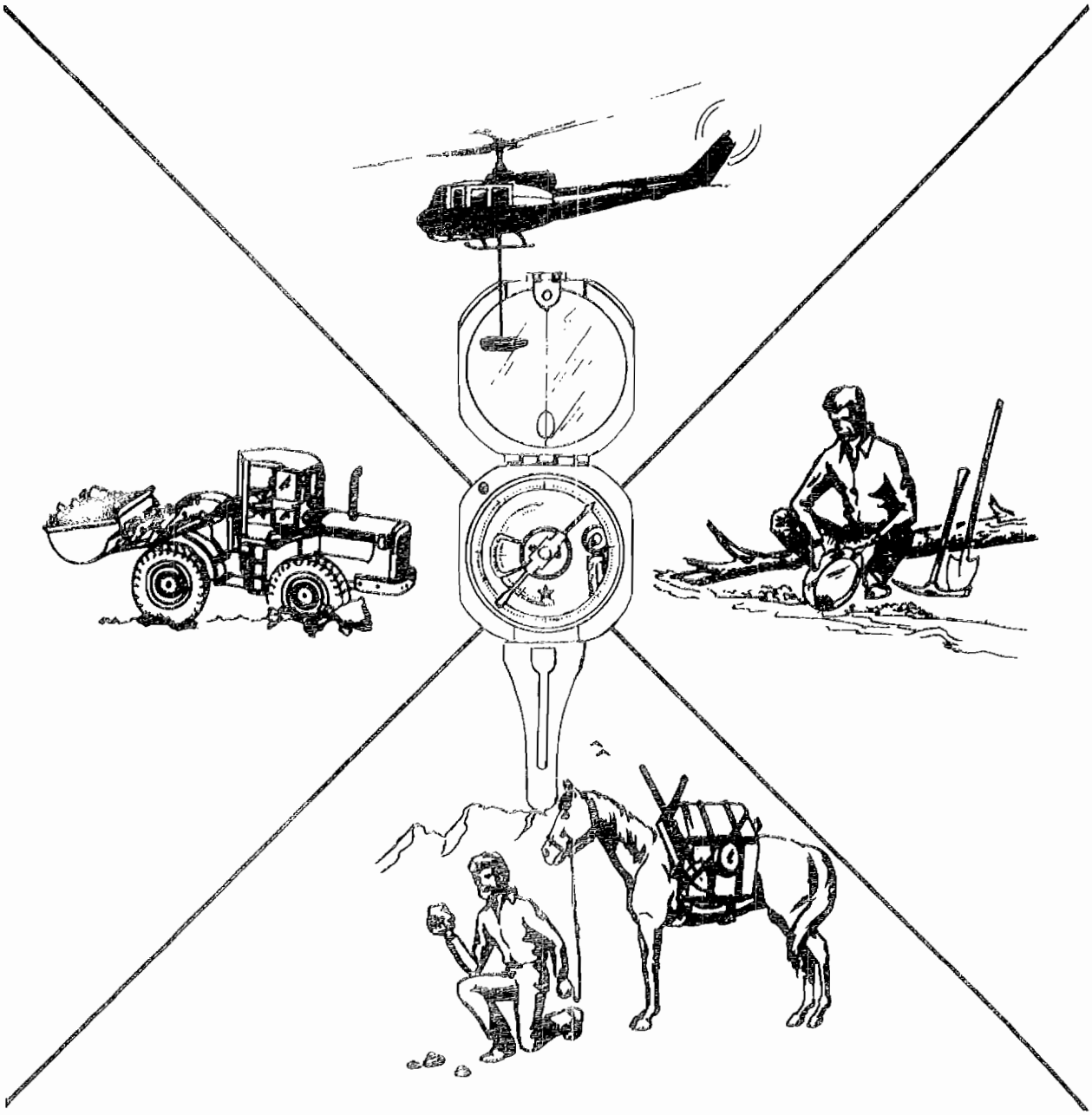
STATE OF ALASKA

Department of Natural Resources



Division of Geological Survey

ANNUAL REPORT

1970

STATE OF ALASKA

William A. Egan – Governor

DEPARTMENT OF NATURAL RESOURCES

Charles F. Herbert – Commissioner

DIVISION OF GEOLOGICAL SURVEY

James A. Williams – Director

Report for the Year

1970

P. O. Box 5-300

College, Alaska 99701

WILLIAM A. EGAN

GOVERNOR
State of Alaska

CHARLES F. HERBERT

COMMISSIONER
Dept. of Natural Resources

JAMES A. WILLIAMS

DIRECTOR
Div. of Geological Survey

D I V I S I O N O F G E O L O G I C A L S U R V E Y S T A F F , 1 9 7 0

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STATE OF ALASKA

WILLIAM A. EGAN, GOVERNOR

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF GEOLOGICAL SURVEY P. O. BOX 5-300 — COLLEGE 99701

The Honorable Charles F. Herbert
Commissioner
Department of Natural Resources
Pouch M
Juneau, Alaska 99801

Dear Commissioner Herbert:

On behalf of the employees of the Division of Geological Survey, it is my pleasure to submit our annual report for the calendar year 1970.

The report is designed to reflect the activities of the Division with respect to the management of those Alaska resources which are by law the responsibility of the Division of Geological Survey, Department of Natural Resources.

The report summarizes mining production, exploration, and other developments during the year. The activities and accomplishments of this Division are outlined; geological investigations and laboratory work are briefly described; and details on information and services available to the public are included.

This Division will continue to add to the geological knowledge of this great land and foster and assist the growth of the mining industry in the best interests of the State.

Respectfully submitted,

James A. Williams

JAMES A. WILLIAMS, Director
Division of Geological Survey

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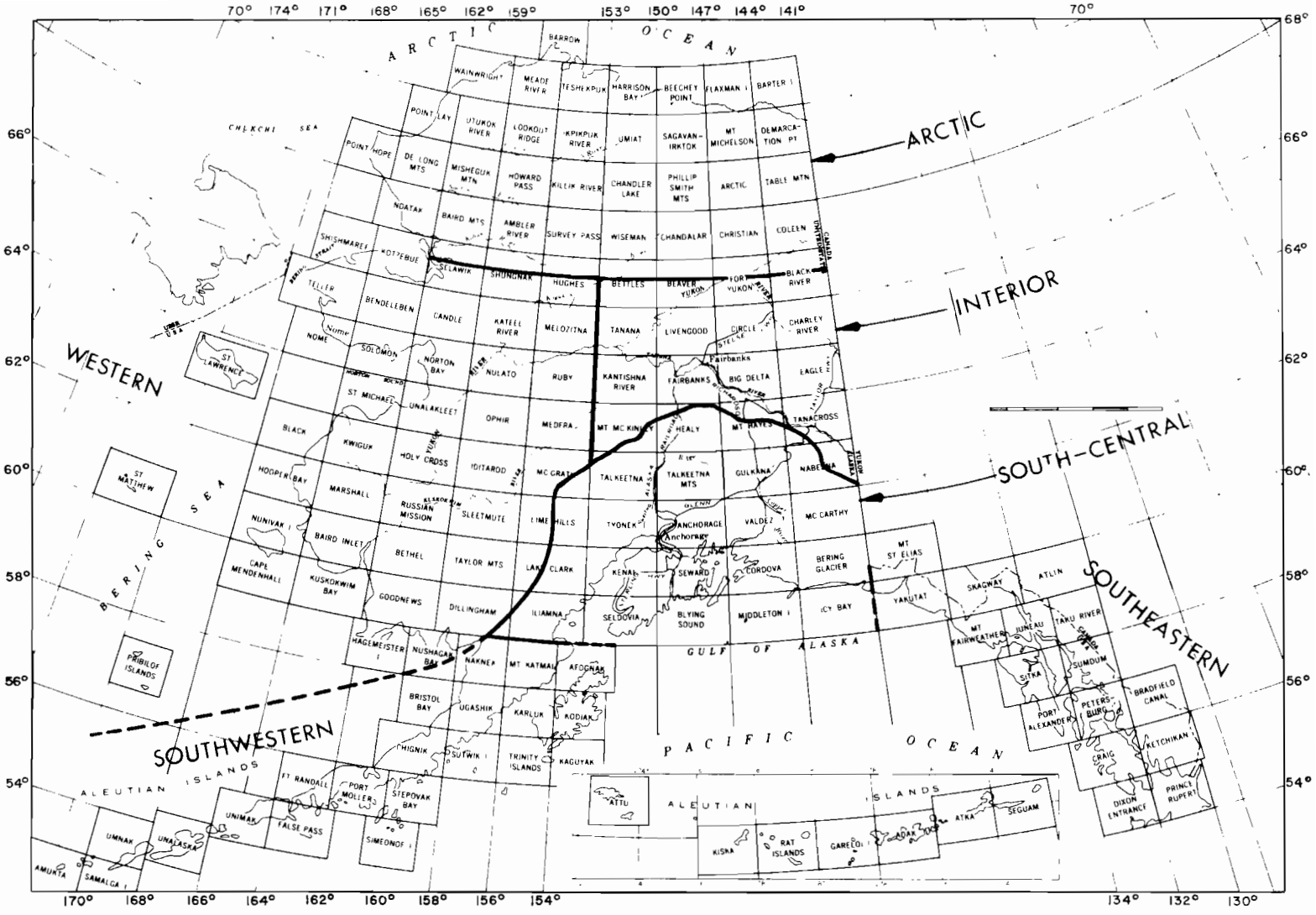

Figure I-1

DIVISIONS OF ALASKA, AS USED IN THIS REPORT

SECTION I

DIVISION OF GEOLOGICAL SURVEY, 1970

INTRODUCTION

The offices of the Department of Natural Resources Division of Geological Survey for the State of Alaska, are located in the maintenance building on the campus of the University of Alaska in Fairbanks. Three other offices under its direction contain Mining Information Specialists which are located in Juneau, Anchorage and Ketchikan. This report has been prepared in five sections and covers the following: (I) Division of Geological Survey, 1970; (II) Government Activity in Alaska, 1970; (III) Alaska Mining Industry; (IV) Prospecting and Exploration throughout Alaska, and (V) Reports by the Division of Geological Survey and preceding agencies.

DIVISIONS OF ALASKA

For convenience, the State has been divided into six arbitrary units as illustrated in figure 1-1. The boundaries of these units are based on bedrock geology, topography, parallels of latitude, and meridians of longitude. The six units are:

1. Arctic Alaska, including the Brooks Range and other parts of the State north of the Arctic Circle, which is near latitude 66° 32' 25" N.

2. Interior Alaska, including that part of the State south of the Arctic Circle, north of the Alaska Range, and east of meridian 153° W.

3. Western Alaska, including the Seward Peninsula, Pribilof Islands, and other parts of the State south of the Arctic Circle, northwest of the Alaska Range, and west of meridian 153° W.

4. Southwestern Alaska, including the Aleutian Islands, Kodiak Island, and the Alaska Peninsula south of parallel 59° N.

5. South-Central Alaska, including the Alaska Range, adjacent mountainous terrain, and intermediate lowlands north of parallel 59° N. and west of meridian 141° W.

6. Southeastern Alaska, including all of the State east of meridian 141° W.

NEW DIVISION NAME

Our readers may have noticed on the cover of this report that this organization is now the Division of Geological Survey and as such replaces the Division of Mines and Geology. This is the result of a new law, Chapter 125, passed by the 1970 Legislature. Chapter 125 requires that there be a Division of Geological Survey within the Department of Natural Resources and that the head of this Division shall be called the State Geologist. The State Geologist has not yet been selected. Responsibilities of the Division as stated in the new law are as follows:

1. The division of geological survey is authorized to make a complete geological survey of the state, giving special attention to all natural products of economic importance, in order to determine the character, location, and amount of these products; and to provide information on and call attention to areas of potential danger of a geologic nature to private or public building projects.

2. The state geologist may make provisions for topographic, geologic, and hydrographic surveys of the state in cooperation with the United States Geological Survey in such manner as in his opinion will be of the greatest benefit to the agricultural, industrial, and geological requirements of the state.

Established services such as assaying, geologic mapping, mine safety inspections, and the dissemination of information will be continued as usual. The scope of Division activities will be expanded as funds and qualified personnel become available.

FUNCTIONS

The principal objectives of the Division of Geological Survey are to make geological surveys of the State, aid and promote the mineral industry in Alaska, gather and disseminate geological information and support good conservation practices. Our organization, its functions and costs, are outlined in Table 1-1. Work accomplished during 1970 is summarized in Table 1-2.

A major service provided by the division is maintaining an up-to-date Kardex file of all known Alaska mining claims, mineral deposits, and claim holders. Geologic mapping and geochemical sampling are carried out during the field season, and the resulting reports and maps are one of the major products of the Division. Property examinations and technical assistance are provided when warranted and when the claim holder cannot afford a consultant. Help in obtaining information is always available at the Division offices, and advice is freely given by the staff. A monthly mines bulletin and this annual report are widely circulated. The Division is also responsible for mine safety and for administering laws pertaining to hard mineral production within the state.

The Division laboratory at College provides free assays and mineral identification and carries out research to aid the staff and public with geochemical and geological investigations. The laboratory analyzes a large number of geochemical samples collected by the staff geologists each summer.

TABLE 1-1. ORGANIZATION, FUNCTIONS, AND COSTS

STATE GEOLOGIST
(DIRECTOR)

Office of Director	Geology Services Section	Mining Geology Section	Laboratory Section
	(PERSONNEL)		
Editor/Researcher Four Mining Information Specialists Secretary Clerk Two Clerk-Typists	Mining Engineer Exploration Geophysicist Cartographer	Chief Mining Geologist Four Mining Geologists Seven Summer Assistants	Lab Supervisor/ X-Ray Mineralogist Assayer Chemist Assayer Geochemical Analyst Mineral Lab Technician
	(FUNCTIONS)		
Kardex file of claim locations and annual labor Publishing and distribution of information circulars, special reports, lab reports, field reports, monthly bulletin, and annual report Budget, finance, and all Division records	Prospect examination Mine safety inspections Geologic mapping and geochemical sampling with written reports Administer geophysical programs mostly aeromagnetic Technical advice and assistance to prospectors, miners, and companies	Ore deposit investigations Ore province evaluation Regional and detailed geologic mapping and geochemical sampling with written reports Technical advice and assistance to prospectors, miners, and companies	Assaying, and Mineral identification of public and Division samples Lab reports on analytical methods, and other pertinent information. Geochemical data processing and evaluation. Technical advice and assistance to prospectors, miners, and companies
	(COSTS)		
$188,100	$644,000	$168,000	$95,800

Total Division Appropriation (FY 70-71): $1,095,900

TABLE 1-2. SUMMARY OF WORK ACCOMPLISHED DURING 1970

STATE GEOLOGIST
(DIRECTOR)

Office of Director	Geology Services Section	Mining Geology Section	Laboratory Section
Processed 7,207 claim location notices; 1,593 affidavits and mining documents. Total active mining claims on file are 24,796. Published 12 professional reports, an annual report, and twelve monthly bulletins (circulation 2500). Distributed 2078 professional reports and 4467 information circulars. Assisted 1516 visitors and answered 1882 information requests. Accounting, budgeting, and maintenance of all Division records.	Visited one prospecting and exploration site. Carried out 30 coal mine inspections and 10 metal mine inspections. Administered 2 Prospector Assistance Programs. Completed information circular on Alaska Map Information, and revised four circulars. Geologic mapping and geochemical sampling of areas encompassing approximately 380 square miles. Over 680 stream sediment samples were collected.	Continued uranium investigations. Detailed geologic mapping and geochemical sampling of four areas, encompassing approximately 300 square miles. Over 800 geochemical samples were collected.	Performed various analyses on public and Division samples ranging from visual identification to detailed quantitative work. Methods employed included X-ray diffraction and emission spectrography, atomic absorption spectrophotometry, optical emission spectroscopy and spectrography, polarizing microscopy, fire assay, and other techniques. Research in geochemical exploration procedures and techniques, with emphasis on problems peculiar to the geochemical programs of private prospecting parties as well as the Division. This is an area of continuing effort, in terms of sampling, analysis, data processing, and data evaluation, in conjunction with the Division geologists. Received and processed more than 1460 samples from the public, plus about 1550 Division geochemical samples.

The State is still in the process of selecting land under the "Rights of Statehood" and our Division works closely with the Division of Lands in this selection. Proposals by Federal agencies for the classification of large tracts in Alaska as wilderness areas, parks, or for restricted use are important issues at present. The Division of Geological Survey will continue to cooperate with the U. S. Bureau of Land Management by providing information on the mineral potential of critical areas.

DIVISION CHANGES AND ADDITIONS

Prospecting and exploration in Southeastern Alaska has increased during the past few years to the point that a mining and mineral information office was needed to serve this region. A new office was opened in Ketchikan last fall, making a total of three such outlying offices maintained by the Division of Geological Survey. The Ketchikan office, located in the National Bank of Alaska Building, maintains records of all mining claims below 57° N latitude. A library contains maps and documents for this region which are published by U. S. Geological Survey, U. S. Bureau of Mines, and the Division of Geological Survey. The mining information specialist in Ketchikan is Mrs. Karen Valentine.

New members of the Division's staff since 1969 include Cleland Conwell, mining engineer; Thomas C. Mowatt, laboratory supervisor; Thomas C. Trible, geochemical analyst; and Patricia A. Garland, mineral laboratory technician. The newly created position of geophysicist was filled by Norman Veach, who will administer geophysical programs to be conducted by the Division.

For the first time funds have been appropriated for a helicoptor to support a Division field party during the entire field season. A helicoptor-supported crew of three geologists and three assistants will do detailed geological mapping in the West Central Brooks Range in 1971.

Another first was the appropriation of money for an aerial magnetometer survey program, which will be conducted over large areas selected by the Division. The program will begin in the spring of 1971 on a contract basis.

ABSTRACTS OF REPORTS TO BE PUBLISHED BY THE DIVISION IN 1971

A brief description of these reports is covered in the following paragraphs.

URANIUM INVESTIGATIONS IN SOUTHEASTERN ALASKA. This report will be prepared by Gilbert R. Eakins, Mining Geologist and is a continuation of our uranium program that consisted of examinations of fourteen localities in Southeastern Alaska. The purpose was to determine if geologic settings, such as structural trends, rock alteration, or mineral zoning, could be used to aid in the search for radioactive materials in the region.

Most of the localities visited were previously known to have radioactivity showings, but others were selected on the basis of geology alone or had been reported to have showings by prospectors. Both Tertiary nonmarine sediments and vein-type deposits were examined. Radiometric surveys with a scintillometer were made on foot, and the geology of some local areas was mapped. Rock samples and stream

sediment samples were collected. The areas visited and summary of the findings are covered in the following paragraphs.

Lucky Six Claim Group. This claim is located 50 miles north of Juneau near William Henry Bay on the west side of Lynn Canal. The known presence of radioactivity and rare earth minerals in a small intrusive here prompted the investigation. Anomalous copper was found in a stream below the claims, and anomalous zinc is present in the William Henry Bay area. The entire intrusive has anomalously high radioactivity.

Mitchell Bay Area near Angoon. This area is located on Admirality Island and is one of nonmarine Tertiary sandstones. No indications of radioactive minerals were found.

BBH Uranium Claims. This claim is located on Endicott Arm, 70 miles southeast of Juneau. Radioactivity was known to exist in pegmatitic materials. The author found that similar zones are fairly widespread in the area but do not appear in themselves to have any commercial possibilities. Interesting structural features are visible along the shores of Endicott Arm and massive diorite can be seen to grade into schist within a few feet.

Kook Lake Area. This area is located on the east side of Chicagof Island. Kook Lake was visited because of the presence of soda-rich intrusives which might offer possibilities for uranium deposits similar to that at Kendrick Bay. Above-average background count was found over the intrusive rock and several possible anomalies were detected by low-level flying with a scintillometer.

Duncan Canal Barite Mine. This mine is located on Castle Island. The author walked the shores of all the small islands in the area and mapped as much of the geology as possible in two days. The purpose was to determine the geologic setting of the barite deposit. Evidently little geologic mapping has been done.

Port Camden. This is located 35 miles west of Petersburg on Kiku Island. This is an area of one of the most extensive deposits of Tertiary sandstone in Southeastern Alaska. Anomalous radioactivity was found in a thin (4 inch) bed of sandstone along the shore just south of Kadake Bay. While this material is very low grade it is interesting because it does show that a certain degree of concentration of radioactive minerals can take place in Tertiary sandstone in the region.

Zarembo Island. This island is located between Kupreanof and Etolin Islands. Tertiary sandstone and fluorite veinlets on the west side of the island were checked for radioactivity. A slightly anomalous zone of sandstone was found along the coast.

Salmon Bay. This area is located at the northwest end of Prince of Wales Island. It has received considerable attention because of the thorium and rare earth minerals in carbonate veins along the coast. The author collected samples and mapped some of the most interesting parts of the area. The radioactivity may be much more extensive inland but is concealed by soil and vegetation.

Devilfish Bay. This Bay is located on the east side of Kosciusko Island. A prospector reported radioactivity in this area. The author found radioactivity up to four times the background value at a copper prospect on the south side of the bay, but the area does not seem to warrant further radiometric investigations.

Virginia Lake. This lake is located just about eight miles east of Wrangell. A prospector recommended this area. A north-south trending zone of schist was found to be slightly anomalous but of too low a level to be of much interest.

Trap Bay. This bay is located near the entrance to Tenakee Inlet, Chicagof Island. This locality was examined because of an indicated anomally detected from the air while working at Kook Lake. The author concluded the anomally was caused by extensive outcrops of conglomerate on the ridge near the entrance to Tenakee Inlet which showed unusually high background values on the ground. It did not seem to have any concentrations of significance.

Mt. Sumdum area. This area is located north of the entrance to Endicott Arm. A prospector reported an airborne anomally here but the author did not reach the proper location. No radioactivity was found except some diorite float along the beach which gave up to three times the background value.

King Salmon Bay. This bay is located just 20 miles south of Juneau on Admirality Island. A rather rare acid intrusive near the head of King Salmon Bay and nearby pegmatite dikes containing rare earth minerals had been reported by the U. S. Geological Survey. No radioactivity was found on the small intrusive.

Blackjack Claims, Dall Bay. This bay is located on the south end of Gravina Island. Some fairly high grade uranium samples have been reported from the area. Radioactive dikes along the coast were sampled.

After studying the sample analyses and thin sections the author will try to relate the known radioactivity in Southeastern Alaska to regional geology. It appears that a relationship to copper occurrences may exist.

WALES PROJECT, PRINCE OF WALES ISLAND, S. E. ALASKA. This report will be prepared by Gordon Herreid, Mining Geologist and is briefly described in the following paragraphs.

During the season of 1970, fifty square miles of the Craig A-2 quadrangle were mapped, including detailed mapping along 60 miles of coastline in Hetta Inlet. There were 380 geochemical stream sediment and rock chip samples taken.

In the 290 square miles underlain by Wales group rocks and associated granodiorite intrusives, at least 70 mineral deposits are known from early day prospecting. At the present time prospecting is again active. The richest of the known deposits are small-sized contact metamorphic copper deposits near granodiorite stocks that are probably of Mesozoic age. Most of the deposits, however, are small veins distant from granodiorite intrusives. Some have been mined for copper and/or gold.

The contact metamorphic copper deposits and associated intrusive rocks have been mapped and described in some detail by earlier workers, but the geology and ore deposits of the remaining area are not well known. It is an attractive possibility that in this large area there may be undiscovered large ore deposits in addition to minor veins.

The Wales group includes all of the foliated metamorphic rocks on southern Prince of Wales Island. Mapping by the Division has resulted in a new interpretation of both structure and lithology. The two principal units are gradational with one

another and both range from slightly to well foliated. The contacts between the units are sinuously folded in part of the area. In another part of the area, that is less deformed, marble beds terminate abruptly and can be seen to have originated as reefs.

Minor structures indicate that the Wales rocks have been folded twice. The youngest folding is responsible for the main south south east trend of the beds. The older folding is marked by local swings in the beds and strong folding of the contact between marble and phyllite in part of the area. Throughout the area foliation is parallel to bedding.

Rocks mapped as Devonian by earlier workers are thrust over the Wales group at Keete Inlet. Near Eek Inlet "Devonian" greenstone grades by a sharp increase in regional metamorphism transformation into typical Wales phyllite. Recent Potassium Argon dating shows the "Devonian" to be Pre-Ordovician just 10 miles Southeast of Keete Inlet. Obviously an understanding of much of the geological data is yet to come.

Field tests for readily extractable copper showed anomalies in stream sediments from the northern part of the area, near granodiorite contacts. These are related to known contact metamorphic deposits. An anomaly was found in the vicinity of the Corbin mine, a vein deposit mined for copper in the early days.

The Corbin adit was mapped and showed pyrite and minor chalcopyrite(?) along a steeply dipping fault zone. This fault shows up as a lineament on air photos. Pits indicate that the old-timers followed the fault with their prospecting.

Surface workings at the Copper City mine were mapped in some detail. This is another small copper-gold deposit mined before World War I. The deposit is adjacent to a pre-metamorphic rhyolite sill. Similar sills without adjacent pyrite are present nearby and in the "Devonian" just east of Eek Inlet.

The author will continue geologic mapping and geochemical investigations of the Wales group during the 1971 field season.

GEOLOGY AND GEOCHEMISTRY OF THE ANGAYUCHAM MOUNTAINS, WESTERN ARCTIC ALASKA. This report will be prepared by Crawford E. Fritts and is briefly described in the following paragraphs.

Geological mapping and geochemical sampling of the east-trending Angayucham Mountains began on foot in June 1970 and were completed in August with the aid of three weeks of full helicopter support. The area studied is approximately 40 miles long and 5 to 10 miles wide. The principal base of operation was at Selby Lake about 35 miles east of the village of Kobuk. The Angayucham Mountains are immediately east of the Cosmos Hills, which are the site of a complex window described in Division Geologic Reports 37 and 39. Both areas are along the northern edge of the Kobuk trough and include parts of a foothills belt along the southern flank of the Brooks Range. Field work by the Division now has been completed along approximately 65 miles of that belt.

Work in the Angayucham Mountains was undertaken primarily to learn more about (1) regional bedrock and surficial geology along the southern flank of the Brooks Range close to a proposed transportation corridor, (2) copper mineralization described in previous literature, and (3) the eastward disappearance of serpen-

tinite characteristic of the Jade Mountains and Cosmos Hills. The recent work revealed significant data concerning the lithology, stratigraphy, structure, age, metamorphism, and geologic history of rocks in the Angayucham Mountains, but copper mineralization and serpentinite emplacement appear to have been insignificant in this area.

In marked contrast to the Cosmos Hills window, the principal geologic structure in the Angayucham Mountains is a steeply inclined, locally overturned, east-trending monocline consisting of weakly (regionally) metamorphosed pillow basalt and interbedded phyllite, chert, and limestone of probable Devonian age. Pillow structures consistently show tops facing south. Weakly (dynamically) metamorphosed clastic rocks of Cretaceous age have been thrust over the Devonian strata. Metavolcanic rocks in this area are equivalent to similar metavolcanic strata that form one of four thrust sheets in the frame of the Cosmos Hills window. Cretaceous strata in the Angayucham Mountains are equivalent to rocks of similar lithology and age found in the uppermost thrust sheet of that window. Field relations in the vicinity of Selby and Narvak Lakes indicate that the history of faulting of Cretaceous strata in that area is much more complex than previously realized. The sequence of events now is known to include (1) initial low-angle overthrust faulting of Cretaceous conglomerate and related rocks, (2) moderate-angle reverse faulting of Devonian and Cretaceous strata, (3) more overthrust faulting of both kinds of rock, and (4) late high-angle normal faulting. Displacements on the major overthrust faults are measured in miles. Near Narvak Lake, minimum throws of 2000 and 3000 feet can be demonstrated on a major reverse fault and at least one normal fault.

Four east-trending normal faults characterized by probable large vertical displacements have been traced several tens of miles along their strikes in this area. They are nearly parallel to a conspicuous lowland (including the Ambler Lowland) which separates the Cosmos Hills-Angayucham Mountains belt from the Schwatka Mountains of the Brooks Range. One or more similar normal faults may underlie that depression. It now appears likely that the main part of the Brooks Range in western Arctic Alaska was upfaulted relative to the southern foothills belt in Tertiary time after the main episode or episodes of overthrust faulting in Cretaceous to Early Tertiary time.

GEOLOGY AND GEOCHEMISTRY OF THE BENDELEBEN MOUNTAINS, SEWARD PENINSULA, ALASKA. This report will be prepared by Roderick R. Asher, Chief Geology Section. The geology of 20 square miles between the Libby River and the North Fork of the Niukluk River in the Bendeleben Mountains was mapped. The work revealed a heavily pyritized zone in black slate on the west side of the Niukluk just north of the mouth of Kingsley Creek.

A total of 680 stream sediment samples were collected in the area mapped and adjacent areas. Incomplete analyses of the samples indicate that at least four important anomalies are present. The potential is for lead and zinc disseminated in shale or schist and for disseminated molybdenum.

imentation, copper mineralization, and important episodes of igneous and tectonic activity in this region, and (3) measure the displacements on major overthrust and high-angle faults now known to offset the local strata. During 1971, the mapping project for the Survey Pass Quadrangle will have full helicopter support during the entire season.

Southeastern Alaska. Detailed mapping of the geology and geochemistry of the Craig A-2 quadrangle and adjoining areas on Prince of Wales Island will be continued. The aim of the geologic work is to describe and map the rocks of the Wales Group and to determine the structures. The structural geology and rock type distribution is largely unknown in the area. The work at high elevations will be facilitated by a limited amount of helicoptor support.

Geochemical bedrock and stream sediment samples will be taken throughout the area mapped and multi-element analyses made of each. The results will show the normal relationship between bedrock and stream sediments. The data will be used to define the threshold values for anomalies more closely than would be possible without knowledge of the bedrock composition and will be useful in the design of prospecting programs in the region. Gordon Herreid, mining geologist, is shown examining rock thin sections in figure 1-2.

South-Central Alaska. Detailed geologic mapping and geochemistry will be conducted on the south flank of the central Alaska Range. The area selected lies mostly in the southwest corner of the Mt. Hayes quadrangle between the Maclaren River and Clearwater Creek. The mapping will tie into an area previously mapped to the west.

GEOLOGICAL SERVICES SECTION. This section is responsible for Geologic mapping and Commodity Study, and an airborne Magnetometer Survey Program.

Geologic Mapping And Commodity Study. The Division's mining engineer has two projects planned for 1971. The first will be a long-range study of mercury in Alaska. The Lower Kuskokwim region contains a large mercury province which undoubtedly will be the source of most of the mercury produced within the state.

The second project is planned to consist of geologic mapping and sampling in the Haines-Porcupine region of Southeastern Alaska as time permits. The area has produced gold, Copper, lead, and zinc deposits also have been reported present. Available geologic information is inadequate and is based largely on early work by Wright (1904) and Eakin (1919). During 1970 a U. S. Geological Survey party collected samples southwest of the Haines highway in the Skagway B-3 and B-4 quadrangles. The intent of the Division's program is to conduct a reconnaissance geological survey northeast of the Haines highway in the Skagway B-2, C-3 and C-4 quadrangles. Reconnaissance mapping by the Division is also under consideration for the Bering River coal field.

Airborne Magnetometer Survey Program. A contract has been granted to Lockwood, Kessler & Bartlett, Inc., with offices in Anchorage, who submitted the low bid for airborne magnetometer surveys covering large areas along the flanks of the eastern and central parts of the Alaska Range, on the Seward Peninsula, and in the Goodnews Bay region. The starting date for flying is April 15, 1971, and 180 days are allowed for completion of the program.

Table 1-4. Geochemical Reports For 1970 (continued)

Report Number	Date Issued	Title	Author
23	May 1970	Preliminary Report to Geochemical Report No. 23: A Geochemical Investigation in the Eagle A-1 Quadrangle, Fortymile District, Alaska	Roderick R. Asher
23	May 1970	Geochemistry and Geology of the Boundary Area, Fortymile District, Eagle A-1 Quadrangle, Alaska.	Roderick R. Asher

TABLE 1-5. SPECIAL REPORTS FOR 1970

Report Number	Date Issued	Title	Author
3	May 1970	A Petrified Forest on Unga Island, Alaska.	Gilbert R. Eakins
4	May 1970	Mineralization Near Stepovak Bay, Alaska Peninsula, Alaska	Gilbert R. Eakins

DIVISION PROGRAMS FOR 1971

Division programs for 1971 include work to be done by the Mining Geology Section, Geological Services Section, and Laboratory Section.

MINING GEOLOGY SECTION. Programs to be conducted by this section will include three areas, Arctic Alaska, Southeastern Alaska and South-Central Alaska.

Arctic Alaska. During the past three years, the Alaska State Division of Geological Survey has produced detailed geologic maps of more than 400 square miles and analyses of nearly 500 geochemical samples collected in the Cosmos Hills and Angayucham Mountains in the southern foothills belt of the western Brooks Range. The area studied so far includes the well known copper prospect at Bornite. It also is a few miles south of another important copper prospect known as Arctic Camp, which is in the Schwatka Mountains of the Brooks Range immediately west of the Kogoluktuk River. Data presently available suggest that the copper deposit at Bornite may be structurally as well as stratigraphically and lithologically controlled. Dolomitic host rocks there are in thrust-fault contact with all adjacent formations. Aerial reconnaissance suggest that copper-bearing carbonate strata near Arctic Camp may be equivalent to carbonate host rocks at Bornite.

The Division hopes to extend its work northward across the trend of the Brooks Range in order to (1) establish the true stratigraphic and structural relationships between copper-bearing rocks of the southern foothills belt and those in the main part of the Brooks Range, (2) determine the relationship between sed-

imentation, copper mineralization, and important episodes of igneous and tectonic activity in this region, and (3) measure the displacements on major overthrust and high-angle faults now known to offset the local strata. During 1971, the mapping project for the Survey Pass Quadrangle will have full helicopter support during the entire season.

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GEOLOGICAL SERVICES SECTION. This section is responsible for Geologic mapping and Commodity Study, and an airborne Magnetometer Survey Program.

Geologic Mapping And Commodity Study. The Division's mining engineer has two projects planned for 1971. The first will be a long-range study of mercury in Alaska. The Lower Kuskokwim region contains a large mercury province which undoubtedly will be the source of most of the mercury produced within the state.

The second project is planned to consist of geologic mapping and sampling in the Haines-Porcupine region of Southeastern Alaska as time permits. The area has produced gold, Copper, lead, and zinc deposits also have been reported present. Available geologic information is inadequate and is based largely on early work by Wright (1904) and Eakin (1919). During 1970 a U. S. Geological Survey party collected samples southwest of the Haines highway in the Skagway B-3 and B-4 quadrangles. The intent of the Division's program is to conduct a reconnaissance geological survey northeast of the Haines highway in the Skagway B-2, C-3 and C-4 quadrangles. Reconnaissance mapping by the Division is also under consideration for the Bering River coal field.

Airborne Magnetometer Survey Program. A contract has been granted to Lockwood, Kessler & Bartlett, Inc., with offices in Anchorage, who submitted the low bid for airborne magnetometer surveys covering large areas along the flanks of the eastern and central parts of the Alaska Range, on the Seward Peninsula, and in the Goodnews Bay region. The starting date for flying is April 15, 1971, and 180 days are allowed for completion of the program.

The surveys will consist of close-spaced flight lines (3/4 mile apart) at low elevation (1000 feet above ground level where possible). The survey results will be shown as contours of magnetic intensity overprinted on topographic maps at a scale of 1 mile to the inch. These maps will be useful for interpreting geology and in locating mineralized areas associated with magnetic rocks both at the surface and under hundreds of feet of overburden. The maps will be available at low cost on a pre-announced date from the offices of the Division of Geological Survey. Contract administrator for the Division is Norman J. Veach, Exploration Geophysicist, in consultation with the U. S. Geological Survey. Though the present work is 100% State-financed, a matching-fund cooperative program with the USGS is planned for future years.

LABORATORY SECTION. Future programs and aims of the Laboratory Section are summarized as follows:

1. Undertake a review and re-evaluation of analytical procedures, sample handling, and data reporting, with regard to public samples submitted for assay and identification as follows:

    a. A detailed procedural manual of each analytical method will be prepared for the guidance and information of concerned public parties and Division personnel. Initial emphasis will be on the atomic absorption spectrophotometer, optical emission spectroscope and spectrograph, X-ray emission spectrograph, X-ray diffractometer, and laboratory radiation counter; subsequently attention will be devoted to other techniques, including fluorimetry, mercury vapor analysis, fire assaying, and specific gravity determination, as well as miscellaneous methods of interest.

    b. Establishment of routine procedures for sample handling, analysis, and data reporting, in order to optimize efficiency and reliability, delineate areas of responsibility, and minimize chances for errors.

2. Research in various aspects of field geochemical methods, eg. particle size effects, pH effects, nature of solvents employed, effect of organic matter in sample, etc. This will be done with the view to improving analytical precision, efficiency, and accuracy, in order to facilitate analysis in the field, together with optimizing confidence in the data obtained. Results will be made public for the benefit of private exploration work.

3. Evaluation and reassessment of the Division geochemical program with the object of attempting to make any improvements deemed advisable or necessary. This will involve three major areas of emphasis, somewhat as follows:

    a. Analytical procedures, (field and laboratory).

    b. Theoretical considerations, including types of samples (stream sediments, soils, bedrock, natural waters, air, soil gases, ie.), elements sought, geologic/geochemical associations, etc.

    c. Data processing (computer interfacing, input, data manipulation, and output) and data interpretation.

4. Development of a computerized scheme permitting major, minor, and trace constituent elemental analyses of geological materials utilizing X-ray emission spectrography.

5. Increasing our level of sophistication in X-ray diffraction analysis, in order to maximize the information obtainable by this technique for any given sample. Alteration, atomic substitution (solid solution, ie.), polymorph/polytype, order-disorder, and other crystallographic information obtainable with X-ray powder diffractometry procedures are of interest, with mineral compositions, ore genesis, geothermometry, and other geologic-geochemical relationships being sought by these methods. Miss Namok Cho, Chemist and James Pray, Assistant in the X-ray laboratory are shown in figure 1-3. Thomas C. Trible, Geochemical analyst shown in figure 1-4 is reading an optical emission spectograph film for the semi-quantitative analysis of a geochemical sample.

Figure 1-2

Gordon Herreid, Mining Geologist examining rock thin sections with a petrographic microscope.

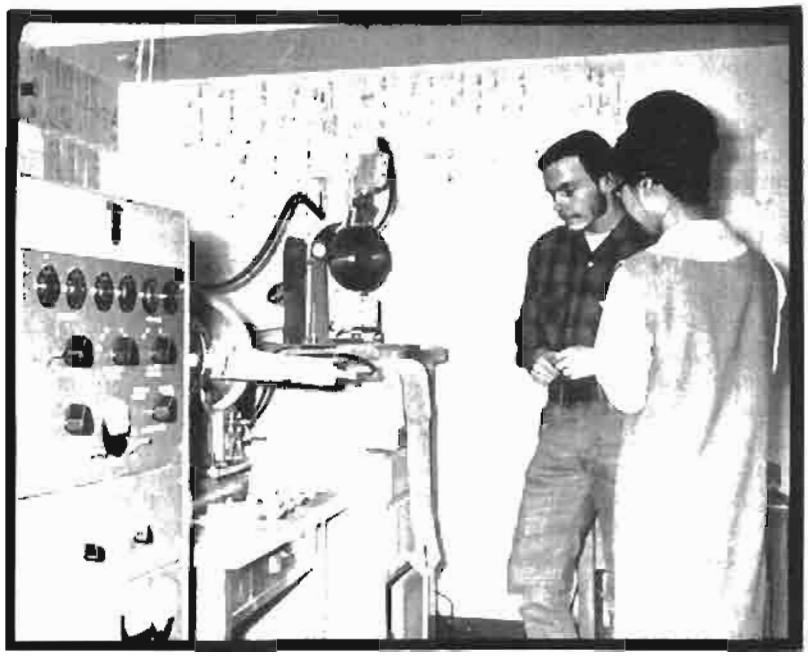


Figure 1-3
Miss Namok Cho, Chemist and James Prey assistant in X-ray laboratory.

Figure 1-4
Thomas C. Trible Geochemical Analyst reading an optical emission spectograph film for the semi-quantitive analysis of a geochemical sample.

PROSPECTOR ASSISTANCE PROGRAM AND COSTS

The Alaska Legislature did not appropriate funds for the Prospector Assistance Program in 1970. Encumbered funds from 1969 permitted acceptance of only two applications out of a total of 22 received; one from James R. Wylie and one from A. E. Chilson. At the time of this report only James R. Wylie had completed his report and requested reimbursement. Actual prospecting expenditures are shown in Table 1-6. Regulations covering the Prospector Assistance Program provide that submitted programs will be held confidential for a period of two years. Programs that have been submitted through 1968 have been summarized and are available to the public at our Fairbanks, Anchorage, and Juneau offices. If the summary of a particular program is of sufficient interest to an individual the entire program can be made available to him.

The following costs presented are based on an average of expenditures by participants in the State Prospector Assistance Program. The prospecting programs used in the calculation represent a broad range of activities from reconnaissance prospecting by one man with minimal equipment to a crew of men utilizing heavy equipment for stripping overburden. Consequently the cost for any individual prospecting venture may vary considerably from the average, depending on the scale of the program.

The average expense for 1963 through 1969 has been $22.65 per man day. The following is a breakdown of these expenses:

Necessary Expenses	Cost per Man Day
Transportation	7.67
Food	4.21
Equipment and Supplies	10.77
Total	$22.65

Total expenditures for this seven year period were $155,370 covering 6858 man days. The cost to the State during that time was $100,993 or about 65 percent of the total.

Transportation includes aircraft, tracked vehicles, rubber tired equipment, and boats used to travel to and from prospecting areas and to transport supplies and equipment. Food includes groceries and other staple consumable items. Equipment and supplies include tools, camping equipment, prospecting equipment, fuel, and general supplies. Each year more heavy equipment is used to explore claims staked under the program than in previous years; thus there is a general increase in the cost of equipment and supplies.

Travel is mainly by charter aircraft. Small fixed-wing aircraft are available for charter in most Alaskan towns. Charter rates for a Piper Cruiser range are about $40 per hour; charter rates for a Cessna 180 are about $60 per hour. Helicopters are available in Ketchikan, Juneau, Anchorage, and Fairbanks; charter rates range from $135 to $150 per hour with a minimum guaranteed flying time of three hours per day.

TABLE 1-6. PROSPECTORS ASSISTANCE PROGRAM, 1970

Name	Locality Prospected	Man Days	Claims Staked	Samples Assayed	ACTUAL PROSPECTING EXPENDITURES				Reimbursed By State
					Travel	Food	Equipment & Misc.	Expense Per Man Day	
James R. Wylie and Joseph H. Shelton	Kuskokwim	296	0	3	473.97	1,965.53	5,489.45	26.85	$4,000
AVERAGE PER MAN DAY		-	-	-	2.96	6.64	18.54	-	13.51

SECTION II

SECTION II

GOVERNMENT ACTIVITY IN ALASKA, 1970
(other than the Alaska Division of Geological Survey)

U. S. GEOLOGICAL SURVEY

Alaskan activities are the responsibility of several branches. These branch offices and their addresses are:

BRANCH OFFICES	ADDRESS
Alaska Mineral Resources	Pacific Coast Field Center 345 Middlefield Road
Office of Marine Geology	Menlo Park, California 94025
Regional Geophysics	Rocky Mountain Field Center Denver, Colorado 80225
Exploration Research	
Engineering	
Paleontology and stratigraphy	Washington, D. C.
Isotope Geology	

The Branch of Alaskan Mineral Resources maintains an office in Rooms 402 and 403 of the Brooks Building on the University of Alaska campus at College. The resident personnel include a geologist and a clerk. A reference set of Alaskan publications, maps and related publications are available for consultation. In Anchorage the Branch office is located in the Skyline Building, at 218 E Street. Resident personnel include two geologists and one clerk. Alaskan Survey publications and information releases are available to the public.

Current studies and activities in Alaska include the following:

1. Geologic mapping and mineral resource evaluation, principally at scales of 1:250,000 and 1:63,360.
2. Mineral district mapping and evaluation.
3. Mineral reconnaissance.
4. Geochemical studies and sampling related to mineral studies.
5. Aeromagnetic and gravity surveys and interpretation.
6. Engineering geology studies in urban areas.
7. Isotope age determinations and interpretation.
8. Heat flow.
9. Oil shale studies.
10. Subbottom profiling, sampling, and geophysical studies of the ocean floor.

A complete coverage of the location and types of studies performed are presented in Table 2-1.

TABLE 2-1. AREAS STUDIED

Location	Type of Study
(ARCTIC ALASKA)	
Northeastern Brooks Range	Reconnaissance mapping
Pipeline Route	Engineering-geologic study between Prudhoe Bay and Wiseman
(INTERIOR ALASKA)	
Livengood Quadrangle	Structural, stratigraphic and Paleontologic studies and pipeline route reconnaissance.
Tanana Quadrangle	Geologic studies and sampling along the Pipeline route.
Eagle Quadrangle	Continuance of geologic mapping and geochemistry
(WESTERN ALASKA)	
Shungnak-Hughes Area	Continuance of regional mapping of the Yukon-Koyukuk province
Eastern Seward Peninsula	Geologic mapping and geochemistry
Seward Peninsula	Regional geology and economic geology
St. Lawrence Island	Basic geologic and resource studies
(SOUTHWESTERN ALASKA)	
Tikchik Lakes Area (USGS)	Geologic mapping and geochemistry
Alaska Peninsula	Sampling and age-dating of Tertiary lavas in Iliamna quadrangle
(SOUTH-CENTRAL ALASKA)	
Valdez-Paxon and Wiseman-Paxson	Engineering-geologic study of pipeline route
Southern Alaska Range	Geologic studies and economic evaluation
Eastern Alaska Range	Geologic mapping and geochemistry

Table 2-1. Areas Studied (continued)

Location	Type of Study
(SOUTH-CENTRAL ALASKA) (Continued)	
Wrangell Mountains	Geologic mapping and geochemistry in the McCarthy C-8 quadrangle
Anchorage Area	Geologic mapping and geochemistry in the western Chugach Mountains
Gulf of Alaska	Regional geologic problems in Tertiary rocks
(SOUTHEASTERN ALASKA)	
Haines-Porcupine Region	Completion of geologic mapping and geochemistry in the Skagway B-3 and B-4 quadrangles
Juneau	Regional mapping on the Coast Range batholithic complex
Sumner Strait	Acoustic subbottom profiling
Sea Otter Sound	Sedimentary study of the Karheen Formation
Dall Island	Geologic mapping
Annette-Gravina Project	Geologic mapping on Gravina, Revillagigedo, and Annette Island
Ultramafic Study	Studies of the ultramafic complexes on Duke and Blashke Islands
Hyder	Geologic mapping in Smeaton Bay, in Boadfield A-1, and Ketchikan D-1 quadrangles

REPORTS AND MAPS PUBLISHED DURING 1970. The USGS publications and maps listed in Tables 2-2 and 2-3 were released in 1970. Open file reports are usually available for study at the various USGS and Division of Geological Survey offices in Alaska. Copies of open file reports can usually be obtained at private expense from the USGS at Menlo Park. USGS numbered bulletins and professional papers may be purchased from the U. S. Government Printing Office or over the counter at the USGS Public Inquiry Office in Anchorage. USGS circulars are free.

TABLE 2-2. USGS PUBLICATIONS, 1970

Number	Title	Author
	(PROFESSIONAL PAPERS)	
543-I	Tectonics of the March 27, 1964, Alaska earthquake	George Plafker
545-D	Effects of the earthquake of March 27, 1964, on the Alaska Railroad	D. S. McCullock M. G. Bonilla
546	The Alaska earthquake, March 27, 1964-lessons and conclusions	
625-B	Geology and lode-gold deposits of the Nuka Bay area, Kenai Peninsula, Alaska	D. H. Richter
643-A	Species of Aquilapollenites and Fibulapollis from two Upper Cretaceous localities in Alaska	B. C. Tschudy
648	Vegetation of Amchitka Island, Aleutian Islands, Alaska	H. T. Shacklette and others
653	Early Silurian Graptolites from Southeastern Alaska and their correlation with graptolitic sequences in North American and the Arctic	
664	Carbonate facies and the lithostrotionid corals of the Mississippian Kogruk Formation, Delong Mountains, northwestern Alaska	A. K. Armstrong
696	Ground water in the permafrost regions of Alaska	J. R. Williams
	(BULLETINS)	
1211-D	Geologic reconnaissance of a possible powersite at Takatz Creek, Southeastern Alaska	J. E. Callahan
1271-F	Geologic interpretation of reconnaissance aeromagnetic survey of northeastern Alaska	W. P. Brosge E. E. Brabb E. R. King
1274-Q	The Skokai Group in the McCarthy B-4, C-4 and C-5 quadrangles, Wrangell Mountains, Alaska	J. G. Smith E. M. MacKevett, Jr.
1284	Paleozoic stratigraphy in the northwest coastal area of Prince of Wales Island, southeastern Alaska	G. D. Eberlein Michael Churkin, Jr.
1287	Geology and ore deposits of the Central York Mountains, western Seward Peninsula, Alaska	C. L. Sainsbury

Table 2-2. USGS Publications, 1970 (continued)

Number	Title	Author
	(BULLETINS) (Continued)	
1294-B	Probable Permian age of the Rampart Group, central Alaska	W. P. Brosge M. A. Lanphere H. N. Reiser R. M. Chapman
1312-B	A portable refraction seismograph survey of gold placer areas near Nome, Alaska	H. G. Greene
1312-H	Geology, mineral deposits, and geochemical and radiometric anomalies, Serpentine Hot Springs area, Seward Peninsula, Alaska	C. L. Sainsbury Travis Hudson Reuben Kachadoorian Thomas Richards
1312-J	Preliminary geologic investigations in the Kanuti River region, Alaska	W. W. Patton, Jr. T. P. Miller
1312-L	Geochemical and geophysical reconnaissance of parts of Yakutat and Muciat Saint Elias quadrangles, Alaska	E. M. MacKevett, Jr. George Plafker
1312-M	Geochemical and geologic reconnaissance of a part of the Fortymile area, Alaska	H. L. Foster S. H. B. Clark
	(CIRCULARS)	
632	Some estimates of the thermal effects of a heated pipeline in permafrost	A. H. Lachenbruch
---	Fluorite prospects in the northwestern Kigluaik Mountains, Nome D-2 Quadrangle, Alaska	C. L. Sainsbury Reuben Kachodoorian T. E. Smith
	(OPEN FILE REPORTS)	
395	Metallic mineral resources map of the Hagemeister Island Quadrangle, Alaska. (map scale 1:250,000)	Edward H. Cobb
396	Metallic mineral resources map of the Sleetmute Quadrangle, Alaska. (map scale 1:250,000)	Edward H. Cobb
397	Geochemical data from the Nabesna A-2 Quadrangle, Alaska	D. H. Richter N. A. Matson, Jr.

Table 2-2. USGS Publications, 1970 (continued)

Number	Title	Author
	(OPEN FILE REPORTS) (Continued)	
398	Geochemical data from the Nabesna A-4 Quadrangle, Alaska	D. H. Richter N. A. Matson, Jr.
399	Fluorite prospects in the Northwestern Kigluaik Mountains, Nome D-2 Quadrangle, Alaska	C. L. Sainsbury R. Kachadoorian T. E. Smith
400	Bering Sea, seismic reflection profiles, 1969	David W. Scholl Michael S. Marlow
401	Analyses of rock and soil samples, Chandalar and eastern Wiseman Quadrangles, Alaska.	W. P. Brosge H. N. Reiser
402	Chemical analyses of stream sediment samples from the Chandalar and eastern Wiseman Quadrangles, Alaska	W. P. Brosge H. N. Reiser
403	Metallic mineral resources maps of seven Alaska quadrangles: Chignik, Cold Bay, Dillingham, Lake Clark, Naknek, Port Moller, Unalaska. (map scale 1:500,000)	Edward H. Cobb
404	Analysis of Shublik Formation rocks from Mt. Michelson quadrangle, Alaska.	Robert L. Detterman
405	Gold resource potential of the Denali bench gravels, Alaska	Thomas E. Smith
406	Analyses of bedrock and stream-sediment samples from the Haines-Porcupine region, southeastern Alaska	G. R. Winkler E. M. MacKevett, Jr.
407	Reconnaissance geologic map of the Nabesna A-3 quadrangle, Alaska. (map scale 1:63,360)	D. H. Richter
408	Reconnaissance geologic map of the Nabesna B-4 quadrangle, Alaska. (map scale 1:63,360)	D. H. Richter
409	Chemical analyses of stream sediment samples from the Sadlerochit-Jago Rivers area, Mt. Michelson and Demarcation Point quadrangles, Alaska	W. P. Brosge H. N. Reiser M. B. Estlund
410	Petroleum possibilities of the Yukon-Koyukuk province, Alaska	William W. Patton, Jr.
411	Geologic map of the Teller quadrangle, Alaska (map scale 1:125,000)	C. L. Sainsbury

Table 2-2. USGS Publications, 1970 (continued)

Number	Title	Author
	(OPEN FILE REPORTS) (Continued)	
412	Preliminary interpretation of geophysical data from the lower Noatak River basin, Alaska	David F. Barnes Irvin L. Tailleur
413	Reconnaissance geologic map, analyses of bedrock and stream sediment samples, and an aeromagnetic map of parts of the southern Alaska Range (2 maps one at scale 1:125,000 and other at 1:250,000)	Bruce L. Reed Raymond L. Elliott
414	Morphology, sedimentation and seismic characteristics of an Arctic beach, Nome, Alaska--with economic significance	H. Gary Greene
415	Metallic mineral resources map of the Bethel quadrangle, Alaska (map scale 1:250,000)	Edward H. Cobb
416	Metallic mineral resources map of the Goodnews quadrangle, Alaska (map scale 1:250,000)	Edward H. Cobb William H. Condon
417	Analyses of rock and stream-sediment samples from the Craig B-3 quadrangle, Alaska	Allen L. Clark Henry C. Berg Donald A. Grybeck A. Thomas Ovenshine Raymond Wehr
418	Analyses of rock and stream-sediment samples from the Craig B-4 quadrangle, Alaska	Allen L. Clark Henry C. Berg Donald A. Grybeck A. Thomas Ovenshine Raymond Wehr
419	Analyses of rock and stream-sediment samples from the Craig B-5 quadrangle, Alaska	Allen L. Clark Henry C. Berg Donald A. Grybeck A. Thomas Ovenshine Raymond Wehr
420	Analyses of rock samples from the Craig B-6 quadrangle, Alaska	Allen L. Clark Henry C. Berg Donald A. Brybeck A. Thomas Ovenshine Raymond Wehr
421	Analyses of rock and stream-sediment samples from the Craig C-5 quadrangle, Alaska	Allen L. Clark Henry C. Berg Donald A. Grybeck A. Thomas Ovenshine Raymond Wehr

Table 2-2. USGS Publications, 1970 (continued)

Number	Title	Author
	(OPEN FILE REPORTS) (Continued)	
422	Analyses of rock and stream-sediment samples from the Craig C-7 quadrangle, Alaska	Allen L. Clark Henry C. Berg Donald A. Grybeck A. Thomas Ovenshine Raymond Wehr
423	Analyses of stream-sediment and rock samples from the southwestern and central parts of the Eagle quadrangle, Alaska	Helen L. Foster
424	Preliminary geologic investigation of Western St. Lawrence Island, Alaska	William W. Patton, Jr.
425	Analyses of stream sediment samples from Western St. Lawrence Island, Alaska	William W. Patton, Jr.
426	Analysis of stream sediment samples from the McCarthy C-8 quadrangle, Alaska	G. R. Winkler E. M. Mackevett Jr.
427	Metallic mineral resources map of Russian Mission quadrangle, Alaska (map scale 1:250,000)	Joseph M. Hoare Edward H. Cobb
428	Metallic mineral resource map of Talkeetna quadrangle, Alaska (map scale 1:250,000)	Allen L. Clark Edward H. Cobb
429	Interpretation of an aeromagnetic survey of the Amchitka Island area, Alaska	C. D. Bath W. J. Carr L. M. Gord, Jr. W. D. Quintivan
430	Analyses of rock and stream-sediment samples from the Sumdum A-3 quadrangle, Alaska	Allen L. Clark David A. Brew Donald A. Grybeck Raymond Wehr
431	Analyses of rock and stream-sediment samples from the Sumdum A-4 quadrangle, Alaska	Allen L. Clark David A. Brew Donald A. Grybeck Raymond Wehr
432	Analyses of rock and stream-sediment samples from the Sumdum B-3 quadrangle, Alaska	Allen L. Clark David A. Brew Donald A. Grybeck Raymond Wehr
433	Analyses of rock and stream-sediment samples from the Sumdum B-4 quadrangle, Alaska	Allen L. Clark David A. Brew Donald A. Grybeck Raymond Wehr

Table 2-2. USGS Publications, 1970 (continued)

Number	Title	Author
	(OPEN FILE REPORTS) (Continued)	
434	Analyses of rock and stream-sediment samples from the Sumdum B-5 quadrangle, Alaska	Allen L. Clark David A. Brew Donald A. Grybeck Raymond Wehr
435	Analyses of rock and stream-sediment samples from the Sumdum C-4 quadrangle, Alaska	Allen L. Clark David A. Brew Donald A. Grybeck Raymond Wehr
436	Chukchi Sea seismic reflection and magnetic profiles 1969, between northern Alaska and international date line	Arthur Grantz W. F. Hanna S. C. Wolf
437	Analyses of rock and stream-sediment samples from the Taylor Mountains A-6 and southern part of Taylor Mountains B-6 quadrangles, Alaska	Allen L. Clark W. H. Condon J. M. Hoare Dennis H. Sorg
438	Analyses of rock and stream-sediment samples from the northern part of the Taylor Mountains B-6 quadrangle, Alaska	Allen L. Clark W. H. Condon J. M. Hoare Dennis H. Sorg
439	Analyses of rock and stream-sediment samples from the Taylor Mountains C-8 quadrangle, Alaska	Allen L. Clark W. H. Condon J. M. Hoare Dennis H. Sorg
440	Progress map, geology of the Sadlerochit and Shublik Mountains, Mt. Michelson C-1, C-2, C-3 and C-4 quadrangles, Alaska (map scale 1:63,360)	H. N. Reiser J. T. Dutro, Jr. W. P. Brosge A. K. Armstrong R. L. Detterman
441	Results of geochemical sampling in the western Clearwater Mountains, Alaska	Thomas E. Smith
442	A brief hydrologic and geologic reconnaissance in the Cordova area, Alaska (copy at Menlo Park, Calif. only)	Ivan Barnes
443	A proposed stream flow data program for Alaska (copy at Menlo Park, Calif. only)	J. M. Childers

Table 2-2. USGS Publications, 1970 (continued)

Number	Title	Author
	(OPEN FILE REPORTS) (Continued)	
444	Hydraulic tests in hole UA-1 and water inflow into an underground chamber, Amchitka Island, Alaska (copy at Menlo Park, Calif. only)	W. C. Ballance
445	Lead-zinc- and barite-bearing samples from the western Brooks Range, Alaska, with a section on petrography and mineralogy	Irving L. Tailleur G. D. Eberlein Ray Wehr
446	High-resolution seismic survey of a nearshore area, Nome Alaska	A. R. Tagg H. Gary Greene
447	Physiographic diagrams of parts of the continental borderlands of California and Alaska 12 physiographic diagrams, as follows: Southern California Borderland; Eastern Murray Fracture Zone and Transverse Ranges; Southern Monterey Bay; Monterey Canyon; Central San Francisco Bay; Pribilof Canyon; Zhemchug Canyon; Bering Canyon; Buldir Depression; Nuka Bay Alaska; Western Aleutian Arc (viewed from south); Western Aleutian Arc (viewed from north).	Tau Rho Alpha
448	Paleozoic and Precambrian rocks of Alaska and their role in its structural evolution	Michael Churkin, Jr.
449	Water resources reconnaissance of the Glovin area, Alaska	J. B. Weeks
450	Water resources reconnaissance of the Kwiguk Emmonak area, Alaska	A. J. Feulner
451	Water resources reconnaissance of the Old Harbor area, Kodiak Island, Alaska	J. B. Weeks
	(SHORT PAPERS)	
	Detrital gold and sediments in Nuka Bay, Alaska. Reference Professional Paper 700-C pp C35-C42	Erk Reimnitz Roland Van Huene F. F. Wright
	Age and stratigraphy of the Heceta Limestone in northern Sea Otter Sound, southeastern Alaska. Reference Professional Paper 700-C pp C170-C174	A. T. Ovenshine G. D. Webster

Table 2-2. USGS Publications, 1970 (continued)

Number	Title	Author
	(SHORT PAPERS) (Continued)	
	Application of magnetic and electrical resistivity methods to placer investigations in the Fairbanks district, Alaska. Reference Professional Paper 700-C pp C107-C113	L. A. Anderson G. R. Johnson

USGS MAPS. The U. S. Geological Survey has released a set of five 1:24,000 (1 inch = 2000 feet) scale maps of the Fairbanks Quadrangle. The maps are Fairbanks D-1, SW: Fairbanks D-2, NE; Fairbanks D-2, SW; Fairbanks D-2, NW; and, Fairbanks D-2, SE. The maps are 50¢ each and may be purchased from the U. S. Geological Survey Map Distribution Office, 310 First Ave., Fairbanks, Alaska 99701.

TABLE 2-3. USGS MAPS

Number	Title	Compiled By
I-445	Permafrost map of Alaska	O. J. Ferrians, Jr.
I-573	Geologic map of the Charley River quadrangle, east-central Alaska	E. E. Brabb Michael Churkin, Jr.
I-590	Surficial and engineering geology of the central part of the Yukon-Koyukuk lowland, Alaska	F. R. Weber T. L. Pewe
I-593	Reconnaissance geologic map of the Tanacross quadrangle, Alaska	H. L. Foster
I-601	Preliminary geologic map of the Black River quadrangle, East-Central Alaska	Earl E. Brabb
GP-354	Aeromagnetic map of parts of the Ugashik and Karluk quadrangles, Alaska	G. E. Andreasen W. J. Dempsey J. L. Vargo
GQ-804	Geologic map of the Healy D-2 quadrangle, Alaska	Clyde Wahrhaftig

Table 2-3. USGS Maps (continued)

Number	Title	Compiled By
GQ-805	Geologic map of the Healy D-3 quadrangle, Alaska	Clyde Wahrhaftig
GQ-806	Geologic map of the Healy D-4 quadrangle, Alaska	Clyde Wahrhaftig
GQ-807	Geologic map of the Healy D-5 quadrangle, Alaska	Clyde Wahrhaftig
GQ-808	Geologic map of the Fairbanks A-2 quadrangle, Alaska	Clyde Wahrhaftig
GQ-809	Geologic map of the Fairbanks A-3 quadrangle, Alaska	Clyde Wahrhaftig
GQ-810	Geologic map of the Fairbanks A-4 quadrangle, Alaska	Clyde Wahrhaftig
GQ-811	Geologic map of the Fairbanks A-5 quadrangle, Alaska	Clyde Wahrhaftig
GQ-844	Geologic map of the McCarthy C-4 quadrangle, Alaska	E. M. MacKevett, Jr.
GQ-899	Geologic map of the McCarthy C-5 quadrangle, Alaska	E. M. MacKevett, Jr.
MR-52	Antimony occurrences in Alaska	Edward H. Cobb
MR-53	Bismuth occurrences in Alaska	Edward H. Cobb
MR-54	Mercury occurrences in Alaska	Edward H. Cobb
MR-56	Uranium, thorium, and rare-earth elements in Alaska	Edward H. Cobb

U. S. BUREAU OF MINES

Former Secretary of the Interior, Walter J. Hickel, appointed William E. Eckard to head the Interior Department's Bureau of Mines in Alaska. Eckard, a native of Pittsburgh, Pennsylvania has 20 years federal research experience in petroleum development and production engineering. He is chief of the Bureau's Alaska office of Mineral Resources, with headquarters in Juneau.

The Alaska Field Operations office budget for 1971 is $540,000, the major portion of which is being used for the Bureau's Mineral Deposit Investigations program. A long range goal is the establishment of a mineral data bank-file which can be computerized for retrieval of a large amount of information on the state's mineral deposits. Mineral economics and supply are important areas of investigation.

The U.S.B.M. is engaged in geophysical studies to determine the interface between overburden and underlying formations in Alaska. Research to develop less expensive drilling methods is being conducted in the Fairbanks area. An effort to extinguish coal seam fires is being made in cooperation with State and other agencies. The mineral assay office in Juneau analyzes samples collected by Bureau personnel and offers service to prospectors.

USBM PUBLICATIONS

Publications of the U. S. Bureau of Mines on Alaska--published after release of the Division of Mines and Geology 1969 annual report are listed in Table 2-4. Areas studied by the U. S. Bureau of Mines is listed in Table 2-5. Also published was a Minerals Yearbook USBM, Alaska Chapter in Volume III, Area Reports: Domestic Yearbook Chapter, The Mineral Industry for Alaska, for the years 1967 and 1968, by Kevin Malone.

TABLE 2-4. USBM REPORTS

Number	Title	Author
	(INVESTIGATIONS)	
RI 7321	Sampling and Coking of Coalbeds in the Kokolik River, Kikpowruk River, and Cape Beaufort Areas of Arctic Northwestern Alaska	R. S. Warfield
RI 7356	Effects of type of cut, delay, and explosive on underground blasting in frozen gravel	Richard A. Dick
RI 7392	Spray-Applied Polyurethane Foam to Insulate Heated Rooms Excavated in Permafrost	K. Robert Dorman Aldon E. Gooch
	(OPEN-FILE REPORTS)	
OFR 1-69	Reconnaissance of Tatonduk River Beds	A. L. Kimball
OFR 6-69	Reconnaissance Sampling of Decomposed Monzonite for Gold Near Flat, Alaska	A. L. Kimball

Table 2-4. USBM Reports (continued)

Number	Title	Author
	(OPEN-FILE REPORTS) (Continued)	
OFR 16-69	Sampling for Gold in River Bars, Kuskokwim River Basin, Alaska	R. P. Maloney
OFR 22-69	Silver in the United States Potential Reserves, Chapter 2 Silver in Alaska	by Staff, Bureau of Mines Robert Thorne
	Reconnaissance of the gold-bearing quartz veins in the Tibbs Creek area, Goodpaster River, Big Delta quadrangle, central Alaska	Bruce I. Thomas
OFR 3-70	Testing for Downward Vein Extensions of Gold-Silver Mineralization in the Wolf Creek-Fairbanks Creek Divide Area, Fairbanks District, Alaska	R. S. Warfield
OFR 14-70	Reconnaissance of the Gold-Bearing Quartz Veins in the Tibbs Creek Area, Goodpaster River, Big Delta Quadrangle, Central Alaska	Bruce I. Thomas

TABLE 2-5. USBM AREAS STUDIED

Location	Type of Study
(ARCTIC ALASKA)	
Western Arctic	Inventory of Mineral Deposits near Arctic Coast from Point Hope to Barrow, Alaska
Pipeline Corridor	Inventory of Mineral Deposits along the Proposed Prudhoe Bay to Fairbanks Corridor, including the Central Brooks Range classification area.
(INTERIOR ALASKA)	
Pipeline Corridor	Inventory of Mineral Deposits along the proposed Prudhoe Bay to Fairbanks corridor

Table 2-5. USBM Areas Studied (continued)

Location	Type of Study
(INTERIOR ALASKA) (Continued)	
Fairbanks area	Development of drilling techniques for sampling mineral deposits
(WESTERN ALASKA)	
Kuskokwim mercury area	Assess the mineral resources of the Sleetmut, Taylor Mountains, and Idatarod quadrangles
Nome and Goodnews Bay areas	Development of geophysical methods for profiling bedrock under placer deposits
(SOUTH CENTRAL ALASKA)	
Wrangell Mountains	Examine mineral deposits in the Nabesna and McCarthy quadrangles
Prince William Sound	Assess mineral deposits in the south central part of the Seward quadrangle
Ninilchik	Examine coal outcrop fire
(SOUTHEASTERN ALASKA)	
Ketchikan-Hyder area	Inventory mineral deposits in the Ketchikan, Bradfield Canal and Prince Rupert quadrangles
Ketchikan area	Analysis of the potential of certain Bureau of Mines developed geophysical equipment for delineating mineral deposits in a marine environment

MINERAL INDUSTRY RESEARCH LABORATORY

The Mineral Industry Research Laboratory (MIRL) is part of the University of Alaska's College of Earth Sciences and Mineral Industry at College, Alaska. Its purpose is to conduct basic and applied research to promote the mineral industries in the state.

MIRL equipment is used by the State Division of Geological Survey. The best example is the emission spectrograph with which each Division geochemical sample is analyzed for 30 elements by emission spectroscopy. Data is tabulated by a computer processing program which includes the calculation of the mean, threshhold value, anomalous value, and standard deviation. Histograms for each element of interest are developed. MIRL personnel assisted in developing the computer programs, and an interchange of ideas for better analytical methods is maintained. Projects completed by MIRL during 1970 and new publications issued are listed below. Further information is available from the College of Earth Sciences and Mineral Industry, University of Alaska, College, Alaska.

MIRL PUBLICATIONS

Anyone interested in Alaska prospecting will find useful information in the following books for sale at the Mineral Industry Research Laboratory, University of Alaska, College, Alaska, 99701.

Alaska Mining Law Manual, by Charles F. Herbert, was revised and republished. Price $4.00.

Benefication of Tin-Tungsten Ore from Lost River, Alaska. The project was completed and the report submitted to the sponsor, P.C.E. Exploration, Ltd., of Toronto, Canada.

Boyhood in the Nome Gold Camp, by Irving Reed; Price $1.50.

Determinative Mineralogy, by Anthony and Wilkinson; price $1.50.

Fortran IV Program for Processing Geochemical Sediment Data; MIRL Report No. 23, by Lawrence E. Heiner.

Handbook for the Alaskan Prospector, by Ernest Wolff; price $6.00.

Introduction to Prospecting and Mining, by Leo Mark Anthone; price $4.00.

Mineral Commodity Maps of Southeastern Alaska; a set of commodity maps, with a scale of one inch equals 20 miles, show the locations of all metallic and nonmetallic deposits in Southeastern Alaska. All maps are constructed for use as overlays on a geologic map of the region.

Mineral Resources of Northern Alaska, by Lawrence E. Heiner and Ernest N. Wolff, was expanded and reprinted.

ALASKAN SEMINARS AND SYMPOSIUMS

Alaska Seminars and Symposiums held during the year 1970 are as follows:

1. The Geophysics and Geology of the Bering Sea Region: June 26 - July 4; sponsored by the University of Alaska's Geophysical Institute.

2. North Slope Seminar: February 1-3, Palo Alto, California. Sponsored jointly by the U. S. Geological Survey and the American Association of Petroleum Geologists.

3. Alaska Tectonics Symposium: February 23-25, Anchorage, Alaska. Sponsored by the Alaska Geological Society.

4. Alaska Division Meeting of the American Association for the Advancement of Science Conference: August 16-19, University of Alaska, College, Alaska.

SECTION III

SECTION III

ALASKA MINING PRODUCTION

MINERAL PRODUCTION

The value of 1970 mineral production in Alaska is estimated at $299.4 million compared with $257.6 million in 1969 according to production statistics compiled by the Bureau of Mines, U. S. Department of the Interior. Crude oil and natural gas from the Kenai Peninsula and offshore Cook Inlet fields once more were the leading mineral commodities, accounting for $256.7 million or 86 percent of total mineral production. Other mineral commodities, in order of value, included sand and gravel, coal, stone, barite, gold, platinum-group metals, and mercury.

Mineral production showing quantity and value are listed in Table 3-1. Production of major commodities since 1949 are listed in Table 3-2. Physical volume of Alaska mineral production is listed in Table 3-3. Annual mineral production in Alaska from 1900 through 1970 is illustrated in Figure 3-1. Known mineral deposits throughout Alaska are shown in Figure 3-2.

The statistics shown in Table 3-1 were prepared under a cooperative agreement for the collection of mineral data between the Bureau of Mines, U. S. Department of the Interior, and the Division of Geological Survey of the Alaska Department of Natural Resources. The Figures for coal and 1969 barite are presented on authority of the Division of Geological Survey only.

PRECIOUS METALS

Platinum was again No. 1 in value of the precious metals produced in Alaska. Goodnews Bay Mining Company continued to operate a dredge and two sluice boxes at its operation on the Salmon River near Goodnews Bay, Alaska. Gold production is estimated to have increased approximately 50 percent over 1969. The United States Smelting Refining & Mining Company continued to operate its dredge on the Hogatza River. Chandalar Gold Mining Company had its lode mine in operation in the Brooks Range near Chandalar Lake and milled 3,000 tons of ore in August. Small operators produced minor quantities from isolated areas in the Kuskokwim Mountain Region near Marvel Creek the Livengood district, Manley Hot Springs district, and a few areas out of Nome on the Seward Peninsula. Offshore mineral exploration continued with Inlet Oil Company assuming the leading role, and Rowan Drilling Company gearing up near Nome late in the year.

BASE METALS

Mercury mining in Alaska picked up with production at three and possibly four mines. Alaska should again rank No. 3 in the production of mercury in the United States. No. 1 producer was the Alaska Mines and Minerals Company at the Red Devil Mine, where production was from both underground and open pit. The mine supplied sufficient ore to keep the mill operating at maximum capacity most of the year. Robert Lyman continued to operate his White Mountain Mine. Diamond Shamrock Co. subleased the Cinnabar Creek Mine to the Haday Mining Company of

Salt Lake City Utah. Under the direction of T. A. Hubbard, a small concentrator was set up and concentrates were shipped by air to Anchorage, Alaska for retorting. C. T. Rasmussen produced a few flasks and continued development work on his Red Top mine near Aleknagik.

Several shipments of copper ore were reported to have been made from the McCarthy area and a permit to ship 1,000 tons of copper concentrate to Japan was allowed by the Department of Commerce from a mine near Hyder, south of Ketchikan, Alaska.

The high price for antimony induced several producers to ship stibnite ore. Most of the ore is reported to have been hand cobbed, but at least two small mills operated during the summer, one at Stampede and one near Fox. In addition to these, stibnite was recovered in the flotation of cinnabar at the Red Devil mine. Some antimony production was reported from the Wood River and near Dillingham. The Toklat Mining Company produced antimony in the Kantishna district.

BARITE

The Inlet Oil Company continued their underwater mining of barite at Castle Island near Petersburg, Alaska.

COAL

Coal production continued at about the same level as 1969. The Nenana field again produced nearly all the commercial coal used in the State. The Vitro Minerals Company sold their mine to Usibelli Coal Company. One new operation entered the field at Healy - the R and B Coal Company.

American Mining and Exploration continued sampling and testing of coal in the Beluga River field. Other companies are investigating there also. Investigations continued in the Bering River field.

URANIUM

Newmont Exploration, Ltd., wholly owned subsidiary of Newmont Mining Co., has completed a three-year drilling program evaluating the reserves at the Kendrick Bay property (Ross-Adams mine) on Bokan Mountain, Prince of Wales Island. Newmont, lessee of the property, has announced that the company spent $750,000 proving up approximately 1 million pounds of uranium oxide which it expects to produce over the next three years. Mining is expected to begin early in 1971.

TABLE 3-1. MINERAL PRODUCTION IN ALASKA

NOTE: ALL values are in Thousands of Dollars

Mineral	1969		1970(1)	
	Quantity	Value	Quantity	Value
Antimony--short ton antimony content	47	13	120	100
Barite--thousand short tons	95	1,190	150	1,875
Coal--thousand short tons	728	4,647	786	5,278
Gold--troy ounces	21,227	881	38,400	1,378
Lead--short tons	2	1	---	---
Natural Gas(2)--million cubic feet	50,864	12,665	59,185	14,855
Petroleum, Crude(2)--thousand barrels	73,953	214,464	82,250	241,815
Sand and Gravel--thousand short tons	16,205	18,615	20,365	26,070
Silver--thousand troy ounces	2	4	4	7
Undistributed(3)	---	5,163	---	7,994
TOTALS	163,123	257,643	201,260	299,372

NOTE: (1) Figures for 1970 are preliminary and subject to revision.

(2) Gas and petroleum figures will differ from those published by the Division of Oil and Gas because of different methods of compiling and reporting. For complete details on fields, wells, etc., see the Division of Oil and Gas Annual Report.

(3) Includes copper, gem stones, mercury, peat, platinum group metals, stone, and tin. Figures on these minerals have been withheld to avoid disclosing individual company confidential data.

TABLE 3-2. PRODUCTION OF MAJOR COMMODITIES SINCE 1949

NOTE: ALL values are in thousands of dollars

Year	Gold	Mercury	Coal	Oil and Gas	Total All Production (millions)
1950	$ 10,125	$	$ 3,033	$	$ 17.9
1951	8,387		3,767		19.5
1952	8,420	6	5,779		26.3
1953	8,882	8	8,452		24.3
1954	8,699	277	6,442		24.4
1955	8,725	12	5,759		25.4
1956	7,325	853	6,374		23.4
1957	7,541	1,349	7,296		30.2
1958	6,525	774	6,931		20.9
1959	6,262	851	6,869	311	20.5
1960	5,887	940	6,318	1,496	21.9
1961	3,998	816	5,868	17,776	34.7
1962	5,784	711	6,409	31,657	54.2
1963	3,485	76	5,910	33,760	67.8
1964	2,045	95	5,008	35,490	66.1
1965	1,479	104	6,095	35,614	83.2
1966	956	101	6,953	50,418	86.3
1967	803	79	7,178	95,455	134.6
1968	835	78	5,034	191,083	221.7
1969	881	100	4,647	227,129	257.6
1970(1)	1,378	1,260	5,278	256,670	299.4
	$108,422	$8,490	$125,400	$976,859	$1,560.3

NOTE: (1) 1970 figures are preliminary and subject to change.

TABLE 3-3. PHYSICAL VOLUME OF ALASKA MINERAL PRODUCTION

Mineral	Weight	Quantity	Year	
			From	To
Antimony	(Approx 53%Sb) short tons	4,146	1928	1970
Coal	Short tons	22,145,000	1951	1970
Copper	Short tons	690,011	1880	1967
Chromite	(Approx 45% CR203 long tons	29,000	1917	1957
Crude Petroleum	42 gallon barrels	241,494,671(1)	1958	1970
Gold (Total)	Troy ounces	30,003,889	1880	1970
Lead	Short tons	25,016	1906	1969
Mercury	760 lb. flasks	38,099	1902	1970
Natural Gas	Million cubic feet	335,924	1948	1970
Sand and Gravel	Short tons	194,571,970	1958	1970
Silver (Total)	Troy ounces	19,080,012	1906	1970
Stone	Short tons	10,893,000(2)	1921	1966
Tin	Short tons	2,400(2)	1902	1966
Tungsten	Short ton Units WO3	7,000	1916	1958

NOTE: Platinum, barite, and other commodity figures are confidential and are not included in 1970 production.

(1) The only other crude petroleum recorded production was from the Katalla area. From 1901 to 1932, 154,000 barrels of oil were produced there.

(2) Production data, if any, withheld in 1967, 1968, 1969 and 1970.

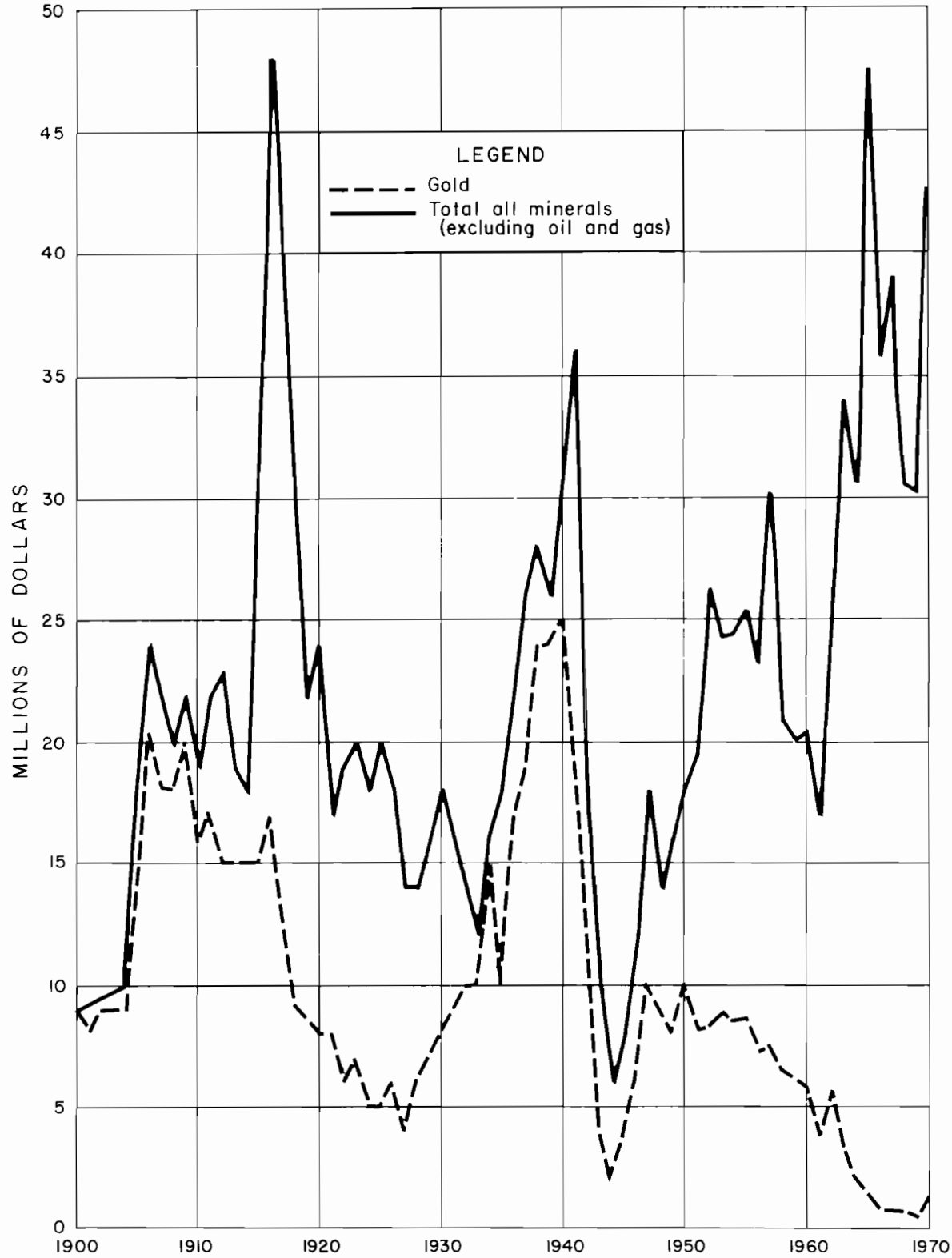


Figure 3-1

ANNUAL MINERAL PRODUCTION IN ALASKA 1900 - 1970

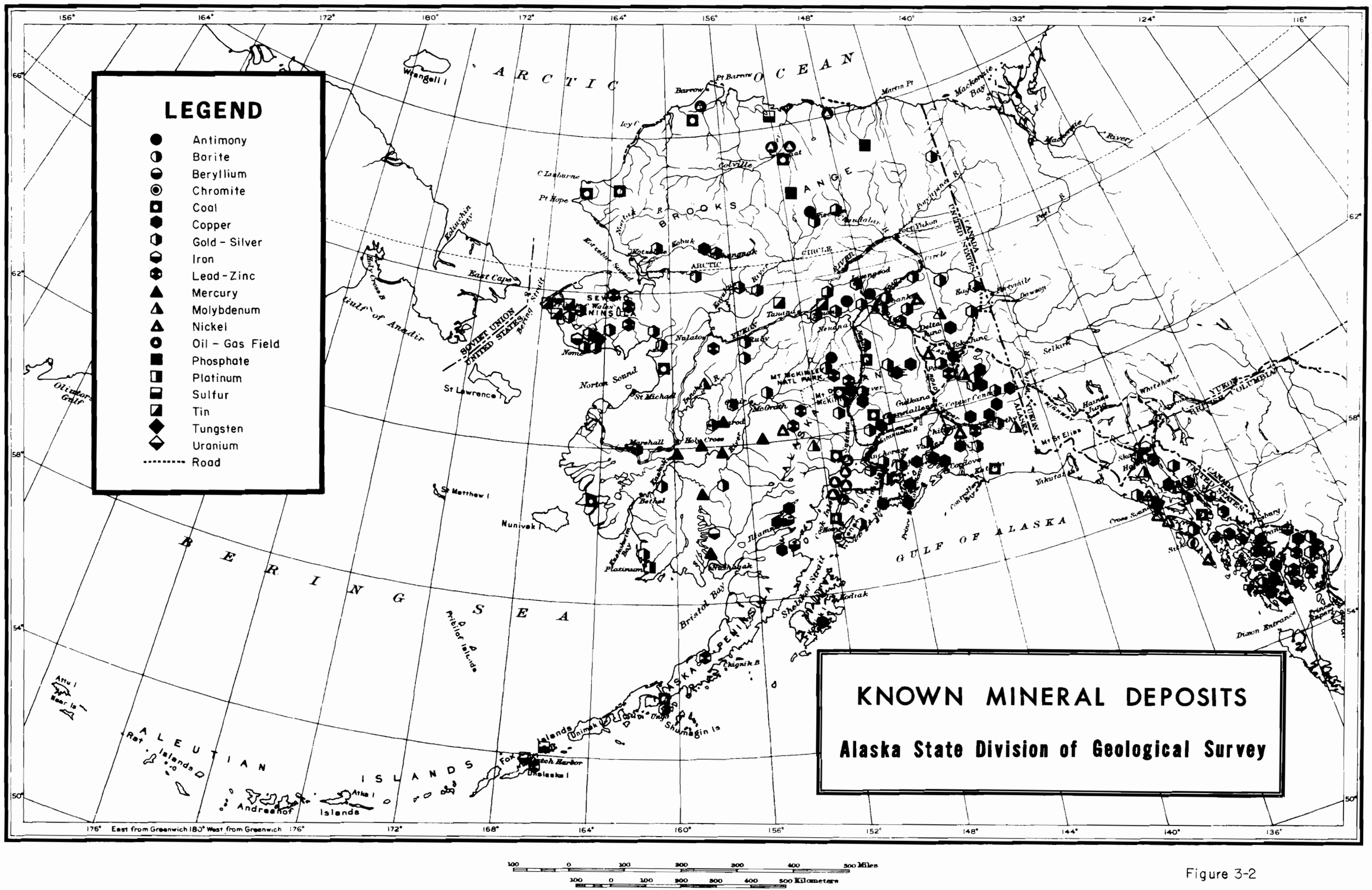


Figure 3-2

KNOWN MINERAL DEPOSITS 3-7/3-8

SECTION IV

SECTION IV

PROSPECTING AND EXPLORATION THROUGHOUT ALASKA

MINERAL EXPLORATION

Recent exploration ventures conducted by major companies in Alaska have been directed largely towards the search for large, low-grade deposits suitable for open pit mining. Copper and nickel deposits are of particular interest.

An increasing number of mining companies and others are showing an interest in Alaska's mineral potential, though the actual field work remained on about the same level as in 1969. Individual prospectors continue to be active throughout the state. Southeastern Alaska, Seward Peninsula, the Fortymile district, the Nabesna area, and the McCarthy district were the most popular regions during 1970.

EXPLORATION AND EXPENDITURES

It is estimated that a total of about $6.9 million was spent on exploration in Alaska during the year, about the same as in 1969. See figure 4-1. Last year's estimate for 1969 expenditures is now judged to have been too high. Division records show that 7,207 new mining claims were recorded as of January 1, 1971.

ARCTIC ALASKA. It is estimated that approximately $775,000 was spent on minerals exploration in 1970 in Arctic Alaska. Bear Creek Mining Company is continuing its effort to increase its reserves around its copper properties at Bornite in the Kobuk area, and is doing reconnaissance work eastward along the south flanks of the Brooks Range.

Kaiser Steel Co. with Morgan Coal Co. examined coal beds in the Kukpowruk River area near Cape Beaufort, and took some large underground samples.

American Metal-Climax and Perini also are showing an interest in Arctic coals.

WESTERN ALASKA. An estimate of the total amount spent for exploration in Western Alaska is $1,225,000; a considerable proportion of which was for offshore prospecting in the Nome area. The Seward Peninsula, in particular, is well mineralized and will be the scene of new mining production in the foreseeable future.

PCE Explorations, Ltd., headed by Murray Watts, acquired a lease on the Lost River mine properties approximately 90 miles northwest of Nome on the Seward Peninsula. An extensive core drilling program is underway. The item of primary interest is the fluorite, but the tin, beryllium, and tungsten will be valuable by-products.

Gold Strike Mining and Exploration Corp., an Alaskan organization, is seeking financing to develop lode and placer claims on Humbolt Creek, 125 miles north of Nome.

Field parties were reported to be exploring for mercury in the Kuskokwim River region. James Wylie and Dorr Holloway were two of the most active. Harry Waterfield prospected with a sizeable crew.

Offshore exploration and the continued study for underwater deposits of placer gold, platinum, and tin is being conducted by the mineral division of Shell Oil, and Amerada-Hess, American Smelting and Refining Co., Inlet Oil Corp., Rowan International and Aurora Mining.

Rhiny Berg continued his exploration work at the old Independence property on the Kugnek River and elsewhere, and Alaskamin of Portland was active in the vicinity of Granite Mountain, where a staking rush occurred in 1969. Placid Oil investigated a number of prospects on the Seward Peninsula.

INTERIOR ALASKA. Expenditures for exploration in Interior Alaska are estimated to be $1,325,000 for 1970. The most activity was in the Eagle and Tanacross quadrangles near the Canadian border. This was the result of favorable geology in the district resembling that around the Casino prospect in the Dawson Range across the border in Canada. Casino is thought to have possibilities of being a commercial copper porphyry. A number of major companies were active in the district (Fortymile) including American Exploration, American Smelting (now drilling there), International Minerals, Occidental Minerals, Straus Exploration and others.

Other parties were at various locations in Interior Alaska working for Earth Resources (with Dillingham Dredging and Freeport Sulfur), Rob Foster, Amoco Minerals, American Metals Climax, Inspiration Copper, and Wallace MacGregor.

Cassiar did some more work on the asbestos near Eagle even though no title can be obtained to nonmetallics not staked prior to the present land freeze. Bob Beck and Bob Buzby both continued exploration work on prospects in the Bonnifield district. Jim Lundgren of Pacific Construction took equipment into the My Creek area of the Fortymile and did some development work. Western Exploration of Anchorage contracted for airborne geophysical work based out of Manley Hot Springs.

American Exploration Co. (AMEX) drilled a large, low-grade copper deposit at Orange Hill. Other companies including AlVenCo of Anchorage were active in the same area, generally referred to as the Shushana or Nabesna district.

SOUTH-CENTRAL ALASKA. Total expenditures for exploration in South-Central Alaska during 1970 are believed to be approximately $1,100,000.

Hanna Mining is continuing its detailed study of the old Kennecott Mother Lode property near McCarthy. Cities Service Minerals Corp. made good progress with its development program at the Denali copper prospect. This property is likely to be the first new copper producer in Alaska. Cities Service also fielded a recon crew again, as it has for several years.

Anaconda American Brass of Vancouver and Inexco of Denver were active in the McCarthy area, and Gordon Burdick continued his development work at the Old Green Butte property. Ptarmigan Co. of Anchorage continued its exploration and drilling of several prospects in the Slana district.

Cortella Coal Co. continued to hold and develop permits in the Bering River coal field, while American Exploration and Morgan Coal Co. continued investigations and drilling in the Beluga field.

SOUTHWESTERN ALASKA. SEREM of Alaska, Inc., a French consortium, is reportedly investigating a copper-molybdenum prospect near Chignik on the Alaska Peninsula. Exploration expenditures by this company and others in the region during 1970 are estimated at $150,000.

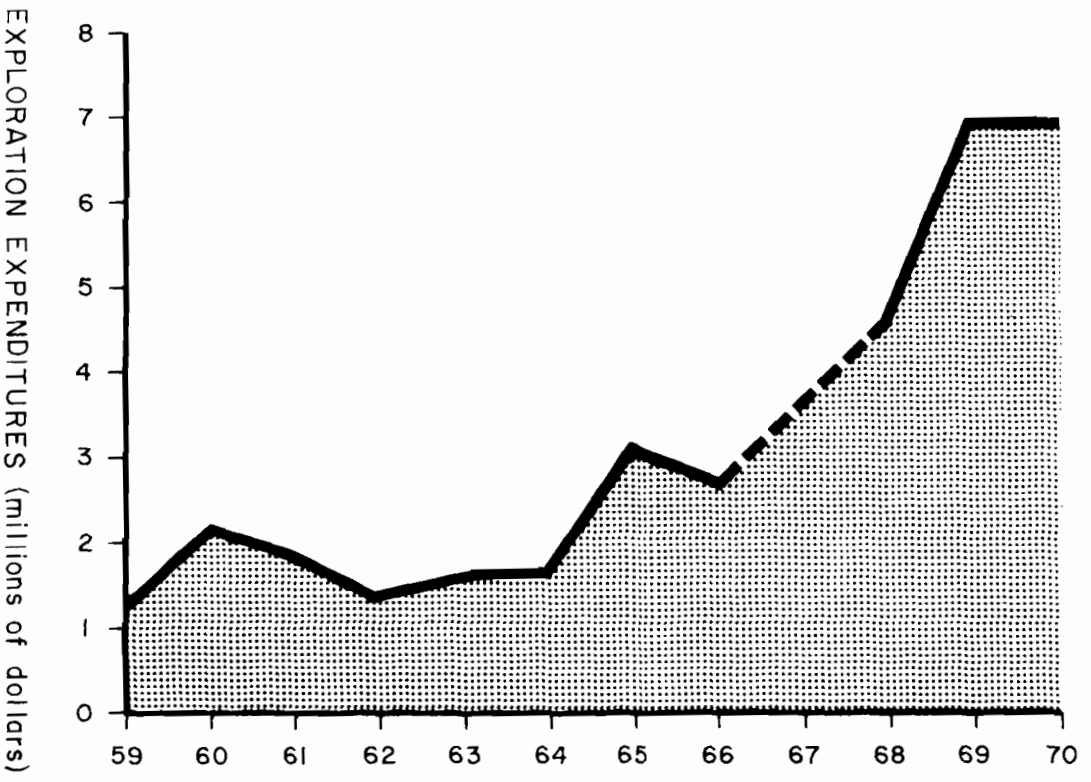
SOUTHEASTERN ALASKA. The largest amounts for exploration in the state were spent in Southeastern Alaska. It is estimated that expenditures in this region during 1970 were about $2,275,000. Marcona Corp. of San Francisco released tentative plans early in the year for the development of the large magnetite iron ore deposit at Port Snettisham, 35 miles southeast of Juneau. Construction of a $130 million plant is proposed for ore treatment. U. S. Steel Corp. continued its work on the Klukwan alluvial iron deposit near Haines.

Humble Oil and Refining conducted one of the most expensive programs in the region by a program of deep drilling on a block of 276 claims in Ground Hog Basin. This is Bill Huff's Whistle Pig prospect. El Paso Natural Gas is also a big operator in Southeastern Alaska with recon parties, drilling projects, and a lab and offices in Ketchikan.

Newmont Exploration Ltd., was preparing to reopen the Ross-Adams uranium mine near Kendrick Bay on Prince of Wales Island early in 1971 and ship to its Dawn mill near Spokane. The orebody is extremely high grade. Phelps Dodge operated a boat and "chopper" supported recon party. AlVenCo of Anchorage was active in several Southeastern areas. Paramount Mining Co. and United Copper Corp. are jointly evaluating a large low grade copper deposit near Ketchikan. Union Carbide had two small parties doing geochemical reconnaissance.

Alakon Metals Ltd., is reported to be exploring 42 claims on Admirality Island, where they apparently have found good silver values. This is property of Red Rock Mining Co. of Juneau.

Other companies active in southeastern Alaska were American Smelting and Refining Co., Utah Construction and Mining, Mobil Oil Co., and Hawkins, Eichner, and Lilly of Ketchikan.



Note: Information not available for 1967
Graph exclusive of oil and gas

Figure 4-1

EXPLORATION EXPENDITURES IN ALASKA 1959-1970

ALASKA MINING ACTIVITY DURING 1970

A list of various prospectors, mines, and companies are listed in table 4-1. A list of active coal mines is shown in table 4-2. Active companies interested in Alaska mining possibilities are listed in table 4-3 and consultants available for work in Alaska are listed in table 4-4.

TABLE 4-1. PROSPECTORS, MINERS, AND COMPANIES

NOTE: Information on placer terms used in last column are at end of table.

Name and Address	Location of Mines and Recording Districts in Alaska	Approx. Crew	Type of Operation
Alakon Metals Limited 202-569 Howe Street Vancouver 1, B.C., Canada	Admiralty Island Juneau	5	Drilling silver prospect
Alaska Barite Co. 345 Sixth Avenue Suite 202 Anchorage, Alaska	Castle Island Petersburg	20	Open pit mine barite production
Alaskamin 525 Failing Bldg. Portland, Oregon	Seward Peninsula Cape Nome	12	Exploration
Alaska Mines & Minerals, Inc. Ray Wolfe Box 422 Anchorage, Alaska	Red Devil Mine Kuskokwim	34	Mercury production
Alaska Resources Syndicate, Inc. Seattle, Washington	Alaska general Several		Investigations
Alaska Yukon Minerals Co. 111 East Fifth Avenue Anchorage, Alaska	Copper River region Chitina	2	Prospecting
Albertson, Everett O. 7 Mile Farmers Loop Road Fairbanks, Alaska	Alaska general Several	2	Prospecting
Almasy, Theodore J. McGrath, Alaska	Nixon Fork area Mt. McKinley	1	Prospecting
AlVenCo Clyde Wetherell 6391 I Street Anchorage, Alaska	Alaska General Several	11	Prospecting, drilling
AMAX Exploration Inc. 601, 535 Thurlow Street Vancouver, B.C.	Fortymile Several Fairbanks	4	Investigations

Table 4-1. Prospectors, Miners, and Companies (continued)

Name and Address	Location of Mines and Recording Districts in Alaska	Approx. Crew	Type of Operation
Amerada Hess Corp. Box 2040 Tulsa, Oklahoma	Bering Sea Cape Nome	1	Offshore prospecting
American Exploration & Mining Co. One California Bldg. Suite 2500 San Francisco, California	Alaska general Several	12	Investigations
American Smelting & Mining Co. 504, 535 Thurlow Street Vancouver, B.C.	Alaska general Several	8	Property exploration and offshore
Ames, Robert 1220 Fifth Avenue Fairbanks, Alaska	Ready Bullion Creek Fairbanks	1	Small scale hand(3)
Amoco Minerals Co. 1612 Court Place Denver, Colorado	Shushana Area Fairbanks	5	Exploration
Anaconda P. O. Box 1764 Spokane, Washington	McCarthy district		Investigating prospects
Anderson, Red Manley Hot Springs, Alaska	Glen Gulch Manley Hot Springs	2	Nonfloat(1)
Asbestos Corp. Ltd. 814, 837 W. Hastings Vancouver, B.C.	Alaska general Several	3	Exploration
Atlantic Richfield Box 59 Anchorage, Alaska	Southeast Alaska Several		Claim staking
Au Limited Henry Warner Box 674 College, Alaska	Porcupine Creek Fairbanks	2	Placer development
Auric Mining Co. Nome, Alaska	Bluff Cape Nome	4	Offshore drilling
Aurora Mining Co. Nome, Alaska	Bluff Cape Nome	4	Offshore drilling

Table 4-1. Prospectors, Miners, and Companies (continued)

Name and Address	Location of Mines and Recording Districts in Alaska	Approx. Crew	Type of Operation
Ballard, John D. Box 920 Sitka, Alaska	Chichagof Island Sitka	1	Prospecting
Ballis, Joe Fairbanks, Alaska	Wiseman area Fairbanks	2	Prospecting
Basey, Bill & Martin, Lloyd Box 1173 Ketchikan, Alaska	George Inlet Ketchikan	2	Lode explor-ation
Bear Creek Mining Company 1135 West 8th Anchorage, Alaska	Kobuk region and Alaska Range Several	40	Drilling and recon
Beck, Bob Box 294 Nenana, Alaska	Wood River area Nenana	3	Antimony development
Berg, Rhinehart Kobuk, Alaska	Kugruk Fairhaven	6	Exploration, drilling and underground drifting
Blair, Boyd 320 Lakeview Trailer Court Fairbanks, Alaska	Eva Creek Fairbanks	2	Gold lode development
Bliss, Patrick J. & Sons 129 East 11th Anchorage, Alaska	Ungalik Creek Cape Nome	3	Bucket line dredge
Bloomquist Aniak, Alaska	Marvel Creek Bethel		
Boedecker, Bill, Joines, and Evert Hollis, Alaska	Hollis Ketchikan	2	Prospecting
Boese, Earl Wiseman, Alaska	Linda Creek Fairbanks	2	Nonfloat(1)
Bonanza Creek Placers Terry Gill Port Alsworth, Alaska	Bonanza Creek Iliamna		
Bonanza Gold, Inc. E. 15 Walton Spokane, Washington	Prince of Wales Island Ketchikan	4	Iron lode development

Table 4-1. Prospectors, Miners, and Companies (continued)

Name and Address	Location of Mines and Recording Districts in Alaska	Approx. Crew	Type of Operation
Bonnell, Frank 1057 W. 80th Street Los Angeles, California	Kantishna district Fairbanks	1	Lode prospecting
Bookwalter, Vern Nome, Alaska	Buster Creek Cape Nome	2	Nonfloat(1)
Bradley, Carl Wrangell, Alaska	Southeast Alaska Several	1	Prospecting
Brockway, John T. 1737 Glacier Avenue Juneau, Alaska	Baker Peak Sitka	1	Copper development
Bruce, Farrell Box 10149 Klatt Station Anchorage, Alaska	Chicken Fairbanks	1	Lead-silver development
Bunker Hill Box 29 Kellogg, Idaho	Alaska general Several	1	Investigations
Burdick, Gordon McCarthy, Alaska	McCarthy McCarthy	2	Copper development
Burns, John Boundary, Alaska	Poker Creek (40-Mile) Fairbanks	1	Nonfloat(1)
Busty Belle Mine Tury Anderson & Associates 101 E. Street Fairbanks, Alaska	Fairbanks Fairbanks		Lode development
Butler, Charles R. Box 1896 Fairbanks, Alaska	Stampede Mine Kantishna district	12	Stibnite mining
Buzby, Bob Mile 46 Richardson Highway Fairbanks, Alaska	Dry Creek Bonnifield		Drilling
Cache Creek Exploration Co. 701 Welch Road Palo Alto, California	Interior Alaska Fairbanks	7	Recon exploration
Cambridge Mining Corp. Ltd. 1130 Bay Street Toronto, Canada	Seal Cove Ketchikan	5	Drilling

Table 4-1. Prospectors, Miners, and Companies (continued)

Name and Address	Location of Mines and Recording Districts in Alaska	Approx. Crew	Type of Operation
Canyon Creek Mining Co. Albert H. Kvamme Akiak, Alaska	Canyon Creek Kuskokwim	4	Hydraulic(2)
Carlo, Bill 2111 Southern Fairbanks, Alaska	Hunter Creek Rampart	1	Hydraulic(2)
Cassiar Asbestos Corp. Cassiar, B.C.	Eagle Fairbanks	5	Prospect investigation
Casto, Steve 33 Mile Haines, Alaska	Porcupine Creek Haines	1	Small scale hand(3)
Chandalar Gold Mining Co. Box 1332 Fairbanks, Alaska	Chandalar District Fairbanks	10	Nonfloat(1) and mill
Cities Service Mineral Corp. 61 Broadway New York	Denali Highway area Talkeetna	23	Copper lode development and exploration
Coben, Daniel Fairbanks, Alaska	Boulder Creek Manley Hot Springs	2	Placer prospecting
Copper Range Co. 4401 Wallingford Ave. N Seattle, Washington	Alaska general Several	2	Prospect investigations
Cortella Coal Corporation Box 745 Cordova, Alaska	Bering River Field Carbon Creek	8	Coal development
Craig, Glenn Box 936 Juneau, Alaska	Canyon Creek Fairbanks	4	Nonfloat(1)
Cyprus Mines Corp. 822-510 W. Hastings St. Vancouver, B.C.	Alaska general Several	2	Investigations
Davis, Bon Box 25 Nome, Alaska	Fairbanks Fairbanks	1	Gold lode maintenance
Dayo, Stanley	Covney Creek		

Table 4-1. Prospectors, Miners, and Companies (continued)

Name and Address	Location of Mines and Recording Districts in Alaska	Approx. Crew	Type of Operation
Dickman Mining Co. Orville J. Dickman Teller, Alaska	Eagle Creek Cape Nome	3	Nonfloat(1)
Dotson, R. L. Ketchikan, Alaska	Southeast Alaska	1	Prospecting
Dunbar Co. 7414 East Lincoln Drive Scottsdale, Arizona	Cape Creek Cape Nome		Tin development
Duval Corporation 506-602 W. Hastings Street Vancouver, B.C.	East Central Alaska	10	Recon Exploration
Dynasty Exploration Ltd. 330-355 Burrard Street Vancouver, B.C.	Southeast Alaska Several		Exploration
Earth Resources 90 Park Avenue New York	Interior Alaska	8	Recon exploration
Edgecumbe Exploration Co. C.T. & G.H. Morgan Box 758 Sitka, Alaska	Silver Bay Sitka	2	Gold lode maintenance
Egnaty, Jack Sleetmute, Alaska	George River Kuskokwim	1	Prospecting
Elmer, Lewis G. 1624 Jessie Street Boise, Idaho	Slate Creek Fairbanks		Placer maintenance
El Paso Natural Gas 1014 Water Street Ketchikan, Alaska	Southeast Alaska General	14	Recon exploration and drilling
Emberg, Truman E. Dillingham, Alaska	Egegik Bay to Ugashik Bay Alaska Peninsula	4	Beach sand prospecting
Emerson, Fred Haines, Alaska	Porcupine Creek Haines	1	Small scale hand(3)
Empire Jade Co. Gene Joiner Kotzebue, Alaska	Jade Creek Koatak-Kobuk	1	Jade recovery and cutting

Table 4-1. Prospectors, Miners, and Companies (continued)

Name and Address	Location of Mines and Recording Districts in Alaska	Approx. Crew	Type of Operation
Falconbridge (St. Eugene Mining Co.) 504, 1112 West Pender St. Vancouver, B.C.	Central Alaska Several	8	Recon exploration
Farrell, Ed & Rainery, Del Fairbanks, Alaska	Boulder Creek Manley Hot Springs	2	Placer prospecting
Ferguson, Bill Box 985 Fairbanks, Alaska	Ester Dome Fairbanks	2	Gold lode development
Foster, Willie Nome, Alaska	Hannum Creek Fairhaven	3	Nonfloat(1) and lode prospecting
Fullerton Brothers Flat, Alaska	Willow Creek Mt. McKinley	3	Nonfloat(1)
Garrughi, Ron Fairbanks, Alaska	Alatna	2	Nonfloat(1)
Gates, Willard E. McGrath, Alaska	Cripple and Bear Creeks		
Gates, Tex Ophir, Alaska	Colorado Creek Mt. McKinley	3	Nonfloat(1)
Getty Mines, Ltd. Vancouver, B.C.	Alaska general	1	Property investigations
Gilbertson, George 314 Charles Street Fairbanks, Alaska	Dan Creek McCarthy	1	Prospecting
Goodnews Bay Mining Co. 422 White Building, Seattle or Platinum, Alaska	Salmon River & Tribs. Bethel	40	Platinum dredge
Haday Mining Co. Hubbard, A. T. 445 East 2nd South Salt Lake City, Utah	Cinnabar Creek Mt. McKinley	7	Open pit mercury production
Hamilton, Harley 3101 Dawson Anchorage, Alaska	Kennecott Property McCarthy	2	Surface sniping
Hanna Mining Corp. 1300 Leader Building Cleveland, Ohio	Kennecott Property McCarthy	7	Exploration, drilling

Table 4-1. Prospectors, Miners, and Companies (continued)

Name and Address	Location of Mines and Recording Districts in Alaska	Approx. Crew	Type of Operation
Hansen, Burnett F. Eagle, Alaska	Ben Creek Fairbanks	1	Nonfloat(1)
Hapeman, Fred Chicken, Alaska	Buckskin Creek (40-Mi.) Fairbanks	1	Nonfloat(1)
Hassel Mining Co. Harold Hassel Box 1071 Fairbanks, Alaska	Ready Bullion Creek Fairbanks	2	Nonfloat(1)
Hawkins, W. A., Eichner, Ken and Lillie, Angus Ketchikan, Alaska	Southeast Alaska Several	2	Prospecting
Hecla Mining Co. 1105-900 W. Hastings St. Vancouver, B.C.	Alaska general Several	1	Investigations
Heflinger Mining Co. Carl Heflinger 409 Clara Street Fairbanks, Alaska	Livengood Fairbanks	4	Nonfloat(1)
Heiner, Larry Petersburg, Alaska	Southeast Alaska Several	1	Prospecting
Hibberd, Bill 1723 A. Tongass Ketchikan, Alaska	Southeast Alaska Several	1	Prospecting
Hill, Howard 221 2nd Avenue Fairbanks, Alaska	Platte Creek Nenana	2	Nonfloat(1)
Hogendorn and Volkheimer Nome, Alaska	Seward Peninsula Cape Nome	2	Barite prospect
Hollingsworth, Howard Spokane, Washington	Hannum Creek	1	Development
Holovics Placers Louis Holovics, Jr. Manley Hot Springs, Alaska	American Creek Fort Gibbon		
Holloway, D. and Rehard, R. Box 16 Aniak, Alaska	Kolmakof Property Kuskokwim	4	Mercury exploration and drilling

Table 4-1. Prospectors, Miners, and Companies (continued)

Name and Address	Location of Mines and Recording Districts in Alaska	Approx. Crew	Type of Operation
Homestake Mineral Devel. Co. 304, 535 Thurlow Street Vancouver, B.C.	Alaska general Several	1	Investigations
Hudson, E. and Wittrock, W. 817 Lakeview Trailer Court Fairbanks, Alaska	Livengood Fairbanks	3	Gold lode prospecting
Huff, J. W. Box 837 Ward Cove, Alaska	Southeast Alaska General	2	Prospecting
Humble Oil & Refining Co. P.O. Box 120 Denver, Colorado	Southeast Alaska General	18	Recon exploration, drilling
Inexco Phil R. Holdsworth 1009 Mendenhall Apts. Juneau, Alaska	McCarthy Several	7	Recon exploration
Inlet Oil 345 6th Ave., Suite 202 Anchorage, Alaska	Goodnews Bay district Bethel	10	Offshore prospecting
Inspiration Development Co. Box 69 Inspiration, Arizona	Central Alaska	9	Exploration
International Mineral and Chemical Corp. Old Orchard Road Skokie, Illinois	Fortymile district Fairbanks	8	Recon exploration
International Mine Service, Ltd. Box 1052 Whitehorse, Yukon Terr.	Alaska general Several	1	Investigations
Johnstone, Jack	Prince of Wales Island Ketchikan	2	Prospecting
Kaiser Steel Corp.	Kukpowruk River North Slope		Investigating Arctic coal
Kilbury, Claude E. 2415 E. Hemlock Ketchikan, Alaska	Unuk River Ketchikan	1	Nonfloat(1)
Kiwalik Mining Company Nome, Alaska	Kiwalik Cape Nome	2	Dredge

Table 4-1. Prospectors, Miners, and Companies (continued)

Name and Address	Location of Mines and Recording Districts in Alaska	Approx. Crew	Type of Operation
Kloss, Herman K & D Lode Sunset Cove, Alaska	Sunset Cove Juneau	1	Prospecting
Lanning, Tony Manley Hot Springs, Alaska	Thanksgiving Creek Manley Hot Springs	1	Nonfloat(1)
Larsen, Clifford P. O. Box 1875 Fairbanks, Alaska	McKinley Park Nenana	1	Nonfloat(1)
Larson, Ken Box 1388 Ketchikan, Alaska	Southeast Alaska Several	1	Prospecting
Lindfors, Hugo Nome, Alaska	Rocky Mtn. Creek Cape Nome	1	Development
Lost River Mining Corp., Ltd. P. O. Box 503 Nome, Alaska 99762 Ronald Sheardown or Suite 420 159 Bay Street Toronto 1, Ontario			
Lucky Seven Mining Co. Walter E. Roman Box 141 Fairbanks, Alaska	Fish Creek Fairbanks	7	Nonfloat(1)
Lundgren, James 420 College Road Fairbanks, Alaska	Fortymile area Fairbanks		Exploration
Lyman, Robert Lyman Mining Co. McGrath, Alaska	White Mountain Kuskokwim	5	Mercury production
Lynch, Joe Juneau, Alaska	Southeast Alaska Juneau		Tailings and prospecting
Lynch, John 1700 91st Street Seattle, Washington			
March, Fred	Koyukuk River	2	Nonfloat(1)

Table 4-1. Prospectors, Miners, and Companies (continued)

Name and Address	Location of Mines and Recording Districts in Alaska	Approx. Crew	Type of Operation
Marcona Iron Co. 1 Maritime Plaza San Francisco, California	Snettisham Juneau		Drilling iron deposits
M and M Mining Co. Box 1591 Anchorage, Alaska	Taylor Creek Kuskokwim	2	Nonfloat(1)
McCanse, Ed Ronde Valley Lumber Co. P. O. Box 608 Union, Oregon	Klery Creek Noatak-Kobuk	4	Dredge
McCay, Alan V. Box 513 Wrangell, Alaska	Southeast Alaska Several	2	Prospecting
McCrillis, Dave Alaska Drilling & Construction Company Box 2325 Ketchikan, Alaska	Southeast Alaska General	25	Contract drilling and geological work
McGee, L. 836 Lingley Way Reno, Nevada	Tofty Manley Hot Springs	8	Nonfloat(1)
McGregor, Wallace Box 297 Eureka, Nevada 89316	Alaska general Several	5	Recon exploration
McGill, Fred Petersburg, Alaska	Admiralty Island Petersburg	1	Prospecting
Magnuson, Warren Minalaska, Inc. Ophir, Alaska	Gaines Creek Mt. McKinley	3	Nonfloat(1)
Mardis, James E. General Delivery Anchorage, Alaska	Glacier Bay Juneau	1	Prospecting
Marvel Creek Mining Co. Awe, Charles Aniak, Alaska	Marvel Creek Bethel	1	Placer development
Meldrum, Billy Chicken, Alaska	Chicken Creek (40-Mi.) Fairbanks	1	Stripping

Table 4-1. Prospectors, Miners, and Companies (continued)

Name and Address	Location of Mines and Recording Districts in Alaska	Approx. Crew	Type of Operation
Miettunen, Ray 332 Dunbar Fairbanks, Alaska	Alder Creek (40-Mile) Fairbanks	1	Nonfloat(1)
Mineral Basin Mining Corp. Moa, Arthur Box 126 Hyder, Alaska	Mt. View Property Ketchikan	2	Lode development
Miscovich, Andrew 779 8th Fairbanks, Alaska	Porcupine Creek Fairbanks	2	Nonfloat(1)
Miscovich, John Otter Dredging Co. Flat, Alaska	Otter Creek Mt. McKinley	2	Nonfloat(1)
Mobil Oil Company 612 S. Flower Street Room 1342 Los Angeles, California	Southeast Alaska Several	2	Exploration
Morgan Coal Co. Indianapolis	Beluga Field	2	Exploration
Moore, Norman 326 Baranof St. Fairbanks, and Dohney, Edward Box 604 College, Alaska	Chistochina River Chitina	2	Lode gold exploration
Mt. McKinley Mercury Mining Co. Arley R. Taylor, Pres. 12515 Shorewood Lane, SW Seattle, Washington	Mt. McKinley Fairbanks	6	Mercury exploration and antimony production in Fairbanks
Munz, William Nome, Alaska	Dahl Creek Noatak-Kobuk	1	Jade recovery
National Lead E. 220 Wellesley Spokane, Washington	Alaska general Several	1	Investigations
Newlun, O. H. Box 623 Ketchikan, Alaska	Prince of Wales Island Ketchikan	1	Prospecting

Table 4-1. Prospectors, Miners, and Companies (continued)

Name and Address	Location of Mines and Recording Districts in Alaska	Approx. Crew	Type of Operation
Newmont Exploration Ltd. 300 Park Avenue New York	Prince of Wales Island and Brady Glacier Ketchikan	30	Uranium production and nickel evaluation
North American Dredge Co. John Stevens Flat, Alaska	Otter Creek Mt. McKinley	1	Dredge
Nugget Mining Co. Steve Pederson Box 685 Nome, Alaska	Niukluk River Cape Nome	2	Dredge
Occidental Minerals Corp. 6073 West 44th Avenue Wheat Ridge, Colorado	Alaska General		Recon and offshore prospecting
O'Carroll, Michael J. 14615 - 25th S.W. Seattle, Washington	Spruce Creek Nulato	3	Nonfloat(1)
Olive Creek Mines Carl Parker Box 552 Fairbanks, Alaska	Amy Creek Fairbanks	4	Nonfloat(1)
Olson, Henry T. "Tiger" Taku Harbor, Alaska	Juneau & Admiralty Districts	1	Prospecting
Ott, Martin H. 332 N. Boundary Fairbanks, Alaska	Chicago Creek Manley Hot Springs	1	Nonfloat(1)
Pacific Construction Company Lundgren, Jim 707 Steese Faribanks, Alaska	Steamboat Creek Fairbanks	3	Prospecting
Pannick, Harry General Delivery Fairbanks, Alaska	Flume Creek Fairbanks	2	Nonfloat(1)
Paramount Mining Co. 505 Burrard Street Vancouver, B.C.	Gravina Island Ketchikan	4	Exploration
Parker, Albert Box 289 Juneau, Alaska	Glacier Bay Juneau	2	Gold lode maintenance

Table 4-1. Prospectors, Miners, and Companies (continued)

Name and Address	Location of Mines and Recording Districts in Alaska	Approx. Crew	Type of Operation
Parker, Fred Deering, Alaska	Inmachuck River Fairhaven	4	Nonfloat(1)
PCE Explorations, Ltd. Murray Watts Nome, Alaska	Lost River Cape Nome	10	Developing fluorite, tin, and beryllium
Peters Creek Mining Maxene Gagnon Jacobsen 841 Birch Creek Anchorage, Alaska	Peters Creek Palmer		Prospecting
Phelps Dodge Corp. Box 991 Douglas, Arizona	Southeast Alaska Several	8	Recon exploration
Pieper, Paul Box 1294 Ketchikan, Alaska	Southeast Alaska Several	1	Prospecting
Placid Oil 425 G Street, Suite 800 Anchorage, Alaska	Seward Peninsula Several	3	Exploration
Prince Creek Mining Co. Alvin H. Agoff Flat, Alaska	Prince Creek Mt. McKinley	1	Nonfloat(1)
Prospector John Box 271 Skagway, Alaska	Skagway Skagway	1	Small scale hand(3)
Ptarmigan Co. Kirk Stanley Box 3-3959 Anchorage, Alaska	Nabesna River Fairbanks	15	Drilling and exploration
Quam, E. S. Box 564 Fairbanks, Alaska	Tofty Manley Hot Springs	1	Nonfloat(1)
Radovan, Martin McCarthy, Alaska	Glacier Creek McCarthy	1	Copper lode prospecting
Rainbow Mining Co. Ed Dalton Box 990 North Pole, Alaska	Fairbanks Fairbanks	3	Drilling

Table 4-1. Prospectors, Miners, and Companies (continued)

Name and Address	Location of Mines and Recording Districts in Alaska	Approx. Crew	Type of Operation
Rambaud and Hanks Rambaud, John Chicken, Alaska	Lost Chicken Hill Fairbanks	1	Nonfloat(1)
Rasmussen, C. T. Alaska Red Top Mine, Inc. 7933 Jewell Lake Road Anchorage, Alaska	Marsh Mountain Bristol Bay	4	Mercury production
Red Rock Mines, Inc. Ray Renshaw 192 Douglas Highway Juneau, Alaska	Southeast Alaska Juneau	1	Investigations
R & H Mining Co. P. O. Box 16 Aniak, Alaska	Interior Alaska Kuskokwim	4	Mercury
Rhode Island Creek Mines A. W. Pringle Manley Hot Springs, Alaska	Rhode Island Creek Manley Hot Springs	3	Nonfloat(1)
R. S. Richard & Associates Box 1817 Anchorage, Alaska	North Fork Kashwitna River & Alaska Peninsula area Several	3	Copper, iron and gold prospecting
Roberts, Don O. Box 1700 Fairbanks, Alaska	Seward Peninsula Cape Nome	1	Prospecting
Robinson, George F. Chicken, Alaska	Jack Wade Creek (40-Mile) Fairbanks	1	Stripping
Rosander, Toivu Ophir, Alaska	Yankee Creek Mt. McKinley	3	Placer drilling
Ross, Don Box 2307 Ketchikan, Alaska	Southeast Alaska Several	1	Prospecting
Rowan Drilling Company, Inc. 3023 Humble Building Houston, Texas	Bering Sea and Seward Peninsula Cape Nome	18	Lode and placer investigations; offshore prospecting
Ruby Mining Co. Al Kangus Ruby, Alaska	Long Creek Nulato	2	Nonfloat(1)

Table 4-1. Prospectors, Miners, and Companies (continued)

Name and Address	Location of Mines and Recording Districts in Alaska	Approx. Crew	Type of Operation
Serem of Alaska, Inc. 426 Eagle St., Room 5 Anchorage, Alaska	Alaska general Several	3	Investigations
Shell-ASARCO Shell Bldg.; 100 Bush Street San Francisco, California	Bering Sea Cape Nome	1	Offshore prospecting
Sinclair Oil Co. Box 584 Anchorage, Alaska	Alaska Peninsula Several	6	Prospecting
Sirilo, Julius Box 625 Bethel, Alaska	Aniak district Kuskokwim	1	Prospecting
Skelly Oil Co.	Eagle area Fairbanks	2	Exploration
Smith, Arthur W. Box 3-252 Eastchester Branch Anchorage, Alaska	White River McCarthy		Prospecting
Stout, Al Eagle, Alaska	Dahl Creek Kobuk	2	Nonfloat(1)
St. Eugene Mining Co. 504, 1200 W. Pender St. Vancouver, B.C.	Kasna Creek Iliamna	2	Copper development
Straus Exploration, Inc. 4554 West 6th Avenue Vancouver 8, B.C.	East Central Alaska	9	Recon exploration
Sume, Ron K. General Delivery Anchorage, Alaska	Knik Glacier Palmer	1	Prospecting
Texaco	Interior Alaska Several	4	Recon exploration
Thomas, Joe Sitka, Alaska	Chichagof Mine Sitka	2	Development
Thermal Energy Company 4681 First National Bank Bldg. Dallas, Texas	Various Several		Holding extensive coal deposits

Table 4-1. Prospectors, Miners, and Companies (continued)

Name and Address	Location of Mines and Recording Districts in Alaska	Approx. Crew	Type of Operation
Toklat Mines, Inc. 4104 Northwood Drive Anchorage, Alaska	Kantishna district	15	Antimony production
Trans-Pacific Resources, Inc. Spokane, Washington	Tuxedni Bay Cook Inlet		Magnetite evaluation
Tweet, N. B. & Sons Teller, Alaska	Kougarok River Cape Nome	6	Nonfloat(1)
Tweiten, Oscar Box 162 Fairbanks, Alaska	Chatham Creek Fairbanks	1	Small scale hand(3)
Union Carbide Corp. 751 Ryland St. Reno, Nevada	Southeast Alaska Several	4	Recon exploration
United Copper Company Markham, R. V.	Gravina Island Ketchikan	3	Exploration
U. S. Steel Corp. 525 William Penn Place Pittsburg, Pa.	Klukwan Haines	2	Iron development
U.S.S.R. & M. Co. Box 1170 Fairbanks, Alaska	Hogatza River Nulato	20	Gold dredge and Alaska exploration general
Utah Construction & Mining Co. 718-510 W. Hastings Street Vancouver, B.C.	Alaska general Several	6	Exploration
Vogler, Joe (Joseph E.) Box 7 Fairbanks, Alaska	Deadwood Creek Fairbanks	2	Nonfloat(1)
Warwich, Bill (William W.) 315 5th Avenue Fairbanks, Alaska	Fortymile Fairbanks	1	Mercury development
Waterfield, Harry Box 4-11 Anchorage, Alaska	Kuskokwim	7	Prospecting
Watson, B. B. Cape Yakataga, Alaska	Yakataga Beach Cordova	1	Small scale hand(3)
Weisner, Ira Rampart, Alaska	Little Minook Creek Rampart	1	Nonfloat(1)

Table 4-1. Prospectors, Miners, and Companies (continued)

Name and Address	Location of Mines and Recording Districts in Alaska	Approx. Crew	Type of Operation
Western Exploration Locke Jacobs Suite 5A, 428 4th Avenue Anchorage, Alaska	Central Alaska	4	Airborne geo-physical
Weston, Dave (David M.) Box 1938 Fairbanks, Alaska	Dome Creek (40-Mile) Fairbanks	1	Nonfloat(1)
Wigger, Walter 900 Park Drive Fairbanks, Alaska	Eva Creek Fairbanks	1	Nonfloat(1)
Wilson, Starkey A. 852 Wilson Building Dallas, Texas	Beluga Coal Field Anchorage	1	Coal inves-tigation
Woodman, I. N. Box 573 Valdez, Alaska	Tonsina Lake Area Valdez	1	Prospecting
Worthington, John Ketchikan, Alaska	Prince of Wales Island Ketchikan	1	Prospecting
Wright, Virgil J. Box 980 Sitka, Alaska	Herbert Groves Island Sitka	1	Prospecting
Wylie, James R. Box 208 Aptos, California	Kuskokwim Kuskokwim	6	Prospecting, drilling
Zaizer, Clarence Ruby, Alaska	Greenstone Creek	1	Nonfloat(1)
Zaizer, Rudy	Canyon Creek (Near Bethel)		

NOTES: (1) "Nonfloat" indicates mechanical placer gold operation using draglines and/or bulldozers to transport gravel to nonfloating washing plant, bedrock sluiceboxes, or elevated sluices.

(2) "Hydraulic" indicates placer gold operation in which gravel is excavated and transported to sluiceboxes solely by water jets from hydraulic nozzles.

(3) "Small scale hand" indicates placer gold operation in which gravel excavation and transportation is accomplished by hand or ground sluicing.

TABLE 4-2. ACTIVE COAL MINES

Name and Address	Location of Mine	Approx. Crew	Type of Operation
Alaska Matanuska Coal Co. Paul Omlin Box 13 Palmer, Alaska	Premier Mine Matanuska Field	2	Strip
Usibelli Coal Mines, Inc.(1) Usibelli	Healy Creek Nenana Field	80	Strip
B and R Coal Mining Co. Carroll Burnett and Bing Ringstat Box 40 Healy, Alaska	Otto Lake Nenana Field	10	Strip

NOTES: (1) Usibelli includes the Healy Creek properties previously operated by Vitro Minerals Corp., and purchased by Usibelli during the year.

TABLE 4-3. COMPANIES INTERESTED IN ALASKA MINING POSSIBILITIES

Company	Address	Person to Contact
Alakon Metals, Ltd.	202-569 Howe Street Vancouver 1, B.C., Canada	Donald W. Tully
Alaskamin Inc.	525 Failing Building Portland, Oregon 97204	William P. Murray
Alaska Mineral Exploration Co., Inc.	118 East 6th Avenue Anchorage, Alaska 99501	R. E. Lyle
American Exploration & Mining Co.	P. O. Box 619 Anchorage, Alaska 99501	Benno J. G. Patsch
American Metals Climax (AMAX)	601-535 Thurlow Street Vancouver 5, B.C., Canada	R. A. Barker
American Smelting & Refining Co.	504-535 Thurlow Street Vancouver 5, B.C., Canada	Sal A. Anzalone
Amoco Minerals Co.	1612 Court Place Denver, Colorado 80202	William D. Burton
Anaconda	P. O. Box 1764 Spokane, Washington 99201	

Table 4-3. Companies Interested in Alaska Mining Possibilities (continued)

Company	Address	Person to Contact
Anaconda American Brass	Brittania Beach, B.C. or 116, 744 West Hastings Street Vancouver 1, B.C., Canada	Glenn Waterman
Arrow Inter-America Corp.	304-535 Thurlow Street Vancouver 5, B.C., Canada	F. B. Whiting
Asbestos Corp. (Explorations) Ltd.	814-837 West Hastings Street Vancouver 1, B.C., Canada	
Atlantic Richfield Co.	Box 59, Anchorage, Alaska 99501 or Box 749, Dallas, Texas 75221	
Bear Creek Mining Co.	E. 7621 Sprague Spokane, Washington or 1135 W. 8th Anchorage, Alaska 99501	David M. Snyder C. G. Bigelow
Bunker Hill Company	P. O. Box 29 Kellogg, Idaho 83837	Foster Howland
Cache Creek Exploration Co.	701 Welch Road Palo Alto, California 94304	Robert L. Foster
Cambridge Mining Corp. Ltd.	1130 Bay Street Toronto, Canada	
Canada Superior Exploration Ltd.	2201-1177 W. Hastings Vancouver 1, B.C., Canada	R. A. Dujardin
Canex (Placer Development, Ltd.)	800-1030 West Georgia Street Vancouver 5, B.C., Canada	A. G. Horton
Cassiar Asbestos Corp.	Cassiar, B.C., Canada	W. N. Plumb
Chandalar Gold Mining Co.	Box 1332 Fairbanks, Alaska 99707	Frank Birch
Cities Service Minerals Corp.	1016 West Sixth Avenue Anchorage, Alaska 99501	Don Stevens
Cominco Ltd.	1155 West Georgia Street Vancouver 1, B.C., Canada	S. J. Pedley
Conwest Exploration Co.	901-675 West Hastings Street Vancouver 2, B.C., Canada	
Copper Range Exploration Co., Inc.	1425 Brentwood St. Lakewood, Colorado 80215	C. Phillips Purdy, Jr.

Table 4-3. Companies Interested in Alaska Mining Possibilities (continued)

Company	Address	Person to Contact
Cordero Mining Co.	131 University Avenue Palo Alto, California	J. Eldon Gilbert
Cyprus Exploration Corp. Ltd.	1101-510 West Hastings St. Vancouver 2, B.C., Canada	J. B. P. Sawyer
Diamond Shamrock Corp.	300 Union Commerce Bldg. Cleveland, Ohio 44115	Don Deardorf
Duval Corp.	506-602 West Hastings St. Vancouver 2, B.C., Canada	Robert Gale
Dynasty Exploration Ltd.	330-355 Burrard Street Vancouver, B.C., Canada	Robert W. Nusbaum
Eagle Picher Industries, Inc.	Box 910 Miami, Oklahoma 74354	
Earth Resources	303 Expressway Tower Dallas, Texas 75206	
El Paso Mining Division	P. O. Box 1720 Ketchikan, Alaska 99901	Robert Falk
Getty Mines, Ltd.	Suite 503 10 King Street East Toronto 1, Ontario, Canada	Kenneth M. Reim
Getty Oil Company	3810 Wilshire Blvd. Los Angeles, California 90005	George B. Griswold
Goodnews Bay Mining Co.	422 White Bldg. Seattle, Washington 98101	Charles Johnston
W. R. Grace and Co.	Ore and Mining Division 806-1860 Lincoln Street Denver, Colorado 80203	
Hanna Mining Co.	200-1200 W. Pender Street Vancouver, B.C., Canada	Alex G. Jones
Hecla Mining Co.	1105-900 W. Hastings Street Vancouver, B.C., Canada	Phil Conley
Homestake Mineral Development Co.	Old National Bank Bldg. Spokane, Washington 99201	Donald A. Hull
Humble Oil and Refining Co.	P. O. Box 120 Denver, Colorado 80201	Omer R. Humble

Table 4-3. Companies Interested in Alaska Mining Possibilities (continued)

Company	Address	Person to Contact
Inexco	1009 Mendenhall Apts. Juneau, Alaska 99801	Phil R. Holdsworth
Inlet Oil	345 6th Avenue, Suite 202 Anchorage, Alaska 99501	
Inspiration Development Co.	Box 69 Inspiration, Arizona 85537	Hugh W. Olmstead
International Minerals & Chemical Corp.	5401 Old Orchard Road Skokie, Illinois 60076	Peter O. Sandvik
International Mine Services Ltd.	Box 1052 Whitehorse, Yukon Territory, Canada	John McMullin
International Nickel Company of Canada, Ltd.	Toronto-Dominion Centre Toronto 111, Ontario, Canada	Henry F. Vuori
J. R. Simplot Co.	Box 2777 Boise, Idaho 83701	Joe Jemmett
Kerr McGee Oil Industries	Kerr McGee Building Oklahoma City, Okla. 73102	
Marcona Corp.	1 Maritime Plaza San Francisco, Calif. 94111	Philip Morey
Mobil Oil Co.	612 Flower St. Room 1342 Los Angeles, California 90017	
Murph Metals	P. O. Box 6195 Dallas, Texas 75222	
National Lead Company	E. 220 Wellesley Spokane, Washington 99207	Jon Broderick
Newconex Canadian Exploration Ltd.	914-525 Seymour Street Vancouver 2, B.C., Canada	Paul W. Richardson
New Jersey Zinc Exploration Co., Ltd.	905-525 Seymour Street Vancouver 2, B.C., Canada	R. C. MacDonald
Newmont Exploration, Ltd.	300 Park Avenue New York, New York 10022	Robert B. Fulton
Nissho-Iwai American Co.	Union Oil Bldg., Suite 130 909 W. Ninth Avenue Anchorage, Alaska 99501	

Table 4-3. Companies Interested in Alaska Mining Possibilities (continued)

Company	Address	Person to Contact
Northwest Explorations	Box 297 Eureka, Nevada 89316	Wallace, McGregor
Occidental Minerals Corp.	6073 W. 44th Avenue Wheat Ridge, Colo. 80033	Thomas L. Wright
Ocean Science and Engineering	4905 Del Ray Avenue Washington, D.C. 20014	
P.C.E. Explorations, Ltd.	420-159 Bay Street Toronto, Ontario, Canada	Murray E. Watts
Panarroya	126 Rue St. Pierre Quebec 2, Canada	
Phelps Dodge Corp.	Drawer 1217 Douglas, Arizona 85607	R. W. Ludden, Jr.
Rio Tinto Canadian Explorations, Ltd.	615 Two Bentall Centre Vancouver 1, B.C., Canada	M. B. (Mike) Mehrtens
Rowan Drilling Co., Inc.	3023 Humble Bldg. Houston, Texas 77002	
SEREM of Alaska, Inc.	426 Eagle Street, Room 5 Anchorage, Alaska 99501	M. Michel Berducat
Shell Canadian Exploration Co.	815 East Fourth South Salt Lake City, Utah 84102	
Shell Oil Co.	100 Bush Street San Francisco, Calif. or 1008 Sixth Los Angeles, California 90054	
Silver Standard	808-602 West Hastings Street Vancouver 2, B.C., Canada	William Dunn
Springer and Associates	502-1200 West Pender Street Vancouver 1, B.C., Canada	Karl J. Springer
Standard Oil Co. (Indiana)	910 South Michigan Chicago, Illinois 60605	P. N. Pitcher
St. Eugene Mining Corp. (Falconbridge)	504-1112 West Pender Street Vancouver 1, B.C., Canada	Alex Smith
Straus Exploration, Inc.	4554 West 6th Avenue Vancouver 8, B.C., Canada	Gavin Dirom

Table 4-3. Companies Interested in Alaska Mining Possibilities (continued)

Company	Address	Person to Contact
Superior Oil Co.	1 East First St. Reno, Nevada 89501	
Texas Gulf Sulphur Co.	701-1281 West Georgia St. Vancouver 5, B.C., Canada	J. Russell Lowdon
Thermal Energy Co.	4681 First National Bank Bldg. Dallas, Texas 75202	
Union Carbide Exploration Corp.	270 Park Avenue New York, New York 10017	
Union Oil Company of Calif.	2805 Denali Street Anchorage, Alaska 99503	E. D. B. Laudeman
U. S. Smelting Refining & Mining Co.	Box 1170 Fairbanks, Alaska 99707 or 235 East 42nd Street New York, New York 10017	Dan Eagan
U. S. Steel Corp.	Box 510 Provo, Utah	J. K. Hayes
Utah Construction & Mining Co.	718-510 West Hastings Street Vancouver 2, B.C., Canada	E. S. Rugg
Western Exploration	Suite 5-A 428 4th Avenue Anchorage, Alaska 99501	Locke Jacobs

AVAILABLE CONSULTANTS

A list of consultants available for work in Alaska are listed in Table 4-4. This list of consultants is not complete, nor does it necessarily constitute a recommendation. Anyone wishing to have his listing changed or added should write to the Division of Geological Survey at Box 5-300, College, Alaska 99701.

TABLE 4-4. CONSULTANTS AVAILABLE FOR WORK IN ALASKA

Company and Address	Company and Address
Alaska Drilling & Construction Co. Box 2325 Ketchikan, Alaska 99901	Chipp, Eddie R. Box 5-254 Fairbanks, Alaska 99701
Alaska Exploration Corporation Suite 210, 700 Bldg. Anchorage, Alaska 99501	Colp, Douglas 1101 Gillam Way Fairbanks, Alaska 99701
Alaska Geological Consultants 2227 Spenard Road Anchorage, Alaska 99503	Cook, Donald J. Box 5-93 College, Alaska 99701
Alaska Mineral Lab (Assaying) 2229 Spenard Road Anchorage, Alaska 99503	Cox, Manning W. 315 Montgomery Street, Suite 1120 San Francisco, California 94104
Anderson, Eskil W. 924 22nd Avenue Spokane, Washington 99203	Daily, Arthur F. 488 Fairbanks Avenue Oakland, California 94610
Anderson & Kelly 606 Idaho Building P. O. Box 1411 Boise, Idaho 83701	Dickinson-Oswald & Associates 433 9th Avenue Anchorage, Alaska 99504 (Land Surveyors)
Archer, Cathro & Associates #1 Bentall Centre Vancouver 1, B.C., Canada or Casca Building Whitehorse, Yukon Territory	Dolmage, Campbell & Associates, Ltd. Suite 808-900 W. Hastings Street Vancouver 1, B.C., Canada
Bacon-Crowhurst 1111 W. Georgia Street Vancouver 1, B.C., Canada	Foster, Robert 701 Welch Road Suite 2209 Palo Alto, California 94304
Bechtold, Ira C. 1987 Skyline Vista Drive La Habra, California 80631	Gardner, R. C. & Associates 615 S. Flower Street, Suite 303 Los Angeles, California 90017
Behre Dolbear & Company, Inc. 11 Broadway New York, New York 10004	Glass, James R. 515-355 Burrard Street Vancouver, B.C., Canada
Boyd, Glen A. P. E. Rt. 3, Box 6377, Lake Sammamish Issaquah, Washington 98027	Hawley, C. C. Box 48E, Star Route A Anchorage, Alaska 99502
Bradley, Waring 1639 Sunrise Drive Anchorage, Alaska 99504	Heinrichs Geoexploration Company P. O. Box 5671 Tucson, Arizona 85703

Table 4-4. Consultants Available for Work in Alaska (continued)

Company and Address	Company and Address
Hoskins, B. C. 621 West Galer Street Seattle, Washington 98119	Noble and Ruckmick 1475 East California Blvd. Pasadena, California 91106
Hubbell & Waller Engineering Corp. 10 Harrison St., P. O. Box 9305 Seattle, Washington 98109	O'Neill, William A. 505 8th Avenue Anchorage, Alaska 99501
Huff, J. W. "Bill" Box 837 Ward Cove, Alaska 99928	Pilgrim, Earl R. Box 1896 Fairbanks, Alaska 99707
Jasper, Martin W. 3007 W. 30th Avenue Anchorage, Alaska 99503	R & M Geological Consultants Box 2630 Fairbanks, Alaska 99707
Kaufman, M. A. Box 13296 Spokane, Washington 99213	Reed, William M. Route 1, Box 118 Clinton, Washington 98236
Kelly Pittelko Fritz & Forssen Suite 900, 424 "G" Street Anchorage, Alaska 99501	Renshaw, A. L., Jr. 2229 Spenard Road Anchorage, Alaska 99503
Knaebel, Jeff J. Box 5-919 Fairbanks, Alaska 99701	Renshaw, Dan 519 Eighth Avenue Anchorage, Alaska 99501
Lehmann, Ernest K. 1705 Emerson Avenue South Minneapolis, Minnesota 55403	Research Laboratories 16 Congress Pasadena, California 91105
Lindex Ventures, Ltd. 2403-2020 Hard Street Vancouver 5, B.C., Canada	Resource Associates of Alaska, Inc. Box 5-433 Fairbanks, Alaska 99701
Lindgren Exploration Company 338 South Walker Avenue Wayzata, Minnesota 55391	Saunders, Robert H. P. O. Box 1801 Fairbanks, Alaska 99707
Matsumoto, Tak 3313 Doris Drive Anchorage, Alaska 99503	Schmidt, Ruth A. M. 1040 C Street Anchorage, Alaska 99501
McGregor, Wallace Box 297 Eureka, Nevada 89316	Seraphim, R. H. 427-470 Granville Vancouver 2, B.C., Canada
Moerlein, George A. Box 40, Star Route A Anchorage, Alaska 99502	Stanley, Kirk W. P. O. Box 3-3956 Anchorage, Alaska 99504

Table 4-4. Consultants Available for Work in Alaska (continued)

Company and Address	Company and Address
Stevenson, William G. 509 475 Howe Street Vancouver 1, B.C., Canada	Wilson, L. Kenneth 315 Montgomery Street, Suite 1120 San Francisco, California 94104
Thompson, Raymond M. 5752 South Jasmine Englewood, Colorado 80110	Wilson, Starkey A. 852 Wilson Building Dallas, Texas 75201
Utermohle, George E., Jr. Box 5338 Fairbanks, Alaska 99707	Wylie, James R. Box 208 Aptos, California 95003
Waterfield, Henry W. Box 4-11 Anchorage, Alaska 99503	Zaegel, William G. Box 3464 Anchorage, Alaska 99501
Wetherell, Clyde Box 1550C, Star Route A Anchorage, Alaska 99502	

SECTION V

SECTION V

REPORTS BY THE DIVISION OF GEOLOGICAL SURVEY AND PRECEDING AGENCIES

REPORTS BY THE DIVISION AND PRECEDING AGENCIES

Reports issued by the Division of Geological Survey and preceding agencies include: General Reports; Table 5-1 lists Information Circulars; Table 5-2 lists Geologic Reports; Table 5-3 lists Geochemical Reports; Table 5-4 lists Special Reports; Table 5-5 lists Laboratory Reports; Table 5-6 lists laboratory notes, and is concluded by a list of Miscellaneous Publications.

GENERAL REPORTS. A list of General Reports dating back to 1912 follows:

*Report of the Mine Inspector for the Territory of Alaska to the Secretary of the Interior, fiscal year ended June 30, 1912.

*Report of the Mine Inspector for the Territory of Alaska to the Secretary of the Interior, fiscal year ended June 30, 1913.

*Report of the Mine Inspector for the Territory of Alaska to the Secretary of the Interior, fiscal year ended June 30, 1914.

*Report of the Territorial Mine Inspector to the Governor of Alaska for the year 1915.

*Report of William Maloney, Territorial Mine Inspector, to the Governor of Alaska for the year 1916.

*Report of the Territorial Mine Inspector to the Governor of Alaska for the year 1917.

*Annual Report of the Territorial Mine Inspector to the Governor of Alaska, 1920.

*Annual Report of the Territorial Mine Inspector to the Governor of Alaska, 1921.

*Annual Report of the Mine Inspector to the Governor of Alaska, 1922.

*Annual Report of the Mine Inspector to the Governor of Alaska, 1923.

*Report upon Industrial Accidents Compensation and Insurance in Alaska for the biennium ending December 31, 1924.

*Report of the Territorial Mine Inspector, calendar years 1925-26.

*Report of cooperation between the Territory of Alaska and the United States in making mining investigations and in the inspection of mines for the biennium ending March 31, 1929.

*Report of cooperation between the Territory of Alaska and the United States in making mining investigations and in the inspection of mines for the biennium ending March 31, 1931.

*Mining Investigations and the Mine Inspection in Alaska, biennium ending Narch 31, 1933.

*Report of the Commissioner of Mines to the Governor, biennium ending December 31, 1936.

*Report of the Commissioner of Mines to the Governor, biennium ending December 31, 1938.

*Report of the Commissioner of Mines to the Governor, biennium ending December 31, 1940.

*Report of the Commissioner of Mines to the Governor, two biennia ended December 31, 1944.

*Joesting, Henry R., Strategic Mineral Occurrences in Interior Alaska, Pamphlet #1, May 1942.

*Joesting, Henry R., Supplemental to Pamphlet #1 - Strategic Mineral Occurrences in Interior Alaska; Pamphlet #2, March 1943.

*Anderson, Eskil, Mineral Occurrences other than Gold Deposits in Northwestern Alaska; Pamphlet #5-R, May 1944.

*Stewart, R. L., Prospecting in Alaska (26-page pamphlet) December 1944. (revised to November 1949).

*Glover, A. E., Industrial Minerals as a Field for Prospecting in Alaska, including a glossary of Elements and Minerals (82-page booklet) March 1945. (Revised to May 1946).

*Anderson, Eskil, Asbestos and Jade Occurrences in the Kobuk River Region, Alaska; Pamphlet #3-R, May 1945.

*Roehm, J. C., Some High Calcium Limestone Deposits in Southeastern Alaska; Pamphlet #6, March 1946. Mimeographed copies are available.

Race, William H., The Mineral Industry of the Kenai-Cook Inlet-Susitna Regions, 1962.

*Report No. PE 85-22: Report on Preliminary Investigation of the Kings River Area Limestone Deposits, Anchorage Quadrangle, by Martin W. Jasper and Miro Mihelich, State Mining Engineers, January 1961.

Report No. PE 65-1: Report on the Mespelt Mine of Strandberg Mines, Inc., Nixon Fork District Medfra Quadrangle, Alaska, by Martin W. Jasper, State Mining Engineer, February 1961.

Alaska's New Mining Law for State Lands, by James A. Williams, Director, State Division of Mines and Minerals, December 1961 (Reprinted from Mining Engineering Magazine).

Geology and Ore Deposits of Alaska, by Gordon Herreid, Geologist, State Division of Mines and Minerals, December 1961 (Reprinted from Mining Engineering Magazine).

Tectonics and Ore Deposits in Alaska, by Gordon Herreid, Mining Geologist, State Division of Mines and Minerals. Presented at the 1964 Alaska AIME conference, College, Alaska, March 19, 1964.

A Possible Guide to Metal Deposits of Alaska, by Charles F. Herbert, Deputy Commissioner, State Department of Natural Resources. Presented at the 1964 Alaska AIME conference, College, Alaska, March 20, 1964.

*Map: Better-Known Mineral Deposits, Possible Petroleum Provinces, and Existing Roads.

Map: M.I. Report 194-1; A Preliminary Map of the Bedrock Geology of the Fairbanks Mining District, Alaska, by Robert B. Forbes and Jim M. Brown, Department of Geology, College of Earth Sciences and Mineral Industry, University of Alaska for the Division of Mines and Minerals, December 1961.

*Report of the Commissioner of Mines, biennium ending: December 31, 1946, 12-31-48, 12-31-50, 12-31-52, 12-31-54, 12-31-56, and 12-31-58.

Report of the Division of Mines and Minerals for the years: 1959, 1960*, 1961*, 1962*, 1963*, 1964*, 1965, 1966* and 1967.

Report of the Division of Mines and Geology for the year 1968.

Note: *Out of Print. On file at the Division offices and certain public and University libraries.

INFORMATION CIRCULARS. Information circulars are listed in Table 5-1. These circulars are available to the public on request.

TABLE 5-1. INFORMATION CIRCULARS

Circular Number	Title	Date
1	Proper Claim Staking in Alaska	11-12-70
2	Mineral Rights of Aliens in the State of Alaska	3-1-68
3	Hand Placer Mining Methods	3-5-68
4	Uranium Prospecting in Alaska	3-7-68
5	General Alaskan Mineral Information	3-27-70
6	Alaskan Prospecting Information	3-8-68
7	Compulsory Assessment Work Affidavits	(1)
8	Exploration Companies and Available Consultants	2-10-71

Table 5-1. Information Circulars (continued)

Circular Number	Title	Date
9	Alaska Rockhound Information	8-1-69
10	Skin Diving for Gold in Alaska	4-2-68
11	List of Reports Issued by the Division of Mines and Geology and Corresponding Preceding Agencies	4-9-70
12	Services of the Division of Mines and Geology	6-17-69
13	Dangers in Old Mine Openings	11-6-62 (2)
14	Mining Laws Applicable in Alaska	11-15-70
15	A Prospectors Guide to the Sale and Lease of Mineral Properties	6-12-69 (2)
16	Alaska Map Information	3-16-70

NOTE: (1) Discontinued
(2) All circulars have been revised except those noted

GEOLOGIC REPORTS. A list of geologic reports are listed in Table 5-2. Unless otherwise noted, all copies may be purchased by the public for the sum of $1.00 each copy.

TABLE 5-2. GEOLOGIC REPORTS

Report Number	Title	Author	Date
1	Preliminary Report on Geologic Mapping in the Coast Range Mineral Belt	Gordon Herreid	1962
2	Bedrock Geology of the Rainbow Mountain Area, Alaska Range, Alaska	Larry G. Hanson	Nov. 1963
3	Geology of the Portage Creek-Susitna River Area	Donald Richter	1963
4	Geology and Mineral Deposits of the Denali-Maclaren River area, Alaska	M. A. Kaufman	May 1964

Table 5-2. Geologic Reports (continued)

Report Number	Title	Author	Date
5	Geology of the Niblack Anchorage Area, Southeastern Alaska	Gordon Herreid	May 1964
6	Geology and Mineral Deposits of the Ahtell Creek Area, Slana District, Southcentral Alaska	Donald H. Richter	May 1964
7	Geology of the Dry Pass Area, Southeastern Alaska	Gordon Herreid M. A. Kaufman	June 1964
8	Geology of the Paint River Area Iliamna Quadrangle, Alaska	Donald H. Richter Gordon Herreid	Jan. 1965
9	A Geologic and Geochemical Traverse Along the Nellie Jaun River, Kenai Peninsula, Alaska	Gordon Herreid	Aug. 1965
10	Geology of the Bluff Area, Solomon Quadrangle, Seward Peninsula, Alaska	Gordon Herreid	June 1965
11	Geology of the Omilak-Otter Creek Area, Bendeleben Quadrangle, Seward Peninsula, Alaska	Gordon Herreid	June 1965
12	Geology of the Bear Creek Area, Seward Peninsula, Candle Quadrangle, Alaska	Gordon Herreid	May 1965
13	Geology and Geochemical Investigations Near Paxson, Northern Copper River Basin, Alaska	A. W. Rose R. H. Saunders	June 1965
14	Geology and Mineral Deposits of the Rainy Creek Area, Mt. Hayes Quadrangle, Alaska	A. W. Rose	
15	Geology and Mineralization of the Midas Mine and Sulphide Gulch Areas Near Valdez, Alaska	A. W. Rose	Mar. 1965
16	Geology and Mineral Deposits of Central Knight Island, Prince William Sound, Alaska	Donald H. Richter	July 1965
17	Geology and Geochemistry of the Hollis and Twelvemile Creek Area, Prince of Wales Island, Southeastern Alaska	Gordon Herreid A. W. Rose	April 1966
18	Geology of Chromite-Bearing Ultramafic Rocks Near Eklutna, Anchorage Quadrangle, Alaska	A. W. Rose	May 1966

Table 5-2. Geologic Reports (continued)

Report Number	Title	Author	Date
19	Geology of part of the Amphitheatre Mountains, Mt. Hayes Quadrangle, Alaska	A. W. Rose	Feb. 1966
20	Geological and Geochemical Investigations in the Eureka Creek and Rainy Creek Areas, Mt. Hayes Quadrangle, Alaska	A. W. Rose	June 1966
21	Geology of the Slana District, Southcentral Alaska	Donald H. Richter	July 1966
22	Geology and Geochemistry of the Nixon Fork Area, Medfra Quadrangle, Alaska	Gordon Herreid	July 1966
23	The Geology and Geochemistry of the Inmachuk River Map Area, Seward Peninsula, Alaska	Gordon Herreid	Nov. 1966
24	Preliminary Geology and Geochemistry of the Sinuk River Area, Seward Peninsula, Alaska	Gordon Herreid	May 1966
25	Geological and Geochemical Investigations in the Metal Creek Area, Chugach Mountains, Alaska	Donald H. Richter	May 1967
26	Geological and Geochemical Investigations Southwest of Farewell, Alaska	Gordon Herreid	July 1968
27	Geology and Mineral Deposits of the Dolomi Area, Prince of Wales Island Alaska	Gordon Herreid	June 1967
28	Geology of the Upper Chistochina River Area, Mt. Hayes Quadrangle, Alaska	A. W. Rose	Feb. 1967
29	Progress Report on the Geology and Geochemistry of the Sinuk Area, Seward Peninsula, Alaska	Gordon Herreid	July 1968
30	Geology of the Upper Slana - Mentasta Pass Area, Southcentral Alaska	Donald H. Richter	May 1967

Table 5-2. Geologic Reports (continued)

Report Number	Title	Author	Date
31	Geology and Stream Sediment Geochemistry of Anton Larsen Bay and Vicinity, Kodiak Island, Alaska	Arthur W. Rose Donald H. Richter	April 1967
32	Geology of an Area on the Upper Talkeetna River, Talkeetna Mountains Quadrangle, Alaska	Arthur W. Rose	Feb. 1967
33	Geologic and Geochemical Study, Solomon C-5 Quadrangle, Seward Peninsula, Alaska	Roderick R. Asher	April 1969
34	Geology and Geochemistry, Diana Lakes Area, Western Talkeetna Mountains, Alaska	R. E. Anderson	June 1969
35	Geology and Geochemistry, Sithylemenkat Lake Area, Bettles Quadrangle Alaska	Gordon Herreid	June 1969
36(1)	Geology and Geochemistry of the Sinuk Area, Seward Peninsula, Alaska	Gordon Herreid	May 1969
37	Geology and Geochemistry in the Southeastern Part of the Cosmos Hills, Shungnak D-2 Quadrangle, Alaska	Crawford E. Fritts	June 1969
38	Uranium in Alaska	Gilbert R. Eakins	May 1969
39	Geology and Ceochemistry of the Cosmos Hills, Ambler River and Shungnak Quadrangles, Alaska	Crawford E. Fritts	May 1970
40(1)	Geology of the Spirit Mountain Nickel-Copper Prospect and Surrounding Area	Gordon Herreid	May 1970
41	An Experiment in Geobotanical Prospecting for Uranium, Bokan Mountain Area, Southeastern Alaska	Gilbert R. Eakins	May 1970
42	Geology and Geochemistry of the Chandalar Area, Brooks Range, Alaska	Eddie R. Chipp	May 1970

NOTE: (1) Geologic reports 36 and 40 have been completed and are waiting printing of maps.

Table 5-3. Geochemical Reports (continued)

Report Number	Title	Author	Date
23	Geochemistry and Geology of the Boundary Area, Fortymile District Eagle A-1 Quadrangle, Alaska	Roderick R. Asher	May 1970

NOTE: (1) Out of print. Has been included with 1965 work in Geochemical Report Number 6 covering both years.

(2) Out of print. On file in certain public and university libraries.

(3) No charge for this publication.

SPECIAL REPORTS. Special Reports are listed in Table 5-4 and are available to the public for the price of $1.00 each copy.

TABLE 5-4. SPECIAL REPORTS

Number	Title	Author	Date
1	Mineral Occurrences in the Yukon Tanana Region, Alaska (1)	R. H. Saunders	April 1967
2	History of Mines and Prospects, Ketchikan District, Prior to 1952	John Bufvers	Feb. 1967
3	A Petrified Forest on Unga Island, Alaska	Gilbert R. Eakins	May 1970
4	Mineralization Near Stepovak Bay, Alaska Peninsula, Alaska	Gilbert R. Eakins	May 1970

NOTE: (1) Out of print. On file in certain public and university libraries.

LABORATORY REPORTS AND NOTES. The following laboratory reports and notes prepared by the laboratory staff of the Division of Geological Survey are shown in Table 5-5 and 5-6. These papers are not published for distribution but are available on request.

TABLE 5-5. LABORATORY REPORTS

Number	Title	Author	Date
1	A Rapid Radiometric Analysis for Equivalent Uranium	P. L. Anderson M. Mitchel, Jr.	May 1969

Table 5-5. Laboratory Reports (continued)

Number	Title	Author	Date
2	Analysis of Copper, Lead, and Zinc by Atomic Absorption Spectrophotometry	P. L. Anderson Namok Cho	May 1969
3	Geochemical Analytical Procedure for Copper, Lead, and Zinc by Atomic Absorption Spectroscopy	P. L. Anderson	April 1969

TABLE 5-6. LABORATORY NOTES

Laboratory Note Number	Investigations
1	Precision and accuracy of the gold-silver Analysis by atomic absorption on a quartz-type rock.
2	Laboratory test of zinc in water and ice.
3	AAS analyses of gold and silver in high antimony samples.
4	Digestion of heavy sulfide ores for AAS analyses.
5	Suggested reporting procedures for atomic absorption silver and gold analyses.
6	Improved mercury analyses by XRS.
7	Molybdenum analyses by atomic spectroscopy.
8	An investigation of the 2833A° AAS lead line.
9	Interference by calcium, magnesium, and iron on lead, zinc, and silver by AAS analyses.
10	Semi-Quantitative uranium analysis by X-ray spectrography.
11	Potential geochemical sample contamination from cloth sample bags.
12	Comparison analyses.
13	Some experiments in the geochemistry of copper and zinc.
14	Dithizone field test some suggestions.
15	A Geochemical orientation study for lead and zinc in the Fairbanks, Alaska area.

MISCELLANEOUS PUBLICATIONS.

Miscellaneous Paper No. 1 The Great Alaska Earthquake, March 27, 1964.

Race, William H., The Mineral Industry of the Kenai-Cook Inlet-Susitna Region, 1962.

Roehm, J. C., Some High Calcium Limestone Deposits in Southeastern Alaska, Pamphlet No. 6, March 1946. Mimeographed copies are available without maps.

Alaska's New Mining Law for State Lands, by James A. Williams, Director, State Division of Mines and Minerals, December 1961. Reprinted from Mining Engineering magazine.

Tectonics and Ore Deposits in Alaska, by Gordon Herreid, Mining geologist, State Division of Mines and Minerals. Presented at the 1964 Alaska AIME Conference College, Alaska, March 19, 1964.

Geology and Ore Deposits of Alaska, by Gordon Herreid, December 1961. Reprinted from Mining Engineering magazine.

A Possible Guide to Metal Deposits of Alaska, by Charles F. Herbert, Deputy Commissioner, State Department of Natural Resources. Presented at the 1964 AIME Conference, College, Alaska, March 20, 1964.

Mine Safety Regulations, 1963, from the Alaska Administrative Code. Temporarily out of print. Available May 1970.

Geological Literature on the Cook Inlet Basin & Vicinity, Alaska, by J. C. Maher and W. M. Trollman, published by Department of Natural Resources in cooperation with the U. S. Geological Survey. (82 p. and figures). Price $1.50.