# NESTING OF THE GREENLAND WHEATEAR ON BAFFIN ISLAND

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In the vicinity of the United States Air Force Base near the head of Frobisher Bay, in southern Baffin Island, the Greenland Wheatear (*Oenanthe oenanthe leucorhoa*) bred in considerable numbers in the summer of 1953. During our sojourn there from June 14 to August 22, we saw it almost daily. It was not, however, as common as the Snow Bunting (*Plectrophenax nivalis*), Lapland Longspur (*Calcarius lapponicus*), Water-Pipit (*Anthus spinoletta*) or Horned Lark (*Eremophila alpestris*).

We lived at the east edge of the Base. By walking westward a mile—as far as the Sylvia Grinnell River—northward two to three miles, and eastward or northeastward three to five miles, we covered fairly regularly and often an area about 18 square miles in extent, much of which was "desert tundra," a habitat preferred by the wheatear (Soper, 1940:16-17). In the area eight or more pairs of the birds nested, five within about a mile of the Base. We found four nests, none less than half a mile apart. Nest 1 was near the Hudson's Bay Company post, about a mile east of the Base, on a clifflike slope along the bay shore proper. Nest 2 was in the southwest face of a sprawling mass of rock a third of a mile northeast of the Base. Nest 3 was under a rock on a bluff hill about a mile northwest of the Base. Nest 4 was under a rock on a low ridge about a quarter of a mile north of the building in which we lived. A fifth pair of wheatears lived along the rocky east bank of the Sylvia Grinnell River, but its nest was not located.

None of the four nests had been used previously, and we observed nothing indicating that a second brood had been, or was being, reared anywhere in the region. The nests were thin-walled, shallow, not very compact, and definitely one-layered. We were eager to obtain data on re-use of nests and on second broods because of the remarkable findings of Wynne-Edwards (1952:378) on these matters at Clyde, Baffin Island, in 1950.

In addition to the ten adult wheatears and the young from four nests, we many times saw and heard an adult male which seemed unmated the whole summer, and at the Hudson's Bay Company post, in early August, we saw an adult female and at least four young which had not been reared in the nest we found in that vicinity. Also, in rough country east of the Hudson's Bay Company post, we saw adults with or without young on several occasions. Part of this last-named area was outside the 18-square-mile area we regularly visited. However, we found the species only near the coast in the general vicinity of the Base.

The unmated male wheatear mentioned above was unapproachable, far-ranging, and given to singing a great deal. We several times encountered it in high land about half a mile northeast of the Base. It commonly sang briefly from a bald knob above us, and then suddenly launched forth in flight-song. Occasionally it hovered on rapidly beating wings while singing, but usually moved forward, high in air, to another knob two or three hundred yards away, singing the whole time. If we followed, it gave snatches of song as it moved from rock to rock ahead of us; or, finding itself on an eminence, it launched forth again in flight-song, making its way to a knob farther on, or, in a wide circle, back to the place from which it had first flown. It may have had a mate and nest; but it certainly acted as if it were in no way attached. Whether it was the "extra" male which appeared at nest 2 on June 28 and helped with feeding the large brood there, we did not know. Nest 2 was fully a mile from the high land which this male frequented.

## BREEDING BEHAVIOR

Several authors (including Kumlien, 1879:73; Soper, 1928:116, 1940:16-17, and 1946:420; Sutton, 1930 and 1947; Taverner, 1934:128; Forbes, 1938; Shortt and

Peters, 1942:347 and Wynne–Edwards, 1952:377-378) have already reported the Greenland Wheatear from eastern and southern Baffin Island. We saw it first on June 15, on a rocky ridge northeast of the Base. The south-southeast wind was not especially strong, but the air was chilly (maximum temperature: 39.1°F.) and snow half-covered all the higher slopes. More snow fell that day, too—odd, hard, opaque little balls resembling hail. While we were watching a pair of Snow Buntings, a bird of similar size appeared on a large boulder, lifted one half-spread wing in the wind, and flew off revealing a bold white rump-patch. The wheatear probably was a female, for its prevailing color-tone was brown. Later in the day a handsome male approached us closely, alighting on a great rock with tail fanned wide. It sang several times. The songs were bright and interesting, but short and not wholly musical, for some phrases were harsh. It did not scold us at all, nor did it sing a flight-song.

Two days later (June 17) we saw three wheatears just northeast of the Base. One was called by us a "full adult in high plumage." It may well have been the "unapproachable" male already mentioned. There was also another male—this a duller, perhaps younger, individual. It hopped and flitted along, revealing its white rump-patch, occasionally singing a brief song. A still duller, browner bird was near it, a female. We were much impressed with the female, which had a way of hopping along quietly, stopping now and then with head cocked to one side as if looking or listening intently. Her eyes were large. She reminded us of a Robin (*Turdus migratorius*). While standing still, in "listening" attitude, her tail hung almost straight down, with its tip against the rock or moss. The male, by contrast, was the very embodiment of excitability and agitation. As he flitted along the slope he seemed almost to hurl himself at, or pounce upon, the rocks he used as perches. His tail was never at rest. For a time the female was preoccupied with a spot at the edge of a large snowbank. She seemed to be finding food on the moist ground there. The two were rarely more than 30 yards apart; but they did not keep close together. The male never fed the female nor, so far as we could tell, displayed before it; and neither bird made a move that in any way suggested nest-building. The male performed no flight-song.

It seems clear now that these birds had a nest downslope from us about a hundred yards, and that the female was not on the nest because, not having laid the full clutch of eggs, it had not yet started incubating them. One thing is certain: that very day there was a wheatear nest not far from us, near what we called Snow Bunting nest "No. 1." The bunting nest we visited regularly from June 15 to mid-July. In going to it we usually walked up a ravine from the tundra-flat to the south and in so doing continued to miss the wheatears' nest-territory just to the west. We found the wheatear nest July 8, on which date it held young about a week old (see below). Allowing two weeks for incubation and several days for growth of the nestlings, we submit that it must have held an incomplete clutch on June 17.

On June 22 we found wheatear nest 1. It was on a steep rocky slope, almost a cliff, about 60 yards above high-tide mark. It was in a fissure in a vertical southward-facing wall of rock and contained four well developed young. We found it by watching the parent birds, which were much agitated by our presence. They called *weet*; *chack* (or *check*); occasionally *weet-check*; infrequently a rapid *check-check-check-check-weet* or *eet-check-check-eet*. We thought we could identify spiders, large crane-flies, and caterpillars among the food they brought in. The male and female seemed to be about equally active in bringing food and in scolding us. The male sang infrequently but did not perform a flight-song. The nesting spot was sheltered, sunny, indeed downright warm in comparison with the windy slopes above. The young wheatears made no attempt to scramble from the nest when we touched them, nor did they squeal on being brought

out for examination. The long, shaggy natal down, which clung in profusion to the plumage of their upper parts, was mouse gray. Their mouth-corners were pale yellow, the lining of their mouths dull orange-yellow, without spots or blotches of any sort.

On June 23 we saw a female wheatear near the bunting nest referred to above. Sutton's notes for that day read: "When I went to Snow Bunting Nest No. 1 early this

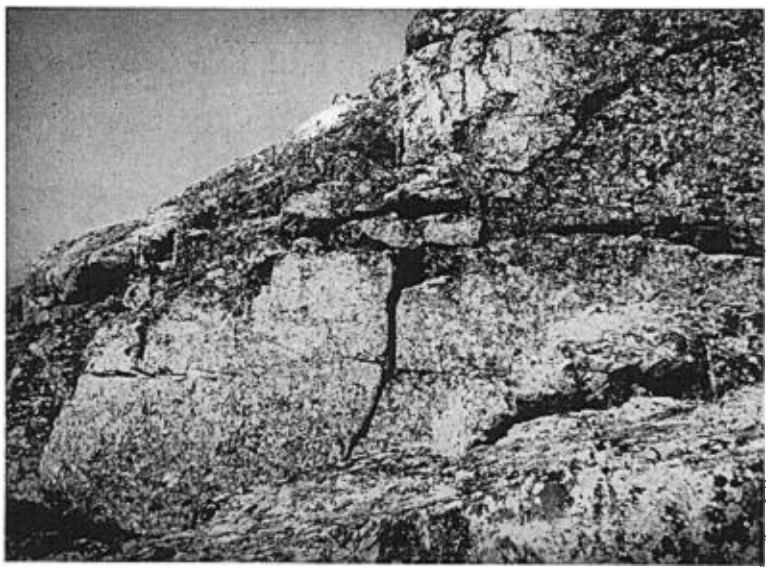

Fig. 1. Site of nest 1 of Greenland Wheatear; Frobisher Bay, Baffin Island, June 22, 1953.

morning, I saw no bunting in the immediate vicinity, but a female wheatear did fly from the little ridge and I thought at first it had flown directly from the nest. It fluttered rapidly from rock to rock and disappeared before I realized what was happening. Wonder where these birds can be nesting!" We now believe that this female wheatear *did* leave her nest that morning. On June 24, while Parmelee was making observations near Snow Bunting nest no. 1, he saw the male bunting fiercely driving a male wheatear off. This was additional evidence that the bunting and wheatear nests were not far apart.

On June 25 we found wheatear nest 2, this one with seven well developed young. We found it by watching the female carrying food. The nest was in a narrow niche in a vertical, southwestward-facing wall of rock. The nest-niche was about 10 feet above ground. We could not feel into the nest for the crevice was narrow (cf. Forbes, 1938:493). Both the male and female were busy feeding the young. The male was not singing. The young were hard to count for the nest was about two feet back in the niche. Sunlight probably never touched them directly, but they certainly were well sheltered from the wind and rain. Several big snowbanks in the vicinity were melting rapidly. There was a meltwater pool some inches deep at the foot of the nest-wall.

On June 25 we visited nest 1, finding the young there almost ready to leave. They scrambled into the crack back of the nest when touched. Two which we caught by the tarsi and toes we pulled gently out for examination. They did not squeal on being handled. Much natal down still clung to the plumage of their upper parts. The larger nestling, a male, we took as a specimen. The nest and young were crawling with mites.

On June 28 we spent a total of almost 14 continuous hours observing the feeding of the seven young at nest 2 (see table 1). We went to the nest about 8 a.m., but did not begin recording our observations until 9:45. By 9:45 we had two or three times seen an *extra* male bird which evinced great interest in the nest. This bird was, we believed, fully adult although it was somewhat less boldly colored than the bird we felt sure to be the male parent. It sang a full loud song occasionally, whereas the only songs given by the male parent were short and not very loud. Only once, at 9:49 a.m., did we see the two males and the female all at the same time. At 1:20 p.m., Sutton saw the male parent drive off the dull-colored "extra" male, but the chase was not spirited. At 1:42 p.m.,

Fig. 2. Site of nest 2 of Greenland Wheatear; Frobisher Bay, Baffin Island, June 25, 1953. The nest was about 10 feet above ground in the shadowed forepart of the great mass of rock.

one male flew in with food just as the other male left the nest—good evidence that two males were actually feeding the young. What the "extra" male was, or where he had come from, we did not know.

The weather conditions of June 28 merit detailed discussion. The day was sunny but chilly. The south-southeast wind became steadily stronger, working up to a velocity of 20 mph. The minimum temperature was 33.2°F., the maximum 44.2°. Fog, drizzle, or rain often accompanied a south or southeast wind at this season (the whole bay was ice-covered), so despite the sky's brightness, we were half expecting the weather to worsen. At 7:40 p.m. Sutton jotted down a note to the effect that the sun had been "under a cloud for about ten minutes." This marked the beginning of almost five days of very foul weather. Parmelee, ensconsed in his sleeping-bag, did all the work of observing and recording from 7:45 on. The evening was gray and foggy. Fine rain fell. By 10:40 visibility was so poor that Parmelee was obliged to move his sleeping-bag to the very base of the nest-wall. By 11:30 it was so dark and raining so hard that he could not see properly even at close range. He could distinguish the female from the male bird (birds?), but had difficulty in being certain that the incoming bird had food in its mouth.

When he stopped his work the wheatears still were busy carrying food, despite the rain and semi-darkness.

Two facts about this 14-hour period of observation are notable: First, rarely during the entire period did either parent (or the "extra" male) spend more than a few seconds at a stretch at the nest; the comings and goings of the birds were virtually incessant. The young certainly were not brooded much—if at all. Second, the adult birds made 367 trips to the nest with food. The average period between feedings was two minutes and 12 seconds. The total number of feedings by the female was 171, by the two males, 196.

In obtaining food the wheatears usually flew out of sight either round the mass of rock to the east, northeast, or north, or downslope a considerable distance. Occasionally they found food within a few rods of the nest. Most mouthfuls of food brought in were large, but when a bumblebee (*Bombus arcticus*) or butterfly was captured, that insect usually was brought in separately. At 11:37 a.m., the female brought in a large bumblebee. While it was at the nest another bumblebee flew past us downslope. The female wheatear must have seen or heard this bee, for she promptly left the nest and gave chase. She snapped at the bee fiercely several times, but it escaped.

Infrequently an adult went to the nest without food, but such visits were exceedingly brief. In approaching the nest the birds alighted first on a narrow projection near the nest-crevice, then hopped and fluttered across the rock-face to the nest-crevice proper. Only occasionally were the female and a male at the nest at the same time, and the two males were never, so far as we could tell, at the nest together. If the female was perching on the projection when the male came from the nest, she fluttered her wings. Never, however, did we see a male give food to the female: the males and the female all gave food directly to the young. If, on leaving the nest, the male met the incoming female in midair, he gave a short, not very loud song while flying. The female also sang a short song in flight whenever, on leaving the nest, it met the incoming male. Whether the "extra" male sang, or was sung to, in this fashion we did not know.

Both male and female birds carried off fecal sacs. While carrying these they flew rather slowly, usually in a straight line, employing a measured, fluttering wing-beat. They invariably carried the sacs downhill. Most sacs they carried 40 to 60 yards, dropping them from three or four feet in air; but occasionally they alighted, placed the sac on the ground, and jabbed at it as if trying to break it up or shove it into the moss. Many sacs they carried westward, dropping them from the air just beyond a large snowbank. A male bird dropped one sac while hovering about four feet above the ground. We were not sure that the "extra" male carried off fecal sacs. During the 14-hour period of observation 74 fecal sacs were carried from the nest, 37 by the female, 37 by the male (males?). Never did a bird leave the nest with a fecal sac without first having delivered food to the young.

Our presence near the nest undoubtedly reduced the total number of feedings somewhat. Occasionally one of the birds stopped food-gathering for a short time, approached us closely, and called *check-check-check-check-weet,* or *weet-check,* excitedly. At 4:04 and 4:09 p.m., one of the males gave sudden violent chase to a male Lapland Longspur which was singing flight-songs close by. Why the wheatear suddenly objected we could not understand, for the longspur had sung literally scores of songs without rousing the slightest animus. Two or three times one of the male wheatears chased a Snow Bunting briefly. Several times we saw a lemming (*Lemmus trimucronatus*) making its way along a fissure about 30 feet from the wheatear nest. The birds paid no attention. Neither did they seem to mind in the least the pipits which often flew past the nest-crevice or fed in the mossy area just below the nest. At 4:49 p.m., a Peregrine (*Falco peregrinus*) flew low past the nest-rock. No wheatear was in sight at the time.

Table 1

Record of Feedings at a Greenland Wheatear Nest, June 28, 1953

Food was brought by the parents and also by an "extra" male which was indistinguishable most of the time from the male parent. An asterisk indicates fecal sac removal after food delivery.

| A.M. | | 12:08 | F | 2:10 | M | 4:17 | F | 5:47 | F | 7:27 | M |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9:45 | M | 12:13 | F | 2:11 | M | 4:18 | M | 5:49 | M | 7:31 | M |
| 9:55 | F | 12:14 | M | 2:12 | F | 4:20 | M | 5:51 | F | 7:32 | M* |
| 10:05 | F* | 12:20 | M | 2:13 | F | 4:21 | F | 5:53 | M | 7:33 | F |
| 10:07 | M* | 12:22 | F | 2:16 | F | 4:22 | M | 5:58 | M* | 7:36 | M |
| 10:11 | F* | 12:23 | M | 2:17 | F | 4:23 | F | 6:01 | M* | 7:37 | F |
| 10:12 | F | 12:24 | F | 2:23 | M* | 4:24 | M | 6:04 | M | 7:41 | F |
| 10:16 | M | 12:25 | F | 2:24 | F | 4:26 | F | 6:07 | F* | 7:42 | M |
| 10:25 | F | 12:26 | F | 2:26 | M | 4:27 | M | 6:10 | M | 7:44 | M |
| 10:27 | M | 12:30 | F | 2:33 | M | 4:29 | F | 6:14 | M | 7:44 | F |
| 10:31 | M | 12:35 | M | 2:36 | F | 4:31 | M | 6:15 | F | 7:54 | M |
| 10:33 | M | 12:37 | F | 2:37 | F | 4:33 | M | 6:21 | M | 8:02 | F* |
| 10:34 | F | 12:40 | M | 2:38 | M | 4:35 | M | 6:22 | F | 8:03 | F* |
| 10:47 | F* | 12:44 | F* | 2:39 | M | 4:36 | F | 6:23 | F | 8:07 | F |
| 10:48 | M | 12:45 | M | 2:40 | F* | 4:37 | M | 6:25 | M | 8:12 | M |
| 10:49 | F | 12:50 | F | 2:42 | M* | 4:38 | F | 6:26 | F | 8:12 | F |
| 10:50 | M | 12:51 | M | 2:46 | F* | 4:38 | M | 6:30 | F | 8:14 | F |
| 10:55 | M | 12:55 | F* | 2:50 | F* | 4:40 | M | 6:31 | M | 8:18 | F* |
| 10:57 | M | 12:56 | F | 2:51 | M | 4:41 | F | 6:31½ | F* | 8:20 | F |
| 10:59 | M* | 12:58 | M | 2:51½ | M | 4:42 | F | 6:32 | F | 8:20 | M[1] |
| 11:00 | F | 12:59 | F | 2:52 | M | 4:44 | M | 6:33 | M | 8:22 | F* |
| 11:02 | F* | 1:00 | M | 2:56 | F* | 4:44 | F* | 6:34 | F* | 8:23 | F |
| 11:05 | M* | 1:03 | F | 2:57 | M | 4:45 | M | 6:35 | F* | 8:24 | F* |
| 11:06 | F | 1:04 | M | 2:58 | F | 4:45 | F* | 6:35½ | F | 8:25 | M |
| 11:06½ | M* | 1:04½ | F | 2:59 | F | 4:46 | M | 6:36 | M* | 8:26 | M |
| 11:08 | M | 1:08 | M | 3:01 | F | 4:49 | F | 6:40 | M | 8:29 | M |
| 11:10 | M | 1:09 | M | 3:02 | F | 4:50 | M | 6:41 | F* | 8:30 | M |
| 11:13 | F | 1:14 | M | 3:04 | M* | 4:51 | F | 6:42 | M* | 8:31 | F |
| 11:15 | M | 1:15 | F | 3:08 | F | 4:56 | F | 6:43 | F | 8:33 | F |
| 11:16 | F | 1:20 | M | 3:09 | M | 5:00 | F | 6:50 | M | 8:35 | F |
| 11:20 | M* | 1:21 | F | 3:18 | F | 5:02 | F* | 6:51 | F* | 8:38 | F |
| 11:21 | F | 1:23 | M | 3:25 | M | 5:03 | M* | 6:52 | M* | 8:39 | M |
| 11:24 | F | 1:24 | M* | 3:26 | F | 5:07 | M | 6:53 | M | 8:43 | F |
| 11:25 | M* | 1:25 | M | 3:30 | M | 5:07 | F | 6:57 | F | 8:43 | M[1] |
| 11:35 | F | 1:26 | F | 3:32 | M | 5:10 | F | 6:59 | M | 8:44 | F[1] |
| 11:37 | F | 1:27 | F | 3:33 | F* | 5:12 | M* | 7:00 | M | 8:48 | M |
| 11:40 | F | 1:27 | M | 3:38 | F* | 5:14 | M | 7:02 | M* | 8:48 | F |
| 11:41 | M* | 1:30 | F | 3:40 | F | 5:15 | F | 7:04 | M | 8:50 | M[1] |
| 11:42 | F* | 1:31 | F | 3:41 | F | 5:19 | F | 7:06 | M | 8:53 | F |
| 11:44 | F | 1:32 | M | 3:43 | M* | 5:20 | F | 7:07 | F* | 8:54 | M |
| 11:47 | F | 1:36 | M | 3:44 | M* | 5:23 | F | 7:10 | M | 8:55 | F[1] |
| 11:47½ | M | 1:36½ | F | 3:45 | M | 5:25 | M | 7:11 | M | 8:58 | F |
| 11:52 | M | 1:38 | M | 3:47 | M | 5:27 | M | 7:11 | F | 9:00 | F* |
| 11:55 | M | 1:40 | F | 3:54 | F | 5:30 | M* | 7:14 | F | 9:05 | M |
| 11:56 | F | 1:42 | M | 3:56 | M* | 5:30½ | F | 7:14½ | M | 9:07 | F[1] |
| 11:56½ | M | 1:46 | M* | 3:56 | F* | 5:30½ | M | 7:16 | F | 9:08 | M |
| 11:57 | M | 1:50 | M | 3:58 | F* | 5:36 | M | 7:17 | M | 9:09 | M |
| 11:59 | M | 1:56 | M* | 4:00 | F | 5:38 | M | 7:18 | M | 9:10 | M[1] |
| 12:00 | F | 2:00 | M* | 4:01 | M | 5:38 | F | 7:19 | F | 9:10 | F[1] |
| | | 2:02 | F | 4:02 | F | 5:39 | F | 7:20 | M | 9:12 | M* |
| P.M. | | 2:05 | M* | 4:04 | M | 5:41 | F* | 7:21 | F* | 9:15 | M |
| 12:01 | M | 2:07 | F | 4:08 | F | 5:43 | M* | 7:23 | F | 9:16 | F |
| 12:05 | M* | 2:08 | M | 4:09 | M | 5:45 | F | 7:24 | M | 9:20 | M |
| 12:07 | F* | 2:09 | F | 4:13 | M | 5:46 | M | 7:25 | M | 9:23 | M |

[1] Feeding of young bird outside the nest-crevice.

Table 1 (Continued)

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9:24 | M | 9:46 | M* | 10:00 | M | 10:17 | F | 10:35 | M | 11:11 | F |
| 9:27 | M | 9:47 | F | 10:05 | M* | 10:20 | M | 10:39 | F* | 11:20 | M |
| 9:30 | M | 9:49 | M | 10:06 | F* | 10:22 | M* | 10:40 | M* | 11:21 | F |
| 9:31 | M | 9:50 | F | 10:07 | M | 10:24 | M | 10:50 | F | 11:25 | M |
| 9:36 | F | 9:53 | M | 10:08 | M | 10:25 | M | 10:55 | M | 11:29 | F |
| 9:36 | M* | 9:54 | M | 10:10 | M | 10:28 | M | 11:00 | M | 11:30 | M |
| 9:38 | M | 9:55 | M | 10:13 | M | 10:29 | F | 11:03 | F | | |
| 9:45 | F* | 9:57 | F | 10:16 | M* | 10:33 | M | 11:10 | M | | |

At 8:20 p.m., one of the young wheatears made its way to the mouth of the nest-crevice and scrambled or fell to a narrow shelf about four feet below the nest. Here it received food for over an hour (see table 1). At 9:25 p.m., Parmelee noticed that he could no longer see this bird. Wondering what had happened, he investigated, finding it drowned in the meltwater pool. It had been dead a very short time. The adult wheatears continued to make trips to the shelf on which it had been, but they did not fly to the bottom of the nest-wall.

From 10:40 to 10:50 p.m., no adult wheatear took food to the nest: Parmelee was moving his sleeping-bag closer, and the birds were greatly perturbed. From 11:13 to 11:20 p.m., there was great excitement and a complete cessation of food-carrying: a Snowy Owl (*Nyctea scandiaca*) was flying about the nest-rock menacingly. From 11:18 to 11:20 the great bird hovered almost directly over the nest. Nicholson (1930:306-307) discusses in detail interruptions in feeding by parent wheatears caused by "frequent visits" of a family of Gyrfalcons (*Falco rusticolus*).

Parmelee discontinued his observations at 11:30 o'clock. At the Base we examined the dead nestling. It was very stub-tailed. We decided that it had left the nest prematurely, perhaps as a direct result of our attempt to handle the nest contents that afternoon.

The four days following June 28 were gray and disagreeable. On our several visits to the nest during this period we observed nothing in any way comparable to the amount of activity we had witnessed on June 28. Could the adult birds have sensed on that date that bad weather was ahead of them; that incessant gathering of food was necessary if the big brood was to be kept alive? Or were the insects themselves unusually active on the bright day and the birds merely slaves to their instinct in continuing to obtain food as rapidly as possible so long as it was available? During the four inclement days insects must have been very hard to find. Three of a brood of four young Horned Larks which we had been observing died during this bad spell, probably from shortage of insect food.

On July 2 (much fog) we went to nest 2 at 4:50 a.m., finding all quiet, except that a male Lapland Longspur was singing flight-songs nearby. At 5:10 we heard a rough *bjee*—the food-cry of a young wheatear. At 5:20 a male Snow Bunting alighted near the nest-crevice and the young wheatears raised a great clamor. We had never heard a comparable noise on the arrival of an adult wheatear. The cries subsided when the bunting flew away. Surprised because no wheatear had driven the bunting off, we went to the nest-crevice and found (1) a young wheatear, hunched up but very spry looking, at the edge of the meltwater pool below the nest; (2) a dead nestling, of about the same size as the living one, in the water a few feet away; and (3) several dead hairless lepidopterous larvae, each about an inch long, also in the water. While we were picking the dead bird up, an adult male wheatear darted from a deep crack about four feet above the nest-crevice. We believe it had been asleep there, perhaps in a much-used roosting place. It flew past us, alighted on a rock about 20 paces off, and began calling *chack*. Then the female appeared. The young wheatear at the edge of the meltwater pool was short-tailed, but obviously much older than the bird which had left the nest on June 28. The brood now numbered five.

In the afternoon Parmelee returned to nest 2 to obtain photographs of the young birds leaving the nest. He failed to find any birds at all for a time; then an adult male appeared, flying toward some rocks several rods to the southwest of the nest. Investigating promptly, Parmelee found two young birds, both short-tailed but well able to fly. One darted off, keeping up with the adult without much difficulty. The other stayed quiet long enough to be photographed, then flew off, alighting in a pool. Here it propelled itself sturdily to safety, using its wings.

Fig. 3. Left. Young Greenland Wheatear just after leaving nest 2; Frobisher Bay, Baffin Island, July 2, 1953. The blurred light area directly above the head is natal down, thrown slightly out of focus by the wind.

Right. Young Greenland Wheatears in nest 4; Frobisher Bay, July 16, 1953. The rock above the nest has been removed. Note absence of natal down from head of bird to right. There was very little space between the nest-cup and the rock above it and the down probably was worn off during feedings.

On July 3 we went to nest 2 about 5:00 a.m. The nest was empty. We failed to find any wheatear—either young or adult—for some time. Then, off to the north, we heard a rough *bjee* and knew that a young wheatear was begging for food. We found the fledgling on an inaccessible ledge. Tossing pebbles at it, we frightened it into a crevice. Presently it emerged and flew rapidly straight across a snow-filled gulch. We caught and banded it. It was not very strong on its legs and we left it with misgivings, for it seemed to be quite abandoned by its parents.

That afternoon, in hilly country a mile or so north of the Base, we saw wheatears several times. One adult, a female we thought, flew from a cliff below us just as we flushed a Rough-legged Hawk (*Buteo lagopus*) from its nest. The wheatear must have been feeding only a few yards from the hawk's nest. On a hilltop two hundred yards east of the hawk's nest we happened upon a pair of wheatears. They flitted off downslope and were soon out of sight. We may have found this pair's nest on our way back to the Base. Near the top of a great bluff overlooking the flat on which the Base stood, we became suddenly aware of the presence of two wheatears—a male and a female. The male quickly disappeared—in the direction of the quarry; but the female suddenly entered a narrow opening beneath a rock. We could scarcely believe that it had gone to the nest, for it had uttered no cry of alarm. But when it failed to reappear we investigated, finding that there was a considerable space beneath the rock. At first we could see nothing at all

under the rock; but presently we descried the bill and eye, then the head and neck, of the female and the edge of the nest. Since it had gone to the nest without food we assumed that she was incubating.

An hour or so later we returned with camera equipment, hoping to photograph a nestful of eggs. Both the male and female wheatear greeted us, scolding energetically. The male soon left, but the female remained. We looked under the rock and clearly saw a young wheatear, large and well feathered. The mother was very solicitous at first, but became gradually less demonstrative, eventually seeming to lose interest. Puzzled over this behavior, we moved the rock, caught and banded the young bird (which flew strongly about 20 yards), and examined the nest. Its contents were two unspotted blue eggs, both slightly broken and glued to the feathers and grasses of the lining, and a great mass of feather-sheath particles. Part of the brood obviously had left. The oldest young were probably being cared for by the male. The female was still bringing food to the youngest of the brood. She may have been caring also for one or more young outside the nest. The two eggs had been cracked while they were quite fresh; there was no sign of an embryo in either. The nest was about 15 inches back from the entrance. The nest-rock was on a steep slope about six feet above fairly level, not very stony, ground. The nest was thin-walled. It was made of grasses and dead plant-stems, lined with feathers and fine grasses. The nest and the cup into which it fitted were surprisingly damp—almost wet.

On July 4 we visited nest 2 for the last time. Near the sprawling nest-rock we came upon the female parent and two of her brood. We expected to find the young cowering in a sheltered place—but instead they were on the tops of the rocks, flouncing about with their mother, calling *chack,* and giving every evidence of being in excellent condition. The female was feeding them, but they were no longer using the *bjee* food-cry. No other young was seen.

On July 8 we found wheatear nest 4. We had started to walk toward the top of a little ridge just west of a bunting's nest when we heard loud wheatear alarm notes on the other side. On reaching the top we saw not far below us a Raven (*Corvus corax*) and a pair of agitated wheatears. The Raven, on seeing us, made off immediately, and the wheatears melted away as soon as the Raven had gone. Later that morning we returned, watched from the little ridge, and saw the female wheatear, with food in her mouth, go under a not particularly large rock which rested on a slope near the spot from which the Raven had flown. Just below the opening she had entered lay an egg broken in on one side. It contained a large, dry embryo which obviously had been dead for some time. Remarkably enough the Raven, which must have been foraging, had not eaten it. (There is, of course, the remote possibility that it had not been lying there at the time of the Raven's visit.) Having decided not to roll the rock over until we knew a bit more about the parent birds, we tried to ascertain what was in the nest. The crevice was too narrow for the hand. We thought we could see, in the half-light, the head of a young bird sticking over the edge of the nest.

In the afternoon we returned to the nest. The whole area seemed lifeless. Using a mirror, we threw light under the rock and thought we could make out the bill of a young bird; then suddenly we saw the adult female as she hopped swiftly from the nest, paused an instant, and retreated into the darkness. We tried to force her out by striking the rock with a pebble, but she would not leave. We propped a net against the rock and waited. Within about ten minutes she flew out, straight into the net. We banded her and let her go. She flew about 15 yards, alighted on a rock, shook herself violently, bobbed, called *chack,* and about-faced to scold us.

The following morning (July 9) we went to nest 4 early. The female was there, calling *chack* as usual, and carrying food under the rock. We did not see a male. Lifting one end of the rock, we found that the nest contained three young and one highly translucent egg. The young made no attempt to get away. They were probably about a week old. We collected the egg, which contained a small dead embryo.

On July 10 we visited the nest again, this time seeing a male, which called *weet* and *weet-chack,* call notes we had never heard the female use.

On July 10, Parmelee made a surprising discovery. While returning to the Base from the "HBC River" (our name for a stream which emptied into the bay near the Hudson's Bay Company post), he came upon a male and female wheatear and at least four well developed young. Knowing that we needed another adult male specimen, he decided to collect the male parent if he could. Watching that bird closely, he readied himself for a wing-shot. As he approached the rocks near which he had last seen it, a wheatear suddenly burst out, he shot, and the specimen fell. On picking it up, he found it to be a *young* bird, the very one we had banded near nest 2 on July 3. This, then, was the brood from nest 2, fully a mile and a half from the deserted nest, still together, still receiving food from their parents! The young bird, which we had given up for lost, had fared well. It was in excellent condition. A few long strands of natal down still clung to the plumage of its hind neck.

On July 11 we visited nest 4, finding the female busy feeding the young. We saw no male anywhere in the vicinity. We lifted the rock and banded the three young, which made no attempt to bolt when we took them from the nest. The nest was clean but damp. It was completely free of mites or other parasites, so far as we could see.

On July 16 we took photographs of the young in nest 4. While we were moving the rock so as to expose the nest, the young birds bolted, and we mortally injured one of them. On July 23, not far from the nest-site, we saw the banded mother and a banded young one. What had happened to the other young bird we did not know.

Two unbanded young wheatears which we observed for some time near the dump just west of the Base on July 31 were in the midst of the postjuvenal molt. Their tails appeared to be full-grown. An adult female and two young birds which we saw August 1 along the shore of Tarr Inlet also were molting. Two wheatears which we saw just north of the Base on August 2 appeared to be in fairly complete first winter plumage. These birds were feeding along the edge of a bare, gravelly area. On August 3, 4, and 5, at the Hudson's Bay Company post, we repeatedly saw an adult female and from two to four young—all of which were molting.

## PROSPECTS FOR ESTABLISHMENT OF THE SPECIES

Several authors, notably Forbes (1938:495) and Shortt and Peters (1942:347), have voiced their belief that the Greenland Wheatear was becoming more common on Baffin Island. Whether or not this apparent increase was actually an increase in observers or observations rather than of birds, we wish to point out that what we witnessed of wheatear nesting behavior at Frobisher Bay convinced us that the species is remarkably hardy. Not one of the four nests we observed was wholly unsuccessful. True, some eggs did not hatch. True, two young drowned shortly after leaving one of the nests. But that very nest contained seven well developed young when we found it, and at least four of the brood fledged successfully despite a very bad spell of weather. Another nest held four well developed young when we found it, and three of these fledged successfully (four probably would have fledged had we not collected one). Thus, 15 of 19 eggs hatched and 11 of the 15 nestlings apparently fledged successfully.

Choice of nest-site certainly is an important factor in this species' success. Each of

the four nests we found was hard for a man to reach with his hand and about equally hard for a raven to reach with its bill, or an owl or peregrine to reach with its bill or foot. Neither foxes (*Alopex lagopus*) nor weasels (*Mustela erminea*) were at all common in the Frobisher Bay area in the summer of 1953. A fox could hardly have reached any of the four nests. A weasel could have reached two of them easily, one with difficulty, one with great difficulty—if at all. Certainly the wheatear is now well established in Greenland and in Baffin Island, and its range may well be increasing. What we observed and have reported above leads us to believe that *Oenanthe oenanthe* may well have a completely circumboreal breeding distribution within the next century or so.

ACKNOWLEDGEMENTS

We wish to thank the Arctic Institute of North America for the grant-in-aid which made possible our work in Baffin Island. Especially grateful are we to Lt. Col. P. D. Baird, Director of the Institute's Montreal Office, and to Lt. Col. Walter A. Wood, Director of the Institute's New York Office, for their personal interest. Our thanks, too, to Dr. V. C. Wynne-Edwards, to Derry Ellis, and to Constables Robert Van Norman and Robert Pilot of the Royal Canadian Mounted Police, for their assistance in the field.

SUMMARY

1. Several pairs of Greenland Wheatears nested in rough country near the United States Air Force Base at the head of Frobisher Bay, Baffin Island, in the summer of 1953. We found four nests, all within about a mile of the Base. Two of these were in crevices in vertical rock-walls, two under large rocks.

2. None of the four nests had been used before. We found no evidence of double-broodedness.

3. Nest 2 held seven well developed young when we found it June 25. During a 14-hour period on June 28 this brood was fed continuously by the parent birds and at least part of the time by an "extra" adult male. The three adults made 367 food-trips. Among the food brought in were bumblebees and butterflies. This great activity immediately preceded a four-day spell of vile weather during which insect food was very hard to obtain.

4. A male wheatear, busy feeding young at nest 2, sang brief, not very loud songs in flight when, in leaving the nest after food delivery, he met the incoming female. The female also sang briefly when, on leaving the nest, she met an incoming male.

5. Eight days after the brood had left nest 2, the entire family (male, female, and at least four young) were together a mile and a half from the nest. The young were still receiving food from the adults. Natal down still clung to the plumage of at least one of the brood.

6. In nest 3, found July 3, there were two eggs (broken some time before), one well developed young bird, and evidence (particles of feather-sheath) that other young already had fledged. In nest 4, found July 8, there were three young several days old and a translucent egg; outside the nest, about two feet away, was another egg (broken).

7. A wary, unapproachable male, which sang a great deal, apparently had no mate or nest all season.

8. In the four nests a total of at least 19 eggs were laid. Of these, four did not hatch. Of the 15 nestlings, two drowned—possibly because of leaving the nest prematurely; one was mortally injured while we were moving the nest-rock; and one we collected as a specimen.

9. *Oenanthe oenanthe* is now well established, at least locally, in Baffin Island.

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