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WINTER LIFE AND NESTING STUDIES OF HEPBURN'S ROSY FINCH IN WASHINGTON STATE.

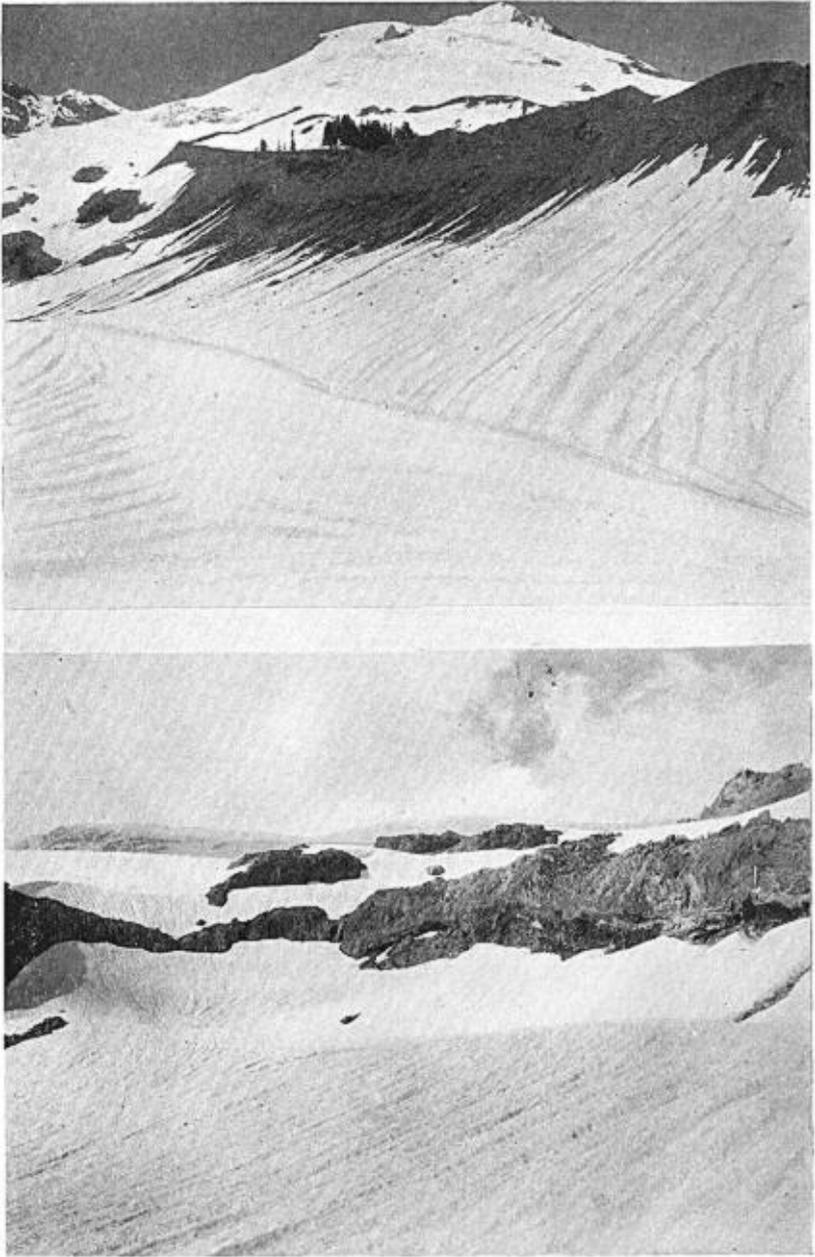
(Part II. Summer: Nesting.)

BY WILLIAM T. SHAW.

Plates VIII-X.

IT WAS greatly desired to find the nest of Hepburn's Rosy Finch and learn of its breeding habits. An extended study of the published accounts on the subject of its nesting showed very little exact information and consequent need of investigation in the remote fields of its Arctic-Alpine habitat. The task of finding its nest was difficult yet most alluring.

On August 6, 1924, while arranging for a photographic exposure upon Mount Baker, in central Whatcom County, Washington, my attention was drawn by three small birds coming down out of the upper air and alighting upon the tip-top branches of a high mountain hemlock (*Tsuga mertensiana*) which stood in the last clump of trees at snow line upon an old heather-grown moraine. Through the binoculars they looked like Pine Siskins (*Spinus pinus*) but their identity was in doubt. On nearer approach the familiar chirp of the Rosy Finch (*Leucosticte tephrocotis littoralis*) was heard and in a moment they descended to a patch of snow upon the rocky sides of the new moraine and faded out of the landscape, so nicely did they blend in with the rocks about them. Closer contact showed them industriously gleaning from a bunch of last-year's lupines, (probably *Lupinus volcanicus*) and from tufts of rushes (*Juncus*) both of which grew beside this moraine. Adding to the interest was the presence of a mother Ptarmigan (*Lagopus leucurus rainierensis*) and four one-third grown young, all in the space of about 20 feet square. Both species were tame and permitted an approach of ten feet in the case of the Ptarmigan and fifteen in that of the Rosy Finches. There were three birds in the Finch flock, all dull-colored, and at least two of them were young. Pressed too closely, one of them uttered the "let's be off call"—"weep-weep," so



Photos by Wm. T. Shaw.

UPPER: EAST MORAINE OF EASTON GLACIER, MT. BAKER, WASHINGTON. A
SUMMER HOME OF HEPBURN'S ROSY FINCH.

LOWER: RHYOLITE OUTCROP, WHERE THE BIRD NESTS.

interestingly given in winter at their feeding box on occasions when no food had been provided for them, and presently they were in the air and undulating down to a lower snow bank. Here they permitted close observation and were seen walking diligently in search of food upon the snow. One attacked a dipterous insect, another investigated a cone of the high mountain hemlock. After a few minutes of this, they raised on wings sufficient to carry them over the moraine in the direction of the great glacier. This was the second time they had been seen this summer, both times near great quantities of ice and snow. These seemed to be post nesting rovers as they were not seen the following day. This observation at least told us something of their probable time of nesting and incidentally too, something of their nesting habitat for it was not over half a mile from here that our first nest to be found was located five years later, and that the final success of the original quest was achieved ten years after, in 1934.

Yet this was not the first indication which had come to me of their home life in the high mountains. On August 22, 1919, while accompanying the Biological Survey investigations in the State of Washington, under the leadership of Dr. Walter P. Taylor, fledglings, still on uncertain wings were observed at an elevation of about 7000 feet, upon Burroughs Mountain, Mount Rainier. So recently had they left the nest and so clumsily were they using their wings that they became the object of interest to one of the foals whose mother was among our pack horses and bore an investigation by this youthful equine, prompted by curiosity, as they fluttered conspicuously over the rocks by the trailside. Again on July 25, 1924, a Rosy Finch had been observed at an elevation of 5800 feet, on Glacier Peak, Snohomish County, Washington. One, apparently a female was seen here on two days and appeared to be nesting as she was concerned with the presence of two Sparrow Hawks (*Falco*) in her neighborhood. The bird remonstrated with them from the tree tops, though she was seen at times on the flat rocks near the snow. The excited call, accompanied by nervous wing-twitching was being given. Once more on the eighth of August, 1924, at an elevation of 6000 feet, they were observed on Deming Glacier, Mount Baker, Washington. Never before did I realize the source of color of the Rosy Finch until three were seen to rise twittering out of the foot of the ice cascade of the Glacier and disappear over the cliffs to the south and east. Here were tones of brownish and gray hues such as to render the bird all but invisible when it came to earth. Again, at an elevation of about 6000 feet, upon Mount Stuart, Chelan County, Washington, on July 24, 1925, adult Rosy Finches were present, though no fledglings were seen upon the feeding areas. With these suggestions as to nesting habitats, and probable time of nesting, we undertook our first determined effort to obtain information upon them in 1929, choosing Easton Glacier, Mount Baker, Washington as the field.

Nesting Habitat.—With the idea that they would likely be found nesting around rocky cliffs, gained from the fact of their being so persistently observed near them and from the fact of their tendency to cling to brick walls in and about the buildings at Pullman, where they were also observed entering windows, and roosting on ledges of brick walls in sheltering porches, and above all from noticing that they were entering the Cliff Swallows' nests along the Snake River, suggested to us that they would be very apt to select rugged cliff outcroppings for a nesting habitat.

So, remembering their former occurrence at Mazama Park, Mount Baker, Washington, I determined to reach this camp, if possible, earlier than on former years. Approaching the Mountain on July 1, 1929, we found the forest rangers reporting great quantities of snow in the high mountains. Hesitatingly we ventured in, camping for the night at a deserted trapper's cabin, still wet and chilly from its recent liberation from snow. That afternoon a reconnoitering party visited the upper country of the moraines to find great fields of snow extending widely, with here and there a wind-swept shoulder of an old moraine blown free. Here, in the shelter of a clump of one of those brave outposts of high mountain hemlocks in full view of the great dome itself and only a short step from Easton Glacier, we decided to establish camp. The Park was almost entirely covered with hard granular snow, averaging about three feet in depth and open only around the park-like clumps of trees. Our horses could travel over it however and not go through too deeply even in the late afternoon. We returned to the lower camp.¹

The night was fine and clear and our hopes of getting the pack-laden horses up and over on hard snow early in the morning were high. Dawn however was far from that for our valley was fog-shrouded. Summoned to the difficult task of breaking and making camp in rain storm and fog, by the fine capability and courage of our packer Mr. George Ely, we sent the first load of camp outfit up. On his return Ely reported the ridge densely fogged. Later we appreciated this, since we could not see a hundred feet in any direction. Two boys, accompanying the first pack had been busy however, and snow had been shoveled out of our tree clump and a fire was under way,—the first token of home. The tent soon added the second touch and presently smoke curling from our Sibley stove completed the scene of comfortable occupation.

Slowly that morning the fog drifted out, revealing to those boys who had

¹ To those who have had no actual experience in the high mountains of the north in summer the mention of snow in June and July so persistently is apt to be misleading and convey a false impression of chilly atmosphere. Indeed far from being cold, the sunny days are very pleasant, the air from the warm lowlands drifting over the snow fields and making them very companionable. Of much greater concern, than the temperature is the blinding glare of the sun reflected from the snowfields.

come into this beautiful spot, blind-folded as it were, this lovely sight of wintry parks, alpine forested,—fog-steaming glacier moraines, forbidding black buttes and crowning all the miles and miles of near- and far-distant peaks. Time passed quickly those first hours and presently the great white form of Baker glowed warmly and silently in the lingering rays of the ending day. Lesser peaks, one by one, took on their cold ashen hues with the fading light. Soon we were to go into our first night on the high mountains.

Yes, as of other years, the Rosy Finches were there, feeding quite busily at the line of melting snow, hopping or walking silently along the snow edge of the vegetation-covered lateral moraine, seeking no doubt the last-year's seeds laid bare by the thawing snow. Silently, industriously, they fed, the only sound being the occasional faint swish of heather or huckleberry twigs released by the warm rays of the sun from the prone-pressed imprisonment by compacting winter's snows. Once one fluttered into the air, Junco-like, for a passing insect. Again one flew diagonally up for a distance of about 15 feet to bring down some small winged creature. But no more aerial maneuvers for such actions are rare with the Rosy Finches. After twenty minutes or so of this seed-searching, departing twitters were uttered and after flying once or twice from one prominent rock to another, the twitterings increased in the rapidity of departure and the birds, now usually in pairs, and seldom ever seen in groups of more than three or four, vaulted over the knife-edged, lateral moraine in the direction of the outcropping ledges of the upper glacier.

On July 10, it was decided to cross the cirque at the lower end of the glacier and study conditions along the east wall. The going was rather rough, with two glacial streams to cross, which by return in the evening were indeed formidable. This east moraine had been wind-swept in winter and was now free from snow and towards its upper reaches had stretches of wild flower gardens. Here also were Rosy Finches, five being seen in all. Two of them, after feeding, passed over my knife-edge perch and headed for a series of slab-strata and clinker domes in the upper ice, which retarded the flow of the glacier.

On July 11, Deming Glacier was visited and Rosy Finches found flying in the direction of its formidable walls which are very craggy. Around the precipitous cliffs, one pair especially was noted as if they were nesting there. On July 12, William Morris and the Anderson boys, my camp companions, accompanied me and we went directly up the cirque towards the low ledges of slabs and clinkers. A little after noon Don Anderson and I were ascending a slope, when an old Rosy Finch flew past on its way towards the upper rim-rock walls of the moraine. A little later Herbert Anderson reported hearing what seemed to be the chirping of young birds, though obscured by the noise of a water-fall. For the rest of our stay in this region

we neither saw nor heard any birds (Condor 1929). On returning, as I passed the wild flower gardens of the moraine, finches were seen feeding by the edge of the snow. They had come from the ledges beside the glacier and presently two of them left in the direction of the upper end.

In the evening I went over and over in my mind all the circumstances of these observations and was more and more convinced that the birds were nesting in the ledges of the moraine walls. I had hopes of being able to make one more effort. With food and rest came new courage and before dawn I had determined to go again in a final effort to find the nest on this last day before the packer came to take us out.

In the morning I announced my decision and was soon under way. Again two birds were seen on the east moraine by the gardens and snow patches but soon left towards the upper ledges. After about an hour's time I arrived above the ledges and looking down saw a Rosy Finch eagerly progressing over the snow, this time picking up benumbed insects. Her actions easily could be seen through the binoculars. For some minutes she continued this, moving in the direction of the water-fall. Here she flew in short successive flights up over the slippery stones until the snow fields beside me were reached, there to continue her insect searching. Finally after some restless chirping she flew to a little pool beside the snow for a splattering bath. After a dip she would shake out her plumage and flutter away a few feet only to return again. This she did four distinct times before dropping to the rocks below. Here, after a few moments she fluttered up under an overhanging ledge about 100 yards below the falls. For a long time I watched her point of disappearance, but she did not return. Marking the general position of her concealment, I cautiously lowered myself down over the incline to the snow field below. Now approaching the ledge under which she had disappeared I sat down on a pile of rocks and began making a study of the wall with the glasses. Here were domes of reddish, clinker-like, porous rock, overlain with flat stratified slabs of a very hard structure. Both formations were later referred by Dr. Wm. M. Tucker of the Fresno State College, to rhyolite, differently metamorphosed in cooling. Water dripped over about half of this area. The drier parts showed irregular gas-formed crypts here and there and in two of these appeared from the distance, that which looked like nesting material. One, at least, had what was distinctly shown as loose weathered ends of grass, though very old.

With this preliminary study, I next started across the snow. The first niche soon lost its favorable look, but the second still seemed hopeful. While standing on the sloping snow, glass to eyes, I heard a familiar chirp, the call of a returning Rosy Finch. With scarcely the pause of a moment she flew direct to the niche and eager mouths of better-than-half-grown fledglings rose to meet her. The long quest had ended!

The position of the nest was not easy of approach owing to the steepness of the snow leading up to the base of the overhanging ledge under which the crypt of the nest was located. Cautiously I worked my way to a point nearest the nest, focusing upon the nest cavity at a distance of about 10 feet. Sliding down to the rocks below, I sat there for a half hour watching the movements of the bird and trying to persuade myself to return for a lateral view of this overhanging ledge, for this was a dangerous outcropping of much cracked-up rock, as was shown by recently fallen slabs scattered here and there over the snow.

The nest looked much like that of a Robin, being open at the top, framed of grassy structure, probably *Juncus* or some related form. A nearer approach was impossible, for the crag was undercut about ten feet with the nest about half way back in the ceiling.

At times of feeding the young seemed to reach into the throat of the mother, uttering meantime high-sounding chirps resembling those of the common Eastern Kingbird (*Tyrannus*). The adults seemed not to be carrying visible food in their mouths.

So the 1929 season ended for us; we were to leave the mountains next day.

Studies of 1932.—It was not till 1932 that we had opportunity of returning again. On July 6, of that year, Mr. William C. Moore and I found ourselves established in camp at the foot of the east moraine of Easton Glacier. Deep snow would let our horses go no farther. The morning of that day, while Moore returned to the lower meadows with our horses, I started for the outcroppings at the head of the moraine. No Rosy Finches were sighted until about noon when one was observed. On arriving at the point where they had been found three years previously, the characteristic staccato note uttered in the region of the nest was heard and presently a bird was seen flying to one of the peculiar dome-like structures. On approaching it was seen dropping from a hole in the upper part of the soft substructure of the dome. The bird soon returned and there was no doubt about there being a nest with young in it. On this occasion there was but one pair of Rosy Finches on the east side of the glacier. From time to time down to the bare patches of red heather (*Phyllodoce empetrifomis*), partridge-foot (*Lutkea pectinata*), rush (*Juncus*) and other forms of vegetation, for the moraine had been blown free. While most of the surrounding country was uniformly and deeply clothed with snow and ice, both slopes of this moraine were not only uncovered, but had an advanced growth of vegetation of about three weeks over the rest of the territory of even a thousand feet less altitude. After feeding, the birds flew over to the inside (glacier side) of the moraine and took a rather direct course up to the nesting territory. Once there, they usually perched once or sometimes twice, then flew direct

to the nesting site, pausing and looking about for as much as 10 or 20 seconds, before disappearing into the nest cavity.

Again, as in 1929, the nest was too high to reach, probably 15 feet up and overhung by dangerous slab-like formations. It was at about the limit of vegetation, only a very sparse growth of moss and lichens showing near the nest locality. Above the rock wall of the nest were a few scattered and stunted hemlocks, but only a very few and they were inconspicuous. A bunch of grass at the entrance of this nest crypt being the last vegetation seen.

The parent birds seemed only slightly concerned at the presence of the camera and operator, located probably not more than 15 feet from their nest. Sometimes they returned so silently that their presence was not detected until one glanced at their accustomed nest-side perch. Often as they approached they fluttered about and uttered staccato twittering notes, but not especially in alarm. Occasionally one heard notes from the nest, but no sound seemed to come from the young, as was the case in 1929, the little birds in this case probably being much younger.

Two old nests were found here in this porous rock, one almost directly below the occupied nest and about ten feet distant, the other at about the same level and about one rod down the glacier. The desirability of these nest crypts seems to depend upon the amount of snow which has fallen during the previous winter, for these old nesting cavities, now about on the level with the banks of snow were entirely and deeply hidden in 1933, while the occupied one of 1932 was just a little above the tip of the snow bank in 1933. The first of the two old nests was easy to reach and examine. It was placed in a rather open space in the rock, roughly speaking about 8 inches wide by 10 inches high. It was not a secure enclosure, but was penetrated by light from two or three small openings from the sides and back where the rocks did not fit tightly together besides being widely open from the front. In it the nest was set back about ten inches from the opening. This old nest was saved and will be referred to later.

Feeding seemed to be done by regurgitation, as the food for the nestlings seemed to be held in the throat of the parent and was not visible to the observer. Both male and female took part in the feeding of the young and the care of the nest, although the female seemed to make about three trips to one of the male. While in the vicinity of the nest, the male showed more spirit and animation than the female.

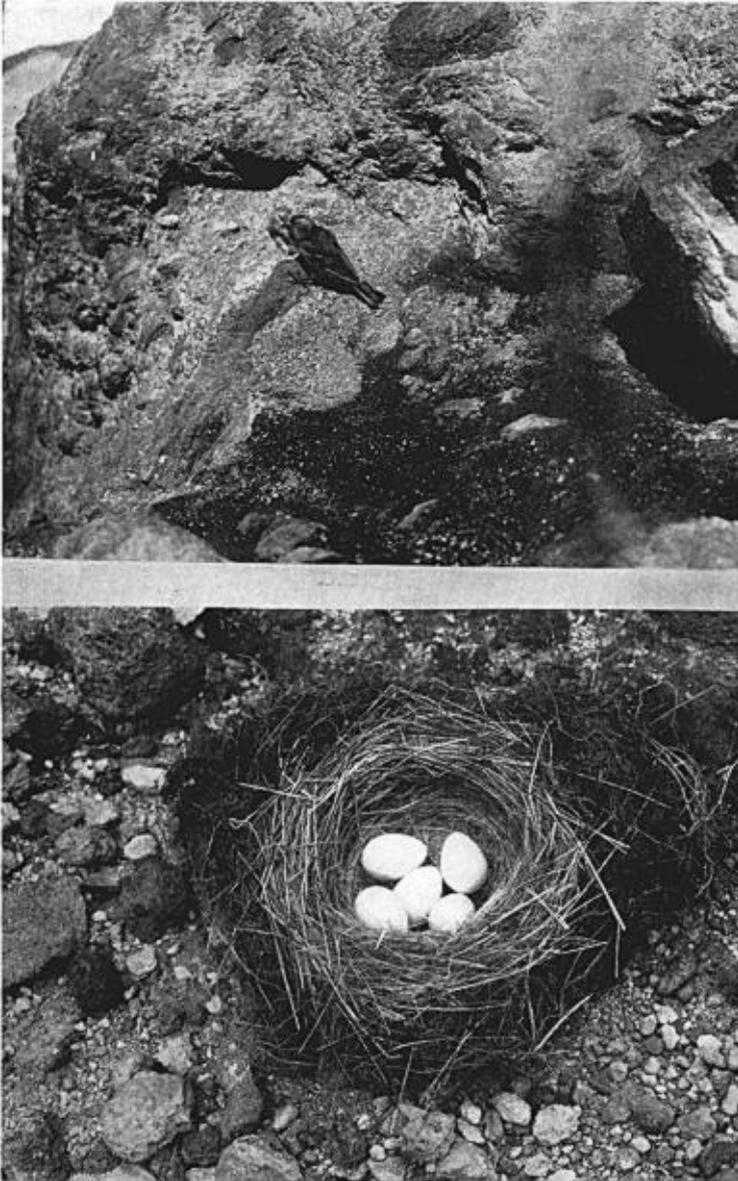
Flight up the glacier from the feeding grounds was rollicking and Finch-like but with long-drawn waves. Flutterings about the nest area were accompanied by a slight whirl of wings and motions suggesting more weight of body than found in the Pine Finch for example.

Studies of 1933.—For two years we had failed to find the eggs of this bird

by being late in the field, and a glimpse of these would greatly help to complete our studies of this life history. This year it was determined to establish camp sufficiently early that our efforts should have more hope of success. June 14, 1933, found us in the timbered low country, expecting to go by pack outfit to our old camp site of 1932. The winter of 1932-33 had been one of exceptionally heavy snow fall and a reconnoitering party brought back word that miles of snow intervened between us and the old camp site of 1932, which indeed as a camp site was now non-existent, being completely obliterated by snow. The old cabin of 1929, a full-sized structure was completely snowed under, only the gables showing. The old nesting rimrock was all but buried and now wet and dripping from slowly melting snow. Yet a pair of finches was there, quite undisturbed, upon this warm heath of the lateral moraine from which winter winds had long since swept the snow. Here was a veritable budding garden.

Packers hesitated in the face of all this Arctic display. Again good food, a night's rest and a sunny morning awakening in the midst of that lovely lowland forest, brought new courage. We recalled a local mountaineer, Otto Willis,—“Yes, he would take us as far as horses could go.” So in the course of a day or two, our packs were being pulled from our horses and piled in the shelter of a great fir in a gloomy forest of belated snow high on the mountain side. We had crossed about two miles of it, and horses could go no farther; from here on the entire outfit was back packed largely by Wm. Moore, at least two and a half miles nearer our desired goal. That night we slept in the old trapper cabin, entering at first by a gable window, later by steps of snow cut down to the door. On the 19th of June we found quite the only available clear space, from which the snow had been warded off by two large high mountain hemlocks and an Alaskan cedar (*Chamaecyparis nootkatensis*). Here, with a little shoveling, room was made for our tent on bare ground though the snow was fully eight feet deep nearly all around us. Soon the tent was up and a most comfortable bed of hemlock, tarps, and Hudson's Bay blankets was constructed. Moore, with back packing now completed, next cut a fine old dry Alaskan cedar for fire wood. Its 300 closely-set annular rings furnished a luxury of fragrant yellow wood for the 28 days we were in. The Sibly was soon heating the tent splendidly and the little camp grill presently was set up outside for cooking fine food. A few scoops of the shovel shortly produced a ready-to-hand cooler back in the depths of our bank in the purest of last winter's snows.

On this morning of the 20th, we made our first trip up the right lateral moraine, past our old camp of 1932, now five to six feet under snow, crossed about all the familiar glacial streams of '29, now deeply covered, without knowing they were there, except where they passed the base of trees. By and by we gained the moraine's knife edge where winter winds had swept



Photos by Wm. T. Shaw.

UPPER: HEPBURN'S ROSY FINCH IN FRONT OF NESTING CAVITY, JULY 8,
1934.

LOWER: NEST AND EGGS TEMPORARILY REMOVED FROM CAVITY, JUNE 17,
1934.

the snow into the cirques beyond, and here was spring,—far beyond our camp below. One could lie on the warm dry heather beds and luxuriate in the sun. From June 20 to July 6 the Glacier and its east side moraine were searched almost daily, yet no nest was found. The birds were there, one pair and an extra male, rather constantly. One of the males was giving the familiar spring twitter of animation and excitement and once was noted perched on a conspicuous boulder, with quivering wings as if displaying the beauty of his delicately tinted courting plumage. Yet we did not find the nest. The landscape was greatly changed from former years by the piles and piles of snow. However, we were learning something of the Rosy Finch, from day to day.

We had noted, long ago at Pullman, Washington, the habit of the birds of gleaning at the very edges of the last lingering snow banks, at the *moist edges* of them, during the last few days before their departure from that country in spring. A good feeding ground apparently, where might be found windblown seed of winter drifts, now gently lowered to the moist earth by melting banks. They were doing the same thing here! Silently, persistently and patiently, they would nimbly patrol this moist strip of earth by the edge of the snow. Even when they went down to the wild flower gardens, in bloom on the lower reaches of the moraine, they did not seek the warm dry earth but rather searched the moist edge of the remaining snow banks greatly restricted though they might be. When young are in the nest, it is noticeable that the times spent by individual birds in gleaning seems to synchronize very suggestively with the intervals of absence of the parent birds from the nest. On July 6, 1933, a Rosy Finch was observed, having found a flat wash of dead grass and silt still damp from its release from the edge of the winter compressing snow. Into this moist plat of earth it persisted in delving for some minutes with its beak. Close examination of this soil showed that there was a small blackish seed present, strangely like a seed observed in the gullets of very young Rosy Finches a few days later and referred to more directly below. The usual path of the bird was, however, a six inch strip at the very edge of the snow. Vegetation or heather farther back did not seem to interest it. There the twigs released from a perfectly prone position of winter captivity by the melting snow presently spring up or slowly rise, according to kind and elasticity of plant, and instead of the smooth path by the snow edge, they produce a tangle a few inches farther back through which the bird could not easily walk as it does, Lark-like. While watching one thus foraging, I was surprised to see her hop, Robin fashion, out over the snow, alternating this with an attempt to walk across the soft granular crystals. Rapidly she struck right and left with her beak at what I supposed were benumbed insects. Going out to investigate, tiny winged plant lice were found, here and there, and now and then

a gnat-like dipterous insect appeared. The Rosy Finch is very quiet when foraging and always searching, searching! Even in rainy, fog-dripping weather they still glean, pausing occasionally to shake their feathers free from gathered moisture.

While this snow-edge habit seems to be commonly employed at this season at snow line, it is not the only method used in searching food at the time of nesting. During the week of July 18-25, 1925, while camped on Jack Creek, opportunity was given to observe female Hepburn's Rosy Finch gleaning in a rather dry situation in the Pass between Mount Stuart and Ingalls Peak at an elevation of about 6500. At this time when making observations in this divide, while still on the Jack Creek side, I heard the familiar call of the Rosy Finch and saw two birds circle about and finally perch on the top of a subalpine fir (*Abies lasiocarpa*). After a few moments of inspection they flew directly to the ground and began walking very briskly about, crouching low and gleaning. One was observed picking seeds from the seed-crown of *Spraguea multiceps*. On the Ingalls Creek side of the pass three Hepburn's Rosy Finches were observed, at intervals during the afternoon, gathering from a patch of ripe spring beauty (*Claytonia lanceolata*) now holding heads filled with an abundance of shiny black seeds. On each arrival they approached the ground as described for the Jack Creek side of the pass.

Finally our long vigil was to be rewarded, this time by finding an occupied nest within fairly easy and safe reach. On the morning of July 9, Moore reported having twice seen Rosy Finches passing from the feeding grounds to a big outcropping head, almost the last one in the upper center of the glacier. With the aid of the binoculars he had distinctly seen a female Finch come from a crack in the slab rock which made up the crown of this dome. Together we went over the intervening snow field and as we approached the cliff we distinctly saw a bird enter the recess under observation. Shortly it emerged and flew directly over to the feeding grounds of the east moraine. While Moore was climbing the rock toward the nest, which was accessible from above, a bird returned and entered and did not reappear. After several minutes, when he approached, the bird darted out. Again very young fledglings were found in the nest.

As rapidly as possible we arranged to photograph the nest and young which could not be done *in situ* for they were arms length in the crevice and a tripod could not be placed. This difficulty was overcome by a bold expedient of carrying the nest bodily to a focal area in front of the camera and returning it at once after the exposures were made. Almost immediately the mother bird returned and flew into the rock cleft even before we had the camera removed from the vicinity. Later Moore went down to the snow field and watched with the binoculars, reporting the return of the

female to the nest cavity from which she did not emerge for the next half hour that he remained. She was evidently brooding the young, as it was now about 4 P. M. Subsequent development showed very satisfactory negatives from these exposures.

The Nest.—This was a bulky affair a little smaller than that of a Robin. It was constructed on the outside with considerable black, dead *Usnea* or tree moss (a lichen) and what seemed to be rootlets of what might be partridge-foot (*Lutkea pectinata*) which was to be found projecting down from the undercut sod of the moraine's knife edge. Quantities of rootlets, possibly of a sedge (*Carex*), rushes (*Juncus*) or a bent grass (*Agrostis*) were found although these fragments were difficult to determine. A few bits of old dead moss stems were also present in the outer wall. The lining was of grass culms which had the appearance of having been shredded to a considerable fineness in the bottom of the nest. Several Ptarmigan feathers were present in the lining.

The location of the nest was unlike that of the others, being in the slab formation, but this choice of habitat may have been due to the late season and very deep snow which almost covered the rhyolite domes.

The Young.—These young Rosy Finches, which may have been about three days old were decidedly flesh-colored with large, dark, closed eyes and bright yellow-rimmed mouths. They were clothed with a very light gray down, toyed by the gentlest of air currents, giving them a whitish appearance. Their legs were rather unusually long, the tarsi and toes flesh-colored. They uttered no sound. A very astonishing thing observed about them was that their gullets, full lengths of their necks, were quite full of seeds which showed plainly through their transparent skins. Of these there seemed to be two kinds, some brownish or blackish, similar to those now being found in the silt deposits of the snow edges both on July 6 and 12 mentioned above, and later determined as the seeds of the huckleberry (*Vaccinium deliciosum*) of the previous year's crop, and a second kind, a whitish or yellowish seed, probably a violet (*Viola palustris*) found fruiting on the moraine heath at the present date.

The nest was revisited on the 13th of July. We were greatly pleased, for we had no more than arrived than we saw a bird dart out from the nest cavity. At once our fears were set at rest as to the response of the birds to the rough treatment of our photographic efforts of four days previous. Pleased beyond expression, for they were not only there but had reconstructed the nest with the addition of more lining in the form of Ptarmigan feathers, a little *Usnea* and quite a lot of cascade mountain goat hair (*Oreamnos americanus americanus*).

We now remained in the vicinity of the nest for the first three hours of the afternoon during which time the parent birds did not return to their young

more than three or four times. Both male and female were attending the brood. Twice the mother spent half an hour at a time apparently brooding the little ones. She was silent when about the nest locality. The male on the other hand was very twittery when near the nest, using the jubilant notes heard in late spring in Pullman. Both parents seemed surprisingly indifferent to our presence, scarcely uttering protest at all.

The interval of four days had shown a remarkable change in the young. They were now found to have grown considerably in size, and especially in the development of wing feathers. The eyes were still shut, and it was estimated that at the present rate of development they would be able to leave the nest in another ten days. But it was to be another twelve months before we should see Rosy Finches again.

Observations of 1934.—Mount Baker had an early season in 1934. By the middle of June, the snow was quite gone around the old Schreiber cabin, where in 1933 at the same date the building was all but completely covered. We were easily able to take our horses the entire distance to our old location of 1929 where we established camp on the 16th of June. Moore had visited the Glacier as early as June 2d and observed at least four Hepburn's Rosy Finches. These birds were showing signs of the approach of the nesting season even at that date. As to the duration of the stay of Hepburn's Rosy Finch in its summer home on Mount Baker, it is interesting to know that Josephine Gordon, reported seeing two of these birds, in winter plumage, upon the Mountain, at an elevation of 3000 feet, on November 25 of this same year.

On the afternoon of the sixteenth Moore made a preliminary trip over the glacier returning to say that he had observed a pair of Hepburn's Rosy Finches remaining rather consistently about an outcropping in the upper center of the glacier, which had been practically buried with snow and ice the year before. This same evening two Rosy Finches were observed gleaning along the immediate edge of the melting snow of the west moraine of the glacier where quite a variety of flowers was already in bloom.

On the morning of the seventeenth we both set out, expecting to spend the day upon the glacier. Moore was to go directly to the central locality where he had seen the Rosy Finches the evening before, I to follow the west rim-rock. My progress had taken me down the outcropping about two-thirds of the way when I heard a distant call from the center of the glacier. Hastening in the direction of the sound I soon saw Moore coming across the snow field.

"Well, I found it! A nest with five eggs."

This was about 9:30 in the morning. While Moore returned to camp for more photographic equipment I went over to the locality he had described and sat in a warm sunny nook of the outcropping, awaiting his return.

The situation resembled very closely, both in geological formation and in position on the glacier, the habitat of the 1933 nest. Both outcroppings were dome-shaped, of hard, slab-flaked rhyolite formation rather than the pumice-like walls of gas-formed cavities also of rhyolite, where were found the nests of 1929 and 1932. To the west of the nest site not more than 25 or 30 yards was an outcropping of the old glacier ice itself. Far over to the southwest lay the reddish sierras of the Sisters. As guardians from the rear stood Arctic Baker and the rugged crags of the Black Buttes, themselves probably the last jagged remains of the wall of a huge crater. Arctic indeed was this landscape, yet inviting on this sunny day in June. Now and then a lone insect passed by,—a bumble bee lined over the rocks and flew with characteristic directness of flight; perhaps the fairy bells of *Vaccinium* awaited his clumsy investigations in a more congenial garden of the moraine. Now an idle butterfly flitted about my little rock cove seemingly to enjoy the warmth of the rock walls,—for here no trace of flower or vegetation existed! Presently a solitary syrphid fly lit upon my hand, confident in its wasp-like mimicry. And all this time there was no sign of the Finches.

Shortly, Moore returning, led the way, and now from a little porchway opening from beneath a large boulder lodged among its fellows and almost buried in silt, flitted a small brownish bird. She seemed not panic-stricken but rather quietly insistent upon her right to return to her own. The male appeared occasionally during the hours we spent there, but apparently it was the female who was doing the incubating.

The nest was well concealed, back about 12 or 14 inches from the opening leading to it and quite impossible to photograph *in situ*.

After careful consideration during lunch hour, we finally decided to focus upon a given spot, upon which the eggs were to be placed. This was done and within a very brief space of time the eggs were returned, and almost at once the mother entered the cavity where lay her nest and did not return! After giving her an interval of half an hour the entire nest itself was placed in front of the camera and five exposures made in prompt succession. Again the nest was returned to its site, and again, very promptly, the mother bird entered her door and did not come forth! Even by this date, the 17th of June she was sitting very closely.

The Nest.—In shape the nest was Robin-like, the rim of its cup being about $2\frac{1}{2}$ inches in diameter. The coarse outer margin of the 1934 nest, as well shown in the figure was made almost purely of a lichen, of the genus *Usnea*, so common in the humid forests of Western North America. This plant commonly called "gray moss," hangs pendant from the branches of conifers and other trees and upon dying turns from greenish gray to black. When moist it is very flexible and becomes hard and binding when inter-

woven as in a nest rim. It may have been taken from the branches of fir trees or picked from the surface of the snow, where it had fallen in small pieces. In addition there were a few plant rootlets, probably taken from the under-cut knife edge of the lateral moraine or from pieces of sod dislodged from this position. Most of these were difficult of determination but in addition a few stems and heads of a rush (*Juncus*) were found. A few scattering tufts of a true moss were recognized as was also an occasional culm of the wood rush (*Luzula*). The nest cup was very neatly woven, thickly and firmly with the yellowish culms of dead, last year's bent-grass (*Agrostis humilis*)¹ the coarser stems making up the upper rim, the frayed, fragile paniculate tips woven into the cup and bottom, which extended through to the sub-stratum. No leaves or blades of rush, sedge, or grass were used, only culms. Adding to the local interest of this nest were a few Ptarmigan feathers, doubtless from three known pairs of these birds nesting on the moraines. As a further touch of local patronage was the ultimate lining of wild goat hair, which is visible in the illustration and which could easily be gathered from low bushes on the moraine slopes, left there by a local herd of these mountain mammals occasionally seen from our camp.

This nest would seem quite typical, although the rim of the nest of 1933, had noticeably more rootlets mixed with *Usnea*. All three nests examined, namely the new 1933 and 1934 nests and the old one of 1932 had much in common. In the lining of each appeared the culms of bent-grass. Each had a few feathers of the Ptarmigan (in the case of the 1934 nest seven were found). The 1933 and 1934 nests had a noticeable lining of wild goat hair, which however was not found in the ruins of the old 1932 nest. In the bottom of the 1933 nest were found the puparia of a Dipterous insect, probably a blowfly. These puparia were also found in the old 1932 nest but not in that of 1934.

The Eggs.—The eggs were white, glistening like good porcelain. Their contents showed pinkish in the sun and at the round end was an opaque area, formed by the air space. In shape they were formed like an old-fashioned, wooden spinning top,—very oval at one end and nicely pointed at the other. In size one egg carefully studied measured 22 x 16 millimeters. There were five of them.

Subsequent Data.—We had fond hopes of securing further data. Day after day the gentle bird persisted in her incubation. On the 18th, ice froze at our camp,—the 19th sleet fell upon the old snow at the nesting site. The 21st was a day of heavy fog and rain; turning to snow at camp and

¹ This determination was kindly made for me by Mr. and Mrs. Carl S. English Jr. whose botanical work upon Mount Baker and other areas of the Northwest is well known. The joint authorship of Mrs. English and Dr. Harold St. John has resulted in a publication entitled "Flora of Mount Baker." 1929.

continuing as such during the following night, the 22d it snowed until noon with intermittent sleet and hail during the afternoon. Then came a clearing day on June 23 with occasional snow flurries, producing a fresh fall of 2½ inches on the old snow at the altitude of the nest. June 24 and 25 were sparkling days of high-riding, billowy clouds and bluest of skies followed by two days more of storm in which rain was the precipitation. These were the incubation and brooding days of the Rosy Finch, secure in her rock-sheltered retreat.

Finding the Young Hepburn's Rosy Finches.—The eggs had been discovered on the 17th of June. On the 23d only eggs were present. The morning of June 25 four young and an unhatched egg were found. Again the nest was removed after a spot had been focused upon. Here were four helpless mites, slightly younger than our finds of 1933. Tender skin was noticed, irregularly tufted with fluffy gray down, which moved in the breeze. Large, dark, closed eyes,—yellow-rimmed mouths, thin, wobbly necks through which pulsed spurts of warm blood from strong heart to brain, all showing most vividly when the birds were brought from their hidden retreat to open daylight. No sound was uttered. Every effort was made by the fledglings to hide the eyes from the light. One white egg remained. A few days later one of the discarded egg shells was found about fifty yards below on the snow field where it had doubtless been dropped by the parent bird. It comprised about half of the shell, representing the pointed end of the egg.

The Young at Six Days Old.—On June 30 the Rosy Finch nest was again visited. The young now weighed 56 grams for the four of them, or 14 grams apiece. They still retained the gray downy plumage of hatching; but now had in addition, blackish pterylae of pin-feathers and stubby wing and tail quills. The eyes of one or two of them were just faintly opening and they had tiny far-away voices, rarely used, at long intervals. Their general color was noticeably darker. As in the case of the nestlings observed in 1933, their gullets were now distended with seeds both dark and light, the light predominating. A slight disturbance would cause them to reach eagerly for food, stretching their slim necks to their fullest extent and opening their mouths widely.

The Young at Nine Days Old.—On July 3, 1934, when the young were 9 days old the nesting site was again visited and the occupants weighed and photographed. At this date they had advanced markedly and weighed 84 grams, or an average of 21 grams apiece. They were now showing distinct signs of intelligent, awakening interest. Hunger seemed to be a rather constant stimulus. Baby down was now giving way to rather coarser resistant feathers. Eyes were all open, as also were gaping yellow-rimmed mouths on slightest provocation. They had grown remarkably and were now indeed a nest full.

The nest itself which was brought out of its retreat each time photographs were taken, was still holding well to its original shape and had none of the overtrodden, flattened shape of abandonment such as was shown on July 8, 1934, when it was being deserted.

The Young Hepburn's Rosy Finches at Fourteen Days Old.—July 8, 1934, was a day of rain and drifting fog. All forenoon we remained in camp, but the fear that the young Finches, now 14 days old, might leave the nest for good induced us to make the trip over the glacier which by now was beginning to lose much of its last-winter's snow, and to show crevasses here and there. Drifting fog and rain accompanied us; but our unusual effort was to be abundantly rewarded, for already two of the four fledglings had flown. Our last picture of the series was now possible; the final weight of a nestling was to be taken. The following day no birds, young or old remained. The Rosy Finches had abandoned their glacier nesting places for the more congenial and fruitful foraging sites beside the moist edges of the retreating snow banks of the flower-clothed moraines.

The little birds were now a study in brown, in bristling quills for future flight efforts; but still retained tiny seams of nestling down, to be tossed gently back and forth by drifting fog as yet no sign of the gray of the adult head had begun to show. One of the remaining two little Finches weighed 26 grams on this the 14th day of its life and its last day before leaving the home nest.

The Incubation Period.—This can only be inferred. It was noted that one egg, the one which did not hatch, had a slight stellar fracture on one side, on the day the eggs were discovered. This probably arrested development. On subsequent investigation, an embryo of about 5 or 6 days growth or incubation was found. The body, head, eyes and beak were all well formed, while both yolk and white in quantity remained. This evidence, together with the 9 known days of incubation would place this period at about 14 days.

This is the story of our search; these the records of our findings. It was indeed a quest full of alluring obscurities and challenges to one's better self. In all our immediate studies, acknowledgedly still incomplete, of this wonderful bird on Mount Baker, we took no life, save the possibility of that attendant upon the cracked egg, which may have been due, unintentionally, to our gross manipulation. Long may the Hepburn's Rosy Finch enjoy her Arctic-Alpine fastness for we feel as Dawson felt with his Sierra Rosy Finch (*Leucosticte tephrocotis dawsoni*) "If lofty association means anything for character, also, the Sierra Nevada Rosy Finch ought to be the very best of birds, for it is his privilege to spend a life time wrestling with the eternal snows." (Birds of California, p. 158). Long may the crags of Baker remain a peaceful sanctuary, in pleasant view of the one-time home and now the last resting place of James Hepburn, pioneer naturalist, for whom this bird,



Photos by Wm. T. Shaw.

UPPER: YOUNG HEBBURN'S ROSY FINCH, NINE DAYS OLD, JULY 3, 1934.

LOWER: FLEDGLING AT TIME OF LEAVING NEST. JULY 8, 1934.

Hepburn's Rosy Finch, was named,—a retreat safe, let us hope, from those who might be tempted to seek out the glories of her habitat to do her harm.
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