

ATTENTIVENESS OF CRANES AT THEIR NESTS

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LITTLE has been published on the attentiveness of cranes at their nests. R. P. Allen (*The Whooping Crane*, New York, Natl. Audubon Soc., Research Rept. no. 3, 1952; see pp. 184-190) presented some notes on the captive Whooping Cranes (*Grus americana*) which nested in 1949 at the Aransas National Wildlife Refuge, Texas. I related some notes on the Sandhill Crane (*G. canadensis*) in Michigan and Georgia (*The Sandhill Cranes*, Bloomfield Hills, Michigan, Cranbrook Inst. Sci., Bull. 29, 1949, see pp. 86-90 and 97-99; *Auk*, 67: 38-51, 1950); on the Sarus Crane (*G. antigone*) in the Lincoln Park Zoo, Chicago (*Auk*, 64: 602-615, 1947); and on the White-naped Crane (*G. vipio*) at the Detroit Zoological Park, Detroit, Michigan (*Auk*, 68: 194-202, 1951).

Cranes are very attentive to their eggs. If they do leave the nest, they usually remain nearby where they can easily watch the nest. On three occasions, however, I have found Sandhill Cranes away from their nests during midday when there was a warm sun. Also, early one morning my wife and I found the nest of a Crowned Crane (*Balearica pavonina*) in Northern Rhodesia with the eggs unattended. We did not see either bird in the hour we were in the vicinity. Later in the day we returned to the nest to see if it was deserted, and found that it was not. Nevertheless, most cranes seldom if ever leave the eggs unattended.

This paper summarizes my observations of the attentiveness of various species of cranes. Many of the notes on the Sandhill Crane were made at the Phyllis Haehnle Memorial Sanctuary, Jackson County, Michigan. Here I was able to watch the largest southern Michigan population from a point on a nearby hill, and activities at all or nearly all nests could be observed, except on rainy days or days with poor visibility, when this was not always possible. More was learned here, however, than I have been able to learn elsewhere. Usually I remained in my automobile so that I would not frighten the cranes. On many occasions I also spent the night there. By similar methods, I watched cranes in Africa. At one place I was able to watch nests of both Crowned and Wattled (*Bugeranus carunculatus*) cranes which were nesting only about 500 feet apart. At other places I observed nests of the Stanley Crane (*Anthropoides paradisea*). In Sweden, in May and June, 1963, I was also able to watch European Cranes (*Grus grus*) at their nests, in one place from a specially built tower, in another from a nearby woodland. In May, 1950, I spent eight days watching a pair of Whooping Cranes at their nest at the Aransas Refuge in Texas. Here the sexes of the two captive birds were known. In the wild I presumed that the larger bird at a nest was the male. Usually the pre-

sumed male was distinguished also from the presumed female by a deeper voice and by strutting more and attacking more often any enemies that alighted nearby.

FEDING PERIODS

The attentive period of cranes at the nest is often regulated to some extent by the bird that is not incubating. The bird at the nest seldom leaves unrelieved. Thus, the length of the period of feeding, especially if the bird feeds some distance from the nest, may influence the attentive period. Averages of feeding periods are given in Table 1. Usually the longest feeding period was the first in the morning. The extremes for the Sandhill Cranes at Haehnle Sanctuary were: for the first daily period, 69 to 645 minutes; for the second, 37 to 430 minutes; the third, 49 to 405; the fourth, 46 to 148; and the fifth, 84 to 125 minutes.

Water is essential to cranes. Often on returning to the nesting marsh, cranes stopped to drink immediately. Thereafter, they seldom hurried and sometimes took much time before going to the nest. Sometimes they fed in the marsh; sometimes they bathed; at times they just stopped to preen.

The captive Whooping Cranes at Aransas could not fly and their nest was some distance from dry land and in a salt water marsh. There was food on the adjacent dry land supplementing that in the marsh. Both of these cranes, when ending their attentive periods, "hiked" out towards the supplemental food. Sometimes there was none there. They then walked over a nearby ridge. On one cool morning on this ridge, the female ate 828 grasshoppers in a two-hour period right below the tower from which observations were made. The grasshoppers were young and small and rather lethargic. The female at this time also ate a snake and some crabs. Always, after eating, the birds went to a fresh water pool and drank.

While watching Wattled Cranes in South Africa and Northern Rhodesia I noted that they fed chiefly on insects, apparently grasshoppers and the like. Stanley and Crowned cranes also fed on insects but much more on seeds from the heads of grasses and sedges. Both also ate crabs. I did not see them eating frogs but the latter were present on all nesting territories. Sandhill and European cranes fed on snails, crabs, frogs, and many insects, especially grasshoppers and crickets, and often dug for earthworms in the soil.

ATTENTIVENESS

At Haehnle Sanctuary I watched Sandhill Cranes on 11 different days at 17 different nests (Table 2). I timed 76 daytime brooding periods. Where it was possible to ascertain the sex (74 cases), the males were at

TABLE 1
AVERAGE LENGTH OF FEEDING PERIODS¹ OF CRANES DURING THE NESTING PERIOD²

Species	Periods								
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
<i>Grus canadensis</i>	268 (27)	183 (21)	213 (14)	101 (7)	100 (4)	75 (1)	—	—	—
<i>Grus americana</i>	134 (7)	125 (7)	133 (7)	152 (7)	123 (7)	107 (4)	68 (2)	60 (1)	—
<i>Bugenerus carunculatus</i>	342 (2)	137 (2)	134 (2)	—	—	—	—	—	—
<i>Anthropoides paradisea</i>	154 (2)	92 (2)	60 (2)	92 (2)	87 (2)	71 (2)	58 (2)	70 (2)	43 (2)
<i>Balearica pavonina</i>	212 (3)	164 (2)	125 (2)	72 (2)	63 (2)	58 (1)	—	—	—

¹ In minutes.

² Sample size in parentheses.

TABLE 2
ATTENTIVE PERIODS OF SANDHILL CRANES AT THE NEST AT HAEHNLE SANCTUARY,
JACKSON COUNTY, MICHIGAN

Date	Nest	Number of incubation changes ¹	Length of each period on the nest		First morning change		Last daily change	
			Male	Female	Time	Parent leaving nest	Time	Parent going onto nest
1959								
25 April	91	3 (0)	213	340	0637	♀	1550	♂
2 May	90	3 (0)	393	234	0625	♀	1652	♂
2 May	91	1 (0)			1533	♂	1533	♀
2 May	92	4 (4)	69, 291	207	0543	♀	1510	♀
2 May	93	3 (0)	392	229	0709	♀	1730	♂
1960								
24 April	95	2 (0)	645		0630	♀	1715	♀
24 April	96	3 (3)	362	100	0640	♀	1422	♂
30 April	95	2 (0)		350	0726	♂	1316	♂
30 April	96	2 (1)	378		0703	♀	1321	♀
30 April	97	2 (0)	411		0633	♀	1324	♀
1961								
21 April	101	3 (1)	128	157	0652	♀	1137	♂
21 April	102	6 (1)	110, 129, 100	147, 79	0720	♀	1645	♀
22 April	101	4 (2)	87, 212	288	0710	♀	1657	♀
22 April	102	5 (1)	129, 173	82, 112	0743	♀	1559	♂
23 April	102	3 (3)	204	270	0626	♂	1420	♀
29 April	102	2 (1)		450	0855	♂	1625	♂
30 April	101	4 (2)	222, 405	158	0602	♀	1907	♀
30 April	102	4 (2)	164	432, 105	0649	♂	1830	♂
30 April	103	6 (2)	143, 329, 84	37, 148	0612	♀	1833	♀
30 April	104	6 (2)	124, 136, 125	133, 118	0633	♀	1709	♀
30 April	105	4 (3)	242, 365	104	0603	♀	1754	♀
6 May	102	4 (1)	144, 271	230	0711	♀	1756	♀
6 May	103	5 (0)	170, 119	216, 168	0632	♂	1745	♀
6 May	104	3 (2)	sexes undetermined		0634	?	1415	?
1962								
28 April	109	2 (0)		402	0720	♂	1402	♂
28 April	110	5 (0)	164, 83	219, 137	0602	♂	1605	♀
28 April	112	3 (1)	242	430	0543	♀	1655	♂
28 April	113	7 (1)	192, 46, 75	114, 49, 92	0602	♂	1530	♀
28 April	114	4 (0)	338, 221	85	0617	♀	1701	♀
Averages and Totals		3.6 (1.1)	215.3	194.6	0642	19 ♀ ♀ 9 ♂ ♂	1603	17 ♀ ♀ 11 ♂ ♂

¹ Numbers in parentheses are the number of times the birds called in unison changing at the nest.

TABLE 3
INCUBATION BY SANDHILL CRANES, JACKSON COUNTY, MICHIGAN

Date	Nest	Observation period	Per cent of time eggs incubated	Per cent of daytime incubation by male	Time at the nest standing, preening, etc., but not incubating (minutes)	
					Male	Female
1959						
25 April	91	0534-1915	93.4	53.2	10	44
25 April	92	0534-1915	95.3	54.9	33	5
2 May	90	0445-1830	99.7	59.6	1	1
2 May	92	0445-1830	98.9	43.4	4	5
2 May	93	0445-1830	97.3	55.9	3	19
1960						
24 April	95	0525-1715	97.3	90.6	19	0
24 April	96	0525-1720	98.7	75.2	9	0
30 April	95	0530-1922	97.8	57.5	14	4
30 April	96	0530-1922	99.4	45.5	2	3
30 April	97	0530-1922	99.4	49.3	3	2
1961						
21 April	102	0530-2000	97.8	39.1	6	13
22 April	102	0500-2000	97.8	59.7	17	2
23 April	102	0500-1500	97.5	48.7	5	10
29 April	102	0600-2000	98.9	46.4	4	5
30 April	102	0500-2000	98.4	40.1	8	6
30 April	103	0500-1900	97.5	66.7	10	11
6 May	102	0512-1825	98.8	47.6	5	4
6 May	103	0512-1825	97.8	46.1	11	6
1962						
28 April	109	0500-2000	98.5	55.6	5	8
28 April	110	0500-2000	97.2	33.3	18	7
28 April	113	0500-2000	92.5	41.9	26	41
Averages			97.6	52.3	10.2	9.3

the nest for 41 periods averaging 215.3 minutes (range, 46-645); the females were there for 33 periods averaging 194.6 minutes (37-450).

Based on the birds leaving the nests in the morning or going onto it at night, however, the females more often remained on the nests at night, being there in 36 (64.3 per cent) of 56 cases (Table 2). The males were there in the remaining 20 cases. The length of time between the average time of the last evening change (1603 hours) and the first morning change (0642 hours) was 875 minutes (Table 2). Actual recorded times at four nests, at night when males were incubating, were 864, 867, 1,027, and 1,033 minutes (average, 947); and at one nest with a female incubating, 898 minutes. The five-nest average was 938 minutes. The eggs were always incubated at night, even the night following the laying of the first egg.

By day, based on 20 periods of observation with an average beginning of 0512 hours and an average ending of 1854 hours, the eggs were incu-

TABLE 4
ATTENTIVE PERIODS OF WHOOPING CRANES AT THE NEST
AT ARANSAS WILDLIFE REFUGE, TEXAS, IN 1950

Date	Number of incubation changes ¹	Length of each period on the nest		First morning change		Last daily change	
		Male	Female	Time	Bird leaving nest	Time	Bird going onto nest
9 May	8 (0)	74, 152, 119, 62	137, 132, 90	0608	♀	1921	♀
10 May	8 (0)	193, 104, 118, 75	89, 127, 109	0600	♀	1935	♀
11 May	6 (1)	126, 119, 109	90, 185	0545	♀	1614	♀
12 May	7 (1)	122, 106, 108, +	215, 122, 149	0535	♀	1917	♂
13 May	6 (0)	159, 129, 194	88, 176	0536	♀	1811	♀
14 May	6 (1)	207, 111	132, 136, 57	0757	♂	1846	♂
15 May	8 ²	112, 188, 159, 60	53, 215, 84	0534	♀	2005	♀
16 May				0700	♂		
Averages and Totals	7.0	126	125	0611		1847	
					6 ♀ ♀ 2 ♂ ♂		5 ♀ ♀ 2 ♂ ♂

¹ Number in parentheses is the number of times the birds called when changing at the nest.

² Both birds called at 0759, 33 minutes after the second change.

Note.—Both birds left the nest 27 minutes, 9 May; 9 minutes, 13 May; 7 minutes, 14 May because of men and boats nearby.

bated an average of 97.6 per cent of the time, and of this incubation, 52.3 per cent was done by the males (Table 3).

On 62 occasions when males approached the nests to incubate, they flew to the nest 13 times (21 per cent) and walked there 49 times (79 per cent). In 48 cases females flew to the nests 17 times (36 per cent) and walked there 31 times (64 per cent).

The birds when leaving sometimes flew immediately from the nest; at times they stood beside their nests and preened for a time before flying. This period of preening lasted up to 47 minutes (average, 12 minutes) for the males and up to 65 minutes (average, 17) for females.

At the Aransas Refuge, Texas, where the climate is much hotter than in Michigan, the captive Whooping Cranes (Table 4) changed places much more often than the Sandhill Cranes just discussed. Although the daily number of changes for the latter averaged 3.6 per day (sample of 29 observation days), the Whooping Cranes averaged 7.0 changes per day (range, 6 to 8). The average of 23 attentive periods of males was 126 (60–207) minutes and for 19 attentive periods of females, 125 minutes

TABLE 5
INCUBATION BY WHOOPING CRANES AT ARANSAS WILDLIFE REFUGE, TEXAS, MAY, 1950

Day of month	Observation period	Per cent of time eggs incubated in daytime	Per cent of incubation by male in daytime	Time at the nest standing, preening, etc., but not incubating (minutes)	
				Male	Female
9	0608-1935	89.7	53.6	19	37
10	0515-1938	92.9	57.2	31	30
11	0522-1945	94.4	40.9	20	27
12	0515-1940	92.8	41.1	29	33
13	0520-1935	94.1	56.8	25	16
14	0510-1925	93.5	61.1	36	13
15	0515-2005	91.7	59.4	45	30
Averages		92.7	52.9	29	26

(53-215). The period between the average times of the last nightly change (1847 hours) and the first morning change (0611 hours) was 684 minutes. On three of seven occasions the same bird that had been there the previous night was still incubating in the morning. The average of these three times was 683 minutes. On the seven days on which I observed the birds (periods of observation averaging from 0523 to 1940 hours), the eggs were incubated 92.7 per cent of the time, and the male was responsible for 52.9 per cent of the incubation (Table 5).

The period between average last daily (1657) and first morning (0611) changes for the Wattled Crane in Natal, South Africa, was 674 minutes. At the single nest studied the male incubated on all four nights when it was checked. In the two days I watched these birds, only once did one of them fly, this when the male chased some Stanley Cranes from the neighborhood. They changed places four times daily (Table 6). The average of the two attentive periods for the male was 157 minutes and of four for the female 238 minutes. These slow, deliberate birds regularly walked to and from their nest.

Both of two pairs of Stanley Cranes studied changed places at their nests 10 times in one day (Table 6). The males averaged 66 minutes (29-119) for 12 attentive periods and the females 93.8 minutes (56-190) per period for 11 periods. Although they flew occasionally (one pair in order to go over a fence), they usually approached and left the nest on foot. The period between the average last daily change (1819 hours) and the average first morning change (0551 hours) was 692 minutes. Females went onto the eggs on two nights and one was there one morning, while one male was there one morning and one night.

One pair of South African Crowned Cranes (Table 6) changed places six times one day and another pair seven times. The incubation period

TABLE 6
ATTENTIVE PERIODS OF CRANES NEAR MOOI RIVER, NATAL, SOUTH AFRICA,
IN DECEMBER, 1961

Day of month	Nest	Number of incubation changes ¹	Length of each period on the nest		First morning change		Last daily change	
			Male	Female	Time	Bird leaving nest	Time	Bird go- ing onto nest
<i>Bugeranus carunculatus</i>								
22	1	4 (1)	163	246, 199	0615	♂	1636	♂
31	1	4 (0)	151	439, 69	0608	♂	1719	♂
<i>Anthropoides paradisea</i>								
14 ²	5	6 (3)	70, 82, 43	103, 85			1815	♀
27	13	10 (1)	87, 74, 49, 48	190, 56, 88, 68, 57	0612	♂	1812	♂
30	5	10 (7)	119 ³ , 64, 87, 49, 29	97, 111, 94, 93	0530 ³	♀	1830	♀
<i>Balearica pavonina</i>								
12	1				0531	♀		
18	1	7 (2)	185, 56, 58	182, 111, 14	0636	♂	1801	♀
31	2	6 (0)	203, 140, 112	143, 89	0615	♀	1742	♀

¹ Number in parentheses is the number of times the birds called when changing at the nests.

² Observations began at 1140.

³ Approximate. (Observed 89 minutes.)

for the males averaged 125.6 minutes (range, 56–203) and for females 107.8 minutes (14–182). The females were on the nest on four nest-nights and a male on one nest-night. The birds usually flew to the nest and also usually flew directly from the nest to the feeding area.

Table 7 shows the amount of time the three species of African cranes incubated their eggs by day and the percentage of incubation undertaken by the males. Averages for these three species and for the Sandhill and Whooping cranes are presented in Table 8. A summary is also given (Table 9) of the periods of attentiveness for these five species and for the White-naped Crane as noted in my earlier observations (*Auk*, 68: 194–202, 1951).

GENERAL OBSERVATIONS

The European Crane in Sweden behaved much like the Sandhill Crane. Both birds flew to their feeding areas at times; at other times they walked away into the surrounding bog. One night the male incubated; the next, the female. I watched one nest for 18 hours and the birds changed places only three times. In the arctic, a pair changed places five times in a 24-

TABLE 7
INCUBATION BY CRANES NEAR MOOI RIVER, NATAL, SOUTH AFRICA, DECEMBER, 1961

Day of month	Nest	Observation period	Per cent of time eggs incubated	Per cent of incubation by male	Time at the nest, stand- ing, preening, etc., but not incubating (minutes)		Time eggs un- attended (min.)
					Male	Female	
<i>Bugeranus carunculatus</i>							
22	1	0508-1830	94.7	40.5	20	10	12
31	1	0600-1830	95.2	31.1	8	16	12
<i>Anthropoides paradisea</i>							
14 ¹	5	1140-1815	88.3	49.9	21	8	17
27	13	0600-1852	95.3	39.7	18	15	3
30	5	0600-1840	80.5	43.8	50	61	37
<i>Balearica pavonina</i>							
12 ¹	1	0458-1000	97.3	84.4	4	4	
18	1	0600-1818	85.3	50.9	14	15	79
31	2	0600-1830	95.6	60.1	21	12	

¹ Not included in averages in Table 8.

hour period. In southern and central Sweden, three first morning changes took place at 0624, 0602, and 0528, while at a nest in the arctic (Gällivare) this happened at 0230. Last afternoon changes were at 1317 at Kristinehamn, central Sweden, and at 1710 at Gällivare. The average of two attentive periods at Kristinehamn was 206 minutes and for four at Gällivara, 220 minutes.

When walking to a nest, cranes usually move very cautiously, stopping every few feet to look around. At times, they approach without hesitation, walking directly to the nest. Sometimes they fly to a spot near the nest, then complete the trip on foot. On occasion I have seen one crane fly to

TABLE 8
SUMMARY OF INCUBATION BY CRANES

Species	Number of days observed ¹	Average observation time per day (min.)	Average time eggs incubated (per cent)	Average incubation by male (per cent)	Average time at nest but not incubating (minutes)	
					Male	Female
<i>Grus canadensis</i>	21	837	97.6	52.3	10.5	9.7
<i>Grus americana</i>	7	857	92.7	52.9	29	26
<i>Grus grus</i>	1	1080	96.8	48.1	17	17
<i>Bugeranus carunculatus</i>	2	776	94.9	35.9	14	13
<i>Anthropoides paradisea</i>	2	766	87.9	41.6	34	38
<i>Balearica pavonina</i>	2	744	90.5	56.0	17	13

¹ Equals number of cranes observed throughout one day, although several were observed simultaneously in some cases.

TABLE 9
SUMMARY OF ATTENTIVE PERIODS OF CRANES AT THE NEST

Species	Number of days of observation ¹	Average number of changes per day	Time of first morning change		Time of last daily change		Averages for daily periods of incubation			
			Average	Extremes	Average	Extremes	Male	Female		
							N	Time (min.)	N	Time (min.)
<i>Grus canadensis</i>	29	3.6	0642	0543-0855	1603	1316-1907	1.7	215.3	1.4	194.6
<i>Grus americana</i>	7	6.8	0611	0534-0757	1847	1614-2005	3.2	126	2.7	125
<i>Grus grus</i>	1	3	0624		1317		1	316	1	97
<i>Grus vipio</i>	1	9	0820		1828		4	91	4	58
<i>Bugeranus carunculatus</i>	2	4	0612	0608-0615	1657	1636-1719	1	157	2	238
<i>Anthropoides paradisea</i>	2	10	0551	0530-0612	1819	1812-1830	4.5	66	4.5	93.8
<i>Balearica pavonina</i>	2	6.5	0607	0531-0636	1751	1742-1801	3	125.6	2.5	107.8

¹ Equals number of cranes observed throughout one day, although several were observed simultaneously in some cases.

a nest, whereupon the other bird would rise and fly away almost simultaneously, so that it appeared that only one crane was flying. This also sometimes happened when the birds walked.

Sandhill and European cranes are quite inconspicuous on their nests. Whooping Cranes, because of their white plumage, are very conspicuous. All three African species observed were very inconspicuous until they raised their heads above the sedges. Any of these cranes were conspicuous when standing unless the vegetation was taller than they were.

When a crane settles onto its eggs, it places one foot on each side of the eggs, then drops its breast over the eggs and settles down gradually. A few sideways movements of the body place the eggs in the proper position. Sometimes, when first starting to incubate, a bird may rise and settle down many times, wiggling back and forth each time. Once settled, however, they remain for long periods of time, watching alertly all of the time. Cranes are less attentive early in the incubation period, and flush more easily than near the time of hatching.

CALLING WHILE INCUBATING

Cranes seldom call while incubating, but I have heard them do so at times. Sometimes they were stimulated by the calls of many other cranes in the neighborhood. Sometimes a lone individual calls from a nest, as though expecting an answer from its mate, which does sometimes follow. When there is a small population, cranes are much quieter than where there are many resident birds nesting near each other.

Nearly all calls given at the nest occur when the birds change places, at which time they call simultaneously, so that at a distance it sounds as though one bird is calling. This call I have named the "unison call." A male Sandhill Crane, while giving this call, throws his head and neck upward, the bill pointing slightly backward. Then he cries out, *kah-rooo—kah-rooo—kah-rooo—kah-rooo*. Usually he repeats this several times. The female responds with a less shrill call, *put-tock—put-tock—put-tock—put-tock*, repeated again and again if the male continues to call. She seldom holds her bill vertically; rather, her head is held horizontally or at a slight upward angle.

Stanley, Sandhill, Whooping, and European cranes gave somewhat similar "unison calls." Those of the Stanley and Sandhill sounded the most alike. Once I heard Wattled Cranes at a nest in South Africa give a "unison call." It sounded more goose-like—*kronk-kronk-kronk*—much shorter in duration and not repeated as were the calls of the Stanley and Sandhill cranes. Both male and female Stanley Cranes gave the loud *kah-rooo* call.

In Table 2 I showed the number of times the Sandhill Cranes observed gave the unison call when changing places at the nest. Of 29 observations

(i.e., one pair observed for one day), neither crane called in the entire day in 11 cases, although the birds did change places at the nest. For the 18 observation days when cranes did call, they called 12 times at the first change (41.4 per cent of the 29 mornings). They called 9 times out of a possible 28 at the second change (32.1 per cent); 4 times out of a possible 22 at the third change (18.1 per cent); 6 of 14 on the fourth change (42.8 per cent); and 1 time out of 5 changes on the sixth and seventh changes (20 per cent).

During early incubation (8 to 20 April) Sandhill Cranes called only 1 time in 9 observed changes (11.1 per cent); at 95 changes in mid-incubation (21 to 30 April) they called 63 times (66.3 per cent); and in late incubation (1 to 15 May) they called on 12 of 34 changes (35.3 per cent).

In Sweden I watched the European Cranes change places at the nest on 10 occasions, and they called on 3 of these. Stanley Cranes, on the 3 days observed, changed places 26 times, calling on 11 (42.3 per cent) while Wattled Cranes called 1 time out of 8 changes (12.5 per cent). Crowned Cranes did not give the "unison call," but on two occasions one individual called when the change was made. However, the female Crowned Crane at nest number 1 (see Table 6) called from the field at 0555 on 12 December, and the male at nest number 2 called from the nest at 1330 on 31 December.

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1703 Wolverine Tower, Battle Creek, Michigan.