THE ROUGH-LEGGED HAWK IN THE AMERICAN ARCTIC

George Miksch Sutton* **and David F. Parmelee†**

THE rough-legged hawk (*Buteo lagopus*) has often been referred to as a "subarctic" or "Hudsonian Zone" bird. Peters (1931) did not mention any of the arctic islands in his statement concerning the breeding range of the New World race, *B. l. sanctijohannis*. Taverner (1935) stated that the northern limit of its range seemed "to just touch the southern edge of the arctic islands". Soper (1928; 1946) and Wynne-Edwards (1952) have given information concerning its breeding in southern Baffin Island. Sutton (1932) reported its breeding on Southampton Island, Porsild (1951) on Victoria and Banks islands, MacDonald (1954) on Prince Patrick Island. Apparently it does not range as far north in the eastern American Arctic as in the western. The map in Cade (1955) gives a good idea of its breeding distribution in the Canadian Arctic Archipelago. Oddly enough, it has never been found in Greenland (Salomonsen, 1950–1).

In southern Baffin Island *Buteo lagopus* is widely distributed today. The MacMillan expedition to the southwestern part of the island collected "one specimen and eggs" (Soper, 1928). Soper (*loc. cit.*) collected it at Cape Dorset and saw it at Amadjuak Bay. His recent comments (Soper, 1946) on the species are: "Breeds sparingly along the south coast from at least Lake Harbour to Foxe Channel. At present it is not known to occur elsewhere on the island." The northernmost record for Baffin Island is apparently that of Manning (*in* Bray, 1943), who saw one at Taverner Bay, along the west coast just north of the Arctic Circle, on June 8, 1940. This record Soper (1946) apparently overlooked.

Wynne-Edwards was the first to report the species from southeastern Baffin Island. He found it at York Sound, Frobisher Bay and Frobisher air base.

Nestings in Frobisher Bay, Baffin Island, in 1953

In 1953 at least four pairs of rough-legs nested near the head of Frobisher Bay. We did not observe the species about Silliman's Fossil Mount, 16 miles west of the air base, and we did not see it in the Wordie Bay area, or near Cape Dorchester, or along the southeastern shore of Amadjuak Lake. All these places lack noticeable cliffs.

The rough-leg had started nesting well before we reached Frobisher Bay. We first saw it on June 17. On the 19th we located a pair about a mile northwest of the air base. Both birds were black, marked with gray, buff, and white, especially on the underwings. They must have been moulting, for

*Professor of Zoology and Curator of Birds, University of Oklahoma.
†Instructor, Department of Zoology, University of Oklahoma.

there were feathers, large and small, all over the place. Bent (1937) states that the annual moult is completed "between April and November". Besides feathers we found numerous droppings, several tufts of lemming fur, and two half-eaten collared lemmings (*Dicrostonyx groenlandicus*). The hawks screamed and dived at us and twice we saw one strike a snowy owl (*Nyctea scandiaca*) a staggering blow in mid-air.

We found their nest (nest 1) on June 21. It was about 20 feet below the top of a cliff, on a slight projection. We could look directly down at the six shiny, not very heavily marked eggs. The nest was neatly and deeply cupped. In its walls were dead willow branches and roots a foot or more long. The lining was of moss and lichens to which clung small feathers and bits of down. While we were near the nest a large falcon, probably a female peregrine (*Falco peregrinus*), flew swiftly past, not far overhead. The rough-legs did not dive at this intruder.

Fig. 1.
Nest of rough-legged hawk on cliff. Near head of Frobisher Bay, Baffin Island. June 21, 1953.

We went to the nest for photographs on June 23. The old birds started screaming when we were fully a quarter of a mile away, but they did not dive at us until we had climbed to the promontory directly above the nest. None of the six eggs was pipped as far as we could tell. Three days later, we approached the eyrie from above and took the birds by surprise. Creeping to the very brink of the cliff, we looked down on the incubating female. She had not heard us and was gazing across the valley. Suddenly the male screamed, and the female, without a glance in our direction, dropped from the nest. The nest now contained only five eggs. Presently the female too was screaming, in a voice higher than her mate's.

The eggs all hatched some time between June 26 and July 3. On this last date we visited the nest twice. In the morning we had an unforgettable look at the female feeding four of her brood (one was asleep). Bits of lemming held in the tip of her beak the chicks sought eagerly. Size variation within the brood indicated a protracted hatching period. The chicks were

buffy or creamy white, not grey, and one of the larger seemed to be more strongly buffy on the crown and back than the others. On our afternoon visit the three larger chicks were sitting up, biting at one another with surprising ferocity.

On July 7, along the eastern side of Tarr Inlet, some miles east of nest 1, a rather small, very dark rough-leg flew toward us screaming. This was the male of the Tarr Inlet pair. On July 11 we visited nest 1, finding the parents and five young all in good condition. The only remains of prey visible in and around the nest were those of lemmings.

A week later we found nest 2 on Hill Island. The hawks, circling above the eyrie, squealed as the motorboat approached, but they did not fly toward us. The nest, a hundred feet or more above water level, was on a narrow ledge well below the top of the cliff. The two good-sized young, both in normal light phase plumage, were standing. The parents were dark and blotchy, like all the other adults we had seen. We did not visit this nest again.

On July 22 the two rough-legs screamed at us along the east shore of Tarr Inlet. The first to fly toward us was the dark male referred to above. The less aggressive female was thin-voiced by comparison. Her plumage looked faded and worn, though she was also decidedly melanistic. The nest (nest 3) was a slight affair of moss, roots, and heather on a steep, rocky slope about a quarter of a mile from highwater mark. We could climb to within twenty feet from below, and from above could let ourselves down to a big rock and look directly across at the four well developed chicks, all of which were in normal light phase plumage.

At nest 3, on July 27, we observed the tactics of the aggressive male. When we were fully half a mile away he appeared, circling high above the nest. Soon he began to squeal and to circle toward us, staying high. His dives were shallow, so the roaring of his wings was faint. The female we did not see until we were within 50 yards of the eyrie. She slipped in from the east, coasted along the slope above us, and screamed shrilly. On July 28 we photographed this nest (see Fig. 2). The young, with mouths open, were probably panting, for the day was the warmest we had had, with a maximum of 59°F.

On August 3, two miles to the northeast of nest 3, we heard squealing from another pair of dark, blotchy rough-legs. Parmelee found the remains of two old nests, then investigated an east-facing, 200-foot cliff above which the hawks were circling and screaming. The female had a way of alighting momentarily on a high knob before attacking in a series of shallow dives. The following day Parmelee climbed the talus below the cliff and saw a fringe of sticks protruding from a ledge just above him. On peering over he was almost struck in the face by a young hawk as it sprang forward and flew off. The remaining three young made no attempt to fly. The nest was a mere handful of twigs and roots. Of the four nests it had been the hardest to find, yet it was the only one accessible without a rope. All four young birds were normal light phase.

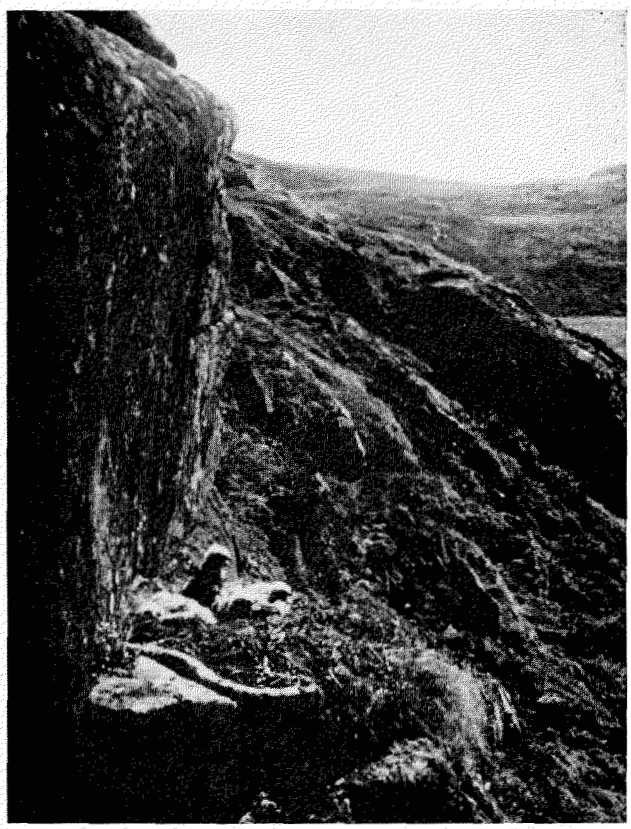

Fig. 2.
Nest of rough-legged hawk on huge rock. Tarr Inlet, near head of Frobisher Bay, Baffin Island. July 28, 1953.

By this time we had become so accustomed to melanistic adult rough-legs that we wondered whether breeding individuals of this region ever wore normal light phase plumage. Since most of the rough-legs we had seen in winter in the United States had been non-melanistic, the thought crossed our minds that the normal light phase was actually the first winter plumage, that birds in first winter plumage were rarely, if ever, melanistic, and that adult birds were rarely, if ever, normal light phase. See also Cade's (1955) comments on melanism.

Our last visit to nest 1 was memorable. Three of the five young were flying strongly about the cliff and two were still in the nest. The youngest was now at least 38 days old. Since we wanted a full-fledged young as a specimen, we decided to take one of the two left in the nest. Both squealed shrilly as we dropped bits of moss on them. Suddenly the larger sprang off, flew with astonishing speed across the valley, and alighted clumsily. We caught and banded it. The nestling collected (male, GMS 11824) was solid black on the belly; its chest, flags, and under tail coverts were brownish buff; its chest was heavily, its flags lightly streaked with dusky. Tufts of creamy white down clung to the plumage of the chin, upper throat, malar region, and tarsi.

Food

So far as we were able to ascertain, the rough-legs were feeding exclusively on lemmings. Both the collared lemming and brown lemming (*Lemmus trimucronatus*) were common in all the places we visited regularly. The abundance of lemmings, plus a scarcity of competitors such as foxes (*Alopex lagopus*) and weasels (*Mustela erminea*), plus the artificial, ample food supply for ravens (*Corvus corax*) at the dump of the air base may have been partly responsible for the local abundance of the rough-legged hawks, snowy owls, and peregrine falcons. Authors agree that the rough-leg is a confirmed eater of small rodents. Blair (1936) found that numerous pellets of rough-legs in Norway were "composed entirely of the fur and bones of voles".

Nesting success at Frobisher Bay

Each of the four breeding pairs observed by us was more or less successful. From nest 1 one egg disappeared, but the remaining five hatched and four young fledged. Nest 2 may well have held more than two eggs. The two young that we could see probably had passed the most critical stage of their nestlinghood. At nest 3 the four young were large when we last saw them, and all probably fledged. At nest 4 one bird fledged, three others very likely did, and one or more others may have done so before we discovered the nest. We observed no slow wasting away of smaller, weaker young (Blair, 1936).

Relationship with the peregrine

Nowhere did we find the rough-leg and peregrine nesting at all close together. Two peregrines that nested on a small cliff near the mouth of the Sylvia Grinnell River were collected on June 18. This cliff was about a mile from rough-leg nest 1. Along the channel between Hill and Bishop islands, where we found rough-leg nest 2, we saw one peregrine, but not its eyrie. At Silliman's Fossil Mount peregrines nested, but we never saw a rough-leg there. At two other places did we record the peregrine, but not the rough-leg.

Possible extension of range

What we have reported above appears at first glance to indicate that the rough-leg is becoming commoner in the American Arctic and that it is extending its breeding range. We must bear in mind, however, that in the greater part of the Canadian Arctic Archipelago very few bird observations have been made, and that no one has studied a given island year after year for a long period or worked the long coast lines in an attempt to plot the breeding distribution of the rough-leg, peregrine, and gyrfalcon (*Falco rusticolus*). Four or more pairs of rough-legs may, for all we know, have bred near the head of Frobisher Bay for a long time.

Ahlmann (1953) states that arctic climate has fluctuated considerably and that in some areas the mean annual temperature has risen significantly in recent

decades. The records for Nottingham and Resolution islands (both near Frobisher Bay) indicate an increase of approximately 1°F. (Longley, 1954). Slight amelioration of climate would not, of course, suddenly produce more cliffs on which rough-legs might nest, and it probably would not eliminate periods of lemming scarcity. All we can say at present is: (1) the rough-leg was not a rare bird at the head of Frobisher Bay in the summer of 1953; (2) lemmings were common there that summer; (3) the northern limits of the breeding of the rough-leg in the New World are well north of the North American mainland.

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