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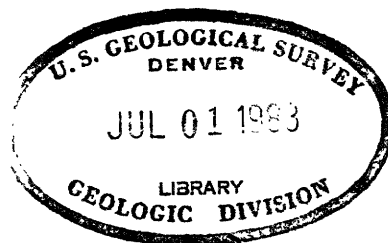
EXAMINATION FOR RADIOACTIVITY
IN A COPPER-LODE PROSPECT ON RUBY CREEK
KOBUK RIVER VALLEY, ALASKA

By
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Trace elements investigations in the
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CONTENTS

	Page
Abstract	1
Introduction	2
Development and geology	3
Radioactivity studies	4
Conclusions	6
References	7

TABLE

Table 1. Locations and data on samples collected during the examination of a copper prospect on Ruby Creek, Kobuk River Valley, Alaska	8
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ILLUSTRATIONS

Figure 1. Index map of Alaska showing location of Ruby Creek area, Kobuk River.....	at end of report
Figure 2. Sketch map of the Ruby Creek area, Kobuk River, Alaska	at end of report



EXAMINATION FOR RADIOACTIVITY IN A COPPER-LODE PROSPECT
ON RUBY CREEK, KOBUK RIVER VALLEY, ALASKA

By M. G. White

ABSTRACT

A "uranium discovery" in the Kobuk River Valley, Alaska, was reported to the Atomic Energy Commission in June 1949 by A. R. Ferguson of Kotzebue, Alaska. At the Commission's request, a spot-examination of the locality was made by the Geological Survey. Investigation shows that radioactivity occurs in copper-bearing iron oxide mineralization filling fissures and fractures in a narrow zone cutting brecciated limestone. The maximum radioactivity corresponds to 0.013 percent equivalent uranium and is mainly in the mineral sphalerite, which is disseminated in minor amount in the fracture fillings. Marked radioactivity was found in only two pieces of rock from the prospect. The highest value obtained in an average ore sample is 0.007 percent equivalent uranium.



INTRODUCTION

In June 1949 A. R. Ferguson of Kotzebue, Alaska, notified the Atomic Energy Commission of a "uranium discovery" in northwestern Alaska. At the request of the Commission, the Geological Survey communicated with Ferguson to obtain a sample and to make a spot-examination of the "discovery". The sample submitted by Ferguson was a few pounds of rock collected by his partner, Rhinehart Berg, while prospecting for uranium with an El-tronics counter, model SM-3. Ferguson stated that the counter had indicated a high content of radioactive material and requested that an assay be made of the sample. After rather extensive correspondence between Ferguson and the Geological Survey, the writer made a spot-examination of the prospect for radioactive material.

The property investigated was originally prospected for copper approximately 40 years ago. It is located on lower Ruby Creek about 160 miles airline east of Kotzebue, a village at the eastern end of Kotzebue Sound and near the mouth of the Noatak River in northwestern Alaska. (See fig. 1.) Ruby Creek is a tributary of the Shungnak River, which in turn is tributary to the Kobuk River. (See fig. 2.) The prospect has been described by Smith (1913, pp. 147-150), who visited it in connection with his geological reconnaissance of the Kobuk Valley.

DEVELOPMENT AND GEOLOGY

As the surface pits and openings of the underground workings at the prospect are caved, the only material available for examination and sampling was that found on the waste piles and ore dump. Although this material is deeply weathered, enough fresh material was found to determine that the main ore minerals are chalcopyrite and bornite. The ore minerals occur in fractures and fissures in a well-brecciated limestone. Subsequent oxidation has developed much limonite along the fractures, and both blue and green copper carbonates were found on a few pieces. It is reported that some galena is present at this prospect (Smith, 1913, p. 148), but none was seen during the present examination. The age of the rock in which the prospect occurs has not been determined and is referred to as "Undifferentiated Paleozoic" by Smith (1913, pl. 2).



One week, including travel to and from Fairbanks, was required to complete the examination of the Ruby Creek copper prospect. The Geiger counter used for the field radiometric work was an El-tronics Survey meter, model SGS-18A, equipped with a probe containing six 14-inch gamma tubes. A continuous counter traverse was run from the airfield on Dahl Creek to the prospect on Ruby Creek via the head of Dahl Creek and return (see fig. 2), but no radiation anomalies were detected. At the prospect itself, on Ruby Creek, the ratemeter reading rose to only slightly higher than what was considered the background reading for the traverse from Dahl Creek to the Ruby Creek prospect.

RADIOACTIVITY STUDIES

Splits of the sample submitted to the Geological Survey by Ferguson were sent to A. E. Glover of the Territorial Assay Office at Fairbanks for preliminary tests. The remainder of the sample was sent to the Geological Survey laboratory in Washington, D. C., for standard radiometric and mineralogic analyses. In the preliminary examination by Glover (1949) the sample was identified as brecciated limestone in which secondary iron oxide minerals fill fractures in the rock. Radioactivity was restricted to the surfaces that were most heavily coated with the oxidized minerals. The report of the Geological Survey laboratory on this sample is as follows:



"Fluorimetric observations indicate that uranium is present in sphalerite, secondary hematite associated with limonite, and in copper carbonate stains. The sphalerite occurs as veins closely associated with pyrite and the hematite associated with limonite as crusts along fractures.

"A fluorimetric uranium determination..... shows that the sphalerite contains .013 percent uranium. The sample submitted for determination was not entirely free from pyrite and gangue material.

"Radiometric determinations....gave the iron fracture zone a reading of .013 percent equivalent uranium and a representative fraction of the sample a reading of .007 percent equivalent uranium."

It is evident from the data above that no large concentration of radioactive material is present in the sample.

The copper content of the original sample submitted by Ferguson is estimated at between 5 and 10 percent (Glover, 1949). Three samples of copper-bearing, brecciated limestone collected by the writer contain approximately 10 percent copper by spectrographic determination.

No fragments of mineralized rock were found having a radioactivity exceeding that of 0.007 percent equivalent uranium.

Boulders of chromite up to 12 inches in diameter are found in the stream gravels of Wesley and Dahl Creeks. (See fig. 2.) Samples were collected from a few of them in the course of the spot-examination of the Ruby Creek copper prospect and tested for radioactivity, with negative results.



A sample received from Ferguson in August 1949 after the spot-examination was completed contained 0.003 percent equivalent uranium. Ferguson did not specify the locality from which this sample came. Locations and data on sample material collected by the writer during the field investigation of the Ruby Creek prospect are given in table 1.

CONCLUSIONS

Field radiometric examination of the copper-lode prospect on Ruby Creek in the Kobuk River Valley failed to locate any high-grade uranium ore. Laboratory study of samples showed that the small amount of radioactivity present is associated with sphalerite and secondary hematite in narrow zones of limonitic material occurring in a copper-bearing brecciated limestone.

Additional field radiometric studies in the Kobuk Valley are not recommended until more is known about its geology or until samples of high-grade uranium ore are submitted by prospectors.



REFERENCES

- Glover, A. E., Territorial Department of Mines assay report
no. I-9189: Copy in U. S. Geol. Survey, Alaskan Trace
Elements Unit, project AV file, 1949.
- Smith, P. S., The Noatak-Kobuk region, Alaska: U. S. Geol.
Survey Bull. 536, 160 pp., 1913.



Table 1

Locations and data on samples collected during the examination of a copper prospect
on Ruby Creek, Kobuk River valley, Alaska

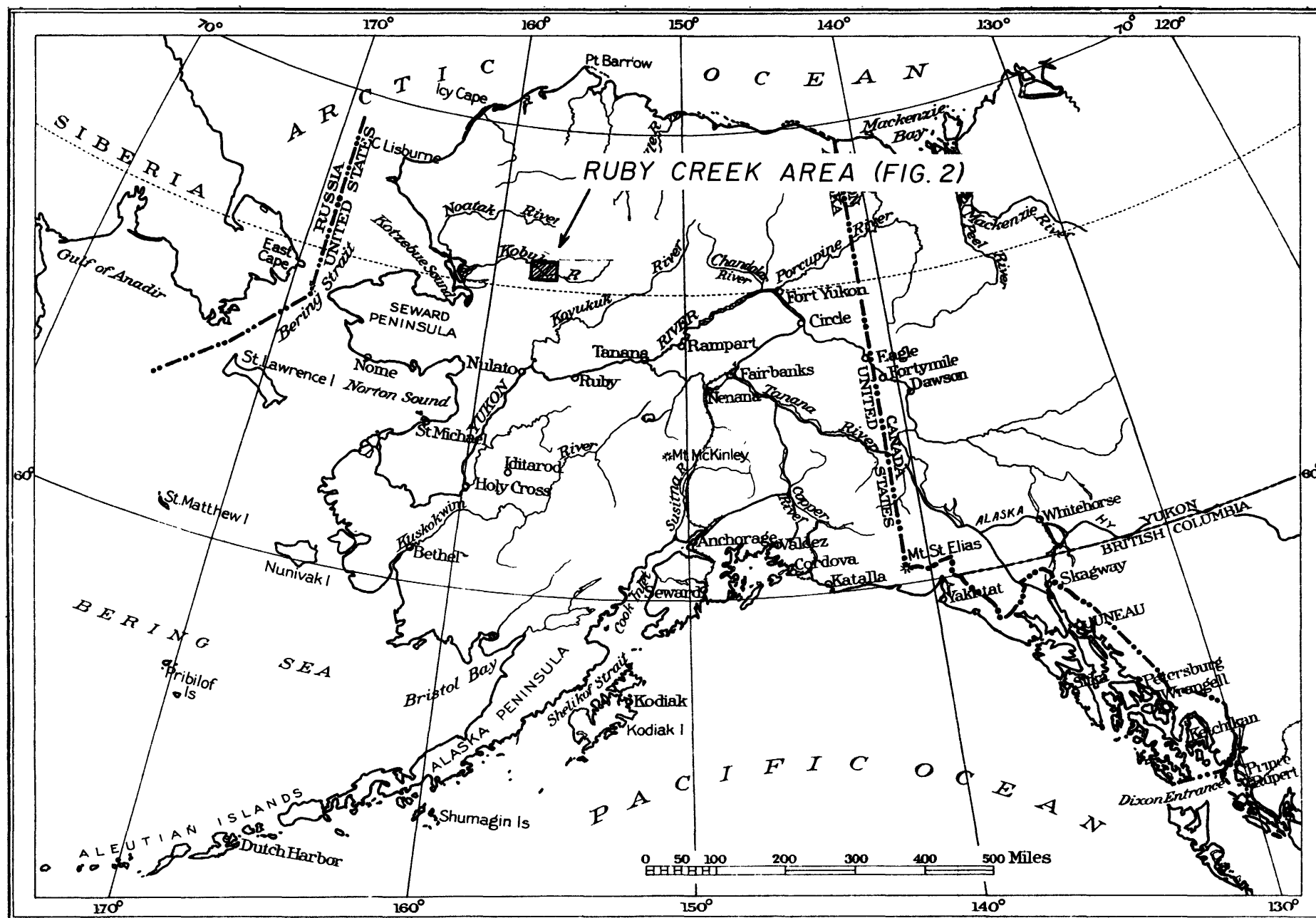
Field No. (49AWe)	Sample No. File No.	Location and description	Percent equivalent uranium	Percent Cu (approx.)	Percent Cr ₂ O ₃ (approx.)
74	3678	Dahl Creek, Goodvik and Tronstedt placer mine (sluice concentrate)*	<0.001	n. d.	n. d.
75	3679	Dahl Creek (chromite from stream gravels)	0.001	n. d.	44
76	3680	Wesley Creek (chromite from stream gravels)	0.001	n. d.	44
77a	3681	Ruby Creek copper prospect (ore in brecciated lime- stone)	0.002	10	n. d.
77b	3682	do	0.006	10	n. d.
77c	3683	do	0.002	10	n. d.

* 98 percent chromite



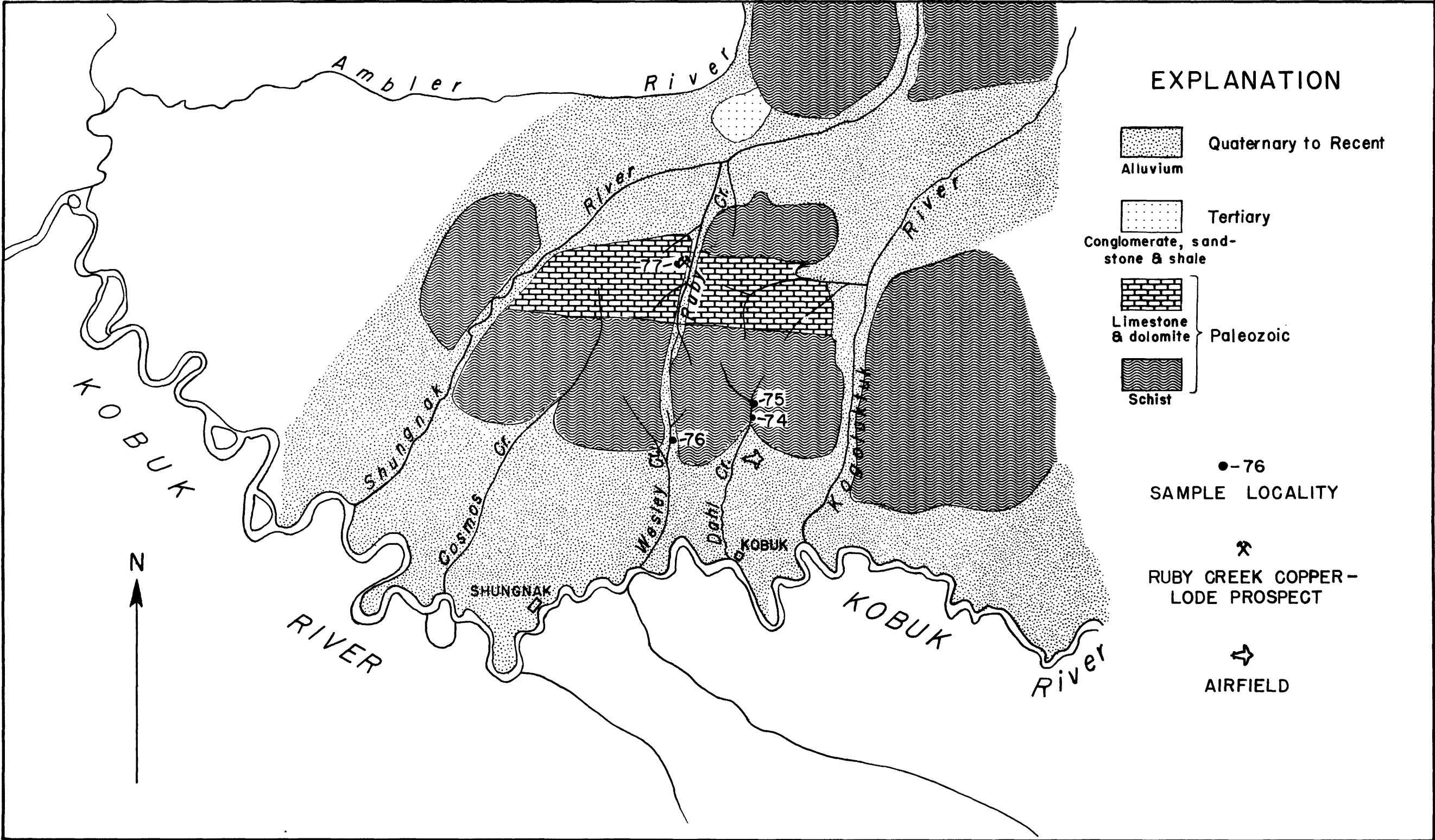
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TRACE ELEMENTS INVESTIGATION
REPORT 76-A
FIGURE 1



INDEX MAP OF ALASKA
SHOWING LOCATION OF RUBY CREEK AREA
KOBUK RIVER





Geology modified from U.S.G.S. Bull. 536

SKETCH MAP OF THE RUBY CREEK AREA, KOBUK RIVER, ALASKA