

NOTES ON MAMMALS IN ALPINE AREAS OF THE NORTHERN ST. ELIAS MOUNTAINS, YUKON TERRITORY AND ALASKA¹

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THE St. Elias Mountains are situated in northwestern British Columbia, southwestern Yukon Territory, and reach their northern extent at the White River in Alaska (cf. Wahrhaftig, 1965, Plate 1). These spectacular mountains have the most extensive glacierization in continental North America. Extensive areas of alpine vegetation are found adjacent to the glaciers, and limited tundra is found on nunataks in the icefield. Incidental to botanical studies during the summers of 1965-68, observations were made on mammals in the vicinity of the Kaskawulsh, Steele, and Russell glaciers which are among those flowing eastward from the icefield on the continental slope of the range (Fig. 1).

Three study areas are along the Kaskawulsh Glacier and the Slims River. (1) Kaskawulsh Nunatak. At the edge of the icefield an extensive bedrock ridge protrudes through the ice and divides the upper Kaskawulsh Glacier into North and Central arms. At the extreme downglacier end of the nunatak is a low, vegetated knoll (Fig. 2). The knoll is about 20 miles upglacier from the glacier terminus and lies a few miles below the firn limit. It is separated by a mile of ice on each side from adjacent mountains. The relatively stable and vegetated surface is at 6000 feet, about 200 feet above the Central Arm, but somewhat less above the North Arm. The vegetated surface is less than $\frac{1}{4}$ mile in its longest dimension. (2) Observation Mountain. Just upglacier from the terminus and on the north side of the Kaskawulsh Glacier is a saddle at 5000-5500 feet between two ridges that reach 7000 feet (Fig. 3). The saddle drops abruptly to the glacier on one side and into the canyon of Canada Creek on the other. (3) Between Sheep and Bullion creeks in the mountains north of the Slims River is a large expanse of rolling tundra at 5000 feet, with ridge crests to 6000 feet. Muller (1967, p. 124, Plate 2) gives an aerial view of this locality.

Two study areas are in the vicinity of the Steele Glacier: (4) on the south wall at the big bend in the glacier at 5800-7000 feet (Wood, 1942, p. 46, Fig. 8 is an aerial view), and (5) on the north side of the valley at 6000-7000 feet (Wood, 1942, p. 46, Fig. 7 is a photograph of this area).

Three study areas at 4000-6000 feet are in the mountains flanking the upper White River on the south side: (6) near the Guerin Glacier, (7) near the Sheep Glacier, and (8) near the terminus of the Russell Glacier.

The Icefield Ranges Research Project (jointly sponsored by the American Geographical Society and the Arctic Institute of North America), under whose auspices the botanical studies were begun, has maintained camps in the icefield; one of these is the Seward Nunatak (9) at 6000 feet on the upper Seward Glacier on the coastal slope of the range (Wood, 1948, p. 110 is a photograph

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of this site). This is a small, sparsely vegetated nunatak. It is the most isolated of all the sites and is miles from extensive vegetation.

Little information is available concerning the mammals in the St. Elias Mountains, especially in remote interior areas. Banfield (1960) presented an annotated list of the mammals of the Kluane Game Sanctuary, of which two thirds is in the St. Elias Mountains, and he cited previous work in the area. This paper presents our notes and reports by other participants in the Icefield Ranges Research Project.

ANNOTATED LIST OF MAMMALS

GRIZZLY BEAR. *Ursus arctos*. We observed bears or sign at areas 1-8. At Observation Mountain, where the greatest variety of wildlife was seen, two Grizzly Bears (one brown and one blonde) were seen periodically throughout July 1966. The bears preferred cool, moist, north- and east-facing slopes where lush herb mats of the snow-flush areas provided food. One such site was near our camp, and we were able to observe a bear on 9 July as it alternately fed and rested for nine hours. The bear was sighted at 0930 hr.; it grazed until 1200 hr. when it lay on its side and rested for an hour. It fed again until 1430 hr., then rested until 1600 hr. After grazing until 1800 hr. it was alerted to our presence by the noise of radio contact with the project plane overhead. The bear went high onto talus and lay down and looked in the direction of our camp for 30 minutes before disappearing over the mountain at 1900 hr.

On 22 July a Grizzly Bear gave chase to 10 adult Mountain goats and 6 kids up a very steep slope. The speed and duration of the sprint was impressive, but the goats easily reached the safety of the ridge crest and disappeared. Another bear was seen running back and forth between ground squirrel burrows, presumably in an attempt to trap ground squirrels that had strayed too far from their burrows. Otherwise the bears spent their time seeking vegetable food. Studies on Grizzly Bear ecology are being conducted in Kluane Game Sanctuary by A. M. Pearson, Canadian Wildlife Service.

TIMBER WOLF. *Canis lupus*. Little Timber Wolf sign was observed along the Kaskawulsh and Steele drainages, and only one was glimpsed in the forest on the north side of the Slims River. At the upper White River in Alaska, sign was more common where tracks of wolves, caribou, and grizzly dotted many gravel bars.

COYOTE. *Canis latrans*. Tracks were seen frequently along the Slims River floodplain and up into the tundra, and yapping was heard on several occasions when we camped near site 3.

RED FOX. *Vulpes vulpes*. Red Foxes were seen at Observation Mountain, the north side of the Steele valley, and along the upper White River. One afternoon we observed a Red Fox barking at and advancing toward a Wolverine. The Wolverine was backing away and was in no apparent hurry to break off the encounter.

WEASEL. *Mustela* sp. A weasel (probably *M. erminea*) was sighted on two occasions in the first week of August 1964, at the Seward Nunatak. It was believed to be feeding on bird remains at the base of a cliff (Ray Lougeay, personal communication). This is just one of several remarkable cases of mammals having traveled long distances over glaciers. Pruitt (1957) reported a weasel at 15,000 feet on Mt. McKinley, Alaska, and concluded that it had "traveled some two vertical miles above timberline . . . before dying, presumably of starvation."

WOLVERINE. *Gulo gulo*. Reported by Banfield (1960) as common. A Wolverine was seen five times in July (twice on the 8th at 0900 hr. and 1600 hr., at 0400 hr. on the 9th, and at 0200 hr. on the 12th, in addition to the fox incident on the 17th) at Observation Mountain. Its curiosity was not dampened by being chased twice by our dog, when it again exhibited no signs of aggressiveness. Other Wolverines were seen on the south side of the Steele Glacier (Walter A. Wood, personal communication) and at 7000 feet on a small glacier near the Steele Glacier (Michael Hebb, personal communication) in August 1967.

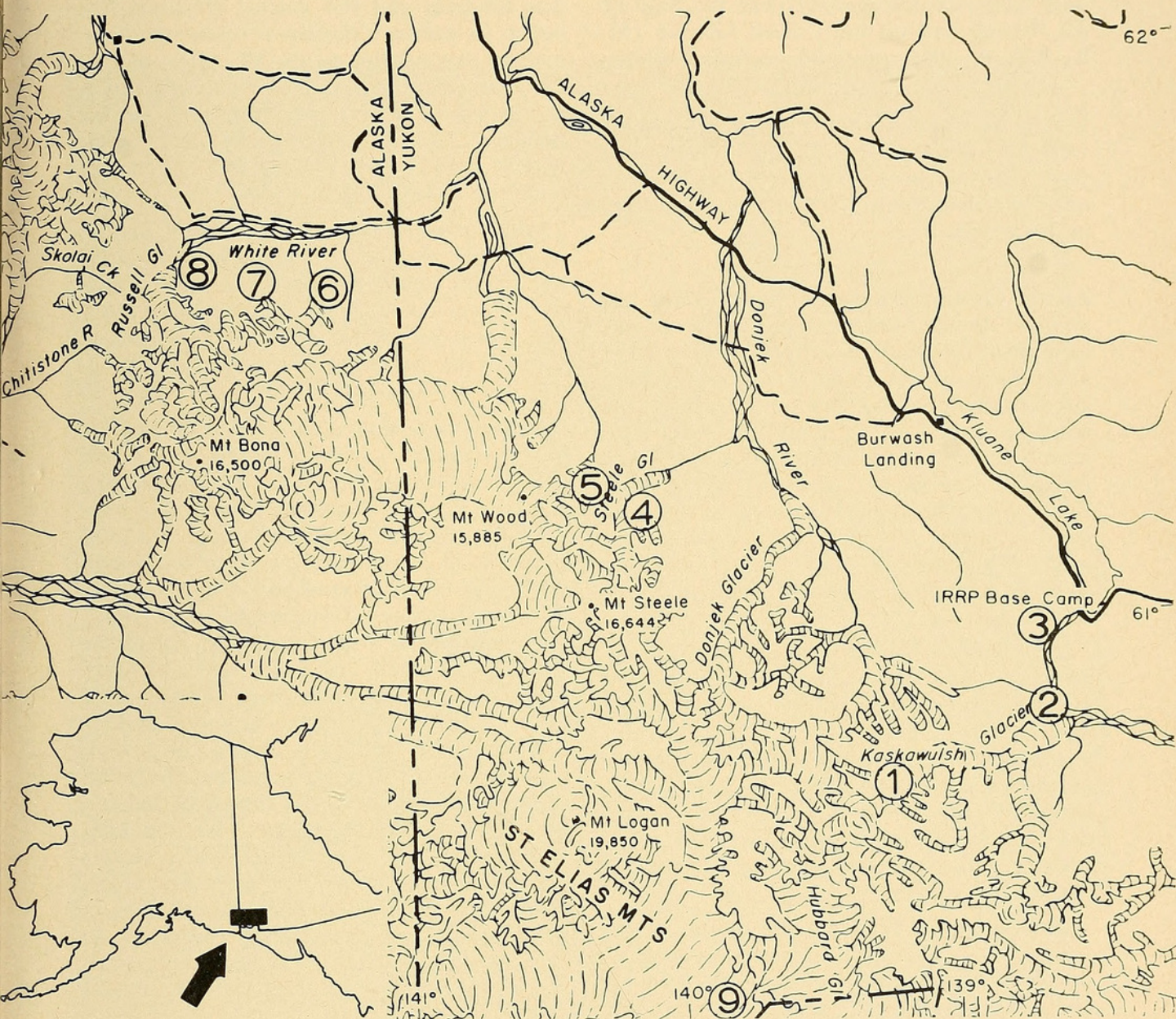


FIGURE 1. Study areas.

COUGAR. *Felis concolor*. The nearest reliable (published) records of Cougar are from northern British Columbia (Rand, 1944) and from west of Watson Lake, Y.T. (Youngman, 1968). However, during 1964-1966 residents along the Alaska Highway between Haines Junction and Burwash Landing and some Icefield Ranges Research Project personnel reported sighting a Cougar along the Alaska Highway and the environs of the

south end of Kluane Lake. Neither these sightings nor the reference in Wood (1967) have been verified. Nevertheless, it is significant that people from the area and familiar with the wildlife caught glimpses of an animal they could not immediately identify.

LYNX. *Lynx canadensis*. We saw no live Lynx but found an entire Lynx skeleton in

a snow accumulation area on the Kaskawulsh Nunatak in 1965. They have been seen well into the icefield near the base of Mt. Bering and on the Lowell Glacier (M. E. Alford, 1966, personal communication).

HOARY MARMOT. *Marmota caligata*. Marmots were not observed by Banfield (1960) but were reported by Cameron (1952). We saw only two marmots at Observation Mountain in July 1966.

ARCTIC GROUND SQUIRREL. *Spermophilus undulatus*. Arctic Ground Squirrels are common from meadows and flats at Kluane Lake (2600 feet) to the alpine areas, where they are found on tundra and on sparsely vegetated moraines up to 6500-7000 feet. The most detailed observations were made between 1 July and 1 August 1965 on the Kaskawulsh Nunatak, where there were at least 13 adults, 7 with young. The ground squirrel population more than doubled in 1965; at least 23 young were born in litters of one to four.

The limited habitat restricts the size of the population, and once maximum numbers are attained, dispersal of the annual increment becomes a necessity. Even before the emergence of the young, all suitable habitat on the knoll was utilized by the adult population. In July 1967 we noted no further development of burrow systems, which indicates that the carrying capacity of the terrain had been reached.

In addition to dispersal, the origin of the population is a problem, since the nunatak is separated from adjacent mountains by a mile of ice. Two routes are possible for migration to or emigration from the nunatak. The stock for the population may have originated from the areas of tundra at the glacier terminus for which the medial moraine could have served as a route to the nunatak. However, this is unlikely, since it would require a 15 to 20 mile trek over rough, essentially vegetation-free terrain. A more likely source is from known ground squirrel populations in mountains directly across the ice from the nunatak, where tundra vegetation is present, but discontinuous (Peter Anderton and Gil Dewart, personal communication). In this case the medial moraine could serve to direct ground squirrels crossing the glacier from either side, downglacier from the nunatak.

The nunatak could have been visited first during Hypsithermal time when its surface was ice-free, and the glacier terminus had begun its retreat. Maximum retreat is documented to within about 10 miles of the nunatak (Denton and Stuiver, 1966) and is postulated to a few miles upglacier of the nunatak (Borns and Goldthwait, 1966), which would place the nunatak in contact with the valley floor.

Due to their impact on the vegetation, it is unlikely that an Arctic Ground Squirrel population could persist for a long period of time on the nunatak. Burrowing activity obliterates or buries vegetation. This and geomorphic processes promote soil instability, thus revegetation is slow.

Young were first seen on the nunatak on 11 July around a burrow system which had been snow covered until the end of the first week in July. The mother grazed at a considerable distance from the young, and even remained in the burrow for up to 20 minutes while the young grazed and dozed near the burrow entrance. Two weeks after emergence the young were ranging far out of the territory of their natal burrow and were digging and "hay collecting." The ground squirrels did not appear to be wary, and no predation was observed during July 1965, probably because of our presence. However, grizzly and canid scats and the Lynx skeleton indicate that these predators visit the area. Any large predator could drastically reduce population size in a short time. An Arctic Ground Squirrel carcass was found decomposed intact indicating that predators do not necessarily reach the nunatak each year. No raptors were seen, but skeletal remains of one were found.

Ground squirrel territories were well defined and covered most of the vegetated surface. Boundary squabbles occurred every morning, and the antagonism between ground squirrels seemed to be of greater intensity and frequency than on the tundra above the Slims River where extensive habitat was available. Late in July there were signs of antagonism between mothers and young. One young ground squirrel was seen on the moraine 200 feet below the nunatak in early August.

Greatest population pressure occurs in the fall when the young of the year require hibernacula, and probably most emigration attempts would be made then. However,



FIGURE 2. Kaskawulsh Nunatak.

glacier conditions would be most hazardous for ground squirrels at this time. Since the nunatak lies below the firn limit, the cover of snow melts by late July. Consequently crevasses are no longer bridged, and the ice surface is crisscrossed by meltwater streams, some of which are swift and deep. Early spring conditions would present far less difficulty, but then one would expect the necessity to seek new territories to be less severe.

A behavior study with a tagging and recapture program on the nunatak and flanking mountains could yield information as to the dynamics of an Arctic Ground Squirrel population in a restricted and isolated area, and whether or not they do, in fact, repeatedly attempt movement across the glacier, and if so, at what season, and with what success. Since a weasel was seen on the Seward Nunatak and pikas or pika sign have been found there and on the Kaskawulsh Nunatak, it is apparent that these small mammals are also capable of crossing large expanses of ice. A. H. Tinker (personal communication) confirmed by trapping without success in 1966 our impression that mice and voles are not on the Kaskawulsh Nunatak.

SINGING VOLE. *Microtus gregalis* (*M. miurus*). We did no trapping, but the distinctive hay-piles (consisting here of *Salix arctica* and *S. barrattiana*) and their "singing" identified a population of *M. gregalis* on the tundra between Sheep and Bullion creeks in 1966. There was more sign in 1967, and the population was obviously high. We noted at least 25 burrow entrances in an area 5 by 8 feet. By June 1968 the population had crashed; no animals were seen and much of the old hay-piles remained, although on the north side of the Steele valley *M. gregalis* were plentiful. During 1967 when the mouse population was high between Sheep and Bullion creeks, numbers of this species were low at nearby Kluane Lake (A. H. Tinker, personal communication).

COLLARED PIKA. *Ochotona collaris*. Pikas were observed in areas of blocky talus at Observation Mountain and in the vicinity of Steele Glacier among moraine boulders and in talus. Pikas or sign have also been noted well into the icefield. According to Walter A. Wood (1948, and personal communica-

tion) pikas were found on Seward Nunatak and other nunataks in the vicinity in 1945 and 1948 but were not seen in 1951. We found old pika scats and the remains of a haypile in the talus of a snow accumulation area on the Kaskawulsh Nunatak. No pikas were heard or observed there in July 1965, 1966, or 1967.

PORCUPINE. *Erethizon dorsatum*. A Porcupine was seen on 4 July 1968 at 5500 feet on the tundra between Sheep and Bullion creeks.

MOOSE. *Alces alces*. Banfield (1960) mentioned evidence of feeding and tracks on the tundra. We saw Moose tracks along an old mining road in the tundra above the Slims River. The road was heavily used since it is a convenient route through the shrub zone between the forest and tundra. Tracks and scats of bear, moose, fox, and coyote were common.

Three Moose were seen together on two occasions a week apart on the tundra at Observation Mountain in 1966. They spent 18 hours there on 15 July and 12 hours there on 23 July and climbed on talus to 6000 feet and rested high on the slope for several hours not far from a band of White Sheep.

CARIBOU. *Rangifer tarandus*. Caribou were observed on the Burwash Uplands west of Kluane Lake and in the White River valley, on the floodplain and on the tundra. Several sets of small antlers, presumably from females, were found on high, exposed tundra slopes near Sheep Glacier indicating that this may be an area of calving.

WHITE SHEEP. *Ovis dalli*. Banfield (1960) presented a distribution map for White Sheep in the Kluane Game Sanctuary. They are common throughout the St. Elias Mountains; we saw them at locations 2-8. We camped at Observation Mountain from 6 July to 2 August 1966. Bands of 5 to 20 adults were seen daily. Small bands of lambs and ewes appeared for the first time that season on 25 July and were often seen after that date. Undoubtedly they had been hidden in more precipitous areas. As the summer progressed, the bands of sheep stayed higher on the mountain, perhaps to remain near the retreating edge of snowbanks to feed on the new vegetation.

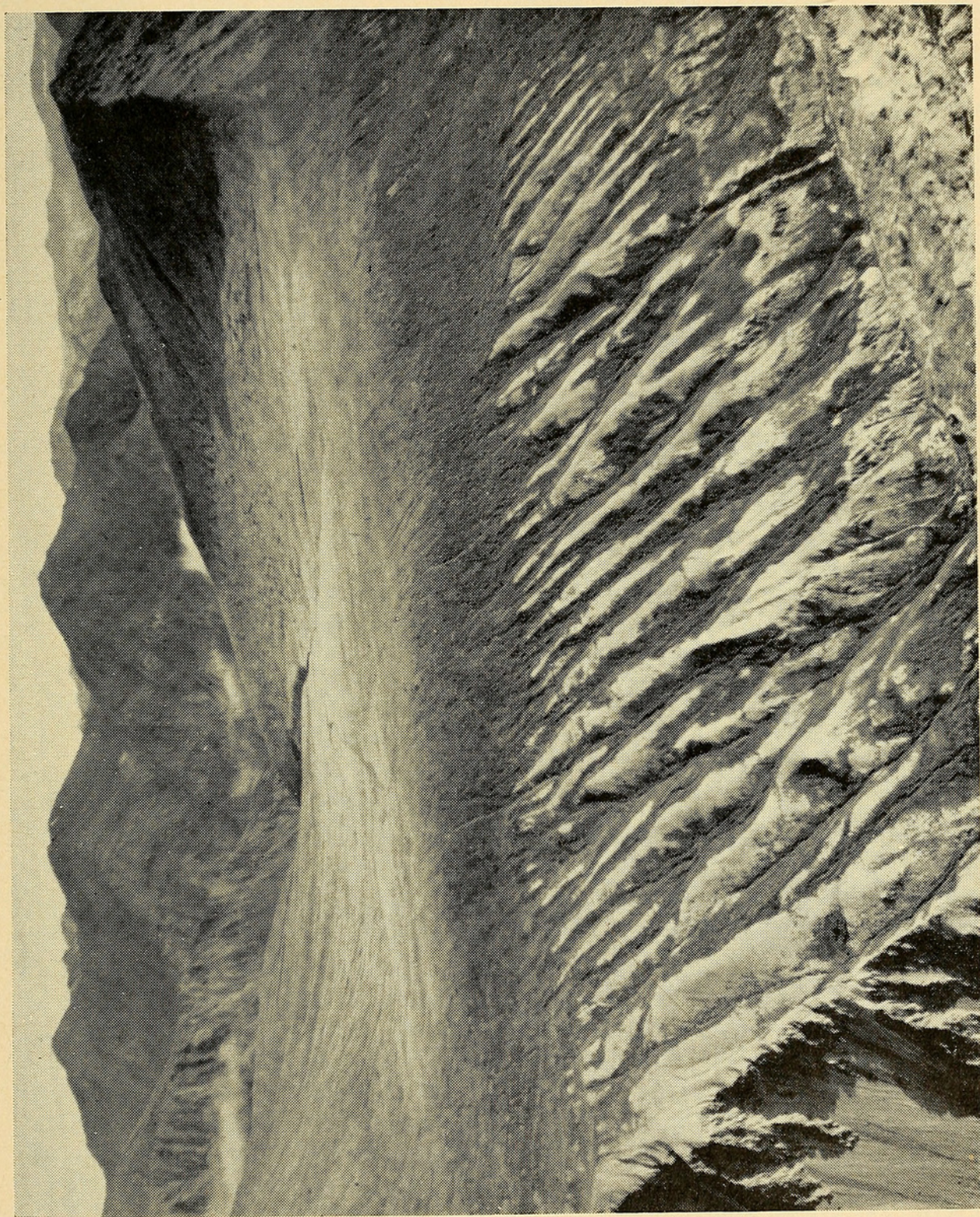


FIGURE 3. Observation Mountain, saddle.

MOUNTAIN GOAT. *Oreamnos americanus*. Banfield (1960) stated that local reports placed goats in the Alsek River valley alone. We observed goats at Observation Mountain and in the mountains flanking Bullion Creek, and in 1914 Auer (1916; cf. Rand, 1945) hunted and photographed them in the Slims River Canada (Kennedy?) Creek area.

Mountain Goats have been seen on the Kaskawulsh Nunatak in 1964 (Peter Anderson, personal communication), and many "beds" and scats were found there. A recent sighting near the mouth of Steele Creek

(Cliff Armstrong, personal communication) places goats further north along the range. It is possible that Mountain Goats are now extending their range east and north in the St. Elias Mountains.

At Observation Mountain one, two, and three males were seen from time to time until 21 July when does and kids appeared. The males often rested and grazed near and even mixed with bands of White Sheep. The nursery bands ranged in size from 2 to 10 adults with up to 6 kids.

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