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## A Study of the Cardinal in Iowa

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*Davenport Museum*

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## A Study of the Cardinal in Iowa

By JAMES HODGES

One of the newer birds in the state of Iowa during the last half century is the Eastern Cardinal *Richmondena cardinalis cardinalis*. The Cardinal is a Carolinian form but has extended its range through most, if not all, of Iowa and has been recorded as a breeding bird in Minnesota and other northern states.

This study was conducted from the spring of 1943 through October, 1947 in the area of Scott County, Iowa where the Cardinal is now a common resident.

The Cardinal, because of its striking plumage, has attracted the attention of even the non-bird student and thus has received a variety of names: Cardinal Grosebeak, Cardinal Red-bird, Red bird, Red-headed Jay, Crested Red-bird, Cardinal bird, flame bird, and others.

The purpose of this study is two fold. First of all it is to give a general history of the bird in Iowa and to present the results of preliminary investigations of its life history in this area and second is to compare the habits of Iowa birds to those studied by Mrs. Laskey in Tennessee (Laskey, 1947; 27-44).

Before continuing something should be said as to the abundance of the Cardinal in this county. Though it is referred to as a common resident it is not as common as the Black-capped Chickadee or White-breasted Nuthatch but it is never-the-less common enough to force its presence on one's attention. It was rather difficult to gather nesting data on the Cardinal because nests are difficult to find and are far between plus the fact that the Cardinal does not nest as a general rule in our back yard as do so many other common birds, but on the other hand Mrs. Laskey found them nesting and roosting near houses in Tennessee. Cardinals are frequent visitors to winter feeding shelves but in the majority of cases when the nesting cycle starts the birds prefer to return to more secluded areas.

I wish to take this opportunity to express my appreciation to those who have aided me in so many ways in the preparation of this study: Mr. E. B. Chamberlain of the Charleston Museum, Charleston, South Carolina for information and data; Mrs. G. E. Charles of West Columbia, South Carolina who contributed some of her original observations; Mrs. Amelia R. Laskey for a reprint of her article on the Cardinal in Tennessee; George Miksch Sutton of the University of Michigan for reading the manuscript and making

valuable suggestions and for giving me copies of his two papers on this species; Josselyn Van Tyne of the University of Michigan for reading the manuscript plus the many helpful suggestions he made; and to the individuals who kindly gave me permission to quote from some of their published writings.

#### HISTORY OF THE CARDINAL IN IOWA

In order that a better understanding may be had on the Cardinal in Iowa a brief summary of the topography of the state would not be amiss. Iowa is situated between 40° 20' and 43° 30' north latitude and 90° 15' and 96° 43' west longitude. The state is an extensive plain of 55,475 square miles lying between the Missouri and Mississippi River. Iowa is a little too far inland to receive the equalizing effects of winds blowing directly from the ocean, the climate of Iowa is strictly continental in type. This means a very wide range of temperature, winters of considerable severity, and summers of almost tropical heat.

When the first list of Iowa birds was published by Keyes and Williams in 1893 the Cardinal's status was given as: "Not common. Only occasionally seen in central Iowa, but noticed more often in the southern portion of the state." In 1907, 14 years later, the *Birds of Iowa* by R. M. Anderson was published which listed the Cardinal as, "One of the birds which seems to be extending its range northward in Iowa. . . . At the present time the Cardinal appears to be more abundant in Iowa than formerly, and certainly occurs further north. . . ."

Philip A. DuMont in 1934 had the following to say in regard to the Cardinal's status in Iowa, "A permanent resident, breeding in all parts of the state. It is a common bird in the southern two-thirds (of Iowa) and along the Mississippi and Missouri River Valleys, somewhat rare in the extreme north-central part of Iowa."

As to the present time the best source of information are the spring and Christmas bird counts published in the March and September issues of *Iowa Bird Life*. From these counts it may be concluded that the Cardinal is a common resident in all of Iowa at the present time.

Like any other avian resident species, the Cardinal fluctuates in population from one year to the next. The number of individuals present also fluctuates with the seasons indicating a slight migratory movement, but at the present time not enough data are available to work out in detail the migratory movement.

## THE SONG

I shall make no attempt to describe the song of the Cardinal except to say that the general quality of the male's song is rich and strong yet sweet and pleasing to the ear. I have never heard a harsh note given by a bird of this species. I have found the song to be rather weak in volume at the start of the song season but as the season advances the song becomes much louder. Once in a while one will be heard singing "sotto voce" (or "whisper" singing) but I have found this type of song to be rare. There is usually a pause after each song lasting from 3 to 10 seconds in length but on March 27, 1947 I heard a male give four complete songs, one after the other without a pause, which was the first time I had ever found this.

Laskey found that from June 28 through most of July in 1942 that her Cardinals sang 28 different songs of two to six syllables each. I have, however, very little data on this and no exact count was kept but the variations in the song are of common occurrence. There are some differences in the singing of individual male birds but I have found it to be very slight. A. A. Saunders recorded (1929) an instance of double singing by a Cardinal. The bird sang two distinct songs at the same time, first singing each one separately and then singing them both together.

In an average five-minute period during the spring song period the song is given from 16 to 19 times by the male. (This does not mean the average number of complete songs but the average number of times the Cardinal begins a new song). On March 2, 1946 a male singing at 2:00 p.m. was heard to sing 20 songs in a period of five minutes. Another male on April 7, 1947 at 10:30 a.m. in a five minute period sang 35 songs, an average of seven songs a minute. On July 1, 1947 a male singing at 5:00 p.m. gave ten songs in one minute, all incomplete except one which was complete. In the next minute this same bird gave 9 incomplete songs while in the third minute he gave only 2 incomplete songs.

The male begins to sing during the latter part of February or the first part of March. This is the average start of the spring song period. I have, however, two early songs; one given on January 18, 1946 and January 11, 1947. During those two Januarys we had mild and spring like weather which may have prompted the starting of the spring song period. During the middle of February of these two years other males started to sing. Some of these early spring songs may be a little on the squeaky side but these may be young males singing for the first time. Laskey recorded that in

Tennessee, his clear ringing whistles are heard in January and February, while the female usually starts singing in March. Mrs. Laskey also found her Cardinals singing in every month of the year but had, however, very few records for November and December. I have never heard the Cardinal sing in the last two months of the year here in Scott County. As in the case of most of our songs birds they don't sing in the winter but as a few do it may be a continuation of the fall song into winter or the spring song begins before the winter is over.

It is difficult to say if the weather has an influence on the song but from my own observations I would say that the only time that the weather does affect the song is in the spring, when the temperature and type of weather may influence the Cardinal to sing for the first time. I have heard this bird sing in a 40 M.P.H. wind, in thick fogs, in very heavy rain storms; in one case when it turned cold with a 10° F. temperature plus two inches of snow the next morning the Cardinal was heard to sing.

The song is used for specific purposes. It, of course, is employed more during the nesting cycle than any other time of the year. The song acts as an advertiser to both sexes. To the males it is a warning to stay away from the singer for he has a mate, a territory or both, and any trespassers will be driven off. On the other hand the song is employed to court a female or to tell other females in that area that he is unmated. It is a frequent occurrence that when one male is singing other nearby males with territory will join in and sing with or answer the original singer. On April 7, 1947 I heard a pair of adult males singing to each other at 10:15 a.m. Then another bird not far away joined in and all three birds sang back to each other for about five minutes when all of them suddenly stopped. These birds, however, were not over 250 feet from each other but on the same day at 2:35 p.m. I found a pair singing to each other in a rural area. These two singers were about one-fourth mile apart from each other; then a third bird joined in which was about one-half mile from any of the first two songsters. All three of these birds were males.

In close relation with the song is the singing perch. The singing perch may be in a variety of places. I have found males singing on the top of a pile of underbrush, with 3 feet of snow on the ground and again I have found one 60 feet up on the top of a metal windmill, but these, of course, represent extremes. On the average the singing perch is some exposed limb or branch of a fairly good sized tree. In all cases the male selects a singing perch where he will be

conspicuous. I did find in one instance a male who had two singing perches but such cases I believe are quite rare. If a male does have two singing perches it usually abandons one of these, continuing to use the most advantageous perch. On one occasion I saw a male fly from one singing perch to another and while in flight it gave a complete song. This is my first record for such a performance.

The frequency of the song varies during the nesting cycle which Table I illustrates. Eight months of the 1947 song period with the

**Table 1**

Comparison of the Frequency in the Song

Month	No. Days in Month	Days Heard	No. Individuals
January	31	4	5
February	28	3	3
March	31	24	12
April	30	24	23
May	31	20	8
June	30	11	11
July	31	13	19
August	31	4	5

number of days in each month, the number of days singing was heard, and the number of individuals singing. In January the song period started on the 11th. From the 11th to the 31st singing was heard only 4 days by 5 males. In February singing was done by three males during 3 of the 28 days. This may be accounted for by the sudden arrival of inclement weather which lasted for a period of time. In March the general song period started. Singing was heard on 24 of the 31 days involving 12 males. In April the song season was at its peak with singing heard 24 days out of the 30 involving 23 males. The increase in the number of days is only one but the number of singing males had almost doubled. Some of the birds that were singing during March had secured mates and were spending more time in nesting activities instead of singing. In May the number of days heard and the number of males singing takes a sudden drop. Almost all of the birds now are engaged in the nesting cycle while the 8 birds that were singing are composed of those that are yet unmated and several that have completed the first nesting and are about to start the second nesting. In June the number of singing days had decreased to 11 but the number of males in song had risen from the 8 of May to the 11 of this month. These 11 are no doubt birds that have just completed one brood and are starting the second with probably a few yet unmated birds that are still singing. July has more singers and more

days when the song was heard than June but this is the final completion for almost all birds for the first nesting and they are preparing for the second nesting. August is the same as the start of the song season in January. The August singers are no doubt those who have completed the second nesting and a few young birds. In general, when the male begins to sing in the spring the song is given very frequently. That is during pre-nesting time when he has not secured a mate. After he has found a mate the song is still given quite often but not as often as before. When the nest contains eggs or young the song is greatly reduced as to the number of times it is given. This is perhaps due to two factors: (1) song may draw unwelcome visitors who would do harm to the nest and its contents; (2) the male is so busy collecting food for the always hungry nestling that he has very little time in which to sing.

About the song of the female I have very little data. I have found the female to be an infrequent singer and when she does sing it is rather weak in volume; but she often gives the "chip" (which the male also gives). The chip is given more often during the fall, and all of the winter, months.

Mrs. Laskey recorded that at times the female seems to sing more softly than the male, but this is not always or even usually the case. She has found no difference between the song of male and female. Mrs. Charles wrote me that in South Carolina she had found just two cases of a female Cardinal singing on the nest in response to the song of her mate. One was in 1945 and the other in 1946. In both cases the nest was in a tree or shrub only a few feet from the house and the song was heard often over a period of a week or more and sometimes when the mate was not singing. Mrs. Laskey recorded a similar instance for Tennessee though I had never found it here in Iowa. I have never found the Cardinal singing at night but Mrs. Charles wrote me that she had only one record of night singing of this species as it is not considered a night singer. About 12:00 in the night of May 22, 1946 in West Columbia, South Carolina her daughter heard a Cardinal sing a few notes in the wood back of their house. A few nights later Mrs. Charles, too, heard one sing about the same time and place. Of the 25 species of song birds that nested in Mrs. Charles study area of about seven acres in South Carolina the Cardinal was the earliest morning singer. In the nesting season its song has been heard as early as 3:55 o'clock a.m., E.S.T. according to Mrs. Charles. The lack of data that I have on the female of the species is due perhaps to the fact that no intensive study was made of her song as was the case

in the male. George M. Sutton informs me that he has, however, found the female Cardinal to be a very frequent and excellent singer.

For more data on the song see under courtship.

#### TERRITORY

The territory of the Cardinal is the area in which he spends most of his time, leaving it only in unusual circumstances. The exact size of the territory is difficult to determine because it does vary with the locality. The territory may be a small piece of woods, an acre in extent, or the size of an average city block. The requirements of the territory are to provide cover, food, water, and a suitable nesting site.

The establishment of territory becomes evident when individuals are heard to sing in the same area on successive days which is usually in February or the first part of March at the latest. As the spring song period advances more birds proclaim territorial rights through song.

All of the important events take place in the territory: such as copulation, and nesting. The nesting site is usually central, but in rare cases the nest may be constructed on the edge of the territory.

Foraging for the young is carried on in the territory but when the food supply runs out or is almost exhausted the foraging is carried on in near-by areas, where no other Cardinal has a territorial claim, that is, the Cardinal expands his territory limits.

Laskey recorded that the Cardinal does not defend territory so pugnaciously as Mockingbirds but stated that there is some mild fighting in the spring. The Mockingbird does not nest in the area where I made this study so I am unable to compare the temperament of the two species but I have found that the Cardinal does do a great deal of fighting during the courtship period and at some times it is quite furious. E. L. Mosely (1936:312) recorded that he found within a period of less than a year six adult male Cardinals dead in his yard of less than one acre in extent. The killing itself was not in any case directly observed but many desperate combats between rival males were seen. Several of the birds showed evidence of a broken neck. He also observed a mature Cardinal come up to his male offspring from behind, pounce on his back and take out a quantity of feathers. A few days later this same immature bird was found dead. These cases just cited may be an extreme but I think it is safe to say that the Cardinal is just as pugnacious as any other species of the same family during the mating season. I



have, however, found Cardinals nesting in perfect harmony with White-breasted Nuthatches, Black-capped Chickadees, Red-eyed Vireos and others which were nesting nearby. For more data on this subject see under courtship and mating.

#### COURTSHIP

Courtship is carried on by various displays of one kind or another by the males and song is given by both sexes in this stage of the life history. The following events were observed by me which I consider are part of the courtship activity of the birds.

On March 6, 1946 I saw a male chase two other males from his territory. While he was doing this he gave his *chip* plus a low squeaky note that I had never heard before. While he was pursuing the trespasser his mate gave parts of her song several times. It may be assumed that either she was urging her mate on or trying to entice the intruding male back. After the mated male had evicted the trespasser from his territorial limits he returned to his singing perch and gave two complete songs.

On April 6, 1946 I saw a female perched in a tree with a male perched on each side of her at the distances of about five feet. Both males were singing as loud as they could, and once in a while the female would sing with them. On April 22 of the same year I saw one perched close to a female and singing very softly.

On July 10, 1946 I saw a male which I thought to be courting. He moved back and forth along the branch of the tree and fluttered his wings. While doing this he gave a low call *putt*. A female was not far away but she seemed to be paying no attention to the displaying male.

I saw another male courting on March 9, 1947. It would give short snatches of its song and then chase the near-by female a few feet and then stop to sing a few bars of its song and then give chase once more.

At 5:20 p.m. a male was singing in Giddings Woods on March 17, 1947 perched in a tangle of vines about 25 feet up. This bird sang its song in two distinct pitches which I thought was unusual as I had not come upon such an occurrence before. The male sang several times and then flew to another tree fifty feet away and was singing. A female was in the area and she flew to the first perch where the male had been singing. About four minutes later the female flew a little closer to the singing male but the female did no singing. This male sang from 5:20 to 5:40 p.m. but my observation on this performance was halted because of darkness. I think,

however, the male was courting this female by its songs. I imitated the male's song and he immediately responded with a long, loud warble, the type of song used to proclaim territory while the singing that was being given by him tonight was very low in volume. Every time I imitated the song of any male that was singing during the courtship period the male would always answer back with a song but during the remainder of the cycle none would respond to my imitations.

Sometimes foreign males venture into the territory of a male who has secured a mate, to court the female and entice her away. The males that are mated always give chase and drive the trespasser out. Some Cardinals court at times by means of display. The male perches on a limb not far from where the female is perched and he struts or moves back and forth across this limb, flapping his wings in a fanning motion, and gives his call while the female seems to pay no attention to him. Then too, is the courtship feeding where the male feeds the female. I have never observed this habit yet but Laskey recorded that this performance is a common occurrence in March and April but diminishes when the young need attention and the male thus is occupied attending to their wants. Gainer (1937) thought this feeding performance to be the beginning of the courtship period. Another observation made on April 7, 1947 may have some bearing on the feeding habit. On this day I found a male that was singing from its perch. It would sing a few times and then stop and pick a few buds off the tree and then sing again and then repeat the bud eating act. It was observed that all of the buds of the tree that were picked off were not dropped but instead kept. It may be that the instinct to feed another bird caused it to release its energy in this more or less primitive form. In the five minutes that I watched this bird it changed its singing perch four times, gave its song 30 times, plus the eating of the buds of the trees.

#### MATING AND THE NESTING CYCLE

Nesting is the climax, or last phase, of events that begin even before the snow has all melted and run into the near-by Mississippi River. The female selects the nesting site, which takes from two to three days (in some cases even longer). Both sexes take part in the construction of the nest, but the female takes the lead and collects most of the nesting material. The materials for the nest are usually collected in the immediate area of the nesting site. The nest is composed of leaves, twigs, stems of small weeds, grape vine bark, and is usually lined with a fine grass or bark. Of course

some nests are constructed that are void of lining and are frail in structure but these are usually destroyed by weather conditions. A large number of nests and their contents are destroyed in the early spring months by the weather which is very inclement during this time of the year, with high winds, sudden blizzards, and heavy rains, and any nest that is frail will usually meet with disaster. The average elevation of the nest is 15 feet from the ground, but I have found it as low as three feet. Laskey listed nests from  $2\frac{1}{2}$  to 12 feet from the ground with the average height from 4 to 5 feet. Nesting and its activities are in high pitch at about the middle of April but some years this may be a little earlier or later.

After the nest is completed it is one to five days before the first egg is laid. The average number of eggs in a clutch is two but at times as many as three eggs are found. I have never found a nest as yet containing more than three eggs.

Two broods are usually raised in one nesting season if nothing hampers the start of the nesting season or the first nesting season meets with failure. This second nesting begins in the middle of June. My latest nesting date is August 3 (1946), when I found a nest containing two young birds well covered with down. On May 12, 1947 I found a nest built in a tangle of vines near a busy highway was placed about six feet from the ground. The nest contained three eggs which seemed to be fresh or just slightly incubated. The female was incubating and was reluctant to leave the nest and when she did leave she remained within a few feet from the nesting site. On May 18 the nest contained two nestlings and one unhatched egg. The eyes of one of the nestlings were closed yet while the others eyes has just opened. Both were covered and the feather tracts on the wings were visible. The inside of their mouth was a pinkish-purple hue. While I was examining the nest the male bird was heard to sing once very low. On May 25 I again examined the nest and found that the two nestlings had left with their parents and the nest contained only an egg which I assume was infertile. Neither the fledglings or parents were seen or heard while I was in the area this time.

On May 31, 1945 I found two well incubated eggs in McMannus woods. For an experiment I destroyed the nest and its contents to see what the reaction of the parent birds would be. The female returned to the nesting site first and perched on a limb giving her "chip" call constantly. The male returned some time later and perched near the female. He didn't show any visible reaction. On June 12 I returned to the location of the old nesting site but was

unable to find any evidence of renesting but I heard the calls and songs of these same two birds but they were still in their old territory.

The Cardinal is at times a victim of the Cowbird *Molothrus ater ater*, and the eggs of this parasite are in most cases accepted as their own.

The young birds grow very fast, the down soon being replaced by feathers. The tail is the last part of the body to develop to the mature size. Both sexes help to feed the young, with the male bringing more food more times than the female. If any fecal sacs are in the nest, they are carried away by one of the parents.

The parents have habitual ways in which they approach the nest. They usually alight on a near-by limb and look over the area of the nesting site for danger before they come to attend the nestlings.

During this period a slight jar or tapping of the nest will cause the young birds to gape. The nestlings soon learn the way in which the parents approach the nest and so they always stretch their necks in that direction, if the slightest hint is given that the parents are in the area of the nest.

My banding work with this species has been very limited, but my observations show that the best time to band the young is when they are from four to six days old. The older they are the harder they are to band and keep in the nest after banding.

In most cases the young desert the nest in the morning and rarely in the afternoon. They are prompted by the parents who offer food and give calls of encouragement. The young do not go far from the nest during the first day, the average distance being about 10 to 20 feet, the distance increased every day. The fledglings now signal their presence to the parent birds by a very loud squealing call.

As mentioned previously in this paper there are some differences that I have noticed that occur in Laskey's study made in Tennessee and mine conducted in Iowa, a direct comparison of a Southern and Northern climate. The differences occur more often in the nesting phase of the cycle. I have never found a March nesting and if there were some the success of them would be very doubtful due to the inclement March weather of one kind or another which would destroy the nest of a Cardinal or else cause the contents of the nest to perish. The same would be true with a late September nesting because of the same factors but there would be a much greater possibility for a September nesting to succeed than a March one. On the average Cardinals don't nest near human dwellings though there

are of course exceptions. Most of the nests are constructed in tangles of vines, blackberry bushes, and once in a great while one will nest in a small tree but this is quite rare. On the average nests are built in tangles of vines. At times as many as 10 such nests are found in large tangles of vines, being added each nesting season. There might be other differences that occur in these two areas but I think the ones that have been mentioned were the prime ones.

As soon as the fall molt is completed fall flocking begins. Small flocks may be found during the latter part of September on the average and during all of October until the start of the nesting cycle. These flocks are composed of several family groups amounting at times to 25 birds. They of course vary with the density of the population. Flocks in some areas wander over the countryside or are at least partly migratory while those in other areas seem to remain in the same locality. Where they stay and how long they remain in one area no doubt depends upon how much cover and food may be found in the given area. At times individual pairs may be found, at times both sexes or two birds of one sex. I think that in some cases a few pair may remain in each others company during the winter season and mate again for the next nesting. On January 18, 1947 and November 28, 1947 I found a male and female perched in a tree together. Roosting is done in tangles of vines or some other sheltered area where they receive protection from enemies and weather.

#### OTHER DATA

The economic importance of any species of bird deserves a special note. The food of the Cardinal is made up of both animal and vegetable matter. The animal matter is composed of caterpillars, weevils, rose, click, potato, cucumber, and many other beetles. I have found them in some cases preying on aquatic insect life. The vegetable matter is made up of seeds of wild berries and all of the abundant weed seeds. Cardinals do a little damage to ripe cherries, but this damage is very small compared to all of the weed seeds that are destroyed.

The Cardinal has the usual kinds of enemies in this area. Perhaps the greatest one is the house cat which is the foe of all wild birds. Then too, is the vicious little House Wren *Troglodytes aedon parkmani* which will destroy the eggs if they are unprotected by the absence of the parents. Sherman (1925: 130-31) elaborates on this in detail.

I have never found any bird of this species that was infested with ecto-parasites. Mrs. Charles wrote me that she had found two

nests infested with mites in South Carolina and has also found a few birds with ticks that were near the eyes and were large enough to be seen as the birds fed at the window shelf.

The subject of "anting" by wild birds has become predominate in ornithological literature during the last few years but few if any have appeared on this bird anting. Mr. E. B. Chamberlain wrote me that his son, E. B. Chamberlain, Jr., found one anting on July 11, 1946 near Bears Bluff Marine Laboratory, on Wedmelaw Island, South Carolina. When this was first noticed, the bird, an adult male, was hopping about on a wooden roof where a good number of large red ants were moving to and fro. After a moment, the bird began to catch ants, one at a time, with its beak, and to place them in the feathers under its wings, tail, and on its back. As it did this it fluffed out its feathers. These actions were continued for three or four minutes, during which time about forty ants were caught. It could not be determined, however, whether the ants were killed, crushed or alive when placed in the plumage.

#### SUMMARY

The Eastern Cardinal *Richmondena cardinalis cardinalis* is one of the newer birds in the state of Iowa during the last half century. It is not as common as it is in its southern range but it is found in all parts of Iowa at the present time, though in some areas in small numbers.

The contents of this paper is the result of five years of investigation of the habits of this bird in Scott County, Iowa. The aim of the study was to give a history of the bird in the state and its habits and too compare the habits of Iowa birds to those in the south as observed by Mrs. Laskey.

During the winter months the Cardinal is a visitor to winter feeding shelves but when the nesting cycle starts the birds usually return to nest in more secluded areas.

The song of the Cardinal seems to be rather weak at the start of the song season but as the season advances the song becomes stronger. This song has numerous variations plus "whisper singing." The song period starts in the latter part of February or the first part of March, the number of singing males and singing days gradually increase until April when it reaches its peak and gradually declines.

It is difficult to say if the weather has a direct influence on the song but limited observations seem to point to the fact that the start of the spring song season may depend to some extent on the weather.

The use of its song during the nesting cycle is to defend territory and to be used in courtship. The song is usually given from one station which is called the singing perch which may be only a few feet to over 50 feet in height.

I have found the female to be a not common singer but this may be due to lack of observation as other investigators have found the female to be a common and excellent singer.

The size of individual territories vary but they must provide cover, food, water, and a suitable nesting site. The territory is the scene of all important events such as copulation and nesting. As the season advances the bounds of the territory may be expanded to some degree when the food supply has become exhausted.

Courtship is carried on by song and displays of various kinds. The male does almost all of the displaying, both in plumage and song, but at times the female takes an active part in the courtship proceedings.

The female selects the nesting site, which takes from two to three days or even longer. Both sexes take part in the construction of the nest with the female playing the prime part with the nesting materials being gathered near the proposed nesting site. The nest is composed of leaves, twigs, stems of small weeds, grape vine bark, and is usually lined with a fine grass or bark. The elevation of the nest is 15 feet from the ground. On the average it is one to five days before the first egg is laid after the nest is completed. The average clutch of eggs is two but at times as many as three are found.

Two broods are usually raised in a season if nothing has hampered the start of the nesting cycle. The second nesting begins in June.

At times a nest of the Cardinal is found containing eggs or young of the Cowbird and they are generally accepted as their own.

Both sexes help to feed the young, with the male taking a more active part in the feeding and if any fecal sacs are in the nest, they are taken away by one of the parents.

The parents always approach and enter the nest from the same direction but before they go to the nest they usually alight on a near-by limb and look over the area. During this period a slight jar or tapping of the nest will cause the nestlings to gape for food. The nestlings soon learn the direction that the parent enters the nest and always stretch their neck in that direction, if the slightest hint is given that they are near the nest.

Banding should be done when the birds are from four to six days old as the older they become the more difficult it is to band them.

The Cardinals of Iowa don't nest in March as they do in Tennessee and it would be quite rare if a September nesting was found. On the average Cardinals do not nest near human dwellings but construct the majority of their nests in tangles of vines.

Flocking begins just after the fall molt is completed when small flocks may be found during the latter part of September. These flocks are composed of several family groups but this of course varies with the density of the population. In some cases individuals may remain together during the winter months.

The diet of the Cardinal is composed mostly of vegetable matter though some insects are taken. They were seen to feed on cherries once but the damage that they do in this respect must be very minute.

The enemies of this bird are the house cat and house wrens though there must be some loss through hawks and owls and automobiles but it is probably very slight.

Mrs. Charles of South Carolina found two nests infested with mites and found a few birds with ticks that were near the eyes.

One Cardinal was seen "anting" in South Carolina according to E. B. Chamberlain, Jr.

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