THE AUK:

A QUARTERLY JOURNAL OF

ORNITHOLOGY.

VOL. XLI. APRIL, 1924. No. 2.

NESTS AND NESTING HABITS OF THE AMERICAN EAGLE.[1]

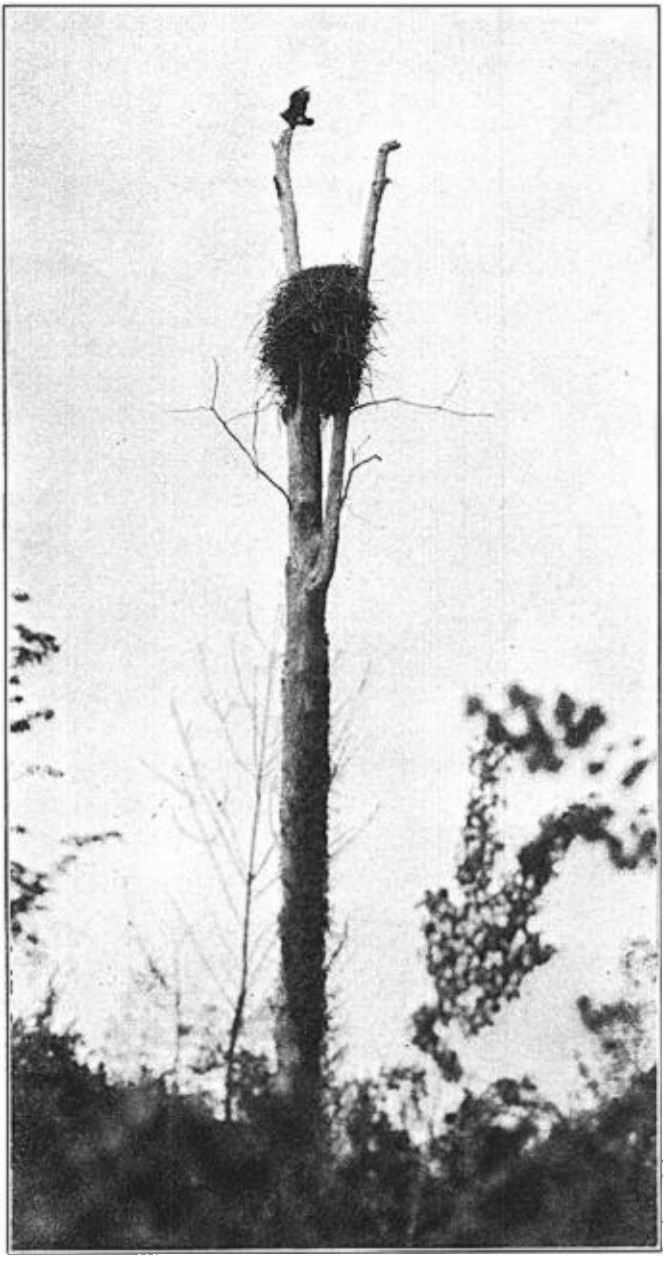
BY FRANCIS H. HERRICK.

Plates XIII–XV

IN northern Ohio the fringe of forest along the southern shore of Lake Erie has long been the haunt of the American or White-headed Eagle (*Haliæetus leucocephalus*). They were here before the white man dispossessed the Indian, and here many have remained, in spite of all the changes which he has wrought in the forests and upon the shore, undismayed if not undisturbed by his incessant activities afield; until, unless an active war has been waged against them, they have come to show no fear of the once novel sights and sounds of an advancing civilization, and for the most part they have come to disregard them utterly, ever trusting to their inherent powers of circumspection for their own safety, to their physical prowess, their adaptability and to their marvelous speed in the air.

The lake country was no doubt favored by the Eagles because of the almost never failing supply of fish to be found in most seasons either at the surface or stranded upon the beach, a supply now greatly augmented at certain points by rejects from the pound and gill-nets of fishermen.

The favorite nesting trees of this region are the sycamore and the shell-bark hickory; and that the dying or dead of these and



NEST OF BALD EAGLE, CYLINDER FORM, IN DEAD SYCAMORE, 77 FEET FROM GROUND. NORTH SPRINGFIELD, OHIO. OCCUPIED 1885–1900.

other species are repeatedly chosen by the same pair of birds must no doubt be ascribed to habit, determined in the first instance by the need of a safe approach to the eyrie, and of an unobstructed outlook from its spacious summit. When one of the branches which supports the nest comes to be used as a perch, the nesting scenes take on at once a new and livelier interest; for then the birds can shift readily from nest to perch, or back again to the nest, and to have the whole family at dinner may be a daily experience. It is possible that a sound tree, when long occupied, might suffer and finally languish under the ever growing mass of vegetable decay which it is usually called upon to sustain. This was apparently the case with the nest-tree at Vermilion, Ohio, about which our interest will be mainly centered in subsequent articles; though somewhat broken at the top, there was enough foliage about this great nest in 1922 to seriously hamper observations; in the following spring, to our great surprise, the flow of sap suddenly failed and, except upon a single branch at a height of barely twenty feet, the life of this tree went out. Other hickory trees in the same grove, though unencumbered, have also died, and during the spring gales of the present year many were broken or overthrown, so we can record only the fact, while the relation of cause and effect remains in doubt.

So far as I have observed, the nest-tree is seldom at first completely isolated, but commonly stands on the border of woods or in an open grove, a mile or more from the lake, and it often rises to such a height as to command the entire neighborhood. I have known one instance where the surrounding timber was cut away, but a kindly farmer spared the Eagles' tree, and its great eyrie, borne aloft and visible for miles in certain directions, stood out like a castle on a hill.

What has just been said would not apply to island-nests, and in our studies of the Eagle experience, is ever warning us against indulgence in the easy path of generalization; not only must we

[1] The "Bald" or White-headed Eagle was adopted as the sign of the independence and sovereignty of the United States by vote of the National Congress on June 20, 1782. Although the Golden Eagle (*Aquila chrysaetos*) is also found within our limits, being now confined mainly to the territory west of the Mississippi River, it seems appropriate and would certainly be convenient to designate our national bird as "The American Eagle," and to make the popular use of this term exactly discriminative of the species.

expect to find much variation in habit among different individuals, but also in the same individuals at different times, for habit in this sense is the result of experience. Most Eagles are great place-holders, and we have recorded the instance at Vermilion in which the same eyrie has been occupied for upwards of thirty-four years without a break, and the immediate region for nearly a century; while other individuals, bent possibly upon improving their condition with respect to the food-supply, their safety or that of their eyrie, seem to be constantly on the move. Thus, a pair at Danbury, Ohio, have moved three times in five years, and I have known a deserted eyrie to be reclaimed after an interval of one or more years, presumably by the original owners. At Kelley's Island a number of nests are in open pastures, and in at least one instance the site is so poorly chosen as to suggest the work of inexperienced builders. On an island in the Pacific, fifty miles south of San Pedro, known as San Clemente, in February, 1903, Breninger[1] found two ground-nests of this Eagle in February, 1903; they were placed on either side of a deep gorge, and were said to have been used in alternation by the same birds for the space of fifteen years; the one, on a large rock a mile from the north end of the island, then contained two eggs; while the other, on a hillside amid grass, was then in disuse; the latter was so high that a man standing beside it could not see into its shallow top.

When the site is well chosen, the nest is securely held in the grasp of a number of spreading branches. Possibly any tree offering such conditions might be taken, but I have seen only the sycamore, the hickory and the elm thus used, and the fact that a given pair of Eagles will sometimes favor the same kind of tree for a number of successive nests is a strong argument for the force of habit. Where the upright branches are nearly vertical, the nest, as in that formerly at North Springfield, Ohio, gradually assumes a cylindrical form (Plate XIII); where the spread is greater, the eyrie takes the cup-form and later that of the wine-glass or tall inverted cone (Plate XIV); in an exceptional case at Kelley's Island, to be later noticed, the eyrie was remarkably symmetrical and in shape of a huge bowl over twelve feet in diameter (Plate XV);

[1] Breninger, Geo. F. San Clemente Island and its Birds. The Auk, vol. xxi, p. 219. Cambridge, 1904.

but it should be noted that such comparisons apply to the exterior only, since "cup" and "bowl" are here solid to nearly the brim; indeed in certain cases no concavity exists, but the eyrie is markedly convex at the top. The diameter of a new as of an old nest will depend, as I have intimated, upon the angle of divergence of its main supports, but in a number of instances observed the first year's nest measured five feet across the top and its height was approximately the same.

A nest of the first year consists of a great mass of sticks, gathered mainly from the ground, borne to the nest-site in one or both talons, by either bird, and laid individually with aid of the bill; as this mass of faggots grows, greater attention is paid to the periphery, where the coarser materials are more carefully and more effectively interlaid and adjusted; the center and interstices are filled with dead weeds, cornstalks and stubble, with incidentally considerable earth introduced with pieces of sod and with weeds. It is no wonder that with the growth of years the core of such a structure comes to form a sodden mass of vegetable mold. The largest sticks which I have taken from different nests were a yard long and two inches thick, but many which I saw in a nest at Kelley's Island this summer appeared to have a length of over six feet. I am not yet ready to speak of the act of nest-building in detail but examination clearly indicates that such sticks are mainly gathered from the ground. The owner of the land on which the nest at North Springfield was situated told me of having seen his Eagles in nesting time fly against the dead branch of a tree and, as it snapped with a sharp report, bear it off to the eyrie; if such statements are true, the Eagle clasps the branch in its talons and breaks it off by sheer force as the Fish-hawk is known to do, an easy matter for birds of their weight and strength. The Vermilion Eagles at a later phase of nest-life would now and again bring in their talons a cluster of living oak-twigs and lay them upon the nest, a curious habit, the meaning of which will be considered in another place.

Eagles are supposed to be mated for life and when one is bereft it goes in search of a new mate. So far as known its quest is invariably successful though it may return with a bird in juvenal dress. This loss and substitution of a mate occurred at the Ver-

milion nest when one of the pair was shot, but this was some years ago and the exact circumstances could not be determined. It may be doubted if either parent would desert or leave for long their young when well started on the road of development; on the other hand, we might expect a lone bird to abandon its eggs per force and, if again mated, to begin a new nesting cycle upon its return; but whether this has actually happened or not cannot be stated. Since at least three years are passed before acquiring the perfect coloring,—white head, neck and tail, and yellow bill,—and since young birds without doubt become sexually mature the first spring after birth, one may expect to occasionally find one in brown or juvenal dress mated to a full colored bird; and Hoxie[1] mentions a case in Chatham County, Georgia, in which both birds were in immature plumage, though the female was then beginning to show distinct traces of white in the tail; the nest in this instance was in process of building on March 6, 1909, but according to this observer it did not contain young until May 17. The incubation period was given as 83 days, and the time from hatching to flight as 42 days. Fresh eggs were said to be found in that section from mid-November to late March. Two cases were also mentioned, at Savannah, in which this Eagle laid a second set of eggs after having been robbed of her first; in the one instance the first set was taken on December 5, and in the other on the twelfth of the same month. There is a similar record for Lincoln County, Maine,[2] where the Eagles held to their eyrie after being repeatedly robbed, and in all probability they made their losses good. In this instance the nest was in a tall dead pine, and what is more important it was lined with green pine boughs, the possible significance of which will be noticed at a later time. Two partially incubated eggs were taken from this nest on April 7, 1891, and three, in which the development was far advanced, on the sixteenth of the same month of the succeeding year. The following happened at the Vermilion nest; a collector ascended the tree and removed the first set of two slightly incubated eggs on March 18, 1920, after which a second set was laid and the young reared in due

[1] Hoxie, W. J. Notes on the Bald Eagle in Georgia. The Auk, vol. xxvii, p. 454. Cambridge, 1910.

[2] See The Auk, vol. xxiii, p. 222. Cambridge, 1906.

course. I have not yet definitely determined the exact period of incubation at Vermilion, being unwilling to interfere in any way with the process until our observations on all later phases of nest-life were reasonably complete. From what was seen this year, however, I am satisfied that the incubation did not exceed four weeks.

It is commonly said that Eagles, when once settled down, occupy the "same nest" year after year; it would be more exact to say that the Eagle builds anew each year, but uses the old nest as a site for the new one. Like most other birds it satisfies its building instinct at a certain time every year, but unlike most it is chained to a certain spot, which is its old nest. As a result of these yearly increments the Eagle's eyrie gradually rises in height and, since it must meet the spread of its main supports, it may increase steadily in diameter often, as we have seen, taking the form of an inverted cone or balloon, until at last the nest-tree collapses under its ever increasing burden. Such a structure from the standpoint of the student, if not of the builder, is thus a compound or storied nest; it might be compared to a stack of saucers, each of which represents a "nest," or a unit which is yearly added to the pile, but becomes so completely incorporated with what precedes as to be thereafter inseparable from it.

II.

Of some eight nests of the American Eagle which I have examined in the south shore region of Lake Erie, two were at North Springfield, two at Danbury and three at Kelley's Island, besides that at Vermilion, the most remarkable of them all.

While travelling on the Lake Shore railroad some years ago, I happened to notice an Eagle's nest from the car-window not a thousand feet from the line at a point near Girard, in Pennsylvania; as this nest appeared to be of unusual size and occupied the top of a dead truncated tree which stood quite alone, it aroused my curiosity. After learning that this great eyrie had long been a landmark of that region, being well known apparently to every workman upon the road, I resolved to pay it a visit. Upon reaching Girard in the following June, I found to my keen regret that the old sycamore with its famous nest had gone down in a gale

of the previous winter, but from photographs[1] made before its fall (Plate XIII), together with measurements which it was then possible to secure upon the ground, I am able to give its exact dimensions. It was nine feet in height and had a nearly uniform diameter of six feet; according to report it had been occupied for fifteen years and its top, as I found, had originally stood at a height of seventy-seven feet from the ground. The nest was essentially wedged between two upright branches, though receiving some support from a smaller division of the main stem which at the base attained a diameter of three and one-half feet; its two main supports were broken off at a height of six feet from the top of the eyrie and served the Eagles as favorite perches and lookout points; the nest was a great mass of wattled or inter-crossed sticks, made solid with earth and the resultant decay of the annual additions of weeds, stubble and straw.

For many years these Eagles were said to have occupied a dead sycamore in the midst of woods in Milesgrove, Pennsylvania; when this aged tree succumbed, the more famous nest, which we have described, was established in another sycamore, also dead, at North Springfield just over the line, in Ohio, in 1885; this lasted as we have seen fifteen years, or until January, 1900. The third nest was started in the spring of that year at a point not many rods from the site of the second and again in a sycamore, but this time in a living and sound one. This tree had a girth of twelve feet at the ground and a clean straight bole without a branch, for sixty feet; at this point it spread a number of strong arms which formed an all-embracing niche for a nest of great size. No doubt it was this great crotch which had attracted the Eagles, though close beside it rose a stately tulip tree, the branches of which met those of the sycamore and partly overshadowed them.

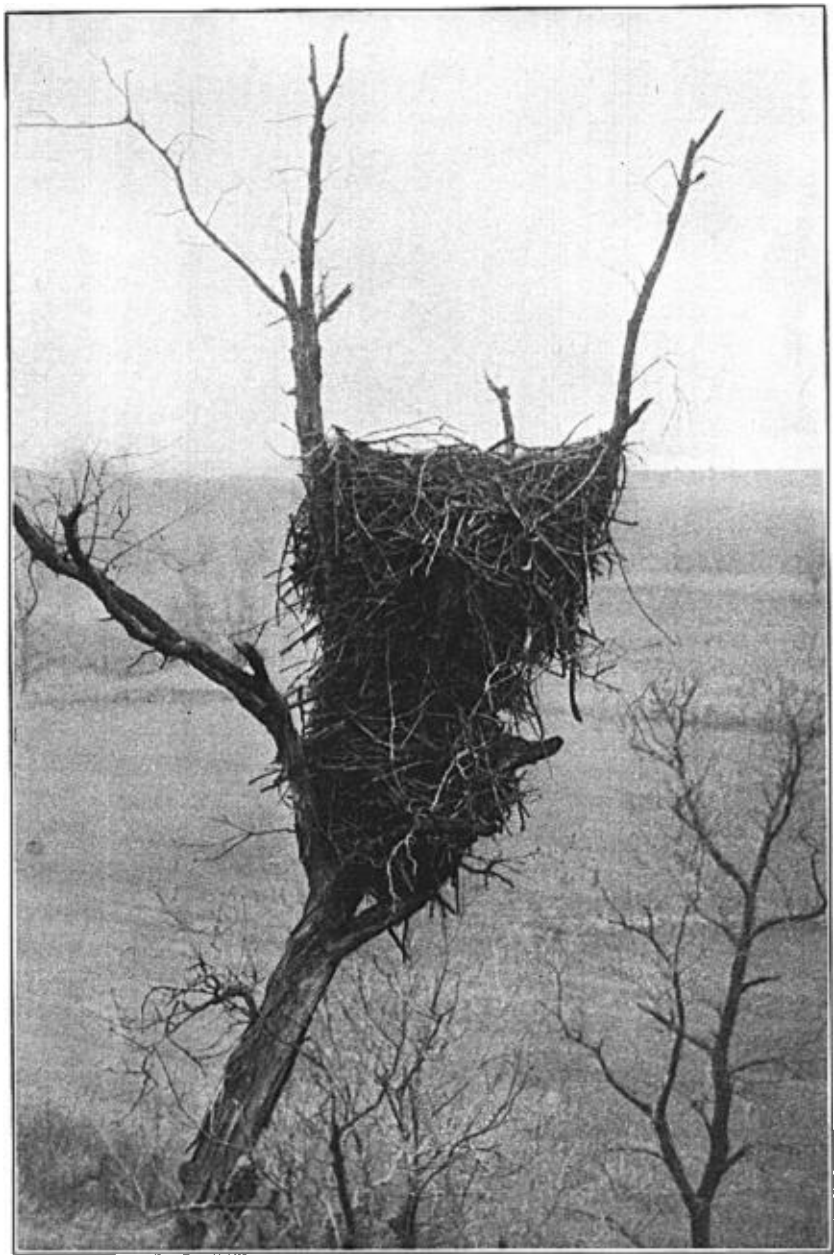
Upon approaching this nest on the eighth day of June not a sound was heard for full twenty minutes, when suddenly one of the Eagles appeared, whose behavior suggested the male bird and, circling overhead, began to sound his peculiar alarm, which I have heard many times since. It may be transliterated as *kar! kar! kar!*

[1] By Mr. H. E. Denio, of Milesgrove, Pennsylvania; for a series of pictures of this nest, see "The Eagle's Nest," St. Nicholas Magazine, vol. xxix, New York, 1902.

with sometimes the suggestion of a final *k* at the end of each syllable, or again as *cac-cac-cac!* Then, alighting in the topmost branch of a dead tree, he expressed his emotion in a manner characteristic of many birds even as remote of kin as the Nighthawk; with depressed head and neck outstretched, with drooped and quivering wings, his mandibles would open and close with the regularity of clockwork. Dr. William L. Ralph[1] was always able to recognize the male by this alarm, the call of the female being more harsh and often broken. The female was sitting in her eyrie during the time of our approach, as became evident when she suddenly left it and with protesting screams soared over the tree-tops; neither bird would come to the nest while I was in the neighborhood. At this time there were two Eaglets in full feather but quite invisible from below, except as one would appear and shoot a white stream well over the edge of the nest. At the Vermilion nest we did not hear the alarm-call after the last week of May in 1922; not once was it sounded within hearing during our long vigil beginning early in June and lasting until the flight of the young Eagles in early July. Silence also seemed to be the rule during the present season, and it was possible for us to determine the female only by her slightly greater size and more sinister countenance. We noticed, however, that whenever an observer showed himself upon our platform, passed under one of the perches or approached the observatory tree, either Eagle, if present, would crane its neck in his direction, open and close the mandibles and if uttering any sound at all, biting it off so effectually that it was scarcely audible at a distance of eighty feet.

Two nests which I examined at Danbury, on July 5, 1922, and which were occupied successively by the same pair of birds, were markedly convex at the top, but whether this peculiarity was due to a habit or whim of the builders or, as seemed more likely, to a lack of suitable supports at the margin of the nests, could not be determined. I am able to give a partial history of these nests through the efforts of Mr. W. G. Tibbels to save the Eaglets from community vengeance. The farmers in their vicinity, it seems, had lost a number of their chickens and were bent on keeping the

[1] Bendire, Capt. Charles. Life Histories of North American Birds. Smithsonian Contributions, vol. xxviii. Washington, 1892.



NEST OF BALD EAGLE, WINE GLASS FORM, 81 FEET FROM GROUND AT VERMILION, OHIO, APRIL 21, 1923. PHOTOGRAPHED FROM PLATFORM AT HEIGHT OF 85 FEET.

Eagle-population down. The first nest to be built and occupied stood at a height of about seventy feet in the top of a dead shell-bark hickory on the edge of woods, about midway between Sandusky Bay and the Lake; it was rather more than six feet tall and measured four and three-quarters feet across the top. Mr. Tibbels climbed to this nest at about the middle of June for three years in succession, 1919–21, and removed the young, his plan being to hold them until they were able to fly and then release them. The old Eagles, he told me, behaved in essentially the same way each time he raided their eyrie; they would swoop down at him with talons extended as if about to strike, but they always swerved when six feet or more away and would eventually settle in the top of nefghboring trees, where with opening and closing mandibles they gave vent to their alarms. They did not leave the vicinity while he was at the nest. On one of these visits the eyrie was strewn with the carcasses of muskrats, rabbits, chickens and fish, including the half-decomposed body of a large carp; two of the muskrat-skeletons carried each a steel-trap, which might indicate that these rodents had been taken outside of the nesting season, or at least not long after the beginning of March, and that the eyrie served its owners as an habitual dining-table.

In the spring of 1921, according to Mr. Tibbels, the Danbury Eagles were seen carrying nest-materials to a new site a mile away while they continued to hold to their first nest described above; this was finally abandoned at the close of that season, probably not because of the repeated raids which had been made upon it, but rather on account of the insecurity of the nest itself, which had lost a main supporting branch. At the time of our visit it was sagging over the stump of this lost limb and appeared as if ready to topple over in the next storm. At all events the new nest was completed and occupied in the spring of 1922 upon the site which had been determined the previous year. This second nest was also in a dead hickory that stood on the border of woods and, although barely elevated above the surrounding tree-tops, it afforded a good outlook. The tree was less than two feet in its greatest diameter and the nest, which was estimated to stand at a height of about seventy-five feet from the ground, was approximately five feet tall and would measure as much or slightly less

across the top. When Mr. Tibbels climbed to another nest about the first of May, he found the top strongly convex, as in the former case, and three eggs lying close together in a depression that was evidently made by the laying bird. On this occasion the old Eagles, contrary to what might have been expected, made no hostile demonstrations, but kept the climber in sight while they were perched in neighboring trees.

As we approached this second nest on the fifth of July, about seven weeks later, one of the old Eagles stood guard above it and soon went off in silence, but a young bird (Plate XIII) that was resting or possibly feeding in the eyrie itself remained until we were close upon the tree. We found that the two Eaglets, which had been on the wing for upwards of a week, were still in the habit of returning to the eyrie either alone or in the company of their parents.

The unpopularity of these particular Eagles evidently had not abated, for an attempt had been made to fire their nest-tree; whether they were eventually driven out or not, I do not know, but according to Mr. Tibbels they again abandoned their eyrie in the spring of the present year, and moving across the peninsula, settled eight miles to the northwest at Port Clinton.

On July 2, my assistant, Mr. E. J. Humel and I visited Kelley's Island, which lies ten miles due north from Sandusky, and is only less famous for its Eagles than for its extensive limestone quarries and its world-renowned glacial grooves. The Eagles now frequent the semi-wild eastern half of the island, which is three miles long by two broad. We visited three nests in the short time at our disposal and learned of a fourth; very likely others still exist and would have rewarded a longer search. All of the nests which we examined were said to have been recently occupied, but they were abandoned at the time of our visit and not an Eagle was seen on the island. Our arrival happened to coincide with that of the well known annual pest of mayflies or "Canada soldiers," which come suddenly, remain a week or less, and as suddenly depart. It is no exaggeration to say that, after leaving the roads, we were hampered at every step by these extraordinary creatures which covered all exposed objects; all standing room seemed to be taken on every spear of grass, on every twig and leaf; the very

bark of the trees, great and small, being "furred" by them; and as we walked they swarmed up in such incredible numbers over our bodies as to almost blind us. It was difficult to keep the lens of our camera clear of them long enough to take a photograph.

All the nests which we saw were in open pastures; the first to be visited, on the northeast side of the island, stood in the top of a decrepit elm at a height of about 75 feet; it was of the cup-form, perhaps eight feet tall and six feet or more across the top. A farmer, engaged in spraying his grapes near by, informed us that it had been abandoned and again reoccupied the present season. Another nest, farther to the south and east, was also in a living elm, which was twelve feet in girth and stood some twelve hundred feet from a roadway. It appeared to be very insecurely placed at a height of about sixty feet and was evidently a nest of the first year, measuring hardly more than five feet either way and remarkable only for its asymmetry, and the great length of many of the sticks which entered into its mass.

The second nest that we visited, at a point a little to the south of the first, was so remarkable that the sight of it alone amply rewarded us for all our trouble and annoyance with insects. It crowns a remarkably small shell-bark hickory (Plate XV), hardly more than a foot in diameter at its base and living in every branch, the lowermost being within reach from the ground so that a good climber should be able to make the ascent in five minutes, and by the aid of a cord to surmount the eyrie. We were told that not long ago a man had made this attempt, but was attacked so viciously that he quickly had a change of heart. This nest is remarkable for its symmetrical bowl-shape, as well as for its great size; according to our rough estimates, it is eight feet tall and twelve feet across the top, which is not over forty-five feet from the ground. It is very evident that the unusual form of this nest is due to the spread of its main supports, which diverge at an angle of seventy degrees. It should be noticed that the top of the eyrie in this instance is almost completely shaded by branches rising to a height of ten feet or more on all sides.

The history of the Vermilion Eagles, the fullest of which I have any records, and covering a period of over eighty years, is given in detail in an earlier paper.[1] During that time four nests have been

[1] The Auk, Vol. XL. 1923.

occupied for varying periods in the township of Vermilion, at points a mile or more removed from the shore of the Lake. The fourth and present nest (Plate XIV), which has been occupied for at least thirty-four years, stands at a height of 81 feet, in a shell-bark hickory which, as already noticed, was more or less alive up to the spring of 1923; it was 12 feet tall and 8½ feet across the top when exact measurements were made on July 20, 1922. When examined at this time, just sixteen days after the young Eagles were on wing, all carcasses of fish, chickens and other animals had been removed and its inside depth did not exceed four or five inches; the Eaglets, in the course of many weeks of exercise, had trodden its surface nearly flat. At that time all the surface material, to the amount of half a bushel or more, was gathered up and lowered in a sack; this was found to consist of fish and chicken bones in sparing amount, fish-scales, short loose sticks such as the young Eagles had often been seen to use in their play, fragments of corn-stalks, clusters of oak-twigs with the dried green leaves still upon them, corresponding with what we had seen the old Eagles bring to their eyrie, besides a miscellaneous assortment of vegetable rubbish. Underlying this loose layer was a fairly compact floor of vegetable mold, which extended some two or three feet on all sides from the center of the nest and was easily dislodged with the hand.

III.

Though hoping to turn my attention to nest-building and other early phases of activity another year, I will now set down in brief what happened at the Vermilion nest in the spring of 1923. When Mr. Headline and his men were building the second platform of our observatory on March 13–15, they were obliged to abandon their work for a part of the time on account of severe gales, which during that month brought down many trees in the grove and threatened that of the Eagles with destruction; accordingly we took the precaution of securing it as best we could by the aid of steel wires. The Eagles were engaged in building also; but, as Mr. Headline reported, they paid little attention to the carpenters; while one of the Eagles would fly over the eyrie and drop a bundle of straw, cornstalks or stubble, which it carried in its talons, the

other would dispose of it, remaining thus engaged for fifteen or twenty minutes at a time; they had already built a barrier of sticks about the margin, and were now laying a mattress of straw and softer materials over the center; when the carpenters finally returned to finish their work on the twentieth of March, this bedding was completed, and one of the Eagles, presumably the female, was sitting in its midst, though not continuously while the men were there. We infer that at least two eggs had then been laid, or were about to be laid, and allowing the Eagle two or three days for sitting on the nest before actually producing an egg, the probable error as to the beginning of incubation is not likely to be greater than this either way.

When I next visited the nest with Mr. Headline on April 6, incubation was well advanced; as we proceeded down the lane and entered the grove not an Eagle was to be seen, and in spite of our past experience it was impossible to repress the feeling that some mishap might have befallen eggs or birds. We had not taken many steps in the grove, however, before the male suddenly hove into view from the east, wheeled and settled on one of his habitual perches in the woods. This quickly dissipated our fears, and as we approached the nest-tree a white head rose from the top of the eyrie, at its very center; with the binoculars we could see that head and neck were craned in our direction, the better to follow our movements upon the ground; as we reached the observatory-tree she went off silently and joined her mate on his tree-top perch. We then proceeded with our business, raising a twelve-foot ladder to the upper platform and mounting it there, in the hope that by its aid we might see the eggs in place, as the Eagle had left them. Since this platform rises 95 feet above the ground, and 14 feet above the level of the nest, this ladder would easily carry the eye 15 feet higher; but at even 29 feet above the top of the eyrie, we could not detect the eggs within it, so completely were they concealed with the thick cover of straw and stubble. As it is a slow, difficult and rather hazardous task to climb the nest-tree we resolved to take no further risks with the eggs during the present season. While on the upper platform at this time I saw an interesting performance—the male Eagle assailing the female, rising above her, striking at her with talons extended, in anything but

an amorous manner, and apparently trying to induce her to return to her eggs.

On April 21, two weeks later, I found both Eagles standing on their eyrie, and at once concluded that the eggs had hatched; this proved to be the case, for upon again ascending to our upper platform we could see two Eaglets, which from their appearance could not have been out of the shell over three or four days, feebly raising their fluffy heads above their warm bed of straw; we could only see that they were well coated with grayish white down, and that their bills were large and by contrast very black. Close to the young and half buried in the straw lay the carcass of some animal which we could not identify, but from the deep red color of the flesh we suspected that it might be a rodent.

Although this Eagle, as Audubon found by climbing repeatedly to the nest, may sit on her nest for a number of days before laying is begun, the incubation period could not have been far from four weeks, or approximately from March 20 to April 17. Since Eaglet number one left its nest for the first time on June 27, and Eaglet number two on July 1, they remained continuously in the eyrie about 71 and 74 days respectively.

IV.

The Vermilion Eagles appear to leave their habitual breeding and hunting grounds only when the usual food-supplies give out. In ordinary seasons, according to Mr. and Mrs. Buehring, they are away only from six to eight weeks, or from mid-November to mid-January; but in the season of 1921–22, which was one of the mildest on record, they were missed for barely a fortnight in the latter part of December. In the winter of 1922–23, which continued rather mild until January, both birds remained in the neighborhood, and were even seen resting on the nest itself at the very end of December.[1] That the use of the eyrie as resting place and lookout point, by force of habit, long outlasts the season of young, we know; by the same token we might expect the adult Eagles to form a strong attachment to their home-territory, and it may well be doubted if they ever leave it except under the pressure of necessity; but in this as in most other respects we should

1 As I was informed by Mrs. F. E. Ranney

expect to find much individual variation, for in a bird of so great a range which covers the entire continent, the pressure referred to must be exerted in greatly varying degrees.

The young of most birds, when once out of their nest are, as we say, "out for good." The slender thread, which binds them to their cradle, is snapped at the moment of flight; for all such the nest has suddenly lost its meaning or at least its function, and new habits at once step in to dominate their after life; moreover, it is the young, and not the nest, which is the strong magnet to which the parents are drawn. With the Eagle, in this respect also, the case is somewhat different, for its young after their first flight are prone to return to their nest, and this they continue to do for a number of weeks, or for as long as they remain in the neighborhood. The adoption of a *nest-perch* by old and young, as noticed at the beginning of this paper, virtually introduces a new element into nest-life, for it alters the behavior of the adults, and tends to prolong the time which the young spend at the eyrie, as will be fully explained at a later time.

So far as is known young Eagles are never permitted to use the home-territory for breeding purposes unless by chance, at some future time, one should become mated to a parent; according to the testimony of other observers, after three weeks or more of semi-independence, they are effectually driven off by the old birds, when their powers of flight and of securing their own food have become well established.

To return to the first Danbury nest; one of the three Eaglets, taken by Mr. Tibbels in June, 1921, was possibly killed and was certainly eaten by the other two; at the time of our visit one of the survivors, though thirteen months old, had never acquired the necessary coordination for independent flight, and was still a captive. Anyone who was confirmed in the belief that the emblem of his country was in real life a timid creature and a coward at heart, would have revised his opinions after having attempted to approach and manage this bird. When, after cautious manipulation, it was finally released and set free upon the grass, it would endeavor to escape by making long leaps and flapping its powerful wings, but it never seemed able to rise much above the ground. When it was headed off and frustrated in these attempts it would

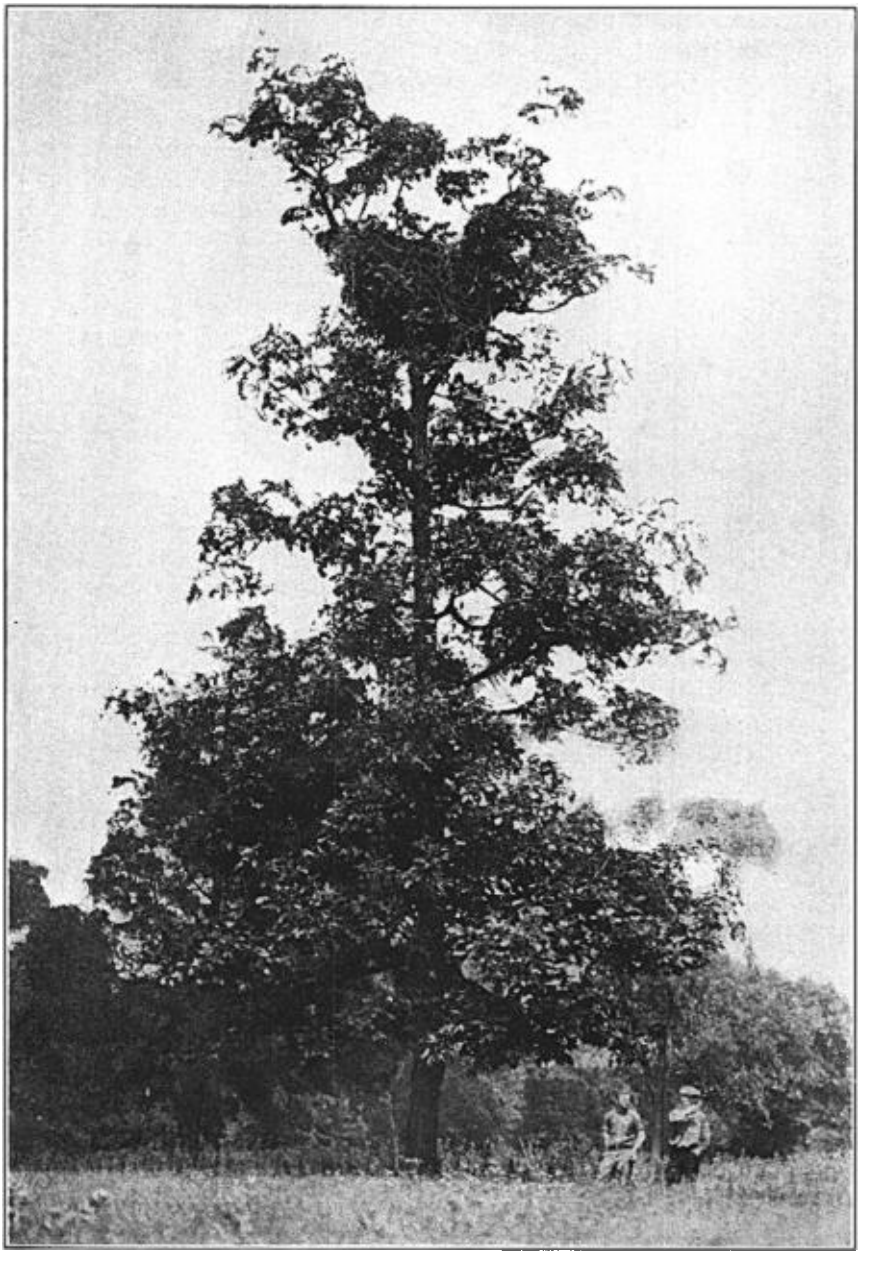
rush swiftly at its assailant, endeavoring to strike with its extended talons, and at the same time to deliver swift blows with the wrists of its wings; when too hard pressed, it would throw itself back, and with erected head-feathers and open mandibles, like a Hawk in a similar predicament, it would strike fiercely with both feet.

V.

As regards the reputed timidity or cowardice of the Eagle, or indeed any other animal, it is impossible to speak with any degree of fairness without due consideration of individual differences, as well as of differences in the same individual under different conditions. Probably few people would care to meet a lion in the open, particularly if unprepared for such an encounter; yet a recent traveller, who walked three thousand miles across tropical Africa, from coast to coast, has declared that the "king of beasts" is "a terrible coward, unless it is starving or has been injured." "I have seen lions," he is reported to have said, "face to face, and the beasts have raced away in terror." The difficulty with the lion, as with the Eagle, is in knowing whether the interview has been correctly timed.

Fear is an instinct which nature has bestowed rather freely for the protection of the individual and the preservation of the race; it often waxes or wanes, according to rather complex conditions, being frequently suppressed by any stronger instinct in those animals usually regarded as timid; in birds it is commonly suppressed by the instinct of guarding and pugnacity, which in many species rises during the period of incubation, and like a fever, reaches a climax not long after the young are hatched, and then gradually subsides. Accordingly a timid animal under the spur of a single instinct may at times become very bold, only to revert to its former state.

In the case of the Eagle as in so many other instances, this is further complicated by individual experience, for, in settled communities where such birds do not always escape persecution, great caution is often acquired; and their survival under difficult conditions shows that it stands them in good stead. The presence or absence of fear is thus clearly the resultant of many factors, of which individual experience is an important variable. Any climber



NEST OF BALD EAGLE, BOWL FORM, IN HICKORY ABOUT 45 FEET FROM GROUND.
KELLY'S ISLAND, OHIO, JULY 2, 1923.

who invades the Eagle's eyrie, unprepared for an attack, especially if the nest is placed low and in wild country, is liable to meet with a surprise. At times the intruder has been badly frightened, and fortunate in having only his hat snatched from his head;[1] at others, perhaps, he has been menaced only, but at too close quarters for personal comfort; again no hostile demonstrations whatever may be made. There are always one or more independent and indeterminate variable factors to be reckoned with, and the issue will depend on the character and experience of the individual bird.

Captain Bendire[2] has recorded the experience of Dr. William L. Ralph on the Indian River, Florida, which furnishes an interesting commentary on what has just been said. This region, long famed for its bird-life, was described as a paradise for the Eagle, at the time of his visit in February, 1886, when with the aid of an assistant he found nearly one hundred occupied nests; most of these were in pine-trees, "generally the highest and thickest that the birds could find," and usually at a height of 50 or 60 feet, the extremes met with at that point being 75 and 30 feet. Dr. Ralph could recall but one instance of Eagles attacking anyone; this was at a nest containing two young but a few hours old, and built in a large pine at Crescent Lake, where the birds would swoop down and almost strike the head of his climber, and were so very savage that one of his party became frightened, and thinking that they might injure him, shot the male, which was the fiercer of the two.

The same writer gives an interesting account by Captain B. F. Goss of two nests of the Eagle on small islands in Nueces Bay, near Corpus Christi, Texas; one of these, thought to be the work of an inexperienced bird, was on an islet which did not rise over

[1] Auk xxi, p. 220. The Eagles at the San Clemente Island nest, to which we have already referred, were said to have had a bad reputation for viciousness. One season at sheep-shearing time, according to this writer, an employe of the Wool Company attempted to ride to the edge of the barranca, and take a look at the young Eagles in their rock-nest; as he did so one of the old Eagles swooped down upon him, snatched his hat from his head, and flying off with it dropped it into the sea. At the time of his visit, the writer quoted approached the nest of the same bird and took a position close to the edge of the abyss, gun in hand. He was accompanied by a small dog which crouched in terror beside him as he sat on the ground; in a moment one of the Eagles swept down upon him and came within a foot of striking him in the face.

[2] Life Histories of North American Birds, pp. 276-278.

two feet above high water, and was little more than a sand reef; the nest "consisted simply of a few sticks laid on the bare ground, not enough to make a single tier even, and these were covered with bones, feathers and fish scales." The other nest, on an island but little larger and bearing a small solitary tree, rose "like a monument" out of the water and was visible for miles. "It was built with surprising regularity, appeared to be a perfect circle, and the sides smooth and almost perpendicular. It was built of sticks, and sloped slightly towards the center," where he said an Eaglet sat and viciously snapped at him as he peered over the edge. Both parent birds, he adds, "attacked us with great fury, screaming and striking at us with their talons." Later when an assistant was taking the eggs from a tree-nest, he continues: "he was set upon by both the Eagles and if he had not had a good stick with which to defend himself, I feel sure they would have struck him."

Precisely the same kind of variability which we have noticed in the Eagle, and apparently due to the same cause, may be seen in the behavior of a Robin, or even of a Bluebird, under similar conditions. Who would expect the ordinarily timid Bluebird to attack a person who approached its nest, at any time or under any conditions? Yet, I have known a male of this serene and gentle species to drive straight at the head of an intruder, and with such speed and fiery pugnacity that he involuntarily threw up his hands.

The Vermilion Eagles were constantly pestered by one or more Kingbirds whenever, upon approaching or leaving the eyrie, they crossed their preserves. It is a familiar sight to see the doughty Kingbird pursuing an Eagle, Hawk or Crow, now and again darting at them, pecking at their head or back and driving them from their territory. The Vermilion Kingbirds would pursue their suppositious enemy up to the nest-tree, and even alight upon its branches, and there continue for some minutes their harsh notes of protest close to the eyrie. More than once during the present season I saw one and sometimes two of these plucky birds follow an old Eagle to its tall perch, alight just above it, and as the spirit moved, dart with vim at the greater tyrant sitting in unconcern but a few feet away; at every lunge of the little Kingbird the old Eagle seemed very much bored; with the glasses I could see that

his mandibles opened just a little at each thrust. In all such cases the Eagle can well afford to adopt a policy of indifference; but when a small Hawk at Vermilion this year tried the same tactics, it met with a quick surprise, for after dodging a number of times, the Eagle opened its talons and with one thrust suddenly stopped the game and barely missed the Hawk. Under certain conditions, the Eagle, as already intimated, may appear to be wary, suspicious and timid to the last degree, but as we have also seen, such conditions do not always prevail. Both adult and young birds, when hard pressed on the ground, or for any cause unable to fly, can put up a stiff fight against any assailant.

Western Reserve University, Cleveland, Ohio.

NESTING RECORDS OF THE WANDERING TATTLER AND SURF-BIRD IN ALASKA.

BY OLAUS J. MURIE.

Plates XVI–XVIII

WHILE engaged in field work for the Bureau of Biological Survey on the caribou and other big game of Alaska I had opportunity to gather some data on interesting nesting birds, which finally resulted in establishing nesting records of the Wandering Tattler (*Heteroscelus incanus*), and Surf-bird (*Aphriza virgata*).

On June 1, 1922, I was hunting for grizzlies in the Alaska Range at the head of Delta River, and while coming down Phelan Creek, saw a dull slate-colored bird fly by and perch on a rock at the edge of the turbulent water, at some distance. I did not recognize the bird, and although I had only a high-powered rifle, I fired at it, hoping to get enough for identification, but missed, and the bird flew on up the stream. Later, by a process of elimination, it suddenly occurred to me that it must have been a Wandering Tattler, which I had not expected to find high in the mountains.

This species was not observed again until July 9 in the same year, when the first evidence of nesting was found. This was on Jennie Creek, a small tributary of Savage River in another part of the Alaska Range. On that date a downy young was collected