

November 1978

Alaskan Caver, Volume 3, No. 2, November 1978

Richard A. Hall

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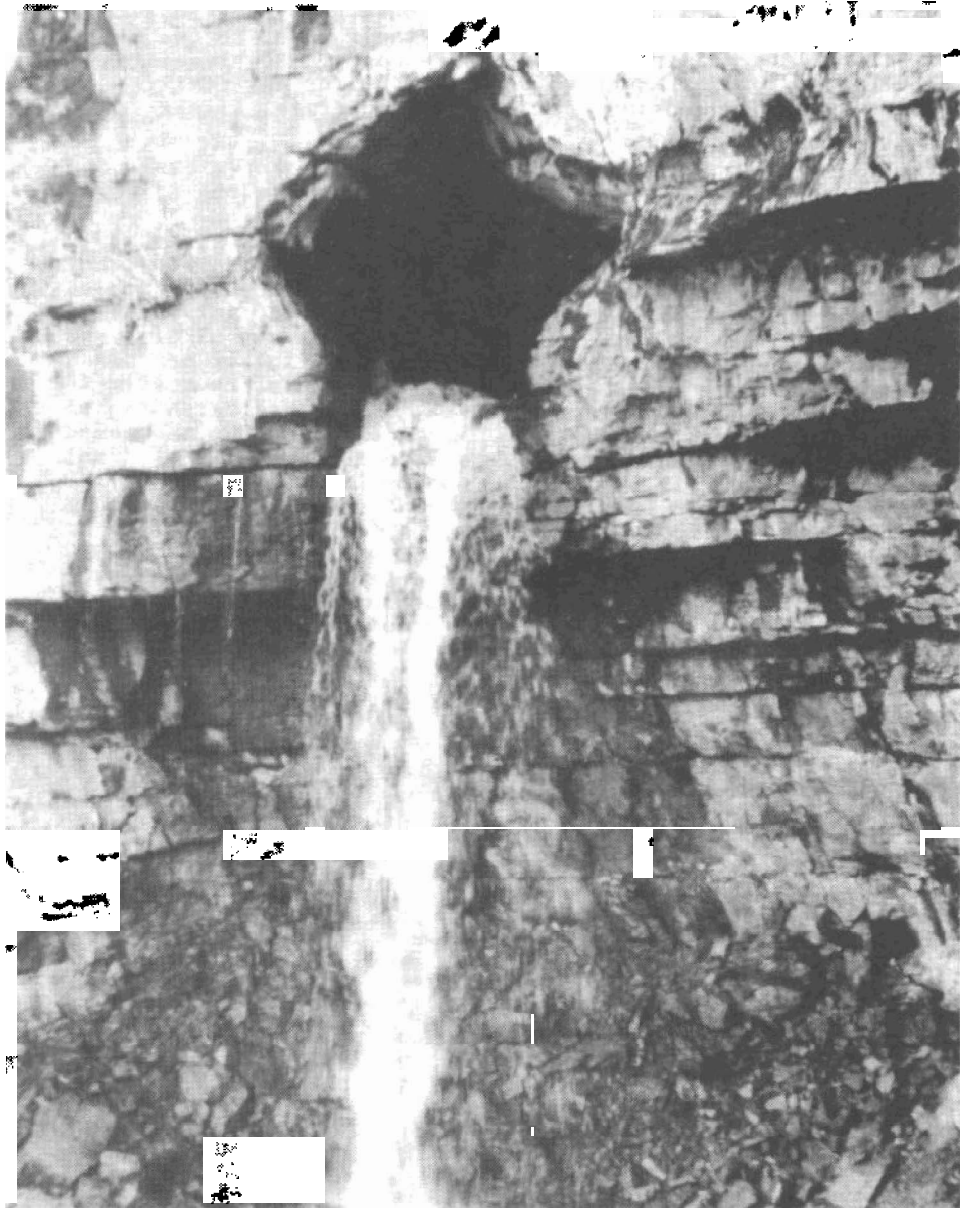
Hall, Richard A., "Alaskan Caver, Volume 3, No. 2, November 1978" (1978). *Alaskan Caver*. 25.
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THE

NOV. 1978

ALASKAN CAVER



VOL. 3 NR. 2

STAR CAVE

DUES ARE DUE

Now that we've gone official as a grotto of the NSS I guess we should abide by our by-laws which require collecting \$3.00 annual dues. Actually a better reason is that the dues are needed to pay for the postage for this publication and other necessary mailings. The bylaws say that new members (and that's all of us this time around) paying after October 1 are covered for the next year. Also, Since the new year is almost here, in order to allow enough time for everyone to send in their dues, no one will be removed from the mailing list before February. So please send your \$3.00 for a regular membership plus \$1.00 for any family memberships to Sidney Jenkins, Box 4-2917, Anchorage, Alaska 99509 or pay dues at a meeting.



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Editor: Richard Hall
Publisher: David Moll

The Glacier Grotto currently meets on the fourth Thursday of each month (5th in Nov.) at the Anchorage Community Center, 125 Third Ave, Anch.

GROTTO OFFICERS

Pres: Jay Rockwell
VP: David Klinger
Sec: Richard Hall
Treas: Sidney Jenkins
At Lrg: David Moll

The cover picture, by Jay Rockwell, is of the entrance to Star Cave near Peavine Bar in Alaska.

CAVES OF THE CHITISTONE

Jay Rockwell

Two reported caves were visited and a new cave was found and surveyed by four members of Alaska's Glacier Grotto in early September; several promising leads were also seen.

There are caves in the valley of the Chitistone River where it flows west into the Nizina River about ten miles due east of McCarthy on the south side of the Wrangell Mountains, Alaska. The area is one of Nizina and Chitistone Limestones (about 15 by 65 miles). In these formations rich copper deposits and some caves have been found.

Joseph Head's report (reproduced elsewhere in this issue) inspired this follow up trip. Lis and Rich Hall, W. Harvey Bowers and myself flew from Gulkana, Alaska on September 9, 1978, having driven over from Anchorage the previous evening. The trip in was a beautiful hour's flight as the Copper River Basin was in full fall color. We passed mud volcanos, a new 42 mile road into the Kluvesna Valley where miners were rushing to get established before d-2 was passed, and a beautiful homestead on Long Lake where the owner hosts a "flyers breakfast" to all comers each Memorial Day. Those portions of the Chitina-McCarthy road we saw looked good till we reached the Kennicott River where the bridge was out. Progress from then on could be either by foot or plane. Our pilot, Winston H. Darkow, reported going 800 feet into a cave or mine on the southwest side of Donoho Peak by the Kennicott Glacier. Kennicott was on Bonanza Ridge and next to the Kennicott Glacier which seemed to be riddled with glacier caves.

Continuing on, two interesting rock glaciers were seen on the west and south sides of Sourdough Peak. We noted that the old railroad bridge over the Nizina River was still intact at its northern end where it crossed the main channels of the stream. Ramps had been made to make this route passible when low water made the south channels fordable. This route to Dan Creek might be possible to four wheeling in early winter as there is an active mine there.

Swinging north and then east we found Peavine Bar on the Chitistone River (T.5., R16E., sec11 of the Copper Meridian), a 2500 foot airstrip. The valley at this point was about one half mile wide with a flat braided stream flood plain. Rising abruptly on either side were treed talus slopes that quickly gave way to Alpine flora on the upper portions on the south side; on the north side the trees went high up to the vertical faces.

Generally, the vertical rock was Chitistone Limestone overlain with Nizina Limestone and underlain by Nikolai Greenstone. The north side of the valley is nearly all limestone while on the south side of the valley the limestone - greenstone interface is where the mineral deposits and caves occur. The interface is at the top of the talus slope in many places. The thickness of the limestones teases credibility and the reader is referred to U.S.G.S. maps G4-943 and G4-1146. An accompaniment to map G4-844 describes the different layers and portions of it are copied elsewhere in this issue. On the south side of the valley the slope is toward the valley. In one place on the north side the limestone appears to have folded back on itself to total over 5000 feet.

Our first task, after setting up camp, was to check out the cave with the waterfall reported by Head and seen on the way in. We followed a bulldozed road west from the airport to where the main channel of the river came hard against the south side of the valley. There we crossed a small stream to an older road along the mountainside. Lime Springs Creek was running heavily and we crossed on fallen trees. The road continued on but became more dilapidated till the steepness of the mountain had precluded further construction. A poorly defined brushed out trail followed an old telegraph line across another creek. Thinking this might be our goal, we went up till we were convinced we were too high, being well above the normal talus slopes. We proceeded along the cliff face for a quarter mile before we found what we have come to call Star Cave because of the shape of the entrance (see cover illustration).

The estimated height of the cave itself was nine feet. The water from the entrance (1-2 cfs) fell clean 30 feet before hitting the rocks. The water issued from an overhanging face being well out from the cliff below and well in from the cliff above. There were openings above and to the west of Star Cave and some were checked but did not go. On a return trip two days later we identified Bucklegrind Cave. Bucklegrind was not entered because of a lack of climbing expertise and two bolts which would be required as tieoff points. The contact between the limestone and the greenstone sloped up as one went into the mountain which is encouraging in alpine caves where permafrost could be a problem.

We felt that the best plan on the return trip would be to rig bolts to reach Bucklegrind from below. The ledges above sloped rather steeply toward the valley and were covered with loose gravel. Footing was treacherous and falling rocks were assured if there was any activity from above. At the cave entrance, tieoff points above the cave were few and far away and many sharp rocks would require padding of ropes.

Continuing west from Bucklegrind and Star Caves along the top of the talus was easy. I heard Harvey call out "Hey, a cave", then "but it only goes forty feet." Then silence. Rich was next. "Hey its big." Then silence. I speeded up and entered Chitistone Junction Cave (described elsewhere as a cave report in this issue). It was not much to be sure but it was nice for these cave-starved cavers.

The trail to these caves was cleared for backpackers, and a camp area was located at the foot of the slope for a winter trip or one next summer.

A different excursion was made on the second day up the stream that runs down to Peavine Airstrip. Going part way up the mountain on old mining roads, Harvey and Rich went east from a cutback and up the stream to a steep narrow canyon with a bedrock and gravel floor. After a few hundred yards at between 30⁰ and 45⁰ it forked and the east fork lead was taken to the face of a cirque of rotten limestone loaded with vugs and remarkable calcite crystals. One example appeared to be a three foot geode with calcite crystals running to the center nearly filling it. At the turning back point, "so far that no one could have gotten this far before", they looked up at the cave they were heading for. It was 20 feet above them and around one of those debris covered slopes that dropped off to nothing. Then they saw a rope, a 5/8 inch climbing rope coming down out of the clouds 15 feet from them. There were other openings in the area that could also be accessible, but with difficulty.

Whenever we were on the upper parts of the tallus slopes, we would pause, winded to admire the beauty of this spectacular valley. Many openings on the other side of the valley were studied with binoculars. Several looked promising and have been written up as cave rumors. The valley, were it in California, might rival Yosemite. It is certainly attractive to Alaskan cavers.

A word of caution should be made here to future trip leaders in this area. This is a very dangerous area for cavers. I first read about "frost pockets" in Canadian Caver where it was pointed out that five consecutive visits to one of these high, remote, and difficult-to-reach openings that only go ten to fifteen feet will destroy the average caver. Some members of our party were beginning after the second day to wander around like starry-eyed mountain climbers mumbling about getting to the plateau on top of the cliffs (to look for sink holes they said). They wanted to climb up the gullies. It was only with difficulty that I got them to return to Bucklegrind and Star Caves on the third day. Fortunately the discovery of Chitiston Junction Cave restored them to their senses. I was much releived as they were getting to enjoy the scenery so much that they almost did not not care whether they got into a cave or not.

Our airplane pilot did not forget us (as sometimes happens in Alaska) and we had an uneventful flight out photographing items we missed on the way in.

BUCKLEGRIND CAVE

report by Joseph Head

Not far from McCarthy, Ak in a wild glaciated gorge is a pile of limestone with the potential of being hollow. There are two cave entrances in the lower bluffs facing the Chitistone River just west of the mouth of Lime Springs Creek. By air the caves are some twenty miles from the town of McCarthy, which by the way is a great place to waste away your summer - if you like to shoot pool.

The caves are near the bottom of 2000' of Chitistone and Nizina Limestones, of the late Triassic age. The rock has been folded and faulted, but not significantly altered mineralogically. The entrances are part way up the South limb of a synclinal basis whose axis lies 1/4 mile away to the NNW. One cave is known to run updip. To the east, on Lime Springs Creek, two medium sized springs put out enough water to warrant a bridge. These springs are located at the bottom of the same structural basin as the caves. They drain a different section of the same block of limestone.

Two entrances are visible. One, however, has a stream pouring out of a 10' high diamond shaped hole. The stream forms a waterfall as it leaves the overhanging entrance, freefalling 30'. There must be a considerable underground drainage system to account for the volume of water pouring out. No major gullies cut that part of the cliffs. No sinkholes are visible on the plateau above. To the west there is a outcrop on a cliff that appears to be a fossil cave filling.

To explore the waterfall cave one would have to wait till the stream was at its lowest and then rapell down from above. A 200' rope would be necessary because of the difficulty in finding anchor points.

The other entrance is 100' to the west and 40' higher. It involves a strenuous rockclimb to reach. Here too, rapelling down from above would be the best way to reach it.

This second entrance is Bucklegrind Cave. It is three foot in diameter, narrowing tighter in places. The cave leads back into the mountain, tending mildly uphill and angling off towards the waterfall entrance. One hundred and fifty feet of bellycrawl was explored and it keeps going. In crosssection the cave is triangular, narrowing to a tight crevice above. The floor is buried under coarse stream gravels. It appears to be of vadose origin.

Due to the great mass of limestone above and the large volume of water draining out the waterfall entrance, the cave has good potential of being a large system.



NATIONAL SPELEOLOGICAL SOCIETY

Form CR 1 - Permanent
Record

CAVE REPORT

CAVE NAME(S) Chitistone Junction Cave SERIAL NO. _____STATE Alaska COUNTY McCarthy QuadrangleOWNER AND ADDRESS BLM (Federal Land)USGS QUAD McCarthy (B-5) LAT 61°31'40" N LONG 142°26'40" W ELEV 2400'REPORT BY Julius Rockwell
Wm. Harvey Bowers, Richard Hall DATE OF REPORT Sept 11, 1978REMARKS: Cave is easily entered from top of talus slope.
Another possible cave with large entrance is above it.

DIRECTIONS FOR REACHING CAVE:

From Peavine Bar (T.5S., R.16E., Sec 11 of the Copper Meridian, Alaska) proceed west along old mining roads on south side of Chitistone R. flood plain. After crossing Lime Springs Creek continue on trail to second creek (first creek may reach river by underground route). After crossing second creek bear left and follow trail upstream to Star Cave from which the stream issues at top of talus. Follow top of talus 1000' further west.

The cave appears to have developed along a fracture in the rock in the North-northeast direction (dip is to the East-northeast). There are several chimneys, some of which have waterfalls and some of which are dry, along its length. One chimney opens up as a sky light. The ceiling is about the same level in the back as at the entrance and the cave ends because the floor slopes up to the ceiling as a pile of rubble. The entire length is 170 feet and the entrance is 60 feet high and 12 feet wide. The cross section is generally the same for the entire length.

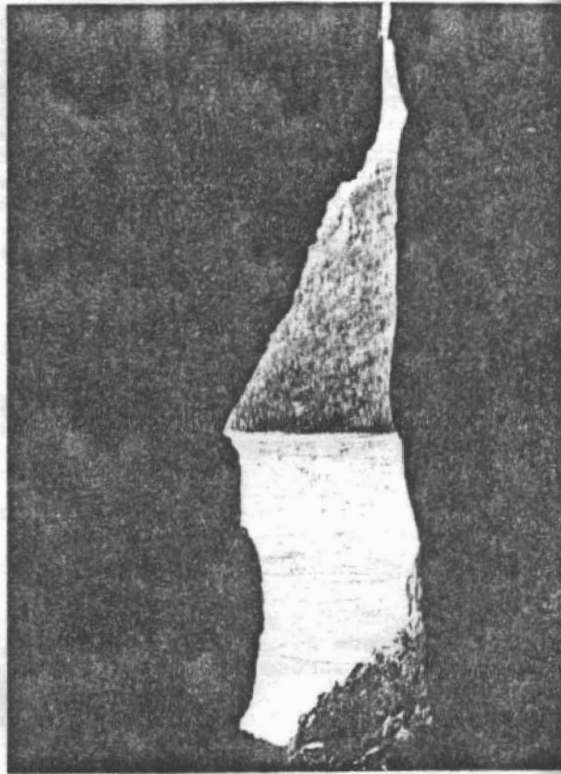
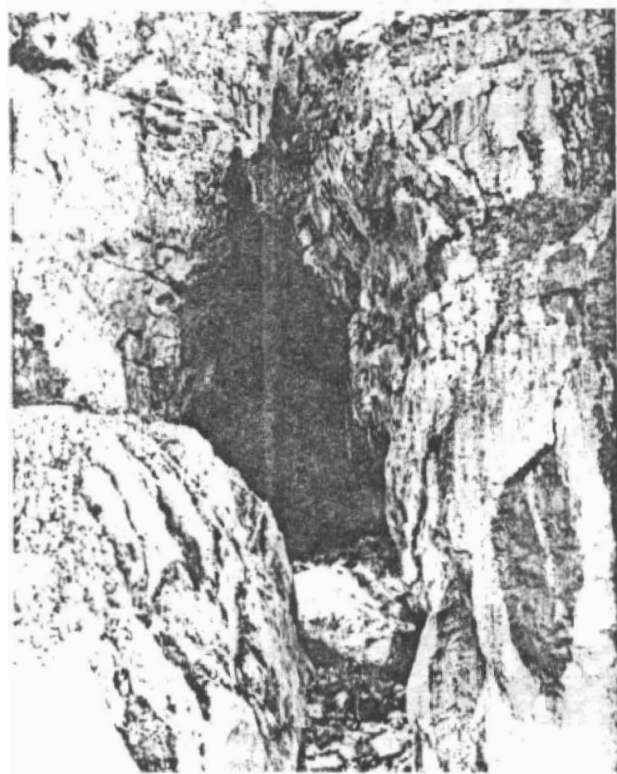
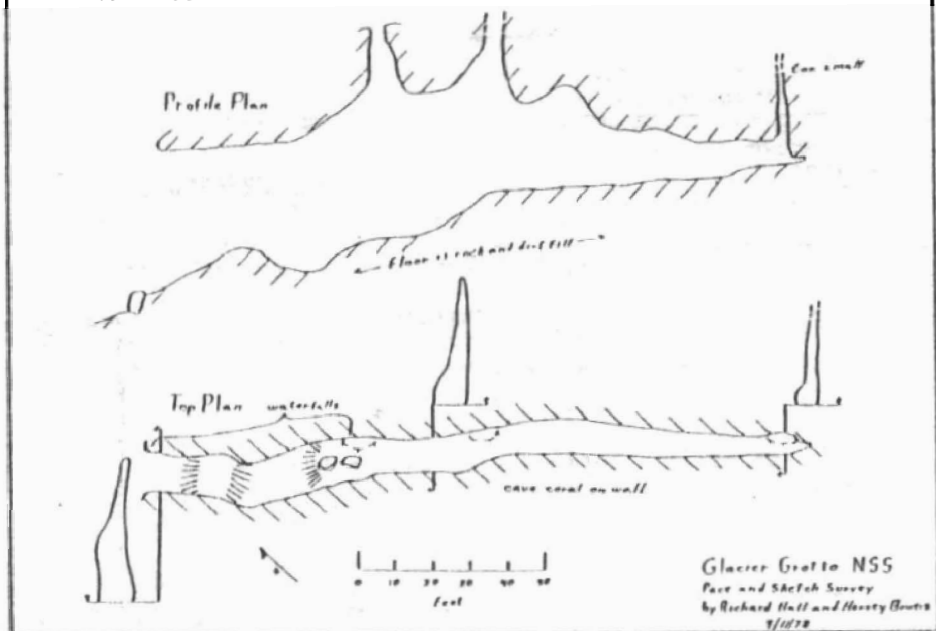
Figure 1. Entrance to Chitistone Junction Cave as seen from talus slope below. Dark area above entrance is the course of trickling water from another cave above.

(NEXT PAGE, BOTTOM LEFT)

Figure 2. Looking out the entrance to Chitistone Junction Cave across the Chitistone River.

(NEXT PAGE, BOTTOM RIGHT)

CHITISTONE JUNCTION CAVE



The following is a list of known cavers in Alaska. If you know of any others, want to correct a listed address, or know of someone outside who would like to join the Glacier Grotto, please contact any officer of the Grotto.

ROSTER OF CAVERS RESIDING IN ALASKA

Revised November 1978

<u>NAME</u>	<u>NSS#</u>	<u>ADDRESS</u>	<u>PHONE</u>	
			<u>HOME</u>	<u>WORK</u>
Arterburn, Ramona		3401 Upland Dr, Anch. 99504	333-9247	
Bernard, Ron		Bx 130 Savage Dr, Eagle River 99577	688-3463	
Bowers, Wm. Harvey	12088	Bx 1069, Wasilla 99687	376-2294	
Bowers, Sandy				
Brockman, Ross		Wiseman, via Bettles		
Evans, Charles G		1036 W 10th Ave, Anch. 99501	277-2396	
Francis, Karl E	2787	Bx 120 Savage Dr, Eagle River 99577	688-2661	
Godbey, William		Palmer	745-2357	
Hall, Richard	16556	4607 Klonkike Crt, Anch 99504	333-2090	265-3365
Hall, Elisabeth	16557			
Hallinan, Nancy	6367	Wolverine Lane, SR Bx 2085	479-6064	479-7558
Hallinan, Thomas	6329	Fairbanks 99701		
Halsey, Gary W		2703 W 31st St, Anch 99503		276-4216
Head, Joseph	13561	1345 Hess Ave Apt E College 99701	479-7494	
Higgins, Mary Ann	19423	665 E 78th Ave, Anch 99502	344-5300	
Iliff, Alice	13966	804 "P" St #3 Anch 99501	279-4729	279-5577
Iliff, Chuck	13965			
Janson, John F		4040 Bx 395, Eagle River 99577	694-2963	
Jenkins, Sidney	18195	Bx 4-2917, Anchorage 99509	274-0805	274-2415
Jenkins, Stan				
Johnson, Tom	16244	moved from Bx 19, Monte Rd Eagle River 99577		
Klinger, David M	10583	80 Birch Hill Dr, Fort	862-5170	862-4103
Klinger, Mark D	11298	Richardson 99505		
Klinger, Brian				
Lewis, Stephen	16936	2508 Sprucewood, Anch 99504	272-5703	276-4566
Means, Sam		Bx 3584 DT Anchorage 99510	694-9258	279-5577
Moll, David M	10106	506 8th Ave, Fairbanks 99701	456-1035	279-8315
Moll, Ginny	12996			456-4982
				452-3214
Morton, Bruce		3202 Star Route 206, Eagle River 99577	694-9112	

<u>NAME</u>	<u>NSS#</u>	<u>ADDRESS</u>	<u>PHONE</u>	
			<u>HOME</u>	<u>WORK</u>
Nelson, Edward		Bx 814, Kodiak 99515		
Perkins, George		Bx 300, Valdez 99689	835-4371	
Rockwell, Jay	11308	2944 Emory St, Anch 99504	277-7150	272-3422
Rockwell, Liz	15232			
Rockwell, Tad	17856			
Sims, Steve		1769 Wickersham Dr Anch	344-4173	
Sims, Pat		99507		
Smith, Warren C	5601	Dept of Chemistry, U of Ak Fairbanks 99701	479-3239	479-7323
Street, David	8257	2510 Foraker Dr Anch 99503	272-5643	265-4718
Street, Nancy	9080			
Street, Kathryn	9960			
Street, Jennifer	13762			
Street, Michael	15327			
Thiele, Jim		3437 Dickson Dr, Anch 99504	333-6396	745-3178
Velikanje, Robert S		2600 Draner Dr Anch 99503	277-8204	
Westman, Eric		Bx 1313, Seward 99664	224-3516	224-3019
(when in Anch with parents)		2020 Alder Dr, Anch 99504	276-2259	
Wickwire, Thomas		908 Smyth Fairbanks 99701		452-1568
Young, Howard		Anchorage (?)		

CONSTITUTION OF THE GLACIER GROTTO

ARTICLE I - NAME

The name of this organization shall be the Glacier Grotto of the National Speleological Society.

ARTICLE II - PURPOSE

The purpose of this Grotto shall be to promote interest in and to advance in any and all ways the study and science of speleology, the protection of caves and their natural contents and to promote fellowship therein in Alaska.

ARTICLE III - MEMBERSHIP

Full membership is limited to members of the N.S.S.. All members present at the adoption of the Constitution and By-Laws are Charter Members of the Grotto. Other members shall be discussed in the By-Laws.

ARTICLE IV - EXECUTIVE COUNCIL

a. The Glacier Grotto shall be governed by an Executive Council made up of the following (all N.S.S. members) elected annually by the members:

1. President
2. Vice-President
3. Secretary
4. Treasurer
5. Two members at large

b. The functions, powers and duties of the Executive Council shall be prescribed in the By-Laws.

ARTICLE V - ELECTIONS

The election of officers for the ensuing year shall be held at the March meeting. Officers who are elected shall take office at the first meeting the following April, unless otherwise provided by vote of the membership. Rules for the conduct of elections shall be prescribed in the By-Laws.

ARTICLE VI - MEETINGS

Meetings of the Grotto shall be held at the time and place prescribed in the By-Laws.

ARTICLE VII - DUES

The dues for membership in this Grotto will be prescribed in the By-Laws.

ARTICLE VIII - BY-LAWS

The Grotto shall, upon adoption of this Constitution, adopt suitable By-Laws to govern the organization and functioning of the Grotto.

ARTICLE IX - AUTHORITY

The Constitution and By-Laws of the N.S.S. shall be binding on the Glacier Grotto. Any action inconsistent therewith shall be null and void.

ARTICLE X - N.S.S. PROPERTY

Any N.S.S. property shall revert to the N.S.S. in the event of dissolution.

ARTICLE XI - AMENDMENTS

Proposed amendments to this Constitution shall be filed in writing with the Secretary, at least one meeting prior to the vote on the proposals, signed by at least five full members of the Grotto in good standing. The vote upon these amendments shall be by written ballot and amendments shall be adopted only by a favorable vote of two-thirds of the full members. All amendments take effect immediately upon their adoption, unless otherwise provided in the amendments themselves.

ARTICLE XII - PARLIAMENTARY PROCEDURE

In all instances not covered by this Constitution or the By-Laws, Robert's Rules of Order, Revised, shall prevail.

BY-LAWS OF THE GLACIER GROTTO

ARTICLE I. MEMBERSHIP

SECTION 1. Full membership is limited to Regular or higher members of the N.S.S. and Regular-Dependent members 17 years and older.

SECTION 2. Associate membership shall be open to any persons interested in speleology and cave conservation.

SECTION 3. All members present at the adoption of the Constitution and By-Laws of this Grotto are Charter Members.

SECTION 4. Applicants for membership shall file their application with the secretary accompanied by membership dues.

ARTICLE II. OFFICERS

SECTION 1. The President shall preside at all meetings of the Grotto and appoint such committees as he deems appropriate.

SECTION 2. In the absence of the President, or in case of his inability to act, the duties of the President shall be performed by the Vice-President. In the event of the resignation, removal or permanent disability of the President, the Vice-President automatically becomes President for the balance of the President's term. In that event, an election may be held to fill the office of Vice-President.

SECTION 3. The Secretary shall keep minutes of the Grotto, send out notices of meetings, have custody of the records of the Grotto and be in charge of receiving and responding to all correspondence received by or sent to the Grotto. The Secretary shall also perform those other duties that are generally performed by Secretaries of like organizations and that may be assigned by the President or Executive Council.

SECTION 4. The Treasurer shall collect the dues, send out notices of delinquency of dues, have custody of all funds belonging to the Grotto and shall keep the necessary financial records. The Grotto's financial records shall be audited annually by a member or person qualified other than the incumbent Treasurer.

ARTICLE III. EXECUTIVE COUNCIL

SECTION 1. The Executive Council shall have complete power to manage the business, to formulate By-Laws, to raise funds in any manner consistent with the policies of the N.S.S.; and to perform all other necessary functions.

SECTION 2. Decisions or actions of the Executive Council may be overruled by a 2/3 majority vote of full members.

SECTION 3. Meetings of the Executive Council shall be held at such times and places as are determined by the Council.

ARTICLE IV. MEETINGS AND ELECTIONS

SECTION 1. Regular meetings shall be held at time and place designated by the President, with the approval of the Grotto. Special meetings may be held at the time and place the President or a majority of the members or the Executive Council may designate.

SECTION 2. A quorum for the transaction of business at a regular meeting consists of 20 per cent of the members in good standing.

SECTION 3. A petition signed by 2/3 of the membership shall be mandatory upon the Executive Council to call a special meeting for the purpose stated in the petition.

SECTION 4. A Nominating Committee shall be appointed by the President at the January meeting and the committee shall present its nominations at the February meeting. Nominations from the floor may be made at the February meeting. Both the Nominating Committee and a member making a nomination from the floor shall give assurance that the person nominated will accept the office if elected. Elections shall be held at the March meeting each year. Newly elected officers shall be installed at the April meeting. Unless otherwise provided by vote of the membership.

ARTICLE V. DUES

The annual dues for regular members shall be \$3.00 per year. Members who are dependents need only pay \$1.00 in annual dues. Dues will cover the full calendar year and those members joining for the first time after October 1. will be considered paid in full for the following year.

ARTICLE VI. CENSURE: SUSPENSION OR TERMINATION OF MEMBERSHIP

SECTION 1. Membership may be terminated by a) voluntary resignation; b) failure to pay dues; c) exclusion for unethical, dishonest or other improper conduct.

SECTION 2. A member may be censured, or a member's membership may be suspended, for conduct unbecoming a member with the concurrence of two-thirds of the members in good standing present at a regular meeting. Suspending of membership privileges may occur only on recommendation of the Executive Council and then only for a time certain.

SECTION 3. Termination of membership occurs only on recommendation of the Executive Council with the concurrence of three-fourths of the members in good standing. At least 15 days notice in writing shall be given to the individual concerned. The individual charged with conduct unbecoming a member and whose membership privileges have been proposed for suspension or whose membership is proposed be terminated has the right to respond orally or in writing before the Executive Council before the vote is taken on the proposal to suspend or terminate membership at a regular meeting.

ARTICLE VII. AMENDMENTS

Proposed amendments to the By-Laws shall be submitted in writing to the Secretary, who shall refer the proposed amendments to the Executive Council for its consideration and recommendation before the next regular meeting. A two-thirds vote of the full members in good standing shall be necessary to adopt any amendment to these By-Laws.

This description of the Chitistone and Nizina Limestones is taken from "Geologic Map of the McCarthy C-4 Quadrangle, Alaska" by E.M. MacKevett, Jr., an accompaniment to U.S.G.S. map GQ-844.

CHITISTONE LIMESTONE

The Chitistone Limestone was named by Rohn (1900, p. 425). It crops out in the southwestern part of the quadrangle, where it is as much as 900 feet thick, although its base is not exposed. Elsewhere in the southern Wrangell Mountains the Chitistone Limestone disconformably overlies the Nikolai Greenstone. It is gradationally overlain by the Nizina Limestone. Beds in the Chitistone Limestone are between 1 and 20 feet thick. They are light or olive gray and, uncommonly, medium or dark gray; they weather light or medium gray or light or yellowish brown. The formation forms bold outcrops and cliffs and in places contains caves and other solution cavities. It consists of limestone with less abundant dolomite, dolomitic limestone, and chert. The dominant carbonate rocks include limy mudstone, packstone, wackestone, and grainstone (terminology of Dunham, 1962, p. 117). They mainly are characterized by scattered bioclastic fragments and by pellets of limy mud that locally are cemented by carbonate minerals or by younger limy mud. Rare constituents of the carbonate rocks include quartz, opaque minerals, and clay minerals. The chert forms nodules less than 6 inches long and uncommon inter-lacing networks. Veinlets of calcite and uncommonly quartz transect parts of the Chitistone Limestone.

Some of the Chitistone Limestone is difficult to distinguish from the Nizina Limestone. Generally the Chitistone Limestone is thicker bedded and lighter colored and contains more dolomite and less chert than the Nizina Limestone.

The Chitistone Limestone was deposited in shallow seas, in part in intertidal, supratidal, and shoaling environments (A. K. Armstrong, oral commun., 1968). Its Late Triassic age is documented by fragmentary remnants of the ammonite *Tropites* (identified by N. J. Silberling, written commun., 1965), indicative of the late Karnian Stage.

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- NIZINA LIMESTONE
- The name Nizina Limestone was applied by Martin (1916, p. 693) to predominantly thin-bedded limestones that previously were relegated to the upper part of the Chitistone Limestone. The Nizina Limestone is exposed locally in the southwestern part of the quadrangle, where it attains a maximum thickness of 400 feet. Its contacts with the underlying Chitistone Limestone are broadly gradational, difficult to map with fidelity, and regionally transgress time boundaries.
- The Nizina Limestone conformably underlies the lower member of the McCarthy Formation or unconformably underlies the Kennicott Formation and is cut by a few small Tertiary plutons. Its characteristic beds are 1/2 to 2 feet thick, medium or dark gray when fresh, and brown or brownish gray when weathered. The formation contains moderate amounts of erosion-resistant black chert that forms irregular nodules as much as 6 inches long, extensive lenses as much as 6 inches thick, and coalescing tuberous aggregates. Commonly the formation forms moderately rugged outcrops.
- The Nizina Limestone is mainly lime mudstone, pelletaloid grainstone, and fine-grained wackestone (terminology of Dunham, 1962, p. 117). These rocks are intergradational and include relatively undisturbed lime mudstones, rocks characterized by disarrayed aggregates of lime mud, and rocks that contain fairly abundant mud-supported bioclastic fragments. Their typical clasts are calcareous and derived chiefly from echinoderms, crinoids, and pelecypods. Less commonly the clasts comprise quartz, dolomite, and siliceous spherical or rodlike remnants of microfossils. Argillaceous minerals and scattered opaque minerals are lesser constituents of the Nizina Limestone. Quartz or calcite veinlets cut parts of the formation.
- The Nizina Limestone was deposited in a shallow marine environment, generally in deeper water than the Chitistone Limestone (A. K. Armstrong, oral commun., 1968). It is Late Triassic in age. No diagnostic fossils were collected from the Nizina Limestone in the C-4 quadrangle, but fossils from Nizina Limestone in the adjacent McCarthy C-5 quadrangle indicate the late Karnian, early Norian, and early middle Norian Stages (N. J. Silberling, written commun., 1963).
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