552

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PRELIMINARY SUMMARY OF RECONNAISSANCE FOR URANIUM AND THORIUM IN ALASKA, 1952

By Helmuth Wedow, Jr., and others

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[Tr]ace Elements Memorandum Report 552

[U]NITED STATES DEPARTMENT OF THE INTERIOR

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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

DEC 1 8 1952

AEC-591/3

Dr. Phillip L. Merritt, Assistant Director
Division of Raw Materials
U. S. Atomic Energy Commission
P. O. Box 30, Ansonia Station
New York 23, New York

Dear Phil:

Transmitted herewith for your information are two copies of Trace Elements Memorandum Report 552, "Preliminary summary of reconnaissance for uranium and thorium in Alaska, 1952", by Helmuth Wedow, Jr., with descriptions of investigations by R. G. Bates, Arthur Grantz, J. R. Houston, P. L. Killeen, J. J. Matzko, A. E. Nelson, F. A. Stejer, R. S. Velikanje, Helmuth Wedow, Jr., and W. S. West, December 1952.

Of all the Alaskan localities investigated by or reported to the Survey in 1952 only the carnotite occurrences in the southern Alaska Range (Fowler prospect) and on Resurrection Peninsula in south-central Alaska and at a locality as yet undisclosed by prospectors; and the occurrence of uranothorianite on the South Fork of the Koyukuk River in northeastern Alaska appear to have any potential for the location of lode concentrations of uranium. Exploration, possibly by drilling, of the thorium-bearing carbonate-hematite veins near Salmon Bay in southeastern Alaska is being contemplated by private individuals. Should the results of such exploration show that the content of radioactive elements at the surface has been reduced by leaching, or that the mineral composition of the veins changes at depth with a possible increase of uranium content, the uranium possibilities of the Salmon Bay area will, of course, warrant reappraisal.

For fiscal-year 1954 the Survey is tentatively planning a semi-detailed investigation of the carnotite in the southern Alaska Range including geologic reconnaissance mapping, followed possibly by trenching and perhaps drilling, should new samples submitted by Fowler and associates and radiometric reconnaissance by the Survey in the last quarter of fiscal-year 1953 yield expected results. Reconnaissance appraisal is tentatively planned for the other uranium occurrences mentioned above in an attempt to locate the bedrock sources of the radioactive minerals and to determine whether further investigations may be necessary.

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We plan to publish this report as a Geological Survey circular, with the exception of the sections on Fowler carnotite prospect, Resurrection Peninsula, carnotite occurrence--"locality undisclosed", and any references to these localities elsewhere in the report or maps. As much of the information on these occurrences was received in confidence from prospectors, it is considered as "Company Confidential". We are asking Mr. Hosted, whether the Commission has any objection to such publication.

Sincerely yours,

Theodore Botinelly

for W. H. Bradley
Chief Geologist

Geology - Mineralogy

This document consists of 43 pages,
plus 1 figure.
Series A

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

PRELIMINARY SUMMARY OF RECONNAISSANCE FOR URANIUM AND THORIUM IN ALASKA, 1952*

By

Helmuth Wedow, Jr., with descriptions of investigations by R. G. Bates, Arthur Grantz, J. R. Houston, P. L. Killeen, J. J. Matzko, A. E. Nelson, F. A. Stejer, R. S. Velikanje, Helmuth Wedow, Jr., and W. S. West

December 1952

Trace Elements Memorandum Report 552

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This preliminary report is distributed without editorial and technical review for conformity with official standards and nomenclature. It is not for public inspection or quotation.

*This report concerns work done on behalf of the Division of Raw Materials of the U. S. Atomic Energy Commission.

USGS - TEM Report 552

GEOLOGY - MINERALOGY

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By Helmuth Wedow, Jr., with descriptions of investigations by R. G. Bates, Arthur Grantz, J. R. Houston, P. L. Killeen, J. J. Matzko, A. E. Nelson, F. A. Stejer, R. S. Velikanje, Helmuth Wedow, Jr., and W. S. West.

ABSTRACT

Reconnaissance for uranium and thorium in Alaska during 1952 was centered chiefly in parts of the Lower Yukon-Kuskokwim region and northeastern, east-central, south-central, and southeastern Alaska.

Samples of carnotite-bearing limestone, reported by prospectors to have been found on Nikolai Creek near Tyonek about 65 miles west of Anchorage in south-central Alaska, contain as much as about 0.6 percent uranium oxide. Specimens of carnotite-bearing sandstone containing at least 1.7 percent uranium are reported to be from Resurrection Peninsula a few miles southeast of Seward. "High-grade" carnotite ore samples from an as yet undisclosed Alaskan locality are reportedly held by a Seward prospector.

Reconnaissance in the northern part of Prince of Wales Island and parts of adjacent islands in southeastern Alaska found that the radioactive carbonate-hematite veins in the vicinity of Salmon Bay are probably limited in areal extent to the Prince of Wales Island coast from near Exchange Cove to Point Colpoys. The veins, apparently almost entirely thorium-bearing at the surface, range from less than 1 inch to about 2 feet in thickness and contain a maximum of about 0.1 percent equivalent uranium with an

average of about 0.03 percent equivalent uranium. Investigations in the Hyder area and the Taku Harbor-Point Astley district failed to locate significant concentrations of uranium minerals.

No uraniferous lodes were discovered in the Koyukuk-Chandalar region, nor was the source of the monazite, previously reported in the placer concentrates from the Chandalar mining district, located. The source of the uranothorianite in the placers at Gold Bench on the South Fork of the Koyukuk River was not found in the course of a brief reconnaissance, but a placer concentrate was obtained which contains 0.18 percent equivalent uranium and is about ten times more radioactive than concentrates previously available from the area.

Reconnaissance for possible lode concentrations of uranium minerals in the vicinity of reported fluorite occurrences in the Hope Creek and Miller House-Circle Hot Springs areas of the Circle quadrangle and in the Fortymile district, east-central Alaska, found 0.055 percent equivalent uranium in a float fragment of ferruginous breccia in the Hope Creek area; analysis of samples obtained in the vicinity of the other fluorite occurrences showed a maximum of only 0.005 percent equivalent uranium. Examination of silver-lead and molybdenum occurrences and a reported nickel prospect in the eastern Alaska Range revealed no radioactivity in excess of 0.004 percent equivalent uranium. Samples taken during radiometric reconnaissances in the vicinities of a zeunerite-bearing copper lode in the Russian Mountains and two molybdenum lodes along the lower Yukon River in the Lower Yukon-Kuskokwim region contain no more than 0.004 percent equivalent uranium.

Radiometric tests in the Nelchina area and Prince William Sound, south-central Alaska, and in the York tin district, Seward Peninsula, by Geological Survey parties conducting other investigations found no new occurrences of rocks or ore deposits containing significant quantities of radioactive minerals.

INTRODUCTION

The major objective of the Geological Survey's Alaskan uranium and thorium reconnaissance program is the discovery of high-grade uranium deposits. The appraisal of Alaskan uranium possibilities (Wedow and others, 1951) in 1950-51 (fiscal-year 1951) led to the reconnaissance, in 1951 and 1952 (fiscal-years 1952 and 1953, respectively) of many deposits of types deemed favorable for the occurrence of uranium because they contain mineral assemblages characteristic of uranium deposits elsewhere in the world. The results of the work done in 1951 have been reported elsewhere (White and others, 1952; Tolbert and Nelson, 1951; West and White, 1952; White and West, 1952; West, 1952; Houston, 1952). The major investigations conducted during 1952 (fiscal-year 1953) were centered largely in the Lower Yukon-Kuskokwim region and in northeastern, east-central, and southeastern Alaska. This program was carried out on behalf of the Division of Raw Materials of the U. S. Atomic Energy Commission. In south-central Alaska brief examinations were attempted of the Fowler carnotite prospect near Tyonek and of a carnotite occurrence on Resurrection Peninsula southeast of Seward. A prospector at Seward indicated that he had samples from a high-grade carnotite prospect but was not yet ready to divulge the locality. Radiometric tests also were made by regular Geological Survey parties working in the York tin district, the Nelchina area, and Prince William Sound (fig. 1).

The radiometric tests conducted during the 1952 examinations were made with standard commercial models of portable survey meters modified to accept a variety of probes (Wedow, 1951). For traversing on foot, the survey meters with 2- by 20-inch gamma probes were mounted on packboards; for spot work on outcrops 6-inch beta probes were used in place of the 2- by 20-inch gamma probes. Carborne or airborne (with light planes and helicopters) traversing incidental to transportation to and from areas of interest was accomplished with probes consisting of three to six 2- by 40-inch gamma tubes.

Helicopter and light plane support for the work in the Lower Yukon-Kuskokwim region was furnished by the U. S. Army, 30th Engineer Base Topographic Battalion, with Forward Echelon Headquarters at Unalakleet. Similar helicopter support for a part of the work in the Circle quadrangle was obtained from the U. S. Geological Survey's Topographic Division. Mr. Arthur E. Glover, Territorial Department of Mines assayer-engineer at Ketchikan, spent a few days with the party investigating the Salmon Bay radioactive carbonate-hematite veins in southeastern Alaska.

Preliminary results of the investigations made during 1952 are described briefly below. All equivalent uranium analyses given herein were made in the Geological Survey's Fairbanks Radioactivity Testing Laboratory at the campus of the University of Alaska at College.

DESCRIPTIONS OF INVESTIGATIONS

Lower Yukon-Kuskokwim region

By W. S. West

Reconnaissance in the Lower Yukon-Kuskokwim region consisted of the radiometric examination of a zeunerite occurrence in the Russian Mountains (no. 1, fig. 1) and molybdenite occurrences in the Marshall area (no. 2, fig. 1) and in the southern Kaiyuh Mountains (no. 3, fig. 1). A proposed investigation of a silver-lead deposit in the northern Kaiyuh Mountains could not be accomplished because of the lack of transportation facilities. These examinations were made from mid-July to mid-August by W. S. West, geologist, and G. M. Haselton, field assistant. Data on the localities examined in the Lower Yukon-Kuskokwim region are summarized in table 1.

Russian Mountains

Mineralogic studies by Moxham (1950) in 1948 disclosed traces of zeunerite in a concentrate from a copper-bearing vein in the Russian Mountains. The maximum equivalent uranium content of samples, collected during 1952, in this area is 0.004 percent, which was found in the quartz monzonite country rock. The adit of the Konechney prospect which contains the zeunerite-bearing copper ore was iced completely shut; all other openings on this property were covered by rock slides or were caved. Old ore and tailings piles in the vicinity of the workings on the Konechney prospect were searched for radioactive materials, but none were found.

Marshall area

Negative results were obtained in radiometric tests on copper-lead-molybdenum lodes in the Marshall area. Samples collected show only 0.001 percent or less equivalent uranium.

Table 1.--Preliminary data on localities examined in the Lower Yukon-Kuskokwim region, Alaska, during 1952

Locality	Geology	Mineralogy	Radioactivity of samples in percent eU_/
Russian Mountains (locality 1, fig. 1)	Cretaceous graywacke and slate intruded by Tertiary quartz monzonite; Tertiary basalt and Quaternary alluvium, glacial deposits, alluvium and glacial outwash; ore deposits are fissure veins and breccia filling in quartz monzonite	Bedrock: quartz monzonite	0.004
		Vein material: arsenopyrite, chalcopyrite, pyrite, malachite, chrysocolla, limonite, hematite, arsenic compounds, quartz, and zeunerite	0.002 or less
Marshall area (locality 2, fig. 1)	Late Carboniferous greenstone and Upper Cretaceous argillites, sandstone, quartzites, and conglomerates intruded by Tertiary or early Mesozoic soda granite, quartz diorite, diorite, and dacite; ore deposits are quartz veins in Upper Cretaceous sedimentary rocks	Bedrock: soda granite	0.001
		Bedrock: diorite	0.001
		Bedrock: mineralized sediments	Less than 0.001
		Vein material: pyrite, galena, chalcopyrite, molybdenite, gold, magnetite, anglesite, wulfenite, malachite, quartz, and calcite	Less than 0.001
Southern Kaiyuh Mountains (locality 3, fig. 1)	Mesozoic(?) rhyolite porphyry and quartz veins	Bedrock: rhyolite porphyry	0.003
		Vein material: molybdenite, molybdite, pyrite, limonite, hematite, and quartz	Less than 0.001

_/ Equivalent uranium

Southern Kaiyuh Mountains

The McLead molybdenite prospect in the southern Kaiyuh Mountains consists of quartz veins with iron and molybdenum minerals cutting rhyolite porphyry. The vein material contains less than 0.001 percent equivalent uranium; the rhyolite porphyry contains 0.003 percent equivalent uranium.

Koyukuk-Chandalar region

By A. E. Nelson

In the latter part of August A. E. Nelson, geologist, and R. G. Smith, field assistant, briefly examined the localities of two previously reported (White, 1952, pp. 8-12) placer occurrences of radioactive minerals in the Koyukuk-Chandalar region in an attempt to locate the bedrock sources of the minerals or, if this was not possible in the limited time available, to duplicate the radioactive placer concentrates. These localities are at Gold Bench on the South Fork of the Koyukuk River (no. 4b, fig. 1) and in the Chandalar mining district (no. 4a, fig. 1). In addition, airborne radiometric traverses in light planes, coincidental to flying for other purposes, were made over the areas surrounding the two localities as well as over a number of intermediate localities showing large gossan zones, which might be the surface expression of significant zones of mineral deposits or alteration. No radioactivity anomalies were discovered in the course of the airborne traversing; however, much of the area in the drainage of the South Fork of the Koyukuk River upstream from Gold Bench has a widespread cover of overburden and vegetation (tundra, moss, muck, and so forth) which renders radiometric surveying with the equipment available (see introduction) ineffective. Summary data on the Gold Bench area and the Chandalar mining district are given in table 2. The results of the ground examinations in the two areas are discussed briefly below.

Chandalar mining district

No radioactivity in excess of 0.001 percent equivalent uranium was found at any of the mining properties visited or localities examined in the Chandalar mining district. The mineralized zones, in which the lode deposits occur, do not contain large concentrations of metallic minerals and no radioactive minerals were found in them.

The source of the placer monazite previously reported (White, 1952, table 4) in the district was not found. Preliminary radiometric examination of concentrates taken from placers in 1952 failed to reveal even traces of the radioactivity previously reported (White, 1952, table 4) in samples from the district.

Gold Bench area

Radiometric traverses on the ground at Gold Bench, a placer-gold mining camp on the South Fork of the Koyukuk River, revealed no significant radioactivity. However, one placer concentrate obtained in 1952 has approximately 0.18 percent equivalent uranium. Laboratory studies to date indicate that the chief radioactive mineral is uranothorianite. This verifies the statement made by White (1952, p. 8 and table 3) that the radioactivity of an older placer concentrate from Gold Bench is due to "traces of uranium-bearing thorianite(?)". The source of the gold mined from the gravels at Gold Bench is unknown; however, Maddren (1913, p. 106) suggests that the source

Table 2.--Preliminary data on localities examined in the Koyukuk-Chandalar region, Alaska, during 1952

Locality	Geology	Mineralogy	Radioactivity of samples in percent eU _/
Chandalar mining district (locality 4a, fig. 1)	Early Paleozoic schist intruded by Silurian or Devonian granitic gneiss; several zones of metallic mineral-bearing quartz veins occur in the district and are probably related genetically to the granitic intrusive	Ore minerals in veins: sphalerite, arsenopyrite, galena, stibnite, pyrite, chalcopyrite, gold, and silver	0.001
		Placer concentrates: minerals in concentrates include hematite, pyrite, arsenopyrite, monazite, scheelite, galena, chalcopyrite, and gold (White, 1952, table 4)	0.001 or less
Gold Bench area (locality 4b, fig. 1)	Early Paleozoic chert, slate, greenstone, tuff, and diabase occur in the area around Gold Bench, which is a deposit of stream gravels overlying a thick series of unconsolidated wash deposits	Placer concentrates: magnetite, garnet, hematite, zircon, sphene, pyrite, scheelite, galena, chalcopyrite, rutile, cinnabar, cassiterite, bismuthinite, gold, and thorianite(?) (White, 1952, table 3)	0.18

_/ Equivalent uranium

area of the gold, is in the mountains on the south side of the South Fork of the Koyukuk River.

As hematite and traces of bismuth, copper, lead, tin, and tungsten minerals are associated with uranothorianite at Gold Bench it is likely that the radioactive minerals have been derived from a metalliferous lode source, possibly a vein, in the drainage area above Gold Bench. Considering the widespread cover of tundra and muck in this area, it appears that the most feasible way to search for the source lode of the uranothorianite would be by the radiometric testing of placer concentrates, after a fashion similar to that used by West and Matzko (1952) on the eastern Seward Peninsula. Special emphasis should be given to the gravels of short tributaries draining the hills along the southeast side of the South Fork.

Circle quadrangle

By W. S. West and J. J. Matzko

Fluorite has been reported in the Hope Creek area (no. 5a, fig. 1) (Prindle, 1910, p. 208) and the Miller House-Circle Hot Springs area (no. 5b, fig. 1) (White and Tolbert, 1952) of the Circle quadrangle. The localities of these occurrences were examined for the possibilities of lode concentrations of uranium during the summer of 1952 by W. S. West, geologist, and G. M. Haselton, field assistant. Part of the work in the Miller House-Circle Hot Springs area was done by J. J. Matzko, geologist, and Fred Freitag, field assistant. A preliminary summary of the data on these two areas is given in table 3 and discussed briefly below.

Table 3.--Preliminary data on localities examined in the Circle quadrangle, Alaska, during 1952

Locality	Geology	Mineralogy	Radioactivity of samples in percent eU /
Hope Creek area (locality 5a, fig. 1)	Pre-Cambrian Birch Creek schist intruded by Tertiary granite and dikes; Quaternary alluvium	Bedrock: granite, some of which is reported to contain tourmaline and fluorite	0.004 or less
		Iron-stained "breccia" float in granite talus: contains goethite, zircon, tourmaline, quartz, and feldspar	0.055
		Granitic dikes in granite	0.004 or less
		Quartz veins in granite	0.002
		Quartz-tourmaline vein in granite	0.002
Miller House-Circle Hot Springs area (locality 5b, fig. 1)	Pre-Cambrian Birch Creek schist intruded by Mesozoic(?) granitic rocks and dikes; Quaternary alluvium	Bedrock: granite contains zircon, sphene, apatite, fluorite, allanite, malachite, muscovite, biotite, chlorite, magnetite, hematite, ilmenite, altered zircon, pyrite, galena, anatase, and rutile as accessory minerals	0.005 or less
		Dikes in granite	0.004 or less
		Iron-stained veins in granite	0.005 or less
		Placer concentrates: contains garnet, sphene, topaz, scheelite, allanite, ilmenite, hematite, magnetite, pyrite, wolframite, cassiterite, arsenopyrite, zircon, tourmaline, fluorite, chalcopyrite, limonite, galena, and gold	0.01 or less

/ Equivalent uranium

Hope Creek area

No evidence could be found of the reported quartz-pyrite-fluorite veins in the Hope Creek area. No bedrock (granite, dikes, and veins) in the area contains more than 0.004 percent equivalent uranium, although a float fragment of iron-stained, limonite-cemented "breccia" in granite talus between Hope and American Creeks contains 0.055 percent equivalent uranium. Until final laboratory tests have been completed, it is presumed that the radioactive elements in this sample are an impurity in the limonite.

Miller House-Circle Hot Springs area

Search for lode concentrations of uraniferous fluorite or attendant concentrations of other uranium minerals in the Miller House-Circle Hot Springs area was unsuccessful. The maximum equivalent uranium content of samples collected was 0.005 percent. Fluorite, previously reported in granitic bedrock only on Deadwood Creek, was identified in vugs of granitic rock on Portage Creek. Preliminary laboratory studies have isolated a non-fluorescent, yellow-green, uranium mineral (not listed in table 3) from a sample of granitic bedrock from Portage Creek, but it has not yet been identified. As previously reported (White and Tolbert, 1952) placer concentrates from gravels on this creek contain in the 0.0X range of percent equivalent uranium. A water sample from Portage Creek contains 40.2×10^{-7} percent uranium. This is a relatively high concentration as the average uranium content of sea water is 1.1×10^{-7} percent (Koczy, 1951) and thus may indicate the significance of using a water sampling technique to attempt to locate possible lode concentrations of uranium in this area. Such a technique, or one other than straight radiometric traversing, is necessary in this area because of a widespread cover of disintegrated bedrock and vegetation.

Eastern Alaska Range

By A. E. Nelson

Copper- and silver-bearing lodes and molybdenite occurrences in the Slana-Nabesna district (no. 6b, fig. 1) and highly oxidized gold- and silver-bearing galena-pyrite veins and molybdenite occurrences in the Chisana district (no. 6a, fig. 1) of the eastern Alaska Range were examined radiometrically during late June, July, and early August 1952. The reconnaissance was conducted by A. E. Nelson, geologist, and R. G. Smith, field assistant. Data on the localities investigated are summarized in table 4.

At all the localities indicated in table 4 radiometric traverses were made in the accessible parts of mines, over ore dumps, prospect pits and cuts, as well as over outcrops of mineralized zones and the adjacent country rocks. None of the traversing indicated any appreciable radioactivity. Routine check samples collected included: channel samples of veins and other types of ore bodies, zones of alteration, spot samples from ore dumps, placer concentrates, and samples of different lithologic types. The maximum equivalent uranium content of any of the samples collected was 0.004 percent. The more radioactive rocks were mostly granitic types wherein the radioactivity is apparently in the accessory minerals.

Table 4.--Preliminary data on localities examined in the eastern Alaska Range during 1952

Locality	Geology	Mineralogy	Radioactivity of samples in percent eU_/
	Chisana district (no. 6a, fig. 1)		
Bonanza Creek and vicinity	Permian volcanic and Devonian sedimentary rocks intruded by granodiorite; many dikes, sills, and small irregular igneous bodies occur throughout the district	Galena, pyrite, silver, and gold occur in veins; gold, silver, copper, cinnabar, molybdenite and galena have been recovered from placer operations	Less than 0.004
	Slana-Nabesna district (no. 6b, fig. 1)		
Nabesna mine area	Metamorphosed Permian limestone (tactite) intruded by quartz diorite; a suite of contact minerals is developed in the tactite; the principal ore in the mine occurs in veins of pyrite and calcite, with minor amounts of chalcopyrite, sphalerite, and galena, which have been found as replacements in fractures and along the contact zones between the limestone and quartz diorite	Chalcopyrite, sphalerite, galena, magnetite, pyrrhotite, arsenopyrite, stibnite, pyrite, and gold plus contact minerals such as andradite, vesuvianite, epidote, specularite, wollastonite, spinel, magnetite, brookite, and others	Less than 0.001
Orange Hill	Permian lava flows, greenstones, and metamorphosed limestone intruded by quartz diorite; dikes of alaskite cut the quartz diorite as well as the sedimentary rocks and all of these are intruded by dacite and andesite dikes	Ore minerals: chalcopyrite, magnetite, hematite, pyrrhotite, pyrite, bornite, sphalerite, molybdenite, tetrahedrite, and gypsum	No anomalous radioactivity noted during airborne traverse
Rock Creek	Molybdenite-bearing pegmatite vein in syenite gneiss; molybdenite occurs as blebs and tiny veinlets	Molybdenite	Less than 0.004

_/ Equivalent uranium

Table 4.--Preliminary data on localities examined in the eastern Alaska Range during 1952--continued

Slana-Nabesna district (no. 6b, fig. 1)--continued

Indian Group	Quartz diorite with wide variation in texture, at most places it is coarsely granular with large feldspar phenocrysts; a series of nearly vertical fracture planes striking almost due east appear to control the localization of the quartz veins containing the metallic minerals	Silver-bearing galena, chalcopyrite, tetrahedrite, malachite, and azurite in a quartz-calcite gangue	0.004 or less
Silver Creek	Diorite cut by a northwest-trending fault or shear zone about 100 feet wide; the rock in the fracture zone has been altered to a rather soft material; several quartz veins containing sparse amounts of the metallic minerals occur in this zone	Tetrahedrite, silver-bearing galena, and gold	Less than 0.001
Mineral Point	Argillite between two limestone bodies is cut by a shear zone trending N 65° W and has been altered to a reddish yellow material; this altered zone has been reported to contain traces of nickel	Copper, nickel(?), gold, and silver	Less than 0.001

As the Orange Hill locality was inaccessible with the transportation equipment available at the time of this investigation because of high, fast water in the glacial Nabesna River, the reconnaissance thereof was limited to an airborne radiometric traverse over exposures of ore-bearing zones and adjacent bedrock incidental to flying to the Chisana district. No anomalous radioactivity was noted in the course of this traverse.

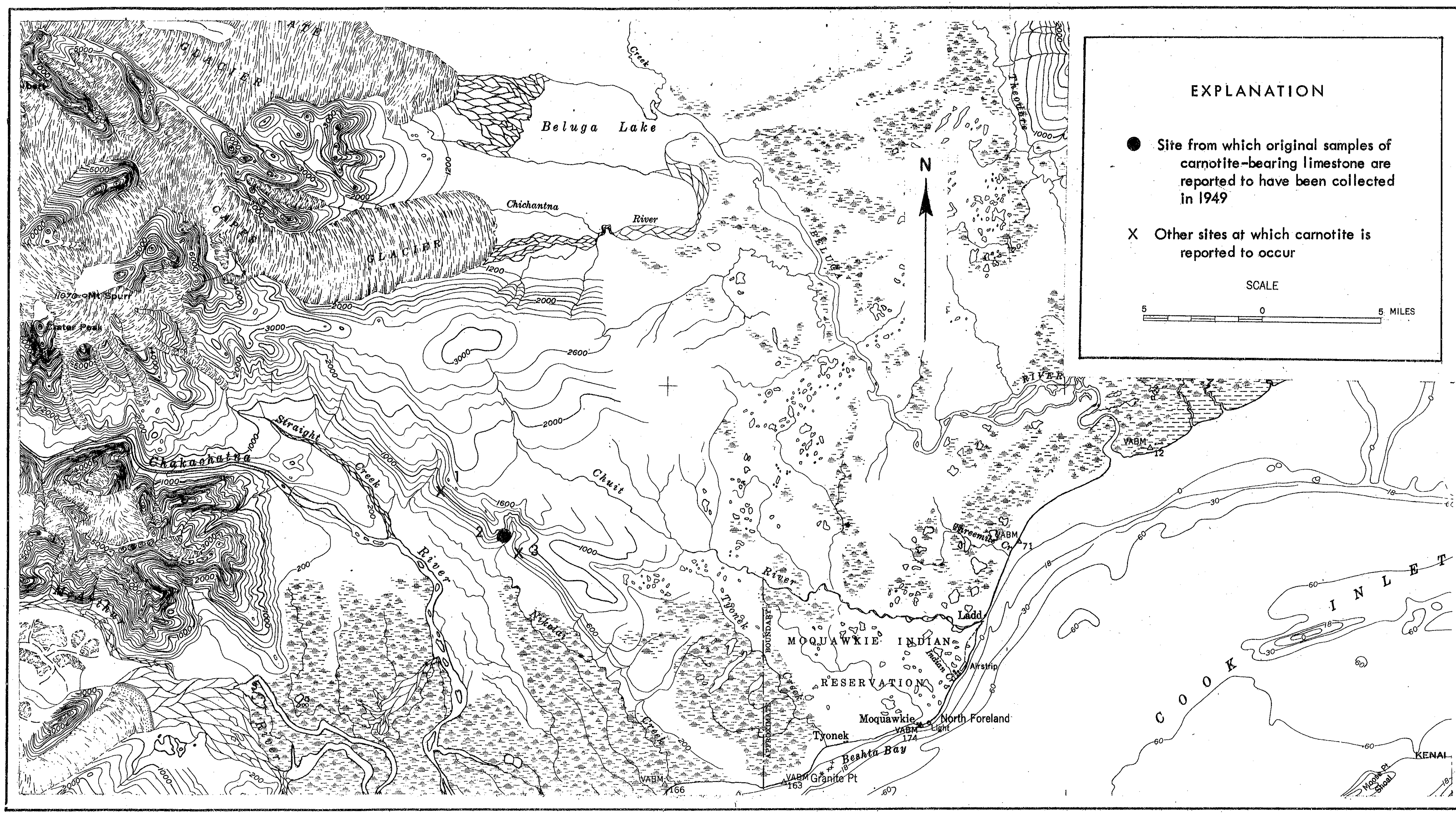
Fowler carnotite prospect

By Helmuth Wedow, Jr. and A. E. Nelson

Samples of tyuyamunite-bearing limestone submitted to the Survey during 1951 by H. N. Fowler of Anchorage contain as much as 0.54 percent uranium or about 0.6 percent uranium oxide. As originally reported in 1951 (Tolbert and Nelson, 1951, p. 6 and table 1) the Fowler prospect was supposed to be located near the Yentna River north of the mouth of the Skwentna River. Information obtained during the following winter by Fowler, however, placed the location on the Deshka River, about 25 miles south-southwest of Talkeetna (fig. 1). The Deshka site was examined briefly with combined airborne and ground techniques by A. E. Nelson, geologist, and E. D. Michael and R. G. Smith, field assistants, in June 1952. Fowler accompanied the party. No uraniferous limestone was found, nor were any radioactivity anomalies discovered. The "bedrock" in this vicinity proved to be beds of glacial clays and sands at least several tens of feet thick.

With the negation of the Deshka River locality as the site of the occurrence of the uraniferous limestone, further inquiries by Fowler and his associates revealed that an Indian from Tyonek, Max Chickalusian, had found the samples in the fall of 1949 on the north side of the valley of a small left-limit tributary (no. 7, fig. 1 and no. 2, fig. 2) of Nikolai Creek, a stream flowing into the north side of Cook Inlet 8 miles southwest of Tyonek. This location is about 17 miles northwest of Tyonek (fig. 2) and about 65 miles west of Anchorage (fig. 1). It lies in the foothills of the southern Alaska Range in the general vicinity of the Chakachatna River and Mount Spurr. An attempt by Fowler, Chickalusian, and Wedow to visit the locality for additional samples and information in October 1952 was unsuccessful because of heavy rains, fog, and high winds. These weather conditions also prevented a sufficiently close approach to the site to conduct a safe airborne radioactivity survey with a light plane. However, in flying to and from the area, several yellowish-pink outcrops, which may be exposures of uranium-bearing rock, were observed along the escarpment on the northeast side of Nikolai Creek (fig. 2). Subsequent information from Chickalusian indicated that other natives had observed material, similar to that which he had collected, at two other localities along the escarpment (nos. 1 and 3, fig. 2).

Chickalusian's description of the outcrop from which he obtained his original samples indicates that it is about 50 feet long and about 10 feet high. According to his statement the "yellow rock" occurs in long lenses up to 3-inches thick between thin beds of limestone. (Previous study of the original samples showed that the carnotite is also disseminated in the limestone.)



MAP OF PART OF THE TYONEK QUADRANGLE, SOUTH-CENTRAL ALASKA

Showing location of Fowler carnotite prospect

No limestone was recognized along Nikolai Creek during early reconnaissance surveys of the southern Alaska Range in the mid-1920's (Capps, 1935). The escarpment along the northeast side of Nikolai Creek and Straight Creek to the northwest is formed mainly by Eocene coal-bearing strata, in part capped by Quaternary glacial deposits (Capps, 1935, pl. 1). According to the general geologic setting the limestone probably underlies the Eocene rocks; its age is presumed to be Paleozoic or early Mesozoic. One of the localities (no. 1, fig. 2) reported by the natives is believed to be one of the "possible uranium-bearing outcrops" observed from the air by the writer. It lies fairly high on the escarpment and is likely to be in a thick clastic bed of the Eocene sequence rather than in limestone.

A partial section of the Eocene rocks just north of the head of Nikolai Creek described by Capps (1935, p. 62) contains a considerable amount of volcanic material in the Eocene clastics. This volcanic material conceivably could be a possible source of the uranium, as indicated in recent studies of the Colorado Plateau deposits by Waters and Granger (1952). Support for this hypothesis is suggested also by the occurrence of an alkali vanadium silicate, similar to hydromica, intimately associated with the tyuyamunite in Fowler's original samples.

Fowler with Chickalusian and one other native plan another attempt to relocate and sample the limestone locality on Nikolai Creek in November 1952 after the freeze-up. If their attempt is successful, additional sample material will be available to the Survey for analysis and study during the winter, in preparation for field investigations in spring.

Southeastern Alaska

By J. R. Houston, R. S. Velikanje, R. G. Bates, and Helmuth Wedow, Jr.

Reconnaissance for uranium in southeastern Alaska during the summer of 1952 was concentrated mainly in the northern and central parts of Prince of Wales Island (no. 9, fig. 1; fig. 3) where reconnaissance studies were made to determine the areal extent and geologic relationships of radioactive carbonate-hematite veins examined briefly in 1951 (Houston, 1952). In the determination of the areal extent of these veins a number of localities on parts of islands adjacent to Prince of Wales Island were examined because mineral deposits there contained mineral assemblages similar to known uranium deposits elsewhere (Wedow and others, 1951).

In addition, brief examinations were made in the Hyder area (no. 10, fig. 1; fig. 3), where samples containing pitchblende(?) taken by the Territorial Department of Mines from the Canyon vein on the Mountain View property were reported to contain as much as 0.7 percent equivalent uranium oxide; and in the Taku Harbor-Point Astley district (no. 8, fig. 1; fig. 3) of a native silver-bearing copper deposit at Point Astley and pitchblende deposits (reported by the U. S. Bureau of Mines) in the Taku Harbor-Limestone Inlet-Port Snettisham area.

The field party engaged in these reconnaissance investigations consisted of J. R. Houston and R. S. Velikanje, geologists, and E. D. Michael, field assistant. R. G. Bates and Helmuth Wedow, geologists, assisted in part of the Prince of Wales Island work and the examinations in the Taku Harbor-Point Astley district. The party was in the field from early July to late September.

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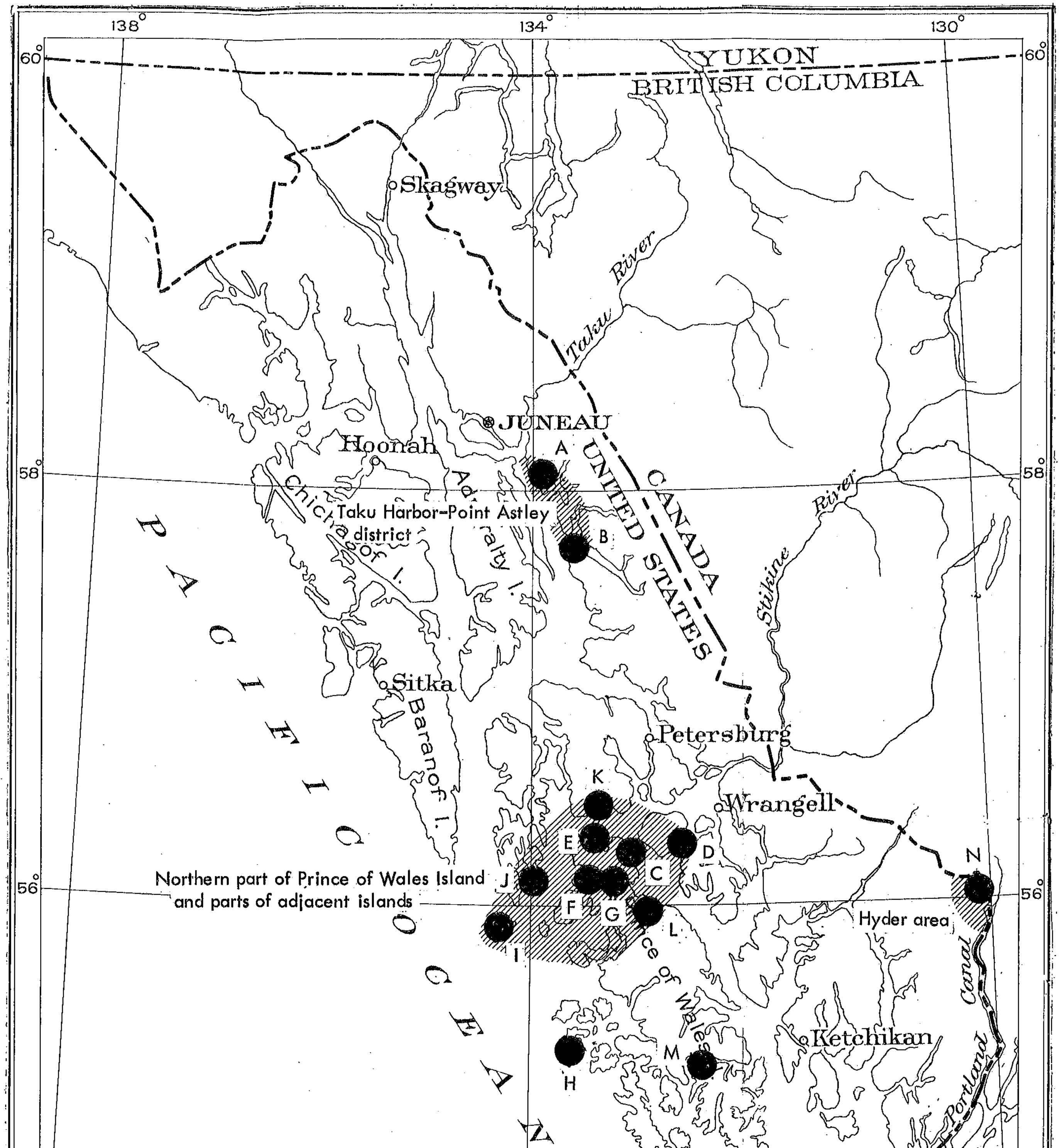
FIGURE 3



EXPLANATION

● Localities examined in 1952

A Taku Harbor-Port Snettisham area
B Point Astley
C Salmon Bay area
D Round Point, Zarembo Island
E The "graywacke" area along the north shore of Prince Of Wales Island
F Shakan molybdenite deposit, Kosciusko Island
G The "graywacke" area around Shakan and Shipley Bays, El Capitan Passage, Kosciusko and Prince of Wales Islands
H Baker Island molybdenite prospect
I Lead deposit on west shore of Egg Harbor, Coronation Island
J Kuiu Island zinc deposit
K Totem Bay, Kupreanof Island
L Lake Bay, Prince of Wales Island
M Green Monster Mountain, Prince of Wales Island
N Mountain View property, Hyder area

Data on the various localities visited are summarized in table 5. Brief statements on specific areas are given below.

Taku Harbor-Point Astley district

Search for the reported pitchblende occurrences at Taku Harbor, Limestone Inlet and Port Snettisham (locality A, fig. 3) was unsuccessful; in fact, no metallic minerals were observed except at the Taku Harbor locality where pyrite and arsenopyrite occur in a breccia zone and disseminated in the adjacent country rock. The maximum equivalent uranium content of samples collected was 0.003 percent.

Examination of the silver-copper lode at Point Astley (locality B, fig. 3) found a 10- to 15-foot thick zone in which a variety of metallic minerals occur in lenticular replacement veins parallel to the schistosity of the country rock. A 1- to 2-foot thick portion of this zone is slightly radioactive and contains 0.006 percent equivalent uranium.

Hyder area

Search for "high-grade" concentrations of pitchblende(?)-bearing material in the Canyon vein on the Fish Creek group, Mountain View property (locality N, fig. 3) was unsuccessful. No samples taken in 1952 from this vein contain more than 0.004 percent equivalent uranium. However, at the southeast end of the drift on the Gray Copper vein a sample was collected that contains 0.035 percent equivalent uranium. The radioactivity in this sample is apparently associated with molybdenite. Although no primary uranium mineral has yet been positively identified in samples collected by the Geological Survey in the Hyder area, certain fracture surfaces in veins and mineralized

Table 5.--Preliminary data on localities examined in southeastern Alaska during 1952

Locality	Geology	Mineralogy	Maximum radioactivity of samples in percent eU/
		Taku Harbor-Point Astley district	
Taku Harbor-Port Snettisham area (locality A, fig. 3)	Paleozoic(?) green schist, phyllite, and limestone intruded by late Jurassic or early Cretaceous quartz diorite	Pyrite and arsenopyrite in breccia zone and disseminated in adjacent country rock	Less than 0.001 in sample of mineralized zone; 0.003 in sample of quartz diorite
Point Astley (locality B, fig. 3)	Lenticular replacement veins parallel to the schistosity of Paleozoic(?) chlorite-sericite schist	Pyrite, sphalerite, bornite, pyrrhotite, galena, and covellite(?) in a quartz-carbonate gangue	0.006
	Northern and central Prince of Wales Island and parts of adjacent islands		
Salmon Bay area (locality C, fig. 3)	Narrow steeply-dipping fissure veins cutting Silurian graywacke, sandstone, shale, and limestone breccia; Tertiary(?) lamprophyre dikes and alkalic dikes low in quartz are associated with the veins	Red hematite, specular hematite, magnetite, pyrite, marcasite, chalcopyrite, thorite, monazite, zircon, parisite, and bastnasite in a gangue of dolomite-ankerite, alkali feldspar, chert, quartz, chalcedony, chlorite, epidote, sericite, kaolinite, purple fluorite, green and white muscovite, apatite, topaz, and garnet	0.095 (one prospector's sample assayed 0.13)
Round Point, Zarembo Island (locality D, fig. 3)	Cretaceous graywacke intruded by late Jurassic or early Cretaceous granite	Narrow epidote veinlets; accessory magnetite in granite	0.004
The "graywacke" area along the north shore of Prince of Wales Island (locality E, fig. 3)	Silurian limestone, argillaceous limestone, and graywacke cut by many Tertiary(?) mafic dikes, a few felsic dikes, and a few small carbonate veins	Calcite	0.001

/ Equivalent uranium

Table 5.--Preliminary data on localities examined in southeastern Alaska during 1952--continued

Northern and central Prince of Wales Island and parts of adjacent Islands--continued

Shakan molybdenite deposit, Kosciusko Island (locality F, fig. 3)	Irregular, vein-like deposit in late Jurassic or early Cretaceous diorite near the contact of the diorite with Silurian graywacke; the ore occurs in irregular pods and vuggy lenses and stringers in a brecciated zone about 4 feet wide	Molybdenite, pyrite, pyrrhotite, chalcopyrite, sphalerite, "limonite", molybdite, and chalcanthite in a gangue of quartz, adularia, epidote, hornblende, clay materials, and diorite breccia	0.004
The "graywacke" area around Shakan and Shipley Bays, El Capitan Passage, and Edna Bay, Kosciusko Island and Prince of Wales Island (locality G, fig. 3)	Silurian limestone, argillaceous limestone, argillite, shale, and graywacke cut by a few small, barren, carbonate veins and some mafic dikes; a small dioritic batholith of late Jurassic or early Cretaceous age intrudes the sedimentary rocks in the eastern part of the area	No significant metallic minerals, traces of molybdenite, chalcopyrite, pyrite, galena, calcite, iron oxides, epidote, garnet, chlorite, and actinolite	0.001
Baker Island molybdenite prospect (locality H, fig. 3)	Silicified quartz diorite of late Jurassic or early Cretaceous age cut by numerous narrow quartz veinlets carrying thin films and small grains of molybdenite	Molybdenite, pyrite, pyrrhotite, molybdite, and iron oxides in a quartz gangue	0.001
Lead deposits on the west shore of Egg Harbor, Coronation Island (locality I, fig. 3)	Irregular replacement deposits along small fractures in Paleozoic limestone; very little mineralization in evidence	Galena, sphalerite, iron oxides, cerrusite, smithsonite, and hydrozincite in a gangue of carbonate and clay minerals	Less than 0.003
Kuiu Island zinc deposits (locality J, fig. 3)	Well-indurated early Paleozoic graywacke, argillite, chert, and hornfels intruded by small, irregular bodies of hornblende diorite of late Jurassic or early Cretaceous age; Tertiary(?) felsic and mafic dikes also intrude the sedimentary rocks; metallic minerals occur in narrow, discontinuous veinlets 1-3 inches wide	Sphalerite, galena, pyrite, pyrrhotite, and "limonite" in a quartz-carbonate gangue	0.001
Totem Bay, Kupreanof Island (locality K, fig. 3)	Tertiary andesite and andesite tuff cut by a few basalt dikes. Narrow altered zones along barren fractures show very slight radioactivity	No metallic minerals observed	0.003

Table 5.--Preliminary data on localities examined in southeastern Alaska during 1952--continued

Northern and central Prince of Wales Island and parts of adjacent islands--continued

Lake Bay, Prince of Wales Island (locality L, fig. 3)	A breccia vein 5-15 feet wide and probably at least 1/2 mile long cutting dark-gray graywacke and argillite of Ordovician age	Pyrite, chalcopyrite, sphalerite, secondary copper minerals, and iron oxides in a quartz-carbonate gangue	0.001
Green Monster Mountain, Prince of Wales Island (locality M, fig. 3)	Early Paleozoic limestone with some green schist intruded by a quartz diorite stock of late Jurassic or early Cretaceous age; the ore occurs in small, irregular masses and veins near the contact	Magnetite, chalcopyrite, pyrite, pyrrhotite, molybdenite, malachite, and iron oxides in a gangue of epidote, diopside, garnet, actinolite, tremolite, chlorite, calcite, quartz, spinel, and phlogopite	Less than 0.001

Hyder area

Mountain View property (locality N, fig. 3)	Jurassic graywacke, argillite, slate, tuff, quartzite, and limestone intruded by late Jurassic or early Cretaceous granodiorite and quartz monzonite; ore occurs in mesothermal fissure veins	Pyrite, pyrrhotite, galena, sphalerite, chalcopyrite, scheelite, molybdenite, tetrahedrite, pyrargyrite, gold, and "limonite" in a gangue of milky quartz, calcite, barite, sericite, and chlorite	0.035

dikes are coated thinly with an unidentified yellow uranium sulfate.

Northern and central parts of Prince of Wales Island and parts of adjacent islands

In the Salmon Bay area (locality C, fig. 3) (Houston, 1952) on the northeast coast of Prince of Wales Island are many steeply dipping carbonate-hematite veins with north to northwest trends that contain small amounts of thorite and monazite. The country rock adjacent to many of these veins is hematitically altered and in some places is also radioactive. The more radioactive veins range from less than 1 inch to as much as 2 feet in thickness. Although the maximum equivalent uranium content of channel samples collected is 0.095 percent, the average content of the radioactive veins is about 0.03 percent equivalent uranium. The highest uranium content of any samples so far analyzed for this element is 0.003 percent.

The most radioactive sample from the area is one obtained by a prospector near the entrance to Salmon Bay; it consists of hematitically altered wall rock and contains 0.13 percent equivalent uranium, but only 0.002 percent uranium. Search for the site of this sample was unsuccessful; it is probable that the site is exposed only at extremely low tides.

The occurrence of the radioactive veins appears to be limited to the northeast coast of Prince of Wales Island from about 3 miles north of Exchange Cove to the vicinity of Point Colpoys, a distance of about 7 miles. One slightly anomalous locality, however, was discovered by prospectors on West Island, 4 miles southeast of Exchange Cove. On the other hand, the hematitic alteration of country rock adjacent to fractures with trends similar to those occupied by the radioactive veins apparently has a much wider distribution, as it was observed along the northeast coast of Prince of Wales Island northward from Whale Passage to Point Colpoys, a distance of about 16 miles. No continuation of the hematitically altered zones or radioactive veins was noted to the north of Prince of Wales Island on the shore of Totem Bay (locality K, fig. 3), Kupreanof Island.

In addition to the radioactive veins, wider, essentially nonradioactive, carbonate veins are also found in the Salmon Bay area. These veins contain small amounts of the rare-earth fluocarbonates, such as parisite and bastnaesite. Five chip-channel samples across what was apparently the highest-grade parisite vein averaged 0.79 percent combined rare-earth oxides; one high-grade grab sample contained as much as 5.0 percent rare-earth oxides. Traces of rare earths are also found in the radioactive veins.

Because the formation of the radioactive veins may have been related to the emplacement of the Shakan batholith to the west of the Salmon Bay area, several areas west and northwest of the batholith with country rock of same age and type as that at Salmon Bay were also investigated for radioactivity (localities E and G, fig. 3). It was found that the radioactivity of rocks in these areas probably does not exceed 0.001 percent equivalent uranium. Various mineral deposits lying west and southwest of the Shakan batholith, such as the molybdenite occurrences at Shakan (locality F, fig. 3) and on Baker Island (locality H, fig. 3), were also examined radiometrically. No samples collected from these localities contain more than 0.004 percent equivalent uranium.

Brief field tests were made in the vicinity of a small granitic stock at Round Point on Zarembo Island (locality D, fig. 3), 18 miles east of Salmon Bay, and at a copper prospect at Lake Bay (locality L, fig. 3), 25 miles south of Salmon Bay. At these localities, also, the maximum equivalent uranium content of various types of rocks and ores does not exceed 0.004 percent. A brief reconnaissance of copper prospects at Green Monster Mountain (locality M, fig. 3), also on Prince of Wales Island, found no radioactivity in excess of 0.001 percent equivalent uranium.

It is concluded from the results of the above mentioned radiometric studies that the areal extent of the radioactive carbonate-hematitic veins is limited to the "graywacke" area along the northeast coast of Prince of Wales Island between Exchange Cove and Point Colpoys. It is not likely that the area extends very far inland to the west as the graywacke is succeeded in that direction by massive limestones which are less radioactive than the graywacke. Some structural control governing the emplacement of the veins is evident, but specific conclusions must await further analysis of field data.

Minor reconnaissance projects

York tin district

By P. L. Killeen

Concentrates obtained from the exploratory drilling for tin placers in the Cape Creek drainage area of the Cape Mountain area by the Zenda Mining Company under DMEA auspices showed no appreciable radioactivity, in contrast to similar drilling samples obtained in the past from tin placers on other creeks (Pauline and Goodwin Gulches) in the area (Bates and Wedow, 1952, p. 15).

Radiometric tests at new localities in the Lost River area, particularly in new workings at the Lost River tin mine, did not reveal any rock more radioactive than that found in 1951 (White and West, 1952).

Since the cessation of the exploration by the United States Smelting, Refining, and Mining Company, no additional prospecting has been done at the Brooks Mountain zeunerite claims (West and White, 1952) owned by George Hellerich and associates. A group of men, mainly from Fairbanks, were reported to have considered leasing the property for further exploration, but dropped their plans before summer, presumably after discussions with engineers of the company.

Western Prince William Sound

By F. A. Stejer and Helmuth Wedow, Jr.

A Geological Survey party, led by F. A. Stejer, investigating copper and pyrite deposits on Latouche Island in western Prince William Sound (no. 12, fig. 1) conducted a brief general reconnaissance of the region in the latter part of June 1952 as an introductory phase of its investigations. In the course of this reconnaissance radiometric tests were made of various types of lodes, granitic masses, and contact zones, including those mentioned by Wedow and others (1951, p. 110).

No appreciable radioactivity was noted in the course of the field tests in western Prince William Sound. Representative samples of the various types of lode deposits all contain less than 0.001 percent equivalent uranium. Most of the samples from granitic bodies and adjacent contact zones contain 0.001 percent or less equivalent uranium. The maximum equivalent uranium content of any samples collected in this region is 0.003 percent and is in samples of granitic rock from Ester Island and Trap Bay; it is presumed that this minor amount of radioactivity is in such common accessory minerals as zircon and sphene.

In addition to the reconnaissance in western Prince William Sound, radiometric tests were made at the occurrences of hematite on Hinchinbrook Island (Wedow and others, 1951, p. 110; Grant and Higgins, 1910, p. 79) about 40 miles southwest of Cordova (fig. 1). Field tests have showed essentially no radioactivity; representative samples submitted for analysis were found to contain only as much as 0.003 percent equivalent uranium.

Resurrection Peninsula

By Helmuth Wedow, Jr.

In September 1952 two small specimens of "carnotite"-bearing sandstone were submitted by Martin Goreson through Russell R. Norton to the writer when in Seward. These specimens were reportedly found in 1949 as "float" at the foot of Spoon Glacier in the valley of Likes Creek on the west side of Resurrection Peninsula (no. 13, fig. 1). Two brief attempts by the writer, one in the company of Goreson and Norton, to locate the bedrock source of the carnotite, or at least duplicate the float material, were unsuccessful because of adverse weather conditions.

A radiometric analysis of the less radioactive of the two specimens shows a content of about 1.5 percent equivalent uranium.[1/] Mineralogic studies of the carnotite indicate

1/ A chemical analysis of this sample made in the Trace Elements Section Washington Laboratory shows 1.7 percent uranium.

that it is probably metatyuyamunite. Other vanadium minerals also occur in the sample.

The area surrounding the supposed carnotite site is underlain by a sequence of lava flows now altered to greenstone (Martin, Johnson, and Grant, 1915, pl. 3). Clastic sedimentary rocks are known to occur in minor amounts with the greenstones and also elsewhere on Resurrection Peninsula and adjacent islands (Martin, Johnson, and Grant, 1915, pp. 217, 223-226). Lode deposits consisting of veins and breccia zones containing chalcopyrite, malachite, azurite, pyrite, marcasite, pyrrhotite, magnetite, and a little sphalerite and hematite occur in the greenstone (Martin, Johnson, and Grant, 1915, pp. 233-237). The writer also observed small amounts of galena in vein float fragments on the beach at Thumb Cove about 2 miles southeast of Spoon Glacier.

Additional information received later from Norton indicated that he had heard from other sources in Seward that pitchblende had been identified in a sample from Day Harbor on the east side of Resurrection Peninsula. This sample was supposed to have been collected some time between 1928 and 1931 by two prospectors, both now deceased. The identification was made at the Colorado School of Mines. Attempts are now being made to find this identification in the Colorado records. Norton further indicated that he could also obtain precise information on the source locality of the "pitchblende" sample.

Nelchina area

By Arthur Grantz and Helmuth Wedow, Jr.

Geologic mapping and stratigraphic studies were conducted by a regular Survey party under Arthur Grantz in the Nelchina area (no. 14, fig. 1) during the summer of 1952. In the course of this work radiometric tests were made of many rocks of different lithologies and ages. These rocks include Jurassic sediments, the Cretaceous Nelchina limestone and Matanuska formation, pre-Cretaceous volcanic rocks, and Tertiary volcanics and intrusives. None of the field radiometric tests gave survey meter readings of as much as twice background. Radiometric analyses of 10 representative samples, the only ones thus far submitted by Grantz, show only 0.001 percent or less equivalent uranium.

Fortymile fluorite occurrences

By J. J. Matzko

During the summer of 1952 two fluorite occurrences in the Fortymile district (no. 15, fig. 1), east-central Alaska, were brought to the attention of the Geological Survey by the Territorial Department of Mines. These are the first reported occurrences of fluorite in the district. Specimens of the fluorite range from colorless through pale green to purple. Although the few specimens in the collection of the Territorial Department of Mines at Fairbanks showed no appreciable radioactivity, the common association of uranium with fluorite, particularly the purple variety, prompted reconnaissance appraisal of the occurrences to determine whether concentrations of uranium might occur within the fluorite deposits or in their vicinities. The reconnaissance was made by J. J. Matzko, geologist, and Fred Freitag, field assistant, in the latter part of August. One of the fluorite prospects is a short distance northeast of Chicken close to the new Taylor Highway; the other is also near the highway in the vicinity of Jack Wade.

Field radiometric tests at the locality near Chicken showed no anomalous radioactivity; the maximum equivalent uranium content of representative samples taken at this site does not exceed 0.003 percent. The locality near Jack Wade could not be examined because the prospect shaft in which the fluorite had been found was completely filled with debris from caving.

Carnotite occurrence--"locality undisclosed"

By Helmuth Wedow, Jr.

In July 1952 the Territorial Department of Mines passed on to the writer an account of statements obtained by one of its field engineers to the effect that a high-grade specimen of carnotite ore had been exhibited as from Alaska by a prospector in Seward. The statements placed the location of the occurrence some 70 miles north of Anchorage. The writer, when in Seward in September, located the prospector, Tom Jones, with the aid of Russell Norton. Jones verified the statements that he had a sample of carnotite from Alaska which showed considerable radioactivity when tested with a Geiger counter, but would not again show the sample or divulge its source. He claimed he and his partner, Harold Arnold of Anchorage, had found a "sizable" deposit of the carnotite near a supposedly rich new placer-gold deposit, both of which they had not yet had an opportunity to prospect or stake. Jones did admit, though, that the location north of Anchorage was incorrect and had been given out as a blind. When it was pointed out to Jones that it was to his advantage to pass on his information and samples to the Survey for an appraisal of the prospect before the end of the field season, he stated that he did not believe it would be feasible to make the examination this fall. He did state, however, that he would contact his partner and arrange to submit samples and location information to the Survey during the ensuing winter. Norton, who had seen both Jones' sample and the Resurrection Peninsula samples of Goreson (see p. 33), stated that Jones' sample was much the higher grade of the two.

SUMMARY AND CONCLUSIONS

The preliminary results of reconnaissance investigations for uranium and thorium in Alaska during 1952 are summarized in table 6. This table shows the locality (district, area, prospect, reported occurrence, and so forth); the chief type of deposit examined, sought for, or reported; and the maximum amount of radioactivity in samples collected at each locality. Only the reported carnotite occurrences in south-central Alaska, the uranothorianite at Gold Bench in the Koyukuk-Chandalar region, and possibly the radioactive carbonate-hematite veins on Prince of Wales Island in southeastern Alaska appear to warrant further consideration. All the other localities investigated in 1952 are believed to have no potential for the occurrence of high-grade uranium ores unless subsequent more detailed information, such as the discovery of new criteria for suggesting the occurrence of such ores or the results of private prospecting, alters

Table 6.--Preliminary summary of results on reconnaissance for uranium and thorium in Alaska during 1952.

Locality	Chief types of deposits examined, sought for, or reported	Maximum radioactivity of samples (Percent eU[1/])	(Percent U[2/])
Russian Mountains	Zeunerite-bearing copper lode	0.004	
Marshall area	Molybdenum-copper-lead lode	.001	
Southern Kaiyuh Mountains	Molybdenum lode	.003	
Chandalar mining district	Metalliferous veins and sources of monazite in placers	.001	
Gold Bench area	Source of uranothorianite in placers	.18	
Hope Creek area	Quartz-pyrite-fluorite veins	.055	
Miller House-Circle Hot Springs area	Fluorite occurrences	.01	
Chisana district	Copper, silver, and molybdenum lodes	.004	
Slana-Nabesna district	Copper, silver, and molybdenum lodes	.004	
Fowler prospect	Carnotite-bearing limestone in prospector's samples	.3	0.54
Taku Harbor-Port Snettisham area	Reported pitchblende(?) lodes	.003	
Point Astley	Silver-copper lode	.006	
Hyder area	Pitchblende(?) in veins	.035	
Northern and central parts of Prince of Wales Island and parts of adjacent islands	Radioactive hematite-carbonate veins and silver, lead, zinc, copper, and molybdenum lodes	.095	.003
York tin district	Radioactive minerals in tin placers at Cape Mountain and at Lost River tin mine (lode)	.005 (est.)	
Prince William Sound	Copper and gold lodes, hematite occurrences, and various granitic masses and adjacent contact zones	.003	
Resurrection Peninsula	Carnotite-bearing sandstone in prospector's samples	1.5	1.7
Nelchina area	Rocks and ores of different ages and types	0.001	
Fortymile district	Reported fluorite occurrences	.003	
"Undisclosed locality"	Carnotite in samples held by Seward prospector		"High-grade"

1/ Equivalent uranium; analyses made in the Fairbanks Radioactivity Testing Laboratory.
2/ Uranium; analyses made in the Trace Elements Section Washington Laboratory.

this conclusion.

The carnotite-bearing limestone (Fowler prospect) reported to occur near Tyonek is probably the most significant lead to develop during the past year. Descriptions by the natives, who sampled the occurrence in 1949 and have reported two other nearby sites of the same type of material, indicate that the area containing the carnotite ore bodies may have a linear extent of as much as 6 miles. As very little is known of the general geology of the region, which will be referred to in subsequent reports as the Mount Spurr region of the southern Alaska Range, geologic reconnaissance mapping will be of prime importance in gaining an understanding of the areal extent of the deposits and possible reserves in the district. Such geologic mapping, along with radiometric reconnaissance, may be followed by trenching, and possibly drilling, as soon as is feasible in order to make use of the few short months available for surface studies.

As the bedrock source of the specimens of carnotite-bearing sandstone, reported to have been collected near the foot of Spoon Glacier on Resurrection Peninsula, is likely to be found in the cirque walls above the glacier, this area will be the focal point of reconnaissance on the peninsula. However, because a number of copper deposits are known in this vicinity and because a possible pitchblende occurrence has been reported on the east side of the peninsula, a brief part of the reconnaissance will be extended to other localities on Resurrection Peninsula.

Until further information and samples are obtained from prospectors, nothing much can be said concerning the as yet undivulged location of the reported "high-grade" carnotite occurrence near a supposedly rich new placer-gold deposit. Assuming that this report is entirely true, the locality could be almost anywhere in Alaska except, perhaps, in southeastern and northern Alaska. The most likely areas in which it could occur are the foothills both north and south of the Alaska and Aleutian Ranges in south-central and southwestern Alaska or on the Seward Peninsula.

The association of uranothorianite with hematite and traces of bismuth, copper, lead, tin, and tungsten minerals in placers at Gold Bench on the South Fork of the Koyukuk River in northeastern Alaska suggests a nearby lode source, possibly a vein, for these minerals. Because the drainage area of the South Fork above Gold Bench has a widespread cover of disintegrated rock and tundra, it is believed that the most satisfactory method for locating such a possible lode source would be the radiometric testing of concentrates from the placers of streams tributary to the South Fork. As the source of the gold in the placers is thought to be in the hills south of the fork, particular attention will be given to the streams draining the left limit of the South Fork.

Because the average radioactivity of the carbonate-hematite veins in the vicinity of Salmon Bay on Prince of Wales Island in southeastern Alaska is only about 0.03 percent equivalent uranium at the surface and appears to be due almost entirely to thorium, it is concluded tentatively that the area does not have commercial possibilities for high-grade uranium deposits. However, it has been learned that private individuals may be interested in conducting further explorations in the area, probably by the drilling of the largest, most radioactive vein. Such exploration would determine whether leaching may have reduced the overall grade of the veins at the surface, or whether the mineral composition of the veins changes at depth with a possible increase in the uranium content.

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