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BREEDING OF THE SEMIPALMATED PLOVER ON BAFFIN ISLAND

By George M. Sutton and David F. Parmelee

Taverner (1934:121) calls the Semipalmated Plover (Charadrius semipalmatus) the "most conspicuous and common plover" of eastern arctic America. Soper (1928:102) calls it "the common plover of Baffin Island." In the summer of 1953, at the head of Frobisher Bay in southeastern Baffin Island, we found it not only the commonest plover but also the commonest shorebird. It was, however, exceedingly local. In most of the 18-square-mile area covered regularly by us we never saw or heard it at all.

Our headquarters were at Lat. 63° 45' N., Long. 68° 33' W., at a Royal Canadian Air Force Base. Here the Semipalmated Plover was a familiar dooryard bird. We saw it whenever we stepped outdoors, day or night, notably an individual which often perched on the roof of a low building near ours, or on a big brown tent close by. At least twelve pairs nested in low country north of the Base. Three more pairs nested just above the high-tide mark near the Base's dump. Scattered pairs nested on the Davidson Point lowlands and along the east bank of the Sylvia Grinnell River about a mile from its mouth. In the rough land between the Base and the Hudson's Bay Company post, about a mile to the east, we virtually never saw the bird. Just east of the post, in a low part of the peninsula enclosing Tarr Inlet on the west, a few pairs bred. The shores of the Inlet were too steep for the species, and the meadows to the east too marshy, but we saw and heard plovers occasionally on the Inlet itself when the tide was out. Along an unnamed river two or three miles east of Tarr Inlet at least two pairs nested. Five or six miles up the "HBC River" (our name for the stream which emptied into the sea near the Hudson's Bay Company post), six or more pairs nested in a close-knit group. This "colony" we visited once, July 26.

The species showed a marked preference for level, well-drained, gravelly places as a nesting-ground (cf. Taverner and Sutton, 1934:33). Nowhere was it a "grass tundra" bird (see Soper, 1940:14). Feeding grounds included tidal flats if these were near the nesting-ground, but favored feeding-places were shallow streams, or mud-bars in tundra ponds. Pairs which nested just north of the Base stayed there all the time. Those which fed on the tidal flats nested between the high-tide mark and the dump, or on Davidson Point. Nowhere did we find "solitary breeding pairs" such as those reported from Bowman Bay by Soper (1946:226). Rather did we find several pairs "in one neigh-

borhood"—as had Hantzsch (1929:11) on the Labrador.

The only bird sharing the plover's breeding-ground at the Base was the Horned Lark (Eremophila alpestris). The Snow Bunting (Plectrophenax nivalis), Lapland Longspur (Calcarius lapponicus), and Water-Pipit (Anthus spinoletta) were common in the vicinity, but they did not nest on the gravel flats—they merely fed there occasionally.

Near the mouth of the Jordan River, 16 miles west of the Base, we found about 15 pairs of plovers in a two-mile stretch of the west bank, all of them, again, in flat, gravelly places. Here a noisy group (three or four pairs) accompanied us almost constantly as we walked upriver. As one pair, whose nesting area we had just traversed, dropped out, another pair joined in the chorus of complaint. So attached to the gravelly areas were they that we saw them nowhere else.

By courtesy of the Royal Canadian Air Force we flew to three areas far removed from Frobisher Bay—an unnamed lake (Lat. 68° 31' N., Long. 71° 22' W.) about 50 miles east-northeast of Wordie Bay, on August 8; the southeast corner of Lake Amadjuak (Lat. 64° 38' N., Long. 70° 28' W.) on August 8 and 15; and a lake (Lat. 65° 20' N., Long. 77° 10′ W.) near Cape Dorchester, August 11. At none of these places did we see or hear a Semipalmated Plover despite there being, in all three areas, gravel flats which looked like those the species frequented near the Base.

Greatly disappointed were we not to find the Ringed Plover (Charadrius hiaticula). All the specimens we collected were semipalmatus, and we feel quite sure that every bird we saw was of that form.

When we started work June 15 we were instantly aware of being late for certain stages in the reproductive cycle of most of the birds. The flat about the Base was bare, but the surrounding slopes were half white with snow, and the bay was covered with ice. Of Horned Larks we saw only males that first day; the females were, we deduced, on their nests. The many pairs of Snow Buntings surprised us: we were to learn that nests had been finished and some eggs laid, but the clutches were not complete and the females were not yet incubating (Sutton and Parmelee, 1953:160). Longspurs and pipits were everywhere, the former conspicuous because of their flight-songs. The Semipalmated Plovers were excited and noisy, but there seemed to be no way of telling in which areas they were nesting.

The plover's common callnote, tee-wick or ke-ruck, we heard almost constantly on the flats. If we climbed the hills, the calling subsided behind us: the flats, not the slopes, were the nesting-ground. The plovers were handsome little birds. The white spot back of and above the eye looked small (see Wynne-Edwards, 1952:368), and the black chestband was narrower in the middle than at the sides. We observed only two flight-songs on June 15. These were speeded-up repetitions of the ke-ruck cry, followed by a rough r-r-r-r-r-r, and ended with a slurred, descending yelp or crow.

Not far from a longspur nest we had found just north of the Base, we saw a plover slipping along the ground with head and fanned-out tail held low. Later in the day (June 15) we returned, again saw a plover running off, and found the nest (Nest 1) without difficulty. It held two eggs. These we marked, each with a red dot. The nest was a



Fig. 1. Semipalmated Plover Nest 1. Near head of Frobisher Bay, Baffin Island, June 26, 1953.

neat, circular cup in the gravel. It was scantily lined with bits of white lichen, short sections of grass-stem, and tiny dry leaves, and was not sheltered in the least by a rock or tuft of grass. It was near the edge of a broad gravelly area and forty paces from a little stream. The long-spur nest was thirty paces to the north, in a turfy spot. The plovers paid no attention to the longspurs, and *vice versa*.

The third egg was laid in Nest 1 between 4:45 p.m., June 15, and 6:08 a.m., June 16. At 7:50 p.m., June 16, there still were only three eggs. Determined to learn as exactly as possible when the fourth egg was laid, we visited the nest hourly during the following ten hours. At each visit we flushed a bird from the three eggs. At 10:20 a.m., June 17, there were still three eggs. The fourth egg was laid between 10:20 a.m. and 2:50 p.m., June 17.

We visited Nest 1 daily but spent very little time there; we did not mark the parent birds; and we never watched one bird relieve the other in incubation. Whenever we went to the nest, both birds seemed to be be there, one on the eggs, the other close by. When, as we approached, the two birds started calling, they were promptly joined by two to four other plovers. On July 17 and 18 the parent birds started calling when we were about 60 paces away. Later it seemed to us that one bird (or both) started calling the instant we stepped out of our quarters and headed in the direction of the nest.

On June 18, about two hundred yards west of Nest 1, we hid behind a pile of gravel and watched several plovers. They seemed to be in twos, and they were running and flying about us in all directions. Presently they quieted down and all but two withdrew. These two ran side by side to a spot not far from us, one promptly squatted, and the other leaned forward with flank feathers puffed out, head down, and tail spread wide and lifted. Assuming that the birds were at their nest, we ran forward, finding only a scrape. We hid again. The two birds ran to another spot, then to another, going through the same performance. Neither of these additional "nests" turned out to contain eggs; they were fairly deep, unlined cups in the gravel, each about 15 paces from the other two. We later found a true nest only a few rods from the three scrapes. These scrapes retained their shape surprisingly well all summer long.

On June 19 we walked several miles up the Sylvia Grinnell River. Nowhere did we see the Semipalmated Plover except along a gravelly stretch about a mile in from the mouth. From June 20 to 26 we saw the species frequently; occasionally saw a bird scuttling off with tail spread wide and depressed, and head down; visited Nest 1 daily; but found no more nests. At Nest 1 we spent about an hour on June 26. Most of that time three birds were near us, calling loudly; but only one of them went so far as to lie on its side with mouth open as if gasping, tail fanned out, and one wing lifted and waving.

June 27, on Davidson Point, we collected our first specimens—two males. In these the testes were somewhat enlarged (7 x 4 and 5.5 x 3 mm. in GMS 11729; each 7.5 x 4 in GMS 11730), but neither had brood-patches. The eyes were dark brown; the eyelids lemon yellow; the bill orange throughout the basal half and black at the tip; the legs and feet brownish yellow. The legs of the living birds had looked orange to us, so the color probably faded immediately after death. The web between the middle and outer toes was distinct.

On June 30, near the dump, we found Nest 2. It held four eggs and was only a rod or so from, and two feet above, high-tide mark. It was in a sloping, twenty-foot-wide, pebbly zone bordering the turfy crown of a low peninsula (island when the tide was exceptionally high). It was not sheltered by any sort of rock or vegetation, but the whole area was protected from the wind by higher land. It was the only nest we found that was not on a gravel flat.

July 1 was our latest date for a plover flight-song. That day we found Nest 3. This was a quarter of a mile north of Nest 2 and not quite that far west of Nest 1. It was on a gravelly flat and was wholly unsheltered by a rock or tuft of grass. It held four eggs.

From July 1 to 5 we visited Nest 1 at least twice daily. Never did we go there without being attended by three or four birds. Where the extra birds came from we did not know. On July 5 one of the parent birds was especially demonstrative: it called loudly, flew close, and dragged itself on the ground with head low, tail spread and pressed down, and wings "shuffling" and waving. Tucker's description of the "injury feigning" of *C. hiaticula* (1948. *Handbook of British Birds*, Fifth Impression, Vol. IV, p. 349) seems to describe quite well what we observed. We did not, however, note any such constant repetition

of a "definite series of actions . . . each time in the same order" as Mitchell (1935: 61) has reported for that species.

On July 5 we found Nest 4. In finding it we tried a new procedure. Knowing, from long association with the birds, that three pairs were nesting not very far west of Nest 1, we partly concealed ourselves, allowed the six birds to gather about us, then, instead of watching the closest, trained our glasses on the farthest and least obvious. This method worked. Presently only five birds were visible near us, then four. Scanning the tundra beyond these, we saw a distant bird, with back toward us, moving off at a slow run. Within 30 seconds it was at its nest. The instant we rose it ran off swiftly, neither dragging itself along the ground nor flying in close with loud calls. The nest held four eggs. It was only a few rods from the three scrapes mentioned above, and 33 paces from a Lapland Longspur nest at the edge of a marshy area. The two nest-sites were radically different, that of the longspur being grassy and wet, that of the plover gravelly and dry.

On July 7 we found Nest 5 (four eggs). It was 136 paces northwest of Nest 3. We found it through seeing one of the parent birds scuttling along the ground with tail spread wide and pressed down. While we

were near the nest, four plovers surrounded us, all calling.

On July 9, at 4:45 p.m., we could hear peeping inside one of the eggs at Nest 1. The egg bore three of our red dots, so it was one of the first two laid. The parent birds were wild with excitement, and four other adults joined the chorus of complaint and protest. On July 10 we visited Nest 1 several times. At each visit we heard peeping inside all four eggs. Although we examined the eggs with care we could not find a hole in any of them. At Nest 4 (the nearest of the other nests) we listened to the eggs, but heard no peeping. Very early the following morning (12:30 a.m., July 11), we found a neat little hole in each egg of Nest 1. The peeping of the four unhatched chicks seemed to be about equally strong. Five hours later (5:30 a.m.) we found all the chicks hatched. They had not emerged simultaneously, for one was not quite dry. They stayed in the nest-cup, making no attempt to run off when we touched them. Nearly two days had passed since we had first heard peeping in one of the eggs, but the actual hatching had, of course, not taken that much time. Jourdain (in Bent, 1929: 231) says that young Ringed Plovers "are hatched within 24 hours." Nowhere in the vicinity did we find a bit of eggshell. The period between the laying of the last egg and the hatching of the four chicks at this nest had been at least 23 days, 9 hours, and 40 minutes; at most 23 days, 19 hours, and 10 minutes. Sutton (1932: 107) reported an incubation period of 23 days from Southampton Island.

On July 12 we went to Nest 1 early, finding it empty. Seating ourselves, we watched the parents, both of whom were greatly excited. One of them soon went to a chick about ten feet from the nest and brooded it. As we picked up that chick we noticed another, a foot or so away. Holding the two chicks, which stopped peeping when covered with the hand, we backed off and resumed our watching. The more bold and clamorous of the parents was also the more intent upon brooding the young. The third chick was much farther from the nest than the first two had been. After we had captured this one the focus

of interest shifted again, this time to a spot fully 30 feet from the nest. The parent plover finally ran to this chick and settled, calling loudly as it brooded. The last chick was noticeably the most vigorous of the four; it struggled more than the others had and continued to peep even when covered by the hand. We color-banded the brood (redon-right) and let them go. The webbing between the middle and outer toes was distinct.

At Nest 2, late that afternoon, we found a tiny hole in one of the eggs: hatching had started. Only two adult plovers attended us there. On the flats north of the Base, while we were making the round of the other nests, three to five adults flew or ran about us constantly. At Nests 3, 4, and 5 we heard no peeping inside any of the eggs.

On July 13 we journeyed to the mouth of the Jordan River. V. C. Wynne-Edwards, also of the party, saw a few plovers on flats near the river mouth.

On July 15 we visited Nests 3, 4, and 5. At none of the nests did we hear peeping inside the eggs.

On July 16, at about 8 a.m., we visited Nest 2, fully expecting to find the chicks hatched and gone. We were amazed to find three dry chicks and an unhatched egg. There was a hole in the egg, and we could hear peeping inside. We color-banded the three young (red-onleft). Hatching of this brood already had required four days. Obviously there was great variation in the time required for hatching-or, and this seemed a pertinent question, precisely when did hatching begin?

On July 17, at 6 a.m., we found two banded and one unbanded young in Nest 2. The third banded chick we failed to find. The unbanded chick, a male (GMS 11763; testes distinct), we preserved as a skin. The tarsi and tops of the toes were dull bluish gray, the soles pale brownish yellow; the bill dark bluish gray, without a hint of yellow or orange at the base; the eyelids gray; the irides dark grayish

On July 18, 19, and 20, along the west side of the Jordan River, we encountered several pairs of plovers, all in well-drained, comparatively grassless areas. No bird of the 30-some we saw was hiaticula. We found neither eggs nor young birds, though adults "feigned injury" repeatedly as we crossed or skirted gravelly areas.

On July 21, early in the morning, we visited Nest 3, finding three dry chicks and a pipped egg. The chicks we color-banded (green-onright). The unhatched chick was peeping inside the egg. At Nest 4 at least one of the eggs was pipped, and the chick was peeping inside. Nest 5 was empty.

On July 23 we visited Nest 4. The bird which left the eggs demonstrated violently. Within a radius of forty to sixty yards the clamor and activity were almost beyond belief. Wherever we looked we saw plovers — two or three of them standing quietly, breasts toward us; others running about calling noisily; others flying. The flying birds crossed and recrossed, often in well-defined flocks. All this we interpreted as a mixing of the local breeding population-a mixing concomitant with hatching of the young and cessation of nest-territory defense. Many of the young were now at large. Where broods were feeding in a circumscribed area not far from the empty nest, the parent birds continued their defense of that area—but the defense was of the young, not of the nest.

We visited Nest 4 on July 25, finding it empty. In vain we hunted for the chicks. Nine adults continued to fly or run about us, calling incessantly. On our way to the Sylvia Grinnell River we crossed a broad gravel flat not far from the landing-strip. Here, in the midst of several agitated adult plovers, we spied a well developed chick running toward a big rock. How the bird got away from us we shall never know, but we never saw it again. Returning from the river, a few hours later, we crossed a small stream near the hangar. Here the complaints of several adult plovers informed us that there were young in the vicinity. Presently we saw two chicks running through the shallow water. We caught them both; neither was banded. We preserved one of them, a female (GMS 11790), as a skin.

On July 26, about six miles northeast of the Base, at a confluence of several tributaries to the HBC River and at an elevation of at least 500 feet, we came upon a close-knit population of six or seven pairs of Semipalmated Plovers which must have been nesting on gravel flats there. This "colony" was farther from the sea than any other observed by us all summer.

We made an important capture on July 28: A "red-on-right" chick from Nest 1. We had noticed, day after day, that plovers continued to call from the vicinity of that nest. As we were walking along the edge of a wettish spot in that area, an adult plover flew directly in front of us, alighted in a crouching attitude with tail spread wide, and moved forward almost as if pushing itself along. As we looked about, fully aware that this behavior indicated the proximity of eggs or young, we saw a half-grown chick, then another, running through shallow water about 15 yards away. With the glass we could see the red legbands clearly. We caught one of the chicks, finding to our surprise that it was still quite downy. Its remiges were about a third grown. We took a photograph showing the spread wing and color-band, and let the bird go. It was 17 days old. The spot at which we had caught the chick was 21 paces from the nest (see Fig. 2).

On July 31 we collected a brightly colored adult male (GMS 11797; testes 4 x 1 and 2.5 x 1 mm.; well-defined brood-patches), one of three birds which seemed much attached to a cluster of small, shallow pools in a gravelly spot on Davidson Point. For a time we thought that this bird had two mates, for it was decidedly the brightest of the three in foot- and bill-color, and it displayed with considerable ardor before the other two birds. The display consisted of a bowing forward; a lifting, fanning, and tilting of the tail; and a puffing out of the side and flank feathers. After we had collected this bird, one of its companions disappeared completely and the other became decidedly less vociferous. The remaining bird eventually stopped calling, made its way to the top of a pile of gravel, and stood there silent. We kept this bird in sight long after leaving the area, looking back at it through



Fig. 2. Semipalmated Plover chick 17 days old. Near head of Frobisher Bay, Baffin Island. July 28, 1953.

our glasses. When we returned early the following morning, a dull-

colored plover was standing in exactly the same spot.

On August 2, from 10:30 to 11:30 a.m., we observed two of the "redon-right" Nest 1 chicks and one parent bird. Our recent capture of one of this brood had brought to our attention the interesting fact that the chicks had not made their way to the ocean-shore. Seating ourselves at a window in a small building not far from Nest 1, we soon saw an adult plover, then one chick, then another, near the spot at which we had caught the young bird five days before. The 22-days-old chicks were much more mature-looking than they had been on July 28, but they were still somewhat downy. Their wing-tips stuck out, giving their tail-end a jagged effect. The white of the collar was noticeable, sticking up like a nuchal patch or crest. The dark chest-band was indistinct. The chicks kept their heads drawn in close against their shoulders. In feeding they progressed in stiff runs of 12 to 16 steps, each run terminated with a jab at the gravel. The jabs looked futile, for the pauses between runs were hardly long enough for the actual sighting of food. Neither chick spread its wings or attempted flight. The parent bird made not the slightest effort to find or obtain food, but stood quietly to one side. We saw nothing of the other parent or the other two chicks.

Gradually the three birds moved away from us. The chicks, now widely separated and no longer feeding, were running across wide stretches of tundra. Presently they climbed the great rounded rocks at the base of the foothill. The agitation of the parent bird seemed unwarranted, since the chicks were now far from us.

Suddenly, with an outburst more shrill than any we had heard all morning, the parent plover flew swiftly up the foothill toward an advancing Raven (Corvus corax). Here was a possible explanation of the parental anxiety: the Raven may well have been in sight for some time. The great bird came straight on, alighting on the very rock across which one of the chicks had recently run. Here it walked about, eyeing the crevices. Determined to see exactly what happened in case the Raven found a chick, we raised the window for a clearer view—and off went the Raven, followed by the screaming plover.

On August 4 we visited an unnamed river some miles east of Tarr Inlet—a stream memorable because of the spectacular ox-bow near its mouth. While walking just above this ox-bow, we saw a plover chick running ahead of us. The rear part of the chick's tarsi and the bottoms of its toes were dull yellow. Captured, the chick emitted a sharp ke-ruck, very like the cry of the adult. Its bill was quite large. Its remiges were fairly well developed, but far too pinfeathery for flight. Tufts of black down clung to the tips of the tail feathers. The manus (wrist to tips of longest primaries) was about two inches long. The head was largely downy; but the back feathers, scapulars, lesser coverts, and feathers of the under parts were mature-looking, being free of downy tips.

On August 10, near the Base, we saw a plover running ahead of us in a muddy road. At first we thought this bird was adult, for it was good-sized; but as we drew closer, it spread its wings wide, displaying stubby remiges not nearly long enough for flight. Its cries were precisely like those of an adult. It made no attempt to fly, but continued to run with outspread wings as long as we chased it. The tarsi and toes were dull brownish orange, the bill dusky, the eyelids gray. Clinging to the tips of the partly grown rectrices were black neossoptiles. This specimen we preserved (male, GMS 11825).

The following day (August 11) we collected a "red-on-right" plover (male, GMS 11826) near Nest 1. This bird had been banded, when one day old, on July 12, and was therefore 31 days old. It was one of a group of six plovers, two unbanded adults and four young (three "red-on-right"; one unbanded), all of which were flying well. Two of this brood, when last seen on August 2, had been wholly incapable of flight. The fledging period had, then, been more than 22 days and less than 31 days.

The specimen collected was very downy on the chin and throat; indeed, wisps of down clung to feathers all over the head. The rectrices had no down at their tips, however. The dark feathers of the upper part of the body were edged with dull reddish-brown, giving a somewhat scaled effect. The remiges, though well developed, were still sheathed at the base.

Between August 11 and 22 we recorded the Semipalmated Plover repeatedly; we did not, however, see any color-banded birds. We encountered many groups of plovers on the tidal flats and noticed that the nesting areas were gradually being deserted. Four of six birds which we saw on the tidal flats near the Hudson's Bay Company post on August 18 were so young that we could see traces of down on their chins and throats. The other two birds were obviously adult. In another group of shorebirds seen that day were six or seven young Semipalmated Plovers and one Semipalmated Sandpiper (Ereunetes pusillus).

DESCRIPTION OF SPECIMENS

The three adults collected were all males. Neither of the two taken June 27 had brood-patches, so we were not sure that they had mates or nests, but they acted as if they were defending nest-territories. Measurements (in millimeters) of these males, all taken on Davidson Point, are as follows:

GMS No.	Date	Wing	Tail	Culmen	Tarsus
11729	June 27, 1953	122	59	13	23.5
11730	June 27, 1953	117	58	14	23.5
11797	July 31, 1953	122	58.5	14	24.5

In the above specimens the web between the middle and outer toes is well developed. The presence of this one character obliges us to call our birds semipalmatus, whether we consider the form conspecific with hiaticula or not.

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SUMMARY

- 1. The Semipalmated Plover bred in some numbers, but locally, in flat gravelly areas near the head of Frobisher Bay, southern Baffin Island, in the summer of 1953. Of five nests found by us, four were in flat low land well back from the sea, while one was on a pebbly slope just above high-tide mark. Birds which nested away from the sea did not visit the tidal flats much, if at all, during the nesting season.
- 2. Each of the five nests found by us held four eggs. We believe that all 20 eggs hatched; eleven of them certainly did. We obtained no evidence that any egg of the 20 was destroyed by a predator.
- 3. At Nest 1 the third egg was laid between 4:45 p.m. on June 15 and 6:08 a.m. on June 16; the fourth egg between 10:20 a.m. and 2:50 p.m. on June 17. We flushed a bird from the two or three eggs repeatedly on June 15, 16, and 17, so these received some incubation while the clutch was incomplete.

- 4. The chick in one of the first two eggs laid in Nest 1 was cheeping at 4:45 p.m., July 9. The four chicks emerged between 12:30 (at which time there was a small hole in each egg) and 5:30 a.m., July 11. The period between the laying of the last egg and the hatching of the brood was at least 23 days, 9 hours, and 40 minutes; at most 23 days, 19 hours, and 10 minutes.
- 5. The chicks at Nest 2 began hatching on July 12 (in the late afternoon one egg had a hole in it); and one chick was still hatching at 8 a.m., July 16. Hatching of that brood extended, therefore, over at least a four-day period.
- 6. A Nest 1 chick, color-banded when less than one day old on July 12, was still somewhat downy and unable to fly on July 28, though its flight-feathers were about half-developed. Nest 1 chicks were still unable to fly on August 2, when 22 days old, but they could fly well on August 11, when 31 days old. The fledging period was, therefore, between 22 and 31 days.

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THE PEREGRINE FALCON ON BAFFIN ISLAND

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In the summer of 1953 at least three pairs of Peregrine Falcons (Falco peregrinus) nested about the head of Frobisher Bay, southeastern Baffin Island—one pair on a low cliff near the mouth of the Sylvia Grinnell River, just west of the Royal Canadian Air Force Base at which we had our headquarters (Lat. 63° 45′ N., Long. 68° 33′ W.); another on the bold eastern front of Silliman's Fossil Mount, near the mouth of the Jordan River, 16 miles west of the Base; and a third on a high, bluff island (not named on maps at hand), across the bay about 15 miles south of the Base. We did not see the species at Lat. 68° 31′,