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A JOURNEY TO THE KENNECOTT COPPER MINE, ALASKA

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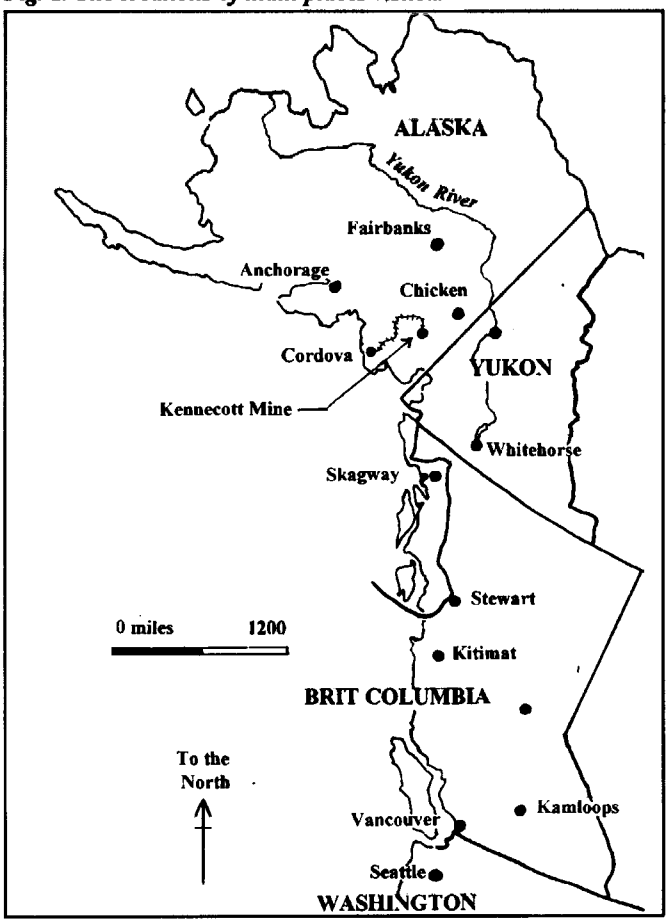
Abstract: A journey made in 1993 to see mining heritage sites in British Columbia, the Yukon and Alaska is described. Major sites included Barkerville, Skagway, Stewart, Willow Creek, Fairbanks, Dawson, and Keno as well as Kennecott, together with many smaller, some working, sites *en route*.

Introduction

The visit was made by my wife and I in the summer of 1993 as part of a journey to experience both the Yukon and Alaska and to see something of those areas' rich mining heritage. It took six weeks using a hire car for some 10,000 miles out from and back to Seattle. The journey took us through some of the World's most mountainous, remote and scenic landscape imaginable, which for present purposes, though the memory remains vivid, will be taken for granted.

The journey was largely done on asphalted roads of generally good or fair quality. Our route took us via the well-known Alaska (Alcan) Highway, but we returned south on the Mackenzie Highway, which is roughly parallel (and was built at an earlier date) but which has a graded dirt surface for some 800 miles. Passing by a great many trees, it is used largely by logging vehicles. The slightly more adventurous part of the journey can be said to have begun at Whitehorse in the Yukon, which is the northern limit for hired recreational vehicles. After there the roads become distinctly quieter with just s few other vehicles per hour and sometimes none, with the Alaska Highway surface distinctly variable but in course, perhaps regrettably, of improvement. Small settlements with fuel can be two hundred miles apart and costs of fuel and accommodation etc. rise considerably northwards. We carried full camping gear which permitted a much higher degree of independence and was essential at times.

Fig. 1. The locations of main places visited.



Kamloops and Barkerville

Having visited southern British Columbia previously, we made our way north quickly through the Rockies, but stopping at the amazing railway loops near Kamloops where the locomotives and brake car of the same train can be seen (from the Trans Canada Highway) travelling in opposing directions past each other. Our route north followed the Fraser River and, after stopping at several small museums – the focus of much local pride, we began to break new ground by arriving at Barkerville in the Caribou Mountains. These are south-east of Prince George and were the focus of a major gold rush beginning in 1858 and peaking in the 1860s. Barkerville takes its mining heritage extremely seriously as well as entertainingly, and not the least incredible feature is the amount of surviving photographic and other pictorial evidence (Howay *et al*, 1987; Ramsey 1987; Downs 1960) of its boom times. Our visit coincided with archaeological excavation of part of what was its Chinese quarter. Most memorable was a "conversation" between two (actor) lawyers in the courthouse where the famous Judge Begbe (Williams 1980) periodically sat, which brought those legally exciting times alive.

Kitimat and Stewart

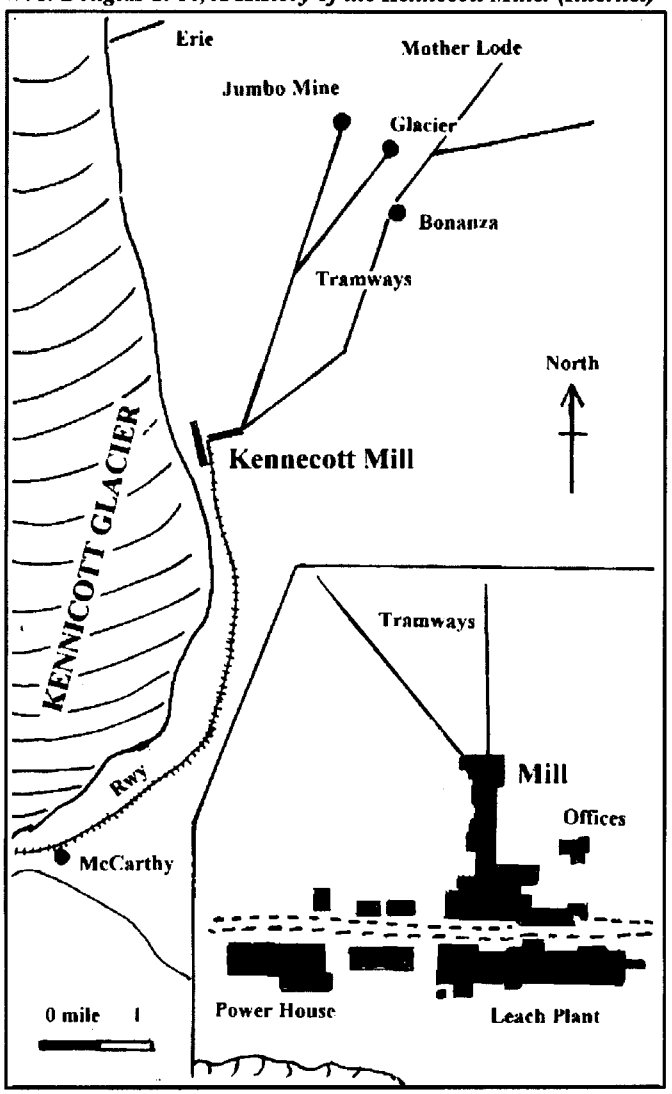
On northwards, we took diversions to the west coast to the Alcan aluminium smelter at Kitimat and its hydroelectric generators. Returning to our mining odyssey, we then went west again via the dramatic Glacier Highway to Stewart, which is on the Canadian /Alaskan boundary which divides along the inlet from the sea called the Portland Canal. This was the shipping point for copper from the Salmon Glacier area which we reached by crossing the border at Hyder, the change of territory being marked only by the change to a dirt-road and by the rotting stench of salmon dying after spawning. We followed the mine track some twenty miles up the glacier side – my wife's diary records "cold, scary, and awesome". We passed several small mines, with abandoned equipment rusting slowly, to the partially restored landscape of the most recent copper mine (by then back in Canada) beyond a major junction in the huge glacier. Here the glacier divides downflow, one flow into a former glacier valley and corrie away from the sea and with no outlet, the other down by our route back to Hyder. On melting in summer, the blind branch has icebergs floating on a trapped lake. Each year, this water

contrives to briefly float the glacier and the water pours out below down to Hyder as a vast flood or *Yökulhlaup*. The then "beached" icebergs left behind are mined by blasting and the broken ice exported to Japan for diluting Scotch whisky!

Skagway and Dyea

We continued northwards, diverting, before Whitehorse, but now just beyond British Columbia and inside the Yukon, over to Skagway (in the Alaskan Panhandle) and nearby Dyea, where most of the Klondikers landed a century ago, their stores tossed over the side of ships on to the beach with them (if they were lucky). Skagway could be described as the "Matlock Bath" of the north today, accessible for visitors by both land and two or three cruise ships daily in season. Richer visitors today, as a century ago, take the White Pass route to the lakes feeding the Yukon River, using the preserved steam railway, whilst the poorer, like us, bother to go around to Dyea, and, if feeling sturdy, journey up the trails to the infamous Chilcoot Pass. Thanks to the railway promoters, who sent out a photographer, there remains again an almost unbelievable record of the hardships of the time (Berton 1983 – a magnificent coffee-table book). Nowadays the trails are way-marked and any remains (such as a thrown-aside cast-iron stove) are carefully preserved. At Skagway, Soapy Smith and his cronies had their vicious rule, but because of the Mounties, his ways do not seem to have transferred themselves over the passes to the Canadian Yukon. Nowadays the fleecing of visitors is more legal, but probably just as effective. More can be read of the 1898 gold rush in Pierre Berton's *Klondike* (1972).

Fig. 2. Sketch map to show the Kennecott Mine vicinity. After W.C. Douglas 1964, A History of the Kennecott Mine. (Internet)



Fairbanks

At Whitehorse, still in the Yukon, it is left for Fairbanks, right for Dawson and the Klondike. After restocking with supplies, it was left, and on to Beaver Creek, the border with Alaska. There was 2500 miles on the clock of our (really Hertz's) new Mazda, and only a couple of days to the northernmost point of the journey, to Fairbanks. We had already seen and climbed over several abandoned gold dredges, but near Fairbanks the very large No. 8 Dredger (Plate 8) has been preserved complete and is open and well-interpreted to visitors. Nearby, the BP oil pipeline, raised on stilts above the perma-frosted ground, can be seen.

Anchorage and Willow Creek

Distances of 400 miles in Alaska are not great, so Anchorage is hardly more than half a day away in summer in the near Arctic latitudes. Here we visited the Museum with its displays on the great 1964 earthquake, despite which the city considers it still necessary to have skyscrapers. Some 60 miles away is the Independence Mine (Plates 10 and 11) in the Willow Creek Mining District, now a State Historical Park and perhaps the most beautiful environment for a mine we have ever seen. The large timber-framed gold-processing mill and other buildings are a preservation nightmare, and are now largely collapsed, but with small parts maintained and used for displays. The mill is at the centre of a bowl-shaped valley and its mines high up the hill sides were served by very long, single span, gravity-powered aerial trams. We scrambled up a steep half-mile to one of the mine entries, where the upper end of an intact static cable was anchored. Trams on either end of a transit cable were controlled by a small drum, about the size of a lorry brake, and ran – or swooped down - on the fixed cable. The adjacent adit was open but extremely dilapidated.

Nearby is a fiercely independent project, a much smaller but complete gold mill, the Gold Cord Mine, being re-furbished privately by Dan Andrew Renshaw of Santa Anna, California. A retired lawyer, he and his wife Ruth stay each summer at their house at the Gold Cord and aim to have the mill working again, with its own small mine. I helped by carrying a few buckets of concrete.

Kennecott

And then, on to the Kennecott Mine. This was a diversion of some 700 miles return from Anchorage on the basis of a site in all other details (in those pre-internet days) then unknown to us except that its name is now used for the American arm of the Rio Tinto Company. On the basis of our sample, it seems most of the 550,000 Alaskans knew even less of it! The mine is on the western edge of the Wrangell and St Elias National Park, which is a rigorously preserved wilderness, with its Yukon extension, getting on for the size of England.

Originally the mine was served by a railway of some 195 miles from Cordova, on the coast. The way to the mine is the former railway, less rails and sleepers, but still complete with most of the sleeper slots. A measure of relief for the three-hour motorised crawl from the highway comes with the extant trestle bridges (Plate 6), where the dirt road fortunately diverts

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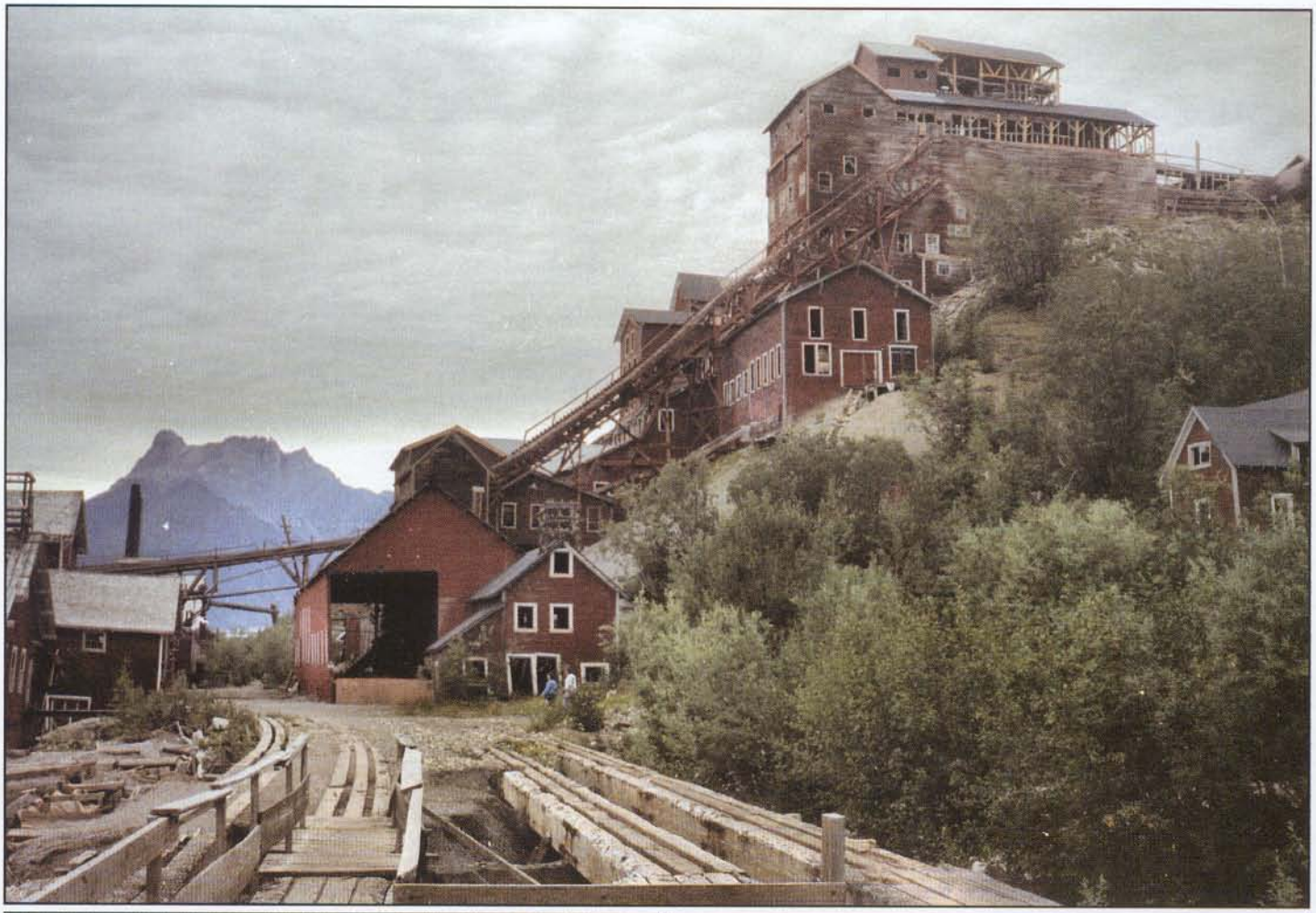
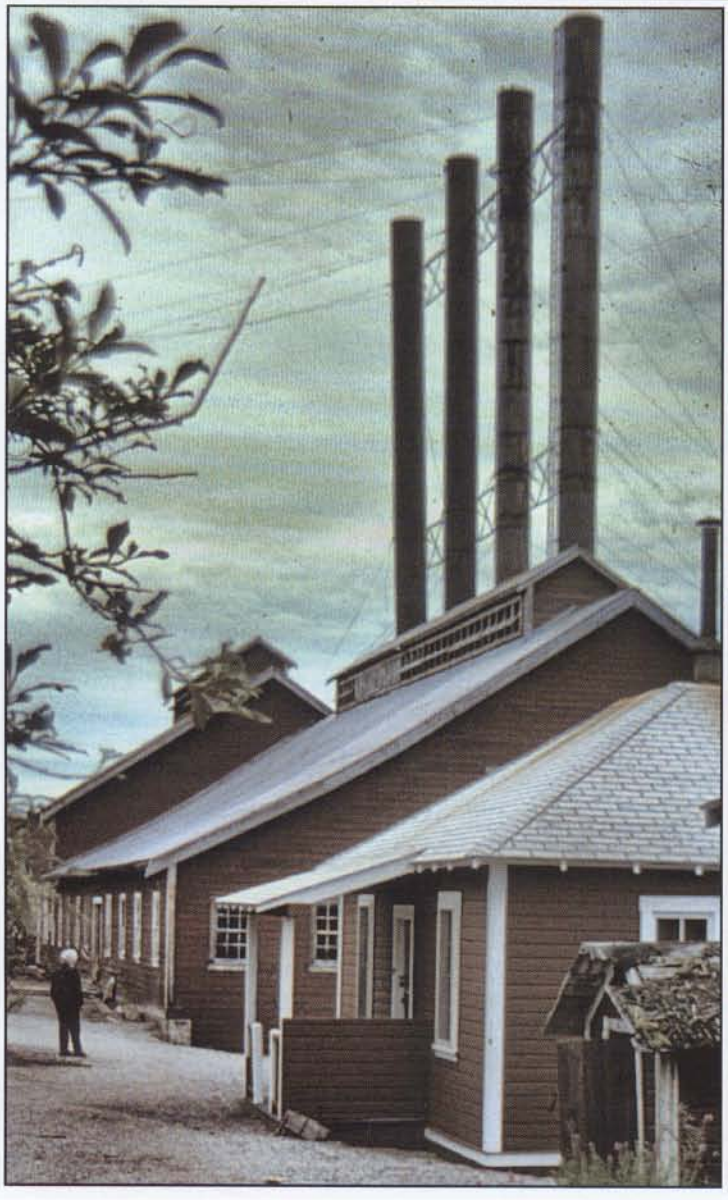
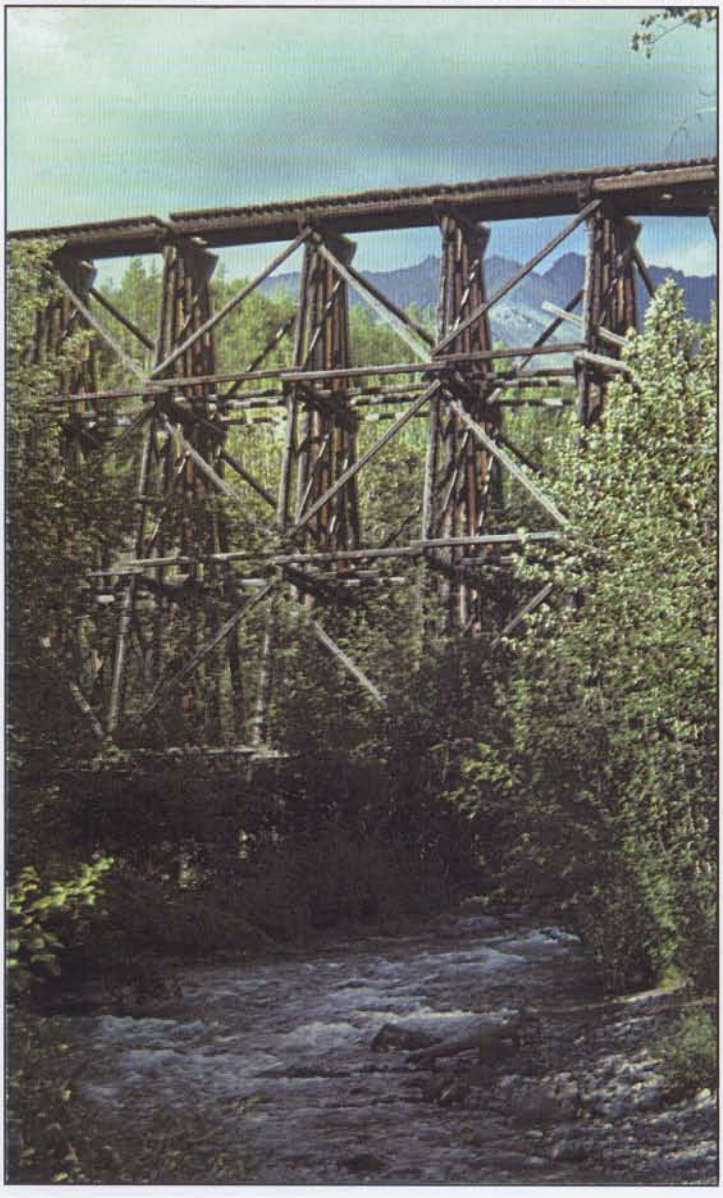
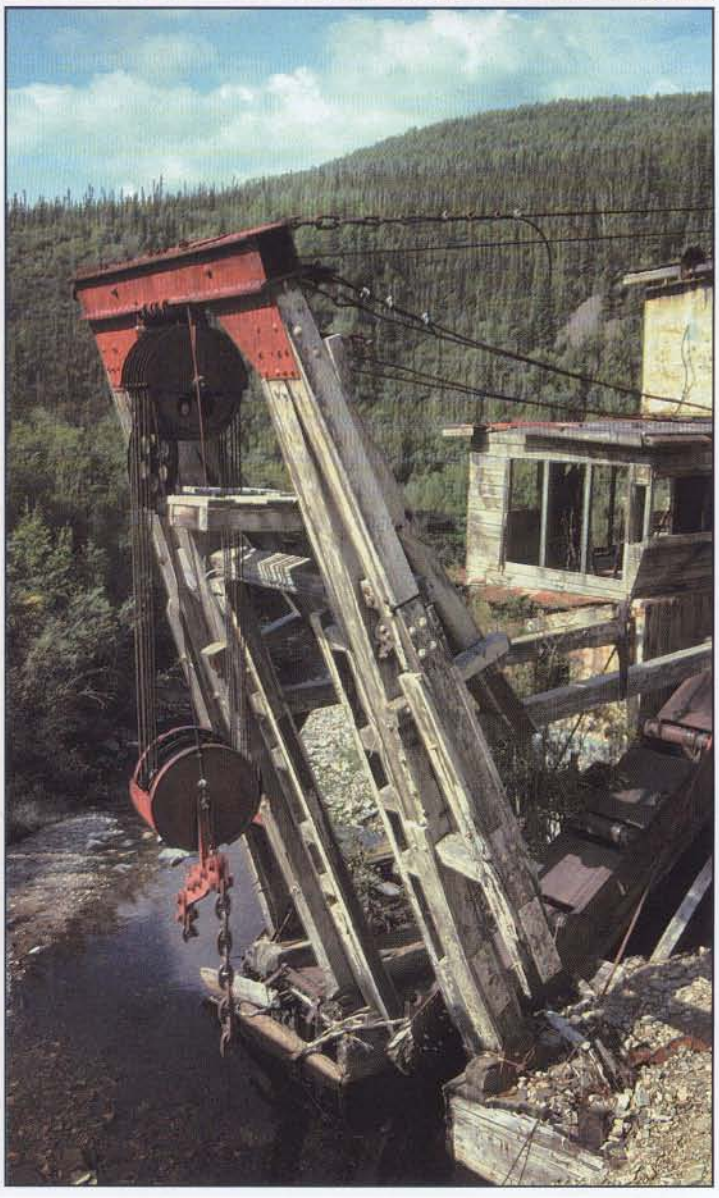
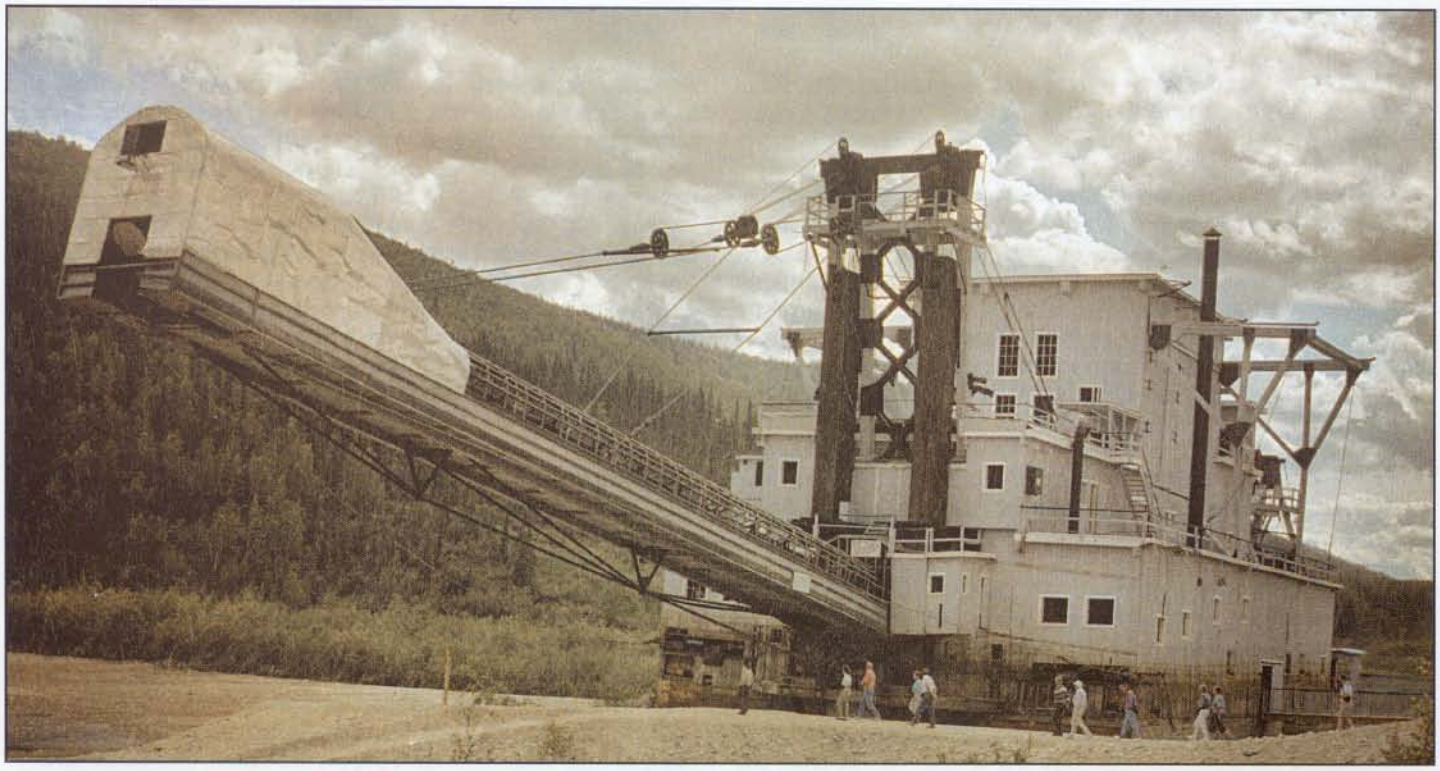
Plates opposite (page 53):
1 (top). The main building - fourteen storeys high - of the Kennecott Mill. Note the railway bridge in the foreground and its entry into the mill. The renewed timbers at the top of the mill are visible.
2 (bottom left). The Kennecott power house. The boilers had been removed.
3 (centre right). The receiving floor at the top of the mill for ore delivered by cableways from the mines.
4 (bottom right). Trestle bridge carrying pipes.

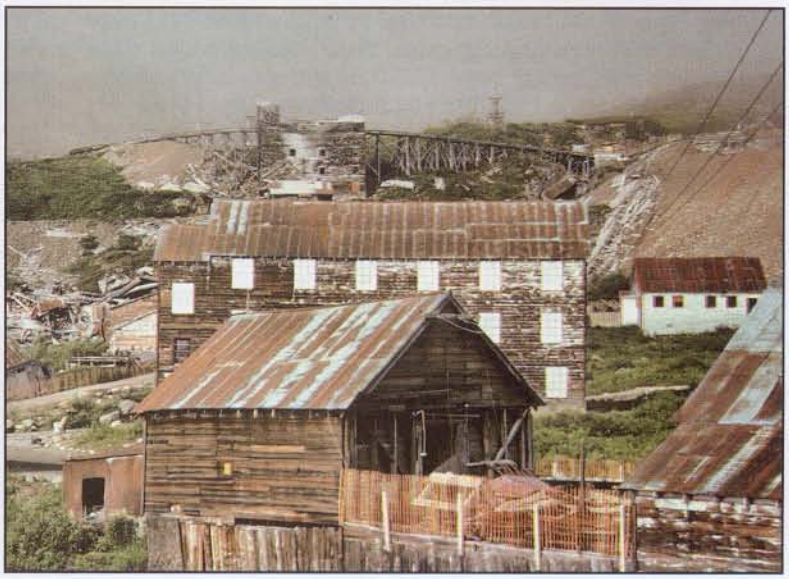












trucks – not there for the mine which no one else visited that day, but for exploring the Kennecott and the Root Glaciers, which pass by.

Although heavy four wheel-drive vehicles can cross the glacial river at times of low flow (early morning or in winter), for us to cross the turbulent waters emerging from the glacier snouts, we had been warned we would have to use two trams linking via an island to McCarthy from where we had to walk to the Kennecott Mine itself – this is the term for the self-actuated (hand-hauled) aerial ropeways, which were a dramatic, if slow way, to travel in these circumstances. The second tram was avoided by dint of a series of dubious planks from boulder to boulder, as the water level was low enough. This left a walk of some six miles to the main mine buildings and the associated ghost town which still has a few inhabitants and a small guest-house.

The Kennicott glacier derived its name from that of a mid-19th century explorer, and that was in turn used for the mine, but mis-spelt as Kennecott. The deposit was discovered in 1900, two years after the great rush to the Klondike, by "Tarantula Jack" Smith and Clarence Warner, who were part of a prospecting venture led by Rueben McClellan. Smith soon after described the Bonanza Mountain Discovery, viewed from the valley, as having "so much stuff sticking out of the ground, it looks like a green sheep pasture in Ireland when the sun is shining at its best" (Towe 1990), which gives a sure clue to his nationality as well as the mineralogy. Soon after, the titles were acquired by Stephen Birch, though not without substantial legal disputes based on the financing of McClellan's party, details which were said to be unknown to Smith and Warner when they contacted Birch. The Alaska Copper Company was founded in 1905 but, although Birch had significant backing already, it was too big a project to handle alone, and Birch induced Daniel Guggenheim (of ASARCO) and J.P. Morgan to become backers.

It was an enormous discovery – probably the largest *rich* copper discovery made in North America in the 20th century (as opposed to the huge low-grade deposits like Bingham Canyon). The only feasible access was by building the railway. This cost, along with the capital needed for the mine and to provide shipping services back to the (ASARCO) Tacoma smelter in Washington State, was some $25,000,000.

Bateman, an economic geologist who worked at the mine, described Kennecott (1942) as a low temperature hydro-thermal, replacement deposit, with complex mineralization but mainly of chalcocite of which masses of tens of thousands of tons occurred. These were deposited in gently dipping Triassic, dolomitic limestone overlying basalt. There were four mines, including Bonanza, Glacier, Jumbo and the Mother Lode and four types of ore which occurred in large shoots: (1) wide replacement veins striking normal to the bedding, widest at the base and pinching out some 500-1000 feet above; (2) tabular or flat replacements localised by fissures in certain beds; (3) glacier ore, found within lateral moraine ground out of the Bonanza Hill deposit, the country rock of which he described as ice; and (4) slide ore, found in talus slopes derived from outcropping ore. The Jumbo mass was described as 80 x 150 x 400 feet averaging 60% copper. The overall grade of ore mined was over 12%. Only a small proportion of ore outcropped at surface, but the depth was limited by the thickness of the limestone in which it occurred, thus limiting the overall size of the deposit. The first ore was shipped in 1911 and the mine closed, temporarily in 1934, finally in 1938. The Alaska Copper Company gave the railway to the State (only a short section was ever used, during the war, from the port) and abandoned the mine. In a large part, it is still there as they left it. It is now included in a World Heritage Site.

The Kennecott mill (Plate 1) is enormous, rising 14 storeys high, built of timber which was painted red with white sill and door frames. It is very close to the glacier and lateral moraines and spoil from a distance can usually only be distinguished by its comparative neatness! Around fifty original buildings are left: The largest, after the mill, includes an ammonia leaching plant and the powerhouse (Plate 2), three bunk-houses and the store, with an assortment of workshops, hospital, cottages and other facilities. Much of the mill machinery is present, but the power-house was stripped. Items such as drill steels are still in place in their racks and mine papers are said to still lie on their desks.

We did not visit the actual mines, which, reportedly, are nearly blocked with ice. The ore from them was brought overhead by aerial ropeways or trams, terminating at a large receiving area at the top-back, but below the apex of the mill roof (Plate 3). The apex, at the time of our visit had been under repair by the State Park, and I was able (on assuring the supervising architect of the (then) worldwide validity of the PDMHS insurance), to go with him high into the roof timbers, looking down some 40 feet or so to the ropeway terminal. Much of the machinery on the floors below was intact and I was also able to enter the separate ammonia leaching plant with it huge 100,000 gallon tanks. It is the most complete and probably the largest surviving of any such early 20th century mill I have seen (of scores) in North America.

Kennecott Mine was very profitable, at least until around 1930. By exchanging its high dividend shares and by direct purchase (Lynch 2002), Kennecott was enabled to acquire some 76% of the shares in Utah Copper, the Bingham Canyon Mine holding corporation which had a far longer projected life – it is still in operation - than the shallow Alaskan company-cuckoo. The Kennecott Copper Corporation was eventually taken over by the British company RTZ, now again known as the Rio Tinto Company, one of the two or three largest mining corporations in the world.

Chicken and the Taylor Highway

The remainder of the journey was far from a disappointment even after this colossus. We used the Taylor Highway then, in Yukon again, the Top of the World Highway to cross over to Dawson. My wife had a midnight adventure: It was half-light with me fast-asleep in the tent with her in the car making-up her diary, when a big bear came wandering around the tent. Regrettably she did not heed the earlier advice from the park ranger, to punch it on the nose, but it still ambled off.

The Taylor Highway passes through a (the only) small settlement of a few cabins called Chicken. *En route* in the district were several small-scale gold-washing operations – two or three men, an excavator, grizzly, pressure-jet disintegrator or wash trommel, sluice and giro-washer were fairly typical (see front cover). There was also an abandoned dredger (Plate 7) and, at Chicken itself, monitors (Plate 5) which were used to wash out Pleistocene superficial deposits which the previous

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Plates on preceding pages 54 and 55:
5 (far top). Monitor which recently worked alluvium for gold and ivory at Chicken.
6 (far left. Wooden trestle bridge on the railway to Kennecott.
7 (far right bottom). Abandoned dredge at Chicken, last used in 1967.
8 (near top). No 8 dredge with its huge tail boom, maintained for visitors at Fairbanks.
9 (near centre). Abandoned dredge in overgrown state.
10 (near bottom left. Detail of collapsed building at Independence Mine, Willow Creek.
11 (near bottom right). Main buildings at Independence Mine, now a State Park.

year had included ivory worth some $35,000, and no doubt some gold too (you can be shown the gold – but how much is a stolidly guarded secret).

Dawson and Bonanza Creek

The view from the Top of the World Highway overlooking Dawson is dramatic: the (small) town lies the other side of the wide, muddy, fast-flowing Yukon river, with the Klondike River coming in, clear-blue, on the far right. The Yukon is crossed, crabwise, by a small vehicle ferry. The town is largely a modern pastiche, a few tourists, a few expensive and tiny-roomed motels and restaurants and bars but a very good small museum and library with a fine collection of photographs and books. The bonanza age seems totally over.

We went up Bonanza Creek (formerly Rabbit Creek) where the initial discoveries by Cormack took place, which has, almost entirely, been dredged, leaving the characteristic ponds with rows of gravel humps resulting from dumping from the tail boom of the dredge. Dredge No.4 was lying, disused, up the road and we were able to board.

A small opening at the side of a steep cliff had a ledge of rock which the dredge had failed to remove. This was being worked by a small family operation – up for the summer – who blasted or dragged out perma-frosted stuff, waited for a day or two for it to thaw, then passed it through the grizzly, disintegrator and over a table. Very small old workings had been exposed, partly still supported by timbers. We shared coffee.

It was time to return south. The Klondike Highway follows the Yukon River, but for us it was upstream rather than the way the Klondikers sailed in the self-made boats or rafts in 1898. The Five Finger Rapids were a terrifying sight, even from the road, and even without the ice floes which accompanied the miners.

The Silver Trail and Keno

Along the route we found signs for a site two hundred miles away and over 60 miles from the main highway. This was for Keno, another abandoned mining town with hopes of attracting visitors under the soubriquet of the "Silver Trail". Not far away was Elsa where mining stopped recently. A whole village had been kept in good order, and one of the two remaining residents expected it to open again "soon", but bringing in miners for two or three weeks then off for a similar time, like on the oil rigs, rather than incur the heavy social infrastructure of the traditional mining town.

Conclusions

The journey was an unforgettable experience - mining heritage, in contrast to, and in absence of the so many competing attractions usual in Europe, is taken seriously and there is much to see. Because there is relatively little to spend money on apart from a few entry fees to heritage sites, a few books and film, the costs were not heavy. The vehicle-hire cost amounted to about 10p a mile inclusive of everything and accommodation costs with camping and self-catering for perhaps half the time were reasonable overall. The time taken of six weeks was probably the minimum when setting out from Vancouver, or our cheaper option, Seattle. A shorter visit but possibly at greater cost would be feasible by flying to Anchorage, but this would miss a great deal out, as do the well-known cruises. Finally, to answer the most common enquiry, we had relatively few problems with insects, but were well-prepared.

Acknowledgements

To my wife, Sheelagh and her travel diary, and for the Plate 1 photograph, to Tony Waltham for an update, and to all those people who spared their time for a passing tourist. Publication of the photographs in colour has been assisted by a small grant.

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Postscript: An internet search of the Alaskan sites is particularly rewarding. The bad news is that progress once again destroys adventure: the McCarthy tram has been replaced by a steel footbridge and the railway track has been graded.

See http//www.alaskagold.com/copper/mcarthy/mcarthy.html:

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