THE ENGINEER MINE
TAGISH LAKE, BRITISH COLUMBIA

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The Engineer mine is a Dana locality for classic, botryoidal "allemontite" (stibarsen and native arsenic). Several other minerals of interest to the collector are also found, including crystallized auriferous silver ("electrum"). The site is currently being mined for gold, but the operators are also setting aside specimens specifically for the collector market.

INTRODUCTION

The Engineer mine is located on the east shore of the Taku Arm of Tagish Lake, about 32 km (20 miles) west of Atlin, British Columbia. Whitehorse, Yukon, is about 137 km (85 miles) north. National Topographic Series Map Sheet 104 M/8E covers this area. Access to the mine is either by boat or float-equipped aircraft.

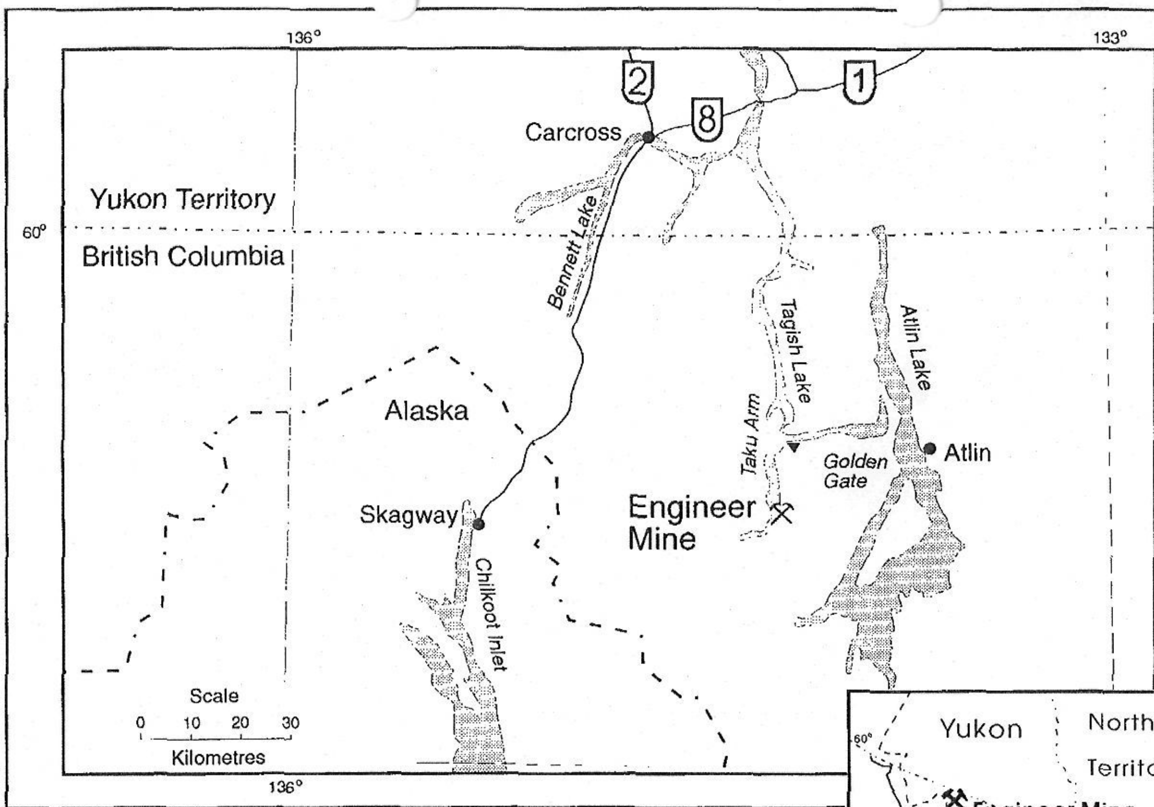
HISTORY

As with so many mines in British Columbia, the Engineer mine's history is one of high hopes and dreams, fancy financial footwork, success and disaster. The story began in 1899, when Charles A. Anderson, an engineer with the White Pass and Yukon Railway, paddled south along the eastern shore of Taku Arm. He found visible gold in large quartz veins in bluffs at the water's edge. Anderson staked the Hope claim on July 8, recorded it in Atlin, then returned with Henry C. Diers, another company engineer, to stake another twelve claims which became known as the Engineer Group. These men then organized the Engineer Mining Company of Skagway, Alaska, and began development work on the property, which continued for several years They also began construction of a small mill, but did not complete it. The Company's money had run out and the results had not been encouraging enough to attempt more fund-raising. As a result, the claims were allowed to lapse in 1906. A group of local men led by Edwin Brown restaked the claims, then in 1907 sold them to Captain James Alexander, John Dunham, Ben G. Nichol and K. Wawrecka of the Northern Partnership Syndicate.

The new owners began by prospecting the neighboring ground, which resulted in the staking of the Northern Partnership Numbers 1, 2, 3, 4 and 5 claims. The construction of the mill was also completed and several tons of high-grade ore were treated by amalgamation methods.

Minimal work was done between 1910 and 1912 due to pending litigation. After acquiring the interests of his partners, Captain Alexander continued more comprehensive and systematic prospecting and development than had been previously undertaken and, for the next 6 years, work continued sporadically. It slowed down when engineers and consultants visited during attempts to sell the mine. When asked about the origin of the mine's name Alexander was reported to have replied, "Because it has been 'engineered' to death!"

In 1918, Wayne Darlington, a well-known New York engineer, managed to secure an option on the mine from Alexander, with a total purchase price of $1,000,000. This option was passed on to the Mining Corporation of Canada. One of the Corporation's



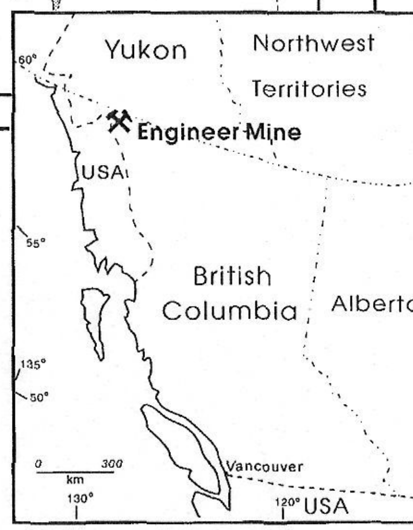


***Figure 1.* Locality map.**

young engineers, George Randolph, was in British Columbia inspecting properties for option. Charles E. Watson, then manager of the MCC, also came to British Columbia to look over properties already optioned by Randolph. Watson had just joined Randolph at the Silver Creek property near Revelstoke when a wire was received to proceed immediately to the Engineer mine. Watson and Randolph joined Captain Alexander, his lady and C. S. Verril, an engineer representing Darlington, in Vancouver. They sailed for Skagway and then went on to visit the mine. The group was returning to Vancouver aboard the Canadian Pacific Railway steamer *Princess Sophia,* which had sailed from Skagway at midnight on October 26th, 1918. At 3:00 a.m., in a blinding snow storm, the steamer ran aground on the Vanderbilt Reef in the Lynn Canal. At dawn, the tide was low, leaving the boat high and dry on the reef. For more than a day the ship was perched atop the reef. It had been decided that if an attempt were made to bring the passengers ashore during the storm, many would surely perish. Just after dark on October 28th, the *Princess Sophia* finally plunged off the rocks, taking everyone on board into the icy depths. A pet dog was the only survivor (Greene, 1969).

For several years after Alexander's death, little work was done at the mine due to litigation regarding the ownership. It turned out that the woman accompanying Alexander in British Columbia was not his wife as people had assumed. Apparently Mrs. Alexander and their 16-year-old daughter were still living in England when they learned of his demise. Litigation arose when their claim as heirs was countered by a claim made by Alan Smith of Philadelphia. Smith claimed that he had grubstaked Alexander and the two had an agreement that in the event of the death of one partner, the other was to receive the deceased's share of the Engineer mine. The mine was held under bond by Eela Copper Company, a Nevada mining corporation. Repair and development work done during this time was headed by Reggie Brooks, a long-time friend of Captain Alexander.

The property was examined and bonded by Andrew Sostad for New York interests in the fall of 1923. Extensive work began again in 1924, when Engineer Gold Mines, Limited, was incorporated in the State of Delaware, with the British Columbia head office in Vancouver. With a capitalization of $1,000,000, the Company made the mine a major operation by building a power plant and transmission lines and installing a 50 tons-per-day concentrator near the 5th level portal. The concentrator was started in November of 1925 and within two months had milled 1,700 tons of ore yielding 1,814 ounces of gold and 843 ounces of silver. The high mining and milling rate outpaced the development of reserves and after the summer of 1926, having produced 7,757 ounces of gold that year, the mine and mill were shut down for the winter to let ore reserve development catch up. After a short period of milling during the summer of 1927, developed reserves were once again exhausted and the mine was closed. Exploration and development continued until 1931 when all work in the mine was ceased even though reserves had been established in the lower levels. Reggie Brooks stayed on as a caretaker for Engineer Gold Mines for the next two years. Although he was not a paid employee, he was permitted by the company to hand-mine the surface showings.

In 1934 the mine was sold at a Sheriff's sale to representatives of the Mining Corporation of Canada, Limited, for $25,000 cash in

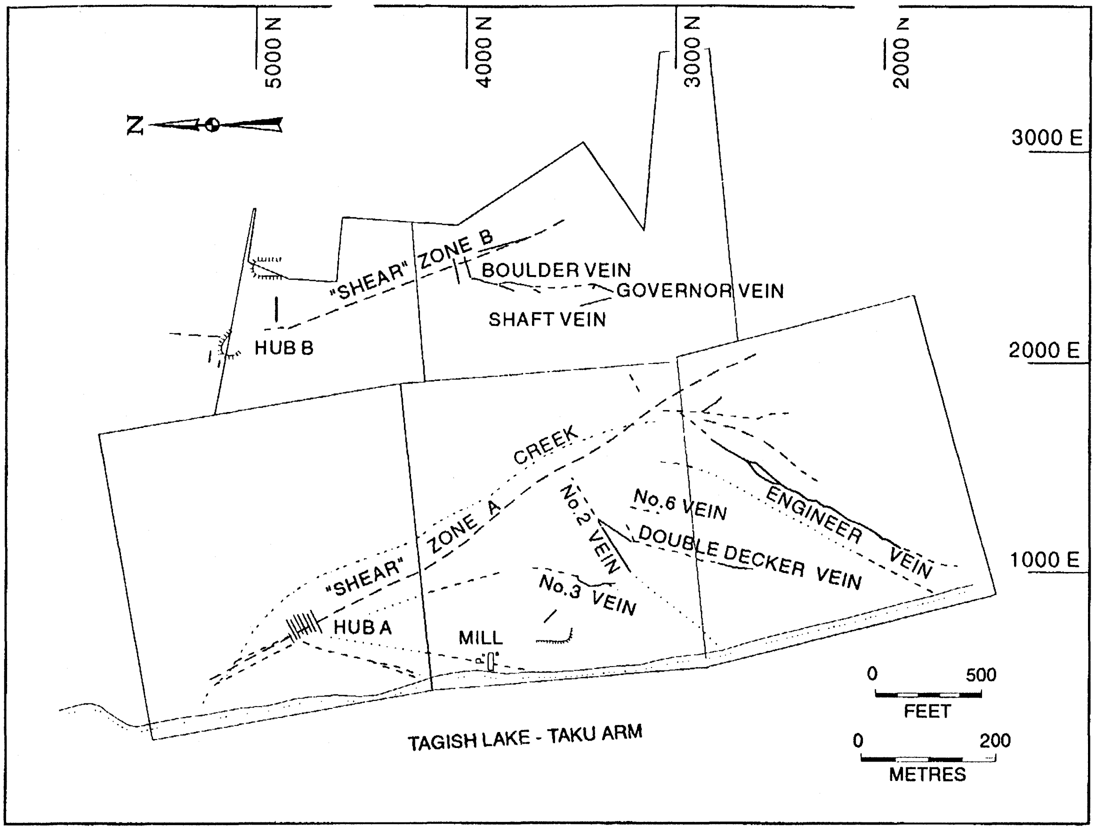


Figure 2. **Surface plan of the Engineer mine showing outcrops of the major veins. (Computer drawn by Arne Toma after Smith, 1990.)**

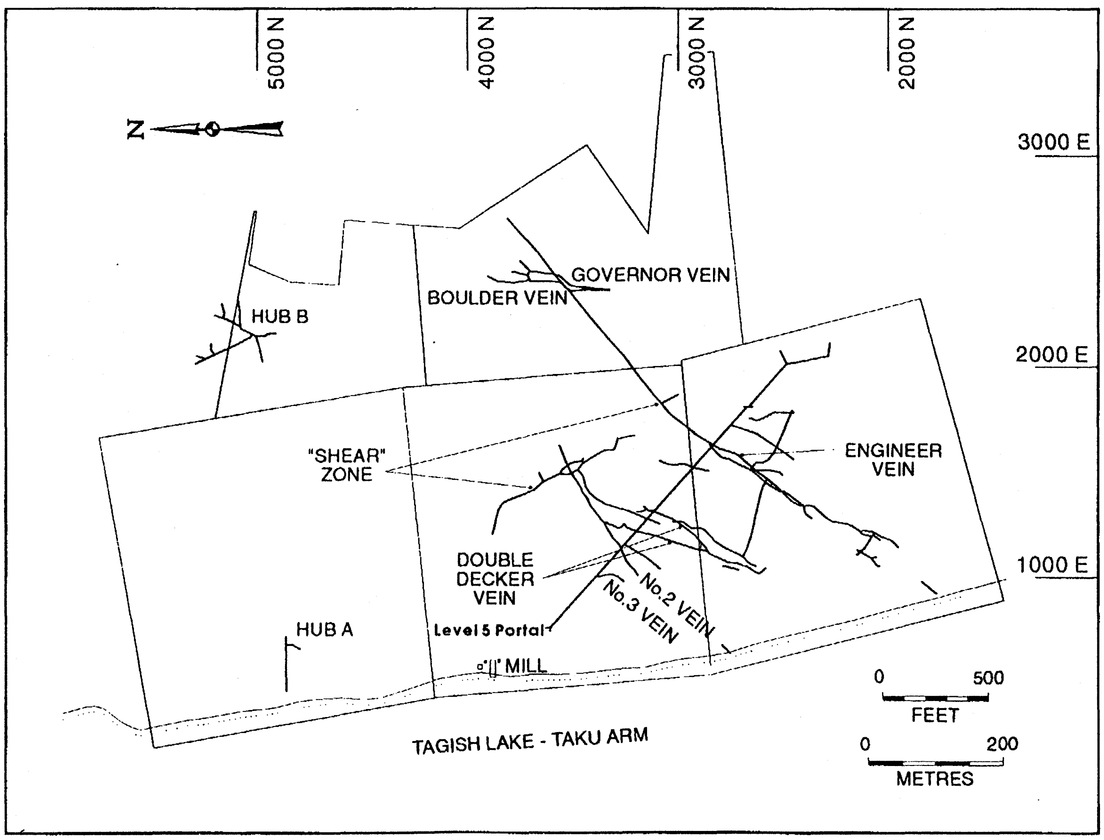


Figure 3. **Underground workings at the Engineer mine. (Computer drawn by Arne Toma after Smith, 1990.)**

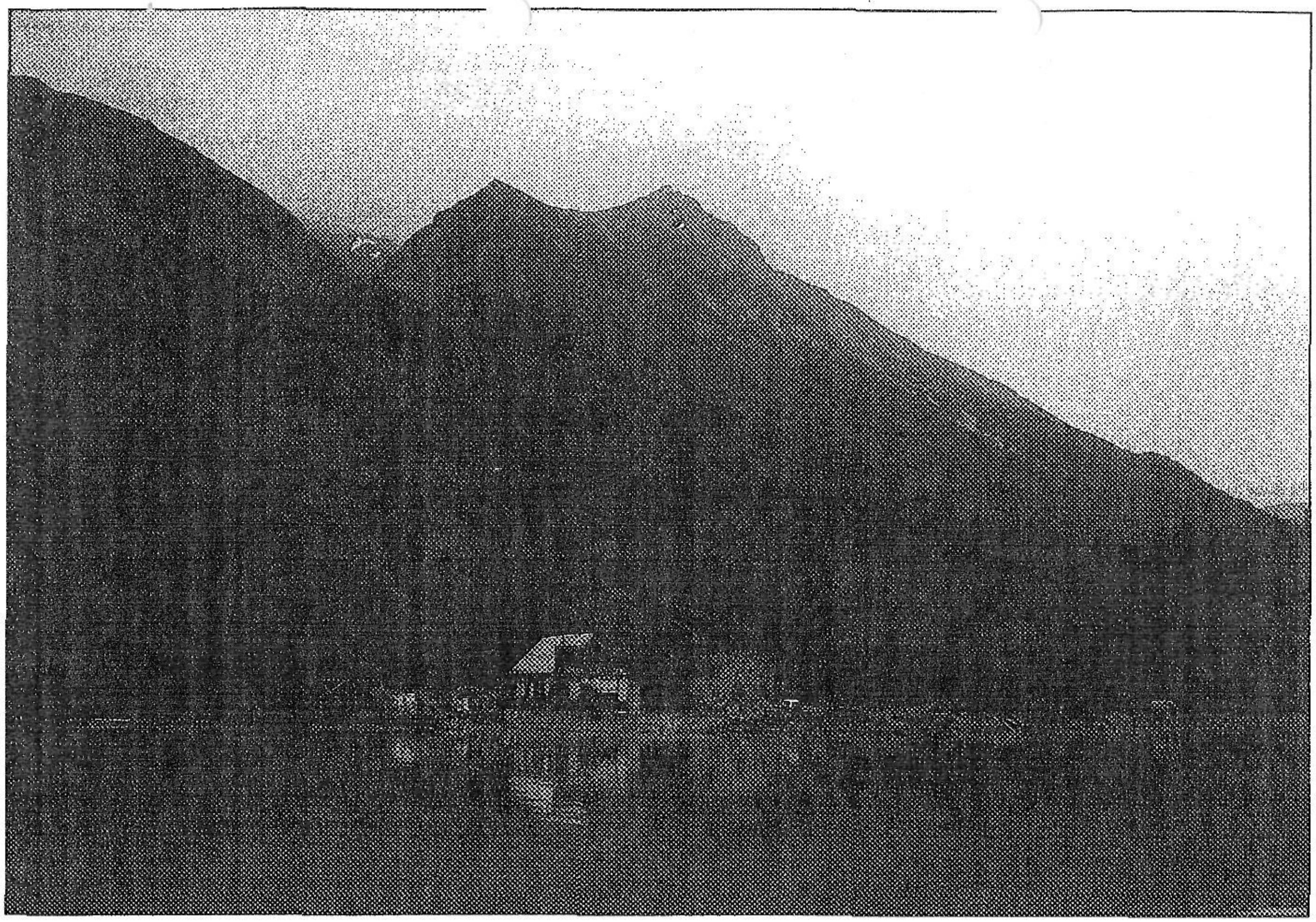


Figure 4. **Engineer mine camp on the eastern shore of Tagish Lake. Photo by Mark Mauthner.**

satisfaction of judgments against the mine: over $8,700 to a C. L. Hershman, over $4,000 to a Louis Schulz and $207,431.18 in favor of John G. Harris. In his memoirs, Reggie Brooks relates how the latter came to have a claim against the mine. Apparently, someone who knew Harris well had informed Brooks that the claim was transferred to Stewart Hamilton, then treasurer of Engineer Gold Mines in New York, by C. V. Bob, an earlier president of the company, in exchange for an estate in the West Indies which Hamilton had acquired. Hamilton, in turn, transferred the loan indebtedness to Jack Harris, his brother-in-law because, as an executive officer of the company, Hamilton could not very well sell the mine and satisfy his judgement for the debt.

The Mining Corporation of Canada made no attempt to reopen the mine. John E. Hammell arranged for an option on the mine from the Corporation in 1936. The engineer he had hoped would run the operation died after falling down a shaft at a gold mine in the Philippines, and Hammell consequently turned down the option. In May of 1944, Neil Forbes, Tommy Kirkwood and Pete Brandes of Atlin bought the mine from the Mining Corporation for $5,000 plus about $1,500 in back taxes. These miners highgraded the property off and on through the 1940's until 1952. Walter Sweet, also of Atlin, joined the group in 1945, after obtaining Pete Brandes' interest.

There has been no production from the mine since 1952, although several companies have made efforts to explore the property further. The property was bought by Tagish Gold Mines Limited in the early 1960's. Nu-Energy Resources Limited merged with Tagish Gold Mines in 1975 and in the same year conducted an exploration program. In 1979, Nu-Lady acquired the right to the property and continued exploration for the next couple of years. Total Erickson Resources Limited carried out magnetometer aerial and ground geophysical surveys in 1987 (Smith, 1990). The Engineer mine is presently being worked by Warren Arnholtz and Swede Martensson of Ampex Mining.

One story about the Engineer mine relates a curse put on the mine in its early days. The curse proclaims that "nothing but death and disaster would be the lot of Alexander and anyone else who had anything to do with the property" (Fairlie, 1940). Perhaps it is still in effect. With their operation shut down for the season, Warren and Swede were heading home across Tagish Lake in October of 1993 when a sudden storm capsized the boat. They, along with the boat's owner and captain, Rob Cumming, hung on for over an hour in the icy water before being rescued. Most of that season's gold lies at the bottom of the lake. The tale is not yet ended.

GEOLOGY

Several investigators made cursory observations in the Tagish Lake area from 1899 to the mid-1950's. A map of the area was drawn by R. L. Christie in 1957. The most significant work relevant to the Taku Arm (in particular, to the east of the lake) was done by Bultman (1979) and by the British Columbia Geological Survey (Mihalynuk and Mountjoy, 1990). The Engineer mine area was also studied as part of the Bennett Project conducted by the BC Geological Survey (Schroeter, 1986).

The Engineer mine claims are situated within the Whitehorse

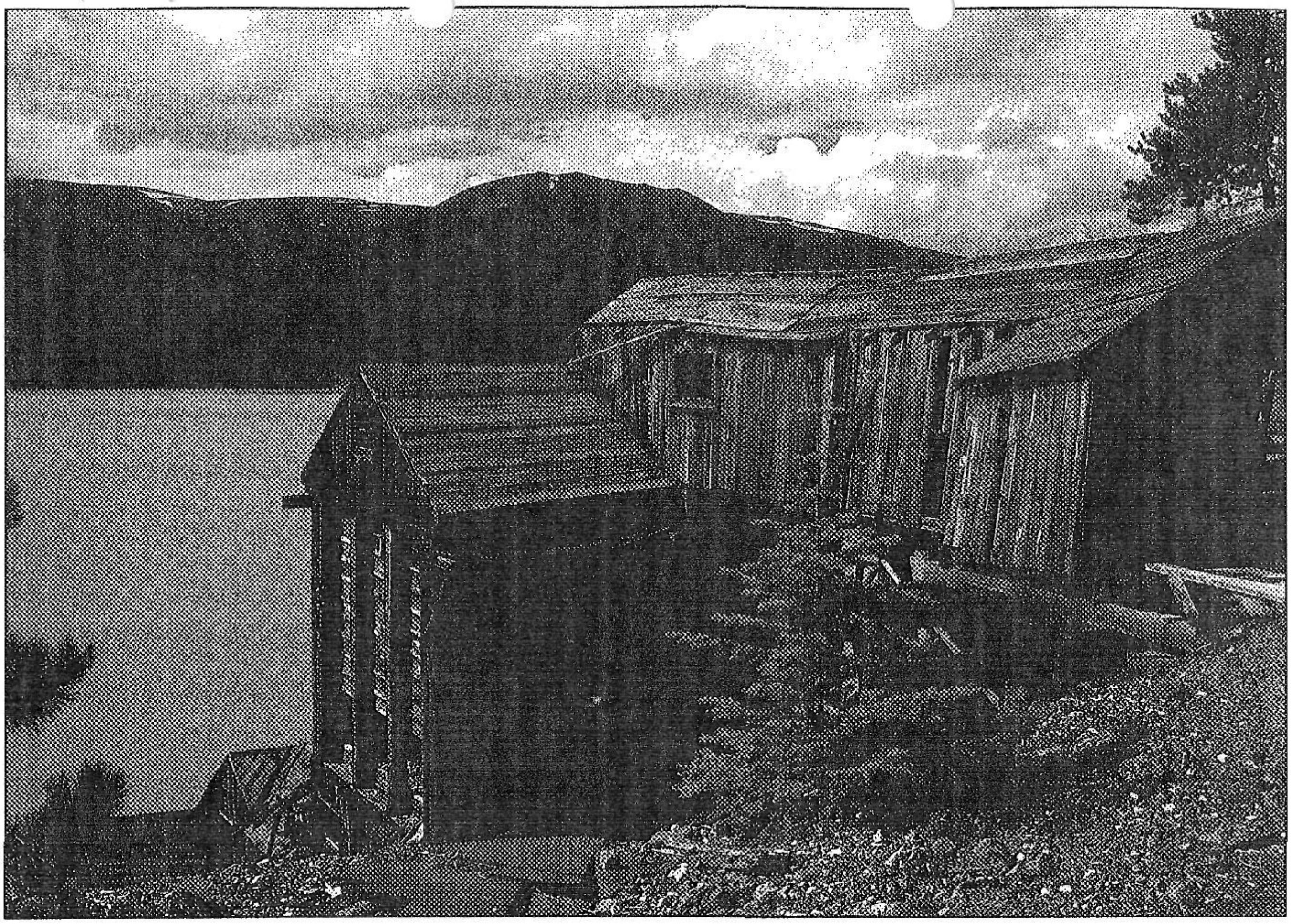


Figure 5. **Engineer mine mill on Tagish Lake. Photo by Mark Mauthner.**

Trough, which is a synclinorium underlain by the Late Triassic Stuhini Group. The center of the trough is dominated by the Jurassic Laberge Group. The Whitehorse Trough is structurally controlled to the west by the Llewellyn Fault, which separates it from the Coast Plutonic Complex, and to the east by the Nahlin Fault which separates the trough from the Atlin terrane.

The orebodies of the Engineer mine are part of an epithermal vein system situated in the sedimentary rocks of the Inklin Formation. This formation is one of two comprising the Laberge group of rocks, which are a northwest-trending linear belt of Early Sinemurian to Late Pliensbachian muddy turbidites, graywackes and conglomerates (Johannson, 1993).

Several workers have made comments about the mineralization history, or aspects thereof (for example, Mihalynuk and Mountjoy, 1990, and Schroeter, 1986), but a more comprehensive hypothesis than the one presented in this article has not yet been put forward or tested. Smith (1990) points out that two types of mineralization exist: the low-grade, finely disseminated mineralization of the "shear zones" and "hubs," and that of the "erratically distributed pockets of high-grade gold ore that occur in the numerous narrow quartz veins throughout the property."

Two nearly vertically dipping and northwest-trending zones of dilatant quartz veins ("shear zones" in previous literature) cut the Inklin rocks. These have been interpreted as splays of the Llewellyn Fault system (Schroeter, 1986). Smith (1990) also compares the "shear zone" quartz veins with the type of quartz veins found in the California Motherlode belt on the basis of the presence of graphitic horizons parallel to the quartz zones. The last major motion along the Llewellyn Fault has been dated at about 132 Ma (million years) by potassium-argon dating of sericite from the fault zone (Mihalynuk, personal communication, 1993), and an early period of gold mineralization could have taken place during this time. Each of these zones hosts a large, oval stockwork or "hub" from which some subsidiary, though clearly epithermal, veins seem to radiate.

Schroeter (1986) suggests that "mineralization in the vicinity of Engineer Mountain and Bee Peak may be genetically related to a hydrothermal event associated with intrusive activity." Mihalynuk (personal communication, 1993) has obtained dates of 55 Ma and 62 Ma for the Sloko volcanics, which he feels are coeval with the Engineer Mountain plutons. An epithermal event associated with this activity could well have followed older structural weaknesses such as the "shear" zones and created offshoots. The distinct clastic nature of some of the electrum/roscoelite mineralization suggests that the epithermal event was at least a lengthy one, if not multi-episodic with earlier mineralization having been brecciated and redeposited by a later episode of the same event. Furthermore, a specimen of the epithermal material (in the University of British Columbia collection) exhibiting a slickensided surface with the gold smeared across it supports the idea of an extended or multi-episodic epithermal event. The feature is too small to suggest post-epithermal tectonic movement in the area, and no large-scale, post-mineralization faulting was observed by the author who visited the mine (MM).

MINERALS

Allemontite mixture of stibarsen + arsenic or antimony

The occurrence of "allemontite" at the Engineer mine was the first in Canada (Walker, 1921). Because allemontite is a discredited species, further description of the material is given under **arsenic** and **stibarsen.**

Ankerite $Ca(Fe,Mg,Mn)(CO_3)$

Ankerite occurs as fine-grained masses up to several centimeters in calcite veinlets in the cockscomb quartz/calcite veins.

Antimony *Sb*

The occurrence of native antimony at the Engineer mine is first mentioned by Thomson (1937) and Walker (1921). It occurs as lumpy nodules up to 5 cm wide in cockscomb quartz. These specimens are quite different from the banded, colloform "allemontite" in that they appear homogeneous. A polished cut through a specimen in the University of British Columbia collection does not show banding like that in similarly cut "allemontite." Native antimony has also been found as rhombohedral crystals to 2 mm in calcite veinlets on level 5 of the "E" vein.

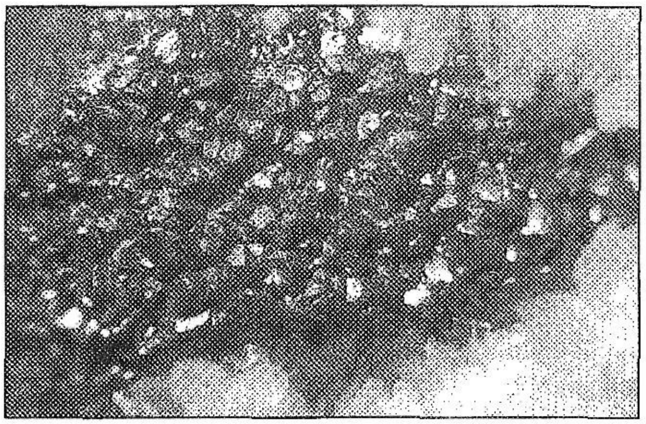


Figure 6. **Arsenic crystal group, 7 mm. Mark Mauthner collection and photo.**

Arsenic As

Native arsenic occurs as bright silvery bands interlayered with stibarsen ("allemontite"). After being collected and exposed to air, these bands soon alter to a sooty black color. Reniform masses up to 30 cm wide are the largest known. The surface of these aggregates can vary from being smooth to pimply to drusy with crystals up to 1 mm visible. [See also **stibarsen.**]

Figure 7. **Arsenopyrite crystal, 0.8 mm, with löllingite. Mark Mauthner collection and photo.**

Arsenopyrite FeAsS

Arsenopyrite occurs as euhedral prisms associated with the roscoelite/electrum nodules and as freestanding crystals in quartz

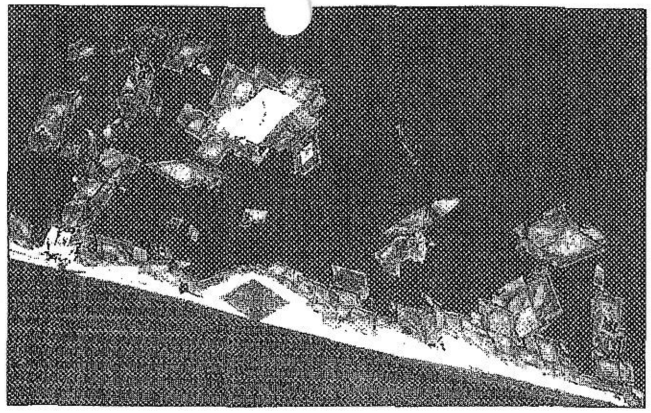


Figure 8. **Arsenopyrite crystals (gray) with löllingite (white) in polished section back-scatter electron image 250 μm across, by M. Raudsepp. U.B.C. collection.**

vugs of the calcite/quartz veins. Crystals up to 5 mm are known. Some interesting arsenopyrite crystals with a coating of löllingite and more tiny, irridescent arsenopyrite crystals sprinkled over the löllingite also occur in the quartz vugs. The arsenopyrite samples analyzed contain 0.55 to 4.49 % antimony. Values for iron remain fairly constant, whereas the sulfur and, to a lesser degree, the arsenic values fluctuate correspondingly with the antimony values. This suggests that the antimony is substituting for sulfur and possibly arsenic in the structure.

Table 1. **Five analyses of various zones within an arsenopyrite crystal. Analysis #6 was made on the lighter grey core of the arsenopyrite crystal seen on the far right, center of BSE photo 3. See also BSE photo 2.**

	1	*2*	*3*	*5*	*6*
Weight %					
Concentration					
Fe	35.08	35.74	35.66	35.71	32.98
S	19.53	21.20	20.82	20.95	16.60
As	43.52	41.70	43.09	40.79	41.23
Sb	2.51	2.12	1.26	3.38	9.49
TOTAL	100.64	100.76	100.83	100.83	100.30
Normalized Atomic					
Concentration					
Fe	34.16	34.13	34.09	34.29	34.01
S	33.13	35.26	34.66	35.03	29.81
As	31.59	29.68	30.70	29.19	31.69
Sb	1.12	0.93	0.55	1.49	4.49
TOTAL	100.00	100.00	100.00	100.00	100.00

Berthierite $FeSb_2S$

Berthierite was identified by X-ray analysis in a sample collected by the British Columbia Geological Survey. It occurs as fine needles up to 1 cm long in a quartz-lined vug (Schroeter, 1986).

Bismuth Bi

Bismuth was first mentioned from the Engineer mine by Cairnes (1911), but no analyses or documentation of specimens were given. No bismuth was detected in any samples analyzed by the current authors.

Calaverite $AuTe_2$

[See under **Tellurides.**]

Calcite $CaCO_3$

Calcite is a gangue mineral in the epithermal, vuggy quartz veins. Aesthetic rhombs and blades up to several centimeters in size and coated with iron oxides are found in the vugs of many of the same veins. Clear, colorless prisms with rhombic terminations also occur throughout the mine.

Chalcopyrite $CuFeS_2$

Chalcopyrite was reported to occur in a quartz vug in the quartz/calcite veins (*B.C. Mines Annual Report*, 1927). This is the only mention of any copper-bearing mineral occurring in this mine.

Fluorite CaF_2

Fluorite occurs as pale green masses and small, clear, colorless cubes in the epithermal veins. The cubes (up to 1 mm on an edge) are associated with arsenopyrite and calcite crystals in quartz-lined vugs.

Gold Au

[See under **Silver**.]

Table 2. **Five analyses of different points within a löllingite overgrowth on an arsenopyrite crystal. See BSE photos 2 and 3.**

Analysis	*8*	*9*	*10*	*12*	*13*
Weight % Concentration					
Fe	28.50	28.16	29.36	28.84	28.72
S	1.17	0.84	4.49	2.16	1.96
As	67.72	67.92	62.31	66.27	66.76
Sb	2.56	2.42	3.67	2.53	2.26
TOTAL	99.95	99.34	99.83	99.80	99.70
Normalized Atomic Concentration					
Fe	34.66	34.61	34.42	34.68	34.63
S	2.47	1.79	9.17	4.53	4.12
As	61.42	62.24	54.45	59.40	60.00
Sb	1.43	1.36	1.97	1.39	1.25
TOTAL	99.98	100.00	100.01	100.00	100.00

Löllingite $FeAs_2$

Löllingite was identified as a coating and as tiny crystals on arsenopyrite crystals in quartz vugs. These coated arsenopyrite crystals have a bizarre, spiky appearance and could be considered as löllingite encrustation pseudomorphs after arsenopyrite with some smaller arsenopyrite and pyrite crystals sprinkled on the löllingite. Electron microprobe analyses showed the presence of 1.26 to 1.97 % antimony.

Pyrite FeS_2

Pyrite occurs as cubes and pyritohedrons up to 2 mm in small quantities near and along the vein/country rock contacts. These are probably the result of country rock alteration and scavenging as the hydrothermal fluids were intruding. Pyrite was also found as extremely small (5–10 microns) crystals on löllingite/arsenopyrite crystals. Sulfide mineralization is very poor throughout the mine.

Pyrrhotite $Fe_{1-x}S$ ($x = 0$–0.17)

Massive pyrrhotite occurs intimately associated with the arborescent electrum and roscoelite, and as small blebs and streaks in clasts of the sedimentary host rocks within the quartz/calcite veins. As with other sulfides, pyrrhotite is a very minor constituent in the veins.

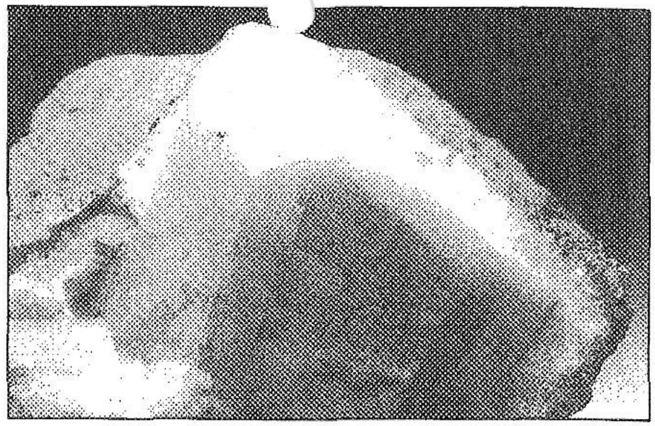


Figure 9. **Quartz pseudomorph after a calcite crystal, 6 cm. Mark Mauthner collection and photo.**

Quartz SiO_2

Quartz is the main gangue mineral in the Engineer vein system. Most is of a drusy, "cockscomb" habit and while not really notable on its own, often provides a beautiful matrix for other, more "collectible" species. Of interest to the collector, though, are the drusy quartz pseudomorphs after calcite and the pseudomorphous specimens in which the calcite has been replaced by quartz producing "quartz pseudomorphs after pseudomorphs after calcite."

Roscoelite $K(V,Al,Mg)_2(AlSi_3)O_{10}(OH)_2$

Dark green to black roscoelite occurs as a radiating, micaceous coating (up to several millimeters thick) surrounding electrum in the epithermal veins. This association is sometimes enclosed in calcite which can be etched away to reveal the arborescent nature of the electrum and roscoelite. All green micaceous minerals analyzed by the authors have been identified as roscoelite. No chromium was found in any sample. References to "mariposite" in previous literature are probably references to the roscoelite due to their similar appearance and because mariposite is perhaps more commonly associated with gold veins.

Siderite $FeCO_3$

Siderite was identified as dark brown, earthy or sparry masses and as paler brown, crusty crystal aggregates up to several centimeters in diameter. It is associated with clear, colorless calcite in quartz vugs.

Silver (Auriferous) (Ag,Au)

Highly auriferous silver (40–42% Au) occurs as dendritic crystals, plates and wires in the quartz/calcite veins. Auriferous silver from the "E," Double Decker and adjacent veins is most often enclosed in roscoelite. This association is found as distinct clasts and as irregular nodules, both up to several tens of centimeters in size. Auriferous silver occurs alone in cockscomb quartz, particularly in the Shaft and Governor veins. A number of superbly crystallized specimens, ranging in size from micromounts to miniatures (5 cm), were collected from the Governor vein during the 1994 season. Habits of these crystals vary from centimeter-sized single sheets (flattened octahedra) to millimeter-scale, highly modified cuboctahedra. The sheet-like crystals commonly have raised, triangular growth hillocks on them. Quartz crystals often "pierce" the sheet-like crystals, which then have overgrowths of more equant crystals collaring the quartz. This is the first noted occurrence of well-crystallized auriferous silver ("electrum") in Canada. (Note: the "E" vein is also referred to as the "Engineer" or "No. 8" vein.)

Figure 10. Bright electrum in dark roscoelite, 8 cm across. U.B.C. specimen #6724; Mark Mauthner photo.

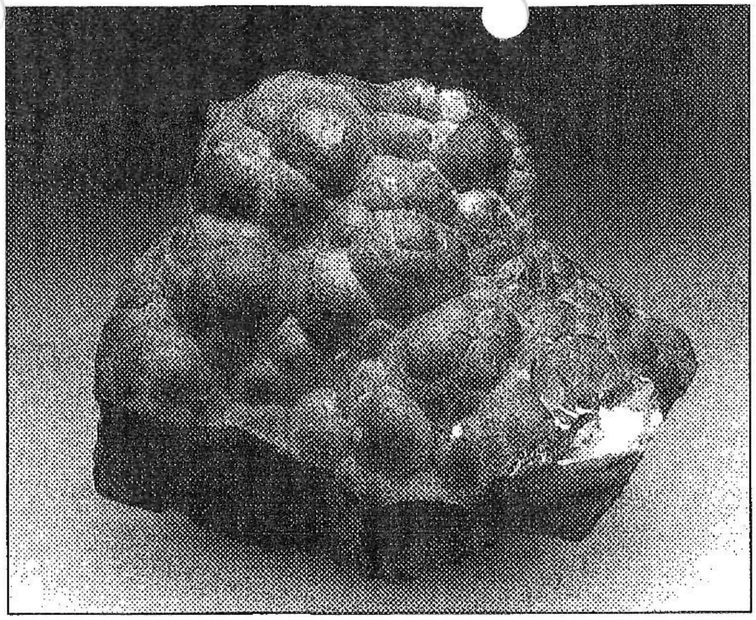


Figure 11. Botryoidal, layered stibarsen with minutely intergrown arsenic, 5.8 cm across. Canadian Museum of Nature specimen #35193; Jeffrey Scovil photo.

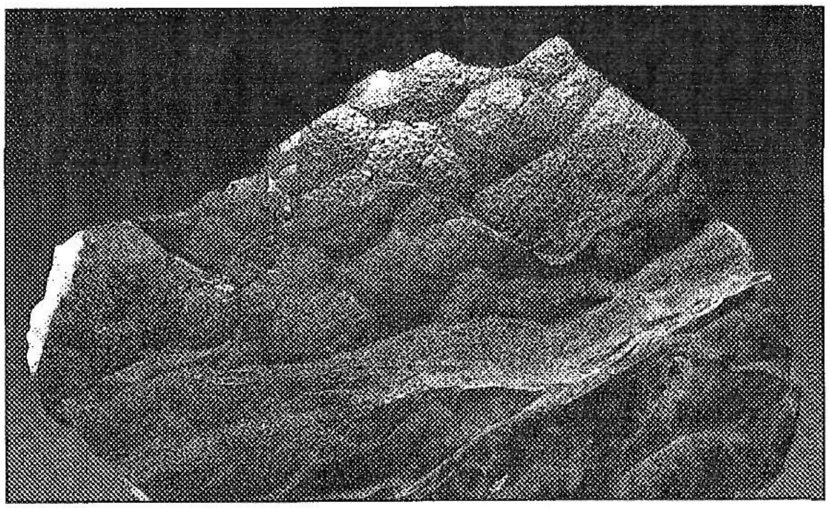


Figure 12. Botryoidal, layered stibarsen with minutely intergrown arsenic, 8 cm across. U.B.C. specimen #44; photo by Mark Mauthner.

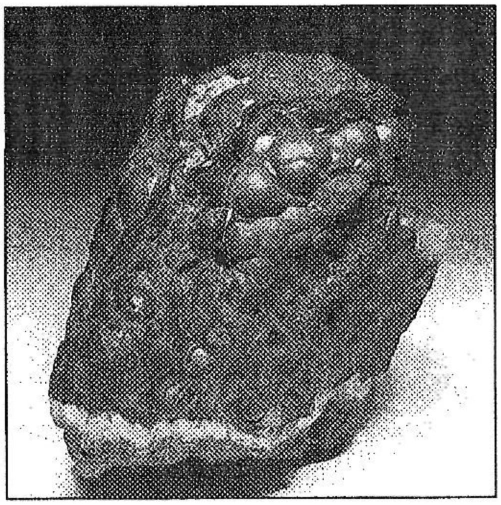


Figure 13. Botryoidal stibarsen with minutely intergrown arsenic, 13 cm across. U.B.C. specimen #2252; Mark Mauthner photo.

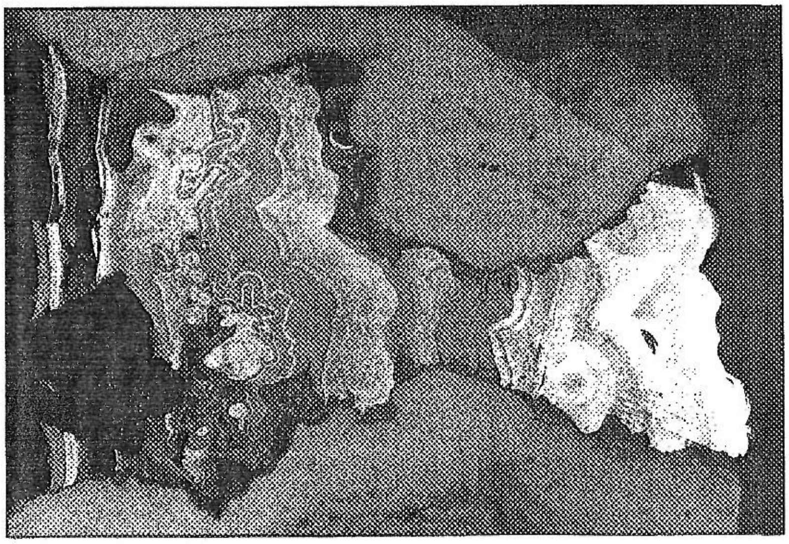


Figure 14. Cut and polished specimen of banded stibarsen/arsenic ("allemontite"), 5.5 cm across. U.B.C. specimen #43; Mark Mauthner photo.

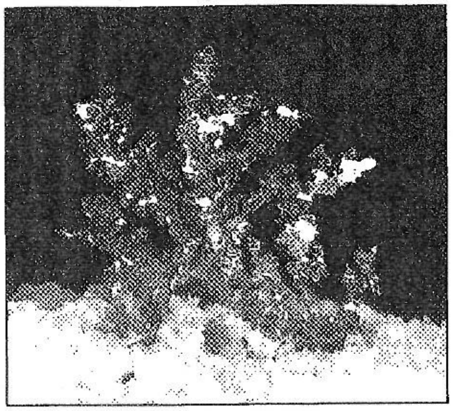
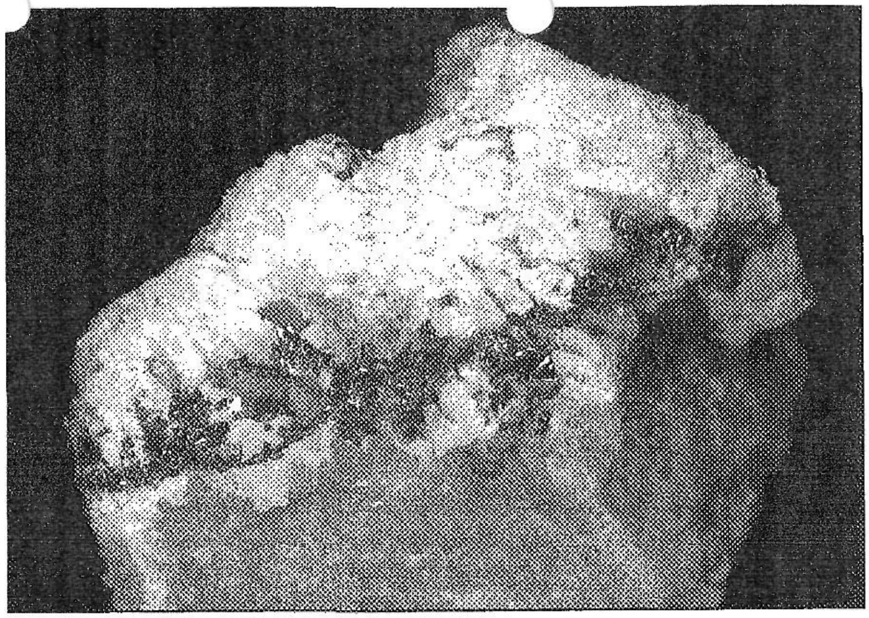


Figure 15. Arborescent auriferous silver crystal group, 1 cm. U.B.C. collection; Mark Mauthner photo.

Figure 16. (right) Arborescent auriferous silver crystals in quartz, 3.5 cm. U.B.C. collection; Mark Mauthner photo.



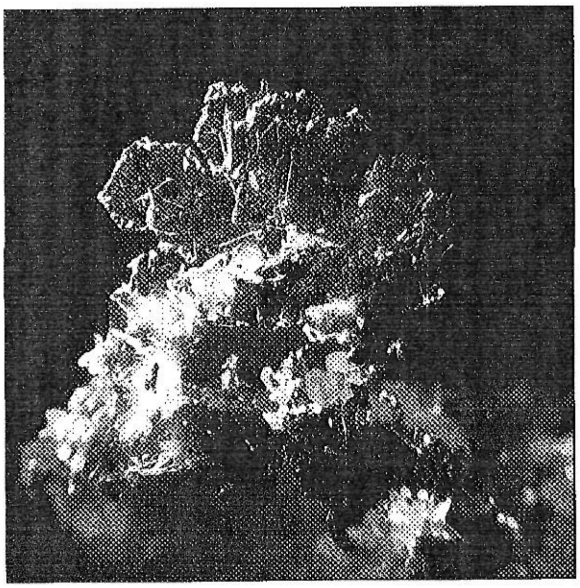


Figure 17. Auriferous leaf silver, 7 mm. Mark Mauthner collection and photo.

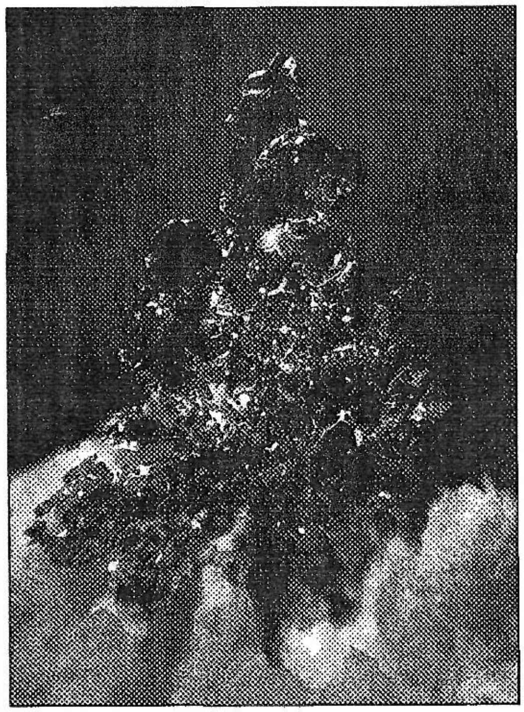


Figure 18. Auriferous silver, 7 mm. Mark Mauthner collection and photo.

Figure 19. Auriferous silver crystal leaf, 3 mm. Mark Mauthner collection and photo.

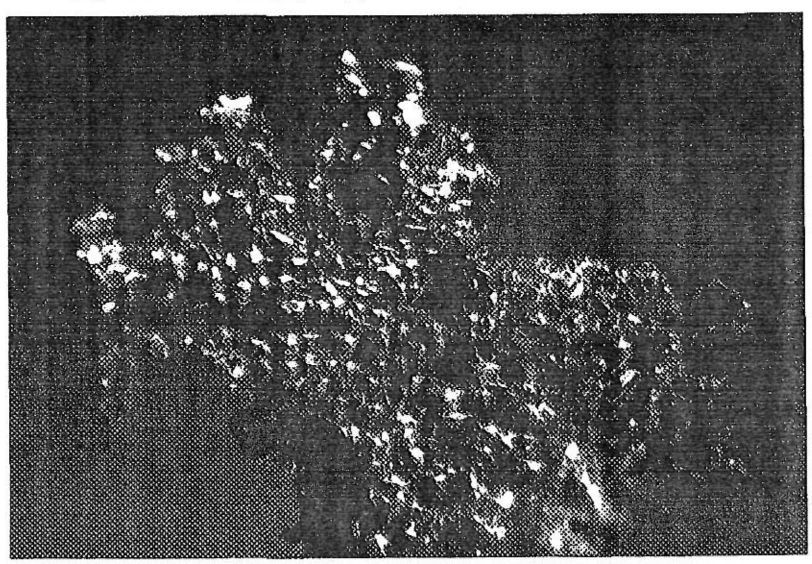


Table 3. **Analyses of two silver samples. Copper and mercury were analyzed for but were not detected.**

	ENG2-M12	ENG3-M10
Weight % Concentration		
Au	57.04	54.27
Ag	42.02	43.96
Sb	0.92	1.13
TOTAL	99.98	99.36
Normalized Atomic Concentration		
Au	42.17	39.80
Ag	56.73	58.87
Sb	1.10	1.33
TOTAL	100.00	100.00

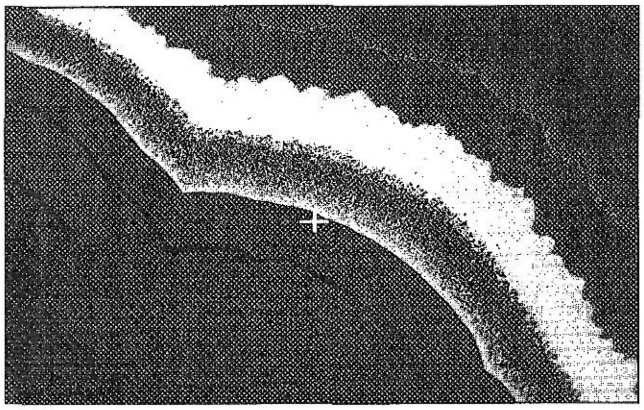


Figure 20. **Back-scatter electron image of "allemontite" consisting of an intimate intergrowth of 95% stibarsen and 5% arsenic in the light-colored bands and 50% stibarsen/50% arsenic in the gray bands. U.B.C. collection; Mark Mauthner photo.**

Stibarsen SbAs

Stibarsen occurs with arsenic as an intimate, layered mixture ("allemontite") which forms reniform masses up to 30 cm in breadth. Analyses of the layers have shown them *not* to be pure stibarsen interlayered with pure arsenic, as one might intuitively guess by looking at a polished sample. Most layers are some mixture of both minerals with the layer boundaries generally being defined by changes in grain size. Occasionally, a layer of relatively pure stibarsen or arsenic occurs, but this seems to be the exception. Most of this material was found in the upper levels of the mine and discarded during hand-cobbing of the ore. It is still being found on the fifth level (Bonanza Shoot) of the "E" vein.

Stibnite Sb_2S_3

Gwillim (1900) notes that the Engineer orebody "carries values in free gold, also some stibnite." However, no Engineer mine stibnite specimens are currently known, and it is suggested that the usage of "stibnite" may be synonymous with "antimony (stibnium)." Most of the work done at the time would have been in the allemontite-rich upper levels, and this source of antimony would have been the most obvious.

Tellurides

Telluride occurrences at the Engineer mine were first mentioned by Gwillim (1900). However, he states that none were found in the Geological Survey of Canada's samples. All other references to tellurides date back to this first document, which is at best second-hand, unsubstantiated information. Calaverite was first mentioned by Cairnes (1911), who referred to Gwillim's "gold telluride" as "telluride, apparently calaverite." The 1900 report of the Minister of Mines quotes from a prospectus from the Engineer Mining Company of Skagway that indicates the presence of tellurides. It is further explained in the report that the Provincial Assayer did not find any tellurium in any of the samples. These samples were selected by the Company as representative of those which had been giving unfavorable fire assay results, due the "great presence of tellurides" compared to cyanide tests performed after the ore had been roasted. It is our opinion that the roasting effect was probably due to the presence of arsenic which, like tellurium, volatilizes readily upon roasting.

CONCLUSIONS

The occurrence of several minerals for which there is no physical evidence in the form of analyses or specimens would suggest that they were originally misidentified. These minerals include native bismuth, stibnite and tellurides, reports of the occurrence of which have unfortunately persisted in the literature.

Two distinct periods of mineralization are seen in the Engineer mine orebodies. The first produced low-grade dilation veins and may well have been related to Cretaceous movement along the Llewellyn Fault. The second period was clearly an epithermal event, possibly related to Tertiary magmatic activity, during which mineralizing fluids followed pre-existing structural weaknesses. Clastic textures of some of the gold/roscoelite mineralization, and minor faulting within the epithermal veins makes it apparent that more than a single episode was involved in this event. Most of the minerals of interest, ore as well as specimens, were emplaced during this period.

COLLECTING

The Engineer mine is currently being worked for gold by Ampex Mining. The operators, Warren Arnholtz and Swede Martensson, are setting aside material for the specimen market. It may also be worthwhile, from a collector's point of view, to sift through the 100-level dump material for "allemontite." A few nice pieces were found by one of us (MM) within a few hours of combing the surface of the dump.

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