



UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
GRAND TETON NATIONAL PARK
MOOSE, WYOMING

GRAND TETON NATURE NOTES

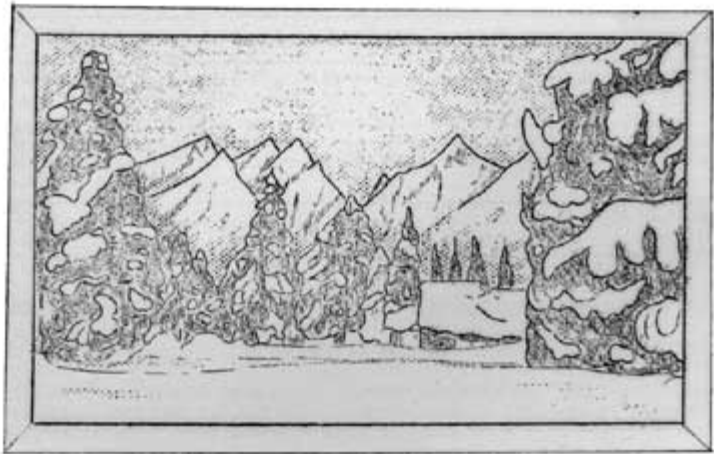
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Thomas E. Whitcraft	Howard R. Stagner
Superintendent	Editor

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NATURE NOTES



SNOWBOUND IN THE TETONS
from a photograph by Harrison R. Crandall

Grand Teton National Park

Vol. III, No. 1.

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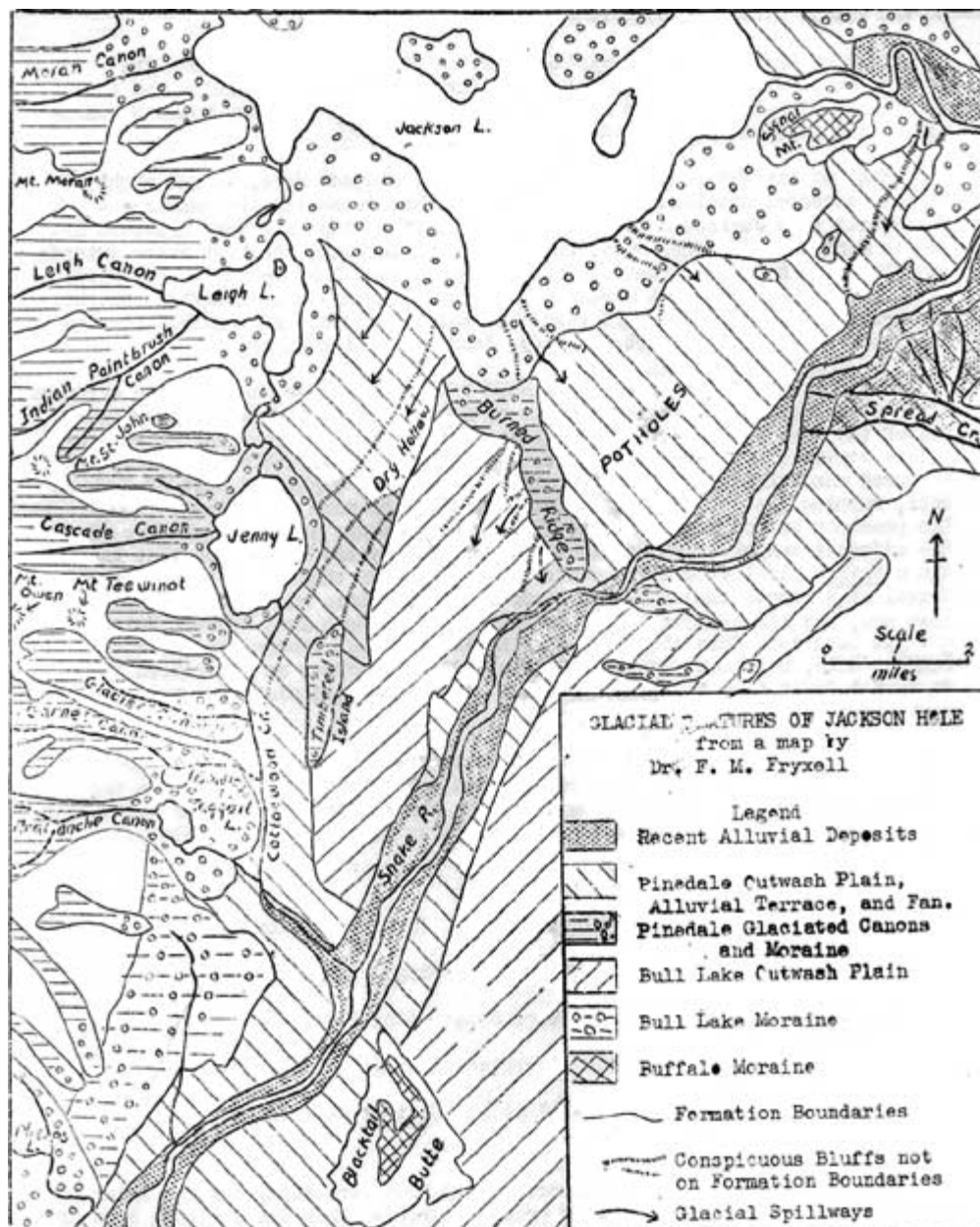
TETON GEOLOGICAL NOTES - No. 1 THE GLACIATION OF JACKSON HOLE

by Dr. F. M. Fryxell

The geological record from which one may decipher the glacial history of the Teton Range is found in part within the mountains themselves, in part outside them, especially in adjacent Jackson Hole.

To many visitors, speeding up the state highway, the flats of Jackson Hole may seem to offer little that is worth a second glance. But the geologist will recognize on the valley floor a great diversity of ridges, terraces, channels, and depressions, features that furnish the key to the glacial events which have occurred both in the valley and in the great range to the west.

To grasp the significance of these features one can do no better than visit the east tip of the main section of Burned Ridge (see map, page 3), and from this point, with the Narrows of the Snake River directly below, survey the country to the north and south.



(click on image for a PDF version)

Here one sees that Jackson Hole is diagonally crossed by two low, wooded ridges: Burned Ridge on which we stand, and another ridge several miles to the north, that follows the south border of Jackson Lake. Around this northerly ridge the Snake River makes a circuitous eastward journey whence it turns southwestward and directly through Burned Ridge to form the Narrows at our feet. Were we to examine more closely, we would discover that both of these ridges are irregular and hummocky of surface, and composed of cobbles and boulders many of which are striated — proof that they were transported by glaciers, and that therefore the ridges themselves are typical glacial moraines.

Equally distinct from our viewpoint are two broad plains which extend outward from these ridges and slope evenly southward. Unlike the ridges from which they emerge, these plains are overgrown with sagebrush; hence the moraines and the glacial outwash plains — for such they are — are strikingly distinct. Composed of porous quartzite gravel with little or no soil they constitute barren ground indeed for anything but sage. Both of the

outwash plains are deeply trenched by the Snake River, and the northerly plain is continued south of the Narrows by terraces that border the Snake River well beyond Blacktail Butte, where they widen into the swampy flats of the southern part of Jackson Hole.

The meaning of these features now becomes evident, for they can mean only this: that northern Jackson Hole was at two distinct times invaded by a glacier. These two times of glaciation must correspond to those which geologists have reported from the Wind River Mountains and elsewhere, on the basis of similar records there found. For the earlier of these times the term "Bull Lake Stage" is generally used; for the latter, "Pinedale Stage". In terms of these stages then, one may briefly review the glacial events of this region:

In the Bull Lake Stage a glacier (The Burned Ridge Glacier) entered the valley from the north and northwest, and advanced as far as Burned Ridge. At this position it must have stood for a time long enough to permit the ice to heap up the Burned Ridge moraine, and the glacial streams to deposit the outwash plain extending southward from it. The plain must have reached unbrokenly around and beyond Blacktail Butte, into the most southerly reaches of Jackson Hole.

In time the Burned Ridge Glacier melted back from its moraine, and eventually disappeared altogether. Did a large lake come into existence in the basin behind Burned Ridge? If so (as seems probable) it must have been drained during the interglacial stage which followed — an interval of long duration in the course of which streams greatly reduced the extent of Burned Ridge, trenched the outwash plain between the Narrows and Blacktail Butte, and in southern Jackson Hole largely eroded away similar Bull Lake deposits.

The task of the streams was arrested unfinished, when in Pinedale time glacial conditions returned. Again a glacier (the "Jackson Lake Glacier") pushed into the north end of the valley, fed chiefly by smaller glaciers which occupied the Teton canons. In its southward growth it advanced over the same path as its predecessor of the Bull Lake Stage. The moraine of this glacier indicates that its front must have shifted back and forth. The large size of the Jackson Lake moraine is evidence of a prolonged stand in this position, but there are "islands" of moraine farther south, protruding from the outwash plain. That the ice front got farther south than even these "islands" is indicated by the pitted areas (locally called "the potholes") which lie between them and Burned Ridge. Presumably these pits mark situations where the glacier, in retreating, left behind it masses of stagnant ice which had separated from its main body. These ice masses became surrounded or buried by outwash gravels, which, when the ice later melted out, slumped in to produce depressions in the otherwise even outwash plain. Since pits of this sort extend all the way to Burned Ridge, one is led to conclude that the Jackson Lake Glacier for at least a brief time reached as far south as this ridge, that is, it practically attained the same limits as did the Burned Ridge Glacier long before.

From this shifting ice front vast quantities of outwash gravel were carried out by short-lived glacial streams. These were deposited not only on the main outwash plain but within the river trench south of the Narrows and on

the valley floor in southern Jackson Hole.

Jackson Lake came into existence as the glacier retreated from the Jackson Lake Moraine, and the water was dammed between the moraine and the ice front. With the complete disappearance of the ice the lake assumed essentially its present size and shape.

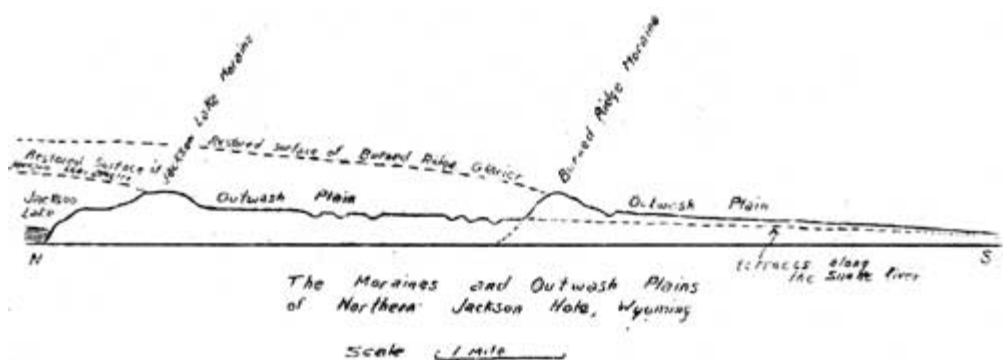
What of the Tetons during the two glacial stages? Here, as one might expect occurred similar events. Valley glaciers descended the canons and pushed out into Jackson Hole. The moraines left by the Bull Lake glaciers are now in most places eroded away, but Timbered Island and the high bench extending along the mountain front southward from Taggart Lake appear to be extensive remnants of Bull Lake moraine. The Pinedale moraines, in marked contrast, are beautifully preserved, and form the basins which are responsible for the existence of Phelps, Taggart, Bradley, Jenny and Leigh Lakes.

But the glacial story can be pushed back yet another chapter. For evidence of this one must climb to the summits of Signal Mountain, Blacktail Butte, or one of the Gros Ventre Buttes. In these surprising situations one again discovers striated boulders and cobbles — mere patches of ancient moraine, like tattered manuscripts. Similar deposits occur on the highlands east of Jackson Hole, capping the intercanyon divides 1000 feet or more above the valley floor. The presence of morainal remnants in such situations, and their absence in the adjacent canyons, can be accounted for only by the assumption that there was a third glaciation which occurred much earlier than even the Bull Lake Stage, at a remote time when the floor of Jackson Hole was 1000 feet higher than now, and the present system of canyons which open into Jackson Hole had not yet been cut. This stage, which likewise has been recognized far outside Jackson Hole, has been named the "Buffalo Stage". Scanty as its record is we cannot doubt that this, the earliest of the three glaciations, was much the most widespread.

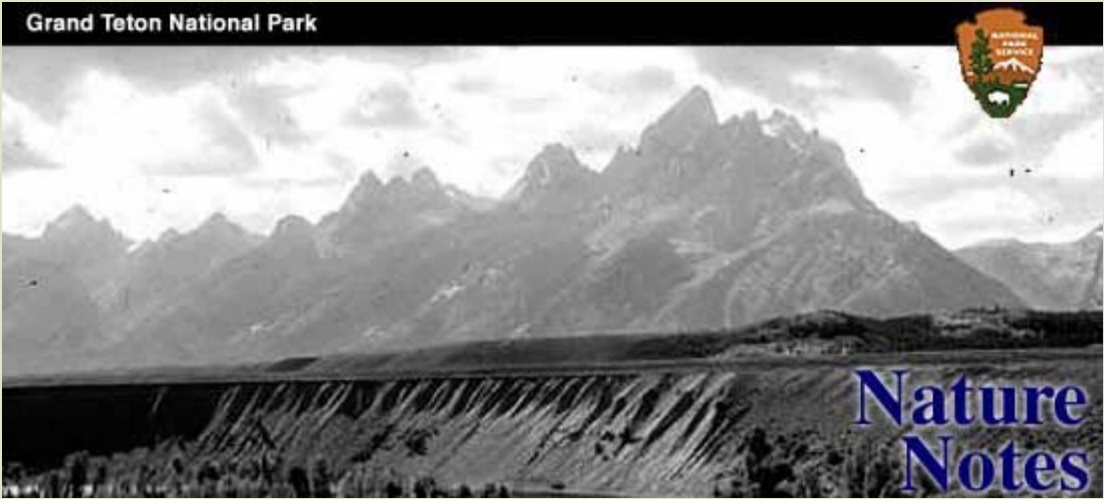
Thus, what we commonly call the "Ice Age" or "Glacial Period" (the "Pleistocene Period" in geological terminology), which lasted perhaps two million years, really involved no less than three distinct times of glaciation, and two of deglaciation. These may be tabularly represented as follows:

	Postglacial time
	(Pinedale Glacial Stage (3rd glaciation)
	(
	(Later Interglacial Stage
	(
Subdivisions of the Pleistocene Period	(Bull Lake Glacial Stage (2nd glaciation)
	(
	(Earlier Interglacial Stage
	(
	(Buffalo Glacial Stage (1st glaciation)
	Preglacial time

The three glaciations were successively less extensive, and the later of the two interglacial stages was of briefer duration than the earlier. What of postglacial time, which represents the briefest interval of all? Is it truly postglacial, or are we now living in a third interglacial stage? To this question geology has as yet no positive answer, though investigation now in progress leads one to hope that a future solution is not improbable.



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A SOLAR HALO

by Howard R. Stagner
Junior Park Naturalist

A beautiful and quite rare optical phenomenon was observed in the sky on the morning of January 20 near the Granite Canon Showshoe Cabin by Superintendent Whitcraft and the writer. A series of colored rings, concentric around the sun, tangent arcs, and bright spots appeared in the display.

The preceding day had brought heavy, low-hanging clouds and considerable snowfall on the higher slopes, but during the night the atmosphere cleared and the temperature dropped to 21 degrees below zero. The morning of the twentieth the sun rose in a cloudless sky and the thermometer hovered near zero throughout the day. A fine shower of tiny, light frost crystals was falling during the early forenoon.

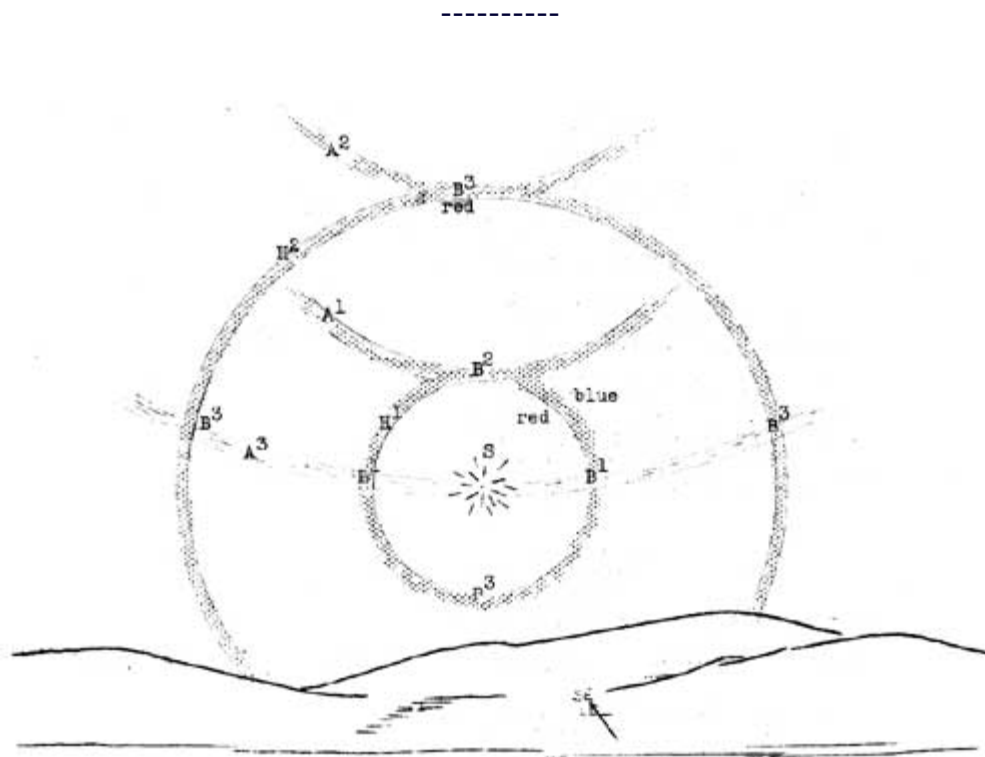
The haloes were first seen shortly before ten o'clock in the morning. They maintained their brilliance for about fifteen minutes, then gradually faded to extinction by noon.

The display consisted of two rings or haloes around the sun, horizontal band of light passing through the sun, two upward bending arcs tangent to the halos, and seven bright spots on the rings. Of the halos, the inner one was the more intensely illuminated and colored. Both were colored like the rainbow except that in both rings red appeared on the inner side. The inner halo was complete, while the outer one was visible through an arc of some 200 degrees with the lower part passing below the horizon. The band of light passing through the sun appeared to be a part of a huge arc which was faintly visible only within the rings and for a short distance beyond. Tangent to the upper side of each ring were arcs, quite short and similar to the rings in coloration.

Bright spots were formed at the intersections of both the light band and the two arcs with the two rings, the brightest being on the inner ring. At the lower edge of the inner halo a bright spot appeared, possibly marking the tangent point of another colored arc below this point.

According to Moore (Descriptive Meteorology, Appleton, N.Y., 1914) and Weld and Palmer (Textbook of Modern Physics, Blackiston, Philadelphia, 1925) solar haloes are interference phenomena produced by refraction and dispersion of light in passing through tiny frost crystals. The crystals, hexagonal prisms capped by pyramids, falling slowly through a quiet atmosphere, are believed to be in rapid rotation around the longer crystal axis which in falling assumes a horizontal position. To form the inner colored halo, light rays undergo refraction both in entering and in leaving the crystals, and are thus bent toward the observer. In addition, the light rays which produce the sensations of the various colors are separated or dispersed to form the colored bands. A similar refraction and dispersion forms the outer colored ring, but in addition, at this greater angle from the sun, internal reflection occurs within the crystal. The inner ring forms at about 22 degrees away from the sun, and the outer at 46 degrees. White light reflected from the surfaces of certain crystals without refraction or dispersion is responsible for the band of white light which passes through the sun.

While such haloes are considered quite rare outside the polar regions, several such displays of less development have been observed both in Grand Teton and in Yellowstone National Parks. In Yellowstone Nature Notes, Vol. XIV Nos. 1 and 2 for January-February, 1937, William E. Kearns, Assistant Naturalist, describes a partial solar halo, apparently almost identical with the one herein described, which was seen in Yellowstone Park on December 29, 1936.



SOLAR HALO

Explanation of the diagram:—

S¹- Sun

H¹- Halo, very bright, colored

H²- Halo, bright, colored

A¹- Tangent Arc, bright, colored

A²- Tangent Arc, dim to moderately bright, colored.

A³- White band of light, dim.

B¹- Bright Spots, very bright, white.

B²- Bright Spots, bright, white

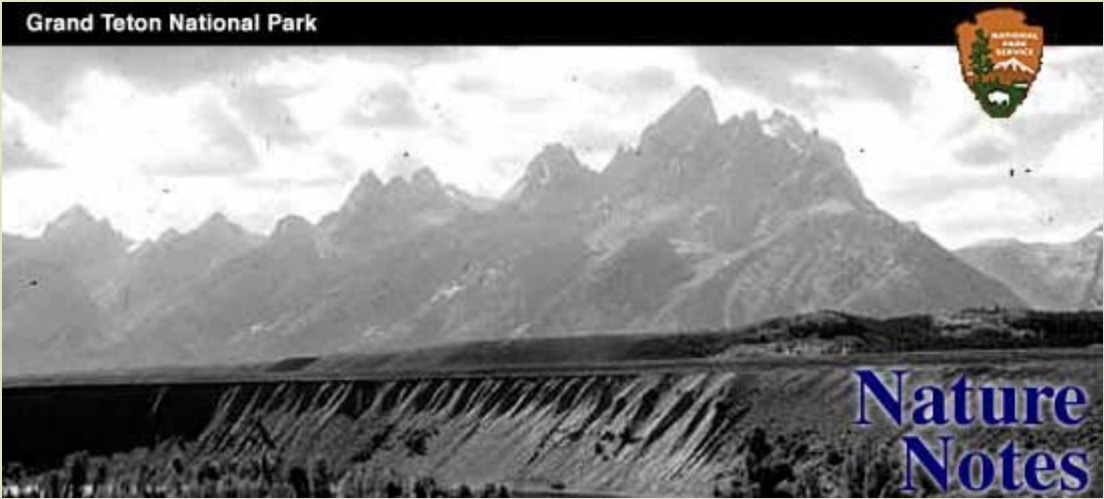
B³- Bright Spots, dim to moderately bright.

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THE MARTEN, A HIGH MOUNTAIN MAMMAL

by Allan D. Cameron
Ranger-Naturalist

The marten (*Martes caurina origins*) possesses a variety of traits which make it one of the most fascinating of all our wild animals. It is what might be termed a "medium-sized" animal similar to the better known weasel to which it is closely related. The adults may reach a length of three feet, and may weigh from five to six pounds.

The American Sable, as it is sometimes called, is considered to have the best quality of any marketable fur. The marten is circumpolar in distributions, and in former times was extensively trapped in Siberia where the largest and best supply of that beautiful fur came from. Undoubtedly some of the travels and discoveries made by the early trappers in western North America can be attributed to the much-prized marten fur. Martens range southward down the main Rocky Mountain Cordilleran as far south as Colorado as well as to the southern part of the Sierra Nevada Range of California. It is often referred to as the Pine Marten as it is frequently associated with heavy timber-covered mountains of the northern hemisphere.

The adaptability of the creature accounts for its being found today not only in forested mountains but at or above timberline as well. In fact one of the most recent records we have for the Tetons places it well above timberline on the sharp arete between Mount Owen and Mount Teewinot. On August 12 a party of six climbers were attracted by the disturbance set up by a small group of birds, Black Rosy Finches (*Leucosticte atrata*), and soon saw the cause: a very agile animal running in our direction. It apparently failed to notice the group of climbers at first as its attention was on the birds. It

was not long, however, until the animal was aware of us and proceeded to make a detour.

We could not help noticing how completely at home the marten seemed in his rocky habitat as he scrambled over the rocks with the utmost confidence and agility. It negotiated the perpendicular rock walls with no apparent difficulty—a feat that I am sure we would have put in the "humanly impossible" class in spite of our own climbing experience and equipment. We noted, too, the restless and ferocious attitude this animal possesses.

As one might expect of creatures with such a disposition, they are seldom seen together. In fact, male and female are together for only a short time during February and March, and a record of two males together is unknown. This alpine species is somewhat smaller than the timber-dwelling variety, and the one we saw on August 12, 1936, was about two feet in length and must have weighed about four pounds.

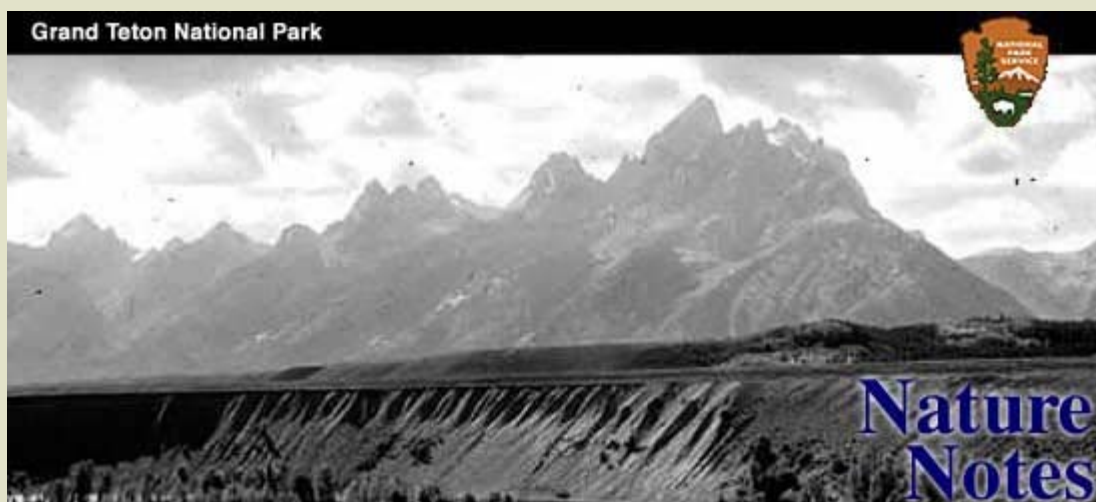
Marten are fairly common in the timbered areas of the park, and are occasionally seen during the winter. Jess Roberts reports that one has been visiting his residence at Jenny Lake in search of food, and is now so bold that no ordinary gesture will frighten him away. H.R.S.

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TRAILMAKERS Part LV. ROBERT STUART- THE RETURN FROM ASTORIA

by Walcott Watson
former Temporary Ranger

A new record was established in 1812-13 by Robert Stuart and his small party of men in making the cross-continental journey from Astoria on the mouth of the Columbia to St. Louis. The preceding year the overland expedition of the Astorians had made the westward crossing in 340 days, and on the return Stuart reduced this time to 306 days.

The hardships and dangers and obstacles to travel at this early day when no marked trails, highways, no villages except transitory Indian camps existed to give directions, are better emphasized in our minds when we reflect that by automobile, traveling this same route, the journey may be comfortably made in five or six days, and that less than a day now separates these points by airplane.

Stuart's purpose in making the hazardous trip was to carry back to John Jacob Astor despatches and reports from Astoria. Astor's sea expedition had arrived at Astoria on March 22, 1911 after a voyage around the "horn" lasting 195 days, and the overland expedition had joined them in February, 1812. But in the meantime had occurred the Indian attack on the Tonquin, the ship which had brought the sea expedition to the mouth of the Columbia. The ship itself had been destroyed by the last survivor of the crew when in desperation and to revenge himself on the Indians who had captured the ship, he set fire to the powder magazine.

An earlier attempt to send despatches had been thwarted by bands of marauding Indians that frequented the Columbia River, and only the

aggressiveness of Stuart's party carried them past the Indians and to the Snake River region. Originally the party consisted of Stuart, Ben Jones, McLellan, John Day, Ramsey Crooks, Andri Vallor and Frances LeClerc. Day soon developed a mental derangement, and was sent back to Astoria in the care of friendly Indians. On the Snake River the party met John Hoback, Miller, Rezner, and Robinson who had been left near Ft. Henry the previous year to trap beaver. These men were in desperation after having lost their furs and equipment to the Indians, but upon being supplied with new traps and guns, all but Miller, who replaced Day on the return journey, remained to try their skill against the forces of nature and the Indians another season.

The return party became lost for a time near the Idaho-Wyoming boundary, and just before the Tetons came into view, McLellan, a very self-willed man, abandoned the group to push forward by himself. He probably passed through Jackson Hole about October 3, 1912. The rest of the party, delayed by the illness of Crooks, nearly exhausted from a month of aimless wandering without any forward progress, and nearly half-starved as a result of their inability to kill game that for some reason was unusually scarce, probably did not reach Jackson Hole until about October 7. The six men did not linger in Jackson Hole, but pushed onward up the Hoback, and on October 13 overtook McLellan who by this time was nearly starved and completely exhausted. The plight of the party had become so desperate that one of the men suggested that "one should die to save the rest". He desisted from this idea only when Stuart threatened to shoot him on the spot if he continued to insist on that procedure. The next day brought relief to the party, however. An "old, run-down buffalo bull" was sighted, and, after considerable effort and anxiety on the part of the men, was killed.

The path of the Astorians then led from the head of the Hoback River, down Lead Creek to the Green or Spanish River. This stream was followed for some distance, then the party diverged toward the southeast crossing several tributaries of the Green flowing from the Wind River Mountains. The continental divide was crossed near South Pass which was later to become the gateway to the West over the Oregon Trail, Mormon Trail, California Trail, the Overland Stage Route, and the original Pony Express Routes. It is not definitely known whether or not the historic pass was actually used by the Stuart party, and most historians claim the discovery of the pass for later explorers.

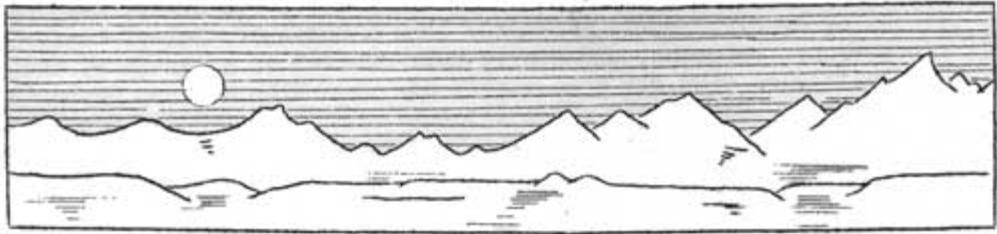
The Sweetwater River, flowing southeatward from the mountains, formed the natural route to the Platt and Missouri Rivers, but Stuart, thinking that this stream must flow southward, crossed it and entered the difficult and desolate area east of the Wind River Mountains. In passing to the south of the Rattlesnake Mountains, the party again encountered the Sweetwater River, and followed this stream through Devil's Gate, past Independence Rock, and to the North Platt River.

It was by this time late October, and the group prepared to spend the winter in a wooded area along the stream. A cabin was built in the bottomland, and a good supply of game was killed for winter use. But Arapahoe Indians soon discovered the location of the cabin, and the begging and stealing activities of these Indians soon depleted the stores. The comfortable cabin, "the first building within the limits of the present state of Wyoming"*, now no longer considered safe, was abandoned, and the party pushed on down the Platt and

established a second winter camp near what is now Wellsville, Nebraska, a few miles downstream from the later location of Ft. Laramie, Wyoming.

During the winter canoes were built, and with the coming of Spring, the journey was resumed by boat. "In perfect health and in fine spirits" the group arrived at its destination on April 30, 1813.

* Chittenden, The American Fur Trade
Other quotations from Washington Irving, Astoria.

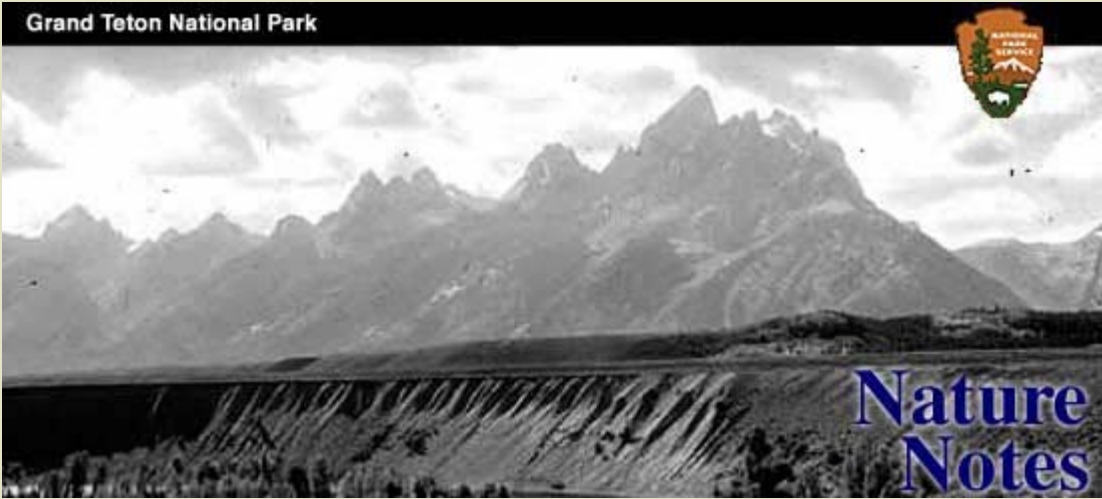


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WINTER BIRD GUESTS

by Sylvia Stagner

One of the special pleasures the winter affords here is the fun of watching the birds as they flock to our feeding tables. We learn to recognize them not only as chickadees, jays, and crows, but also as engaging individuals who vary in size and temperament just as people do.

Chickadees, both the Long-tailed (*Penthestes atricapillus*) with their perky black caps, and the Mountain Chickadee (*Penthestes gambeli*) with a white stripe over each eye, are our most numerous and welcome guests. Fat and thin, large and small, they are a gay, zestful, songful lot. Last winter, however, one poor chickadee lost his tail feathers through some mishap or other and came to Hazel Hanks' feeding board regularly when the other birds were gone. He could fly, but had difficulty in maintaining his equilibrium, particularly when "taking off". Fortunately, as time went by his feathers grew out, and he became a normal happy chickadee again.

All winter a pair of Black-headed Jays (*Cyanocitta stelleri anectens*) have made themselves conspicuous with their amazing variety of chatter and vivid appearance — their shiny, black-crested heads and their gorgeous blue plumage being accented by the snowy background.

Another frequent visitor of the larger birds is the Rocky Mountain Jay or "Camp Bird" (*Perisoreus canadensis capitalis*) whose dark grey band across the back of his light grey head is a distinguishing feature. He is a curious and friendly sort of rascal, sometimes a bit tousled looking, who is usually on hand wherever there is any food to be found.

No such welcome visitor is the Clark's Nutcracker (*Nucifraga columbiana*)

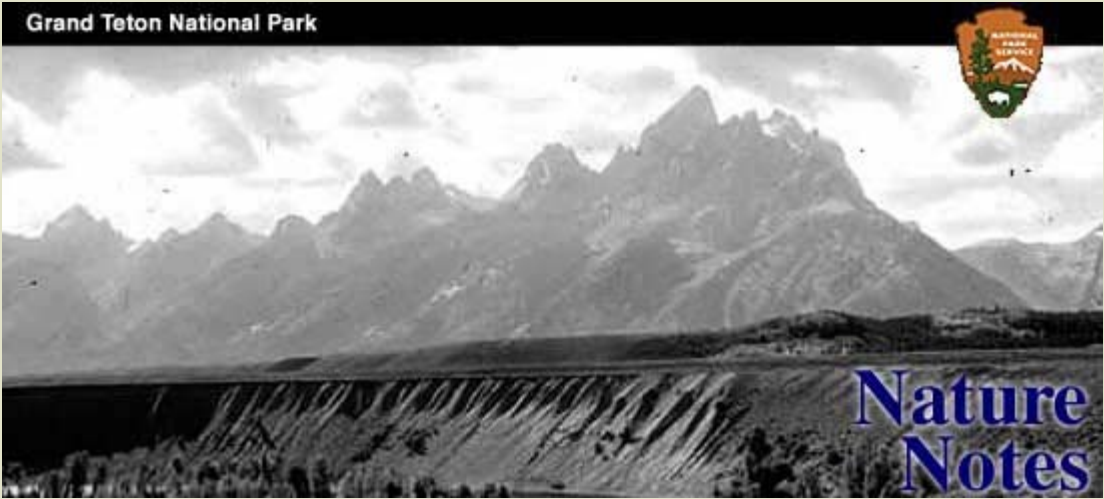
whose heavy black bill shows him to be a member of the Crow family, and a handsome one, too, with his sleek gray body, black and white wings and tail. He is somewhat of a bully and monopolizes the feeding table.

Often we find the large, black and white striped Rocky Mountain hairy Woodpecker (*Dryobates villosus monticola*) at our feeding boards. The male has a bright red bar across the nape of the neck. Occasionally a woodpecker about half as large as the Hairy and its exact duplicate in coloration comes, too,— the Batchelder's Woodpecker (*Dryobates pubescens leucurus*).

Jess and Ella Roberts, who are spending the winter at Jenny Lake, report in addition to the above birds, the large handsome black and white American Magpies (*Pica pica hudsonia*) at their feeding table, as well as the tiny Red-breasted Nuthatch (*Sitta canadensis*) All winter we watched for these colorful, fearless little creatures who seem equally at home upside down or right side up as they travel along the branches and trunks of trees. Finally in March a belated pair surprised and delighted us by coming regularly to the feeding boards.

Both Superintendent Whitcraft and Naturalist Stagner have been able to get some fine close-range moving pictures of these birds.

We know that Grouse (*Dendragopus obscurus richardsoni*) have been in the vicinity all winter, but now that Pink-sided Juncos (*Junco mearnsi*) are visiting our tables, we are convinced that Spring is on its way and soon our feeding tables will be deserted by our winter guests who have afforded us so much entertainment during the months of deep snow.



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TALUS

January 5- Flying Squirrels (*Glaucomys sabrinus bangsi*) have again made an appearance at headquarters. One has made nightly forages to the bird-feeding table just outside our window during the past week or ten days. He is plainly visible by the light from the house. At first he was rather timid, and his appearances consisted of rapid jumps across the lighted area during which he secured whatever food was easily picked up. Later, becoming more accustomed to the light and the proximity of man, he could hardly be frightened away, and a fine opportunity to observe the broad skin folds extending from wrist to ankle, the rather large eyes, and its beautiful, soft, grayish-cinnamon pelage was thus afforded. H.R.S.

January 8- Chief Ranger Hanks today discovered a tiny owl, measuring not over ten inches in length, which has taken refuge in the equipment shed at headquarters. In the somewhat dim light among the rafters, this round-headed bird's general color appeared to be as grayish with rather broad vertical bands of light and dark on the breast, white around and especially above the eyes, and radiating outward from the eye areas were finer light gray or white lines. The lines passing vertically over the head continued over the top of the head. Although identification of this bird is not positive, it most resembles the Saw Whet Owl (*Cryptoglaux acadia*), and is here mentioned for the information of those who may see this bird at a later date. H.R.S.

January 10- Park Ranger Winess and I were quite surprised today to find a Kingfisher (*Megaceryle alcon*) near the outlet of Leigh Lake. For some distance the outlet stream is broad end shallow, and seldom freezes completely over. No doubt this bird finds abundant food in this vicinity throughout the year. A.F.H.

January 19- Early sub-zero weather formed ice over Granite Creek throughout its entire length by December 1. But on today's journey up this canon, most of the stream was again open, the ice having melted beneath a cover of several feet of snow. Several Water Ousels (*Cinclus mexicanus unicolor*) were seen busily flitting from one spray-washed boulder to another, and diving now and then into the icy water. My desire to hear the famed winter song of this bird was not gratified. H.R.S.

January 20- A Purple Finch (probably *Carpodacus cassini*) was perched up under the eaves of the office building this morning. This species is well represented in the park during the summer, but it is indeed rare to find one here during the severe winter months. A.F.H.

February 2- The Jenny Lake Museum has recently received several fine colored photographs from Mr. S. N. Leek of Jackson and Moran, Wyoming. Mr. Leek, a long resident of Jackson's Hole is famed for his large collection of photographs dating from early in his residence in this region. The pictures donated to the museum include some early views of the Tetons, and the annotations on the views give them an historic value comparable to their artistic worth. H.R.S.

February 5- Hazel Hanks reports that today she was witness to a thrilling combat between two birds for possession of the feeding board just outside her window. A Black-headed Jay (*Cyanocitta stelleri anectens*) was furiously attacked by a Rocky Mountain Hairy Woodpecker (*Dryobates villosus monticola*). The Jay occupied the top of the platform while the woodpecker hung upside down from the under side to make sudden and furious sorties upward. The Jay, in actual possession, was on the defensive, and was by no means in a happy situation, but even though the woodpecker seemed to have the advantage, after a short battle he abandoned the fight, flew away, and left the jay in full possession.

February 11- Nearly four-thousand elk (*Cervus canadensis*) are now on the feeding grounds of the United States Biological Survey ranch near Jackson, Wyoming, and a good supply of natural forage is still available making unnecessary any artificial feeding as yet. A small herd was also seen today in the Gros Ventre River bottoms about six miles north of Jackson, and it is reported that a few are spending the winter on Blacktail Butte. Aviators report considerable elk in the upper Gros Ventre country, and a few still remain in the lowlands south of park headquarters as well as in the Berry Creek area just north of the park. H.R.S.

February 20- Moose (*Alces americanus shirasi*) lingered late in most of the areas along the base of the Teton Range. During January they were present in considerable numbers along Cottonwood Creek, near Jenny Lake and in the area south of park headquarters. During February most of the moose departed, presumably making their way toward the Snake River where many of them winter. Chief Ranger Hanks reports that only along the lower slopes of Mount Moran, where willow patches on rather exposed slopes provide food, were these animals seen on recent patrols. H.R.S.

March 4- Recent warm weather has made travel into the mountains extremely hazardous. In venturing about six miles up one of the Teton canons on snowshoes today, Park Ranger Winess and I crossed five large

slides of recent origin. One of these filled the entire bottom of the canon for a distance of some 250 yards. These great masses of snow sliding and falling down the steep slopes completely cover the stream and the vegetation in the bottoms of the canons, and in their great velocity frequently push far up on the opposite side of the canon. Fortucately, no slides occurred while we were in the canon today. A.F.H.



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