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Chuck Pease

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T H E

A L A S K A N

C A V E R

Volume 1

Number 2

April - December 1970

This publication is distributed free to interested cavers in Alaska first and then to "Outsiders" as long as the supply lasts. The first issue of THE ALASKAN CAVER was only a three page xeroxed copy. Response to the first issue was rather poor and therefore only twenty-five copies of this issue were xeroxed. The publication of this newsletter on Alaskan caving will continue as long as there is any interest shown by cavers both here and in the "lower 48", however, THE ALASKAN CAVER will have no set frequency of publication. We would still greatly appreciate any articles from any of our readers. This issue contains a real nice article compiled by Bill Halliday of Seattle. This is the type of material we are looking for, also any trip reports concerning caves here in Alaska. The editor has recently been married and near the end of April 1971 will leave for twelve months in Thailand. He will be returning to Alaska as soon as possible - to stay!

Edited by

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CAVES AND POTENTIAL CAVE AREAS OF ALASKA

BY Bill Halliday

As every Alaska-based spelcologist knows all too well, the speleological potential of this largest state has received little attention. Various factors mentioned below are partially responsible for this. Of particular significance is the fact that the most celebrated of Alaska's caves are outside the mainstream of American and world speleology. These are the burial caves of the Aleutian Islands, reported at least as early as 1878 (Dall, 1878) and given wide notice by Hovey in 1882. As nearly as can be determined by Hrdlicka's excellent anthropological report (Hrdlicka, 1941), none of these is of more than slight speleological interest with the possible exception of what may be crusted fumarole. While some may be of littoral origin, most seem to be talus caves or rockshelters.

Perhaps the next most celebrated Alaska caves are the crusted fumaroles of the Katmai National Monument area, repeatedly mentioned in National Geographic Society publications (Griggs, 1922). To date, speleologists seem to have left this type of cavity entirely to vulcanologists.

Regarding caves of the four major types - limestone solution, lava tube, glacier and littoral - National Speleological Society members have published or filed brief reports when temporarily employed or stationed in Alaska. Throughout the 1960's, a low-priority information search was conducted by the Cascade Grotto of the NSS and by the Western Speleological Survey, with collection of a medicum of data especially from personnel of the U.S. Geological Survey. To date, however, the most notable single published report on Alaska speleology remains that of Hackman (1949) despite its limitations in area and extent of investigation. With a recent upsurge of interest in glacier caves, lava tube caverns and pseudokarst in general, the stage appears set for a burgeoning of interest in Alaska speleology.

In the following report, each major type of cave will be considered separately. In some cases, insufficient information has come to hand for certainty in classification (i.e. is a cave in the littoral zone of a limestone shore of solutional or littoral origin). Corrections and additions would be welcomed by both the author and THE ALASKAN CAVER.

ALASKA LIMESTONES AND SOLUTION CAVERNS THEREIN

Contrary to some published statements, much limestone is present in Alaska. Figure 1, showing a reconnaissance map of limestone deposits in southeastern Alaska, probably minimizes the total; similar maps of other areas in the same report (Hodge, 1944) show only a small percent of those recorded by later, more intensive studies. Limestone also crops out extensively on the Seward Peninsula and in several interior ranges. A deposit in Mount McKinley National Park in close proximity to the Alaska Railroad has received undue publicity because of that proximity. A 1930 U.S. Geological Survey reconnaissance map of northwest Alaska shows outcrops of Silurian Skajit Limestone and Carboniferous Lisburne Limestone seemingly hundreds of miles long, running roughly east-west across the Brooks Range from Cape Lisburne and Cape Lewis to and beyond Anaktuvuk Pass. From the map, these outcrops appear to vary from one to ten miles in width. From this map, it appears that regions near the mouth of the Kivalina and Noatak Rivers, the upper Noatak River, the Alatna River and the canyons north and south of Anaktuvuk Pass are particularly enticing to cave hunters.

Much of Alaska's limestone has never been viewed by a spelcologist. Along the outheastern coast, access is entirely by boat or scaplane; once ashore the venturer s difficult bushwhacking and/or wallowing in muskeg. Between the railroad and the national park deposit is an unfordable river. Some outcrops near Nome are access- ible by jeep road, but Nome is isolated from the main Alaska road system. Although a few airstrips exist in the interior ranges, access to potential cave areas here is largely by helicopter, float plane or canoe.

The Hodge (1944) reconnaissance report on southeastern Alaska limestone recorded the following locations and descriptions:

"SOUTHEAST ALASKA COASTAL LIMESTONE TERRAIN

INTRODUCTION

Many limestone and marble deposits occur adjacent to the coast of southeastern Alaska, of which more than 56 locations are noted in this report. The infor- mation upon which this report is based is taken largely from government reports and except for Dall Island no commercial reports were available...the marbleized limestone is apt to be dolomitic and to carry injurious minerals...

The islands are tops of a submerged mountain range, and fronting the coast is the high barrier of the Coast Range, which is indented by long, deep fjords...

The marbles have resulted from the pressures induced by strong deepseated fold- ing of old rocks (Devonian and older) and have the effect of cross-cutting igneous rocks. Adjacent to the marble areas, however, are unaltered limestones, in many places, in great bodies and rarely of high chemical purity.

All of the limestone deposits herein recorded lie close to tidal waters. Many of the limestones outcrop as cliffs on the shores of sheltered waters...

Limestone occurrences which appear from the record to be large (among those shown on Figure 1 - MRH) and to have a purity of over 98% CaCO_3 and where the estimated cost of delivery in bins at Portland will not be more than \$2 are shown below:

16. Herbert Graves Island, west of Chicagof, $57^{\circ} 40' \text{ N}$, $136^{\circ} 15' \text{ W}$. On southwest side of island opposite mouth of Kukkan Bay; Silurian limestone on (nearby) Edwards Island. Pure.
20. Kuiu Island in Kiky Strait. Permian limestone.
21. Beauclerc Peak and range of mountains along southwest side. Pure limestone.
21. (sic) Edwards Island in Port Beauclerc. Silurian limestone. High-grade. Thick.
22. Saginaw Bay, bluffs along east side opposite cannery. Pre-Silurian. 1,000 feet thick. Intercalated beds of chert.
22. (sic) Head of Saginaw Bay, on northeast side. Limestone cut by diorite dikes; strikes inland to SW. 96.62%.
26. Prince of Wales Island. Description starts at the NE, goes S, W and on around island. Adjacent islands mostly given separate descriptions. Clarence Sound (Strait) Islands, Kaswarcf Group, Screen Island. Silurian, pure, thick.

36. Calder Region. Limestone occurs in Calder Range and extends northward to Labouchere Bay. Vermont Marble Company. Elevation 100 feet at Calder Quarry on S, near head of Marble Creek. Limestone beds 100-1000 feet thick. Marble belt 3,000 feet wide strikes NW and dips SW, extends south across Dry Pass to Marble Island; cut off on NE and just back of Shakaan by granite. To NW crosses Calder Bay and reappears to N and beyond. Cut by diabase dikes. 99.26% CaCO_3 .

Dry Pass, 25 miles long, extends E from Calder and Shakkam Strait to El Capitan Strait. El Capitan Marble Company; Vermont Marble Company. Limestone occurs on two small islands and at the N side of the entrance. Pre-Silurian. Part of a large area covering Prince of Wales and adjacent islands. Strike N60E. Forms bluff 200-400 feet high. Cut by dikes which have marbleized adjacent limestone. Uniformly pure, white to blue-gray. Some quartz seams. Quarries at 100 foot elevation.

37. Labouchere Bay. Silurian limestone extends from Calder to Labouchere and includes Point Protection, Point Baker & Red Bay. Pure, thick.

38. Point Protection. East side.

38.(sic) Point Baker. Along coast and for $1\frac{1}{2}$ miles to east.

40. Koscuisko Island. Aneskett, easternmost point, $56^{\circ} 9' \text{ N}$, $133^{\circ} 16' \text{ W}$. Silurian limestone covers most of the island. Jointed and sheared, cut by dikes. Gradually changes to marble from Aneskett westward. Limestone dense, massive, nodular and shaly. 95-99% CaCO_3 . Large, thick. Quarries.

Sarhini (Darheen) Cove, west of Aneskett and on N side of island. Rocks are the same as above.

Klawak Passage, between Koscuisko and Calder. El Capitan Mining Company.

43. Marble Island, in Davidson Inlet and south of Koscuisko. Extension of Shakaan belt. Quarries present. Island 3 x 4 miles, maximum elevation 1528 feet.

Tokeen, northwest shore. Vermont Marble Company. Dark blue limestone altered to marble. Much pyrites. 81-99.51% CaCO_3 . Belt 2,500 feet wide extends SE across Orr Island. Much jointed, cut by andesite and porphyry dikes. Dips $38-40^{\circ} \text{ NE}$. Quarry near wharf.

Marble Island, SE of Token, $1-1\frac{1}{2}$ miles. Rocks as at Token.

43. (sic) Davidson Inlet and islands therein; south and SW of Marble Island. Head of Eagle Harbor. Thick, pure.

43. (sic) White Cliff, $55^{\circ} 55' \text{ N}$, $133^{\circ} 29' \text{ W}$. Thick, pure. Orr Island, between Davidson Inlet and Sea Otter Sound. Mission Marble Company. 95-99% CaCO_3 . Covers most of island, 25 feet above high tide level, much jointed. Dips steeply, strike NW, pure. Quarry at water edge.

7. Heceta Island. Mottled, fine-grained, dense hard limestone. 84-99% CaCO_3 , at edge small bay and 50 feet above high tide level at middle of N side of island.

46. Cordova Bay. SW side of Prince of Wales Island and between Prince of Wales and Long Islands; Barrier Island. Pure thick Silurian limestone.

49. Round Island. E side of Long Island, $54^{\circ} 47' N$, $132^{\circ} 32' W$. Two belts of pure thick Silurian & pre-Silurian limestone strike NW into Dall Island.

Dall Island. Northern part is called Quadra. Large volume of high grade rock.

50. Hawkon Village. Pre-Silurian limestone belt strikes NW to Waterfall Bay, grades into dolomitic marble.
51. View Cove. Pacific Coast Cement Company. Large high-grade deposit, quarry. Strikes NW to Cape Lookout.
52. Breezy Bay in Tlevak Strait. Belt strikes NW to Diver Island.
53. Diver Island.
54. Cape Lookout.
55. Waterfall Bay and Cape Augustine. Slightly dolomitic marble.
56. Port Bazaan.

Several of the less-pure deposits in the above are moderately dolomitic."

LIMESTONE SOLUTION CAVES IN THE HACKMAN REPORT

The following were listed by Hackman in 1949:

"Kosciusko Island. This island gives every indication of a great number of caves. The author visited about six while camped in the vicinity of Edna Bay. The location of one of these six was described to me by the superintendent of the now temporarily closed Juneau Spruce Mill Logging Camp. Upon looking for this cave I found five more in the same general locality. All are along the east face of a ravine and appear to belong to a chain-work of caves and underground channels that catch the overflow from a lake about a mile up the ravine. The ravine itself is dry at present but at one time must have been the main drainage of the lake before the caverns were hollowed out. Although the underground channel meanders some it does run roughly parallel to the ravine but at a slightly lower level."

At the time I visited the cave, which was during an unusually dry spell, there was no visible running water. There were, however, some deep pools in the cave, some over ten feet deep, and in one of them I chanced to see a twelve-inch fish swimming around. Whether high water had carried this fish into the pool, or whether it was a blind cave fish was not determined since upon a return trip with a net the fish was nowhere visible. The back part of the pool was a duck-under and the fish was either back there or had moved on to another part of the cave through some nonvisible channels. (Island is 26 miles long - CRP).

Near Cape Pole and on the homestead of one "Pike Pole Slim" is a small cave which runs about seventy-five yards into a low bluff. The cave has a small stream in it and the owner has formed an entrance and

Baker Island. The island is almost completely of limestone and a mining engineer that made a study of the deposits on the island stated that traveling on it was dangerous because of the many sinks, caves and pits. (Island is 15 miles long - CkP).

White Cliff Island. Running into the face of a vertical limestone cliff and about ten feet above the water's edge is a small cave that runs about fifty yards into the face of the cliff and ends up in a series of small chimneys. (Island is one mile in diameter - CRP).

Orr Island. On the central eastern side of this island and behind a small offshore island is a cave that runs into the face of the cliff and has a small stream in it. (Island is 7.5 miles long - CRP).

Coronation Island. Folklore Cave. The folklore of the Tlinket Indians gives the raven as the principal deity and ancestor of their race. The story goes that 'way back in the days of creation, and before he started his line of descendants, the raven wished to make the seas safe for his people. Therefore, selecting as a meeting place a cave on the island which later was named Coronation Island (named in honor of the anniversary of the coronation of George III - CkP), he invited all the terrible monsters of the deep and when they had all assembled in this cave, he cast a spell on them that they might never be free to molest his people. And today when one visits this cave the monsters are all there to be seen. This story was told to me by Joe Demrit, the local Indian who told me of the burial cave. Joe is part Tlinket and has visited the cave. He states that there are considerable formations in the cave and that it was probably the shape of some of these that inspired the imagination of the early Indians to associate them with terrible monsters of the deep. The author did not have an opportunity to visit this cave since it was a considerable distance from where we were working at the time. (Island is 10 miles long - CkP).

Heceta Island. This island is mostly of limestone and has a considerable number of sink holes on it, some of them filled with water and forming picturesque lakes. There is a large cave entrance in a sink hole about half-a-mile inland from the east side of Port Alice. The cave has an underground stream in it and is believed to drain a sink hole lake farther up the way. And just offshore, seen at low tide a large spring gushes out of the ground and is about eighteen inches across. It is believed to be a part of the same drainage system. The author talked with some geologists who were working on the island and they said they had seen some cave entrances but had not investigated them any further. (Island is 15 miles wide - CRP).

There is considerable Indian lore tied up with many of the caves in this area, and my first clue to such a find came early in the summer while I was in Craig, Alaska. Here I heard of an Indian burial cave that was discovered by two trappers about ten years ago (i.e. 1939). The cave is located on the south side of a small inlet not far from the northern end, and on the west side, of Dall Island. The story goes that the two trappers found two mummified Indians in this cave. The remains were in a sitting position, wrapped in woven cedar mats and resting in hewn cedar boxes whose sides were held together by twisted bark rope of the same type of wood."

National Speleological Society files list these as follows:

Alice Cave (the cave on Keceta Island, near Port Alice)
Fish Cave (the cave on Kosciusko Island with slight record of a fish)
Folklore Cave (the cave on Coronation Island, so listed here)
Orr Cave (the cave on Orr Island)
Pike Pole Slim's Cave (the cave on Kosciusko Island on the homestead thereof)
White Cliff Cave (the cave on White Cliff Island)

At the time of his pioneering report, Hackman was employed by the U.S. Geological Survey. As mentioned, other USGS personnel have reported the existence of caves in other areas. David M Hopkins (written communication, 1961) has noted the presence of caves and karst in the extensive limestones of the Seward Peninsula, on Boulder Creek, a tributary to the Sinuk River, on the Kwiniuk River, and at Willow Creek in the valley of the Nome River... One set, on Trail Creek, a tributary to Cottonwood Creek which in turn flows into the Goodhope River, has yielded some very important Eskimo material". These caves are stated to have been subjected to intense frost action, and the most extensive is "a few hundred feet long". This correspondent added: "I saw some very small caverns in the Port Clarence limestone in the York Mountains last summer and there are many karst pits in an old marine terrace in front of the York Mountains. C.L. Sainsbury, who worked in the York Mountains last summer, tells me that nevertheless good caves are rare there. There are also sinkholes in a limestone area inland from Cape Woolley on Seward Peninsula but I know of no caves".

On Chichagof Island, karst is well developed in the Rust Creek area. The creek flows "for a considerable distance" through a cave which is 30 feet high and 40 feet wide at the upper entrance (Reed & Coats, 1941).

In the Western Speleological Survey file is a report of a cave at Fylus Bay on Admiralty Island in which Indians in historic times found about a dozen bears hibernating and "harvested" them. Its listing here is only tentative.

LAVA TUBE CAVERNS AND POTENTIAL AREAS OF THEIR OCCURRENCE

It is likely that Alaska contains many more lava tube caverns than those recorded to date. One ("Baltzo's Cave") is located on the southwest flank of the higher point of Bogoslof Hill on St. Paul Island in the Pribilof group. The only known exploration party after penetrating about 200 meters toward the summit crater turned back; local Aleuts are superstitious and will not enter the cave. Breakdown is scarce and flow features are prominent. (Baltzo, Howard, written communication, 5-4-68). Somewhat similar superstitions are reported concerning "The Devil's Mouth" on Nunivak Island (Stevens, Robert W., oral communication, 1970). This is tentatively listed as a lava tube cavern; collapsed lava tube are present nearby in the Ibikwit Lava Bed and an unnamed lava bed south of Nanswakjiak Crater (Hoare, Joseph M., written communication, 12-29-64). David M. Hopkins reports (written communications, 10-6-61 & 12-29-64) "a number of lava tubes" in the Lost Jim flow north of Mt. Bandeleben and south of Ileruk Lake on the Seward Peninsula. "Some of them can be penetrated to depths of several tens of feet below the flow and for horizontal distances of a hundred feet or so; possibly with proper lights it might be able to penetrate them more extensively". Joseph T. Hoare has reported some smaller lava tube caves near Unalakleet, "in the very young flows which came from a small unnamed cone between the Andreatsky River and The Sisters... The tubes are only 2-5 feet deep and a few feet wide". He believes that larger lava tube caverns may exist in larger flows nearby.

LITTORAL CAVES IN ALASKA

In contrast to some other parts of the world, the study of littoral caves has lagged in the United States. With the exception of those archeologically important caves, this is also true of Alaska where their number is probably immense and the potential for their study perhaps unexcelled.

To date, only a few littoral caves have been recorded. The following caves mentioned by Hackman are tentatively listed as littoral:

Coronation Island. "... many giant sea caves along the coast. One fisherman told me that on a calm day he ran his fishing boat into one of the larger caves. These trolling boats are usually about 50 to 60 feet long and about as high... an abundance of bird life... One can fire a gun near the entrance of one of these caves and thousands of birds will fly out."

Baker Island. "... a large blow-hole cave on a point to the northwest..."

Noyes Island. "Along the rocky Cape Addington... are several caves. One consisted of two caves which have a talus slope in between them and when viewed from out at sea gives the appearance of a large wolf head. Another cave nearby is at the base of a high cliff and has a picturesque lake in it. Farther to the north and up the coast is a cave that runs through the cape, which at this point is about a quarter of a mile across... There are other sea caves along the western shore of the island proper."

Kosciusko Island. A rumored cave with petroglyphs on the NW side of Shipply Bay; type uncertain.

These caves are listed in the files of the National Speleological Society as follows:

Coronation Island:	Sea Fowl Caves.
Baker Island:	Blow Hole Cave.
Noyes Island:	Wolf Face Cave.
	Cliff Cave.
	Addington Cave.
Kosciusko Island:	Petroglyph Cave.

Hackman also recorded mention of a burial cave at the NW tip of Dall Island, where a littoral cave would be likely. The files of the Western Speleological Survey contain unverified rumors of a Buried Treasure Cave on Kuiu Island, probably on the south side, and of a small littoral cave near Kewalik. The caves on King Island where walrus meat was formerly stored (Spring, 1967) may be littoral.

ALASKAN GLACIER CAVES AND GLACIAL PSEUDOKARST

Alaska appears to have an extraordinary potential for this newly recognized subdivision of speleology. In retrospect, it is surprising that only now is interest burgeoning in glaciopaleospeleology. Since the turn of the century, the Malaspina Glacier near Yakutat has been known to contain large probably lengthy caves (Russell, 1897), apparently still unexplored. Some of these caves may extend the entire width of this glacier. Russell reported that "the course...

can in some instances be followed for miles, by listening to the muffled roar of the rivers rushing through ice caverns far below the surfaces". Somewhat puzzlingly he added: "One can sometimes penetrate a great distance" (into these caves) but specifically stated that it was necessary "to infer what takes place within the tunnels" and it appears that the only Malaspina Glacier caves which he explored were short upper-level glacial caves "from one deep valley to another" which he used to "avoid a steep climb over moraine-covered ice".

To date, the most intensive glaciopelological studies in Alaska are those of Reed (1970) and his student Clayton (1964) of the Martin River Glacier, located about 60 miles east of Cordova. They found pseudokarstic phenomena comparable to all stages of the karst cycle. Englacial and subglacial caverns are present, but the entire topography is undergoing extremely rapid change. A large subglacial cavern about 12 feet in diameter, with two branches and nearly a mile of passage explored in 1962 was observed in the final stages of collapse in 1965. In another area, two interconnected sinkhole lakes and four nearby lakes emptied and refilled at a rate of about a million gallons per minute, on three occasions during the study, requiring about 5 hours to empty. The glacier here is about 300 feet thick and the subsurface channel is probably subglacial. On approaching the sink when the lower lake was empty, an impressive roar was audible deep below. Periodically, very loud noises like explosions were audible. When the noise stopped, the system began to refill at an equal rate. Other lakes in the area similarly drained and refilled periodically on a less spectacular scale. Each summer, intermittent torrents burst from the snout. Sometimes the discharge occurred by a fountain 20 feet high, active as long as a week. The events described are notably reminiscent of limestone speleogenesis at a tremendously accelerated scale.

In the Juneau area, a less dramatically emptying glacier lake drains into a cave located near Camp 17 on the Juneau Icefield, in the Lemon Creek Glacier between Cairn Peak and Observation Mountain. Maynard Miller explored this cave for about 200 feet several years ago; recently it was explored for about 300 meters by Ross Mack (oral communication, June 24, 1970) and found to narrow to impassability along a stream slot. A similar lake near Camp 10 at Icy Basin, in the south col of Vantage Peak, may also drain into a cave. Old postcards are known of a large glacier cave in the snout of the Mendenhall Glacier.

Glaciers in South-Central Alaska are also known to contain caves. Caves in the Byron Glacier have been studied recently by Pease (1969). Two orifices coalesce after a short distance, forming a 600 foot cave averaging 15 feet wide and 7 feet high. Another cave consisted of a single large chamber. A third with a huge entrance is about 1500 feet long, averaging 25 feet wide and 9 feet high. As of September 1970, this latter cave was no longer accessible due to the collapse of the first 150 feet of passage! Eklutna Glacier contains a single large chamber cave that is the head of Eklutna River. One quarter of a mile up the glacier is a 100 foot plus pit with a good size stream going underground at this point. This pit is only 10 feet in diameter and due to the amount of water entering, it would be necessary to divert the stream prior to exploring. This shaft was seen two summers with no change noticed and appears permanent.

McKenzie (1969) explored a cave in the Adams Inlet Glacier of Glacier Bay National Monument less than 10 hours after it had suddenly evacuated. He was able to penetrate only about 36 meters. The glacier cave reported by Peterson and McKenzie (1968) in the Casement Glacier is a small cavity due to movement of ice over a bedrock protuberance rather than ablation as in the case of the other known Alaska glacier caves. Caves have been reported in the Gulkana, Jarvis and Gunnysack Glaciers east of the Richardson Highway and about midway between Fairbanks and Anchorage (Child, 1961), and in the Sunset Glacier of Mt. McKinley National Park (National Park Service, 1935). Hundreds of others probably exist.

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- My sincere thanks to Charles Pease Jr for bringing the Hrdlicka reference to my attention.

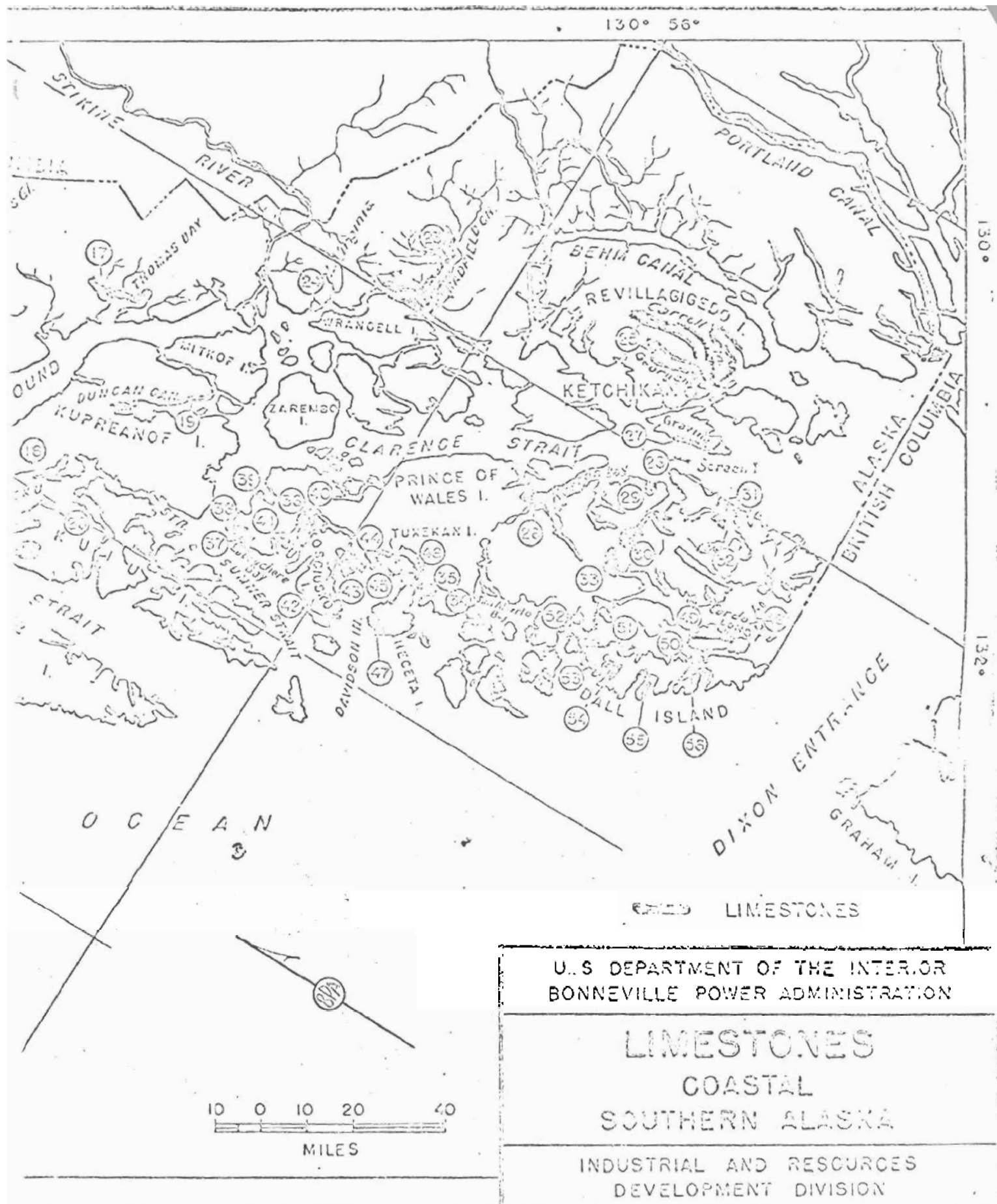


Figure 1

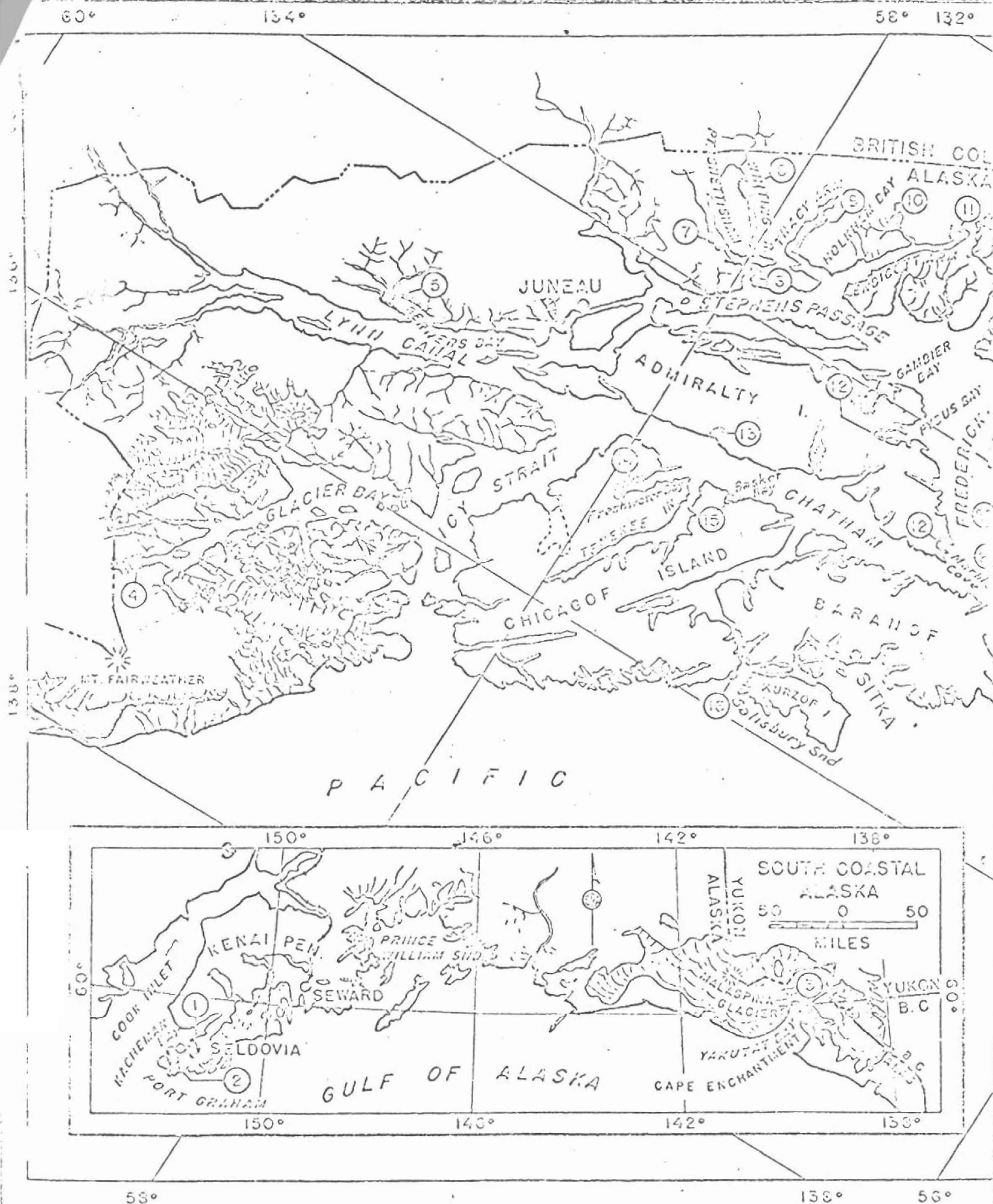


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Coastal Alaskan Limestone Terrain (Southern Alaska)

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38. Point Baker, Prince of Wales Island.
39. Red Bay, head of, Prince of Wales Island.
40. Aneskott, Kosciusko Island.
41. Shaskan Bay, Pyramid Peak, Kosciusko Island.
42. Edna Bay, southwest shore, Kosciusko Island.
43. Marble Island, Davidson Inlet, Tokoon, south of Kosciusko Island.
44. Our Island, also Heot, Green and Owl Islands, between Kosciusko and Prince of Wales Islands; also San Otter Sound.
45. Tuxekan Island, north side.

46. Stanley Island in Tuxekan Passage.
47. Neceta Island.
48. Barrier and Round Islands, in Cordova Bay, between Prince of Wales Island and Dall Island.
49. Long Island.
50. Hamken Village to Waterfall Bay, Dall Island.
51. View Cove, Dall Island.
52. Breezy Bay in Tlevak Strait.
53. Diver Island, in Mearse Passage off Dall Island.
54. Cape Lookout, Dall Island.
55. Waterfall Bay and Cape Augustine, Dall Island.
56. Port Bazan, Dall Island.