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Richard A. Hall

THE ALASKAN CAVER

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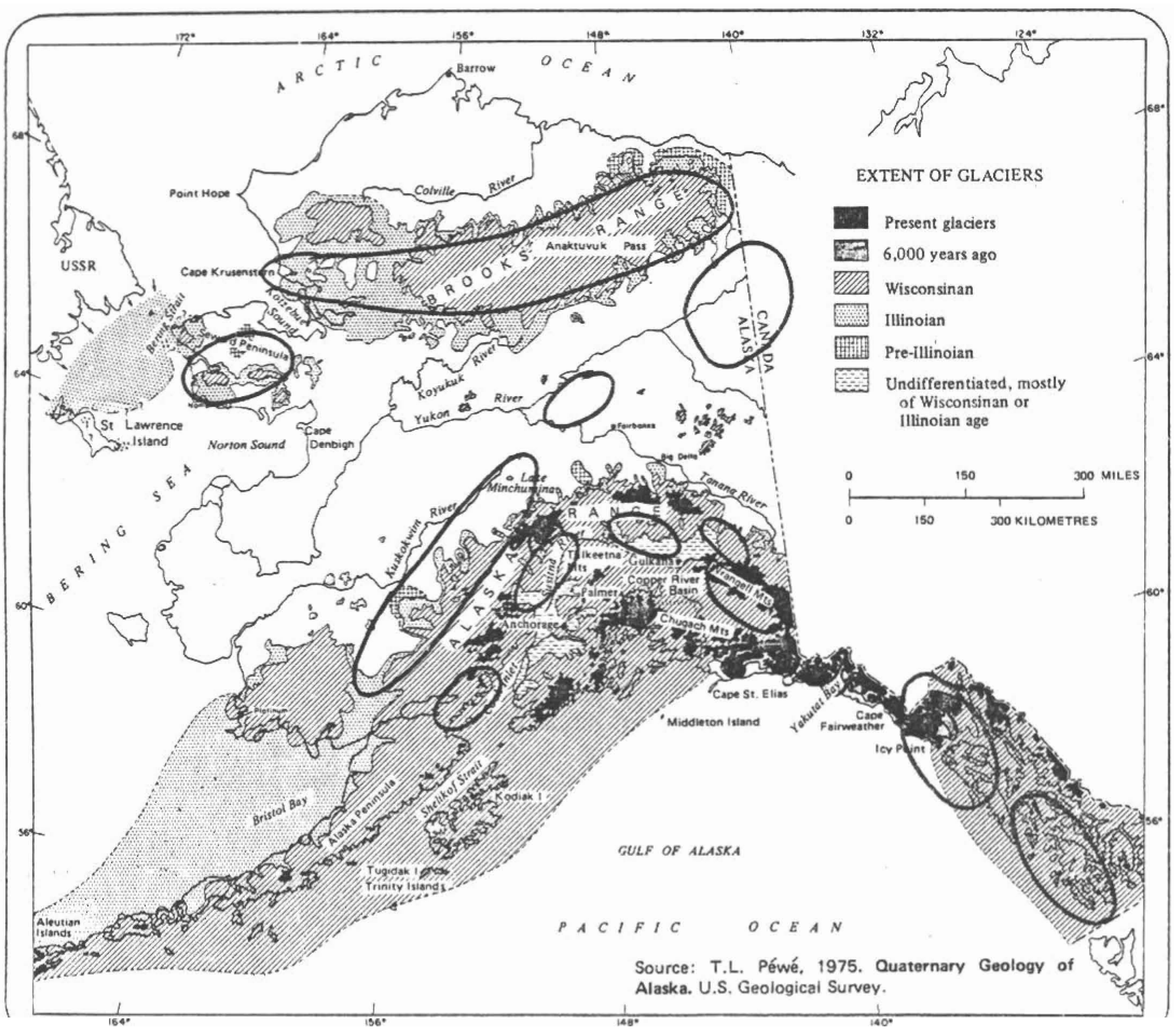

Glaciated and Limestone Areas in Alaska

CALENDAR OF EVENTS

August 16-17	Possible trip to check out Devonian Limestone in the Mentasta Lake area. Check with Rich Hall if you are interested.
August 21	Glacier Grotto Meeting. The program will be an NSS slide show on Caving Safety. Meetings are held in room 312 Grant Hall, Alaska Pacific University at 7:30 pm.
Aug.24-Sept.1	Annual Labor Day Chitistone Valley cave trip. We will fly in from Gulkana (about $130 each) and spend our time roaming the hills and walking, or crawling as appropriate, into any holes we find. We hope to enter Buckgrind Cave by putting in a bolt if necessary. Someone with climbing experience is especially welcome; two thousand foot cliffs are available for climbers but climbing or caving skills are not required for the trip. Contact Rich Hall at 333-2090 for more information.
September 18	Glacier Grotto Meeting. The program will be slides of our July White Mountains trip. Meetings are held in room 312 Grant Hall, Alaska Pacific University at 7:30 pm.
October 16	Glacier Grotto Meeting. The program will be an NSS slide show on Ellison's Cave in Georgia.
November 20	Glacier Grotto Meeting.
December 18	Glacier Grotto Meeting. The program will be an NSS slide show on "Fundamentals of Caving".

The ALASKAN CAVER is a periodic publication of the Glacier Grotto of the National Speleological Society. Subscriptions are free to members. Membership dues are $3 per annum. Dues can be sent to Jay Rockwell at 2944 Emory St, Anchorage, AK 99504.

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GROTTO OFFICERS

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A CAVE IN LONG ORDER?

When Carlene and I moved to Haines, AK we felt we were destined to be as all other Alaskan cavers; content crawling in shelter caves, under boulders and the like. We had found glacial deposits of limestone and marble but didn't know where they came from. Our only geologic map drafted probably in 1916 was totally out of whack and an attempt on my part to check a "very deep" fissure had resulted in failure; on the third attempt after several miles of canoeing and more miles of steep hiking through brush, it proved to be only 15 feet deep. I was so frustrated and weighed down with all the vertical gear (200 foot of rope), I didn't even enter. continued on page 7

GLACIER GROTTO MEMBERS AND FRIENDS

The following list includes full members (those who maintain a current membership with the NSS as well as the Glacier Grotto) designated "**", associate members (Glacier Grotto members who are not current NSS members) designated "*", and friends including ex-members and others who have shown an interest in our activities. If you know anyone who would like to become a member or to correct any of the listings please contact Jay Rockwell or Rich Hall.

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ALPINE KARST*

The NSS Bulletin of July 1979 (vol 41, num 3) contains several papers from a symposium entitled "Geomorphology and geohydrology of alpine karst terrains of the Rocky Mountains" held at the annual meeting of the Geological Society of America in Denver on November 8, 1976. Although Alaska was not included in the issue, knowledge about alpine karst in the Rocky Mountains of the Lower 48 States and Canada can probably be extended to parts of Alaska and would be helpful in cave exploration here. In order to discuss alpine karst it must first be defined; the opening article by Eberhard Werner of West Virginia University explains "A working definition has been largely developed by concensus among the various investigators. If we look at the various terrains, we see that an alpine karst is one which is at high altitude, normally at or above tree line, and where all surface water is frozen for an extended period every year"(p51). Correlative attributes listed by Werner include high hydraulic gradients, lack of or a thin, fragile ground cover, relatively recent glaciation, and severe weather. Limestone solution tends to be uniform over bare rock surfaces rather than concentrated into streams which form cave entrances.

Although there are some differences due to local lithology, topography, precipitation patterns, and types and location of caves and karst features in different areas, there are many similarities in the karst regions described in the six articles. The areas of concern are generally 7000 to 10000 feet above sea level. They have had varying degrees of glacial activity with the Canadian Rockies having more than the U.S. Rockies. Thickness of the strata containing calcarious rocks range up to 3000 feet thick. In some cases the consistancy of the rock is pure, massive, crystaline limestone while in others the main calcarious rock is dolomite and in other cases it is interbedded with chert, shale, sandstone, or other non-calcarious rocks up to 1000 feet thick.

The authors consistantly divided their caves into two basic groups; pre-glacial and post-glacial which means older caves and newer caves. Although there are similarities in their nomenclature, the authors had different groupings and names for the various permutations of karst and glacial phenomena including glacially modified karst features and karst modified glacial features.

Post-glacial caves are typically small, vadose, and joint or fault controlled. Where there is high recharge from non-calcarious rocks at higher elevations, caves are more often enterable at the insurgence than when the limestone is at the top of the mountain or on an open shelf. When there is no recharge from above, the water falls into enlarged joints and cracks scattered over the face of the rock which are usually too small to enter. When the enlarged joints are large enough to enter, they are generally vertical pits which drop either straight or in steps until a less permiable layer of rock is encountered after which the water runs down dip along the base of the limestone. Such pits are usually full of dirt, rubble, or snow and the water soaks through the bottom. Only a very few of these pits contain caves. Most of the pits are on leeward slopes because there are snowdrifts where snow piles up all winter providing a continuous supply of high carbon dioxide content water during the summer. James Wilson, in his article, "Glaciokarst in the Bear Range, Utah" (p93), graphed three dozen karst features and snow

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*analysis and condensation of Alpine Karst Symposium from "The NSS Bulletin" V 41 # 3.

patches showing that the majority fall between N5E and N90E which is the quadrant on the leeward side of the mountains where snow collects and also on the north side of the mountains where snow melt is more gradual and hence there is a source of water over a longer period. Enterable caves are more likely found at the resurgence end because many small sources of water have merged into one more powerful stream. However, being able to find this end is very dependent upon the amount and kind of glacial activity. Where glaciers left deep piles of gravel and fill, the water sometimes rises through the soil in springs.

Pre-glacial caves are typically larger than post-glacial caves and are usually not related to current topography. Some caves in Canada even carry water through mountains across the continental divide. Upstream entrances occur on hillsides or hilltops as often as in blind valleys or sinks. Cave entrances and sinks are often filled with alluveum and even perennial snow and cave passages are sometimes choked with boulders, gravel and clay deposited by glaciers. Because of glaciers eroding and/or filling, springs are sometimes high on cliffs, sometimes under piles of talus and debris, and almost never at ground level. These caves sometimes have active streams but often are dry. They are of phreatic as well as vadose origin.

Locations that the authors considered more favorable for caves in alpine karst were very consistant and, with a few additions, follow the usual lines for cave exploration in other terrains. Thick, massive, crystaline, resistant limestone is better than dolomite. Syncline axes are more likely locations than elsewhere. More water from runoff uphill or, in alpine areas, from a nearby snowfield creates larger caves. A high hydrolic gradient was sometimes preferred to flatter land. (It gives the water more physical power but does not allow the water to disolve as much rock). The more glaciated the area is, the less chance of finding pre-glacial caves; some were destroyed and some are covered or filled. Cirques in limestone are also good locations because they pool the water to give it more concentration. Contrary to cave development theories in warmer climates where vegetation is believed to increase the carbon dioxide content of the water and thus its ability to disolve limestone, surface cover of vegetation or even a thin layer of soil in alpine karsts restricts karst and cave development. Limestone, capped by a non-calcarious rock layer where water can enter uphill from the cap has been found to form larger, more uniform, caves than where the limestone is exposed everywhere. Bare limestone in alpine areas results in many small swallow holes rather than large entrances. In his article "Karst Devcelopment on the White River Plateau, Colorado" (p95), Mark Maslyn describes pre-glacial caves protected by a shale cap which are no longer related to the post-glacial topography.

Because about 60 percent of Alaska was covered by glaciers at some time and because most of the potential cave areas in the state are in these glaciated locations, it would be worthwhile to compare the terrain in Alaska with those discussed in the Bulletin. The glaciated limestone areas in Alaska range from sea level to over 15000 feet in elevation. The map on the cover is Figure 91 copied from "Alaska Regional Profiles",by State of Alaska; general areas where caves may exist have been circled on the map. Since the real criterion was high hydrolic gradient rather than elevation per se, these glaciated areas, such as in the Wrangell Mountains and the Brooks Range, fit the definition of alpine karst even though they are at lower elevations. Both of these areas are known to have hanging waterfalls coming from cave entrances which is a common feature in alpine karst. Star Cave (see picture and story in Alaskan Caver Vol 3 Num 2) is a prime example of a hanging waterfall 500

feet above the floor of the glacially scoured Chitistone Valley. Limestone is, in fact, still deeply covered by glaciers in several parts of the state.

However, there are areas of limestone that have not been glaciated such as north of Eagle, in the Kuskokwim River valley and in the White Mountains, where limestone pinnacles, a common feature in non-glaciated areas, are seen. These non-glaciated areas, however, are not like other non-glaciated limestones in the country. They are at a higher latitude which means that the ground is frozen much of the year and the elevations range from 1000 to 5000 feet which is similar to many possible alpine karst areas in Alaska. The reason that glaciers did not form in these areas is that the weather in Interior Alaska is much dryer than on the coast. Because there is less precipitation, cave development would be slower but snowbanks provide some water well into summer. However, caves developed before glaciers formed elsewhere in North America would not have been destroyed by glacial scouring here.

There are also glaciated limestone regions that do not exhibit alpine karst in Alaska. The best examples are the Chichagof and Craig areas in Southeast Alaska. Although the glacially scoured mountains provide high hydrolic gradient, the climate is milder than in alpine areas and the ground is densely covered with temporate rain forests. Snow does not remain long in the summer except at higher elevations.

Despite variations in the different reports on alpine karst and despite some basic differences in karst in Alaska, it is evident that alpine karst exists in some Alaskan locations and cave/limestone relations developed in other states and Canada can be very useful in the search for Alaskan caves.

Rich Hall

con't from p 2

Our first break came almost two monthes after we arrived. A recently written geological report arrived in the mail; a gift from Rich Hall. It showed massive marble deposits in the area! It was only a week after we got the report when I happened to be in the area of some of the marble and asked a local about caves. To my surprise he described a cave with whistling wind noises adjacent to a lake which he had entered for some distance at low water! More select investigation took us to an old prostector who revealed the same lead plus the best way to get to it.

About this time I was, one day, in the lounge of a motel in town and became terribly interested and horrified at a pile of speleothems on a window sill. It was even more interesting to find that they were of local origin and the fellow (William McCarlstrum) who had just brought them in resided in the motel. I only had some brief discussions with him before he suddenly moved to Ketchikan. (By the way, he did mention a 1-3 thousand foot deep pit of volcanic origin near Ketchikan.) I also got another copy lead describing the same cave at the lake from him and also was told of other caves in this area.

On a day off work I found myself 30 miles from Haines, chopping my way through devils club and heading for "Cave Lake Cave". Suddenly I broke out into the open and stared at the yawning mouth of a cave! It is in the face of a cliff which rises up from one side of the lake. About 10 feet of the entrance was above water and perhaps as much submerged. I noted water lines on the cliff showing that spring runoff fills the lake to a height of at least six more feet each year. I began to understand why there is little surface water in the area.

In the coming months it is likely there will be more people met and more caves located here. As for Cave Lake Cave, we can hardly wait till late summer.

Kevin Allred

PEOPLE

Sydney and Stan Jenkins are leaving the state (they assure me temporarily) for North Carolina and/or Florida and/or California. We will miss them. Sydney was the first Glacier Grotto Treasurer.

Kevin and Carlene Allred have moved to Haines, Alaska from Washington State. They would very much like to set up a trip to Rust Creek Cave in the Whitestripe Limestone on Chichagof Island but I'm sure they'll try any cave down there that you can find. Obviously they have found something as evidenced from Kevin's article on page 2. Drop them a line if you are interested in caving in Southeast Alaska(address p 3).

I've got some non-caver friends floating on the Porcupine River and through Devils Canyon this summer so I put them on Cave Alert; I asked them to keep their eyes on the lookout for anything that looks like a cave. If you or a friend are floating or hiking somewhere you can check with me about limestone or known caves in the area so you'll know where to look. Rich Hall 333-2090.

COOL CAVES

According to the Associated Press tourist visits to Mammoth Cave National Park are up thirty percent over last year. The Park Superintendent said he was not sure whether the heat wave in the area and the fact that the cave temperatures are only 54 degrees in the cave was a cause of the increase.

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NEWS - DATED MATERIAL