

A BEHAVIOR STUDY OF THE WHITE-TAILED KITE

WITH ONE ILLUSTRATION

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This paper treats mainly those activities of the White-tailed Kite (*Elanus leucurus*) which have sexual significance and which take place in the early half of the reproductive cycle. It is a study of behavior having a broader coverage than is embraced by the term "courtship." Observations were carried beyond the prenuptial period and, since they were made in a region where the population was denser than is usual for kites, a study of the relationship between neighboring pairs was possible.

About 53 hours were spent in field observation. A large portion of this was spent in the study of two adjacent pairs of kites. The activities of one of these pairs, henceforth referred to as the "north pair," were studied in detail; the activities of the second, or "south pair," were noted for the most part only when they concerned the north pair. The remainder of the time was devoted to censusing, and to observing the foraging methods and other activities of other pairs. The intermittent nature of the observations made impossible a study of the gradual changes in behavior. However, the fact that visits were made at regular weekly intervals minimizes the effect of this lack of complete data.

These studies were carried on in the San Joaquin delta region of California where, protected and isolated by the sloughs, the kites find willow-covered marshy islands on which to nest and large open areas, for the most part under cultivation, in which to forage. Observations were made from a car parked at an estimated distance of 50 yards from the nest. This distance had certain disadvantages, but was satisfactory in that once the observer was settled the birds paid no attention to him.

In a study of this nature it is obviously necessary to be able to identify the individual birds. Fortunately distinguishing between the two members of the north pair was rendered simple by the fact that the male, on the first day of intensive study, had a broken remex near the dividing line between primaries and secondaries. The gap resulting from the subsequent loss of this feather was present at least until the study was terminated. During this whole period the female appeared to be in perfect plumage. In addition to this, there are certain natural sexual differences recognizable in the field. The female is noticeably larger than the male and the gray of her back and wings is darker. In flight she is steadier and has a wing area appearing proportionately greater than that of the male. These differences were constant in the several pairs observed but, being of a comparative nature, it was necessary to see both birds if they were to be used.

NARRATIVE

This section is devoted to a narrative of the behavior of the north pair of kites. It shows how behavior changed with the season, how the birds divided their day into various periods of activity, and serves as a framework in which certain of these activities, to be described in detail later, can be oriented.

Observations on this pair were made as follows:

February 4, 1940	11:15 a.m. to 11:45 a.m.	½ hour
March 3, 1940	7:50 a.m. to 4:50 p.m.	9 hours
March 10, 1940	6:00 a.m. to 10:45 a.m.	4¾ hours
March 17, 1940	6:15 a.m. to 10:10 a.m.	4 hours
March 23, 1940	4:02 p.m. to 6:50 p.m.	3 hours
March 24, 1940	5:18 a.m. to 3:18 p.m.	10 hours
March 31, 1940	5:15 a.m. to 1:00 p.m.	7¾ hours
		39 hours

On March 3, 10, and 31 observations of this pair were also made for short periods in the late afternoon, observations of other kites having been made in the meanwhile.

At the time of the first observation on the north pair the sexual bond had already been formed. The two birds were observed perched near each other for some time. Finally one flew, going out to forage, and in a few minutes the other followed. Another mated pair was also watched on the same day. For about half an hour they were perched in the top of a dead willow only two or three feet apart. Only once did one of the two leave, going then to chase a Marsh Hawk (*Circus hudsonius*) which flew close by. On this date foraging and perching near each other were probably the only activities of paired kites.

I do not know when behavior actually connected with reproduction started, for on March 3, the next day of observation, copulation and work on a nest had already commenced.

A kite's morning meal, eaten shortly after dawn, usually consists of one small mammal. This meal evidently was finished when I arrived about 8 a.m. on March 3; the birds were perched, motionless and quiet. A few minutes later copulation was observed, the kites then becoming inactive again for almost two hours. During this time they preened and called occasionally. There followed a 20-minute period, initiated by a copulation, during which the birds worked on their nest. From 10:10 a.m. to 1:20 p.m. was another period of inactivity. The two kites perched low on the lee side of a clump of willows, sheltered from a rather strong wind. There they sat near each other and preened, the female almost continually, the male less frequently. Occasionally they called. This three and a half hour interval was broken when both birds flew out and returned to the nest with twigs. During the rest of the afternoon, until observations were terminated at 4:50 p.m., the male spent most of his time foraging. In this time three of the small mammals he caught were eaten by the female and three by himself. His forays were interspersed with three more copulations.

A week later, March 10, observations began at 6 a.m. The kites, perched in the half light, evidently had not begun their day's activities. Several minutes later copulation took place and then the male went out to hunt. Returning shortly, he passed his catch to the female. This morning, at least until 10:45, when observation ceased, there was considerable activity. At 7:05 a territorial fight took place with the pair to the south. Later twigs were brought to the nest, copulation occurred four additional times, the male made nuptial flights, and several times patrolled his territory. Later in the day I made two short observations. At 1:15 p.m. the male was observed foraging and at 4:20 the pair was seen near the northern boundary of their territory, at which time copulation occurred.

On March 17 I arrived at 6:15 a.m. At that time the male was away but shortly returned with a mouse. On this morning the kites each ate $1\frac{1}{2}$ mice, the male as usual doing the foraging. They flew to the south, alighting in a piece of newly-gained territory, and copulated. The female stayed perched there almost an hour while the male brought a stick to the nest and made several nuptial flights. When the female returned, she brought a twig to the nest. Copulation then took place, after which the male made several trips to get nest material. About 9 a.m. the wind became rather strong and the birds soon repaired to the sheltered low willows where they habitually perched close together under such circumstances. They were still there when observation ended at 10:10 a.m.

On March 23 I arrived at the territory of the north pair at 4 p.m. At that time the female was on the nest incubating. The male, which was perched nearby, soon went foraging. When he returned with a catch, the female left the nest, went to a dead willow

perch, and began preening. About three minutes later she flew to the male's perch and got the mammal which by then he had partially eaten. After she had eaten, they copulated twice, the two acts being separated by an interval of 13 minutes. The male then brought another mammal which the female ate. After that they each brought one twig to the nest and the female then settled on the eggs after having left them uncovered for 40 minutes. The male then preened awhile and later caught and ate two mammals. Until it was almost dark, he perched near the nest and then flew off, probably to a sheltered perch he habitually used at night. The female was still on the nest when I left after dark.

The next morning at about sunrise the male was heard calling from the direction in which he had gone the night before. Soon he arrived and perched in a dead tree not far from the nest. He remained there until the female left the nest three-quarters of an hour later. Immediately they copulated and then the male went hunting. He soon returned with a mammal for the female. When finished eating, she obtained a twig, took it to the nest, and then resumed incubation. For the next two hours almost continual preening by the male was the only activity noted. After this the male flew off, returning with his mouth full of limp-looking straw. As the male deposited this in the nest, the female left. In the next six minutes copulation was noted twice. The male then went hunting and on his return brought a small mammal, which the female ate. A few minutes later she made an unsuccessful attempt to break a twig from a willow tree, then returned to the nest to resume incubation. For nearly half an hour the male preened, then flew off to hunt. When a motor boat passed near the nest, the female left it and flew to a perch on a dead willow. She preened and continued to do so as the male ate a mouse he had brought in. Later she took a twig to the nest and again incubated. From 10:12 a.m. to 1:39 p.m. was a period of prolonged inactivity. The incubating female did a little preening; the male, which was perched, also did some preening. At the end of this period the male went hunting. He remained away longer than usual and when it began to rain about 2 p.m., he was still away. At 2:20 he returned and perched, his hunt unsuccessful. He spread his wings and tail in the now heavy rain, using this as a means of bathing. At 2:38 the female left the nest and joined him in bathing. By 3:18 the condition of the roads, due to the heavy rain, was so poor that I had to leave. By then the female had been off the nest 40 minutes and showed no signs of returning.

On March 31 the first sign of activity was the calling and then appearance, at 5:32 a.m., of the male from his overnight perch, perhaps 75 yards from the nest. During the next 40 minutes he made several flights about his territory but showed no evidence that he had been foraging. In the course of one of his absences the female, which had been incubating, spent a four-minute period off the nest, shaking and preening herself. When the male's flights ceased, he preened for about half an hour, then, at 6:45, went foraging. At 6:47 the female left the nest to receive in mid-air the mouse the male was bringing. After eating this, the female returned to her incubating while the male spent most of his time preening. Observations were continued until 1 p.m. Up to that time the female did not leave the nest. The male interspersed his preening with a few nuptial and patrol flights and brought one stick to the nest. The period, as a whole, was one of little activity.

BEHAVIOR

Pairing.—It seems probable that the White-tailed Kite, a resident species, once mated, thenceforth remains paired. Whenever I have seen kites they almost always have been in pairs. Unfortunately, I have never observed them in late fall or early winter, the period when sexual bonds would be most apt to break, so it is yet possible that this latter may happen. However, with the exception of but two kites, all I saw after February 4 of 1940 were paired. It is probable that odd birds wander, as I found that the two mentioned above did, and await their turn to fill in a gap in the resident population.

Territoriality.—A bird as rare as the White-tailed Kite might be expected to be well dispersed, with each pair well isolated. This is often the case, but when conditions are favorable it is found that kites group together, forming moderate-sized communities. However, this does not mean that they are in any sense colonial. The pairs of kites remain spaced out over this favored area in a fairly uniform manner, but close enough in most cases so that territorial boundaries must be determined.

At least the general outlines of these territories must have been formed by February 4 in 1940, for on that date the pairs of birds observed were perched at approximately the places they used later when territories were well established. The territory of the north pair in its final form is shown on the accompanying map (fig. 81). Part of the boundary of the territory of the south pair is also shown. On March 3 the male of the north pair covered all parts of his territory except area E, that small portion marked off at the south end. This area, it was discovered, was then part of his neighbor's territory.

A week later, on March 10, one hour after sunrise, the north male, followed shortly by his mate, flew from near the nest directly to area E. On arriving at this small bit of the island they immediately perched on dead willows. It was not more than a few seconds before they were beset by one and then both kites of the south pair. All four birds engaged in the ensuing tussle, each singling out one of the other pair. Because of the speed of the action, I could not determine whether they chose an opponent of the same sex. The opposing birds towered up to about 150 feet, high for kites, each trying to gain a superior position. Finally they would engage each other, grasping with their feet the leading wing edge or the feet of the opponent. Once or twice the bill was used to hold an opponent's wing. Tangled up in this way, they would be unable to fly and would tumble earthward, a whirling mass of wings. When about half way down, they would lose or release their holds and separate, immediately flying up again to start over. Each of the two sets of birds repeated this about four times. By then the invading pair began to retreat and were soon in hasty flight back to their home ground followed by one of the south pair which dived at them as they fled. The activities of the south pair shortly afterward took them to the southern part of their own territory whence they evidently were unable to detect the return of their neighbors to the disputed bit of territory. The female of the north pair stayed in area E almost 45 minutes undisturbed. Later in the morning the north pair made two more trips to this spot for nest twigs and they copulated there once.

A week later, March 17, possession of this spot by the north pair was undisputed. They copulated there early in the morning, then brought twigs back to the nest. Later the female spent half an hour perched in E while the male twice brought sticks from there. Apparently by perseverance they had increased the size of their territory. Such extended flights and long periods away from the immediate nest region were quite unusual behavior for the female. It may be that to feel in complete possession of their territory both members of the pair must be familiar with it. This is supported by the fact that I only once saw the male at the island marked F and at that time he was in the company of the female. Copulation took place there as well.

The territories of the north and south pairs also bordered between the foraging areas B and C. The male of the north pair used B regularly and always restricted himself to the area as shown on the map. The male of the south pair evidently did most of his hunting to the west, for his visits to area C were infrequent, though he did use it for foraging and at least twice he entered area B. On one of these occasions he was discovered by the north male which, by several dives and swoops, drove him out. Twice, also, the male of the south pair was caught foraging in area A whence he was immediately ejected by the

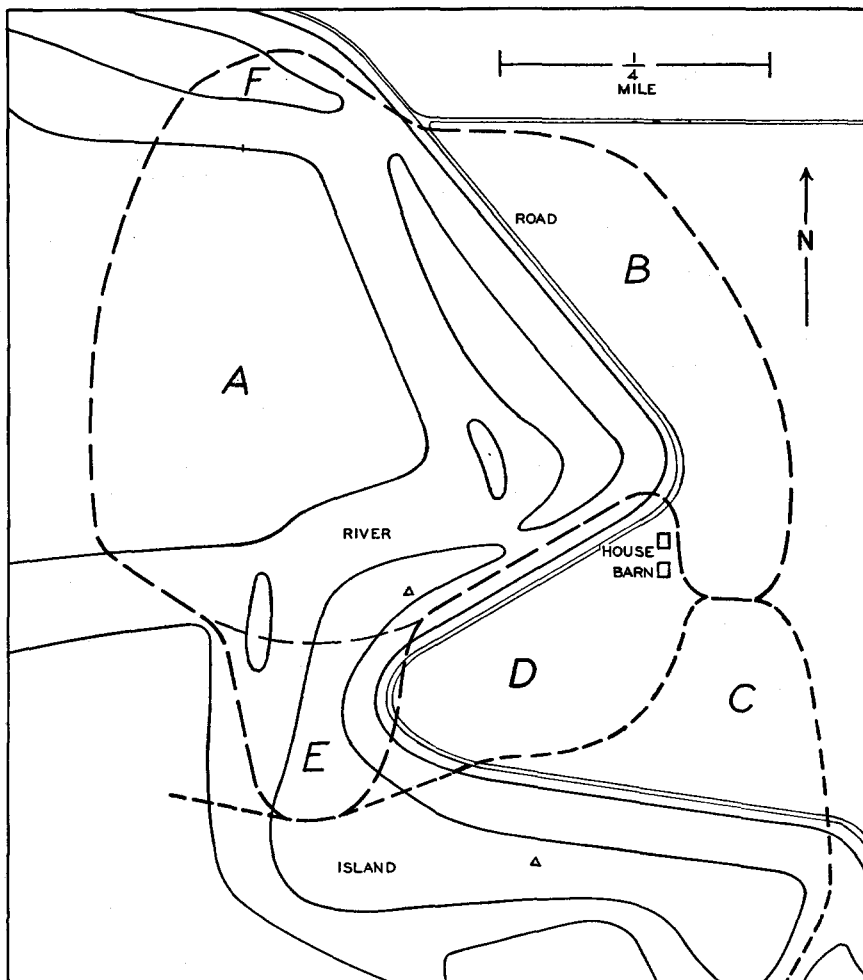


Fig. 81. Territories of White-tailed Kites in San Joaquin delta region of California. Broken lines mark boundaries. Areas A, B, E, and F constitute the territory of the north pair as finally determined; Area C, and earlier E, belonged to the south pair (see p. 298); D was unoccupied ground. Triangles mark nest locations.

owner. In both cases the intruder left flying straight for his home roost, coming south over the nest and area D. He never ventured to reach area A by this route; had he done so, he surely would have been detected. More likely he circled into it from the west, in which direction part of his own territory probably lay.

Usually two or three times a day, sometimes oftener, the north male went out on what were seemingly patrol flights. On these he covered a large part of his territory, flying in a normal and direct manner. Foraging would not be confused with patrolling activities, for the former could be recognized by the specialized methods of flight which are used. He was by no means such a vagrant as was the south male. During my periods of observation he never ventured beyond his territorial boundaries after they reached their final position. In observance of these limits the female was just as strict as was the

male. Even though the boundary line was only fifty yards from the nest, she was not observed to cross it. Since she did not engage in patrolling or foraging, and as her trips for nest material were usually quite short, she had little occasion to leave the area.

From my study of the north pair I have arrived at certain conclusions regarding the factors which controlled the size and shape of their territory. For some distance to the north there was no suitable nesting site for another pair of kites. Therefore they were free to move from their nest region as far as they needed. This need was apparently controlled by the availability of food. Areas A and B were able to supply it. To the south and probably to the west they were bounded by the territory of the south pair. Area D to the southeast is a depressed region, much of which, during the period of study, was covered by a thin sheet of water. This area, surrounded by the two territories, was claimed by neither pair and was not used for foraging, nor was it patrolled by either male. Since a large proportion of the area defended was used for foraging, and since useless ground remained unclaimed, it seems that, in this species, maintenance of territory is important as a guarantee of food supply. The right to an area will be supported by both members of the pair if need be. Thus the territory is the kite's own game preserve.

Foraging.—Although the subject of foraging might not be expected to come within the scope of this paper, certain aspects of it have a sexual significance. The main point is that during the courtship and incubation periods foraging is done by the male only. Not once was the female of the north pair or of any other pair observed engaged in hunting. Although 53 hours of observation spread over five weeks' time do not prove that females do not hunt at this season, the feeding behavior followed so uniform and definite a pattern from week to week that I feel the statement can be made with a fair degree of safety.

In spite of the fact that the male provided all the food for both birds, he was not overburdened. He was able to secure a sufficient number of small mammals for himself and his mate during a short period in the early morning and a more extended period in midafternoon.

Usually the female's hunger was satisfied, or at least partially so, before the male ate anything. For example, in his afternoon hunting period on March 3 the male caught 6 mammals. Of these the female ate numbers 1, 2, and 4, and the male ate 3, 5, and 6. The male occasionally relieved his hunger before the female was well satisfied by eating what he caught while perched at a distance. The above case also illustrates this point. Catches 1, 2, and 4 were the first three which were brought to the perching area. The male ate catch 3 while away, but brought 5 and 6 back before eating them, the female apparently being no longer hungry.

One of the ways in which the food is transferred from the male to the female is most spectacular. When about 100 to 150 yards away the male begins repeating the single note *kewp* as he approaches with a small mammal. The female then leaves her perch, or the nest if she is incubating, and flies to meet him, calling *eee-grack* as she goes. When they meet, it is usually at an elevation of about 50 feet. The male, half hovering, flies along slowly and holds the mouse with feet extended well below him. They both call *eee-grack* as the female flutters along behind and beneath the male. Finally she is close enough to turn her body to a vertical position and to reach forward and upward to grasp the mammal with one or both feet. Just at that moment the male hovers still and then, when the female has the prey, he flies off. The female swoops downward and then flies to a perch, where she eats.

The above method and the following one are used with nearly equal frequency. In the second type the female does not fly out to meet the male, even though he usually calls while approaching, but waits for him to arrive. The male may then perch next to

the female, but more often he does not. In such cases the female flies over and perches next to him. There is then *eee-gracking* and a fluttering of wings by both as the female grasps the mammal with her foot. Sometimes there is quite a struggle before she gets it, but she always succeeds. The seeming stubbornness on the part of the male may be the result of a desire to keep his catch, but this seems unlikely since he always loses it. Perhaps his resistance is a form of sexual "teasing." Similarly, when the transfer takes place in midair, the male sometimes moves along rapidly enough so that the female is continually just out of reach of the food while they traverse a distance of 50 feet or more. He would be quite capable of hovering in one spot while the transfer took place.

Usually when the female was no longer hungry, the male would bring his food to a perch near the nest and eat it, the female paying no attention to him. A few times this was apparently the situation, but after he had been eating for a short while, the female flew to his perch and got the remains of his meal, there sometimes being less than half the mammal left.

Copulation.—On March 3, the first day of intensive study, copulation was observed. Since it took place as frequently that day as on any later date, it is probable that it had been going on for a number of days. It was observed each successive week-end until March 24, but was not noted in $7\frac{3}{4}$ hours of observation on March 31. The copulation period, therefore, lasted at least 22 days. Of this period, 15 to 20 days were before incubation began, the uncertainty resulting because the first day of incubation was not determined.

The frequency with which copulation took place varied but little. It averaged slightly less often than once for each hour of observation. On March 3 it occurred at about even intervals during the day, but later tended to occur in the early half of the morning and the latter half of the afternoon.

Copulation took place only when the female was perched on a dead willow branch. The male would fly to her, hover, and drop to her back. There he would dig his claws into the feathers of the female's pelvic region as he stood still a moment, with his wings half spread, while the female assumed the proper position. She would lean forward so that her back was horizontal or sloping slightly forward and would raise her tail to a vertical position, most often to the left side of the male. At the same time she would spread and droop her wings. There would then be a juxtaposition of the two cloacal regions, the male meanwhile fluttering his wings; after 3 or 4 seconds he would fly away. Following this the female would hold her position, wings limp and tail raised, for about 2, sometimes fully 3, seconds, and then suddenly snap back into a normal perching position. During the whole performance they called *eee-grack* continuously.

The actual time of conjugation, as stated above, is only 3 or 4 seconds. This short time and the generally inept appearance of the act lead me to believe it is rather inefficient. Probably the frequency with which it is done compensates for this.

The stimulus calling forth the mating act is rather vague. In a majority of the cases copulation occurred in an otherwise inactive period. Most often the two birds were perched near each other, perhaps preening, when the male would fly to, and mount the female, the "releaser" for the action being, to me, entirely undetectable. Occasionally it occurred when the birds had just put twigs in the nest; twice it occurred when the birds were visiting new territory, and once the male mounted the female directly upon returning from patrolling his domain. Twice during the incubation period it took place almost immediately after the female left the nest. Once only, on March 3, was it preceded by posturing of the female. On this occasion she assumed the position she takes during copulation and, in addition, fluttered her wings. The male, which was about 40 feet away, immediately responded.

Nest building.—Whether the same nest is used in successive years I do not know. At all events, on March 3 the nest eventually used by the north pair, and the only one seen in the territory, was a well-formed structure. In a month's time it did, however, gradually develop a more substantial appearance.

The work on it was done in about equal shares by the male and female, although in general they did not work together or at the same time. Within my periods of observation material was brought to the nest 23 times. On only four of these trips did the birds cooperate. In one case each bird carried a twig as they returned together from the area they had newly acquired from the south pair. On another occasion the female flew out while the male was foraging and they returned, flying close together, each with a twig. More often one or the other bird went for a twig shortly after copulation took place or, as already stated, the two acts were sometimes performed in the reverse order. The female often got a twig soon after eating and went to the nest with it. This she continued to do into the early part of the incubation period. She would leave the nest as the male approached with food for her, eat, then fly to near-by willows for a twig. Returning to the nest with it she would then resume incubation. The male's work was not often connected with other activities. He occasionally worked quite alone, a few times even when the female was out of sight.

Most of the twigs were gathered within 50 yards of the nest. The bird would alight in the slender outer twigs of a willow, seize a near-by one in its bill and begin tugging. Occasionally breaking the twig proved to be an impossible task and the bird would fly away. Almost always it was difficult enough so that the bird would have to lean far back and beat its wings. When the twig broke, as often as not the bird would lose its balance and fall over backwards. There would then be a second or two of fluttering while it extricated itself and the twig. It would then fly to the nest, hover above it, and finally drop straight down into it. Usually very little time was spent arranging the twig in the nest before the bird left or began incubating. The female was seen to bring only twigs, usually from 6 to 12 inches long. The male brought, in addition to similar material, one reed and, while the female was incubating, a large mouthful of limp-looking straw.

Incubation.—March 23 was the first day on which incubation was observed. Since the nest was never closely examined, it is not known when the eggs were laid. Judging from the activities of the birds on March 23 and 24 I believe incubation had just started. Their behavior had changed little in other respects. Copulation and the bringing of nest material took place to about the same extent as previously, whereas on March 31 no copulation was observed and only one twig was brought to the nest.

I believe incubation is carried on entirely by the female. She was the only one seen incubating during the day and was on the nest both at dark and at dawn the night of March 23-24 and at dawn on March 31. At dusk the male flies off and perches in a sheltered spot about 75 yards from the nest and returns from that spot the next morning.

During incubation the female sits still for the most part but often turns her head as if looking about. She sometimes preens a little. The male, meanwhile, perches near by or goes foraging.

Flight.—The male White-tailed Kite has a very specialized courtship flight. From its characteristic appearance and for purposes of note taking, I have called it "quiver-flight." The bird may begin it either while flying in the usual manner or immediately after leaving a perch. He raises his fully extended wings to about a 45-degree angle and beats them extremely rapidly through a small arc of perhaps 10 to 15 degrees. At the same time the tail is closed and extended in line with the body. The feet may be either extended downward or kept up under the tail. While doing this, the bird progresses at

only a moderate rate and has a dainty, butterfly-like appearance. In spite of this it must be using a considerable amount of energy since the wing movement is very rapid and the whole body vibrates during the process. There is, in addition, a vulture-like rocking from side to side.

This performance was not seen on March 3, but it was done seven times on March 10 and about as frequently thereafter. Evidently it first appears in the sexual cycle later than such activities as copulation and nest building. A possible reason for this is that the performance is not necessary as a means of securing a mate or as stimulating copulation in this species. It is only one part of the complex of breeding behavior that serves to hold the pair together. Thus within rather broad limits it would make little difference when it appeared.

Quiver-flight seemed to function solely as a display and most often occurred with the female as a spectator. Usually it was done when the two were perched near the nest or when the female was incubating. The male would suddenly leave his perch, proceed with quiver-flight for about 50 to 75 yards, circle, and then return to his perch flying with deep wing strokes in his customary manner. A few times while the female was gathering nest material, she was accompanied by the male which flew in this manner, and once he flew in quiver-flight out to meet her when she was returning to the nest with a twig. On March 10 I made the following unduplicated observation. The male was foraging about 400 yards from the nest. He stopped his hovering with a sudden shift to quiver-flight and immediately turned for "home." This he continued for as far as I could see, which unfortunately was not the whole distance to the nest.

The male uses another type of flight which, though distinct, could easily be confused with quiver-flight. The wings are beaten through a rather shallow arc just slightly above the horizontal, while the legs are always extended downward. It is often used when circling about near the nest as is done when bringing back a mammal for the use of either bird or when returning from a quiver-flight excursion. Once, as already explained, the male chased a neighbor from his feeding area B. In so doing he interspersed his dives at the intruder with short periods of circling about in flight of this type.

The female always flew either with ordinary steady wing beating or by soaring and circling, although outside the courtship and incubation periods she engages in foraging and consequently must use other types of flight.

Voice.—In the White-tailed Kite there is no apparent sexual difference in voice. The two types of calls which the species gives are used by both sexes.

The first of these, and the one most frequently employed, is a low rounded whistle or chirp which may be written as *kewp* or *tewp*. It is probably uttered in less than half a second and may be soft or strongly accented. This note is used as a means of recognition or announcement of presence. The male calls in this manner as he approaches the nest region with food and he is usually answered in like manner by the female. He also gives it both before and as he arrives at the nest in the morning from his overnight roosting place. This note is used under a great many other circumstances, most of them impossible to analyze from the data at hand. While perched near each other and occupied with preening, members of the pair give it at irregular intervals.

The other call is one of excitement or uneasiness. It can be represented by the words *eee-grack* or *whee-grack*. This is its simple and most-used form. The note *eee* is a very high pitched, thin whistle. By contrast the *grack* is a low, extremely guttural, raspy sound. Each part may be used separately or one or both parts may be used in multiples. For instance, in copulation, as the male approaches the female, a series of *eee*'s, probably given by both birds, is heard. When he mounts the female, *grack*'s are alternated with the

eee's. The pattern is the same when a mid-air transfer of a mouse takes place—a period of approach when *eee*'s are heard and a period when the two birds are together during which *grack*'s are given. When the birds are disturbed by either a human or avian intruder, usually only one or two *gracks* will be heard.

Twice it seemed that the female also used the *eee-grack* call as an expression of hunger. Once while perched and once while incubating she began giving it at fairly regular intervals of perhaps 20 seconds. Each time when she did this, the male went out hunting. Thereupon the female ceased calling, and on each occasion the male brought back a mouse for her. In addition, this call is given frequently when no reason can be ascribed for its use. The birds, though by no means vociferous, rarely go silent for more than a few minutes.

SUMMARY

In the San Joaquin delta region of California a White-tailed Kite community of ten pairs was studied. Their territories, in most cases contiguous, followed a slough and stretched along it for 5.8 miles. One of these pairs was studied in detail during the early half of their breeding period. It is believed that kites are permanently paired, yet there is a definite courtship period. In courtship the male has a characteristic flight display. Work on the nest is done by both members of the pair, but the female alone incubates. White-tailed Kites are strictly territorial, the main function of the region controlled being to provide the required food supply which consists of small mammals. During the courtship and incubation periods the female does not hunt; the male supplies the food for both. The female concerns herself only with those functions directly connected with reproduction, although if necessary she will aid in territorial defense.

Berkeley, California, August 9, 1940.