

OBSERVATIONS ON THE RED-NECKED GREBE NESTING IN MICHIGAN

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The Red-necked Grebe (*Podiceps grisegena*) in Michigan is a regular transient although generally uncommon. Zimmerman and Van Tyne (1959) give only 5 summer sight records through August 1958. From 1959–1974 Michigan Summer Bird Surveys recorded only one observation, a group of 12 on 30 August 1962 that were likely migrants (Mahan 1963). The nearest nesting records are for Wisconsin, Minnesota, and Ontario (Jones 1938, Speirs et al. 1944, A.O.U. 1957). The following account is the first record of Red-necked Grebes nesting in Michigan.

STUDY AREA AND METHODS

On 16 June 1975, Steve Goodman and I located a Red-necked Grebe nest containing 7 eggs in a marshy section of Cedarville Bay, Cedarville, Mackinac Co., Michigan. Four days later, on 20 June, we sighted 2 adult Red-necked Grebes in the same marsh. The marsh covered approximately 15 ha of the west shore of the bay (Fig. 1). The near-shore area of the marsh was a dense growth of cattail (*Typha latifolia*) and sedge (*Carex* sp.). The deeper waters contained pondweed (*Potamogeton* sp.), bulrush (*Scirpus* sp.), pickerelweed (*Pontederia* sp.), smartweed (*Polygonum* sp.), spatterdock (*Nuphar* sp.), water milfoil (*Myriophyllum* sp.), and bladderwort (*Utricularia* sp.).

I observed the pair almost daily from 20 June to 29 August 1975, for a total of 259 hours and 37 min. A single sighting was also made on 28 September. I attempted to distribute observations evenly throughout the day from 06:00 to 22:00. Observations before and after the incubation period, when the birds were the most mobile, were made with 7 × 35 binoculars from a canoe. Observations during incubation were made with a 20× scope from a black rowboat anchored among the cattails 67 m from the nest. The birds appeared to become accustomed to the boat and frequently swam within several meters of it. To avoid losing this familiarity the more disturbing visits to check nest contents were made from the aluminum canoe and the nest was approached from the opposite direction of the observation boat's route. Daily nest checks were made until the first egg was laid, after which the nest contents were checked once a week. Although the Red-necked Grebe is a monomorphic species I believe the sexes were distinguishable by the male's brighter plumage, thicker neck, and stockier head.

COURTSHIP

On 5 occasions (23 June–5 July) nesting material was presented by one bird to the other, although unassociated with a nest site or actual nest construction (Fig. 2). One bird picked up a piece of vegetation floating on the water, turned and swam to within several centimeters of the other and dropped it. A lily pad was presented once; a bulrush and then some unidentified vegetation was presented; strands of water milfoil were presented 3 times; and

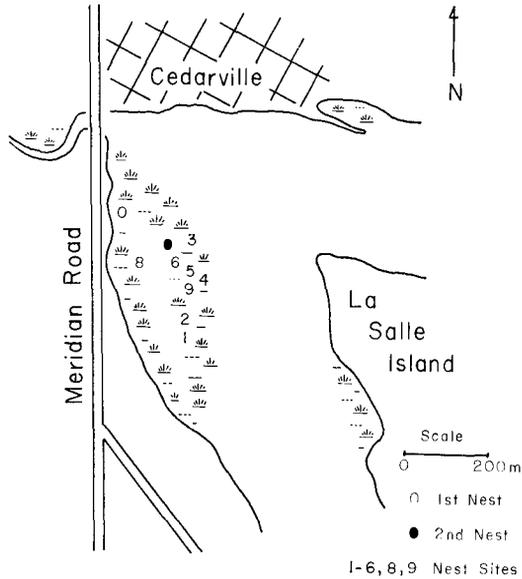


FIG. 1. Location of Red-necked Grebe nests. Cedarville Bay, Clark Township, Mackinac County, Michigan.

unidentified vegetation was presented once. During a fifth presentation both birds simultaneously presented vegetation to the other and then turned away. Immediately after one presentation both birds called in unison and after another the birds turned tail-to-tail (bodies almost touching) and simultaneously dipped their bills and shook their heads.

Courtship observations were few, brief, and involved only 3 (Weed Tricks, Head Shaking, and Turning Away) of the many postures and displays given by Wobus (1964) as part of the Red-necked Grebe's courting repertoire. I believe most of the courtship activities occurred prior to my first sighting the pair on 20 June and possibly some occurred even before their arrival in the marsh. Storer (1969) observed courtship behavior in the Horned Grebe (*Podiceps auritus*) along its migration route and suspected it also occurred on its wintering grounds. Bent (1919) and McAllister (1958) wrote that Eared Grebes (*Podiceps nigricollis*) appeared mated on their arrival in the spring, however, McAllister (1958) further noted that they may change mates on the breeding grounds. Although I never saw the birds on the first nest (found on 16 June) its presence also suggested that all observations were of a renesting attempt and probably courtship and pair bond formation initially occurred in May.

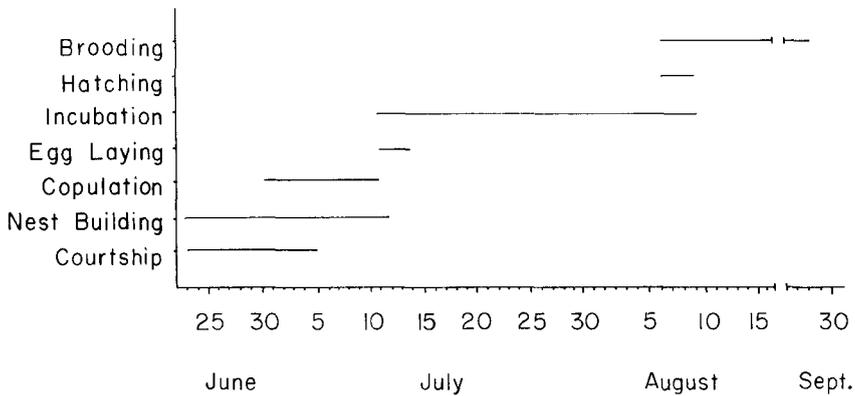


FIG. 2. Duration of breeding activities of the Red-necked Grebe, 23 June to 29 August 1975.

NEST BUILDING

On 25 occasions (23 June–12 July) I observed nest construction. Observations ranged from 1–90 min duration (Fig. 2). The very brief periods of nest building (1–4 min) appeared to have more significance as post-copulatory behavior than actual nest construction. The mean duration of nest building bouts, excluding those occurring immediately after copulation, was 21 min.

Nest building was observed at 9 locations which were from 2–70 m apart (Fig. 1). On several occasions the 2 closest nests were worked on simultaneously. The number of days each nest site was attended by the pair is depicted in Fig. 3. The construction of numerous nests apparently is not uncommon. Speirs et al. (1964) recorded 7 nests built by one pair of Red-necks on Lake Ontario.

The nest site appeared to be chosen by the male either by poking at the future site with his bill, by starting to carry nest materials to a particular spot, or by Invitation. On one occasion the male left the female on a nest site they had been working on for 4 days and had copulated on, swam 6 m to another clump of cattails and assumed the Inviting posture (i.e. lying flat with neck outstretched and low and the bill pointed forward and almost touching the water). The female called several times but the male did not move. After 1 min the female joined the male and both began building at the new site.

All nest sites were among the bulrushes and on floating clumps (less than 1 m in diameter) of cattail roots and stems. Bulrushes, water milfoil, and lily pads were incorporated into the nest. These materials were collected within approximately a 5-m radius of the nest. Bulrush stems were picked up

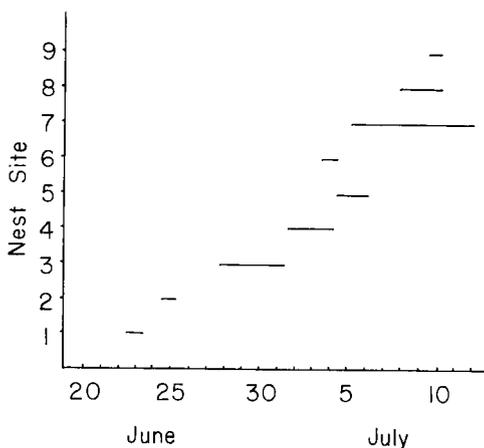


FIG. 3. Duration of nest building activities at 9 nest sites, 23 June to 12 July 1975.

singly and carried crosswise in the bill. Water milfoil was obtained during a brief dive. Lily pads were half-carried, half-dragged through the water and lifted onto the nest.

Nest construction appeared to involve 2 steps. First, bulrushes, lily pads, and some water milfoil were placed on a clump of cattails. This provided a floating platform capable of supporting eggs and an incubating bird. Second, a simple depression was formed by one bird on the nest receiving materials (almost exclusively submergent vegetation brought up from the bottom) from its mate and pulling these around itself into a low rim. Most of the rim was constructed during the first 2 days of incubation.

Nest building was performed by both birds, although the male was the principal builder during the early stages and was observed vigorously piling vegetation on the nest while the female swam back and forth, rested, or preened a couple meters away. Later, the male frequently carried materials to the nest where the female, on the nest, arranged them around herself. As the day of the laying of the first egg approached both birds were often simultaneously involved in the nest building and on one occasion they worked together continuously for 74 min. On several occasions I saw the female building alone.

During the nest building period the birds rarely approached the nest site alone, although one frequently departed before the other. When one finished foraging before the other, it called, preened, and waited until the other joined it. Only when the birds were together did they cautiously return to the nest site several body lengths apart.

The nest in which the eggs were ultimately laid was the seventh nest begun

by the pair (excluding the nest with the 7 eggs) and was among the bulrushes at the edge of the inner open water area in 1.1 m of water (Fig. 1). It had an inside diameter of 15–16 cm and an outside diameter of 38–42 cm. The depth of the depression was 2.5 cm and the top of the rim was only 5 cm above the water level. The first nest (found on 16 June) was floating in 0.5 m of water, 25 m from the shore, and only 30 m from a road. I suspect it became detached at its anchorage, drifted into the shore, and was consequently abandoned. The nest was a sodden mass of bulrushes and water milfoil with a 33-cm outside diameter above water and a 61-cm diameter under water. The top of the nest was 6 cm above water and the depression containing the eggs was 15 cm in diameter.

COPULATION

I observed copulation 6 times from 30 June to 11 July (Fig. 2). The procedure for all copulations was essentially the same: (1) The female climbed onto the nest platform and invited. On 2 occasions the female uttered a faint, plaintive call. (2) Within 0.5–2.0 min the male mounted the female and copulated, while on the nest. Copulation was 3–7 sec in duration and accompanied each time by the copulating call (“Rattern”) described by Wobus (1964). (3) Immediately after copulation the male walked over the female’s head and shoulders and into the water at which time both birds raised their heads. This was followed by (4) Head Shaking by one or both birds or both birds, Slow Swaying (“Wegsehen”), and (5) either both birds preened briefly or the female preened while the male briefly collected nest material.

My observations were in accord with those of Wobus (1960, 1964). The faint vocalization of the female in the Inviting posture may correspond with the platform call of the Horned Grebe described by Storer (1969).

EGG LAYING

Three eggs were laid. The first egg was laid on 11 July and had a bluish matrix which became, by the time it hatched, dark brown due to staining from wet vegetation. I don’t know the exact dates of the laying of the second and third eggs. Wobus (1964) found that the average clutch size for July-nesting birds was 2.5.

INCUBATION

I observed incubation for 151 h and 39 min from 11 July to 9 August (Fig. 2). Incubation was shared by the sexes, the male incubating 41% of the time and the female 59%. For comparison I divided the day into two 8-hour blocks; one representing mid-day (10:00 to 17:59) and the other morning and evening (06:00 to 09:59 and 18:00 to 22:00). In the morning and evening intervals the female incubated 65% of the time, whereas during the

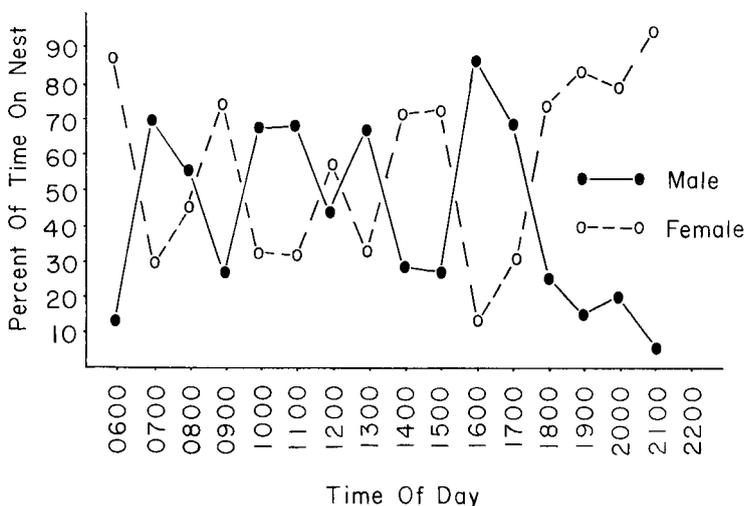


FIG. 4. Average percent of time spent on the nest by sex and time of day. Each time block represents a minimum of 5 hours of observation.

middle of the day she was on the nest only 41%. During all observations before sunrise and after sunset the female was on the nest, suggesting that she performed most of the night-time incubating. From day to day each sex tended to incubate at approximately the same times (Fig. 4).

As the birds adjusted to the incubation routine, the average duration of their individual attentive periods increased. The average attentive period lasted 87 min during the first week but increased to 132 min during the second with a corresponding decrease in the number of periods per day from 10 to 7. The last few days of incubation were similar to the first days of incubation in that the mean duration of the attentive periods decreased to 78 min and the frequency of change-overs increased back up to 10 per day. Wobus (1964) found the average duration of attentiveness to be 1-2 h.

An all-day observation on the third day of incubation revealed that incubation was continuous, or nearly so, during the egg-laying and early incubation periods. During the first 3 days incubation was infrequently interrupted by brief periods of nest building and copulation but from the fourth day on the eggs were very rarely and briefly left unattended.

During the nest reliefs, or change-overs, the returning bird's behavior appeared dependent not only on the strength of its own urge to incubate but also on the incubating bird's readiness or reluctance to leave the nest. Occasionally during extremely hot weather (e.g. 32°C) and after unusually long periods of attentiveness (e.g. 3½-4 h), the mere presence of the returning

bird was sufficient to induce the incubating bird to leave the nest. Head Shaking by the returning bird was the dominant component of nest reliefs and in most cases induced its mate to leave the nest. Head Shaking was part of 49 (68%) of the 72 nest reliefs I observed. During the first week's nest reliefs the returning bird Head Shook as many as 6 times and often the incubating bird also participated in Head Shaking. By the second week Head Shaking was primarily by the returning bird and only done once or twice per nest relief. If Head Shaking failed the returning bird often sat next to the nest (usually to the rear of the incubating bird) and performed comfort movements or poked at the nest for several min. When its mate still remained on the nest the returning bird made brief nest building actions. Twice the male simply "gave up" after these attempts and left for a while; once the female jumped onto the nest forcing the male off. Herring Gulls (*Larus argentatus*) demonstrate a similar behavioral progression during nest reliefs (Tinbergen 1960, pers. observ.). The returning gull's inducements ranged from its mere presence on the territory, to Mewing, to Choking, to bringing nest material to the nest, to physically evicting its mate from the nest.

Three times during the first 2 days of incubation the female, on leaving the nest, Reared and Wing Quivered, thus "coaxing" the male onto the nest. These 3 occurrences were the only times I saw Wing Quivering. Storer (1969) discussed this display as the most intense form of soliciting. The Inviting posture, a milder form of soliciting, was assumed by the incubating bird as its returning mate swam towards the nest. Inviting remained as part of the nest relief pattern through the seventh day, after which I no longer saw it. Prior to egg laying the nest platform had been used primarily as a copulation platform. Thus the occurrence of soliciting postures during the first nest reliefs suggested they were a carry-over from copulation, and possibly such actions on the part of the female encouraged the male's transition to incubating behavior.

Also during the first 2 days of incubation, nest reliefs were twice initiated by the female (as the returning bird) carrying nest material to the nest but not depositing it thereon. Instead she swam back and forth in front of the male as if to entice him off the nest by an activity in which he had, until recently, been vigorously involved. Carrying nest material, as well as soliciting, may have reflected the ambivalence present in the birds as they changed from one behavior pattern to another. I saw none of these activities as part of nest reliefs after the first week of incubation. The nest reliefs gradually became less complex (i.e. fewer movements and postures) as various components were "phased out."

Several change-overs occurred in which I saw none of the usual cues, but rather they appeared to be initiated by impatience, rain damage to the nest,

or disturbances. On the third evening of incubation the male abandoned the nest after a long period of incubating. Both birds returned 27 min later and the female climbed onto the nest. Once after a 44-min downpour, the male slid off the nest and began nest repairing. The female appeared 2 min later and climbed onto the temporarily abandoned nest. The male continued to repair the nest for an additional 18 min. Change-overs occurred twice when the incubating bird was frightened off the nest by fishing boats and once by one of my nest checks.

The birds approached the nest cautiously from the open water, rather than through the bulrushes. During the first 10 days the birds swam on the surface to the nest, usually with considerable head-bobbing movements. Starting on the eleventh day the female approached the nest underwater, diving from 20–30 m away. Seven times when the female surfaced right next to the nest and face to face with the incubating male they both raised their necks up as tall as possible, crest plumes erect, and called loudly and simultaneously. The same display occurred twice when the incubating bird left the nest at the sight of the returning mate. The birds displayed and called as they swam towards each other, and turned face to face as they passed. This mutual upright posturing and vocalizing apparently was a greeting of mate recognition. According to Storer (pers. comm.) this vocalizing corresponds to the Triumph Ceremony of the Horned Grebe and the greeting trills of the Pied-billed (*Podilymbus podiceps*) and Least grebes (*Podiceps dominicus*).

After each nest relief the departing bird spent 3–20 min (mean = 8) preening before it swam out through the bulrushes to forage in the channel. The male was markedly more vocal than the female and often called during his returns to the nest, although by the 6th day his returns had become silent. I rarely heard vocalizing in the immediate vicinity of the nest after the first week of incubation, except during the aforementioned change-overs and after disturbances.

LATE INCUBATION

During the last 5 days of incubation, nest building was frequent and occurred in conjunction with 7 of the 18 nest reliefs of this period. Except for one instance of nest repair, I had not observed extensive nest building since the second day of incubation when rim construction was completed. Since token nest building was a strong nest relief cue, such behavior may have indicated strong drives to incubate or possibly it was displacement activity reflecting frustrations caused by the sounds of chicks within the eggs and internal changes in the birds' drives from incubating behavior to broodiness.

Two days before hatching a new behavior, which I call Lunging, was incorporated into 6 of the 8 observed nest reliefs. Lunging consisted of a

stabbing motion of the bill towards the incubating bird's back and was made by the returning bird as it sat next to the nest. Lunging was apparently an intention movement of feeding the young, during which the adult presents food in the bill to the chicks on the other parent's back.

Several days prior to hatching the incubating bird frequently stood up and either looked down at the eggs or rearranged the nest material around them. Such behavior was most likely stimulated by chick sounds within the eggs. During the earlier days of incubation the birds rarely stood up once comfortably settled on the eggs. During these last days of incubation the non-incubating bird spent considerably more time loafing in the vicinity of the nest than it had before and the birds started approaching the nest through the bulrushes, which they had not done previously.

HATCHING

The 3 eggs hatched on 6, 7, and 9 August (Fig. 2). Since the first egg was laid on 11 July, and incubation began on the same day and was continuous throughout, the incubation period for the first egg was 26 days. Bent (1919) determined the period of incubation to be 22-23 days for eggs he hatched in an incubator. The eggs' constant contact with wet vegetation and the possibility that, although the grebes were continuously on the eggs starting with the laying of the first egg, heat transfer may not have yet been complete might have accounted for the longer incubation period in the wild. Wobus (1964) gave the average incubation period as 23 days but added that it is often longer due to cold weather and/or disturbances.

Hatching occurred in the mid-morning. From 09:49 to 10:24 on the morning the first egg hatched the incubating bird showed considerable uneasiness and stood and looked down at the eggs 6 times. The next day the second egg was intact at 07:30 and the second chick was first observed crawling out from under the incubating adult at 11:45. Two days later at 07:48 the third egg was still intact but during the change-over at 12:38 I saw the chick in the bottom of the nest while the other 2 were in the water. Before settling onto the nest the male picked up the egg shell and dropped it over the rim of the nest.

BROODING

The chicks were brooded on the parents' backs under their wings when the adults were on the nest as well as on the water. This undoubtedly had survival value considering the cold, wet state of the nest and the presence of aquatic predators such as the northern pike (*Esox lucius*). Brooding was performed by both sexes and brooding periods ranged from 57-162 min (mean = 119). During change-overs on the nest the brooding bird stood up,

spread its wings, and shook the chicks off its back and into the nest. After the adult dismounted, its mate climbed onto the nest and raised its wings 4–5 cm off its back allowing the chicks to crawl up and under. During change-overs on the water the brooding bird raised itself into a nearly vertical position and shook off the chicks by wing-flapping. At 3 weeks of age the chicks were no longer brooded on the adults' backs.

After the hatching of the third and last chick on 9 August the nest was used during most of the following day, from 09:29 to 20:52, and then abandoned. I never saw the birds using the nest after 10 August.

FEEDING THE CHICKS

Both parents fed the chicks. During the first week the chicks were fed 2- to 5-cm minnows, small unidentified items (probably insects), and an occasional feather. The age of the first chick I observed being fed a feather was 2 days. Wobus (1964) observed chicks being fed feathers, as well as insect larvae, during their first day of life. After the first week the food appeared to be almost exclusively fish in the 4–10 cm range. During the third week the fish were noticeably heavier bodied and once a medium-sized crayfish was fed to one of the chicks.

As the parents swam towards the chicks with a fish they repeatedly dipped the fish in the water and appeared to be manipulating and pinching it in their bills, as described by Sim (1904). This probably killed and softened the fish and made swallowing and digestion easier. The food was held in the tip of the bill and presented to the chicks while they were on the other parent's back. The chicks frequently dropped the minnows during the first several days' feedings but the parents picked up the dropped minnow and presented it repeatedly until the chick finally got it headfirst into its mouth. The brooding parent frequently picked up any dropped items and fed the chicks on its own back. By the second week the chicks were fed on the water where they persistently begged for food and swam out to meet the parents each time they returned with food, and occasionally even pursued their parents underwater.

Feeding periods during the first week ranged from 23–113 min (mean = 75) with a mean of 9 feedings per period (Table 1). Feeding intervals (i.e. the time between individual feedings) ranged from 1–32 min (mean = 8). A 28- to 129-min loafing period (mean = 58), during which the non-brooding bird loafed and/or foraged for itself, immediately preceded or followed each change-over. During the second week feeding periods were one-third as long as during the first week while the number of feedings per period more than doubled due to the 6-fold reduction in the length of time between feedings (Table 1). Thus the chicks' growing demand for food was met by decreasing the time interval between feedings.

TABLE 1
A WEEKLY COMPARISON OF FEEDING AND LOAFING PERIODS

	Week		
	1st	2nd	3rd
Duration of feeding periods (min)	23-113 (75)*	16-34 (25)	4-27 (17)
Number of feedings per period	2-15 (9)	10-31 (19)	7-32 (16)
Feeding intervals (min)	1-32 (8)	0.5-12 (1.4)	0.25-7 (1.1)
Duration of loafing periods (min)	28-129 (58)	32-64 (50)	23-39 (31)
Mean number of feedings per hour	3.5	12.5	18.0

* Means are given in parentheses.

The mean duration of the feeding periods and feeding intervals continued to decrease through the third week (Table 1). The reduced number of feedings per period simply reflected the shorter duration of the periods. The very short time intervals such as 0.25 min between some feedings were probably the result of both parents simultaneously feeding the chicks. Short time intervals probably also occurred when the birds found their prey concentrated in large schools. Once when the chicks were fed 74 times in a 25-min period, every fish appeared to be the same size (4-5 cm) and while the birds fished they moved steadily along as if following a school. During the third week the mean duration of the loafing periods was 47% and 38% shorter than during the first and second weeks, respectively. Thus although the feeding periods were shorter they were also more frequent, as indicated by the reduced amount of time the adults spent loafing in between. As the chicks grew the mean number of feedings per hour increased steadily from 3.5 the first week, to 12.5 during the second week, to 18.0 during the third week (Table 1).

I last observed the family on 28 September 3.5 km from the nest. The 3 chicks, at 51, 53, and 54 days of age, were still being fed by both parents. According to Wobus (1964) the family bonds break up after 8 to 10 weeks.

INTERSPECIFIC RELATIONS

Red-winged Blackbirds (*Agelaius phoeniceus*) were in frequent attendance of the grebes' nest building. After the grebes' departure from a nest platform, the Red-wings immediately dropped down to the nest and appeared to be snatching up insects, probably brought up with or attracted to the wet vegeta-

tion. Deusing (1939) watched a Long-billed Marsh Wren (*Telmatodytes palustris*) catching insects on a Pied-billed Grebe's nest.

The incubating grebes tolerated the passing and activities of other marsh nesters such as the Pied-billed Grebe, American Coot (*Fulica americana*), Black Tern (*Chlidonias niger*) and Red-winged Blackbird near the nest. The several species of ducks (*Anas platyrhynchos*, *A. rubripes*, *A. discors*, and *Aix sponsa*) common in the marsh were tolerated as they fed near the nest prior to the hatching of the grebe chicks.

The grebes assumed a defensive posture (neck and head upstretched with the bill directed towards the cause of the alarm) whenever Herring Gulls flew low and noisily over the nest. Once 2 immature Ring-billed Gulls (*Larus delawarensis*) dived at one of the 3-week-old chicks and stimulated a half-running, half-flying attack by both adults. These same 2 gulls also tried to rob the male grebe of a crayfish, but only forced him to dive out of their reach. A female Marsh Hawk (*Circus cyaneus*), gliding only 4–5 m directly over the nest, caused the male, with the chicks on his back, to leave the nest.

At hatching the male became strikingly territorial towards other species. On one occasion the male drove off 2 immature Pied-billed Grebes that were foraging at least 40 m from the nest. The male approached one of the Pied-bills in a very pronounced threat attitude, hunched very low on the water. The male dived and in the same instant the Pied-bill half-ran, half-flew 3–4 m across the water. The male surfaced and continued to pursue the Pied-bill in a threat attitude. When the male dived a second time the Pied-bill flew off. The male then turned his attention to the other young grebe and with a similar sequence of actions drove it away. According to Storer (1967) grebes seem to fear underwater attacks and so do not remain on the surface if an aggressive grebe dives.

In aggressive situations diving is "understood" as a threat between different species, and even genera, of grebes but apparently not between higher taxonomic groups. When the male approached a Mallard feeding 10 m from the nest in a threat attitude, the duck continued feeding, and as the male dived the duck remained oblivious to the grebe's actions. However, several seconds after the male dived the Mallard sprang into the air and, quacking loudly, flew off. Apparently the duck did not "interpret" the dive as a threat and so fled only after (presumably) being physically attacked from underwater.

The pair's interspecific territoriality appeared to be in defense of the brood and not the nest site or any fixed area of the marsh. This was suggested by the rarity of agonistic behavior prior to and during incubation and the sudden aggressiveness at hatching. Also, their aggressiveness extended far beyond the nest site and even after the nest had been abandoned. As the brood moved so did the territory. Both adults frequently chased away Pied-billed Grebes,

Mallards, a female goldeneye (*Bucephala clangula*), and a Great Blue Heron (*Ardea herodias*) that came close to the brood as they traveled along the marshy shorelines of the channel.

Twice during the hatching period a muskrat (*Ondatra zibethica*) swimming close to the nest was threatened by the male. When the muskrat dived the grebe immediately followed. Shortly, the muskrat surfaced and continued on its way and the male returned to the nest. The only other interaction with muskrats was that the abandonment of nest site #4, after 4 days of use by the grebes, coincided with muskrats starting to use it for one of their feeding platforms.

SUMMARY

A pair of Red-necked Grebes (*Podiceps grisegena*) was studied in a northern Lake Huron marsh from 20 June to 29 August 1975. Observations were of a re-nesting attempt and courtship behavior was brief and infrequent. Copulation occurred on the nest platform from shortly after nest building began into the egg-laying period.

The nest site was selected by the male although both sexes built the nest. The pair constructed 9 nest platforms, one of which ultimately became the nest in which 3 eggs were laid. Incubation began with the laying of the first egg and both sexes incubated, although the male incubated more during the mid-day and the female more in the morning and evening hours. Nest reliefs were initiated primarily by Head Shaking by the returning bird.

The first egg had a 26-day incubation period. Hatching occurred in mid-morning. The nest was abandoned 2 days after the hatching of the last chick. The chicks were brooded on the adults' backs under their wings. Both sexes brooded and fed the young. Food items consisted of minnows, crayfish, and probably insects. The mean number of feedings per hour increased from 3.5 to 12.5 to 18.0 during the first, second, and third weeks, respectively. Three chicks were successfully raised to over 7 weeks of age.

ACKNOWLEDGMENTS

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NEW LIFE MEMBER

Mr. Hubert P. Zernickow is a new life member of the Wilson Ornithological Society. Mr. Zernickow is an Advisory Systems Engineer with the IBM Corporation at Lansing, Michigan. His ornithological interests are primarily as an observer and photographer, and he has a special interest in owls. Mr. Zernickow is a member of the AOU and is presently president of the Michigan Audubon Society. He is married and his wife, Norene, shares his enthusiasm for birding. In addition to his ornithological interests, Mr. Zernickow enjoys botany, hiking, and canoeing.

