depth, two inches; inside it measured two and a quarter inches across and one and a quarter inches deep. It was a round cup. Again, as in Nest No. 2, leaves were woven over the top of the nest making it impossible to see into it. The support of the nest, however, was different. Instead of being held up from underneath it was attached more or less from the side. With the passage of time it sagged downward more and more until, upon its desertion on July 19, twelve days after completion, it hung suspended at a 45° angle. Later, it became loosened entirely and fell out of the tree.

During the first few days of its existence this nest revived my hopes for success both with its inaccessibility and the intricate lashing by which it was attached. Indeed,

so difficult was it to ~~be~~ seen that I climbed the tree and tore away some of the concealing leaves. Now it will be recalled that the leaves had actually been woven into the nest. Subconsciously I shall always hold myself to blame that my clumsiness in removing the leafy cover was the agency by which some of the essential support for the nest was destroyed, thus causing the third nesting debacle for this worthy pair of birds. Keeping this possibility in mind, let us otherwise attempt to analyze the causes for failure. First, natural phenomena such as wind and rain may have been responsible. There were some heavy rains and strong winds, but this is not unusual, and a nest should stand up to treatment of this kind unless it has been either poorly designed or placed in a location unnatural to the species. Second, a predator may have destroyed the eggs and injured the nest. This is a very real possibility. The night before the female had been sitting tight and contented. The nest itself, moreover, appeared in better shape and more securely righted than it had had a couple of days before. Yet on the following day it was hanging loosely at a sharp downward angle as though the binding strands had been stretched beyond their strength. A larger, heavier bird could have caused this, or a Red Squirrel, although admittedly I had never seen one in the immediate vicinity. Jays I had seen very seldom, but Crows commonly. I found the remains of only one empty shell at the base of the tree, indicating the likelihood that the eggs had been carried off or eaten on the spot. Conversely, though, why did I find even one egg? I did not see the female Myrtle Warbler again. If she were snatched from the

nest by a predator it is highly unlikely that said predator would also seize the eggs. If this be so, one must account for two predators which is stretching credibility quite a bit. I have no constructive ideas whatever to offer on this point. Third, the eggs rolled out of the nest. For several days I had been fearful of just such an eventuality. The day before the final blow the nest had been tilted to the extent where I could see the eggs lying against the side. But, as mentioned, at the end of the day the bird was sitting well within the nest. All in all, however, I never did feel fully confident that the nest, unless it were extensively repaired, would last. Whatever the immediate cause for failure may have been, I hold the bird herself ~~the most~~ culpable.

EGG-LAYING AND INCUBATION

Nest No. 1

This nest was never completed.

Nest No. 2

This nest was observed from July 1 to July 4 when it was deserted. The bird had been incubating all that time. All observations were rather closely repeated at Nest No. 3 except for the following two points. One was territorial defense, as described in the section on Territory. The other was Cowbird parasitism, which will be discussed later under that heading. In this nest were one Myrtle egg and one Cowbird egg, with the possibility of there having been two Myrtle eggs originally.

Egg-Laying

Nest No. 3

I have no data on egg-laying, while I can only make a guess as to the date on which incubation began. I am the first to admit that this failure at exactness is inexcusable but I leave it to the reader's discretion how he would have overcome some of the difficulties. It is rather an accepted fact that birds engaged in nest-building should be disturbed as little as possible and watched only from a reasonably distant spot, for they have as yet no powerful attachment to the nest site. Furthermore, even at the remote spot where I sat on the ground, vainly imagining myself to be concealed by the ferns, I was under the accusing scrutiny of the male bird. I rather doubted that my haunting presence, with which after two weeks he could not help being familiar, influenced him to anything but disquieting suspicion. As I was firmly convinced by this time that these were unusually temperamental birds, perhaps because the harmony of their sexual rhythms were imperfectly attuned one to the other, perhaps because the peak of the nesting compulsion had already been passed, I did not wish to risk the slightest chance of upsetting the delicate balance of Myrtle Warbler equilibrium even though they had long succeeded in upsetting mine. In addition, I was by the time of this third nesting suffering from a psychosis where I suspected the male bird of intimating to the female, if not telepathically then by a sign, an impression that an alien body such as mine would not be conducive to successful nesting. Besides, the nest was being built quite high and was well concealed by surrounding foliage. There was no tree in the vicinity from which to get a better view

and even if there had been, I still could not have seen through the protecting leaves around the nest. It was dangerously early to bring an observation tower close to the nest. The nest-tree itself was a very unsafe one to climb for it was slender and even in a slight breeze the nest swayed quite a bit, nor did I wish science to lose the services of one of its investigators. The fact that I did climb the tree a week later, as the only way of solving the problem, indicates a mad desperation rather than a scientific solution.

Nest-building activity ceased on July 7. This was ascertained by direct observation. The female made fewer and fewer trips and I did not see her carrying nesting material. Since it was less than three days since her last nest had been deserted, and in view of the fact that she worked without the slightest hesitation and with great speed, granted that she had had much practice, and considering that she had already brought lining material, I estimated in the fullness of certainty that after only two days or so of work the nest was ready for use. On July 10 the female appeared to have begun incubating for during the afternoon of this day she spent longer and longer periods in the nest. Just before dark, when I left the area, I still did not see her leave the nest. The nest contained three eggs and assuming that she laid one a day, it was a fairly safe guess that the first egg was laid on July 8, the third and last egg on July 10, and that incubation began July 10.

On July 8, or what was probably the date of laying the first egg, my notes reveal that the female made several appearances in the morning, only one during the afternoon. Also, she did not fly directly from the nest as during nest building, but from

another part of the tree after hopping about a bit. In fact, she returned once so unostentatiously that I was not aware of it for some time, for she also sat very quietly in the nest. From the ground it was difficult for me to see her unless she moved. The male was in the vicinity perhaps twice during the day and he sang no more than that number of times, and hoarsely at that.

On July 9, unfortunately, I was unable to make observations.

On July 10, or what was probably the third day of egg-laying, the female appeared at the nest once during the morning (observations began at 7:30), twice during the afternoon for rather long periods, and at 8:00 P. M. she settled on the nest as though for the night. The male sang a number of times during the day and for the first times, on five occasions, he came right to the nest, three of these times when the female was in it, but for what purpose I could not see.

Thus, it would appear, that until the clutch had been laid, the female spent little time in the nest, while the male made few appearances and sang little. There was no particular evidence of courtship or pursuit. When the full complement had been laid, however, the female was spending more time in the nest while the male even came to the nest several times and sang quite a bit.

The Clutch

I never succeeded in determining whether the eggs were all Myrtle eggs or whether one or more was a Cowbird's.All that is definite is that there were three eggs of which one, which could be seen clearly, was certainly a Myrtle egg for it had the arrangement of markings around the larger end. The Myrtle Warbler

is said to lay one clutch a season. Such would be the case with these birds because there would almost certainly not be sufficient time before or after to raise another brood. Besides, a bird which nests as far north as this one would have a shortened nesting season. The number of eggs per clutch should be from three to five. The number of eggs in this nest was three, which is normal, and if one were to add the one or perhaps two eggs of the previous nest, the number would still be normal.

Incubation.

Although the female gave every sign of spending the night of July 10 on the nest, July 11 marked the beginning of serious incubation which continued until July 19 when the nest was destroyed.

The activities of the male may be disposed of quickly. On July 11 he may have made a half-hearted attempt at bringing food to the female. She was not there and he swallowed the object himself. This was the last time he came up to the nest. On the 12th, or second day of incubation, both he and the female were flitting about together for a while. (Oddly enough, the only other time I noticed anything like it was on what was probably the second day of incubation at Nest No. 2). During the days which followed he averaged less than one appearance a day in the vicinity and he just about stopped singing entirely. In this, however, he was no different from the other birds in the area. Just as he did no work in nest-building, neither did he do anything during incubation. In fact, his self-effacement now became almost complete. It should be stated, however, that when I climbed the tree of the first nest he materialized in

the vicinity, and when I examined the second nest with the eggs in it, he was in the neighborhood "tchinking" violently. At the second nest, also, on one occasion, he drove away a neighboring Redstart although there was nothing intensive about it for it resembled play rather than truculence.

The activities of the female were far from exciting during incubation. Except for the great regularity of the incubation periods which became stabilized after the first few days, they consisted for the most part of sitting in the nest, leaving it, returning to it again, etc. Since the male to all practical purposes was non-existent, there was not even that distraction to vary the monotony. The only changes in the routine were caused by the weather. I understand now why I could find no literature on the incubation of this bird. I did not even enjoy the satisfaction to be obtained from a successful conclusion to this uninspiring vigil. I can only recommend to the future investigator, if he selects this bird, to get at least one other person to help him watch, for apparently it is a 24 hour a day job of uneventful boredom to avoid the sudden calamity which seems to characterize the nedting of the Myrtle Warbler.

~~(Figure shows the egg laying of the incubation period Figure of the non-incubating intervals)~~

As has already been indicated, her method of leaving the nest, once incubation had seriously begun, was an indirect one. She would show signs of restlessness, stand up in the nest, hop about the branches, usually at a slightly higher level, until she reached an outermost one, before flying off. Almost invariably she would leave from the right side of the tree as it faced me. Generally her return was from another direction, rarely

terminating on or even beside the nest. The more usual procedure was to arrive at a lower level and hop up to the nest in stages. Indeed, several times I missed her actual return for she almost slid up into the nest like a snake and settled within it very quietly. On these occasions I became aware of her only because of a movement she would make by shifting her position. But after the pattern of her incubation intervals took form, I knew about when to expect her back. Even so she managed to solidify, as it were, a number of times quite unexpectedly. While off the nest she spent very little idle time on the tree. Where she went and what she did during these intervals I can only conjecture. Since she was not away more than ten or fifteen minutes and sometimes would wipe her bill on a branch when she returned, it is not unreasonable to suppose that she had been feeding. Although she may have had relations with the sex partner during the first few days of incubation, she probably did not after the cycle became well regulated. But on the fifth day, in the morning, she left the nest when the male began to sing in the vicinity. Twice within the next few minutes both birds returned to the nest, the female finally remaining and the male leaving. On the eighth day, during the morning, on one occasion the male came to the nest for a few moments one minute after the female had arrived indicating, perhaps, that they had been together. She did not flush from the nest easily, when I could not help but disturb her, and remained in the immediate area to resume her sitting without hesitation or delay. The observation towers she accepted readily as well as my own futile attempts at inconspicuousness. In view of this partiality to interruption, I believe it quite

admissable that an intrusion by a Cowbird would not have caused her to abandon a nest.

Variations in the incubation rhythm could be traced to variations in the weather, once the sitting cycle attained a regularly spaced uniformity after the fourth or fifth day. When the sun became unbearably hot the bird would sit with the beak open. Also, she would rest on rather than within the nest with half-opened wings, shading it. Though she apparently suffered from the heat she remained at her post. These were about the only alterations in a rigorous schedule. Figures 3 and 4 illustrate the close averages of the incubating and non-incubating intervals respectively.

Observations just before nightfal revealed the female and never the male on the nest.

COWBIRD RELATIONSHIPS

None of the three nests escaped attention from Cowbirds. The first nest was examined and sat in for a moment by a female Cowbird even before it was ever completed. In this instance, though she left no egg, she weakened the rather fragile nest foundation by the weight of her body. The second nest's interior I examined with a long-handled mirror perhaps a day or two after egg-laying had been completed. Only one of the eggs could I discern clearly and that was a Myrtle egg.. There was at least one more egg in the clutch and I left the nest with a strong impression that that was a Myrtle egg also. A few days later, after the nest had been abandoned, I examined it again. This

time there could be no doubt that one was a Myrtle egg, but the secnd egg was a Cowbird's. The Myrtle egg, however, showeda very small puncture, which may have been the cause for desertion. Norris (1947:89) states that it is not at all unusual for a Cowbird to puncture the eggs of the host. I even suspect that there had been originally two Myrtle eggs and that the Cowbird replaced one of them with its own. In regard to the third nest, a pair of Cowbirds had even perched unconcernedly beside it. They were common enough in the vicinity. Whether an egg was laid in the third nest I never found out, for the eggs vanished.

The conclusions to be drawn from the foregoing merit no special deduction. The Cowbird may parasitize the nest of the Myrtle Warbler and its egg may be tolerated by that species. But the nest will be deserted if the egg surfaces show even a tiny break. Three different nesting locations by the same bird offered no problem in discovery to the Cowbird.

VOICE

The typical call-note or "tcheck" of this species was uttered very, very rarely. More often I heard a kind of weak bell-like "tsink", but even this sound was seldom made. The female was never more vocal than this. The male, in addition to the two call-notes, had two songs sung either interchangeably or with a temporary preference for one of them. One of the songs, used much less frequently and ceasing entirely several days before the other, ran up the scale. It reminded me very strongly of a Parula Warbler's or a Prairie Warbler's. In my opinion it was

just as loud and sprightly as theirs. The second and much more common song I would never compare to a weak, colorless trill except when uttered incompletely or with a lack of enthusiasm. This song gave an impression of running down the scale rather evenly, perhaps because the notes, which are not single and not double, are short and succeed one another rapidly, and ending on a lower ~~level~~ pitch. Generally it began with four quick notes on the same pitch followed without a break by a series of half a dozen or more slightly shorter ones, the entire song flowing downward from a start not quite long enough to called level. The male bird of the adjoining territory, whose presence I established but did not investigate, sang from a more or less favorite perch about 25 feet from the ground, especially towards evening. The male of the birds under observation, though he would sing from any part of his range, showed a decided preference for a favorite small area rather than a single favorite perch. He would sing most often from a small grove of pines from the topmost branches. I knew I could rely upon his returning to this spot at intervals, the most definite one occurring before evening. Very often when I heard him singing faintly in the middle distance I could anticipate his ultimate arrival in the grove. His singing became progressively louder as he approached, singing from various perches along the way. Near the nest he sang very little. Nor could I correlate his singing with the proximity of the female. In fact, when he was near the female he did not sing. The emotions of mating were sanctified by a desperate silence.

DISCUSSION

Although I do not propose to psychoanalyze these birds their nesting failures may have been due, perhaps, less to the effect of structural weaknesses of the nests than to the cause of insufficiently reliable instinct. The Myrtle is a Canadian Zone warbler breeding within the coniferous belt stretching through Canada and the northern United States. The Douglas Lake region probably represents an extreme southern fringe of the nesting area and partakes, as Gates (1926:171) puts it, of Transitional Zone characteristics. Root (1942:41) in a study of bog birds of Cheboygan County did not find the Myrtle Warbler common in any part of it other than in cedar bogs. From his data it would appear that this bird, though on the southern limit of its potentialities, or perhaps beyond it, follows inherent tradition by confining itself to the more usual type of habitat, not pioneering into new or different. In an investigation on the frequency of occurrence of summer birds here at the Biological Station made by White (1942:207) the Myrtle Warbler was very rare having been seen on only one occasion. Dr. O. S. Pettingill, Jr. who is better acquainted with the birds of the Station than anyone else tells me that this bird may occur one season but be absent the next, at least on that part of the Station grounds where my birds persisted so heroically.

Now a coniferous forest is more or less dense offering a nesting bird a certain protection by the thickness of the growth. Myrtle Warbler nests, when they have been found, occur almost exclusively in such an environment and are located rather low, from four to twelve feet from the ground. Jean and Richard

Graber, my fellow students at the Station, found Myrtle Warblers in just such a habitat and location. The nest itself may be placed in a cluster of pine needles securing, in additon to a concealing screen and protection from the sun, a firm support as compared to the lithe branches of a deciduous tree such as a poplar or birch, ~~with~~ and immunity from strong wind and driving rain. The very number of surrounding trees makes this possible. The birds under consideration, however, very interestingly chose for their three nest sites a tree which stood almost isolated with open areas for at least three sides ~~for~~ of ten, twenty, or many more yards. ~~Nesting~~ In open deciduous woodland, the nest-tree stood in an especially open spot. The selection of these exposed sites, though falling perhaps within the latitude of individual variability, I consider, for what it is worth, a sufficiently striking departure from the normal to warrant a place within the insecure fabric of the weave of speculation.

Another ponderable element concerns the relationship with Cowbirds. Cowbirds were common and none of the nests were long secret from them. The Grabers, investigating a predominantly coniferous forest only an hour's drive away, reported an almost complete lack of this species nor did they find even a single Cowbird egg in the hundred and more nests they examined. The Cowbird, of blackbird affinity, would appear, therefore, to adhere somewhat to the family preference for open or semi-open habitats. I found it all too successful in open deciduous woodland, the Grabers did not find it at all in denser coniferous growth. Hence the Cowbird may very well have represented a kind of final straw tipping the scale of Nature's inexorable

balance.

The Myrtle Warbler, in the final analysis, may be inherently incapable of breaking out of the confines of its ancestral success. The occasional birds which have appeared at the Biological Station may have held their own in the coniferous bogs but have failed in a habitat to which, it would appear, they are instinctively ill-adapted for breeding. The pair of birds under observation may have belonged to the venturesome few of an intrepid strain of a virile species which from time to time is bound to overextend itself, for to be static means to go backwards. They may have been the offspring, on the other hand, of birds of the previous nesting season but, having returned to the parental bog, may have been forced by the pressure of numbers into the outlying vicinity or, to be more charitable, may have struck out on their own initiative. Another possibility, which springs from the last, is that they were individuals of sluggish instinct insufficiently vigorous to assert themselves on the home grounds, consequently extruded, so to speak, into an undesirable area where their frustrated rhythms could not cope with an inharmonious environment. Indeed, it is not improbable that other nests may have been begun before it became my lot to stumble upon these homeless birds, for I suspect that they were destined never to communicate their aborted inheritance to an effete posterity.

SUMMARY

An attempt was made to secure information on the nesting activities of a pair of Myrtle Warblers, Dendroica coronata coronata. The study, which was not completed, was made on the grounds of the University of Michigan Biological Station,

Cheboygan County, Michigan, from June 24 to July 19, 1949. Three successive nests, all of which came to grief, were attempted by this one pair of birds. It was the encouragement of Dr. O. S. Pettingill, Jr. which supplied this investigator with fluctuating enthusiasm in the undertaking.

The nesting territory was located in an aspen-birch association. Occasional pines were scattered through it. The commonest nesting birds of the territory included Red-eyed Vireos, Redstarts, Robins, Ovenbirds, Flickers, and Cowbirds. The ground was sandy and there was no water, either running or standing.

The territory measured about 150 yards by 50 yards and was already established on June 24. There was an example of interspecific territorial defense, however, exhibited especially by the incubating female.

As for mating, the birds were already paired, but their lack of success in rearing a brood permitted what may have been a resumption of pre-marital behavior. This was characterized by courtship flights of a sudden nature, instigated by the female and joined in by the male after a pause of a few moments. Absolute silence marked these maneuvers which originated from a "playground". This continued through nest-building until egg-laying, with the possibility of an intermittent resumption during the next few days. There was one clearly observed supposed attempt at courtship feeding by the male at the nest during the final stage of nest-building.

Three nests were constructed by the female in which process the male bird took no part. There was uniformity only in that the nest-tree was never chosen among a thick growth, and that

the nest itself showed similar construction and use of materials, typical of the species. Otherwise, one nest was placed in a pine out on a branch, about 20 feet up; the second, in a birch against the trunk, 12 feet up; the third, near the top of a birch at the base of the crown, about 25 feet up. The first nest was never completed and had poor support. The third nest was completed but again the foundation was insecure. The second nest had good support. They were built very quickly, not requiring more than two to three days. All three featured a lining of feathers. An interesting refinement of the two nests in the birches was the weaving into the nest of a leaf of the tree so as to cover over the top of the nest.

Probably two eggs were laid in one nest, probably three in another. Each clutch had egg-laying intervals of one day, undoubtedly begun immediately after nest-building was concluded. The egg pattern followed the usual description. I suspect that the eggs of the two nests were all laid within ten days. During the days of egg-laying the female made few appearances at the nest.

Incubation began either with the laying of the last egg or on the day following. It was marked by the long periods the female spent in the nest the first few days, and the regularity of these periods and of her absences, thereafter. The male, after the first day or two, did not show himself. His singing stopped entirely, but so advanced was the summer that it was probably purely physiological. Dutifully she sat, leaving only long enough to feed, though I had no direct evidence of this. Rarely would she go or come directly to or from the nest. Sometimes I was not aware of her quiet return. As night fell I left

her sitting on the nest. During the heat of day she sat above rather than on the eggs and she shaded the nest and its contents with partially spread wings. In neither nest did the eggs last long enough to hatch.

Cowbirds were a definite factor. They were present at all three nests, probably loosening the foundation structure of the first; depositing one egg in the second and removing, it may be, a Myrtle egg while doing so, and probably puncturing the remaining Myrtle egg; investigating the third nest and, if not leaving an egg, which I never found out, probably unable to do so because ~~its~~ their breeding season was just about over.

As for voice, the most popular call-note, not uttered often, was a kind of "tsink". The two songs of the male, one rising, the other descending, I thought quite sprightly. Towards evening and in the morning, as might be expected, the male sang most often. The usual song was of the descending variety while the other was heard far fewer times.

There are any of a number of reasons for the failures of each of the nests. There may have been other failures before June 24 when observations were begun. Perhaps the Cowbirds, which almost definitely caused the abandonment of one nest, were responsible for the failure of the others. Perhaps the nests were poorly constructed. Perhaps the birds were unsuited physiologically. Perhaps, to account for all other causes, the birds were ecologically unsuited to the area.

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DAILY OBSERVATIONS WITH THEIR SUMMARIES

June 24

Summary

On this date, atabout seven o'clock in the evening, I discovered a female Myrtle Warbler carrying nesting material to a White Pine. The nest was in the first stage of construction which I ascertained later by climbing the tree. She made only three trips to the nest. The male was in and out of the vicinity and did no singing. At 8:30 P.M., when the female had been gone for an hour, I climbed the tree. The nest was located about 20 feet up and five feet out on a branch away from the trunk. I t was merely a very rough unformed shell which could not be seen from the ground. There was practically no support except for the pine needles and two very small branchlets, the nest itself being placed below and to the side of the branch. I could not be certain whether or not this was only a tentative effort at nest-building.

June 25

A. M.
Raining all morning - out on a trip - no observations
P. M.
1:30 - Nest observable now from ground. ♀ coming to nest - ♂ in vicinity
3:49 - ♀ to nest (watching from ground at 30 yards through binoculars)
3:55 - ♂ in vicinity near me - no singing
4:00 - Both birds apparently gone, ~~er~~ . I move closer, to 20 yards from nest.
4:25 - Bird left nest, ♂ or ♀ ?
4:26 - ♀ at nest - no work
4:45 - ♂ with very weak song, is he suspicious? Gone!
4:52 - ♀ Cowbird at nest, looked in, sat in it, then gone. Nest seems tiltled out of position.
4:55 - ♀ Myrtle, examines nest, no work
5:15 - ♂ singing twice↑ on low branch of nest tree. (Alternate cloudy and sunny afternoon, quite breezy, temperature about 70°). [5:25- ♀ brief appearance at nest]
5:30 - ♂ in vicinity, singing not too strongly - gone at 5:33
6:10 - I left the nest.
7:00 - I returned to nest, about 12 yards away - Sky clear, breezy.
7:16 - ♀ in vicinity, uttering call-note.
7:25 - ♂ singing↑ several times in vicinity
7:35 - " " " " "
7:39 - " ↓ twice " "
7:59 - ♂ singing in distance.
8:00 - I climbed tree, ♂ appearing as I did so.

Summary

During the morning it had been raining very heavily, so observations were made during the afternoon and evening. I was surprised to find that despite the downpour work had apparently been done on the nest because it could now be seen from the

ground. The female bird made very few appearances at the nest. The male became more and more vocal as the afternoon wore on. A quick visit by a female Cowbird directly to the nest would appear to have been a determining factor of some sort for coincident with this visit was the cessation of nest-building activity and the increase in singing of the male. The Cowbird did not leave an egg but her weight, it would appear, had tilted the nest out of position. Although the female Myrtle Warbler seemed to have lost interest the male, on the other hand, was attracted to the immediate area of the nest-tree.

June 26

A. M.
5:30 - I come to nest.
6:40 - ♂ in vicinity.
6:45 - I left nest.
7:15 - I returned to nest.
8:08 - ♂ sang weakly close by.
8:30 - (Very overcast, threat of rain, all birds quiet).
8:55 - ♂ in vicinity. (Clearing at 9:10, some sun).
10:20 - ♀ in vicinity - searching on the ground near me, about 25-30 yards from nest. (Bright sunshine).
11:12 - ♂ in vicinity singing several times.
11:26 - Bird near me (unseen) tchicking strongly.
11:45 - I left nest.

P. M.
1:30 - I returned to nest.
2:00 - I climbed tree - nest in poor shape - shell loosely woven with scraps of lining not in place - no Cowbird egg - nest apparently abandoned.
2:10 - Just as I left the nest-tree convinced that the birds were gone a small bird of undertermined origin but of Myrtle size fluttered among the lower branches. Tantalized I left in disgust and took a shave.
2:45 - I returned to nest.
3:40 - No birds, I left nest. As I began to leave vicinity of nest I came upon both ♂ and ♀ a slight distance away from where I had been sitting - first time I saw the two birds together - decided that nest abandoned because suspicious that ♂ and ♀ together only when not nesting
3:45 - I try to find new nest location
3:50 - ♂ singing among some pines.
4:15 - Supposed territory circled by me - I cut through it.
5:00 - 6:00 Found ♂ a few yards from where I had been sitting watching nest for two days - ♂ crouching, peering down, around, and up, hopping about apparently at random, searching but not for food - probably highly excited as I was quite close - bird followed something with his head and was gone - returned to almost same spot after several minutes - same performance - again, after ♀ probably - then, ♂ in one tree, ♀ in another only 10 feet away - ♂ still acting as though searching although ♀ in plain sight - crouched and shook wings like young Chickadee showing yellow rump - ♀ dashes off, ♂ in

pursuit - birds returned to same small area after intervals - ♂ waits for ♀ who dashes off usually in line of direction of ♂ with ♂ like a shot in pursuit - I was quite close, within 10 feet as ♂ hopped about - no singing or sounds of any kind - circumstantial evidence (weak) of a second ♂ .

6:00 - I left territory.

7:15 - I returned. Find ♂ and ♀ , with ♂ chasing ♀ after she starts, but not from previous "playground"

7:20 - No Myrtles in "playground" - however a family of Chickadees is trooping about in it.

7:30 - Almost undoubtedly two pairs of Myrtles in the area - followed up-singing of original? pair, down-singing of the other.

8:30

8:00 - 2nd ♂ while singing dashed off after ♀ but left off to return to perch to sing.

Summary

The nest has been definitely abandoned by the female for she has made no appearances whatsoever. Occasionally, however, the male would come to the area, singing. The nest was in poor shape with a few scraps of lining lying above rather than in it and the shell was still in a rough, incompleted condition. There was no Cowbird egg. I can attribute the desertion to three causes: my own disturbing presence, the visitation by the Cowbird, or the poor location of the nest, which last is probably the likeliest. There was no real anchorage for the nest nad it was now easily visible. During the latter part of the afternoon I found the male and female together for the first time and this circumstance, together with what I considered a resumption of Myrtle courtship, rather convinced me that the nest would see these birds no more and spurred me on to the search of a new nest location. Also, there was established the presence of two pairs of Myrtle Warblers and the first outlines of territory were beginning to take shape.

June 27

A. M.

8:15 - 2nd? ♂ singing a few times ↓

9:00 - " " " " ↓

9:15 - One of first? pair at playground.

10:00 - Least Flycatcher in neighborhood for first time. (Not heard again).

10:05 - ♂ singing ↓ at top of Douglas side of ridge.

10:12 - ♂ singing ↓ few times in nest vicinity, then flies off to edge of Douglas ridge, suspect ♀ also off to same spot.

10:22 - ♂ singing ↓ weakly in poplar near edge of ridge

10:27 - ♂ " a little closer to nest. (Sunny, warm day, light breeze).

10:45 - 2nd? ♂ singing ↓ on perch tree on Burt Ridge, but he flew to this tree from direction of 1st? ♂ .

11:00 - 1st? ♂ singing ↓ on Douglas Ridge. (First suspicion of two males on Douglas territory).

11:10 - ♂ singing ↓ several times.

11:15 - I left area.

P. M.

1:30 - I returned.

1:32 - Saw two small birds follow each other within one minute from nest-tree thus keeping alive the hope that they may come back.
2:27 - ♂ in vicinity singing↑ many times from top of oak then moved 50 yards further away.
6:10 - Have not found the birds, I leave the area.
7:10 - I returned.
7:30 - ♂ singing↓ in vicinity.
7:55 - A ♂ singing↓ on Burt Ridge.
8:28 - A ♂ singing↓ on Douglas Ridge.

Summary

I still could not turn my attention entirely away from this nest. Although the female made no appearances whatever the male did return at regular intervals and sang a number of times during the day. An added complication lay in the fact that two males were in song and it was only a very gradual determination as to where their territories adjoined. For a time I imagined that there was an individual distinction in their songs, that one would sing in upward cadence, the other in downward. But this was only an unnecessary difficulty manufactured by an overzealous, uncertain state of mind. Finally, it was discouragingly made abundantly clear that the female was engaged elsewhere and that I would have to find her.

June 28

Summary

Observations, if they may be called that, were made only after 1 P. M. Outside of hearing the male sing at various times and his predilection for a particular pine grove, there was nothing to report. I caught no sight of the female.

June 29

Summary

This day was again a repetition of the hopeless chase after the singing male in the hope of finding the female. As before, the male returned regularly to sing in a particular pine grove. I was fearfully suspicious that the female was sitting in a nest somewhere where I could not find her. From experience with the first incompleted nest, the male does not approach the female or the nest. It was now the fourth day since the original nest had been abandoned and if I were not to find the female carrying nesting material it is probable that I never should find her.

June 30

Summary

After four days I glimpsed the female twice during the

morning only to lose her promptly both times. She appeared to be feeding leisurely away from both the original nest area and from the small pine grove upon which my suspicions depended. I could form no opinion as to the cycle in which the birds were now finding themselves. I had neither birds nor a nest. Incidentally, the original nest fell out of the tree in which it had been situated, so poor was its location and construction. Perhaps it was not even a serious attempt at nest-building for it will be recalled that the birds resumed so quickly their amorous pursuits and, indeed, may have been indulging themselves during the very process of nest construction.

July 1

A. M.
10:30 - After wandering about all morning I find ♀ and follow until noon. ♀ hopping from tree to tree, and on ground, feeding, acting in true warbler fashion - but she does not leave a particular area.
11:00 - ♂ appears, ♂ and ♀ play around together, but no mad chase - follow one another in trees and on ground - a Redstart joins in, and ♂ Myrtle chases around with Redstart - ♀ back to every day life - does not carry nesting material or food.

P. M.
12:05 - I leave area, ♀ still about.
12:45 - I return.
1:00 - I find ♀ in same area - trail her about.
2:10 - ♀ stops in birch, does not reappear - find her sitting in a nest - seems to be constructed of fine twigs and grass - ♀ does not leave nest - nest about 12 feet up, against trunk about 3 inches in diameter at junction with a branch - very similar location to a nest a Redstart is building in a birch in the vicinity.
3:30 - No sign of ♂ - I look in nest with mirror- a branchlet lies across nest with one green leaf covering top of nest - can see two eggs, impression of light lavender coloring, one egg with spots arranged around one end - more eggs in nest? - I cannot see because of leaf.
4:00 } - ♀ sitting in nest.
6:00 }

Summary

After keeping the female in sight for several hours I finally found her sitting in a nest in an entirely different location from where my suspicions had been directed. It was situated in what may be termed an opposite direction from the original nest, and from the pine grove to which the male regularly repaired, and from the area where I had found the female feeding the day before. The hours I had spent examining coniferous trees for a possible nest had been unnecessarily wasted. The new nest was built in a White Birch, against the trunk, at the junction with two small branches, about twelve feet from the ground. I was rather astounded at this discovery, finding it

difficult to believe that the same bird would build in two such dissimilar locations. The nest was, in fact, almost exactly like one a Redstart was building in a birch not more than fifteen yards away. The nest itself, however, was in all respects the same as the originally abandoned one having a not too finely formed outer shell of small twigs and a lining of feathers. A small leafy twig was woven into the hest structure and one leaf covered over the top of the nest, again like the Redstart's. Two eggs were all I could see in the nest with the aid of a mirror although it is not impossible that there may have been more, so effectively did the overlying leaf defy unobstructed visual examination. Both eggs gave the impression of a light lavender coloration while one showed a distinct ring around one end. During the forenoon hours the male and female played about together but did not indicate the wild abandon of sexual pursuit. Somehow or other the neighboring female Redstart became involved in this flitting about. During the afternoon the female Myrtle gave every sign of serious incubation of which this was probably the first day. The male did not sing nor did he appear close to the nest.

July 2

P. M.
7:00 - ♀ on nest.
8:00 - ♀ playing around with two Redstarts, suspect one is an immature
8:20 - ♀ on nest. I leave ♀ still on nest.
9:00

Summary

Observations were made only after supper. The female took time out from the nest only to chase about with the female Redstart andwhat seems to be an immature male Redstart. This no longer suggests a harmless game but, I suspect, an interspecific territorial adjustment.

July 3

A. M.
7:30 - ♀ on nest.
7:45 - ♀ left nest.
7:50 - ♀ back.
8:07 - ♀ shifts position several times.
8:15 - ♀ gone.
8:20 - ♀ back.
8:25 - ♂ singing↑ within earshot several times.
8:30 - ♀ stirring in nest past half-hour.
8:35 - ♂ still singing, now a variation of↑.
8:40 - ♀ leaves.
8:45 - ♀ and ♂ return - ♀ on nest, ♂ perching on various branches of tree within 2 feet of nest.
8:50 - ♂ leaves.
8:52 - ♂ in immediate vicinity of nest-tree for 5 minutes, then singing↓ within earshot.
9:05 - ♂ singing↓ weakly in vicinity

9:20 - ♀ out of nest.
10:00 - ♀ on ground around nest tree. (Cloudy, warm day, thunder in distance).
10:05 - ♀ playing around with two other birds, suspect Redstarts, then dashes back to nest. (Dark sky, much cooler, big storm coming).
10:35 - Rain.
10:45 - I leave nest, ♀ still sitting.
11:50 - Spot Check. ♀ sitting on nest in rain.

P. M.
12:50 - ♀ sitting. (Rain over, sky clearing, some sun).
1:30 - Spot Check. ♀ sitting.
1:45 - " " "
2:00 - " " "
2:20 - Spot Check. Cowbird left vicinity as I approached nest - ♀ appeared in tree one minute later
2:40 - ♀ on nest.
3:00 - I came with long-handled mirror - ♀ left nest but stayed in tree - leaf in nest, I can see only two eggs definitely - ♂ appeared with a chinky twitter in the vicinity.
3:20 - As I approached the tree, the ♀ appeared and came to the nest, ♂ in vicinity, tchipping.
3:25 - ♀ sitting, ♂ hopping about nest-tree, seems searching for food, approached to 6 feet of me, then made his way off in stages, calling a bell-like chink. Leaf over top of nest seems to protect from sun.
3:45 - Three birds in shrub behind me, ♀ Myrtle and probably two Redstarts, Myrtle dashed off, I tried to follow.
3:53 - ♀ back on nest without my seeing. Every so often she bends head down, tail up, busy doing something or other in the nest, which I cannot see.
4:10 - ♀ leaves nest, perches near it and in close-by branches, preening or scratching, hops around, then takes off.
4:34 - ♀ back in nest, unobtrusive return. (Day hazy now, no sun).
4:42 - ♀ out of nest, flies in wide sweep ending in chase of the two Redstarts - then eats something or other, flies off 40 yards, then returns to nest in circle from behind.
4:52 - ♀ back in nest after the Redstart chase.
5:10 - As I make movement to rise from ground, ♀ leaves nest, but do not know if because of me. (Looks like rain).
5:45 - ♂ singing several times in vicinity.
6:00 - ♀ not back - ♂ still singing - I leave nest.
7:45 - Spot Check. (Rain practically over). ♀ on nest.
7:55 - ♂ singing in vicinity.
8:15 - ♀ on nest.
8:45 - Spot Check. (Raining heavily again). ♀ on nest.

Summary

The female has been incubating quite satisfactorily except for an occasion or two when she pursued the two Redstarts, definitely not in the spirit of play. The male, for the first time, approached to within two feet of the nest and otherwise sang in the immediate vicinity quite a number of times. Once, however, as I was arriving to check on their progress, a female Cowbird flew off, whether directly from the nest I cannot say, and the female Myrtle returned to the nest one minute after this ill-omened occurrence. With the long-handled mirror I could barely

make out the two eggs in the nest while the female remained higher up in the same tree and the male was tchinking violently nearby. At 9:00 P. M. the female was sitting securely and all seemed to be well. It was one of those rare occasions when I left in a confident frame of mind.

July 4

A. M.
6:30 - Spot Check. ♀ on nest.
7:45 - Observation tower placed 6 feet away. ♀ left nest, remained about, perturbed. I took this opportunity to examine the eggs - one Myrtle, one Cowbird.

P. M.
2:30 - Spot Check. ♀ on nest, has accepted tower.
4:00 - Spot Check. ♀ not on nest.
4:25 - Spot Check. ♀ not on nest, but in tree.
4:50 - ♀ not on nest.
5:20 - ♀ not on nest.
5:30 - ♂ singing in distance.
5:55 - ♂ still singing - Have found him 100 yards off, also ♀ .
6:00 - ♀ not on nest.
6:25 - ♀ not on nest.
6:55 - ♀ still not on nest.
7:25 - ♀ standing in nest.
7:50 - ♀ not on nest.
8:55 - ♀ not on nest. Eggs still there.

Summary

In the morning an observation tower was placed six feet away. During the commotion I took a moment to climb to the nest and found one of the two eggs to be a Cowbird's. I left the area but returned in the afternoon for a check.The female was sitting on the nest having apparently accepted the tower. But from 4:00 P. M. on, except for two non-incubating appearances, the female did not return nor did she return for the night. Indeed, during the late afternoon I found both female and male about 100 yards away. The male was doing quite a bit of singing. I lost all confidence in this nest for the birds' actions paralleled those of the previous unsuccessful venture.

July 5

Summary

An early morning check confirmed my blackest suspicions for the nest was unoccupied. Observations were resumed during the afternoon when the male sang almost continually. Although I did not see the female the male's actions were very reminiscent of Myrtle nuptial ceremony. The nest, of course, was not revisited. I removed the nest and an examination revealed the probable cause for desertion. The Myrtle egg had a tiny puncture. Abandonment may be directly attributed to the Cowbird's interference. Otherwise I should be required to place responsibility upon my own presence or upon that of the observation tower.

July 6

A. M.
Male silent or singing very weakly. No sign of ♀ .

P. M.
♂ and ♀ obviously playing about, although actual sight of ♀ only twice or so.
4:15 - Find ♀ stripping bark from branch on ground - discover nest being built about 25 ft. up in center of birch, about 6 feet from top - cup well-shaped - ♀ working very rapidly - flies almost directly to and from nest - no sight of ♂ nor any singing -
5:15 - ♀ still working quickly - many trips - seems to be working on lining of nest.
6:05 - I leave nest - ♀ making trips and working from inside of nest.
7:05 - I return. No bird.
7:10 - ♀ at nest.
7:12 - ♂ near me - dashes off after ♀ as she flies from nest (I sit 20 yards away). ♂ flies after ♀ after she is gone, I feel positive when she is already impossible to see, a kind of delayed action. - Nest not fully lined, can see daylight through framework of shell.
7:32 - ♂ near me again - silent - acts like courting - searching, dashing off, looking down in search of something from branch near the ground, flutters from branch to another with flourish.
7:45 - I left nest. No ♀ .

Summary

After strongly suspecting that male and female were sporting about in the emotional grip of silent chase, I found the female stripping bark from a dead branch on the ground and so was led to the discovery of her third nest in the process of construction. It was during the latter part of the afternooon just about two days after interest had been lost in the other nest. Again a birch had been selected but in a direction opposed to both previous nests completing, as it were, a triangle with the long side between nests 2 and 3, and shorter sides between 1 and 2 and between 1 and 3. The nest was being built about 25 feet from the ground, at the very base of the crown of the tree. It wasdifficult to see clearly for leaves amply protected the site. As before, the female worked alone, but with a feverish rapidity. The shell, from my distant viewpoint, seemed rather well outlined although patches of daylight filtered through. It appeared large and bulky. Toward the end of the day the female was bringing lining material and worked sitting within the framework of the nest. From the extreme rapidity of her work, her frequent trips, the complete lack of hesitation, and the directness of her goings and cmings, and in view of the fact that I had seen her at the last nest a littleless than two days before, I was strongly inclined to believe that the nest had been started the same day. From my position on the ground I could see the male in the vicinity, several times beside me, but silent, seemingly excited sexually, and dashing after the

female when she left the nest. I do not know whether she willingly joined in these demonstrations or whether his hot pursuit served to hinder her single-minded resolve to finish the nest.

July 7

A. M.
7:35 - ♀ Building.
7:50 - ♂ near me, flies off a bit, sings↓ weakly, then comes near me again, flies off again.
8:00 - Can see ♀ with some soft material in bill - ♂ singing↓ weakly in my vicinity.
8:15 - ♀ away for 10 minutes - ♂ singing - ♀ working much slower today.
8:20 - ♂ and ♀ seem to be chasing. ♂ back in my vicinity. Again ♂ follows ♀ female when she flies from nest.
8:40 - ♂ sings↑ once near me, dashes off, probably after ♀.
8:45 - ♂ singing↑ near me. ♂ continually flying about area.
8:55 - ♂ returns regularly to my vicinity.
9:10 - ♂ in emotional state - flutters wings as in courtship - I cannot see ♀. (♀ building nest more slowly this morning).
9:20 - ♂ fluttering about, excited, searching.
9:50 - ♂ in vicinity singing .
10:00 - ♀ not at nest for some time. I leave.
10:50 - As I return am suspicious that a Cowbird is leaving tree.
11:10 - ♀ at nest.
11:15 - ♂ arrives in nest-tree, flutters wings among branches a few feet from nest - ♀ leaves, ♂ dashes after.
11:35 - ♂ singing↑ near me twice.
11:38 - I leave. No ♀.

P. M.
12:45 - I return to nest. No ♀.
3:00 - ♀ bird building again - infrequent trips.
3:25 - ♂ singing↓ in vicinity.
3:50 - " ↓ " "
4:15 - " ↓ " "
4:30 - ♀ in nest for a minute - seems to be adjusting herself. (Very windy P. M., sky overcast).
5:00 - I leave nest. No ♀.
7:10 - I return. No birds.
7:35 - ♀ visited nest.
7:50 - I leave nest. ♀ still away.

Summary

Building activity continued today but at a much slower pace, slackening almost completely in the afternoon. The female occupied herself for the most part with the lining material. The male sang all day; several times he came into the tree close to the nest, and then chased after the female. During these past two days the female has not spent much time in the nest although she has made frequent trips to it. I suspect she is about ready to begin laying.

July 8

A. M.
7:30 - I come to nest. ♀ fussing in nest, leaves, returns, still building.
7:42 - ♂ singing↓ in vicinity
8:00 - ♀ returns - spending more time now in nest at each visit - does not leave directly from nest but hops about the tree for a bit
9:12 - ♀ back for a minute or two, fussing about
10:00 - Still no ♀. All birds very quiet. (Sunny, breezy day).
11:13 - ♀ leaves nest, having coming back without my knowing it. (Sun very warm, sky clear. A number of Cowbirds about).
11:45 - I leave nest - ♀ still not back.

P. M.
12:55 - I return. Nest empty.
1:32 - ♀ in nest, sits for 2-3 minutes, rearranging things with bill, then leaves, not directly from nest but from tree.
3:00 - I leave nest - still no ♀.
4:00 - I return. No ♀.
4:15 - ♂ close to vicinity of nest.
5:32 - ♂ singing↓ weakly and hoarsely.
6:00 - I leave nest - still no ♀.

Summary

Except during the early morning the female hardly appeared at the nest but when she did she spent more time in the nest than previously, for the most part rearranging or building tosome slight degree, or fussing. Nor did the male make himself conspicuous with personal appearances or singing. I am strongly inclined to believe, unless they are preparing to leave this nest also, that egg-laying is about to begin or may have already begun.

July 9

No observations.

July 10

A. M.
7:25 - Nest empty. (Cool, clear, sunny, breezy day).
7:30 - A pair of Cowbirds perched near nest for a moment.
7:55 - 8:05 - ♂ singing↓ twice in vicinity - ♀ appears and hops about nest tree, then goes to nest, rearranges, ♂ comes to her in nest - cannot see what they are doing - ♂ leaves, visits area around me, feeding a bit, singing↑ once, I heard one "tcheck" - ♀ in nest stirring about.
8:10 - ♀ flies out directly from nest. (Clouds coming).
9:10 - 9:20 - ♂singing↓ in vicinity, not strongly.
10:45 - ♂singing↓ in vicinity - arrives in nest-tree, pries in nest with bill, flies off. (Sun getting warm).
11:30 - I leave nest. Still no ♀.

P. M.
12:50 - I return to nest. No ♀.
1:55 - ♀ stirring in nest - I cannot see her when she is not moving. I move to 12 yards from nest-tree. ♀ sitting in nest, moving every so often, the only times I can see her.
2:15 - ♂ singing↓ in vicinity. ♀ flies out directly from nest.
2:18 - ♂ at nest, climbs in halfway, looks about, flies off.
2:34 - ♂ and ♀ arrive together - ♀ sits in nest - ♂ hops around within 12 inches of nest, then hops around the tree, seeming to look out and search in all directions - after 2-3 minutes he flies off.
3:00 - ♀ stirring about quite a bit, head down, tail up.
3:05 - ♀ has left nest.
6:00 - I leave nest. ♀ still not back.
6:50 - I return. No ♀.
8:00 - ♀ finally arrives and settles on nest as though for the night.
8:15 - ♂ singing↓ in the distance, approaches the nest singing, sings in vicinity of nest.
8:30 - ♂ stops singing, flies to nest, joins female, but for what purpose I cannot see, and flies off.
8:50 - I leave nest, supposing to be there but I cannot see her unless she moves.

Summary

The female made few appearances at the nest but when she did she remained for longer periods. Today marked the first times that I saw the male come to the nest himself, when the nest was either empty, or when the female was already there, or or arriving at the same time with the female. Unfortunately, from my disadvantage point on the ground, I could not discern the purposes of his visits when he practically joined the female in the nest. The female gave every indication of having settled on the nest for the night, sustaining the strong impression that egg-laying has already begun or may even be completed.

July 11

A. M.
7:40 - ♀ on nest.
7:57 - ♂ singing↓ once in vicinity.
8:02 - ♂ singing↓ in distance. (Cool day, sun not quite penetrating).
8:05 - ♂ singing↓ once close by - ♀ more alert.
8:06 - While I was looking for the ♂, ♀ has left nest - ♂ hops up tree to nest, something in beak, looks into empty nest, swallows it himself.
8:20 - ♂ and ♀ fluttering about together.
8:28 - ♂ foraging in trees near me, uttering a light "tsink".
8:33 - ♂ singing↓ in vicinity. (Sun breaking through).
9:07 - ♀ in nest.
9:40 - ♀ leaves nest.
10:32 - ♀ back. (Sky clear, sun warm).
11:30 - I leave. Cannot see ♀ on nest.

P. M.
12:30 - I return. ♀ does not seem to be on nest. (On way to nest ♂ was singing↓ about 100 yards off).
12:45 - ♀ on nest, not resting comfortably, on the alert, looking about constantly.
1:00 - ♀ leaves nest.
1:10 - I decide to leave for I have been sitting 12 yards away and it may be too close.
2:15 - I return. ♀ on nest. I move back to within 12 yards.
2:45 - ♀ holding bill partly open.
3:08 - ♀ leaves nest but stays in tree, leaves tree after one minute. (Cloudier, cooler, windier).
3:25 - ♀ back.
3:49 - ♀ leaves nest, leaves tree after one minute.
4:30 - ♂ approaching vicinity singing↓.
5:00 - ♀ back.
5:30 - I leave - ♀ still on nest.
6:55 - I return. Nest empty.
8:10 - ♀ comes to nest and right out again.
8:15 - ♀ back on nest.
8:45 - I leave. ♀ on nest.

Summary

Today marked the start of serious incubation by the female. The periods of time in the nest were regular between proscribed limits, as were the much shorter interludes away from the nest. Indeed, it was reasonably possible to predict the times of her goings and comings during the larger part of the day. The male came into the vicinity a few times and once to the nest. He carried something in his bill and when he examined the nest rather unnecessarily closely to ascertain that it was empty, he swallowed the object in his beak himself. Incidentally, it might be mentioned that the female rarely leaves the nest directly now that the fever of building has subsided, but from a different part of the tree. Also, I have missed the exact moment of her return several times. She settled on the nest as though for the night when I left.

July 12

Summary

No observations except from 7:15 P. M. to 7:45 P. M., when I did not see the female. Unless she is stirring in the nest, however, it is almost impossible to see her.

July 13

A. M.
6:30 - Spot Check. No ♀.
6:33 - ♀ arrives, I leave.
7:30 - 25-foot tower put up 18 feet away - no ♀ - I leave for the day.

Summary

Having made certain by an early morning check that the bird had not deserted the nest, I had a 25-foot observation tower put up about 18 feet from the nest, and I left for the day.

July 14

A. M.
5:30 - No ♀ , I put on canvas on blind and leave.

P. M.
2:20 - ♀ on nest.
2:45 - ♀ restless. (Sky cloudy, breezy, warm in sun).
4:25 - ♀ preens self, flies out directly from nest. I climb into blind after having waited on the ground. Level of platform about a foot or two above that of nest.
4:40 - ♀ back. A branchlet of leaves lies over nest and I still cannot see her unless she moves.
5:39 - ♀ hops to top of tree, flies off. I leave.
7:45 - I return, climb nest-tree - 3 eggs, do not know if any is Cowbird's - I remove some leaves from top of nest.
7:50 - ♀ returns, I leave.

Summary

I made an early morning check and, not finding the female on the nest, I put the canvas on the blind and did not return until the afternoon. The canvas blind did not disturb her for she incubated regularly for the rest of the day. Towards evening I climbed the tree to examine the nest. For one thing, I established that there were three eggs in the nest, but whether any was a Cowbird's I was in no position to determine. For another, I removed some of the leaves which had been concealing the nest from view. The male made no appearances.

July 15

A. M.
5:35 - I enter blind. ♀ on nest.
6:02 - ♀ leaves nest.
6:10 - ♀ back.
6:30 - I leave. ♀ on nest.
7:30 - I return to blind. ♀ on nest not disturbed by my appearance. (Rain).
7:40 - ♀ restless.
7:42 - ♀ leaves. (Rain has stopped; overcast).
7:50 - ♀ back. (Beginning to rain again).
8:05 - ♂ singing↓ weakly some distance away. ♀ leaves nest as he is singing.
8:11 - ♂ and ♀ back. ♀ arrives first and sits in nest, ♂ right after, hops up nest-tree close to nest, flies off with a slight "tsink."
8:12 - ♀ leaves.
8:13 - Same thing again, ♀ on nest, ♂ flies off.

8:33 - ♀ on alert. (Sun breaking through). She settles down, closes eyes off and on.
8:57 - ♀ restless, leaves.(Rather windy).
9:08 - ♀ back. (Windy, no sun).
9:32 - ♀ leaves, returns in ½ minute.
10:05 - ♀ leaves.
10:14 - ♀ back. (Sun now and then).
11:02 - ♀ leaves. (Very windy).
11:10 - ♀ back.
11:45 - I leave. ♀ on swaying nest.

P. M.
12:50 - I return. ♀ on nest.
12:55 - ♀ leaves.
1:08 - ♀ back.
2:01 - ♀ leaves.
2:10 - ♀ back. Every so often she bends head-down tail-up, adjusting at bottom of nest.
3:13 - ♀ leaves.
3:26 - ♀ back. The bird is camouflaged in the nest perfectly.
4:17 - ♀ leaves with a feather of nest-lining in mouth.
4:23 - ♀ returns, wiping bill on branches. (No more sun). Her head follows the course of a couple of passing insects. (Wind much quieter).
5:22 - ♀ leaves. (Raining a bit).
5:24 - ♀ back. I leave.
7:00 - I return to blind. ♀ on nest. After the wind and rain the nest seems to have tipped sideways from moorings - she seems more out of nest than in - I now see some of the soft lining material in the outer shell - outer shell in ragged shape with inner lining showing through.
7:37 - ♀ with some nest lining in beak seems to place it on the outer shell.
8:20 - ♀ leaves nest.
8:29 - ♀ back.
8:55 - I leave. ♀ on nest.

Summary

Incubation proceeded quite normally today, averaging close to fifty minute periods with ten minute intervals when the female was away from the nest. The male sang very few times and came close to the nest perhaps twice. The day was very windy and the nest seemed to have slipped from its moorings so that the sitting bird was as much out as inside the nest.

July 16

P.M.
7:00 - I climb to blind. ♀ on nest. (Sunny, warm, still).
7:25 - ♀ leaves nest.
8:13 - ♀ back in tree, waits around for 2 minutes before going to nest. Nest seems in slightly better shape today, as she sits entirely within it, tail cocked high.
8:30 - I leave. ♀ on nest.

Summary

Observations were made only from 7:00 P. M. Things seemed to be all right for the female was sitting tight. The nest, from its appearance, probably had had some work done on it for the bird now sat well within it.

July 17

A. M.
7:40 - I come to blind. Nest empty. (Sunny and warm).
7:57 - ♀ comes to nest.
8:42 - ♀ leaves.
8:55 - ♀ returns.
8:56 - ♂ hops around nest, flies off.
9:51 - ♀ restless, leaves nest, hops to top of tree, flies off.
10:09 - ♀ back.
11:03 - ♀ leaves nest, hops to top of tree, flies off.
11:15 - ♀ back.
11:20 - I leave. ♀ on nest.

P. M.
1:03 - I return. No ♀.
1:13 - ♀ returns.
1:45 - ♀ holding beak open.(Sunny and hot).
2:30 - ♀ now sitting over rather than on nest, with wings half-spread and beak open.
2:50 - I leave. ♀ still shading nest.
7:05 - I return. ♀ on nest. Only her eye reveals her presence. Yellow cap quite apparent, but from the ground I cannot see her. (Cooler now, sky cloudy). All birds very quiet the last few days. Have not heard even a Cowbird today.
7:33 - ♀ leaves nest after exhibiting alertness and restlessness.
7:45 - ♀ back. I am positive she has reformed the nest in the past two days.
8:20 - I leave. ♀ on nest.

Summary

Nothing unusual occurred today. The female sat with almost clocklike regularity except during the afternoon when it became very hot. She gave evidence of the heat and also sheltered the nest and eggs with half-spread wings. The male showed himself but once and did not sing at all. Most of the birds of the area have stopped singing and I suspect that the male's conduct in this matter has been following the normal physiological course of events rather than that of modified nesting behavior. Concerning the nest itself, I am positive that some repair work has been done upon it.

July 18

A. M.
5:50 - ♀ on nest.
6:05 - ♀ leaves nest. (Cowbird calling).
6:22 - ♀ back.
6:40 - I leave. ♀ on nest.
7:30 - I return. ♀ on nest.
7:40 - Blind moved closer to 12 feet, ♀ staying on nest despite all the work going on.
7:55 - 2 or 3 soft "tsinks" from ♀ .
8:19 - ♀ leaves.
8:34 - ♀ back.
9:13 - ♀ leaves.
9:24 - ♀ back. (Sunny, warm, breezy).
10:12 - ♀ leaves.
10:29 - ♀ back.
10:40 - ♀ keeping mouth open.
11:20 - ♀ leaves.
11:30 - ♀ back. I leave.

P. M.
1:20 - I return. ♀ over rather than on nest. I do not climb blind yet but wait on ground. (Quite windy, rather hot).
2:03 - I climb to blind. ♀ still on nest although could not see her from ground. Suspect nest has tipped a bit in the wind. Am still not sure whether ♀ left without my seeing and returned while I climbed to blind.
2:41 - ♀ leaves. Nest has definitely slipped over sideways as I can make out the three eggs, only one definitely as a Myrtle egg. Eggs not on bottom but on tipped over side of nest. (Thunder in distance).
2:51 - ♀ back.
3:00 - (Beginning to rain). I leave. ♀ on nest.
7:05 - I return. ♀ on nest. (Clear; sun).
8:00 - ♀ dashes from nest.
8:11 - ♀ returns to tree, wiping bill, hops up to nest in steps.
8:30 - I leave. ♀ on nest.

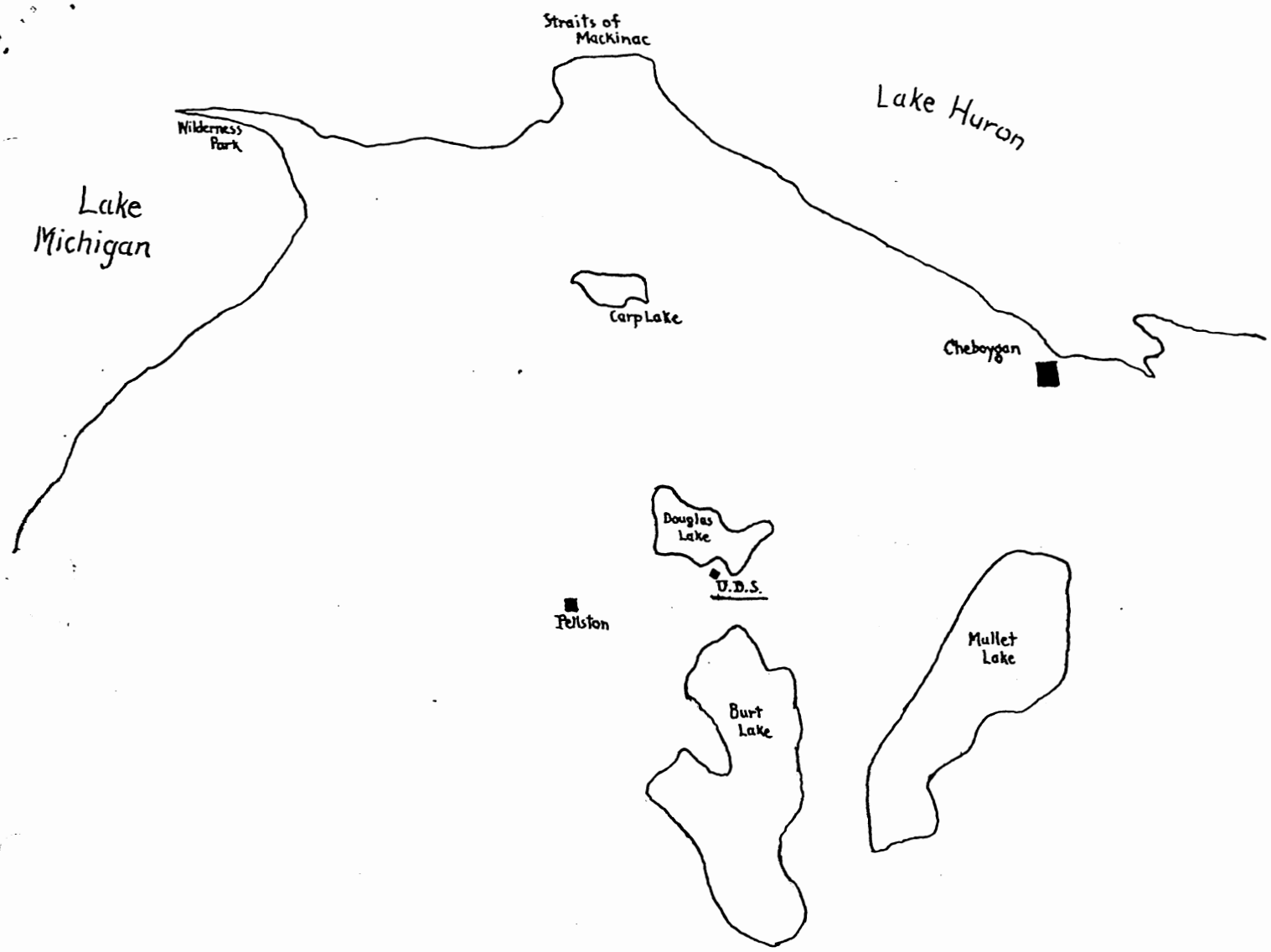
Summary

Despite wind and rain the female adhered closely to her incubation schedule. There was no sign of the male. The nest was tilted badly out of position, to such an extent that I could see the three eggs now resting to one side rather than at the bottom of the nest. I greatly fear that this was due to the female's poor choice of a nest site and to an insufficiently strong attachment of the nest to the tree. A very heavy thunderstorm during the afternoon left me uneasy but as night was falling the female bird was sitting snug and tight on the nest.

July 19

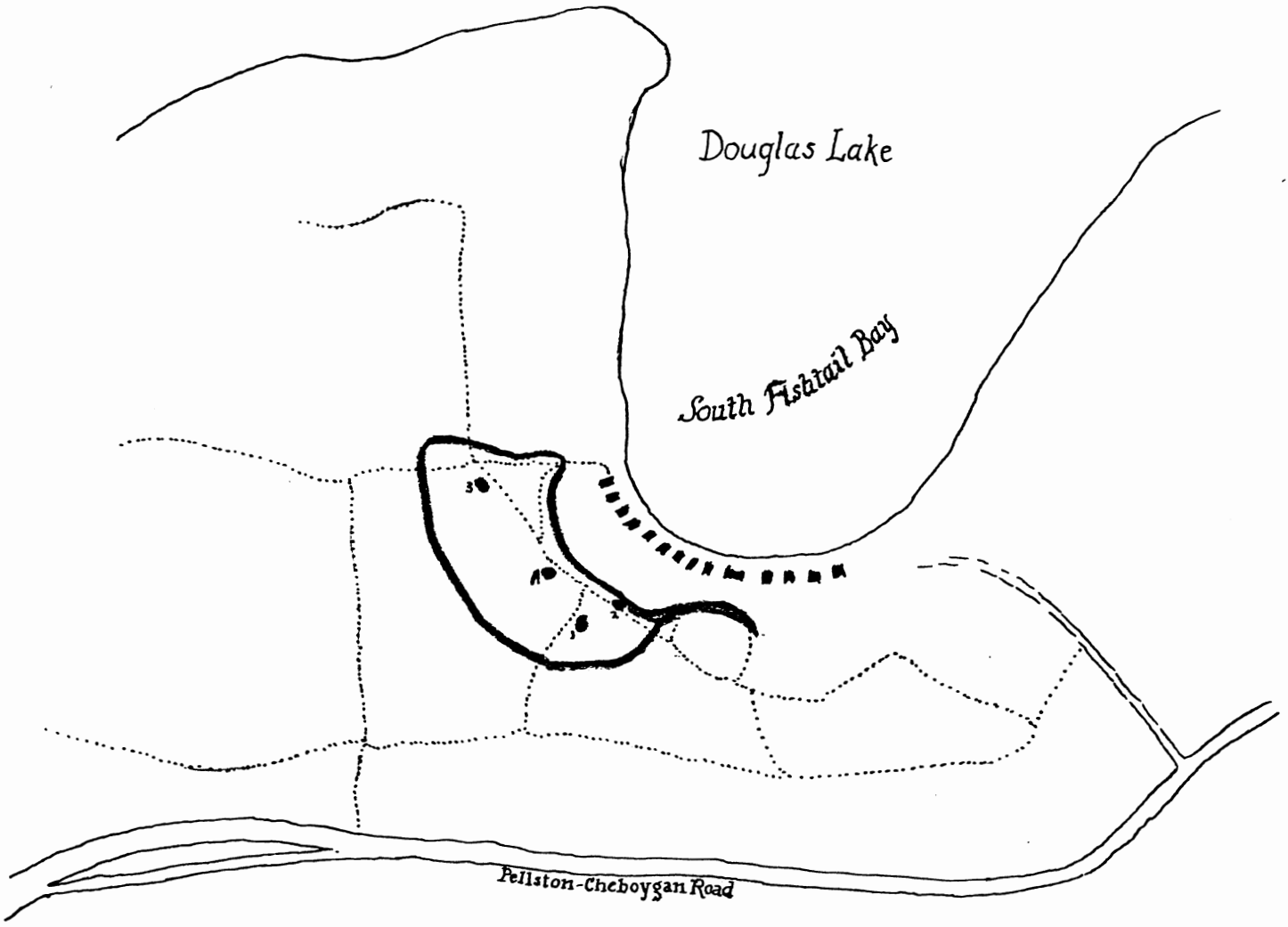
Summary

There are no birds and no eggs in the nest which is hanging at an angle of 45°. At the base of the tree I found the remains of one empty shell. Either the eggs rolled out of the nest and the contents eaten by an animal, or a predator came to the nest. In any case, on what was probably the ninth or tenth day of incubation, the third nest resulted in failure.



Northern Michigan

Figure 1.



U. of M. Biological Station Grounds

Figure 2.

LEGEND

Station Buildings

Fire Trails

Outline of Territory

1 Nest No. 1

2 Nest No. 2

3 Nest No. 3

A Favorite Pine Grove

to Burt Lake

Geo. Wahr, Publisher, Ann Arbor, Mich.

Form 35—Millimeter

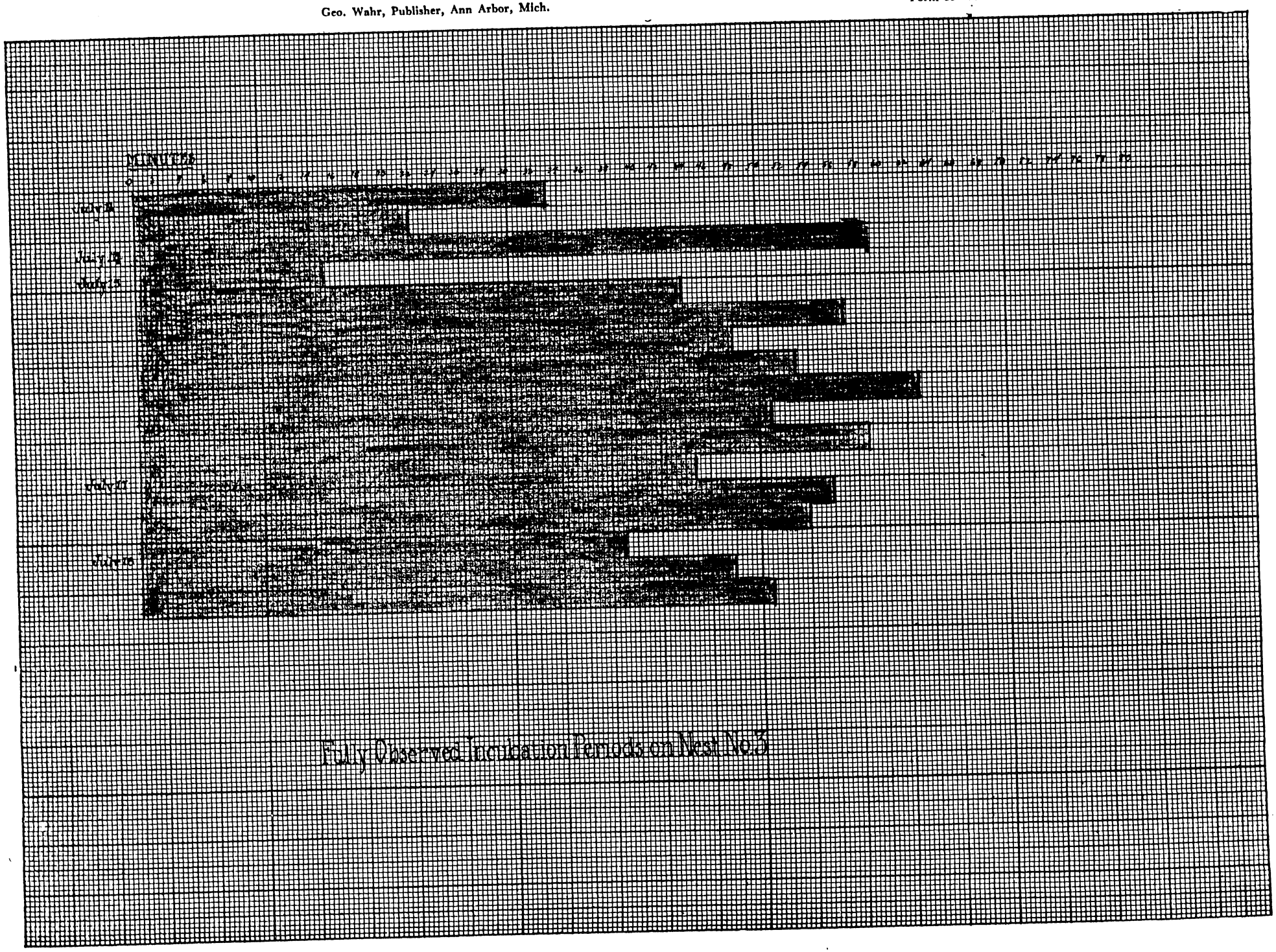


Figure 3.

Geo. Wahr, Publisher, Ann Arbor, Mich.

Form 35—Millimeter

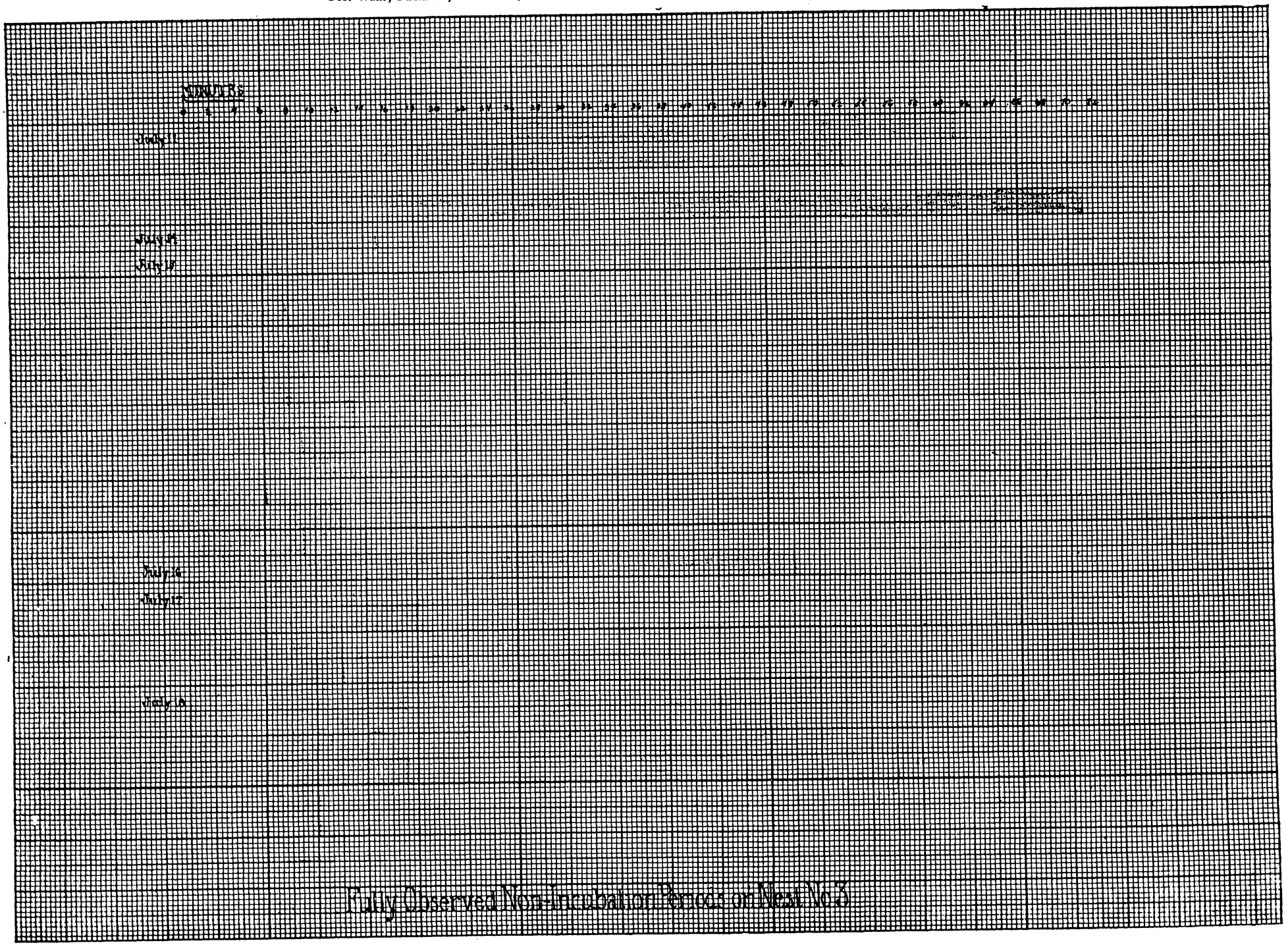


Figure 4