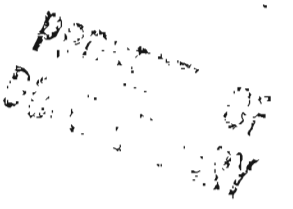
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUMMARY OF REFERENCES TO MINERAL OCCURRENCES (OTHER THAN MINERAL FUELS AND CONSTRUCTION MATERIALS) IN THE MOUNT HAYES QUADRANGLE, ALASKA

By

Edward H. Cobb



Open-File Report 79-238

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This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards and nomenclature.

Introduction

These summaries of references are designed to aid in library research on metallic and nonmetallic (other than mineral fuels and construction materials) mineral occurrences in the Mount Hayes quadrangle, Alaska. References to most reports of the Geological Survey, the U.S. Bureau of Mines, and the State of Alaska Division of Geological and Geophysical Surveys and its predecessor State and Territorial agencies released before September 1, 1978, are summarized. Certain, mainly statistical, reports such as the annual Minerals Yearbook of the U.S. Bureau of Mines and most biennial and annual reports of the State of Alaska Division of Geological and Geophysical Surveys and its predecessor State and Territorial agencies are not included.

A placer deposits map of central Alaska prepared by Cobb (1977) as part of the Regional Alaska Mineral Resource Assessment Program contains no information not derived from older reports and is not cited here. Also not included are data on many claims about which little more than their locations is known (for example, MacKevett and Holloway, 1977, p. 41-43). These omissions should not be interpreted as a judgment on my part that the claims are not valid mineral occurrences, but only that there are insufficient data to describe any mineral deposit that might be present.

Data used in preparing a metallic mineral resources map of the quadrangle (Cobb, 1972) have all been reexamined and locations replotted on figures 3-6 of this report; therefore the 1972 map should no longer be used.

This report is divided into three parts: a section made up of summaries of references arranged alphabetically first by occurrence name; a section that lists synonyms for names in the first section, claim names, and the names of operators and owners of mines and prospects; and a section that lists, by author, all references in the first section and those referred to in these introductory paragraphs.

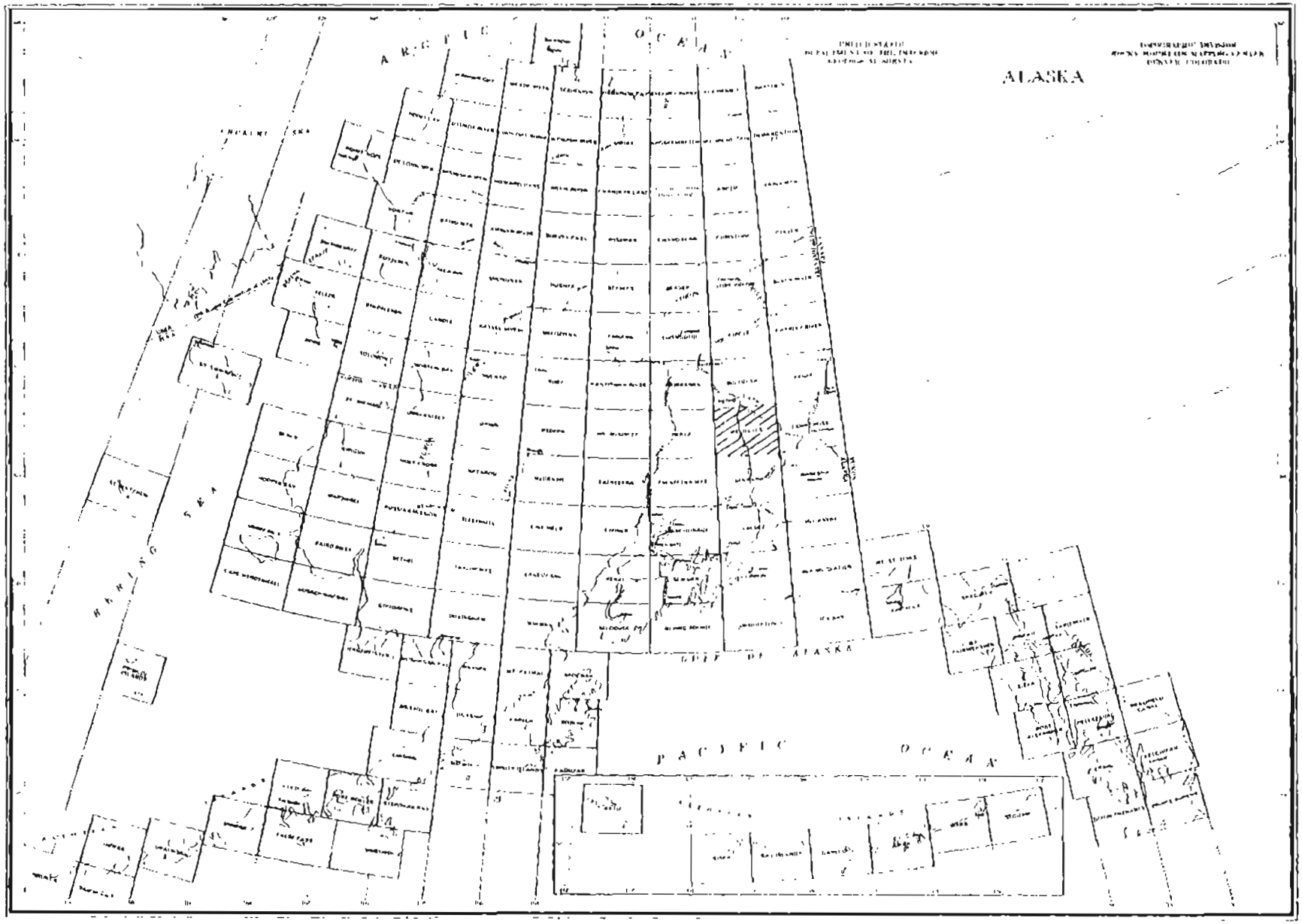


Figure 1 -- Index map showing location of Mount Hayes quadrangle.

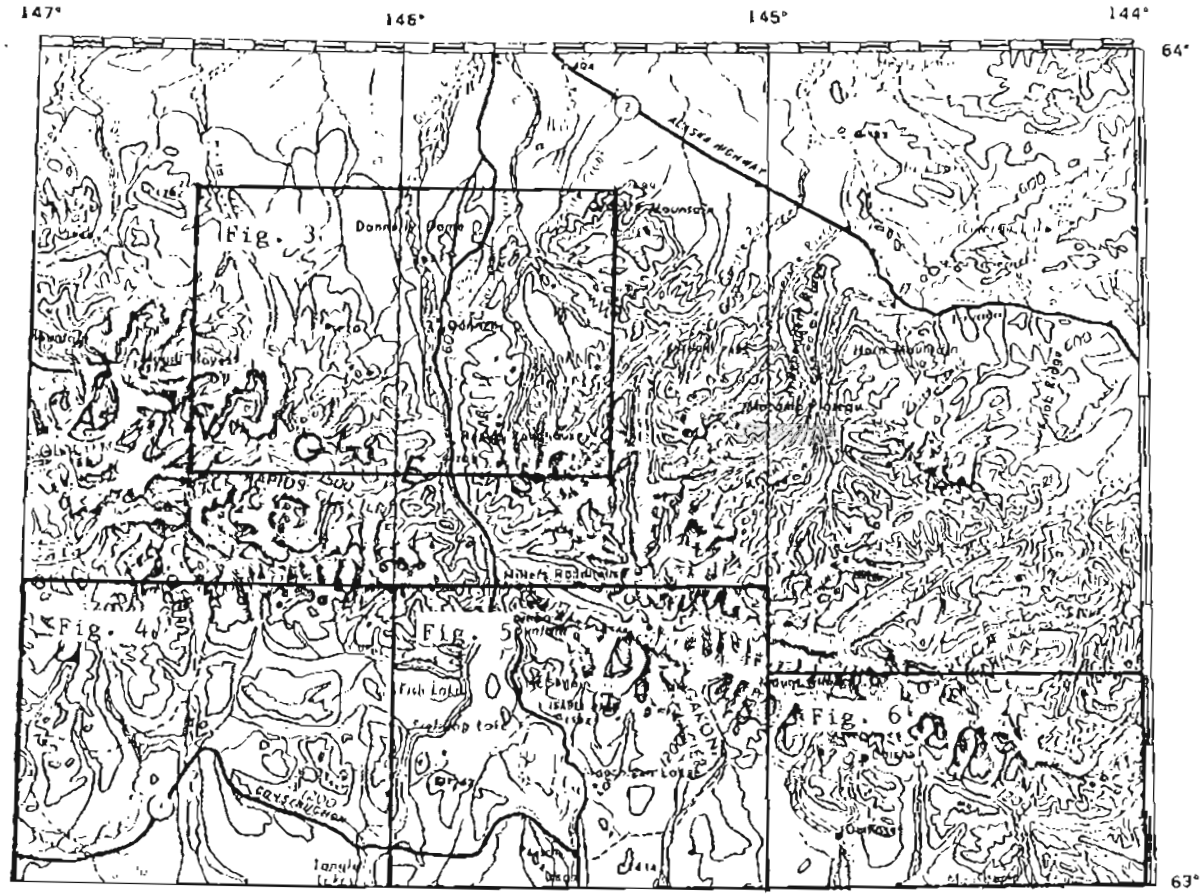


Figure 2 -- Index map showing areas covered by figures 3-6.

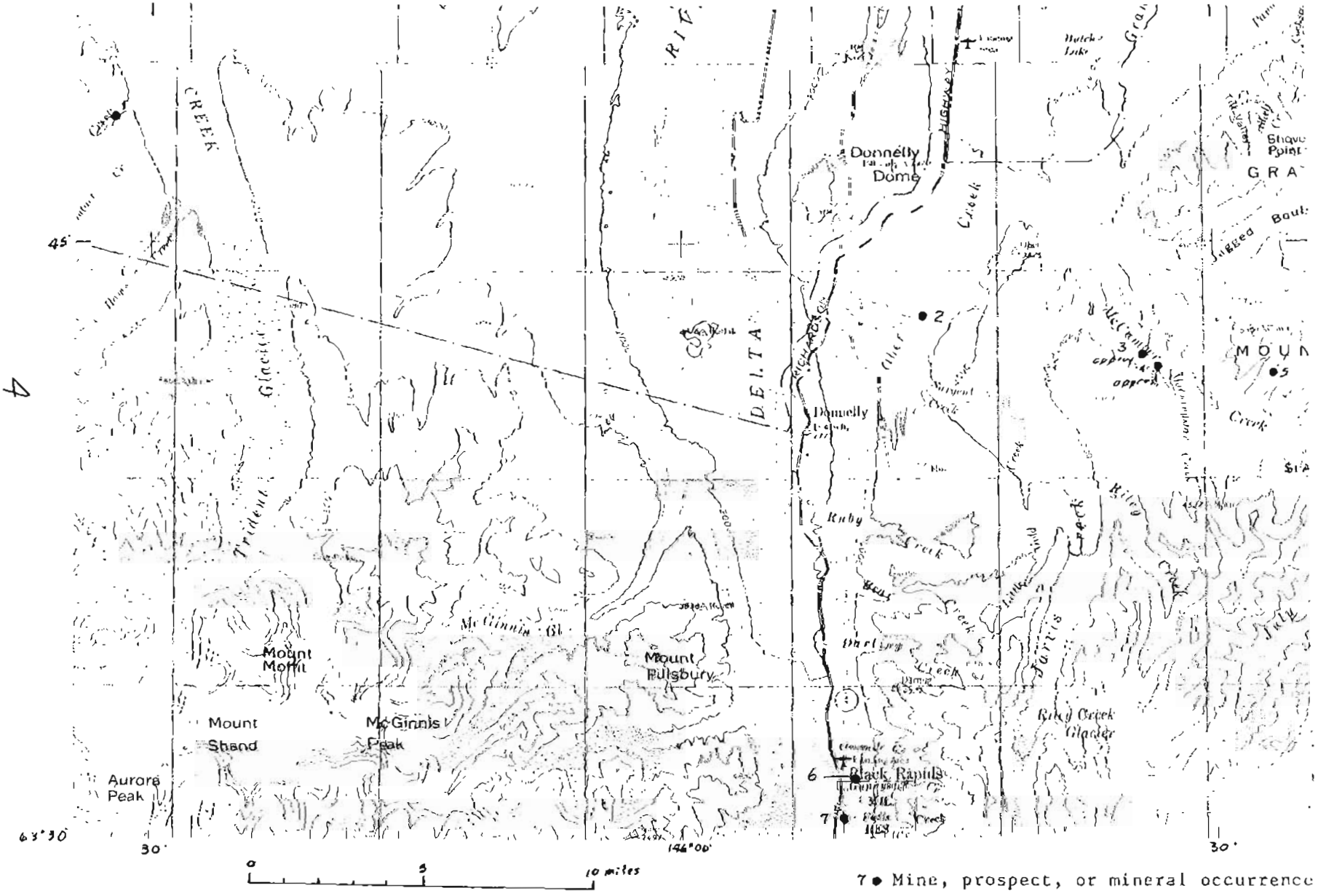
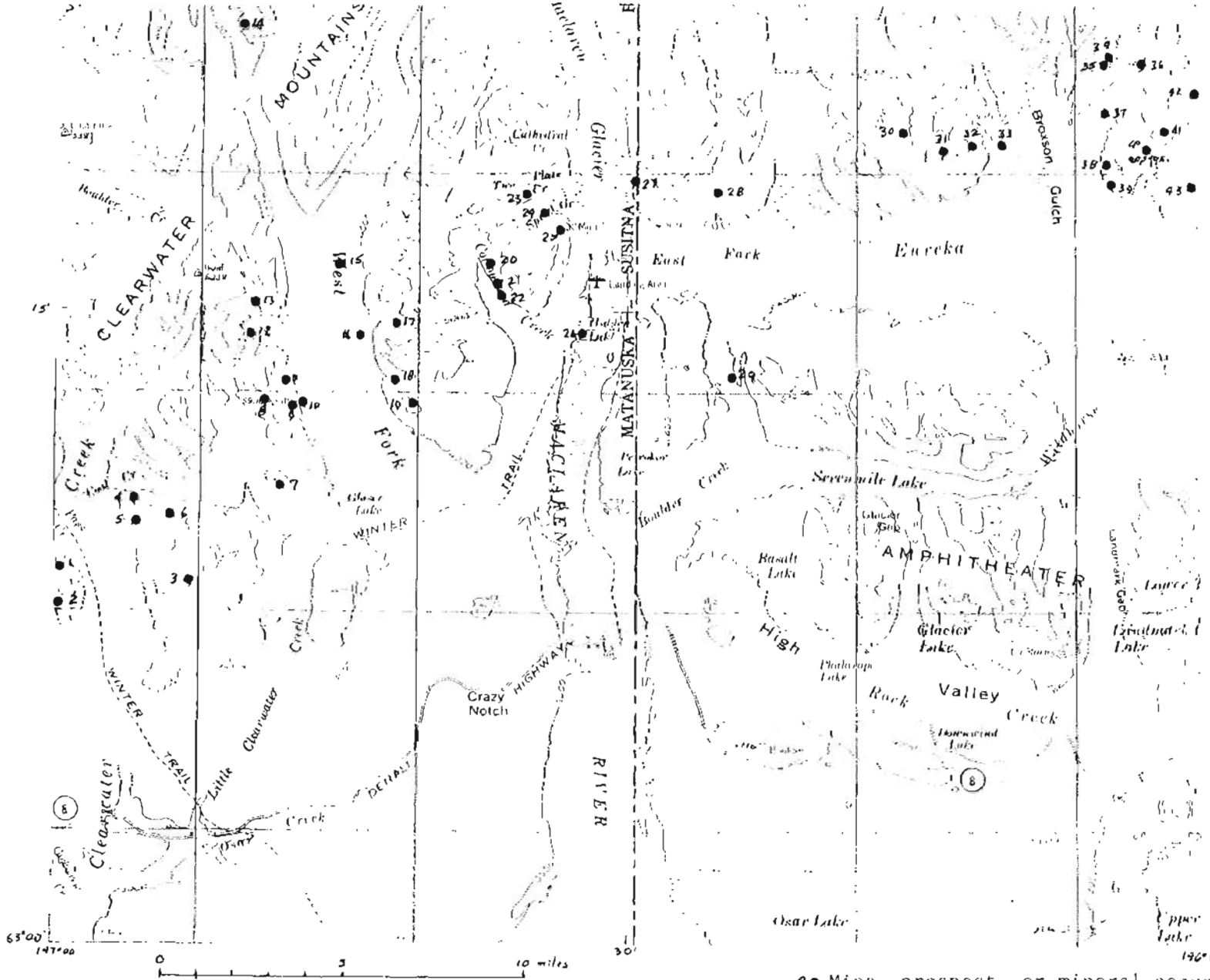
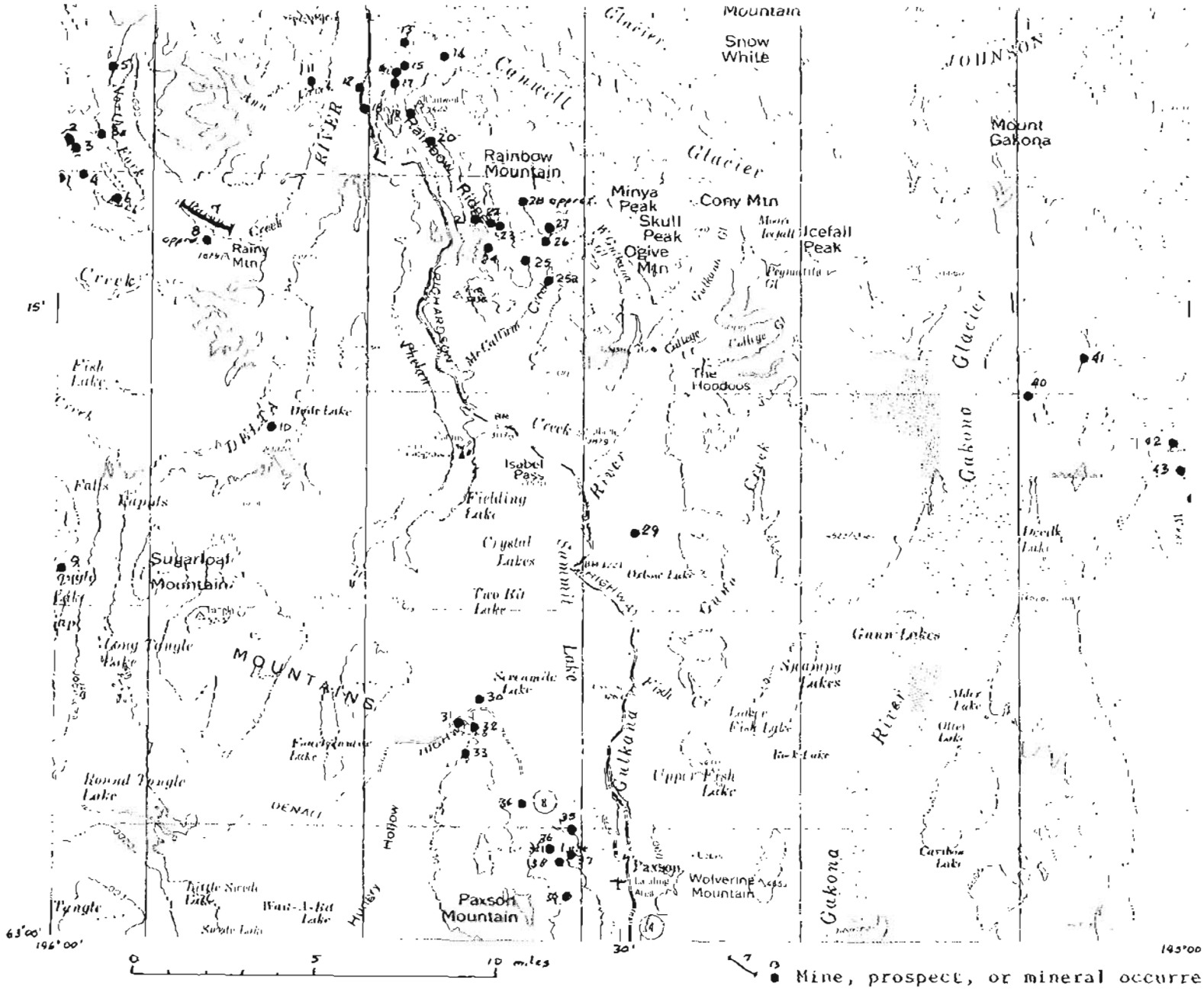


Figure 3 -- Mineral occurrences in north-central Mount Hayes quadrangle.



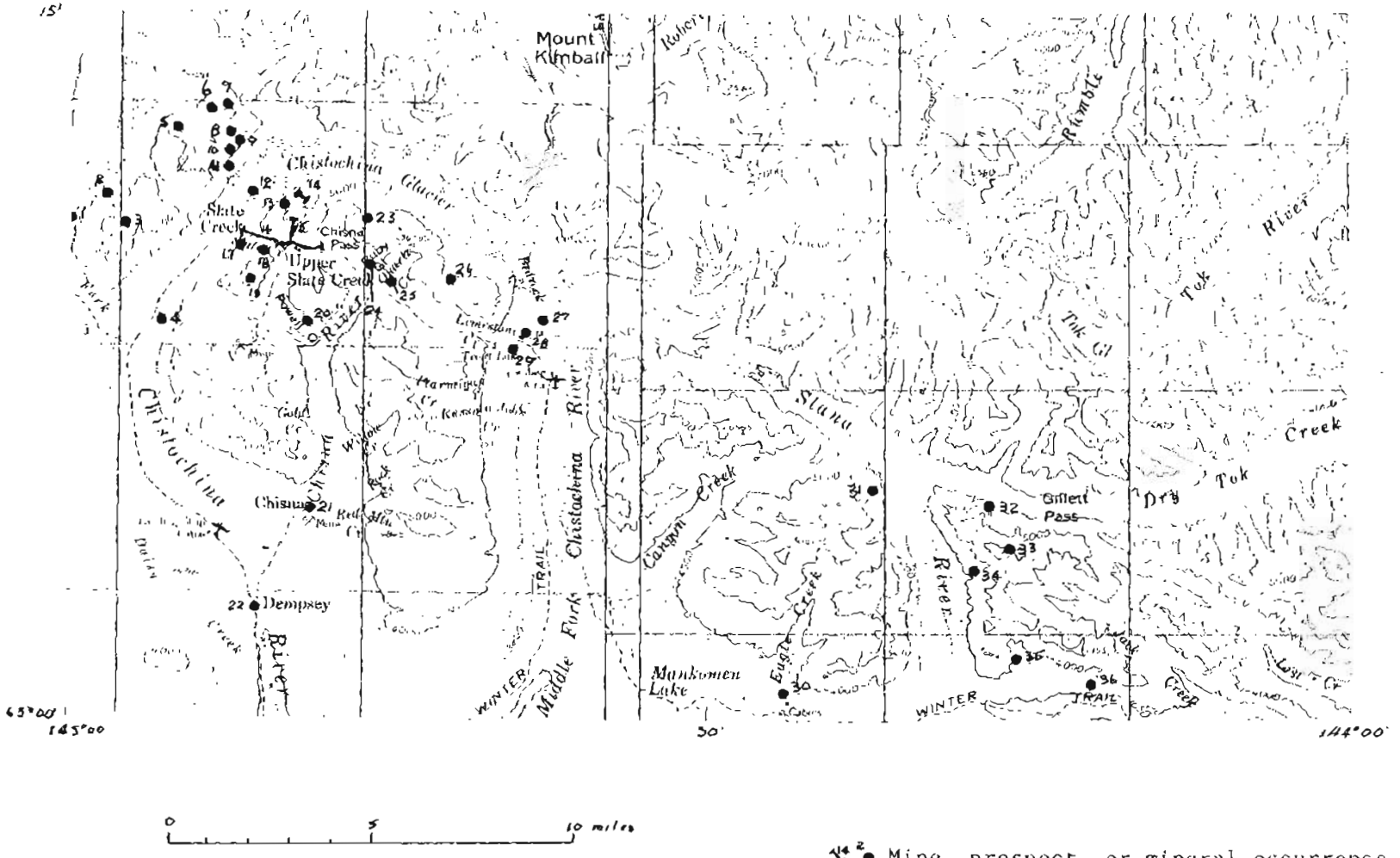
4● Mine, prospect, or mineral occurrence

Figure 4 -- Mineral occurrences in southwestern Mount Hayes quadrangle.



● Mine, prospect, or mineral occurrence

Figure 5 -- Mineral occurrences in south-central Mount Hayes quadrangle.



Mine, prospect, or mineral occurrence

Figure 6 -- Mineral occurrences in southeastern Mount Hayes quadrangle.

Summaries of References

For each mineral occurrence there is a page that gives the name of the occurrence; the mineral commodities present (listed alphabetically); the mining district (Ransome and Kerns, 1954) in which the occurrence is located; the name of the 1:250,000-scale topographic quadrangle (Mount Hayes); coordinates (as described by Cobb and Kachadoorian, 1961, p. 3-4); the figure and locality number on the maps preceding this section; and the latitude and longitude of the occurrence. Numerical coordinates become progressively less accurate as their numbers increase because of the lack of scale stability of the base maps on which I plotted localities; all, however, are probably accurate within about 0.1 inch (about 0.4 mile).

These data, presented at the top of the page, are followed by a short, general summary of the published information on the occurrence. This is followed (continued on additional pages, if necessary) by more detailed summaries, arranged chronologically, of references to the occurrence. Material in brackets is interpretive or explanatory and is not in the summarized reference.

Proper names of mines, prospects, and other mineral occurrences usually are given if such names appear in the reports summarized. If a deposit does not have such a name, but is near a named geographic feature, the name of that feature is shown in parentheses in lieu of a proper name. All references to placer mining on a stream appear under the stream name rather than under the names of individual claims or of operators. Many deposits have no proper name and can not be unambiguously referred to a named geographic feature; such occurrences are called "Unnamed occurrence" and appear at the end of this section.

Citations are given in standard bibliographic format with the exception that references to reports and maps in numbered publication series also show, in parentheses, an abbreviation for the report or map series and the report or map number. Abbreviations used are:

AOF	Alaska Division of Geological and Geophysical Surveys Open-File Report
B	U.S. Geological Survey Bulletin
BMB	U.S. Bureau of Mines Bulletin

C	U.S. Geological Survey Circular
GC	Alaska Division of Geological and Geophysical Surveys (and predecessor State agencies) Geochemical Report
GR	Alaska Division of Geological and Geophysical Surveys (and predecessor State agencies) Geologic Report
I	U.S. Geological Survey Miscellaneous Geologic Investigations Map
IC	U.S. Bureau of Mines Information Circular
OF	U.S. Geological Survey Open-File Report
MF	U.S. Geological Survey Miscellaneous Field Studies Map
MP	Alaska Division of Geological and Geophysical Surveys Miscellaneous Paper
P	U.S. Geological Survey Professional Paper
RI	U.S. Bureau of Mines Report of Investigations
TDM	Alaska Territorial Department of Mines Pamphlet

Summaries are as I made them while reading the cited reports. I made no attempt to use complete sentences and did not edit for grammatical consistency, although I have tried to avoid ambiguities.

(Alteration Cr.) Copper, Gold, Silver

Chistochina district Mt. Hayes (21.9, 0.85)
Fig. 6, loc. 35 63°01'N, 144°16'W

Summary: Thin copper-stained quartz veins in altered, pyritized Pennsylvanian volcanics contain minor chalcopyrite, its alteration products, and pyrite. Sample contained 1.5% Cu, 0.02 oz. a ton gold, and 0.54 oz. a ton silver.

Richter, 1967 (GR 30), p. 16-18, loc. 2 -- Thin quartz veins in a small area of silicified, pyritized, and brecciated volcanic rocks contain minor amounts of chalcopyrite and its alteration products. Grab sample contained 1.5% Cu, 0.02 oz. a ton gold, and 0.54 oz. a ton silver.

MacKevett and Holloway, 1977 (OF 77-169A), p. 40, loc. 54 -- Reference to above.

Richter and others, 1977 (I-1031), loc. 1 -- Copper-stained quartz veins with minor chalcopyrite and pyrite in large altered area. Country rock is Pennsylvanian Tetelna Volcanics.

Bee Mining Co. — Copper, Gold, Lead, Nickel, Silver

Delta River district — Mt. Hayes (9.6, 6.05)
Fig. 5, loc. 11 — 63°20'N, 145°47'W

Summary: Magmatic sulfide lens and disseminated grains in mafic and ultramafic rocks (some serpentinized) of probably Mesozoic age. Principal sulfide pyrrhotite, accompanied by pentlandite, chalcopyrite, and traces of galena. Samples contained as much as 2.01% nickel, 0.61% copper, 0.20 oz. a ton gold, and 0.32 oz. a ton silver.

Rose, 1965 (GR 14), p. 25-26, 32-33, loc. 3 -- In a narrow zone of ultramafic and gabbroic rocks of Mesozoic(?) age; sedimentary rocks and tuff to north; andesitic and dacitic volcanic rocks to south. Mafic and ultramafic rocks may have been intruded along a fault zone. Shattered diorite or quartz diorite at east end of zone; relative ages not clear. Sulfides in a lens about 18 in. thick and disseminated in mafic gabbro (some serpentinized). Sulfides are abundant pyrrhotite, some pentlandite and chalcopyrite, and traces of galena. Samples contained 0.17%-2.01% nickel, 0.1%-0.61% copper, 0.20 oz. a ton gold, and 0.32 oz. a ton silver. Some of nickel probably in silicate minerals. Textures suggest late crystallization of an interstitial liquid derived from a peridotitic magma.

Berg and Cobb, 1967 (B 1246), p. 211-212 -- Data from above.

Mulligan, 1974 (IC 8626), p. 16 -- Geologically similar to Emerick prospect.

MacKevett and Holloway, 1977 (OF 77-169A), p. 38, loc. 28 -- Data from Rose, 1965 (GR 14), p. 25-26, 32-33.

(Big Four Cr.) Gold

Chistochina district
Fig. 6, loc. 14

Mt. Hayes (17.3-17.35, 3.5-3.55)
63°11'N, 144°49'W

Summary: Short, steep creek that heads in a body of auriferous Tertiary conglomerate and sandstone and flows across mainly gabbro bedrock. Mining hampered by water shortages; carried on intermittently from early 1900's to as recently as 1960's. Includes references to Big Four.

Mendenhall, 1903 (B 213), p. 74 -- Staked by 1902 and a little mining. Gold mainly fine. "Round wash" on slopes drained by creek.

Mendenhall and Schrader, 1903 (P 15), p. 54 -- Two or three claims have been staked and worked in a small way. Yield not more than $10-$20 per man per day.

Mendenhall, 1905 (P 41), p. 112 -- Same as Mendenhall and Schrader, 1903 (P 15), p. 54.

Moffit, 1912 (B 498), p. 70 -- Mining, 1910.

p. 74-75 -- Has been a small producer for a number of years. Presence of gold gives support to the idea that gold in Miller Gulch and Slate Cr. is derived from slates north of Slate Cr. Gold finer than that from Miller Gulch.

Chapin, 1919 (B 692), p. 140-141 -- Assessment and development work, 1917.

Moffit, 1944 (B 943-B), p. 29 -- Mining, 1914.

p. 34 -- Auriferous gravel is part of old gravel deposit called "round wash" by miners. Attempts to mine creek gravel from time to time; most recently in 1941.

Moffit, 1954 (B 989-D), p. 193-194 -- Essentially the same as in Moffit, 1944 (B 943-B), p. 34. Gold apparently travelled farther from source than that in Miller Gulch. Insufficient water and small gold content have discouraged most prospectors.

Rose, 1967 (GR 28), p. 25-26 -- Small amounts of placer gold mined intermittently for about 65 years. Creek heads in "round wash" and flows mainly over gabbro. In 1966 there was evidence of mining within the last few years.

Cobb, 1973 (B 1374), p. 26-27 -- Body of gold-bearing Tertiary continental deposits (mainly poorly consolidated conglomerate and sandstone) between heads of Big Four Cr. and Miller Gulch. Mining for many years when water was available.

MacKevett and Holloway, 1977 (OF 77-169A), p. 40, loc. 66 -- Reference to Rose, 1967 (GR 28), p. 25-26.

(Black Rapids)

Antimony

Delta River district
Fig. 3, loc. 7

Mt. Hayes (9.05, 9.0)
63°30'N, 145°51'W

Summary: Quartz vein about 6 in. thick is made up of about 50% bladed stibnite. Vein (may be more than one) explored by adit (now caved), open cut, and some stripping; barren in most places. Country rock is metasedimentary schist.

Ebbley and Wright, 1948 (RI 4173), p. 35-36 -- 2 quartz veins in schist exposed by a partially caved adit and several open cuts and strippings. Mostly barren quartz with pyrite cubes; stibnite and quartz make up a lens in extensively silicified and pyritized schist; lens a few inches to 12 ft. [lapsus for 12 in.] thick. Sample contained 36.46% Sb; no gold or silver.

Moffit, 1954 (B 989-D), p. 207-208 -- Two (or possibly segments of one) quartz veins in schist probably derived from a sedimentary rock have been explored by an old adit, an open cut, and some stripping. Most of quartz contains only a little pyrite, but one exposure in the open cut consists of as much as 12 in. (average 6 in.) of about equal parts quartz and bladed stibnite; no other sulfides and little if any gold or silver. Stripping showed some vein quartz with a little pyrite and stibnite, but not enough to encourage further development.

Berg and Cobb, 1967 (B 1246), p. 211 -- 6-in. quartz vein in schist contains about 50% stibnite.

Mulligan, 1974 (IC 8626), p. 15 -- References to Ebbley and Wright, 1948 (RI 4173) and Moffit, 1954 (B 989-D).

MacKevett and Holloway, 1977 (OF 77-169A), p. 37, loc. 3 -- References to Ebbley and Wright, 1948 (RI 4173) and Moffit, 1954 (B 989-D).

(Boulder Cr. tributary) Copper

Valdez Creek district Mt. Hayes (4.7, 3.95)
Fig. 4, loc. 29 63°14'N, 146°24'W

Summary: Small pods of massive chalcopyrite and bornite in Triassic basalt.

Stout, 1976 (GR 46), p. 30 -- Chalcopyrite and bornite in massive pods as much as 1 in. thick; in basalt of Triassic Boulder Creek Volcanics.

(Broxon Gulch) Gold

Delta River district Mt. Hayes (7.25, 5.75)
Fig. 4, loc. 37 63°20'N, 146°05'W

Summary: Has been gold placer mining; probably in about 1940 and more recently. Proximate source of gold may be glacial gravels.

Rose, 1965 (GR 14), p. 2 -- Has been gold placer mining on easternmost branch.

p. 35 -- Was placer mining, probably in about 1940 and possibly more recently; equipment scattered around and 2+ miles of ditches. Pan concentrates contain 4-7 colors of gold per pan, magnetite, garnet, and epidote. Proximate source of gold may be glacial gravels.

Cobb, 1973 (B 1374), p. 124 -- Reference to above.

Stout, 1976 (GR 46), p. 2 -- Has been placer mining, some recently.

MacKevett and Holloway, 1977 (OF 77-169A), p. 40, loc. 58 -- Reference to Rose, 1965 (GR 14), p. 35.

(Chisna R.) Gold

Chistochina district Mt. Hayes (17.45, 1.6)
Fig. 6, loc. 21 63°04'N, 144°49'W

Summary: Stream drains area underlain by conglomerate, quartzite, tuff, and lava flows of the upper Paleozoic Chisna Fm. cut by diorite dikes and sills. Aufirerous Tertiary continental rocks at heads of some tributaries. Most mining in and near a small canyon cut in a diorite intrusive body; stream staked at one time or another up to headwater tributaries. Gold discovered in 1898 and mined intermittently until as recently as early 1940's; production was probably a few thousand ounces at most. Both stream and bench gravels are auriferous; all mining probably in stream gravels. Includes references to (Chesna R.). See also: (Dempsey), (Ruby Gulch).

Mendenhall, 1903 (B 213), p. 71-74 -- Mining near shallow canyon about 1-1/2 mi. above mouth and on Ruby Gulch near head. "Round wash" on hills around some of headwater tributaries. Gravels 4-8 ft. deep, but mining hampered by many large boulders and much water. Some not very successful hydraulicking in 1902. Production in 1902 (including that from Ruby Gulch), was about $20,000 [about 965 fine oz.] in gold worth $18.72 an ounce [gold at $20.67].

Mendenhall and Schrader, 1903 (P 15), p. 49 -- Gold discovered, 1899.
p. 56 -- Mining at, immediately above, and immediately below canyon. Gravels contain many rock types, many probably brought in by glacial action. Nuggets rare; abundant flakes 1/8 in. or more in diameter. Many boulders; most gold probably in bars swept by swift current. Below canyon some pans from gravel on bedrock reported to have run as much as $1.

Mendenhall, 1905 (P 41), p. 113-114 -- Same as Mendenhall and Schrader, 1903 (P 15), p. 56.

Moffit, 1909 (B 379), p. 157 — Mainly ditch construction and prospecting; 1908; some gold recovered.

Brooks, 1910 (B 442), p. 42 -- Prospecting bench claims, 1909.

Moffit, 1911 (B 480), p. 126-127 -- Preliminary to Moffit, 1912 (B 498).

Brooks, 1912 (B 520), p. 37 -- Mining operations, 1911 [may include those at Dempsey].

Moffit, 1912 (B 498), p. 56 -- Reference to Mendenhall, 1905 (P 41), p. 114.
p. 70 -- Mining, 1910.
p. 75-77 -- Quotation from Mendenhall, 1905 (P 41). Mainly assessment work in 1910. Gold mainly derived from Mankomen Fm.

Brooks, 1913 (B 542), p. 43 -- Prospecting with a churn drill, 1912.

Brooks, 1915 (B 622), p. 45 -- Preparations for prospecting dredging ground, 1914.

Smith, 1917 (BMB 153), p. 33-34 -- Prospecting, 1916; some small-scale mining [may have been at Ruby Gulch].

Chapin, 1912 (B 692), p. 137 -- Gold-bearing stream.

Moffit, 1944 (B 943-B), p. 29-31 -- Gold discovered in 1898; intermittent mining since 1899. Stream drains area underlain by Chisna Fm. (conglomerate, tuff, quartzite, and lava flows) cut by diorite dikes and sills. Most mining in and near a small canyon cut in a diorite intrusive body. Lower part of valley is a broad flat of

(Chisna R.) -- Continued

glacial debris, some of which may have come from Wrangell Mts. Gold in river gravels and bench deposits; all mining has been in stream gravels. Has been considerable investment in ditch and pipeline construction. Mining after much dead work in 1941 was not extensive because of internal dissention in mining company.

Moffit, 1954 (B 989-D), p. 191-192 -- Data from Moffit, 1944 (B 943-B), p. 29-31 summarized. Work being done in 1941 was abandoned.

Rose, 1967 (GR 28), p. 26 -- Has been small to moderate production from claims on lower river. Ground staked from near Red Mountain Cr. about to Ruby Gulch.

Koschmann and Bergendahl, 1978 (P 610), p. 13-14 -- Site of first placer-gold locations in Chistochina district.

Cobb, 1973 (B 1374), p. 26 -- Placer gold discovered, 1898.

MacKevett and Holloway, 1977 (OF 77-169A), p. 40 loc. 70 -- Reference to Moffit, 1944 (B 943-B), p. 29-31.

(Chistochina Glacier) Gold, Platinum, Tungsten

Chistochina district
Fig. 6, loc. 12

Mt. Hayes (17.0, 3.5)
63°11'N, 144°52'W

Summary: Gold, platinum, and a few grains of scheelite in concentrate from gravels that have been exposed by retreat of glacier front since 1900.

Rose, 1967 (GR 28), p. 26 -- 12 claims in area from which glacier front has receded since 1900. Gold and minor platinum recovered from gravel a few feet above river level; must be derived from very recent glacial material.

p. 35-36 -- A few scheelite grains in pan concentrate samples.

Cobb, 1973 (B 1374), p. 28 — Scheelite reported in concentrates.

MacKevett and Holloway, 1977 (OF 77-169A), p. 40 -- Reference to Rose, 1977 (GR 28), p. 26.

(Chistochina R.) Tungsten

Chistochina district Mt. Hayes (16.5, 2.7)
Fig. 6, loc. 4 63°08'N, 144°58'W

Summary: Scheelite in pan concentrate sample.

Rose, 1967 (GR 28), p. 35-36 -- Scheelite in pan concentrate sample.
Cobb, 1973 (B 1374), p. 28 -- Scheelite reported in concentrates.

(Chistochina R., Middle Fork)

Chromite, Copper, Gold, Lead, Platinum, Silver

Chistochina District
Fig. 6, locs. 27-29

Mt. Hayes (18.65-18.85, 2.65-2.8)
63°08'N, 144°38'-144°39'W

Summary: Headwater tributaries cut into or through an extensive bench of glacially derived gravel generally 30-40 ft. thick (in places at least 70 ft. thick) made up of many rock types. Bedrock limestone and volcanic rocks. Most mining in bench near Limestone Cr. where at least 580 oz. of gold has been recovered; some platinum (ratio of 1:100 to gold). Concentrates also contain magnetite, pyrite, chromite, garnet, galena, copper nuggets weighing as much as 2-3 lbs., and small particles of native silver. Heavy minerals on clay false bedrock. Gold probably derived from a foreign source and deposited at end of a period of glacier-front retreat; some or all may have come from older gravels. Includes references to (Lime Cr.). Coordinates above include Limestone, Bedrock, and Kraemer Creeks.

Moffit, 1909 (B 379), p. 157 -- Some gold recovered, 1908.
Moffit, 1911 (B 480), p. 126 -- Preliminary to Moffit, 1912 (B 498).
Moffit, 1912 (B 498), p. 78 -- Placer mining has been on a bench north of Lime Cr. (at one time known as Lake Cr.) 1-1/2 to 2 mi. east of divide between Lime Cr. and Chisna R. Deposit mainly glacial in origin; gold on blue clay bedrock; whole deposit 30-40 ft. thick [probably all above glacial blue clay]. Gravel contains much greenstone; also slate, limestone, conglomerate, and granite. Copper nuggets as much as several pounds in weight caught in sluice boxes.
Chapin, 1919 (B 692), p. 137 -- Lime Cr. is gold bearing.
Brooks and Capps, 1924 (B 755), p. 28 -- Mining, 1922.
Smith, 1930 (B 810), p. 22 -- Prospecting and assessment work, 1927.
Smith, 1934 (B 857-A), p. 26-27 -- Mining, 1932.
Smith, 1934 (B 864-A), p. 30 -- Mining, 1933.
Moffit, 1937 (B 880-B), p. 105-106 -- Prospecting and dead work, 1934-35.
Smith, 1938 (B 897-A), p. 41 -- Prospecting and dead work, 1936.
Smith, 1939 (B 910-A), p. 39-40 -- Prospecting, 1937.
Smith, 1939 (B 917-A), p. 38 -- Small-scale mining, 1938.
Moffit, 1944 (B 943-B), p. 29 -- Mining, 1941.

p. 34-40 -- Limestone, Kraemer, and Bedrock Creeks are cut into or through an extensive bench of glacially derived gravels generally 30-40 ft. thick (in places at least 70 ft. thick); gravels made up of many rock types, of both local and exotic derivation. Bedrock limestone and volcanic rocks. Mining in bench gravels; most near Limestone Cr., where about 580 oz. of gold has been recovered. Concentrates contain, in addition to gold, magnetite, pyrite, chromite, garnet, galena, olivine(?), copper nuggets weighing as much as 2-3 lbs., appreciable amounts of small grains of platinum and occasional small particles of silver. Operation in 1941 was guided by several years of drilling and other exploration and consisted almost entirely of preparatory work for large-scale hydraulicking. Gold probably derived from a foreign source and deposited at end of period of retreat of glacier front;

(Chistochina R., Middle Fork) -- Continued

some or all may have been reconcentrated from older gravels.
Moffit, 1954 (B 989-D), p. 191 -- Has been mining on Lime Cr.
p. 194 -- Data from Moffit, 1944 (B 943-B), p. 34-40 summarized.
Rose, 1967 (GR 28), p. 26 -- Claims on many headwater tributaries. Production has probably been a few thousand dollars; considerable development work in late 1940's.
Cobb, 1973 (B 1374), p. 26-28 -- Gold and platinum in the ratio of 1:100 to gold recovered; probably derived from glacial deposits.
MacKevett and Holloway, 1977 (OF 77-169A), p. 40, loc. 68 -- Reference to Moffit, 1944 (B 943-B), p. 34-40.

(Chistochina R., West Fork) Tungsten

Chistochina district Mt. Hayes (15.85, 3.5)
Fig. 5, loc. 43 62°12'N, 145°00'W

Summary: Scheelite in pan concentrate sample.

Brooks, 1918 (B 662), p. 43 -- Reference really to (Slate Cr.).
Rose, 1967 (GR 28), p. 35-36 -- Scheelite in pan concentrate sample.
Cobb, 1973 (B 1374), p. 28 -- Scheelite reported in concentrates.

(Cottonwood Cr.) Copper

Valdez Creek district Mt. Hayes (3.0-3.1, 4.5-4.7)
Fig. 3, locs. 20-22 63°17'N, 146°37'-146°38'W

Summary: Traces of copper sulfides and malachite in greenstone float. Three occurrences close together. Copper-bearing quartz veins reported; samples said to have contained 0.5-1.5% copper.

Chapman and Saunders, 1954 (C 332), p. 5 -- Copper-bearing quartz veins reported. Samples reported to assay 0.5-1.5% copper; one piece of float reported to have contained 40.85% copper.

Kaufman, 1964 (GR 4), p. 8, loc. 15 -- 3 occurrences. Two southerly occurrences are talus containing small amounts of quartz-epidote material in greenstone with traces of chalcopyrite, bornite, chalcocite, and malachite; sources are probably small mineralized pods or fractures in greenstone. Northernmost occurrence (in a drainage way) is similar except that in addition some of the copper is in amygdule fillings.

MacKevett and Holloway, 1977 (OF 77-169A), p. 37, loc. 10, 11 -- References to above. Loc. 10 is northern occurrence; loc. 11 is two southern occurrences.

Daisy	?
Chistochina district	Mt. Hayes (16.0, 2.7) approx. 63°08'N, 144°59'W approx.

Summary: Claims staked in 1966; only evidence of mineralization is a little iron staining.

Rose, 1967 (GR 28), p. 23 -- 85 claims staked in 1966. Only evidence of mineralization is a little iron staining of quartz monzonite.

(Delta R.) Gold

Delta River district
Fig. 5, loc. 10

Mt. Hayes (9.45, 3.65)
63°12'N, 145°49'W

Summary: Gold panned from river gravels by USGS party in 1910. Location probably correct within 1/2 mile.

Moffit, 1912 (B 498), p. 65 -- Gold panned from river gravels by USGS party in 1910.
Mulligan, 1974 (IC 8626), p. 16 -- Reference to above.
MacKevett and Holloway, 1977 (OF 77-169A), p. 40, loc. 62 -- Reference to above.

(Dempsey) Gold

Chistochina district Mt. Hayes (17.15, 1.0)
Fig. 6, loc. 22 63°03'N, 144°51'W

Summary: Bench gravels, at least partially frozen, carry fine gold. Tunnel driven into bench, about 1908-10; results not satisfactory. Includes references to (Daisy Cr.). See also (Chisna R.).

Moffit, 1909 (B 379), p. 157 -- Prospecting and ditch construction in 1908 reported. Some of bench gravels at Daisy Cr. frozen.

Brooks, 1910 (B 442), p. 42 -- Some work on a tunnel intended to tap an old channel of Daisy Cr., 1909.

Moffit, 1911 (B 480), p. 127 -- Preliminary to Moffit, 1912 (B 498).

Moffit, 1912 (B 498), p. 77 -- Bench gravels carry fine gold. Has been prospecting (mainly a tunnel driven into bench) for several years; no satisfactory results.

MacKevett and Holloway, 1977 (OF 77-169A), p. 40, loc. 69 -- Reference to Moffit, 1912 (B 498), p. 77.

(Eagle Cr.) Copper, Gold, Platinum(?)

Chistochina district Mt. Hayes (20.45, 0.55)
Fig. 6, loc. 30 63°01'N, 144°26'W

Summary: Creek draining type locality of Permian Mankomen Fm. (limestone, clastic rocks, and volcanic rocks). Has been minor gold production from workings in canyon cut in volcanic rocks where creek emerges from mountains. Concentrates contain much magnetite, native copper, barite, and other heavy minerals. Platinum reported; probably present, as it is in many creeks in this general part of the district.

Moffit, 1909 (B 379), p. 157 -- Placer mining, 1908.

Moffit, 1944 (B 943-B), p. 29 -- Preparations for installing a hydraulic plant, 1941.

p. 40-42 -- Upper part of course in Mankomen Fm. (type locality), which here consists of limestone, shale, conglomerate, sandstone, and tuff. Upper valley strongly glaciated. Below upper valley creek flows for about half a mile in a canyon cut in dark, fine-grained volcanic rock. Creek gravels contain rocks derived from Mankomen Fm. and glacial boulders and pebbles of diorite, schist, lavas, and other rock types. Most work has been done in canyon. Gold associated with native copper, much magnetite, barite, and other heavy minerals; magnetite clogs riffles in sluice boxes. Much of gold flaky and smooth; some heavy and rough and does not appear to have traveled far. Platinum is reported. Preparations for mining, 1941.

Moffit, 1954 (B 989-D), p. 191 -- Gold-bearing deposits of commercial value.

p. 194-195 -- Data in Moffit, 1944 (B 943-B), p. 40-42 summarized.

Cobb, 1973 (B 1374), p. 28 -- Data from Moffit, 1944 (B 943-B), p. 40-42.

MacKevett and Holloway, 1977 (OF 77-169A), p. 40, loc. 71 -- Reference to Moffit, 1943 (B 943-B), p. 40-42.

Richter and others, 1977 (I-1031), loc. 5 -- Placer gold deposit; very minor production.

Emerick — Copper, Nickel

Delta River district — Mt. Hayes (10.3, 6.35)
Fig. 5, loc. 13 — 63°21'N, 145°42'W

Summary: Chalcopyrite, pyrrhotite, pentlandite, and pyrite in small lenses in serpentinized peridotite. Same minerals except for pyrite disseminated in a gabbro dike in peridotite. Combined copper and nickel contents are about 4.15% and over 2% respectively. Trenching and sampling in 1962. Beneficiation studies were unsuccessful. See also (Rainbow Mtn.).

Hanson, 1963 (GR 2), p. 67 -- Nickel and copper mineralization associated with ultramafic dikes; discovered in early 1950's.

Rose, 1965 (GR 14), p. 21-25 -- Staked in early 1950's. Trenching, mapping, and sampling by Newmont Mining Co. in 1962. Serpentinized peridotite and a gabbro dike that cuts it are in a sheared and faulted terrane of metamorphosed sedimentary and dioritic rocks, tuffs, and graywacke. Sulfide lenses are short and discontinuous and do not persist more than 10-20 ft. along strike; the maximum observed width is about 10 ft. Sulfides are pyrrhotite, pentlandite, chalcopyrite, and pyrite. Chalcopyrite, pyrrhotite, and pentlandite in an indistinct gabbro dike as much as 8 ft. wide; combined Ni-Cu content is over 2%. Prospect does not appear to be economic.

p. 32-33 -- Disseminated sulfides in gabbro presumably were immiscible liquid droplets in a late fraction of peridotitic magma, of which the gabbro was a late differentiate. Sulfide lenses in peridotite may have been formed by migration of immiscible liquid into fractures and shears.

p. 46 -- Assays of samples indicated as much as 2.68% Cu and 14.02% Ni; unweighted averages are about 1.14% Cu and 3.99% Ni; no gold or silver.

Mulligan, 1974 (IC 8626), p. 16 -- Most of data from above references. Beneficiation studies to find an economic method of concentrating the nickel were unsuccessful. Covered by active unpatented claims.

MacKevett and Holloway, 1977 (OF 77-169A), p. 38, loc. 29 -- Reference to Hanson, 1963 (GR 2).

(Eureka Cr.) Gold

Delta River district Mt. Hayes
NE 1/4 SW 1/4 quad.

Summary: Has been a little small-scale placer mining; 2 men were working in 1910. Activity may have been on Broxon Gulch, Specimen Cr., or elsewhere in basin.

Moffit, 1912 (B 498), p. 65-66 -- Has been prospecting and a little gold production from Eureka Cr. 2 men were mining in 1910.

(Gillett Pass) Chromite

Chistochina district
Fig. 6, loc. 32

Mt. Hayes (21.75, 1.8)
63°05'N, 144°17'W

Summary: Lenticular body of dunite about 2 mi. long contains bands of disseminated chromite and small segregations of massive chromite. Overall grade probably not more than 4% chromite. Sample contained 1.2% Cr_2O_3 and 0.4% nickel.

Richter, 1967 (GR 30), p. 12, loc. 6 -- Lenticular body of dunite with bands of disseminated chromite and small segregations of massive chromite.

p. 14 -- Sample of dunite contained 1.2% Cr_2O_3 and 0.4% Ni.

p. 18 -- 2-mile-long dunite body in Denali fault zone contains bands of disseminated chromite and occasional segregations of massive chromite. Indicated overall grade (based on limited examination) not more than 4% chromite.

MacKevett and Holloway, 1977 (OF 77-169A), p. 40, loc. 53 -- Reference to above.

Glacier Lake

Copper, Gold, Nickel, Silver

Delta River district
Fig. 5, loc. 14

Mt. Hayes (10.6, 6.3)
63°21'N, 145°40'W

Summary: Pyrrhotite, chalcopyrite, and pentlandite in narrow zone along contact between peridotite and diorite. Some material massive (samples contained 1.1% Cu, 6.6%-8.1% Ni, and 0.4 oz. a ton gold) and some consisting of sulfides disseminated in peridotite (samples contained 1.9%-6% Cu, 0.05%-1.5% Ni, and as much as 0.04 oz. a ton gold and 0.35 oz. a ton silver). Slightly explored small occurrence. See also (Rainbow Mtn.).

Hanson, 1963 (GR 2), p. 71-72 -- 2 showings of nickeliferous pyrrhotite and perhaps other complex nickel sulfide mineralization in and associated with serpentinized peridotite dikes in shear zone in silicified diorite. 50 ft. away pyrrhotite lenses contain 20% to more than 50% sulfides associated with quartz. Samples from occurrences in dikes assayed 1.9%-6% Cu,1.1%-1.5% Ni, and tr. to 0.4 oz. a ton gold. Sample from lens assayed 1.1% Cu, 6.6% Ni, and 0.04 oz. a ton gold. [Prospect name not used.]

Rose, 1965 (GR 14), p. 25 -- Irregular intrusive of serpentinized peridotite (or mafic gabbro) is apparently intrusive into quartz diorite. Massive sulfide lens along contact consists of pyrrhotite, chalcopyrite, and pentlandite; small amounts of sulfides disseminated in peridotite away from contact. Sample of massive sulfide assayed 8.1% Ni. Chip sample of disseminated material collected for 3 ft. across contact assayed 2.10% Cu, 0.05% Ni, tr. gold, and 0.35 oz. a ton silver. Hanson [above] reported an assay of 6.6% Ni, 1.1% Cu, and 0.04 oz. a ton gold. Mineralization not evident at another exposure of the same contact.

Mulligan, 1974 (IC 8626), p. 16 -- Nickel-copper sulfide minerals in narrow zone between diorite and peridotite. Covered by active claims.

MacKevett and Holloway, 1977 (OF 77-169A), p. 39. loc. 35 -- References to Hanson, 1963 (GR 2); Rose, 1965 (GR 14).

Green Wonder — Zinc

Delta River district — Mt. Hayes (7.25, 5.5)
Fig. 4, loc. 38 — 63°19'N, 146°05'W

Summary: Mineralized zone less than 1 ft. thick in altered amphibolitic serpentinite consists mainly of sphalerite, chrome garnet, and pyrite; anomalous amounts of Cr and Ni; no nickel mineral identified.

Rose, 1956 (GR 14), p. 29, 34, loc. 13 -- Country rock amphibole "serpentinite" altered to a white rock consisting mainly of garnet, quartz, and diopside. A mineralized zone less than a foot thick is bright green and consists of sphalerite, uvarovite(?), and minor pyrite. X-ray analysis showed "10% zinc, 4% chrome, 2% nickel, and less than 0.1% lead and arsenic. No nickel minerals were observed in the sample." This mineralization is unique in the Rainy Creek area.

Berg and Cobb, 1967 (B 1246), p. 212 -- Data from above [not specifically cited].

MacKevett and Holloway, 1977 (OF 77-169A), p. 38, loc. 20 -- Narrow zone of quartz-silicate rock contains sphalerite, pyrite, and anomalous amounts of Cr and Ni; in amphibolitic serpentinite. Data of copper at Rose's loc. 12 also given.

(Gunn Cr.) — Chromite, Gold, Tungsten, Zinc

Chistochina district — Mt. Hayes (12.0, 3.0)
Fig. 5, loc. 29 — 63°10'N, 145°29'W

Summary: Concentrate sample contained, among other minerals, magnetite, chromite, ilmenite, scheelite, gold, and sphalerite. May have been derived from till.

Rose and Saunders, 1965 (GR 13), p. 15 -- Concentrate sample from location SS6 contained magnetite, chromite, ilmenite, olivine, zircon, scheelite, gold, sphalerite, and a number of silicates. May have been derived from till; granite reported in vicinity.

Cobb, 1973 (B 1374), p. 28 -- Data from above.

(Gunnysack Cr.) Antimony, Gold

Delta River district Mt. Hayes (9.15, 9.3)
Fig. 3, loc. 6 63°31'N, 145°40'W

Summary: Iron-stained milky quartz vein in places more than 20 ft. thick in schist and stockwork of quartz veinlets in footwall. High gold assays reported, but material did not prove to be minable. Low stibnite content. Explored by 30-ft. tunnel.

Capps, 1912 (B 501), p. 54 -- Quartz vein in Birch Creek Schist strikes southwesterly and dips 70° NW. Vein is in places more than 20 ft. thick and consists of iron-stained massive milky quartz. 30-ft. tunnel in schist of footwall shows stockwork of quartz stringers parallel to main vein. Gold content too low for profitable extraction.

Moffit, 1942 (B 926-B), p. 144 -- Reference to above.

Joesting, 1942 (TDM 1), p. 12 -- Gold-bearing stibnite prospect. Tunnel driven in 1916. Ore said to carry $1.50 to $15 a ton in gold; stibnite apparently low grade. [Date of tunnel at variance with Capps, 1912 (B 501), p. 54.]

Berg and Cobb, 1967 (B 1246), p. 211 -- Data from Moffit, 1942 (B 926-B), p. 144 [not specifically cited].

Mulligan, 1974 (IC 8626), p. 15 -- References to Capps, 1912 (B 501), and Moffit, 1942 (B 926-B).

MacKevett and Holloway, 1977 (OF 77-169A), p. 37, loc. 2 -- References to Joesting, 1942 (TDM 1), p. 12, and Moffit, 1942 (B 926-B), p. 144.

(Hidden Lake) Copper

Valdez Creek district Mt. Hayes (3.65, 4.25)
Fig. 4, loc. 26 63°15'N, 146°32'W

Summary: Sparse bornite and secondary copper minerals in small pods and stringers of quartz and epidote in basaltic greenstone.

Saunders, 1961, p. 39, loc. 13 -- Mineralized zone in basaltic rocks; disseminated chalcopyrite and bornite. [Probably the same as Kaufman's loc. 16 (below).]

Kaufman, 1964 (GR 4), p. 8, loc. 16 -- Bornite and oxidized copper minerals associated with small pods and stringers of quartz and epidote in basaltic greenstone; widely spaced, sparsely mineralized, and with no apparent continuity.

(Hidden Treasure Cr.) Gold(?)

Chistochina district Mt. Hayes
S 1/2 SE 1/4 quad.

Summary: Report of plans for installing hydraulic plant, 1914. Creek not identified other than as in Chistochina district. Could be any creek with placer gold, or an unfounded rumor. May be the same as (Jackpot Cr.) and/or (Treasure Cr.).

Brooks, 1915 (B 622), p. 45 -- Preparations for installing hydraulic plant, 1914.

(Jackpot Cr.) Gold(?)

Chistochina district Mt. Hayes
S 1/2 SE 1/4 quad.

Summary: Prospect drilling, 1916. Location of creek not known other than "at the head of the Chistochina." Probably the same as (Ruby Gulch); Chistochina would be lapsus for Chisna.

Brooks, 1918 (B 662), p. 43 -- "Drilling was done [in 1916] for testing dredging ground on a group of claims on Jackpot Creek, at the head of the Chistochina."

(Jarvis Cr.) Copper(?), Gold(?)

Delta River district Mt. Hayes
E 1/4 NW 1/4 quad.

Summary: Placer gold reported; references may be to gold on tributaries. Lode claims have been staked for copper; no further data. See also: (McCumber Cr.), (Morningstar Cr.), (Ober Cr.).

Smith, 1929 (B 797), p. 20 -- Prospecting, 1926.
Wedow and others, 1954 (C 331), p. 18 -- One of the promising placer-gold streams in the area.
Cobb, 1973 (B 1374), p. 124 -- Proximate source of gold showings was probably Tertiary gravel.
Mulligan, 1974 (IC 8626), p. 15 -- Lode claims located for copper in 1954. Specific location doubtful.

Kathleen-Margaret	Copper, Gold, Silver
Valdez Creek district Fig. 4, loc. 25	Mt. Hayes (3.5, 5.0) 63°17'N, 146°33'W

Summary: Northward-striking quartz veins cut Carboniferous or Triassic greenstone and contain bornite and chalcopyrite, a little silver, and a trace of gold. Near an eastward-striking fault zone that is probably related to the genesis of the ore; copper values in only vein thought to be worthy of exploration decrease northward away from the fault-vein intersection. Altered porphyry dike of Teritary(?) age near and parallel to vein may have been source of ore fluid. Tenor of vein as high as 30% copper, but commonly 1%-5% copper. Explored by about 800 ft. of underground workings, trenching, and drilling. About 2 tons of ore estimated to carry 1%-2% copper stockpiled at prospect in 1960. Other veins in area are leaner and cannot be traced for more than 100 ft. See also (McLaren R.).

Chapman and Saunders, 1954 (C 332) -- Country rocks diabasic lavas of Carboniferous or Triassic age intruded by quartz diorite and hornblende diorite. Mineral deposits are quartz veins containing epidote, calcite, and copper sulfides (chalcopyrite and bornite) and secondary copper minerals. Largest vein (probably the only one that might be minable) is 10.5 ft. wide, strikes N 3°-5° E, and dips 70°-90° W. Along east wall is a band of nearly barren quartz 1.5-2 ft. thick; a zone 1.5-2 ft. thick containing 30%-45% copper, and (along the other wall) a zone about 7 ft. thick containing 3.5%-12.5% copper and as much as 0.18 oz. a ton gold and 1.2 oz. a ton silver. Sample from part of vein richest in copper contained 2.55 oz. a ton silver.

Wells, 1956 (RI 5245), p. 1, 9 -- Beneficiation of sample indicated that 1.2% copper ore could be concentrated to a product assaying 36.7% copper in which more than 95% of the copper in the heads was recovered. Heads assayed tr. gold, 0.04 oz. a ton silver, and less than 0.02% nickel.

Saunders, 1961, p. 39 -- Reference to Chapman and Saunders, 1954 (C 332); since publication of C 332, work has included driving more than 800 ft. of underground workings and drilling more than 2,000 ft. of exploratory drill holes. Nearby a band of olivine basalt 1-3 ft. wide carries disseminated native copper and bornite; small, inaccessible outcrop.

Matzko and Freeman, 1963 (B 1155), p. 43 -- Reference to Chapman and Saunders, 1954 (C 332). Highest radioactivity reading was 0.003 mr per hr on a quartz-copper vein.

Kaufman, 1964 (GR 4), p. 4-5 -- Copper minerals in quartz veins.

p. 8-9, loc. 17 --Most of data from Chapman and Saunders, 1954 (C 332). Thickest vein cut by crosscut from an adit about 200 ft. from portal; appears to be leaner than at surface.

p. 13 -- Ground EM survey might be a prospecting tool if vein is sufficiently mineralized.

MacKevett, 1964 (P 501-C), p. C117-C120 -- Country rock is Carboniferous or Triassic greenstone cut by diabase and altered prophyritic intrusive sills and dikes of probable Tertiary age. Eastward-striking steep fault zone and several NE-striking steep subsidiary faults are exposed in

Kathleen-Margaret -- Continued

underground workings. Several copper-bearing quartz veins that strike nearly north, dip steeply or are vertical, and are from a few inches to about 20 ft. thick can be traced for 100 ft. or less along strike. Only one is large enough and rich enough to have encouraged exploration; has been explored by some surface cuts, diamond- and percussion-drill holes, and about 800 ft. of underground workings. Principal copper mineral is bornite; some chalcopyrite and malachite. Grade is from a few tenths of a percent to about 30% copper; commonly 1%-5% copper; minor values in silver and traces of gold. Zone of richest ore is about 60 ft. long, 5 ft. wide, and 100 ft. high; along west wall of main vein. Copper content decreases northward from major fault zone. Mineralization may have been by late-stage fluids associated with a porphyry dike (parallel to and a few feet from the vein) and following intersection of main vein and steep fault zone. In 1960 about 2 tons of ore containing an estimated 1%-2% copper was stockpiled at prospect.

U.S. Geological Survey, 1964 (P 501-A), p. A119 -- Very short summary of MacKevett, 1964 (P 501-C), p. C117-C120.

Rose and Saunders, 1965 (GR 13), p. 10 -- Reference to Chapman and Saunders, 1954 (C 332) and MacKevett, 1964 (P 501-C).

Shacklette, 1965 (B 1198-C), p. C7-C8 -- Reference to Chapman and Saunders, 1954 (C 332). Only species of moss growing on copper-bearing vein that had been exposed is Rhacomitrium sudeticum, which is more tolerant of copper than other mosses growing on undisturbed soil above vein.

Rose, 1966 (GR 20), p. 21, loc. 8 -- References to Chapman and Saunders, 1954 (C 332), Kaufman, 1964 (GR 4), and MacKevett, 1964 (P 501-C). North-striking quartz vein containing chalcopyrite and bornite that cut Amphitheatre Basalt. Sample across 10.75 ft. at discovery point contained 10.9% copper. Explored by 800 ft. of underground workings and surface trenching, all of which indicate that the width and copper content of vein decrease to north. Southern extension of vein faulted off; may be represented by one of several veins with very little copper evident.

Berg and Cobb, 1967 (B 1246), p. 27-28 -- Data from MacKevett, 1964 (P 501-C), p. C117-C120 [not specifically cited].

Stout, 1976 (GR 46), p. 30-31 -- References to older reports; prospect is outside of project area.

MacKevett and Holloway, 1977 (OF 77-169A), p. 37, loc. 13 -- References to MacKevett, 1964 (P 501-C), p. C117-C120; Kaufman, 1964 (GR 4), p. 8-9; Chapman and Saunders, 1954 (C 332).

(Kenyon Cr.) Gold

Goodpaster district Mt. Hayes(?)
NW 1/4 NE 1/4 NE 1/4 quad.(?)

Summary: Tributary of Healy Lake; may be in Big Delta quad. Gold and garnet in gravels about 125 ft. deep. Discovered in 1914; a little mining reported in 1915.

Brooks, 1915 (B 622), p. 50-51 -- Rich discovery reported in 1914 was an exaggeration; gravels about 125 ft. deep and about 60 ft. wide carry some gold and many garnets. Gold angular and bright, medium grained with few nuggets. Bedrock schist. Creek tributary to Healy Lake about 4 mi. from mouth [may be in Big Delta quad.].

Brooks, 1916 (B 642), p. 56 -- Report of a little mining in 1915.

(Landslide Cr.) Chromite; Asbestos

Delta River district Mt. Hayes (5.85, 5.65)
Fig. 4, loc. 30 63°19'N, 146°15'W

Summary: Sparse chromite, magnetite, and chrysotile in veins also containing opal and calcite; in Tertiary(?) dunite.

Rose, 1966 (GR 20), p. 20, loc. 6 -- Dunite cut by sporadic veins and lenses of opal, calcite, brittle chrysotile, magnetite, chromite, and an unidentified green glassy mineral. No concentrations of economic grade were noted.

MacKevett and Holloway, 1977 (OF 77-169A), p. 37, loc. 15 -- Sparsely distributed chromite associated with minor amounts of chrysotile and magnetite in dunite (Tertiary?).

(Little Gold Cr.)	Gold
Delta River district	Mt. Hayes E 1/2 SE 1/4 NW 1/4 quad.

Summary: Placer gold present, but not in paying quantities. Creek follows contact between Tertiary coal-bearing rocks and older rocks.

Moffit, 1942 (B 926-B), p. 143 -- Creek follows east border of Tertiary coal-bearing formation. Reported to carry a little gold, but not in paying quantities. [Location on creek not given.]

(Lower Tangle Lake) — Copper

Delta River district — Mt. Hayes (8.9, 2.76)
Fig. 5, loc. 9 — 63°09'N, 146°00'W

Summary: Small pods of chalcopyrite and bornite in Triassic basalt. Malachite-coated nuggets in nearby stream gravels.

Stout, 1976 (GR 46), p. 30 -- Chalcopyrite and bornite in massive pods as much as 1 in. thick in basalt of Triassic Boulder Creek Volcanics. Malachite-coated nuggets in stream gravels in small cirque.

(Maclaren Glacier | Iron

Valdez Creek district | Mt. Hayes (4.0, 5.3)
Fig. 4, loc. 27 | 63°18'N. 146°29'W

Summary: Skarn in limestone cut by diabase dike contains as much as 10-20 percent magnetite in some exposures. Skarn largely covered by gravel.

Rose, 1966 (GR 20), p. 20-21, loc. 7 -- Fault followed by small gully has Triassic(?) limestone cut by diabase dike and altered to skarn on south side [fig. 3, shows Triassic(?) "argillite, slaty argillite and other sediments" north of fault]. Magnetite makes up as much as 10%-20% of some exposures of skarn. Garnet, diopside, and coarse calcite also present. Skarn found over distance of about 1/2 mi.; magnetite in eastern half only. Exposures poor because of gravel cover.

MacKevett and Holloway, 1977 (OF 77-169A), p. 37, loc. 14 -- Reference to above.

(McCumber Cr.) Gold, Lead

Delta River district Mt. Hayes (11.2-12.15, 12.3-12.45)
Fig. 3, locs. 3, 5 63°42'N, 145°27'-145°34'W

Summary: Placer gold, probably derived from Tertiary gravels, found in middle part of stream course. Probably was a little production, mainly before 1930. Approximate location is (11.2, 12.45), 63°42'N, 145°34'W [loc. 3]. Galena in quartz stringers in schist on ridge NE of creek. Location (from Moffit's field notes for 1939) is (12.15, 12.3), 63°42'N, 145°27'W [loc. 5].

Brooks, 1913 (B 542), p. 45 -- Placer gold mined several years ago [as of 1912].

Smith, 1932 (B 824), p. 34 -- Prospecting and a little placer-gold production reported, 1929.

Smith, 1933 (B 836), p. 34 -- Prospecting and possibly a little placer-gold production reported, 1930.

Moffit, 1942 (B 926-B), p. 143-144 -- Middle part of course in Tertiary Nenana Gravel and glacial deposits. A little gold present, but no commercial deposits have been found. Galena in quartz stringers on ridge.

Wedow and others, 1954 (C 331), p. 18 -- One of the promising placer-gold streams in the area.

Berg and Cobb, 1967 (B 1246), p. 211 -- Galena has been found in quartz stringers in schist on ridge NE of creek.

Cobb, 1973 (B 1374), p. 124 -- Proximate source of gold probably Tertiary gravel.

Mulligan, 1974 (IC 8626), p. 15 -- References of Moffit, 1942 (B 926-B), and Smith, 1930 (B 836).

MacKevett and Holloway, 1977 (OF 77-169A), p. 39-40, locs. 26, 56 -- References to Moffit, 1942 (B 926-B), p. 143-144.

(McLaren R.) Copper

Valdez Creek district Mt. Hayes (3.5, 5.0) approx.
63°17'N, 146°33'W approx.

Summary: Copper lode reported. Said to be in limestone near contact with greenstone. Specimens of chalcocite brought out by prospectors. See also Kathleen-Margaret.

Martin, 1920 (B 712), p. 20 -- Copper lode said to be 10 ft. wide and of high grade found in 1918. Plan to do some exploration.

Brooks, 1920 (B 714), p. 35 -- Prospectors have brought back specimens of chalcocite. Occurrence said to be in limestone near a contact with greenstone.

(Miller Gulch) — Copper, Gold, Mercury, Platinum

Chistochina district — Mt. Hayes (17.3, 3.2-3.35)
Fig. 6, loc. 15 — 63°10'N, 144°49'W

Summary: With Slate Cr. source of most of the placer gold production of district. Platinum also produced (ratio of about 1:100 to gold). Richest placers of district on Miller Gulch. Gold derived from Tertiary conglomerate which had diverse sources, at least some of which probably were north of Denali fault in metamorphic-igneous terrane. Bedrock of gulch is mainly upper Paleozoic slate and argillite cut by dikes. Mining from about 1900 until at least as recently as 1941; hampered by shortage of water. See also (Slate Cr.).

Mendenhall, 1903 (B 213), p. 71-74 — Most productive stream in district; production in 1902 estimated at $175,000 [about 8,465 fine oz.]. Short, steep ravine with 4-8 ft. of gravel over a width of 200-300 ft. at mouth narrowing to 4-5 ft. near source. Gravels mainly of local derivation; considerable "round wash" from hills near head. Gold worth $18-$18.50 an ounce [gold at $20.67].

Mendenhall and Schrader, 1903 (P 15), p. 49 -- Gold discovered in 1900.

p. 52-53 -- Data same as above, with additional information that concentrates contain small copper nuggets, magnetite, cinnabar, and an occasional fragment of osmiridium. Gold coarse; largest nugget found so far about 4 oz.; coarseness increases toward head of gulch. Some of output credited to Miller Gulch from gravels of Slate Creek in claim at mouth; most of gold derived from Miller Gulch.

Mendenhall, 1905 (P 41), p. 110-111 -- Same as Mendenhall and Schrader, 1903 (P 15), p. 52-53.

p. 123 — Compound of osmium and iridium found in sluice boxes.

Purington, 1905 (B 263), p. 207 -- Gold worth $18.41 per oz.

Moffit, 1909 (B 379), p. 157 -- Mining, 1908.

Brooks, 1910 (B 442), p. 42 -- Mining, 1909.

Moffit, 1911 (B 480), p. 124-125, 127 — Preliminary to Moffit, 1912 (B 498).

Brooks, 1912 (B 520), p. 37 -- Mining, 1911.

Moffit, 1912 (B 498), p. 56 -- Reference to Mendenhall, 1905 (P 41). Gold derived from zones of local metamorphism in shales of Mankomen Fm.

p. 70-73 -- Gold discovered in 1900; mining in 1910. Other data from Mendenhall, 1905 (P 41).

Brooks, 1916 (B 642), p. 54 — Mining, 1915.

Smith, 1917 (BMB 153), p. 54 — Mining, 1916; water shortage.

Brooks, 1918 B 662), p. 22 -- Reference to Mendenhall, 1905 (P 41), p. 123.

Chapin, 1919 (B 692), p. 138 -- At head of gulch Tertiary conglomerate unconformably overlies Mankomen Fm.

Brooks, 1921 (B 714), p. 38 — Small quantities of platinum have been recovered incidental to gold mining.

Smith, 1934 (B 857-A), p. 27 -- Mining, 1932.

Smith, 1939 (B 917-A), p. 38 -- Mining, 1938.

Smith, 1941 (B 926-A), p. 34 — Mining, 1939.

Moffit, 1944 (B 943-B), p. 27 -- Was one of principal producing creeks in district.

(Miller Gulch) -- Continued

p. 29 -- Mining, 1941.

p. 33 -- Small, steep tributary of Slate Cr. [Miller Gulch incorrectly described as south of Slate Cr.] with much slide rock choking it. Bedrock mainly slate cut by dikes; some limestone. Gravels mainly slate with some rounded granite boulders and other exotic material. Mining hampered by small and uncertain water supply. Mining in two places in 1941.

Moffit, 1954 (B 989-D), p. 191-193 -- Gold discovered in 1900. Most of data the same as in Moffit, 1944 (B 943-B), p. 33, and Mendenhall, 1905 (P 41), p. 52-53.

Rose, 1967 (GR 28), p. 23-25 -- References to older reports. Richest placer ground in district was on Miller Gulch and Slate Cr. immediately downstream from mouth of Miller Gulch. Proximate source of gold seems to be "round wash" of Tertiary age, some of which is preserved between head of Miller Gulch and Big Four Cr. Ultimate source might have been metamorphic and intrusive rocks north of Denali fault, local sources in the upper Paleozoic Mankomen Fm. (argillite and slate intruded by a granodiorite porphyry body), or (very unlikely) pyritized and altered zones in the upper Paleozoic Chisna Fm. The first alternative is favored, with gold deposited as a Tertiary basal conglomerate, most of which has now been eroded away.

Cobb, 1973 (B 1374), p. 26-28 — Source of much of production from district; richest gravels. Gold reconcentrated from Tertiary conglomerate ("round wash"). Data from Rose, 1967 (GR 28), p. 23-25, summarized. Platinum recovered from concentrates.

Koschmann and Bergendahl, 1968 (P 610), p. 14 -- One of principal placer-gold streams in district.

MacKevett and Holloway, 1977 (OF 77-169A), p. 40, loc. 65 -- References to Rose, 1967 (GR 28), p. 23-25; Moffit, 1954 (B 989-D), p. 191-193.

Moneta-Porcupine Mining Co. Copper

Delta River district Mt. Hayes (7.95, 5.6)
Fig. 5, loc. 2 63°19'N, 145°59'W

Summary: Tactite in metaserpentinite contains sparse chalcopyrite and bornite in a few places.

Rose, 1965 (GR 14), p. 27-28, 33, loc. 6 -- Sparse chalcopyrite and bornite at a few places in fine-grained tactite or hornfels composed mainly of diopside. Country rock is black metaserpentinite made up mainly of hornblende and diopside. Tactite about 3 ft. thick; appears to strike N 55° E.

MacKevett and Holloway, 1977 (OF 77-169A), p. 38, loc. 23 -- Data combined with those for Rose's loc. 5 and generalized.

(Morningstar Cr.) Gold

Delta River district
Fig. 3, loc. 4

Mt. Hayes (11.3, 12.3) approx.
63°42'N, 145°33'W approx.

Summary: Prospecting and possibly a little production of placer gold that probably was derived from Tertiary gravel.

Smith, 1932 (B 824), p. 34 -- Prospecting and a little production reported, 1929.

Smith, 1933 (B 836), p. 34 -- Prospecting and possibly a little mining reported, 1930.

Cobb, 1973 (B 1374), p. 124 -- Gold probably derived from Tertiary gravel.

Mulligan, 1974 (IC 8626), p. 15 -- Considerable prospecting in early days resulted in little recorded production. Placer claims located in 1954 now [1974] idle [claims may be on McCumber Cr.].

MacKevett and Holloway, 1977 (OF 77-169A), p. 40, loc. 57 -- Reference to Smith, 1933 (B 836), p. 34.

Northland Mines — Copper

Chistochina district — Mt. Hayes (17.4, 2.75)
Fig. 6, loc. 20 — 63°08'N, 144°49'W

Summary: Chalcopyrite replaced silicated limestone. Mesozoic diorite exposure about 1.5 mi. away.

Rose, 1967, p. 23, loc. 31 -- Copper occurrence has been staked and prospected. Specimens indicate that chalcopyrite replaced silicated limestone. [About 1.5 mi. from outcrop of Mesozoic diorite.]

MacKevett and Holloway, 1977 (OF 77-169-A), p. 39, loc. 51 -- Reference to above.

(Ober Cr.) Gold, Monazite

Delta River district Mt. Hayes (9.6, 12.7)
Fig. 3, loc. 2 63°43'N, 145°46'W

Summary: Prospecting and probably a little placer mining in early 1900's. Gravel shallow and frozen. Concentrate sample contained monazite, zircon, fluorite, and epidote; average eU about 0.006%. Gold probably derived from Tertiary gravel.

Moffit, 1942 (B 926-B), p. 143 -- Fair placer gold prospects in holes sunk in gravel reported. Gravel frozen and shallow. Country rock schist.

Moffit, 1954 (B 989-D), p. 190 -- Has been prospecting; some placer gold found.

p. 196 -- In the early days was prospecting of frozen gravels. Dumps from old shafts and an abandoned boiler are principal evidence of former mining. Production doubtless was small.

Wedow and others, 1954 (C 331), p. 18 -- Promising placer stream. Concentrates contain monazite, zircon, fluorite, and epidote; maximum eU 0.011%, average about 0.006%.

Overstreet, 1967 (P 530), p. 109 -- Reference to Wedow and others, 1954 (C 331), p. 18.

Cobb, 1973 (B 1374), p. 124 -- Gold probably derived from Tertiary gravel. Monazite in a concentrate sample.

Mulligan, 1974 (IC 8626), p. 15 -- Fair prospects reported in early 1900's. Placer claims located in 1929 reported to be inactive.

MacKevett and Holloway, 1977 (OF 77-169A), p. 40, loc. 55 -- Reference to Wedow and others, 1954 (C 331), p. 18.

(Paxson Mtn.) Copper

Chistochina district Mt. Hayes (10.8-11.65, 0.45-1.6)
Fig. 5, locs. 31-35, 37-39 63°01'63°05'N, 145°33'-145°39'W

Summary: Bornite, chalcopyrite, chalcocite, and secondary copper minerals in Triassic (Nikolai Greenstone equivalent) lavas. Copper minerals in vesicles and in quartz-epidote veins and pods; some occurrences float only. See also: (Paxson's), Tripp.

Rose and Saunders, 1965 (GR 13), p. 10-13, 31-32, loc. 1,2, 4-9 -- Several occurrences of copper minerals (bornite, chalcopyrite, minor amounts of chalcocite, and secondary copper minerals) in epidotized basaltic lava of Triassic age (p. 4-5). Copper minerals in vesicles and in quartz-epidote veins and pods; some occurrences float only. Occurrences concentrated in areas of anomalous jointing and dike intrusion.

Berg and Cobb, 1967 (B 1246), p. 46-47, 212 -- Summary of above, including data on (Paxson's) and Tripp. [Boundary between Delta River and Chistochina districts uncertain; in this summary all considered in Chistochina.]

MacKevett and Holloway, 1977 (OF 77-169A), p. 39, locs. 38, 39, 41 -- Data from Rose and Saunders, 1965 (GR 13).

(Paxson's) Copper

Chistochina district Mt. Hayes (11.5, 0.75)
Fig. 5, loc. 36 63°02'N, 145°34'W

Summary: Small deposit of chrysocolla and chalcocite in 10-ft.-wide zone in highly vesicular basalt (Nikolai Greenstone equivalent) flow. Chip sample contained 6.9% copper; no gold or silver. Deposit exposed by small pit. See also (Paxson Mtn.).

Martin, 1920 (B 712), p. 20 -- Low-grade copper deposit in gulch 1-1/2 or 2 miles west of Paxson's roadhouse.

Rose and Saunders, 1965 (GR 13), p. 10-11, 34, loc. 3 -- Chrysocolla and chalcocite in zone about 10 ft. wide (strike N 75° E, dip about 35° NW) in highly vesicular basalt flow; most abundant near a fault or fracture along north boundary of zone, dying out to south where it is limited by a fault. Chip sample across 10 ft. contained 6.9% copper and no gold or silver. Deposit appears to be limited in all directions except into hillside.

Berg and Cobb, 1967 (B 1246), p. 46-47 -- Data combined with those for (Paxson Mtn.).

Mulligan, 1974 (IC 8626), p. 16, loc. 18 -- References to Martin, 1920 (B 712) and Rose and Saunders, 1965 (GR 13). [As plotted on Mulligan's fig. 7 this would be a different occurrence, but description matches that for (Paxson's).]

MacKevett and Holloway, 1977 (OF 77-169A), p. 39, loc. 40 -- Data from Rose and Saunders, 1965 (GR 13).

(Pegmatite Cr.) Gold

Delta River district Mt. Hayes
E 1/2 SW 1/4 NE 1/4 quad.

Summary: Noncommercial amounts of gold in gravels reported. Location on creek not given. Creek follows contact between granitic pluton and older metamorphic rocks.

Moffit, 1942, p. 144 -- A little gold reported to be in gravels, but no deposits of commercial value were found. [According to pl. 3, creek follows contact between granitic intrusive body and lower Paleozoic or older metamorphic rocks.]

Pioneer	Copper, Gold, Silver
Delta River district Fig. 5, loc. 3	Mt. Hayes (7.95, 5.6) 63°10'N, 145°59'W

Summary: Mafic intrusive body of several kinds of gabbro intruded into amphibole "serpentinite." Chalcopyrite in shear zone (1.13% copper across 5 ft.) and disseminated in light-colored altered gabbro (1.0% copper, 0.01 oz. a ton gold, and 0.22 oz. a ton silver). Explored by several pits; may have been some drilling in 1974. Includes references to: Eastern Star, Rainbow.

Rose, 1965 (GR 14), p. 27, 32, loc. 5 -- Amphibole "serpentinite" intruded by several varieties of gabbro, one of which is light colored and contains disseminated chalcopyrite in grains less than 1 mm in diameter. Host rock in mineralized area has been altered; plagioclase albitized and saussuritized and mafic minerals altered to actinolite. Shear zone in gabbro mineralized with chalcopyrite is exposed in a pit; assay of 1.13% copper across 5 ft. reported. Composite random sample of disseminated material contained 1.0% copper, 0.01 oz. a ton gold, and 0.22 oz. a ton silver; no nickel, lead, or zinc. Explored by several pits.

Berg and Cobb, 1967 (B 1246), p. 212 -- Data from above [not specifically cited].

Mulligan, 1974 (IC 8626), p. 16 -- Reference to Rose, 1965 (GR 14).

Stout, 1976 (GR 46), p. 31 -- Reference to Rose, 1965 (GR 14). In 1973 some preliminary drilling was planned for the next summer.

MacKevett and Holloway, 1977 (OF 77-169A), p. 38, loc. 23 -- Data combined with that for Rose's loc. 6 and generalized.

(Ptarmigan Cr.) Gold, Molybdenum

Delta River district Mt. Hayes (3.65, 14.1) approx.
Fig. 3, loc. 1 65°48'N, 146°32'W approx.

Summary: Sparse molybdenite with quartz in veinlets in granodiorite; in places veinlets constitute small stockworks that have been explored by several adits. Some material has been mined, but was not shipped. Sample, probably picked, reported to have contained 2.71% Mo. Some veins carry a little gold. Claims and developments extend for at least a mile along the creek. Includes references to (Dry Delta R.)

Martin, 1919 (B 692), p. 23 -- Molybdenite deposit reported, 1917.
Martin, 1920 (B 712), p. 24 -- Some work in 1918 on prospect on Dry Delta; said to include closely spaced veins from a few inches to 2 ft. thick in zone 800-900 ft. wide in granite; said to carry gold. Adit driven 100 ft.; some ore mined, but not shipped.
p. 44 -- Some work on molybdenite lodes, 1918.
Brooks, 1921 (B 714), p. 41 -- Reference to Martin, 1920 (B 712), p. 24.
Joesting, 1942 (TDM 1), p. 28 — Several molybdenum prospects in canyon. Molybdenite scattered sparsely through many quartz stringers in granodiorite; in places stringers constitute small stockworks in which most of the prospecting has been done. 4 adits, one 106 ft. long and the others from 24 to 34 ft. long; no commercial ore encountered. Some gold-quartz veins also in the granodiorite.
Smith, 1942 (B 926-C), p. 194-195 -- Discovered, 1914; development and prospecting, 1914-18. More prospecting and development, 1937-40, including adit driven 90 ft. Samples (probably picked) reported to have contained 2.71% and 1.71% Mo. Molybdenite in leaves and patches irregularly scattered and adjacent to small fractures in quartz. Some ore reported to have been mined, but not sold. Deposits described as in fractures in granite. Claims and developments along at least a mile of creek.
Berg and Cobb, 1967 (B 1246), p. 211 -- Data from above references.
MacKevett and Holloway, 1977 (OF 77-169A), p. 37, loc. 1 -- Reference to Smith, 1942 (B 926-B).

(Quartz Cr.) Gold

Chistochina district Mt. Hayes (17.9, 3.0)
Fig. 6, loc. 25 63°09;N. 144°45'W

Summary: Has been small placer gold production.

Rose, 1967 (GR 28), p. 26 -- Has been small placer gold production from Ruby Gulch and Quartz Cr.

MacKevett and Holloway, 1977 (OF 77-169A), p. 40, loc. 67 in part -- Reference to above.

(Rainbow Mtn.) Copper, Gold, Lead, Silver

Delta River district Mt. Hayes (10.05, 11.35, 4.85-6.25)
Fig. 5, locs. 15-28 (incl. 25a) 63°16'-63°21'N, 145°34'-145°44'W

Summary: Quartz veins ranging in thickness from thin veinlets to as much as 8 ft. contain sulfides, mainly pyrite and chalcopyrite with lesser amounts of galena and small amounts of gold and silver. Country rock is a much-faulted mixture of Paleozoic metamorphic rocks intruded by ultramafic rocks, granodiorite (some silicified), and quartz diorite. In one place (fig. 5, loc. 16) mineralized conglomerate contains pyrite, chalcopyrite, and 0.12 oz. a ton gold. All occurrences are small and have been explored only to the extent of collecting samples. See also: Emerick, Glacier Lake.

Hanson, 1963 (GR 2), p. 67-74 -- Many quartz veins ranging in thickness from thin veinlets to as much as 8 ft. contain sulfides, mainly chalcopyrite and pyrite (some galena) and small amounts of gold (maximum 0.02 oz. a ton) and silver (maximum 2.4 oz. a ton). In one place mineralized conglomerate contains pyrite, chalcopyrite, and 0.12 oz. a ton gold. Bedrock is a much-faulted mixture of Paleozoic metamorphic rocks intruded by ultramafic rocks, granodiorite (some silicified and containing pyrite and chalcopyrite), and quartz diorite. All occurrences small and none has been explored beyond collecting samples for study and assay. Data on individual occurrences (numbers refer to fig. 5) follow:

15 - Quartz veins 2-3 in. thick contain chalcopyrite, galena, a trace of gold, and 2.4 oz. a ton silver;
16 - Mineralized conglomerate contains pyrite, chalcopyrite, and 0.12 oz. a ton gold;
17 - Replacement zone 1.5 ft. thick bordering a quartz vein contains chalcopyrite;
18 - Quartz vein contains chalcopyrite, galena, pyrite, and traces of gold and silver;
19 - Small copper-stained quartz veins contain chalcopyrite, pyrite, and a trace of gold.;
20 - Quartz veins as much as 6 in. thick contain chalcopyrite, galena, 0.02 oz. a ton gold, and 1.4 oz. a ton silver;
21 - Some of 10 thin quartz veins contain chalcopyrite and traces of gold and silver;
22 - Quartz veins as much as 8 ft. thick in dacite along a thrust fault contain chalcopyrite and pyrite;
23 - Quartz veins as much as 2 ft. thick contain chalcopyrite, galena, pyrite, and traces of gold and silver;
24 - Several quartz veins about 2 ft. thick and a thicker calcite vein contain pyrite and chalcopyrite;
25 - Small, irregular quartz veins along a fault contain chalcopyrite, galena, 1.4 oz. a ton silver, and a trace of gold;
25a- Quartz veins 0.5-1 ft. thick near a fault contain chalcopyrite;
26 - Small quartz veins contain chalcopyrite, galena, and a trace of gold;
27 - Quartz veins as much as 6 in. thick contain pyrite and scattered chalcopyrite and galena;

(Rainbow Mtn.) -- Continued

28 - Disseminated pyrite and chalcopyrite in silicified granodiorite.
Rose, 1965 (GR 14), p. 24 -- Gold, copper, and lead mineralization in graywacke.
MacKevett and Holloway, 1977 (OF 77-169A), p. 38-39, locs. 30-34 -- References to Hanson, 1963 (GR 2), p. 67-73.

(Rainy Cr.) Chromite, Copper, Gold

Delta River district Mt. Hayes (8.8-9.1, 4.95-5.2)
Fig. 5, locs. 7, 8 63°17'-63°18'N, 145°51'-145°54'W

Summary: Placer gold, in or reconcentrated from glacial deposits, mined sporadically from 1900 to at least as recently as 1930. Chromite in a concentrate sample. Mining was at (8.8-9.1, 5.05-5.2), 63°17'-63°18'N, 145°51'-145°54'W [loc. 7]. Copper lode deposit of possible contact-metamorphic origin may have had some work done on it in about 1918; said to carry a little gold; specimen contained chalcopyrite and pyrrhotite(?); approximate location (9.0, 4.95), 63°17'N, 145°52'W [loc. 8]. Includes references to Copter Lode, (Wilder Cr.).

Mendenhall and Schrader, 1903 (P 15), p. 59 -- Fair placer gold prospects found on stream bars in 1900. Mining attempted in 1901 was not satisfactory and was abandoned.

Mendenhall, 1905 (P 41), p. 117 -- Same as above.

Moffit, 1912 (B 498), p. 65-66 -- Reference to Mendenhall, 1905 (P 41), p. 117. Five men mining on Rainy Cr. in 1910.

Brooks, 1918 (B 662), p. 43-44 -- Copper deposits being prospected, 1916. Apparently contain a little gold. Chalcopyrite and pyrrhotite(?) in specimen. Deposit probably contact metamorphic.

Martin, 1920 (B 712), p. 20 -- Prospect said to be a large body of low-grade copper ore was discovered in 1915; considerable crosscutting reported as of 1918.

p. 44 -- Placer gold mining reported, 1918.

Smith, 1930 (B 810), p. 26 -- Placer gold prospecting, 1927.

Smith, 1932 (B 824), p. 34 -- Placer gold prospecting, 1929; may have been a little development work.

Rose, 1965 (GR 14), p. 2 -- Gold placers have been worked.

p. 34 -- Gold placers worked sporadically from 1900 to as recently as 1930. Not very profitable. At least some of gold in sticky clay; large boulders reported. Evidence of old work for about 1-1/2 mi. below junction of North and West Forks. Bedrock not exposed in creek; gold may have been concentrated in older glacial drift; perhaps some reconcentration in present drainage.

Rose, 1966 (GR 20), p. 33, sample 52 -- Magnetite and chromite in panned-concentrate sample.

Cobb, 1973 (B 1374), p. 124 -- Gold may have been reconcentrated from glacial deposits. Sporadic placer mining, 1900 to at least as recently as 1930.

Mulligan, 1974 (IC 8626), p. 16 -- Gold placers worked sporadically, 1900-30; apparently not very profitable. Claims recorded in 1900 and 1925 reported to be inactive. Copter Lode (reported in 1956) may be the occurrence reported by Brooks, 1918 (B 662), p. 43-44, and Martin, 1920 (B 712), p. 20.

Stout, 1976 (GR 46), p. 2 -- References to Brooks, 1918 (B 662), and Martin, 1912 (B 712) on placer mining. Copper lode claims also in area.

MacKevett and Holloway, 1977 (OF 77-169A), p. 38, loc. 27 -- Reference to Brooks, 1918 (B 662), p. 43-44 [incorrectly cited as Brooks, 1917].

p. 40, loc. 61 -- Reference to Rose, 1965 (GR 14), p. 34.

(Rainy Cr., West Fork) Copper, Gold, Silver

Delta River district Mt. Hayes (8.1-8.35-5.2-5.4)
Fig. 5, locs. 4, 6 63°18'N, 145°57-145°59'W

Summary: Chalcopyrite and copper staining on 2 exposures of tactite. One occurrence is in replaced cherty limestone and the other adjacent to a gabbro dike. Signs of gold-placer mining.

Rose, 1965 (GR 14), p. 28, locs. 7, 9 -- Tactite (mainly epidote, pyroxene, and quartz) replaced zone several feet wide in cherty limestone that strikes N 78° E and dips 68° SE. Sample contained 0.42% copper, 0.01 oz. a ton gold, and 0.40 oz. a ton silver. Chalcopyrite-magnetite rock and garnet-bearing tactite with some pyrite and chalcopyrite. Explored by some now-sloughed trenches and pits. About a mile to the southeast is minor copper staining in amphibole-epidote-calcite tactite adjacent to a gabbro dike.

p. 33-34 -- Aqueous ore fluids probably carried away the calcium, carbon dioxide, and probably other constituents of original rock that was replaced. Old gold placer workings nearby.

Berg and Cobb, 1967 (B 1246), p. 212 -- Garbled data from above [not cited].

MacKevett and Holloway, 1977 (OF 77-169A), p. 38, loc. 25 -- Copper-stained pyrite-bearing tactite adjacent to a gabbro dike.

p. 40, loc. 60 -- Gold placer; reference to Rose, 1965 (GR 14), p. 34.

(Redemption Cr.)	Gold(?)
Delta River district(?)	Mt. Hayes(?) N 1/2 quad.(?)

Summary: Placer gold prospecting reported, 1926. Creek may be in Big Delta quad. and may be in either Fairbanks or Goodpaster district.

Smith, 1929 (B 797), p. 20 -- Prospecting in 1926 reported.

(Ruby Cr.) Gold(?)

Goodpaster district Mt. Hayes(?)
NW 1/4 NE 1/4 NE 1/4 quad.(?)

Summary: Auriferous gravels reported. Tributary of Healy Lake. May be in Big Delta quad.

Brooks, 1915 (B 622), p. 50 -- Auriferous gravels found several years ago [as of 1914]; tributary of Healy Lake.

(Ruby Gulch) (Cr.) Gold

Chistochina district Mt. Hayes (17.75, 3.1)
Fig. 6, loc. 24 63°10'N, 144°46'W

Summary: Headwater tributary of Chisna R. Placer gold mined from a claim near head. Also from head of fan where gulch leaves mountains and enters valley of upper Chisna R.; gold on thin layer of clay false bedrock. Gravel mainly shale from upper Paleozoic Mankomen Fm. and boulders from Tertiary conglomerate ("round wash") at head of gulch. Little if any mining since about 1910. See also: (Chisna R.).

Mendenhall, 1903 (B 213), p. 73-74 -- Headwater gulch of Chisna R.; similar to, but less rich than, Miller Gulch. Near mouth gold is on clay false bedrock. Gold worth $18-$18.50 an ounce [gold at $20.67]; largest nugget found valued at $12.75.

Mendenhall and Schrader, 1903 (P 15), p. 55 -- Same data as above. Mining on Jackpot claim near head of gulch in gravel 2-4 ft. deep; gulch 20-40 ft. wide. Gravel mainly slightly altered shale and boulders from "round wash" on hills at head.

Mendenhall, 1905 (P 41), p. 113 -- Same as Mendenhall and Schrader, 1903 (P 15), p. 55.

Moffit, 1911 (B 480), p. 125-126 -- Fan where gulch debouches from mountains is auriferous; gold on thin, clay false bedrock. Present stream channel where incised into bedrock only sparsely gold bearing.

Moffit, 1912 (B 498), p. 70 -- Mining, 1910.
p. 75 -- Same as Moffit, 1911 (B 480), p. 125-126.

Chapin, 1919 (B 692), p. 137 -- Gold-bearing stream.

Moffit, 1954 (B 989-D), p. 191-192 -- Small headwater tributary of Chisna R. Leaves mountain valley and forms a fan into which creek is now cut. Bedrock is Permian Mankomen Fm. Gravels mostly shale fragments; some granite and greenstone boulders. Gold on clay false bedrock near head of fan; clay layer very thin; mining must be done very carefully so as not to break through it. No mining in recent years.

Rose, 1967 (GR 28), p. 26 -- Has been small production.

MacKevett and Holloway, 1977 (OF 77-169A), p. 40, loc. 67 -- References to Moffit, 1954 (B 989-D), p. 191-192; Rose, 1967 (GR 28), p. 26.

(Savage Cr.) (Gulch) — Gold

Delta River district — Mt. Hayes (9.6, 13.0) approx.
Fig. 3, near loc. 2 — 63°44'N, 145°46'W approx.

Summary: Placer gold prospecting in 1930 and earlier; probably was a little production. Tributary of Ober Cr.; location uncertain.

Brooks and Capps, 1924 (B 755), p. 38 -- In Richardson district; indications [of placer gold] found in 1922 were sufficiently favorable to warrant further investigation.

Smith, 1929 (B 797), p. 20 -- Prospecting reported, 1926.

Smith, 1930 (B 810), p. 26 -- Prospecting on Savage Cr. and tributaries reported, 1927.

Smith, 1932 (B 824), p. 34 -- Prospecting and a little production reported, 1929.

Smith, 1933 (B 836), p. 34 -- Prospecting and possibly a little production reported, 1930.

Mulligan, 1974 (IC 8626), p. 15 -- Tributary of Ober Cr. Said to have been the source of small amounts of placer gold prior to 1930. Active claims in 1974.

(Slana R.) Copper, Gold

Chistochina district Mt. Hayes (20.95, 1.85)
Fig. 6, loc. 31 63°05'N, 144°22'W

Summary: Band of massive pyrrhotite in Triassic Nikolai Greenstone is about 10 ft. thick and 100-150 ft. long; contains minor chalcopyrite. Float sample of pyrrhotite from below outcrop contained 0.6% Cu, 0.04% Ni, 0.02 oz. a ton gold, and a trace of silver.

Richter, 1967 (GR 30), p. 17-18, loc. 5 -- Band of massive pyrrhotite with minor chalcopyrite in basalt; 10 ft. thick, possibly as much as 150 ft. long. Sample (float) of massive pyrrhotite contained 0.6% Cu, 0.04% Ni, 0.02 oz. a ton gold, and a trace of silver.

MacKevett and Holloway, 1977 (OF 77-169A), p. 40, loc. 52 -- Reference to above.

Richter and others, 1977 (I-1031), loc. 4 -- Lens of massive pyrrhotite with minor chalcopyrite; about 30 m long and 3 m thick; in Triassic Nikolai Greenstone.

(Slana R. tributary) Gold

Chistochina district Mt. Hayes (22.35, 0.7)
Fig. 6, loc. 36 63°01'N, 144°12'W

Summary: Small amount of placer gold reported to have been mined. Creek drains contact between basalt and diorite intrusive body.

Richter, 1967 (GR 30), p. 16, loc. 1 -- Small amount of placer gold reported to have been mined. Stream drains contact between basalt and diorite body.

Cobb, 1973 (B 1374), p. 28 -- Placer gold present; apparently not in profitable amounts.

MacKevett and Holloway, 1977 (OF 77-169A), p. 40, loc. 72 -- Reference to Richter, 1967 (GR 30).

(Slate Cr.) Gold, Platinum

Chistochina district Mt. Hayes (16.95, 17.5, 3.2-3.3)
Fig. 6, loc. 16 63°10'N, 144°48'-144°52'W

Summary: Placer mining since 1900; only small scale since about 1962. Slate Cr. and its tributary Miller Gulch were the principal sources of the more than about 150,000 fine oz. of gold from the Chistochina district. Platinum, about 1% of the amount of gold, was also recovered. The richest placers were at and immediately downstream of the mouth of Miller Gulch. Slate Cr. follows a fault zone that separates upper Paleozoic slates of the Mankomen Fm. from conglomerate, quartzite, and volcanic rocks of the older upper Paleozoic Chisna Fm.; Tertiary auriferous continental rocks underlie some or all of the creek course in the fault zone and cap some of the hills at the head of Miller Gulch. Gold proximally derived from Tertiary conglomerate and from glacial deposits. Richest deposits derived from Tertiary rocks. Ultimate source probably in crystalline rocks north of Denali fault; gold probably was concentrated and reconcentrated several times. Includes references to Slate Creek Placers. See also (Miller Gulch).

Mendenhall, 1903 (B 213), p. 71-73 -- Country rock mainly Permian shales and volcanic rocks that have been slightly metamorphosed. Younger "round wash" caps many hills near head of creek and its tributaries; considered by miners to be source of placer gold. Gold probably derived from quartz veins in slightly metamorphosed Permian shale [according to Mendenhall]. Part of Slate Cr. mined in 1902 at and a short distance below Miller Gulch, which contributed much of gold. Production in 1902 worth about $30,000 [about 1,450 fine oz.].

Mendenhall and Schrader, 1903 (P 15), p. 49 -- Gold discovered in 1900.
p. 53-54 -- Low bench across from mouth of Miller Gulch was mined. Best ground below mouth of Miller Gulch; farther upstream gravels are deeper and yield not much (if any) more than wages.

Brooks, 1904 (B 255), p. 47 -- Rumors of important discoveries on White and Slate Creeks, said to be tributaries of Susitna, 1903. [This may be a garbled reference to Slate Cr. in the Chistochina district, where there was mining activity in 1903.]

Mendenhall, 1905 (P 41), p. 111-112 -- Same as Mendenhall and Schrader, 1903 (P 15), p. 53-54.

Purington, 1905 (B 263), p. 207 -- Gold worth $18.47 per oz.

Moffit, 1909 (B 379), p. 157 -- Mining, 1908.

Brooks, 1910 (B 442), p. 42 -- Mining, 1909.

Moffit, 1911 (B 480), p. 124-125 — Preliminary to Moffit, 1912 (B 498).

Brooks, 1912 (B 520), p. 37 -- Mining, 1911.

Moffit, 1912 (B 498), p. 56 -- Reference to Mendenhall, 1915 (P 41).
p. 70-74 -- Most of data from Mendenhall, 1915 (P 41). Mining in 1910 was in glacial material along south side of creek and in gravel near mouth of Miller Gulch. Claims above mouth of Miller Gulch are much leaner than those below.

Brooks, 1913 (B 542), p. 43 -- Preparations for large-scale mining, 1912.

Brooks, 1915 (B 622), p. 45 -- Mining, 1914.

(Slate Cr.) -- Continued

Brooks, 1916 (B 642), p. 54 -- Mining, 1915.
Smith, 1917 (BMB 153), p. 33 -- Mining, 1916.
Brooks, 1918 (B 662), p. 21-22 -- Platinum recovered, 1916.
p. 43 -- Mining, 1916. Reference to p. 22.
Brooks, 1919 (B 666), p. 96 -- Platinum recovered, 1916.
Chapin, 1919 (B 692), p. 137-141 -- Country rock mainly Carboniferous bedded rocks of Chisna and Mankomen Fms.; Tertiary conglomerates infaulted and capping some of hilltops; conglomerate on hilltops auriferous. Slate Cr. flows on conglomerate faulted down between Chisna and Mankomen Fms. Gold and platinum in high conglomerate, in bench gravels of glacial origin, and in stream gravels. Ultimate source of platinum not local; no basic rocks older than conglomerate. Mining in 1917; output estimated at $100,000 [about 4,835 fine oz. of gold]. Platinum estimated to be slightly more than 1% [by volume] of amount of gold.
Martin, 1919 (B 692), p. 21 -- Platinum recovered, 1917.
p. 30-31 -- Production of district estimated at about $100,000 worth of gold and 15-20 oz. platinum; not all of platinum recovered; 1917.
Martin, 1920 (B 712), p. 23 -- Platinum recovered, 1918.
Brooks, 1921 (B 714), p. 38 -- Platinum has been recovered.
Brooks and Martin, 1921 (B 714), p. 71 -- Platinum recovered, 1919; about the same amount as in 1918.
Brooks, 1922 (B 722), p. 23 -- Platinum produced, 1920.
p. 39 -- Gold and platinum recovered, 1920.
Brooks, 1923 (B 739), p. 13, 23 -- Gold and platinum recovered, 1921.
Brooks and Capps, 1924 (B 755), p. 28 -- Placer gold mining, 1922.
Brooks, 1925 (B 773), p. 30 -- Gold and platinum recovered, 1923.
Smith, 1926 (B 783), p. 12, 25 -- Gold and platinum recovered, 1924.
Moffit, 1927 (B 792), p. 33 -- Platinum recovered, 1925.
Smith, 1929 (B 797), p. 16 -- Placer gold produced, 1926.
p. 40 -- Platinum has been recovered.
Smith, 1930 (B 810), p. 22 -- Mining, 1927
Smith, 1930 (B 813), p. 24 -- Mining, 1928.
Smith, 1932 (B 824), p. 28 -- Mining, 1929.
Smith, 1933 (B 836), p. 28 -- Mining, 1930.
Smith, 1933 (B 844-A), p. 28 -- Mining, 1931.
Smith, 1934 (B 857-A), p. 26-27 -- Mining, 1932.
Smith, 1934 (B 864-A), p. 30 -- Mining, 1933.
Smith, 1936 (B 868-A), p. 31 -- Much preparatory work, 1934; all washed out or buried by a flood in August.
Moffit, 1937 (B 880-B), p. 41 -- Most of work in 1935 was rehabilitation after flood of 1934.
Smith, 1937 (B 880-A), p. 35 -- Same as Moffit, 1937 (B 880-B), p. 41.
Smith, 1938 (B 897-A), p. 41 -- Mining, 1936.
Smith, 1939 (B 910-A), p. 39-40 -- Mining, 1937.
Smith, 1939 (B 917-A), p. 38 -- Mining and much dead work, 1938.
Smith, 1941 (B 926-A), p. 34 -- Mining, 1939.
Joesting, 1942 (TDM 1), p. 20 -- Small amounts of platinum have been recovered from gold placers intermittently for many years.
Smith, 1942 (B 933-A), p. 33-34 -- A little mining and extensive prospecting, 1940.

(Slate Cr.) -- Continued

Moffit, 1944 (B 943-B), p. 29 -- Mining, 1941.

p. 31-33 -- Mining in 1941 and for several years before then was on a bench 50-60 ft. above the creek on the north side near the mouth. Most of the gold is in bodies of loose well-rounded gravel included in a mass of tight brownish wash. There was also mining nearer the creek.

Moffit, 1954 (B 989-D), p. 191-193 -- Gold discovered in 1900. Creek in middle part of course follows contact between slates of the Mankomen Fm. and conglomerate, quartzite, and tuff of the Chisna Fm.; some infaulted or infolded Tertiary conglomerate, sandstone, and shale that carry some gold. Original source of gold has not been determined.

Rose, 1967 (GR 28), p. 23-25 -- Total gold production for Chistochina district estimated at between 3 and 3.5 million dollars [about 145,000-170,000 fine oz., assuming gold at $20.67]; probably 90% or more came from Slate Cr. and Miller Gulch, and one-third was between 1898 and 1907. Major mining ended in about 1962; small-scale operations since then. For data on theories of origin of gold see (Miller Gulch) sheets. Slate Creek follows closely a fault zone that separates the Chisna and Mankomen Fms.; the valley may be underlain by a graben containing Tertiary rocks. The creek does not exactly follow the fault zone near its mouth; there is some evidence that there is an old buried channel north of the present one.

p. 37 -- Old buried channel probably should be prospected.

Koschmann and Bergendahl, 1968 (P 610), p. 14 -- One of leading gold producers in district.

Cobb, 1973 (B 1374), p. 26-28 -- Remnants of Tertiary gold-bearing conglomerate preserved in valley. Slate Cr. and Miller Gulch were the principal gold-producing creeks in the district. Platinum, in the ratio of 1:100 to gold, recovered. Gold in richest placers at and below mouth of Miller Gulch was reconcentrated from both Tertiary conglomerate ("round wash") and glacial deposits; gold in other placers, including bench deposits on north side of Slate Cr., was probably derived from glacial deposits. Most probable ultimate source of gold was undiscovered lodes north of Denali fault, possibly near Mt. Kimball, which may have been closer to the headwaters of the Chistochina before faulting than it is now.

MacKevett and Holloway, 1977 (OF 77-169A), p. 40, loc. 65 -- References to Moffit, 1954 (B 989-D), p. 191-193; Rose, 1967 (GR 28), p. 23-25.

(Specimen Cr.) Gold

Delta River district
Fig. 4, loc. 40

Mt. Hayes (7.5, 5.55) approx.
63°19'N, 146°03'W

Summary: Placer claims and remnants of sluices found in 1964.

Rose, 1965 (GR 14), p. 35 -- Placer claims and remnants of sluices. Gold likely to have been derived from pyritized group A rocks [pre-Permian(?) greenstone, slate, and diorite; see p. 5-6]; possibly from ultramafic rocks or high gravels to north.

MacKevett and Holloway, 1977 (OF 77-169A), p. 40, loc. 59 -- Reference to above.

(Treasure Gulch) — Gold, Platinum

Chistochina district — Mt. Hayes
S 1/2 SE 1/4 quad.

Summary: Tributary of Chistochina from which a little platinum was recovered as byproduct of prospecting for placer gold. This gulch is not shown on available maps; may be Miller Gulch or one of the tributaries of the Middle Fork of the Chistochina. May be the same as (Hidden Treasure Cr.) and/or (Jackpot Cr.).

Smith, 1942 (B 933-A), p. 75 -- Some platinum metals recovered as a by-product of prospecting placer gold deposits in 1940. Gulch is a tributary from north of Chistochina R.

Tripp	Copper, Silver
Delta River district or Chistochina district	Mt. Hayes (10.95, 1.8)
Fig. 5, loc. 30	63°06'N, 145°38'W

Summary: Quartz-epidote veins and pods less than an inch thick and amygdules and the rock adjacent to them contain chalcopyrite, bornite, chalcocite or digenite, sparse pyrite, and chrysocolla. Country rock is vesicular basalt (Triassic Nikolai Greenstone equivalent) largely altered to chlorite and epidote. Grab sample of mineralized quartz veins contained 1.38% copper, a trace of gold, and 0.30 oz. a ton silver. Includes reference to Savage. See also (Paxson Mtn.).

Rose and Saunders, 1965 (GR 13), p. 10, 12, 35, loc. 10 -- Chalcopyrite, bornite, chalcocite or digenite, uncommon pyrite, and chrysocolla exposed in road cut, pits, and outcrops. Copper minerals in and adjacent to veins, pods, and amygdules of quartz and epidote; prehnite identified in one sample. Host rocks vesicular basalt [Triassic Nikolai Greenstone equivalent] largely altered to chlorite and epidote. Veins and pods generally less than 1 inch wide and only a few feet long. Grab sample of quartz veins with chalcopyrite and bornite contained 1.38% copper, tr. gold, and 0.30 oz. a ton silver. Exposed rocks appear too low grade and spotty to mine.

Berg and Cobb, 1967 (B 1246), p. 212 -- Data from above. [Prospect probably in Delta River district; boundary between districts indistinct.]

Mulligan, 1974 (IC 8626), p. 16 -- Reference to Rose and Saunders, 1965 (GR 13), p. 11-12. [From data must be the same as the Tripp prospect, though called Savage here. Reference to p. 11 is in error.]

MacKevett and Holloway, 1977 (OF 77-169A), p. 39, loc. 37 -- Data from above.

Yukon Corp. — Gold

Delta River district — Mt. Hayes (10.0, 6.05)
Fig. 5. loc. 12 — 63°20'N, 145°44'W

Summary: Placer gold mining in bench gravels in 1946 reported. Shown on Mt. Hayes B-4 1:63,360 series topographic map as "Miller Mine."

Wedow and others, 1954 (C 331), p. 18 -- Placer gold mining, 1946. p. 31 -- Concentrate sample from workings in bench gravels contained less than 0.001% eU.

Cobb, 1973 (B 1374), p. 124 -- Reference to above; no sign of activity in 1948.

MacKevett and Holloway, 1977 (OF 77-169A), p. 40, loc. 63 -- Reference to Wedow and others, 1954 (C 331), p. 18.

Unnamed occurrence — Asbestos

Chistochina district — Mt. Hayes (16.9, 3.8)
Fig. 6, loc. 10 — 63°12'N, 144°52'W

Summary: Narrow veins of cross-fiber chrysotile in dunite. Apparently not economic.

Rose, 1967 (GR 28), p. 22 loc. 19 -- Narrow veins of cross-fiber chrysotile in dunite; no concentrations approaching economic grade found.

Unnamed occurrence

Asbestos

Delta River district
Fig. 4, loc. 33

Mt. Hayes (6.6, 5.6)
63°19'N, 146°10'W

Summary: Veins of chrysotile asbestos ½ in. wide in dunite. Nearby gossan on upper Paleozoic slate contains anomalous amounts of Cu, Pb, and Zn.

Rose, 1966 (GR 20), p. 20, loc. 3 -- Occasional small veins of chrysotile asbestos up to ½ in. wide in dunite; samples of coarser asbestos in prospector's abandoned camp nearby. Presence of appreciable tonnage of asbestos unlikely.

MacKevett and Holloway, 1977 (OF 77-169A), p. 37, loc. 17 -- Limonite gossan in area of upper Paleozoic slate; anomalous Cu, Pb, Zn. Some chrysotile asbestos in nearby ultramafic rocks.

Unnamed occurrence — Copper

Chistochina district — Mt. Hayes (21.6, 1.35)
Fig. 6, loc. 34 — 63°03'N, 144°17'W

Summary: Float from chalcocite vein.

Richter, 1967 (GR 30), p. 18, loc. 4 -- Piece of massive chalcocite in talus.

Richter and others, 1977 (I-1031), loc. 3 -- Float from chalcocite vein. Country rock is Triassic Nikolai Greenstone overlain by Triassic limestone.

Unnamed occurrence	Copper
Chistochina district	Mt Hayes (21.8, 1.5)
Fig. 6, loc. 33	63°04'N, 144°16'W

Summary: Native copper float.

Richter and others, 1977 (I-1031), loc. 2 -- Native copper float. Country rock is Triassic Nikolai Greenstone.

Unnamed occurrence — Copper

Valdez Creek district — Mt. Hayes (0.0, 2.35)
Fig. 4, loc. 2 — 63°08'N, 147°00'W

Summary: Occurrence of copper mineral(s).

Smith and others, 1973 (GC 26) -- Minor malachite or chalcocite in small veinlets, in vesicles, or on fracture or joint surfaces.

Unnamed occurrence	Copper
Valdez Creek district Fig. 4, loc. 3	Mt. Hayes (0.95, 2.5) 63°09'N, 146°53'W

Summary: Occurrence of copper mineral(s).

Smith and others, 1973 (GC 26) -- Minor malachite or chalcocite in small veinlets, in vesicles, or on fracture or joint surfaces.

Unnamed occurrence — Copper

Valdez Creek district — Mt. Hayes (0.0, 2.6)
Fig. 4, loc. 1 — 63°09'N, 147°00'W

Summary: Occurrence of copper mineral(s).

Smith and others, 1973 (GC 26) -- Minor malachite or chalcocite in small veinlets, in vesicles, or on fracture or joint surfaces.

Unnamed occurrence	Copper
Valdez Creek district	Mt. Hayes (0.8, 3.0)
Fig. 4, loc. 6	63°10'N, 146°54'W

Summary: Occurrence of copper minerals(s).

Smith and others, 1973 (GC 26) -- Minor malachite or chalcocite in small veinlets, in vesicles, or on fracture or joint surfaces.

Unnamed occurrence — Copper

Valdez Creek district — Mt. Hayes (0.6, 2.95)
Fig. 4, loc. 5 — 63°10'N, 146°56'W

Summary: Occurrence of copper minerals(s).

Smith and others, 1973 (GC 26) -- Minor malachite or chalcocite in small veinlets, in vesicles, or on fracture or joint surfaces.

Unnamed occurrence

Copper

Chistochina district
Fig 6, loc. 13

Mt. Hayes (17,15, 3.45)
63°11'N, 144°50'W

Summary: Minor chalcopyrite and copper stain with epidote in Mesozoic mafic gabbro.

Rose, 1967 (GR 28), p. 22, loc. 23 -- Minor chalcopyrite and copper stain associated with epidote in (Mesozoic) mafic gabbro.

MacKevett and Holloway, 1977 (OF 77-169A), p. 39, loc. 49 -- Reference to above.

Unnamed occurrence	Copper
Valdez Creek district Fig. 4, loc.7	Mt. Hayes (1.55, 3.2) 63°11'N, 146°48'W

Summary: Occurrence of copper mineral(s).

Smith and others, 1973 (GC 26) -- Minor malachite or chalcocite in small veinlets, in vesicles, or on fracture or joint surfaces.

Unnamed occurrence	Copper
Valdez Creek district Fig. 4, loc. 4	Mt. Hayes (0.6, 3.1) 63°11'N, 146°56'W

Summary: Occurrence of copper mineral(s).

Smith and others, 1973 (GC 26) -- Minor malachite or chalcocite in small veinlets, in vesicles, or on fracture or joint surfaces.

Unnamed occurrence	Copper
Valdez Creek district Fig. 4, loc. 10	Mt. Hayes (1.8, 3.7) 63°12'N, 146°47'W

Summary: Bornite, chalcocite, and secondary minerals associated with quartz, calcite, and epidote in pods and stringers in float fragments of andesitic and basaltic lava in a rock slide.

Kaufman, 1964 (GR 4), p. 7, loc. 10 -- Copper-bearing float in rock slide. Malachite, azurite, chrysocolla, bornite, and chalcocite associated with quartz, calcite, and epidote in pods and stringers cutting andesitic to basaltic lava. Bedrock source not found.

MacKevett and Holloway, 1977 (OF 77-169A), p. 37, loc. 6 — Reference to above.

Unnamed occurrence — Copper

Valdez Creek district — Mt. Hayes (2.5, 3.75)
Fig. 4, loc. 19 — 63°13'N, 146°41'W

Summary: Occurrence of copper minerals in Triassic basalt. References may be garbled.

Saunders, 1961, p. 38 -- Bornite and malachite reported 5 mi. from mouth of West Fork of Maclaren R.

Smith and others, 1973 (GC 26) -- Minor malachite or chalcocite in small veinlets, in vesicles, or on fracture or joint surfaces.

MacKevett and Holloway, 1977 (OF 77-169A), p. 37, loc. 8 -- Copper-bearing zones in Triassic basalt.

Unnamed occurrencw	Copper
Valdez Creek district Fig. 4, loc. 9 .	Mt. Hayes (1.65, 3.75) 63°13'N, 146°48'W

Summary: Occurrence of copper mineral(s).

Smith and others, 1973 (GC 26) -- Minor malachite or chalcocite in small veinlets, in vesicles, or on fractures or joint surfaces.

Unnamed occurrence	Copper
Valdez Creek district	Mt. Hayes (1.6, 3.9)
Fig. 4, loc. 11	63°13'N, 146°48'W

Summary: Veins 2-6 in. wide in minor fault zone contain pyrrhotite and copper minerals.

Smith and others, 1973 (GC 26), loc. B -- Veins 2-6 in. wide in minor fault zone contain chalcocite, pyrrhotite, covellite(?), and malachite.

Unnamed occurrence	Copper
Valdez Creek district Fig. 4, loc. 8	Mt. Hayes (1.45, 3.8) 63°13'N, 146°49'W

Summary: Occurrence of copper mineral(s).

Smith and others, 1973 (GC 26) -- Minor malachite or chalcocite in small veinlets, in vesicles, or on fracture or joint surfaces.

Unnamed occurrence — Copper

Chistochina district — Mt. Hayes (15.1, 4.3)
Fig. 5, loc. 41 — 63°14'N, 145°06'W

Summary: Iron-stained upper Paleozoic amphibolite, hornblendite, and hornblende-plagioclase rock contains 5%-10% disseminated iron sulfides and magnetite and traces of chalcopyrite.

Rose, 1967 (GR 28), p. 19, 27, loc. 1 -- Iron-stained [upper Paleozoic] amphbiolite, hornblendite, and hornblende-plagioclase rock contain 5%-10% disseminated pyrrhotite, pyrite, magnetite, and traces of chalcopyrite. Zone about 50 ft. wide and 100 or more ft. long; largely inaccessible. Specimen with visible chalcopyrite contained less than 0.05% Cu.

MacKevett and Holloway, 1977 (OF 77-169A), p. 39, loc. 42 -- Reference to above.

Unnamed occurrence — Copper

Valdez Creek district — Mt. Hayes (2.3,4.0)
Fig. 4, loc. 18 — 63°14'N, 146°42'W

Summary: Minor chalcopyrite in isolated stringers in greenstone and granitic rock. Banded chalcopyrite and magnetite and secondary copper minerals in float.

Kaufman, 1964 (GR 4), p. 7, loc. 11 -- Minor chalcopyrite in isolated stringers in greenstone and granitic rock. Banded chalcopyrite and banded malachite-azurite in float.

p. 12 -- Source of chalcopyrite-magnetite float should be prospected for.

MacKevett and Holloway, 1977 (OF 77-169A), p. 37, loc. 7 -- Reference to above.

Unnamed occurrence — Copper

Valdez Creek district — Mt. Hayes (1.35, 4.25)
Fig. 4, loc. 12 — 63°14'N, 146°50'W

Summary: Chalcopyrite and secondary copper minerals in fractured and altered Triassic volcanic rock separated from Mesozoic metasediments by a fault along which felsic magma was locally intruded. Pyrite and limonite ubiquitous.

Smith and others, 1972 (MP 2) -- Highly fractured Triassic metavolcanic rock separated by a major fault zone from Jurassic argillite; felsic magma was intruded locally along fault zone. Chalcopyrite and secondary copper minerals (azurite and malachite) locally abundant in metavolcanic rocks. Pyrite and limonite derived from it ubiquitous. Much of deposit covered by talus. A few hand-dug old prospect pits.

Smith and others, 1973 (GC 26), loc. A -- Elongate mineralized zone with sporadic chalcopyrite, azurite, and malachite in highly fractured and altered volcanic rock on SE side of a fault; pelitic metasediments NW of fault.

MacKevett and Holloway, 1977 (OF 77-169A), p. 37, loc. 5 -- Data from Smith and others, 1972 (MP 2).

Unnamed occurrence	Copper
Valdez Creek district	Mt. Hayes (2.4, 4.3)
Fig. 4, loc. 17	63°15'N, 146°42'W

Summary: Occurrence of copper mineral(s).

Smith and others, 1973 (GC 26) -- Minor malachite or chalcocite in small veinlets, in vesicles, or on fracture or joint surfaces.

Unnamed occurrence — Copper

Valdez Creek district — Mt. Hayes (2.1, 4.2)
Fig. 4, loc. 16 — 63°15'N, 146°44'W

Summary: Occurrence of copper mineral(s).

Smith and others, 1973 (GC 26) -- Minor malachite or chalcocite in small veinlets, in vesicles, or on fracture or joint surfaces.

Unnamed occurrence — Copper

Valdez Creek district — Mt. Hayes (3.3, 5.05)
Fig. 4, loc. 24 — 63°17'N, 146°35'W

Summary: Chalcopyrite and bornite along and disseminated near fractures in basaltic greenstone.

Kaufman, 1964 (GR 4), p. 9, loc. 18 -- Chalcopyrite and bornite in basaltic greenstone along widely separated fractures; some minor sulfide dissemination near fractures. No economic significance.

MacKevett and Holloway, 1977 (OF 77-169A), p. 37, loc. 12 -- Data combined with those for Kaufman's loc. 19.

Unnamed occurrence — Copper

Delta River district — Mt. Hayes (7.85, 5.3)
Fig. 4, loc. 43 — 63°18'N, 146°00'W

Summary: Float from altered limestone (probably an inclusion in Mesozoic(?) amphibole "serpentinite") contains pyrrhotite, pyrite, and minor chalcopyrite and marcasite in gangue of calc-silicate minerals.

Rose, 1965 (GR 14), p. 28-29, 33, loc. 10 — Float from altered limestone contains pyrrhotite, pyrite, and minor chalcopyrite and marcasite in gangue of calc-silicate minerals. Limestone appears to be an inclusion in amphibole "serpentinite."

Unnamed occurrence — Copper

Delta River district — Mt. Hayes (7.25, 5.25)
Fig. 4, loc. 39 — 63°18'N, 146°05'W

Summary: Chalcopyrite in a 5-ft.-wide iron-stained zone in serpentinite.

Rose, 1965 (GR 14), p. 29, 33, loc. 12 -- Copper-stained altered limestone; also chalcopyrite in a 5-ft. iron-stained zone in serpentinite. Limestone appears to be a block or inclusion in serpentinite. Iron-stained zone trends N 60° W.

MacKevett and Holloway, 1977 (OF 77-169A), p. 38, loc. 20 -- Chalcopyrite in limestone inclusion in serpentinite [described as near Green Wonder].

Unnamed occurrence	Copper
Valdez Creek district Fig. 4, loc. 28	Mt. Hayes (4.6, 5.25) 63°18'N, 146°25'W

Summary: Vesicles in basalt (of probable Triassic age) contain minor chalcopyrite with opal, chlorite, and pyrite.

Rose, 1966 (GR 20), p. 21 item 6 -- In sec. 4, T18S, R7E [this location is highly unlikely; undoubtedly should be Sec. 4, T19S, R7E] vesicles in basalt are filled by opal, chlorite, pyrite, and minor chalcopyrite.

Unnamed occurrence

Copper

Valdez Creek district
Fig. 4, loc. 23

Mt. Hayes (3.2, 5.15)
63°18'N, 146°35 W

Summary: Bornite, chalcopyrite, and chalcocite in greenstone fragments in talus. Country rock greenstone cut by hornblende diorite.

Kaufman, 1964 (GR 4), p. 9-10, loc. 19 -- Minor amounts of bornite, chalcopyrite, and chalcocite associated with quartz and epidote in fragments of greenstone in talus; probably derived from small pods of quartz and epidote with sulfides in volcanics. Country rock is greenstone cut by hornblende diorite.

MacKevett and Holloway, 1977 (OF 77-169A), p. 37, loc. 12 -- Data combined with those for Kaufman's loc. 18.

Unnamed occurrence	Copper
Delta River district Fig. 4, loc. 31	Mt. Hayes (6.15, 5.5) 63°19'N, 146°13'W

Summary: Disseminated fine chalcopyrite near fractures in graywacke. Estimated grade across 5 ft. is 0.2% Cu.

Rose, 1966 (GR 20), p. 21 , item 3 -- In Sec. 33, T18S, R8E. Fine chalcopyrite disseminated near fractures in graywacke. Estimated grade across 5 ft. is 0.2% Cu.

Unnamed occurrence	Copper
Delta River district Fig. 5, loc. 5	Mt. Hayes (8.3, 6.15) 63°21'N, 145°57'W

Summary: Chalcopyrite and copper staining in shear zone in upper Paleozoic(?) dacite porphyry and dacite porphyry breccia. Zone exposed for about 10 ft.

Rose, 1965 (GR 14), p. 30, loc. 17 -- Chalcopyrite and copper staining in shear zone about 6 in. wide in dacite prophyry and dacite prophyry breccia. Zone strikes N 70° E; exposed for about 10 ft. Porphyry and adjacent rocks moderately pyritized.

MacKevett and Holloway, 1977 (OF 77-169A), p. 38, loc. 26 -- Chalcopyrite and secondary copper minerals in shear zone that cut upper Paleozoic(?) dacite porphyry.

Unnamed occurrence — Copper

Delta River district — Mt. Hayes (7.5, 6.15)
Fig. 4, loc. 36 — 63°21'N, 146°03'W

Summary: Small sulfide lenses along contact between Mesozoic(?) dunite and/or peridotite and amphibole "serpentinite". Principal sulfide is marcasite; minor amounts of pyrrhotite and chalcopyrite.

Rose, 1965 (GR 14), p. 30, 33, loc. 18 -- 6 small sulfide lenses (largest about 3 ft. by 6 ft) along contact between Mesozoic(?) amphibole "serpentinite" and peridotite (dunite in places) that is serpentinized in places near contact. Sulfides mainly marcasite accompanied by minor chalcopyrite and pyrrhotite. Some specimens contain more than average chalcopyrite, mainly along fractures in iron sulfides.

Berg and Cobb, 1967 (B 1246), p. 212 -- Summary of above [not specifically cited].

MacKevett and Holloway, 1977 (OF 77-169A), p. 38, loc. 19 -- General reference to above that may not be applicable to this occurrence.

Unnamed occurrence	Copper
Valdez Creek district Fig. 4, loc. 14	Mt. Hayes (1.25, 6.4) 63°22'N, 146°50'W

Summary: Abundant malachite in fracutred amphibolite gneiss.

Smith and others, 1975 (AOF 70) -- Abundant malachite in fractured amphibolite gneiss.

Unnamed occurrence — Copper, Gold, Nickel, Silver

Delta River district — Mt. Hayes (7.9, 5.35)
Fig. 5, loc. 1 — 63°18'N, 146°00'W

Summary: Sulfide lens 2-3 ft. thick and 10 ft. long in Mesozoic(?) amphibole "serpentinite" contains marcasite, chalcopyrite, and minor pyrite. Sample contained 0.37% copper, 0.50% nickel (pentlandite probably originally present), 0.03 oz. a ton gold, and 0.33 oz. a ton silver.

Rose, 1965 (GR 14), p. 28, 33, loc. 8 -- Sulfide lens 2-3 ft. thick exposed for 10 ft. along strike lies in Mesozoic(?) amphibole "serpentinite". Contains marcasite (probably alteration product of pyrrhotite), chalcopyrite, and minor pyrite; assay of sample indicated 0.37% copper, 0.50% nickel, 0.03 oz. a ton gold, and 0.33 oz. a ton silver.

MacKevett and Holloway, 1977 (OF 77-169A), p. 38, loc. 24 -- Seems to be a mixed reference to two occurrences in Rose, 1965 (GR 14), p. 28-29, 33, locs. 8, 10.

Unnamed occurrence	Copper, Gold, Nickel, Silver
Delta River district Fig. 5, loc. 32	Mt. Hayes (8.2, 5.7) 63°19'N, 145°58'W

Summary: Small sulfide lenses in hornfels near a small gabbro plug consist mainly of pyrrhotite (probably nickeliferous) partly altered to marcasite and a little chalcopyrite and pyrite. Assay showed less than 0.1% each of copper and nickel, 0.02 oz. a ton gold, and 0.4 oz. a ton silver.

Rose, 1965 (GR 14), p. 27, 33, loc. 4 -- Several sulfide lenses (largest about 10 ft. long and as much as 3 ft. wide) in hornfels that is epidotized and silicified; in upper Paleozoic volcanic and sedimentary rocks (see fig. 2 of reference) a few hundred feet north of a small gabbro plug and a few hundred feet south of a major fault. Assay indicated less than 0.1% each of copper and nickel, 0.02 oz. a ton gold, and 0.4 oz. a ton silver. Principal sulfide is pyrrhotite partly altered to marcasite accompanied by small amounts of pyrite and chalcopyrite. [Pyrrhotite apparently nickeliferous.]

Unnamed occurrence	Copper, Gold, Silver
Chistochina district Fig. 6, loc. 19	Mt. Hayes (17.05, 3.0) 63°09'N, 144°52'W

Summary: Chalcopyrite and hematite in boulders probably derived from a mineralized zone 5-15 ft. wide in upper Paleozoic volcanic rock. Sample contained 0.52 oz. a ton silver and a trace of gold.

Rose, 1967 (GR 28), p. 22, 27 -- Chalcopyrite and hematite with quartz, chlorite, and epidote in boulders on ridgeline. Assay of sample showed 1.14% Cu, 0.52 oz. a ton silver, and a trace of gold. Mineralized zone (in [upper Paleozoic] andesitic agglomerate(?) [of Chisna Fm.]) is probably 5-15 ft. wide.

MacKevett and Holloway, 1977 (OF 77-169A), p. 39, loc. 50 -- Reference to above.

Unnamed occurrence	Copper, Gold, Silver
Chistochina district	Mt. Hayes (15.9, 3.35)
Fig. 6, loc. 1	63°11'N, 145°00'W

Summary: Thin quartz-pyrite-chalcopyrite vein in upper Paleozoic volcanic rocks. Sample contained 2.2 % Cu, 0.46 oz. a ton silver, and 0.02 oz. a ton gold. Exposed in small prospect pit.

Rose, 1967 (GR 28), p. 20, 27, loc. 8 -- Quartz-pyrite-chalcopyrite vein strikes N 10°W and dips 80°NE. Small prospect pit exposes about 6 in. each of sulfides and quartz. Sample of sulfide material contained 2.2% Cu, 0.46 oz. a ton silver, and 0.02 oz. a ton gold. [Country rock is upper Paleozoic volcanic rock of Chisna Fm.]

MacKevett and Holloway, 1977 (OF 77-169A), p. 39, loc. 44 in part -- Reference to above.

Unnamed occurrence	Copper, Gold, Silver
Chistochina district	Mt. Hayes (16.5, 3.9)
Fig. 6, loc. 5	63°12'N, 144°55'W

Summary: Sample of chalcopyrite-bearing pyritiferous Permian argillite along contact with basalt contained 0.04 oz. a ton gold and a trace of silver.

Rose, 1967 (GR 28), p. 21, 27, loc. 14 -- Iron-stained pyritic argillite along contact with basalt [both units of Permian Mankomen Fm.] contains traces of chalcopyrite. Sample contained 0.04 oz. a ton gold and a trace of silver.

Unnamed occurrence	Copper, Gold, Silver
Chistochina district	Mt. Hayes (16.85, 4.05)
Fig. 6, loc. 7	63°13'N, 144°53'W

Summary: Upper Paleozoic amphibolite contains sulfides, including a trace of chalcopyrite, and small amounts of gold and silver; trace of nickel reported from a sample.

Rose, 1967 (GR 28), p. 21, 27, loc. 16 -- [Upper Paleozoic] amphibolite contains pyrrhotite, pyrite, a trace of chalcopyrite, and quartz veins. Sample contained 0.02 oz. a ton gold, 0.14 oz. a ton silver, and traces of Cu and Ni.

MacKevett and Holloway, 1977 (OF 77-169A), p. 39, loc. 46 in part -- Reference to above.

Unnamed occurrence	Copper, Gold, Silver
Delta River district	Mt. Hayes (7.6, 5.65)
Fig. 4, loc. 41	63°19'N, 146°02'W

Summary: Zone a few feet wide in amphibole "serpentinite" made up mainly of amphibole and olivine; minor epidote, pyrite, and chalcopyrite with as much as 0.09 oz. a ton gold, 1.18 oz. a ton silver, a little lead and zinc (no lead or zinc minerals listed), and a trace of nickel.

Rose, 1965 (GR 14), p. 29-30, 33, loc. 15 -- Chalcopyrite and copper staining in amphibole "serpentinite"; most obvious in a zone a few feet wide trending about N 35° E. Rock mainly amphibole and olivine with minor epidote, pyrite, and chalcopyrite. Chip sample across 4 ft. contained 0.75% copper, 0.09 oz. a ton gold, 1.18 oz. a ton silver, less than 0.1 % each lead and zinc, and a trace of nickel.

MacKevett and Holloway, 1977 (OF 77-169A), p. 38, loc. 21 -- Chalcopyrite and secondary copper minerals in amphibolitic serpentinite and upper Paleozoic volcanic rocks.

Unnamed occurrence	Copper, Iron
Chistochina district Fig. 5, loc. 40	Mt. Hayes (14.75, 4.0) 63°13'N, 145°09'W

Summary: Hornblendite boulder in glacial deposits contains about 10% magnetite and a little chalcopyrite.

Rose, 1967 (GR 28), p. 20, 27, loc. 2 -- Hornblendite boulder in glacial deposits contains about 10 percent magnetite and small amounts of chlorite, pyrite, chalcopyrite, and calcite.

Unnamed occurrence — Copper, Iron

Valdez Creek district — Mt. Hayes (2.0, 4.7)
Fig. 4, loc. 15 — 63°16'N, 146°45'W

Summary: Malachite and azurite in greenstone; probably derived from oxidation of bornite and chalcopyrite in fractures near a dioritic dike. In same neighborhood a large body of magnetite reported; probably in limestone.

Saunders, 1961, p. 38, loc. 10 -- Specimens of bornite and malachite reported to have been found.
p. 39, loc. 14 -- Large body of magnetite reported; probably in limestone.

Kaufman, 1964 (GR 4), p. 8, loc. 13 -- Malachite and azurite (probably formed by oxidation of bornite and chalcopyrite along fractures in greenstone) near a narrow dike of quartz hornblende diorite.
p. 13 -- Further prospecting warranted.

MacKevett and Holloway, 1977 (OF 77-169A), p. 37 -- loc. 9 -- References to above.

Unnamed occurrence — Copper, Iron

Delta River district — Mt. Hayes (7.85, 5.9)
Fig. 4, loc. 42 — 63°20'N, 146°00'W

Summary: Tactite zone in upper Paleozoic carbonate rocks contains magnetite, chalcopyrite, pyrite, pyrrhotite, garnet, glaucophane, clinopyroxene, biotite, and calcite. Exposure small.

Rose, 1965 (GR 14), p. 30, 33, loc. 16 -- Small exposure of limestone altered to tactite. Minerals present include clinopyroxene, magnetite, garnet, chalcopyrite, pyrrhotite, pyrite, biotite, calcite, and glaucophane.

MacKevett and Holloway, 1977 (OF 77-169A), p. 38, loc. 22 -- Tactite zone in upper Paleozoic carbonate rocks contains magnetite, chalcopyrite, and pyrite.

Unnamed occurrence	Copper, Manganese
Chistochina district Fig. 6, loc. 2	Mt. Hayes (16.15, 3.5) 63°11'N, 144°58'W

Summary: Pods as much as 5 ft. wide formed by replacement of upper Paleozoic andesite near contact with Mesozoic quartz monzonite contain pyrite, chalcopyrite, and magnetite. Nearby boulder (possibly glacially derived) contains rhodochrosite and rhodonite.

Rose, 1967 (GR 28), p. 20-21, loc. 9 -- Pods as much as 5 ft wide containing pyrite, chalcopyrite, and magnetite with quartz, epidote, chlorite, and carbonate were formed by replacement of [upper Paleozoic] andesite near contact with [Mesozoic] quartz monzonite. Nearby boulder (possibly glacially transported) contains rhodochrosite, rhodonite, and abundant quartz.

MacKevett and Holloway, 1977 (OF 77-169A), p. 39, loc. 44 in part -- Reference to above.

Unnamed occurrence	Copper, Molybdenum
Valdez Creek district Fig. 4, loc. 13	Mt. Hayes (1.35, 4.4) 63°15'N, 146°40'W

Summary: Talus fragments of acidic intrusive rock, probably a small Cretaceous(?) pluton the cut Mesozoic argillite, contain a little disseminated chalcopyrite and molybdenite. Also some fragments of molybdenite-bearing quartz.

Kaufman, 1964 (GR 4), p. 7-8, loc. 12 -- Iron-stained area in argillite; acidic intrusive rock in talus fragments, some with disseminated chalcopyrite and molybdenite; grab sample contained 0.15%-0.25% Mo. Minor amounts of molybdenite-bearing quartz fragments also in talus. Intrusive rock may be from dikes or from a small stock in argillite.

p. 12 -- Area should be investigated further.

MacKevett and Holloway, 1977 (OF 77-169A), p. 37, loc. 4 -- Reference to above; interpreted as pyrite and subordinate chalcopyrite and molybdenite, mainly as disseminations in small Cretaceous(?) pluton that cuts upper Mesozoic argillite.

Unnamed occurrence — Copper, Nickel

Delta River district — Mt. Hayes (7.25, 6.15)
Fig. 4, loc. 35 — 63°21'N, 146°05'W

Summary: Pod and boulders of sulfides contain pyrite, chalcopyrite, and nickeliferous pyrrhotite. Assay of a sample showed 0.9% copper, less than 0.1% nickel, and a trace of zinc. Country rock amphibole "serpentinite".

Rose, 1965 (GR 14), p. 30-31, 33, loc. 19 -- Boulders in zone about 20 ft. wide on hillside contain massive pyrite, chalcopyrite, and pyrrhotite. Sample contained 0.9% copper, less than 0.1% nickel, and a trace of zinc. Nearby is a pod of pyrrhotite a few inches thick and several feet long. Country rock (amphibole "serpentinite") considerably pyritized and sheared.

MacKevett and Holloway, 1977 (OF 77-169A), p. 38, loc. 18 -- Pyrrhotite, pentlandite, and chalcopyrite in peridotite. [Reference is to above; data probably combined with those for Rose's loc. 20.]

Unnamed occurrence	Copper, Silver
Delta River district Fig. 4, loc. 32	Mt. Hayes (6.35, 5.6) 63°15'N, 146°12'W

Summary: Shear zone in upper Paleozoic dacite agglomerate contains pyrite, chalcopyrite, malachite, and as much as 2.2 oz. a ton silver. Explored by a shallow trench and a few pits.

Rose, 1966 (GR 20), p. 20, loc. 5 -- Sheared zone that strikes N 85°W, dips 35°SW, and is in dacite agglomerate contains pyrite, chalcopyrite, and malachite. Sample across width of 1 ft. contained 2.95% Cu and 2.2 oz. a ton silver; no gold. Shear zone and sporadic iron staining traced for several hundred feet. Prospected by a shallow trench and several small pits. Claim staked but not recorded.

MacKevett and Holloway, 1977 (OF 77-169A), p. 37, loc. 16 -- Shear zone in upper Paleozoic dacite agglomerate contains pyrite, chalcopyrite, and malachite.

Unnamed occurrence	Gold
Chistochina district Fig. 6, loc. 26	Mt. Hayes (18.25, 3.0) approx. 63°09'N, 144°42'W approx.

Summary: Placer gold workings reported. USBM data.

MacKevett and Holloway, 1977 (OF 77-169A), p. 41, loc. 77 -- Placer gold workings; no known post-1950 activity. USBM data.

Unnamed occurrence — Gold

Chistochina district — Mt. Hayes (17.1, 3.15)
Fig. 6, loc. 18 — 63°10'N, 144°51'W

Summary: 0.04 oz. a ton gold in sample of altered upper Paleozoic andesite cut by small quartz veinlets.

Rose, 1967 (GR 28), p. 22, 27, loc. 25 -- 0.04 oz. a ton gold in sample of pyritized and altered [upper Paleozoic] andesite cut by small quartz veinlets.

Unnamed occurrence — Gold, Nickel, Platinum, Silver

Chistochina district — Mt. Hayes (16.9, 3.85)
Fig. 6, loc. 9 — 63°12'N, 144°42'W

Summary: Dunite boulder in moraine contains abundant pyrite. Sample contained 0.75% copper, 0.2% nickel, and trace to small amounts of silver, gold, and platinum. Only metallic mineral listed is pyrite.

Rose, 1967 (GR 28), p. 21, 27, loc. 18 -- Dunite boulder in moraine contains abundant pyrite. Sample contained 0.75% Cu, 0.2% Ni, 0.12 oz. a ton silver, and traces of gold and platinum. [No minerals other than pyrite listed.]

Unnamed occurrence — Gold, Silver

Chistochina district — Mt. Hayes (16.95, 3.2)
Fig. 6, loc. 17 — 63°10'N, 144°52'W

Summary: Highly pyritized upper Paleozoic andesite-dacite contains trace to small amounts of copper, gold, and silver; no copper mineral identified.

Rose, 1967 (GR 28), p. 22, 27, loc. 24 -- Grab sample of highly pyritized [upper Paleozoic] andesite-dacite contained 0.15% Cu [no copper mineral identified], a trace of gold, and 0.12 oz. a ton silver.

MacKevett and Holloway, 1977 (OF 77-169A), p. 39, loc. 48 -- Disseminated sulfides, including minor chalcopyrite, in Pennsylvanian volcanic rocks, cheifly andesite and dacite. [Reference is to Rose, 1967 (GR 28), p. 22; may be garbled.]

Unnamed occurrence	Gold, Silver
Chistochina district	Mt. Hayes (17.7, 3.4)
Fig. 6, loc. 23	63°11'N, 144°46'W

Summary: Traces of gold and silver in pyritic slaty argillite of Permian Mankonem Fm.

Rose, 1967 (GR 28), p. 22, 27, loc. 22 -- Sample of [Permian] pyritic slaty argillite [of Mankomen Fm.] contained a trace of gold and 0.12 oz. a ton silver.

Unnamed occurrence	Gold, Silver
Chistochina district Fig. 6, loc. 8	Mt. Hayes (16.85, 3.9) 63°12'N, 144°42'W

Summary: Pyritized Permian argillite contains traces of gold and silver.

Rose, 1967 (GR 28), p. 21, 27, loc. 17 -- Sample of stained and pyritized [Permian] argillite [of Mankomen Fm.] contained 0.02 oz. a ton gold and a trace of silver.

Unnamed occurrence	Gold, Silver
Chistochina district	Mt. Hayes (16.85, 3.7)
Fig. 3, loc. 11	63°12'N, 144°52'W

Summary: Pyritized area at contact between Mesozoic peridotite and monzonite. Sample contained 0.2% Cu (no copper mineral reported), 0.02 oz. a ton gold, and 0.18 oz. a ton silver.

Rose, 1967 (GR 28), p. 22, 27, loc. 20 -- Grab sample from pyritized area at contact between [Mesozoic] peridotite and monzonite contained 0.2% Cu [no copper mineral identified], 0.02 oz. a ton gold, and 0.18 oz. a ton silver.

MacKevett and Holloway, 1977 (OF 77-169A), p. 39, loc. 47 -- Reference to above. [Presence of chalcopyrite reported; probably assumed because of copper content of sample.]

Unnamed occurrence	Gold, Silver
Chistochina district	Mt. Hayes (16.75, 4.05)
Fig. 6, loc. 6	63°13'N, 144°53'W

Summary: Small amounts of gold and silver in sample of upper Paleozoic pyritic diabase-basalt with small quartz veins.

Rose, 1967 (GR 28), p. 21, 27, loc. 15 -- Sample of [upper Paleozoic] pyritic diabase-basalt with quartz veins contained 0.02 oz. a ton gold, 0.18 oz. a ton silver, and a trace of copper.

MacKevett and Holloway, 1977 (OF 77-169A), p. 39, loc. 46 in part -- Reference to above.

Unnamed occurrence	Iron
Chistochina district Fig. 6, loc. 3	Mt. Hayes (16.25, 3.3) 63°10'N, 144°57'W

Summary: Exposure of gently dipping zone of banded hematite about 15 ft. thick appears to have been formed by replacement of upper Paleozoic volcanics. Float of hematite, quartz, and a little magnetite in area about 100 yards long.

Rose, 1967 (GR 28), p. 21, loc. 11 -- Float in zone about 100 yards long contains pieces of specular hematite and quartz with some magnetite. In only bedrock exposure is a banded zone about 15 ft. thick; shallow dip; appears to have replaced [upper Paleozoic] volcanics.

MacKevett and Holloway, 1977 (OF 77-169A), p. 39, loc. 45 -- Reference to above.

Unnamed occurrence	Lead(?), Silver(?)
Chistochina district	Mt. Hayes (15.75, 3.7)
Fig. 5, loc. 42	63°12'N, 145°01'W

Summary: Silver-bearing galena-quartz-carbonate vein reported.

Rose, 1967 (GR 28), p. 20, loc. 6 -- Silver-bearing galena-quartz-carbonate vein reported. [In area underlain by mainly agglomerate unit of Pennsylvanian-Permian(?) Chisna Fm.]

MacKevett and Holloway, 1977 (OF 77-169A), p. 39, loc. 43 -- Reference to above.

Unnamed occurrence — Nickel, Silver

Delta River district — Mt. Hayes (7.25, 6.2)
Fig. 4, loc. 34 — 63°21'N, 146°05'W

Summary: Upper Paleozoic sandstone near an ultramafic body is iron stained, silicified, and hornfelsic. Contains nickeliferous pyrrhotite. Sample contained 0.2% nickel, 0.18 oz. a ton silver, and traces of copper and gold.

Rose, 1965 (GR 14), p. 31, 33, loc. 20 -- Iron-stained, silicified and hornfelsic sandstone of upper Paleozoic age contains disseminated pyrrhotite; sample contained 0.2% nickel, 0.18 oz. a ton silver, and traces of copper and gold. Near an ultramafic intrusive body.

MacKevett and Holloway, 1977 (OF 77-169A), p. 38, loc. 18 -- Pyrrhotite, pentlandite, and chalcopyrite in peridotite. [Reference is to above; data probably combined with those for Rose's loc. 19.]

Synonyms, Claim Names, Operators, and Owners

Many mines and prospects have undergone changes in both their own names and in the names of their operators and owners. All names that appear in the cited references appear in this summary either in the first section as occurrence names or in this as synonyms.

Mt. Hayes

Acme Mines Co. -- see (Chisna R.)
Acme Mining Co. -- see (Chisna R.)
Ahlgren -- see (Miller Gulch)
Akerman & Todd -- see (Miller Gulch)
Alaska Middle Fork Mining Co. -- see Chistochina R., Middle Fork)

Albertson & Pettijohn -- see Kathleen-Margaret
Algren and associates -- see (Miller Gulch), (Slate Cr.)
(Bedrock Cr.) -- see (Chistochina R., Middle Fork)
Beerman and associates -- see (Big Four Cr.)
Big Four -- see (Big Four Cr.)

Blix & Torgerson -- see (Rainy Cr.)
California -- see (Slate Cr.)
(Chesna R.) -- see (Chisna R.)
Cleveland -- see (Chistochina R., Middle Fork)
Coles, Jacobson, Kramer & Levell -- see (Miller Gulch), (Slate Cr.)

Conradt and associayes -- see (Ptarmigan Cr.)
Copter Lode -- see (Rainy Cr.)
(Daisy Cr.) -- see (Dempsey)
DeWitt -- see (Ober Cr.)
(Dry Delta R.) -- see (Ptarmigan Cr.)

Eastern Star -- see Pioneer
Elmer -- see (Chistochina R.), (Slate Cr.)
Elmer, Walker & Watkins -- see (Big Four Cr.), (Slate Cr.)
Emerick and associates -- see Bee Mining Co.
Ghezzi -- see Pioneer

Gillespie -- see (Ptarmigan Cr.)
Glacier -- see (Chistochina R.)
Goldfield Consolidated Mining Co. -- see (Slate Cr.)
Gull -- see (Ptarmigan Cr.)
Hayes -- see (Miller Gulch)

Hazelet -- see (Chisna R.)
Hazelet & Meals -- see (Chisna R.)
Hobbs Enterprises -- see (Miller Gulch), (Slate Cr.)
Holmes & Brail -- see (Chisna R.)
Horn -- see (Chisna R.)

Jackpot -- see (Ruby Gulch)
Jasper -- see (Chistochina R., Middle Fork)
K-M -- see Kathleen-Margaret
(Kraemer Cr.) -- see (Chistochina R., Middle Fork)
Kreamer, Leavell & Hemple -- see (Slate Cr.)

(Lake Cr.) -- see (Chistochina R., Middle Fork)
(Lime Cr.) -- see (Chistochina R., Middle Fork)
Limestone -- see (Chistochina R., Middle Fork)
(Limestone Cr.) -- see (Chistochina R., Middle Fork)
(Macomber Cr.) -- see (McCumber Cr.)

McDowell -- see (Slate Cr.)
M.E.W. Gold Mining Co. -- see (Big Four Cr.), (Slate Cr.)
Meyer & Prolig -- see (Slate Cr.)
Middle Fork Mining Co. -- see (Chistochina R., Middle Fork)
Miller -- see (Ober Cr.), (Slate Cr.)

Monte Cristo Mining Co. -- see (Miller Gulch), (Slate Cr.)
Moore and others -- see Daisy
Newmont Mining Co. -- see Emerick
Petrokov -- see (Black Rapids)
Rainbow -- see Pioneer

Rainbow Mountain -- see Emerick
Red Rock Mining Co. -- see Emerick
Savage -- see Tripp
Schroeder -- see (Slate Cr.)
Slate Creek Mining Co. -- see (Slate Cr.)

Slate Creek Placers, Inc. -- see (Slate Cr.)
Sundt -- see (Slate Cr.)
Tacoma -- see (Slate Cr.)
Transworld Resources -- see Kathleen-Margaret
White Bros. -- see (Eagle Cr.)

(Wilder Cr.) -- see (Rainy Cr.)

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