Information Sharing During the Klondike Gold Rush

DOUGLAS W. ALLEN

When George Carmack struck gold in the Yukon territory on 17 August 1896, he freely shared the details and started what would eventually be three waves of rushes. This reflected a social norm of the Klondike, namely that any miner who struck gold would share this information. Miners did not behave this way in other nineteenth-century gold rushes. The article's hypothesis is that the extreme mining conditions and local geography of the Yukon led to very secure property rights over mining claims. Therefore, it took only a small incentive payment to induce miners to act in the social interest.

Starting with the California Gold Rush of 1849 a series of gold rushes occurred along the western side of North America as miners searched for the elusive yellow mineral.[1] Eventually these efforts culminated in the last, and perhaps greatest, gold rush: the Klondike rush of 1898–1899.[2] Located close to the Alaska border, but within the Yukon territory of Canada, the Klondike River is a tributary of the Yukon River. Although called the "Klondike Gold Rush," gold was actually found in the smaller creeks that run into the Klondike and Indian Rivers.[3] As Figure 1 shows, the entire area was relatively small, and most of the gold was extracted from a half-dozen creeks—Bonanza,

The Journal of Economic History, Vol. 67, No. 4 (December 2007). © The Economic History Association. All rights reserved. ISSN 0022-0507.

Douglas W. Allen is Burnaby Mountain Professor, Department of Economics, Simon Fraser University. Burnaby, BC V5A 1S6, Canada. E-mail: allen@sfu.ca.

My thanks to Jeremy Atack, Yoram Barzel, Karen Clay, Rui Esteves, William Hallagan, David Jacks, Dean Lueck, Clyde Reed, Gavin Wright, Richard Zerbe, and three referees for their warm comments.

[1] Aside from California, in the nineteenth century there were also major gold rushes in Australia (1851), British Columbia (1858, 1862), and South Africa (1890).

[2] Though writing in 1936, the economic historian Harold Innis boldly noted: "It is doubtful if, in rapidity, size, and intensity, the Klondike gold rush has ever been equaled in the whole range of economic expansion" (*Settlement*, p. 183). A contemporary, Charles Stansbury (*Klondike*, p. 30) remarked that, "The world has never seen such placer mines as those of the Klondike. California in its very best days was nothing like it. Placer miners will work claims with great energy that pay 10 cents a pan, but claims on the Klondike all last summer averaged a dollar a pan."

[3] The richest creek, Eldorado, was only three to six feet wide at its mouth (McConnell, *Report*, p. 40). The extreme concentration, but limited area, of gold resulted from a particular geological circumstance. The highest peak in the region (called "The Dome," see Figure 1) was a great massive rock that alone contained gold. As this central location wore down over time, gold moved down its sides along the creeks. See Tyrrell, "Concentration of Gold," for a technical report and explanation.

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

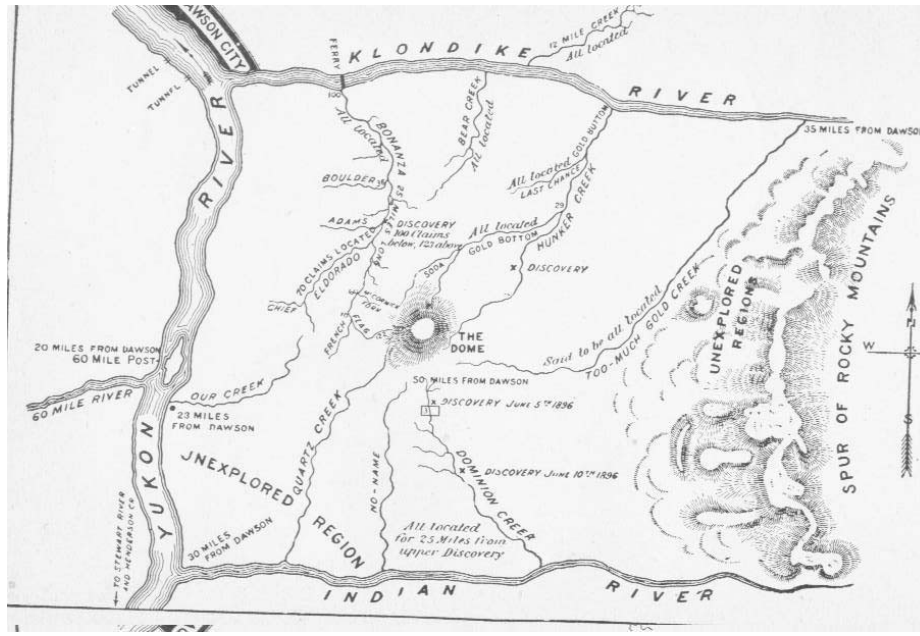


FIGURE 1
GOLD BEARING CREEKS

Source: Chicago Daily Record, *Klondike*.

Eldorado, Hunker, and Dominion being the most famous.[4] In total about 12 million ounces have been mined from the area since discovery, with around 6 million ounces coming from Eldorado and Bonanza creeks.[5]

Men had been prospecting in the Yukon river valley since the mid-1870s with enough success to pay for their mining supplies and minimal expenses within their small mining camps. When George Carmack staked his discovery claim on Rabbit (later Bonanza) creek on 17 August 1896, he followed the local custom of telling his fellow miners of the find and started what would eventually be three waves of gold rushes. The first was within a month of the strike when 200 claims were made by local miners in the area. The second rush occurred in the early part of 1897 when about 3,000 people arrived from

[4] Depending how one measures, the Klondike gold region is between 750 and 1,500 square miles. There were approximately 200–300 miles of creeks mined (Innis, *Settlement*, p. 198). The geological survey of Canada estimated the area to be 800 square miles (McConnell, *Report*, p. 6). Tyrrell ("Concentration of Gold," p. 344) also claims the area to be 800 square miles.

[5] Although the rush ended in 1899, gold mining continues in the region today. Innis estimates gold output peaked in 1903, at almost four times the volume produced in 1898 (Innis, *Settlement*, p. 219). Tyrrell ("Concentration of Gold," p. 348) claimed that by 1907 six million ounces of fine gold had been removed.

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

various parts of Alaska and British Columbia.[6] These first two rushes claimed almost the entire paying creeks. Ironically, when the final massive rush of 30,000 people arrived in 1898, there was little opportunity for any fortune to be made. Disappointed, many left immediately. Others hung on, either establishing claims on untested creeks, purchasing existing claims, or working for claim owners. The Klondike rush ended almost as suddenly when gold was discovered in Nome Alaska on 27 July 1899, and 8,000 people left Dawson city in one week in August.[7] In total it is estimated 100,000 people set out for the Klondike, 30,000 reached Dawson, half of whom looked for gold, but only 4,000 found any. A few hundred got rich.[8]

The Klondike rush took place in relatively modern times, and was documented in the press by adventurous journalists and photographers. At the time it was fairly easy for would-be gold kings to travel from various locations around the world to the launching pads of Seattle, Vancouver, and Victoria, thus contributing to the almost instantaneous rush of 30,000 individuals. However, the remoteness of the Klondike region meant that once the miners arrived on the Alaskan shores, the last few hundred miles had to made by foot—carrying all of their supplies on their backs.[9] As a result, for the first three years the mining technology resembled that of California a half-century before. However, within two years rail lines were laid, heavy equipment brought in, and modern mines established. Thus, the Klondike rush provides a short modern window on older placer mining practices where the weather and geological factors of the area had a strong impact.

The focus of this article is on information sharing. Starting with the very first miners who had reached the area, a social norm developed that any miner who struck gold would share this information with the other miners in the area. A miner did not have to go out of his way or incur costs to share the information, but he was expected to freely reveal his information to any miner who crossed his path. This practice not only held for the first strike on Bonanza Creek, it was maintained throughout the entire gold rush. This begs the question: why would miners behave this way? When a miner shares information about a gold find, he puts his valuable claim in jeopardy without receiving any benefit in return. There would appear to be a dominant strategy to stay quiet

[6] Berton, *Klondike*, p. 92.
[7] Ibid., p. 393.
[8] Ibid., p. 396.
[9] This is a slight exaggeration. Some pack animals were used, and part of the Chilkoot/White Pass route was along the Yukon River. However, the White Pass trail was also called "The Dead Horse Trail" for good reason. In the end, sleds, pack animals, and other forms of assistance were not used by the majority of men on the rush, and many sections were only passable by foot.

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

about a find. Indeed, successful miners in California or British Columbia did not share information on finds.[10] On the other hand, the community's interest is served by information sharing because it prevents socially wasted mining effort on unproductive locations. Something about the Klondike made it unique in solving this social problem.

The article's general hypothesis is that the extreme winter mining conditions and local geography of the Klondike exogenously led to very secure property rights over mining claims. Miners who shared accurate information regarding gold finds did so knowing that their claim would not be infringed upon by a future rush of miners. In more southern mines a miner might stake a claim and later find that its size would be reduced (either by vote at a miner's meeting or by threat of violence) to allow other miners in. This did not happen in the Klondike. Normally secure property rights are thought to arise over formal rules of law and independent court systems; however, in the far north and other mining areas of the Rocky Mountains these institutions were limited. In the Klondike the specific location, local geography, and extreme climate came together to secure rights and strongly complement the fledgling government institutions that were there at the time. As a result, it took only a small incentive payment from the state to induce miners to act in the social interest.

SHARING INFORMATION

One of the more interesting aspects of early Klondike gold mining was the social norm among miners to share information regarding strikes.[11] For example, when gold was discovered in August of 1896 it

[10] This would be less of a puzzle if the type of mining differed significantly in California or British Columbia. However, all three gold rushes were based on placer mining of alluvial deposits. There are several placer methods to extract gold, ranging from simple panning to the use of sluice boxes or rockers. These latter techniques use barriers along the bottom of a long box to trap the heavy gold particles as water washes over the mined material along the box. In all three cases miners would explore creeks, panning for any indication of large deposits. As Klondike miners searched for gold in the summer months, the searching techniques were identical to those used in British Columbia or California. It was common for miners to make a claim and later abandon it for other ones. Once abandoned, mines could be reclaimed by other miners.

[11] Berton, on several occasions points out this sharing norm. Speaking of miners in general he says "Men shared their good fortune with their comrades, and it was part of the code that he who struck a new creek spread the news to one and all (*Klondike*, p. 21); or speaking of the fraternal organization the Yukon Order of Pioneers, he states, "Each member pledged himself to help every other member should the need arise and always to spread the news of a fresh gold-discovery far and wide (ibid., p. 29). Ironmonger Sola was a miner in the area before the strike, and was one of the first miners to come out of the Klondike to announce the gold rush. In his recounting of the events he nonchalantly notes that, "In July of that year [1896] a man by the name of Carmack came down to the Forty Mile Post and told me that he had struck gold . . ." Later, when he arrived at the mouth of the Klondike River he ran into Andy Hunker who imme-

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

was not kept a secret, and news spread quickly among the several hundred miners in the district. The initial find was by Robert Henderson, who, after getting excited over finding eight cents of gold to the pan on Gold Bottom Creek, told everyone he knew on his way to register his claim—including George Carmack, who later staked on Bonanza Creek.[12] In doing so, Henderson was following the strict social norm of the area.

Social cooperation prior to the gold rush extended in other dimensions as well. Before 1894, when the Yukon territory was just a remote frontier with promise, miners respected each other's possessions, shared material goods, and looked out for one another. The general thrust of the miner customs seems to have been the "golden rule."[13] To the extent there were disputes these were dealt with through "miners meetings." These private institutions investigated, tried, and decided on all sorts of disputes and crimes in the area.[14] Miner's justice was swift and severe,

diately tells him of his discovery at Hunker Creek (Sola, *Klondyke*, p. 73). Histories, diaries, and government reports all attest to the strong social norm of information sharing. See, for example, Palmer, *In the Klondyke*, pp. 80–82 1899; or Ladue, *Klondyke Facts*, p. 150. See Ellickson, *Order*, for an excellent account of welfare-maximizing social norms in the context of cattle and whaling. What makes the sharing of information so interesting is its apparent incentive incompatibility.

[12] Prospectors would pan for gold along spots in a creek that looked promising. They would use traces of gold found on the surface as an indication of deposits below. Eight cents of gold found in a pan was a big number (Berton, *Klondike*, p. 37). Interestingly, there is an infamous dispute that centers around the social custom of sharing information. On his way from Gold Bottom creek (see Figure 1) Henderson ran into George Carmack and, acting on the custom of sharing information, urged him to prospect the tributaries of Indian River and other creeks in the area. However, when Carmack and his two Indian relatives, Skookum Jim and Dawson Charlie later discovered the gold on Bonanza creek that started the Klondike rush, they went directly to register the claim and failed to alert Henderson, who was still prospecting out of the way on nearby Gold Bottom. By the time Henderson found out about the find, most of the Bonanza creek was already staked. Historians have argued whether Carmack violated the social custom. Some argue that he did not because Henderson was mining in the opposite direction of the land office. Others feel Carmack violated the spirit of the custom. For the record, Henderson never felt Carmack violated the code by not going out of his way to share his information. The entire dispute, however, points to the strength of the social norm.

[13] See Berton, *Klondike*, p. 29, for more discussion. The diary of a miner named Stanley provides a specific example: "When we reached Porcupine Bar, we tied up long enough to load the jerked moose we had cached there early in the season. We found it in good condition and it had not been molested, though undoubtedly seen by others passing along the river. It is the custom, in this country, to leave everything that belongs to you where you please, even in the most exposed places. . . . The miners have a law, though an unwritten one, that is very severe toward any one who takes what does not belong to him. . . . The least punishment . . . is to be ordered out of the country" (*Mile*, p. 63).

[14] Stone (*Miners' Justice*) provides a detailed account of the Klondike miner meetings. He notes, consistent with Zerbe and Anderson, "Culture," that the early miners arrived in the area with the institutional structures they had learned in the southern mining districts of British Columbia and California. Prior to the rush almost all of the miners were American, and they moved freely across the border with Alaska. There, the miner's meeting was the dominant governance structure, and would remain so throughout the rush. The lack of disorder and general

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

with the punishment for theft usually a flogging and banishment from the region. As in other mining areas, actual violence and property crimes were relatively rare.[15] No doubt this success in hard justice stemmed from the small homogeneous population.[16] In 1885 it is estimated there were only 75 miners in the region, by 1892 this had grown to 1000, and by 1896 it was only 1700.[17]

Whereas prior to 1890 the territory held only miners, by the mid-1890s traders and other nonminers had started to move in.[18] Once large numbers of people arrived during the gold rush, and certainly within the city of Dawson, the golden rule customs started to break down. As the population grew and became more diverse, the miner's meetings became less successful at achieving the social support necessary to settle disputes.[19] In addition, once the large amounts of gold were processed, men started to hide and guard it with light weapons.[20] In the gold fields, before the official survey was done, some miners colluded by staking "absentee" claims against new arrivals, later they jumped these claims for a partial interest.[21] On the journey out with their gold in tow, miners kept it well guarded and under surveillance.[22] Thus the Klondike was not a place where human vice was missing. Yet throughout the entire Klondike episode miners always shared information of new strikes. Why, if many of the social customs broke down with the arrival of large groups, did this seemingly irrational one remain?

My claim is that three characteristics of the region meant that property rights over gold in the ground were very secure, and that this security along with a small payment, created the incentive to share informa-

---

civil order of the mining regions before the rush of miners and government officials also corresponds to the description of the frontier found in Anderson and Hill, *Not So Wild, Wild West*.

[15] See Umbeck, *Theory*, for the similar California account. Stone (*Miners' Justice,* pp. 25–30, and p. 61) notes that ". . . violent conflict was simply not a prominent feature of this particular frontier population. . . ."

[16] See Libecap, *Contracting for Property Rights*, for a discussion on the role of homogeneous populations in mining camps and how it encourages contracting.

[17] Stone, *Miners' Justice*, pp. 9–15. Unlike in California, almost all of the miners were white. Given the vast amount of land with equally low expected output relative to the trivial population, miners would simply "move on" rather than fight.

[18] Prior to this miners had to haul in their own supplies from outposts along the coast.

[19] Stone, *Miners' Justice*, pp. 103–13.

[20] Berton, *Klondike*, p. 80.

[21] Sola (*Klondyke*, p. 45) reports on this practice and notes that the government surveyor William Ogilvie, in his official reports, called this fraud. Ladue (*Klondyke Facts*, pp. 101–03), however, points out that there were only two attempts at doing this, both perpetrators were caught, and both were punished. As Clay and Wright ("Order") point out, claim jumping was allowed when done properly. If a miner abandoned his claim, then others were allowed to take over. This practice was true in California and the Klondike.

[22] Sola (*Miners' Justice*, p. 76) notes that men would watch over their fortunes and not leave their state rooms on the boat journey back to Seattle.

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

tion and provide a large social good to the community. The three exogenous factors were: the proximity of the small mining area to the disputed U.S. border; the high latitude; and the severe cold winter weather. I describe each of these in turn.

The Disputed Alaskan Border

Part of the unique Klondike geography came from location. The Klondike, though entirely within the Yukon Territory, was close to the U.S. border, and the Alaska-Yukon border was partly in dispute.[23] Furthermore, most of the miners were Americans.[24] As news of valuable gold being mined by Americans continued to reach Ottawa during the 1880s, it was thought the sovereignty of the region was jeopardized. In response, the Dominion of Canada sent a force of 20 North West Mounted Police (NWMP), along with surveyors, title registrars, and a magistrate to the area in 1894—two years prior to the Bonanza discovery.[25] By 1897 there were 96 policemen in the area, and by 1898 there were 288.[26] Had the Klondike region been located in the Northwest Territory or somewhere else farther away from the U.S. border, it is highly

[23] Coolidge, writing before the rush, but after the initial gold find, clearly demonstrates the contemporary American opinion that the Klondike was not obviously Dominion territory: "There is every probability that the new discoveries of gold will bring the long pending boundary dispute between the United States and Great Britain to a head. The most profitable diggings are situated near the 141st meridian, which is the boundary fixed by treaty in the Northwestern Territory, and the constant danger of clashing of authorities will precipitate a determination. This country has never been adequately surveyed, and there is some uncertainty as to whether certain of the gold bearing creeks are on Alaskan or Canadian soil. The determination of this portion of the boundary, however, is purely a matter for survey. Ogilvie, the Canadian land surveyor, has been carrying on his observations for some years, but so far as the United States is concerned the only surveys have been unofficial" (*Klondike*, p. 247). There is no question that the Dominion of Canada understood their surveys to be "official." Harris provides a detailed account of the rhetoric flying about on both sides of the border through newspapers and political speeches. He quotes a State Department official saying "The gold fields are free to all . . . Up to the present time no mortal man can say exactly where the boundary line between the American and the British possession runs . . . American miners can go there without fear of interference on the part of Canada." (*Alaska*, pp. 417–418). Meanwhile he quotes an editorial in the *Toronto World*: "It is hardly necessary, to reply to the threats of Americans in the matter. The government of Canada has already made its reply . . . A large force of mounted police and two Maxim guns are now on the way . . . if the miners are inciting to revolt . . . they will perhaps meet with a reception warmer than they anticipated" (Harris, *Alaska*, p. 419).

[24] According to Adney (*Klondike Stampede*, p. 432), in the winter of 1897–1898 only 10 percent of the population of Dawson was Canadian.

[25] Stone, *Miners' Justice*, p. 14.

[26] Zaslow, *Opening of the Canadian North*, p. 113. According to him, ". . . new comers to the Yukon found . . . no untrammeled wilderness where a man could play Caesar, but virtually a police state, in which the police wielded the widest discretionary powers" (ibid., p. 138). Although, it is key to note that the miners welcomed the NWMP, and there is no evidence of abuse of power.

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

unlikely the NWMP would have been present. Likewise, had the Klondike region straddled the Alaska border it is unlikely the NWMP would have been effective.

It was helpful that the NWMP did a commendable job, as every historian and contemporary writer notes.[27] The effectiveness of policing is often credited to "able and incorruptible" leadership, but is perhaps better attributed to the geography of the area.[28] Both the Klondike region and the mine fields had only a few entry points.[29] As a result, the NWMP were able to strategically control the area with only a few hundred men. As the miner Haskell noted "One might think that a handful of police could do very little with the thousands of miners . . . But . . . the country is of such a nature that a few police can hold all the points at which gold must pass in going out of the country."

Furthermore, the NWMP and other government agents were not allowed to own mining claims. Unlike in California where desertion from state law enforcement and the army was common, the police of the Klondike remained at their posts. Again, geography was a factor because there was little point in deserting to such a small area with limited entry and exit points. Anyone deserting would quickly be caught. Thus, the location and geography of the Klondike led to the early arrival of police, helped the police to enforce the Dominion laws, and helped to maintain the police ranks by limiting their options to abandon.

The strong government presence in the Canadian Klondike region meant that miners operated under the Canadian mining regulations.[30] It

[27] Treadgold notes that "There never has been any disorder worthy of mention . . . in the Yukon." He goes on to note that two reasons for this are "The police are rapid, simple, severe in their methods [and] The country is a hard one for criminals, it produces little food; and travel must be on definite trails all occupied by the police" (*English Expert*, p. 69). Haskell notes the same thing, "Whatever may have been the motive of the Canadian government in sending in agents to the new district, it must be said to her credit that she has sent good ones, and that the supervision of the mounted police has given the people of the Klondike a sense of security which is not usually enjoyed in new mining camps . . . " (*Two Years*, p. 432).

[28] Not that the British constabulary system had nothing to do with it. The NWMP officer corps was modeled along the lines of the British civil service where officers had large amounts of social capital that hinged on good performance. This sunk social capital likely prevented the force from becoming a local "mafia." For a discussion of how this general system worked, see Allen, "Purchase"; or Allen and Reed, "Duel of Honor."

[29] Access to Dawson was limited to only five routes. Of these, only two routes—the Yukon river and the Chilkoot/White Pass—were economically viable. Intense amounts of gold were limited to a dozen creeks all bounded by large rivers, which meant that access to the gold fields was also limited to a few trails.

[30] See Harris, *Alaska*, for a discussion of the mining laws from an American point of view. His general consensus was that in Alaska the miners privately bargained in the shadow of the law: "In a large sense, the law of the [Alaskan] miners is an unwritten code . . . ." On the other hand, he notes that "On the Canadian side of the boundary . . . the mining laws of British Columbia are in force" (ibid., p. 402). In terms of the application of law, Harris goes into considerable detail of the powers of the Superintendent of Mines in the Klondike. This government

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

also meant that miners operated under the watch of a host of government mining officials.[31] Under these regulations miners had to register with the mining district and would be given a miner's license with a number. When gold was discovered miners had to physically stake the claim, and sign one of the stakes along with their number. Miners then had three days to register their claim (unless the commissioner's office was more than ten miles away, in which case an extra day was allowed for every ten miles), the registration cost was $15, and only one claim per person was allowed within a district (unless other mining claims were purchased). Thus miners could only claim a second mine if they relinquished the original one. The mining claim granted a right to mine for one year. Thereafter it cost the miner $100 per year to mine. Miners could only be away for 72 hours, unless they went for supplies or had some other reason approved by the superintendent of mines. Claims could be sold or mortgaged, and miners could be represented by proxy.

Mining regulations existed in other gold rushes along the Rocky Mountain range. However, none of those laws existed in the strict regulatory environment present in the Klondike, nor from the very beginning of the gold rush.[32] Although the Canadian mining regulations were similar to those in the United States, there was one important difference. Mining *districts* in Canada were generally larger than in the United States. According to Sam Dunham, in the United States "a separate mining district may be established on every creek where a discovery is made."[33] In Canada the district "shall mean the territory along a river and its affluents."[34] Given the small size of the Klondike area, this meant there were only two districts. Because a miner who made a "discovery" claim was allowed two claims within the district, the larger districts made this second claim payment more significant.

---

agent adjudicated over disputes related to access, water, dates of mining seasons, and other disputes. Finally, he notes that fraud was dealt with severely in the Klondike with a convicted miner being "absolutely debarred from obtaining another location" (ibid., p. 41). See Adney, *Klondike Stampede*, pp. 432–41, for a discussion of the mining regulations from a miner's perspective. According to him, "The police control of the country was as nearly perfect as one could expect" (ibid., p. 440). Other writers similarly note that the regulations were binding. Knox and Pratt state, "There is no claim jumping, as the Canadian laws are rigid and well enforced" (*All About the Klondyke*, p. 13). Adney also points out that the federal government tried to tax the miners with a 10 percent royalty on gold produced. Although the tax raised over the rush amounted to $1,530,000 (Adney, *Klondike Stampede*, p. 441), he and others (see, for example, Harris, *Alaska*, p. 413) felt that only a small fraction of the tax was ever collected.

[31] Palmer (*In the Klondyke*, p. 201) lists off a number of positions outside the NWMP, including mining inspectors, a crown attorney, a gold commissioner, and a district commissioner "with the powers of a dictator."

[32] See Kirk, *Twelve Months*, pp. 140–43, for a discussion.

[33] Dunham, "Alaskan Gold Fields," p. 325.

[34] Ibid.

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

The High Latitude

Staking mines required measurement and surveying, which under normal circumstances, and in southern mines, miners easily conducted. However, measurement was not easy in the Klondike.[35] In the depth of winter there were very limited hours of sunlight and in the heart of summer the sun never set. Both conditions made navigation and direction difficult because the sun was either flat on the horizon or directly overhead.[36] Before proper surveyors worked in the area, miners were seriously bogged down in disputes over mine locations and boundaries, which hindered their ability to mine and trade sites. In his reports to the federal government in Ottawa, land surveyor Ogilvie notes how happy the miners were for their land to be surveyed, aside from the obvious benefit of defining property:

> Another source of satisfaction to all is that they now know distances and directions. Many miners remark to me "we now know how we are going, we can see where south is." In this high latitude in the summer months it is impossible to tell when the sun is near the meridian because its change in altitude is so little for eight or nine hours . . . . This helps to explain much of the variance in the direction of points as given by miners and others . . . .[37]

The government surveyors were part of the Dominion infrastructure sent to the Klondike before the rush, along with the land title office for claim registration. The high latitude of the Klondike seriously hindered the miner's ability to administer their own governance of the creeks, and practically forced them to welcome the government survey. In accepting the official surveys, miners automatically submitted to the authority of the NWMP.

[35] In 1897 the government surveyor William Ogilvie traveled to the Bonanza site where miners were struggling with their own survey. Originally claims were simply paced out. Later, at a miner's meeting it was decided to perform a measurement with a rope. Ogilvie states: "In what way the rope was measured, or how it was held, I do not know. . ." (*Early Days*, p. 161). In an interview of Joe Ladue, the founder of Dawson, Steffens recounts Ladue's memory of the rope incident: ". . . the measurements were all wrong . . . a committee was selected to mark off the claims all the way up the creek with a fifty-foot rope. Somehow a rope only forty feet long was sneaked in . . ." (*Life*, p. 965). Miners were required to make permanent posts to mark their claims, but often simply cut into the bark of a tree. After a few days the sap would cover the markings. Miners seldom measured their distances appropriately "owing to the course the locator steered while measuring." (Ogilvie, *Early Days*, p. 168). The claims were later officially surveyed with the result being many winners and losers.

[36] Haskell, *Two Years*, p. 307.

[37] Sola, *Klondyke*, p. 42.

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

The Weather

Humans have tended to live in temperate and moderate climates; as a result, extreme weather conditions usually are irrelevant. In the Klondike, however, the weather conditions were severe. At 64°N latitude and 165 miles south of the Arctic Circle, the base city of Dawson was a hostile environment virtually every month of the year. Dark, long, frigid, winters; permanently frozen ground; and short, hot, but wet, summers were shocking to all who ventured there.[38] Extensive commentary about the weather is found in the diaries of the miners who made the trek into the Klondike, and rightly so. Temperatures in the winter could reach as low as –70° Fahrenheit, and on average there were only 90 frost-free days per year.[39] The extreme cold and length of winter was the defining weather characteristic of the Klondike. Unlike southern mines, the Klondike ground was perma-frost—frozen all year long. In addition, all creeks and rivers were frozen during the long winter, making conventional mining impossible for most of the year.[40]

The frozen ground created a unique form of mining. From 1896 to 1900 the arduous journey to the Klondike prevented any serious mechanical tools, such as steam engines and dredging equipment, from reaching the mines. To thaw the ground during the winter the miners made fires over the spot they wanted to mine. When the fire died out they would scrape a few inches of melted soil out, hoist it out of the mine in a bucket, and place the muck on a "dump." In the late spring and summer when the creeks would thaw, the dump would be sluiced and panned for gold. Burning continued down the shaft until bedrock was hit 20 to 30 feet below the surface. If a vein of gold was discovered, miners would "drift" by following it using the same burning method.[41]

The weather of the area dictated this method of mining for several reasons. First, the frozen ground was stable and allowed the miners to dig without bracing. Second, because all water was frozen during the winter, the mines were dry. Once the spring run off started, mines would often fill with water and require pumping. Third, and most important, given the relative air pressure in the bottom and surface of the mines during the winter, the deadly gases produced by the fires would exit the mines. In other words the intense winter air created a strong up-

[38] And venturing there was not easy. There were several routes (the Yukon river, the Chilkoot and White passes, the McKenzie river, and through British Columbia), but all were by foot and treacherous. Some who started on the McKenzie route when the first news of gold reached the outside world, did not arrive until two years later when the rush was over.

[39] Berton, *Klondike*, p. 397.

[40] Ironically, during the summer months when gold was searched for, the environment was similar to that of southern mines.

[41] Berton, *Klondike*, pp. 18–19.

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

draft in the mines. Harold Innis notes how this draft was reversed when summer arrived: "Moderation of the temperature made it more difficult to get adequate draught for fires, and in many cases gases and smoke accumulating at the bottom after a night's burning made it dangerous for men to work."[42] Diaries of miners who pushed the limits of the waning winter months mention burning eyes as the sign the gases were not leaving. Robert Kirk notes that "several deaths have already occurred in the Klondike mines from suffocation by gas and smoke."[43] During the summer the gases would stay below ground and prevent entry into the mine. Thus the smoke and gas acted as a security fence for the mine during the summer months.

Throughout most of the winter, the air temperature was so cold that the melted muck loaded in the base of the mine would be frozen solid by the time it reached the top. If not frozen then, it would quickly freeze on the dump. Just as important, any gold in the dump was invisible when frozen. For example, Kirk states:

> Frequently small particles of gold can be seen in the gravel dumps when the gravel is first thrown from the bucket, but the moment it freezes they become practically invisible.[44]

These three factors came together like a perfect storm to secure rights to gold in the mine fields. The frozen gold in the dump could not be stolen, the poisonous summer mines could not be used, the site had to be marked by a government official, and limited entry points acted as security check points and were occupied by NWMP, who were there in excessive numbers due to the border issue. Gold claims were thus protected, which eliminated the major cost of sharing information. But what was the benefit to sharing?

The Incentive to Share

Information sharing is almost always a social good. The benefits of belonging to a community that shares information on strikes is that a miner avoids wasting resources looking in the wrong spot after a discovery is made. However, the cost of sharing information is the threat that a discovery will not be respected by other miners. Thus a miner will hide information regarding his find if he believes others will jump his claim, or if he believes his size of claim will be reduced as others move into the district. Thus a necessary condition for information sharing is

[42] Innis, *Settlement*, p. 203.
[43] Kirk, *Twelve Months*, p. 146.
[44] Ibid., p. 148.

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

the prevention of claim stealing or other types of claim encroachment.[45] As mentioned, the presence of the police, the reliance on government officials for registration and surveys, and the natural protection of the gold by the weather while it was in the ground all meant that a miner's claim was secure. Miners who shared information regarding their find, did so knowing that their claim would not be infringed upon.

A sharing norm, however, provides an incentive to free ride on the efforts of successful prospectors, leading to too little search effort for gold. This was offset by Canadian mining regulations that allowed the discoverer to register *two* discovery claims within the mining district. All others were allowed to register just one. As mentioned earlier, the larger Canadian mining districts meant that this constraint was seriously binding and made the payment of an extra claim more significant. No doubt the value of the second claim was closely related to the first, and it thus became a robust, incentive-compatible, regulation that was flexible enough to handle the different values of claims that arose on different locations. Once the initial set of property rights was established through registration, any miner could buy as many claims as he wanted. The extra claim provided an incentive to look for gold rather than to free ride on the searching of others. Still, the question might be asked: why tell others when silence would appear to be weakly dominant? However, given that the police were willing and able to protect the discovery claim, the miner did not face a cost of revelation and stood to benefit. Indeed, because claims were commonly traded, as more miners rushed to the site the value of the discovery claim increased, further encouraging revelation.[46] The unique environment of the Klondike thus allowed for a simple solution to the problem of information hoarding.

TWO TESTS OF THE HYPOTHESIS

The Constant Claim Size

Evidence for the security of mining claims is found in the remarkable outcome from 1898 when the 30,000 soon-to-be-disappointed miners

[45] By claim stealing I am not referring to the practice of a miner taking over an abandoned mine. Rather I am referring to instances where miners are forced off or forced to share in legitimate claims. Clay and Wright ("Order") point out that the nature of gold mining leads to an optimal property rights structure where legitimate claim jumping is allowed. Canadian mining regulations allowed for miners to take over abandoned mines.

[46] This could lead to miners exaggerating their initial claims. This was also dealt with, in part, through the mining regulations, which required miners to swear an affidavit to the amount of gold they had discovered. Still, as names such as "Too Much Gold Creek" (see Figure 1) testify, false advertising was likely common.

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

arrived. When situations like these arose in California the result was often a redistribution of claims. John Umbeck states that the following quote was "fairly representative of the actual allocation process."[47]

> The first workers on the bar had taken up claims of a generous size, and soon the whole bar was occupied. The region was full of miners and they came pouring down upon the river, attracted by the reports of a rich strike, until their tents and campfires presented the appearance of a vast army. Those without claims far exceeded in number the fortunate ones. A miners' meeting was called to make laws. Majority ruled in a mining camp in those days, and it was voted to cut down the size of claims to forty feet. The claim owners were powerless to resist, but had to admit to the fiat of the majority.[48]

The Klondike could hardly have been more different. Rather than revolt, theft, or redistribution, there was respect for the property rights of the existing miners, even though the new comers were well armed.[49] Many of the 30,000 stampeders of 1898 ended up working on gold mines owned by others, and there is ample evidence of large numbers of workers on mine sites. Under the Canadian mining laws a creek claim was 500 feet long, running up and down the direction of the creek. In addition, the claim would have a width up to the rim of either side of the creek, and this distance varied between 250 to 2,000 feet on the proved creeks depending on the terrain.[50] A miner who owned the claim would

[47] Umbeck, "Might," p. 50.

[48] Farriss and Smith, as quoted in Umbeck, "Might," p. 50.

[49] Sam Dunham was sent by the U.S. Department of Labor to report on all aspects of the gold rush. He noted that, "On September 30, 1897, Bonanza Creek had been staked above and below Discovery for a total distance of about twenty miles, while Eldorado Creek had been staked for a distance of about eight and a half miles, both being located for almost their entire length" (Dunham, "Alaskan Gold Fields," p. 318). The writer Jack London was part of the rush of 98, and no doubt was a little bitter at learning his efforts were for naught, as is apparent in a report he wrote for a monthly review: "All the paying creeks above named were located before the people arrived who were hurrying in from the outside. It is thus clearly demonstrated that those who participated in the fall rush of 1897 and in the spring rush of 1898 were shut out from the only creeks which would pay expenses" (London, "Economics," p. 70). Sola, one of the first miners to come out with gold in 1897 writes: "In the Klondyke [*sic*] region, you must remember, every foot of ground has been taken up by this time (Sola, *Klondyke*, p. 1). See also Wilson, *Klondike Gold Rush*, p. 81; and Stanley, *Mile of Gold*, p. 67. Part of the Canadian folklore of the Klondike is that the NWMP confiscated firearms and prevented Dawson from becoming a town run by pistol-toting gangsters like Soapy Smith in Skagway, Alaska. It is true that the federal government did not permit men to carry firearms and that the police tried to confiscate them. However, this was generally ineffective and firearms were common (Stansbury, *Land of Gold*, p. 58). Perhaps the greatest deterrent in having them was their weight and the general sparseness of wild game. Palmer notes: ". . . to the new-comer it was hinted that a six shooter . . . was a superfluity that would keep him out of trouble only when he kept it at all times hanging on a peg in his cabin. Its weight alone was equal to two days rations in a country where the prospector had to dispense with his helpmeet, the mule or the burro, and carry his grub for a tour on his back. Therefore, arms were never carried unless there was a chance of meeting with game" (Palmer, *In the Klondyke*, p. 71).

[50] Treadgold, *English Expert*, p. 31.

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

often hire workers by wages and mine the entire site. Alternatively, he would use share contracts with two or three miners. A share contract was seldom given for the entire claim, but rather given for a section. The standard lay section was 50 feet, and meant that a standard claim could have ten lay contracts at one time. Thus a 500 foot claim could have as many as 20–30 miners working on shares. Indeed, Sam Dunham, a meticulously observant bureaucrat for the U.S. Department of Labor, traveled the entire Klondike gold fields and reported lists of workers on each of the mines. He notes that when workers were employed by wages there were 10 men per mine on average, with as many as 18 or 20. When workers were paid by the share, there almost always two or three workers per share.[51] His observations are also supported by the reports of individual miners. For example, William Stanley was quite successful as a miner and formed a partnership with three others. However, from his accounts, they and others hired many other miners to work their claims.[52] Another miner, J. Clements, also records the hiring of many miners to work his claim.[53] Thus, rather than have the size of claim adjust to accommodate the influx of new miners, the claim sizes were fixed, and workers were hired to work them.[54] The large number of employees on any given mine reflects the fact that the original miners held on to their entire claims—including any second discovery claim. Unlike the California experience, where the arrival of newcomers often meant a reduction in claim size, tenure in the Klondike was secure. Umbeck finds that claim size varied inversely with its value.[55] He also generally finds claim sizes were small and fluid with respect to the number of miners in the district. Miners would move into an area, stake and register claims, and form small partnerships and local associations. As new miners moved in, the claims would often be redivided, shrink-

[51] Dunham, "Alaskan Gold Fields," pp. 323–25. This would have amounted to 20–30 miners per claim.

[52] Notes from his account state: "Clarence Berry, who has a half interest in Number Six below Discovery on Eldorado Creek has the best developed claim in the gulch. He employed twelve men during the winter in taking out the pay dirt" (Stanley, *Mile of Gold*, p. 97). "We gave a 'lay' to eight men who worked for six weeks, and when we settled it came out that they had earned in that length of time forty-two thousand four hundred dollars, or five thousand and three hundred dollars each" (ibid., p. 100).

[53] "We had 35 men working the claim for the greater part of the winter, and could have given employment to many more (Clements, *Klondyke*, p. 30).

[54] This is not to say that the original claim holders never sold fractions of their claims. Of course, they did. However, whether sold or managed, the rights were secure. One piece of evidence for the security of rights comes from actual gold production. Had their rights been tenuous, miners might have over exploited the gold fields and dissipated their values. Appendix Table 1 shows that gold production (in terms of revenue) continued to grow long after the rush had ended. Wealth was dissipated in the rush for first possession, but there is no evidence the miners overexploited the resource once they had title.

[55] Umbeck, *Theory*.

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

ing in size based on the number of individuals involved. Umbeck interprets this as an outcome of the underlying threat of violence as a method of allocating claims.[56] A similar result occurred in Alaska during the period of the Klondike rush. As noted, Alaskan mining camps were, in practice, governed by the miners. Speaking of Alaska, Walter Billard, claims that:

> in each gulch, prospectors are at liberty to stake out claims not already taken, the size of the claims being determined by vote of all the miners in each gulch, according to the richness of the gravel.[57]

Notably, Alaskan gold fields were spread out across the state, and the equivalent of the NWMP was not present.

Information Sharing in California and British Columbia

CALIFORNIA

California provides a high profile test of the Klondike hypothesis that weather and geography lead to a particular property right structure in the mining area. In terms of remoteness, the two gold fields were quite similar.[58] On the other hand, there were important differences in the two regions. The California gold fields ran along the Sierra Nevada range and spread west through the San Joaquin valley. Unlike the Klondike, the California mining area was less well defined and contained at least three large separate regions. J. S. Holliday indicates mines were spread out over 10,000 square miles.[59] It is generally estimated that about 90,000 miners arrived in California in 1849. This suggests that the Klondike had three times the concentration of potential miners per

[56] This interpretation is disputed by Zerbe and Anderson ("Culture") who note that not all potential miners were able to obtain a claim. They argue that social norms of fairness and institutional knowledge led to the "equal" claim sizes discovered by Umbeck. Under either hypothesis the California mining property rights were less secure.

[57] Billard, *Klondyke Mines*, p. 9.

[58] According to Knox and Pratt: "In '49 California was scarcely nearer to the civilization of the then existing States of the Union than Klondyke [*sic*] is today. . . . the hardships of an overland trip of more than three thousand miles or the scarcely less trying voyage "around the Horn," were quite as apt to deter the "tenderfoot" from attempting to seek fortune among the Sierras as are the extreme cold and possible privations that must be considered by the gold hunters among the Alaskan mountains" (Knox and Pratt, *All About the Klondyke Gold Mines*, p. 10). This similarity would have selected similar types of people in both gold regions.

[59] Holliday, *World*, p. 298. Paul ("California Gold," p. 40) claimed the "mother lode" ran for 120 miles and was 1,000 feet to two miles wide along the base of the Sierra Nevada range. On the other hand, a contemporary scientific study stated the mines spanned over nine degrees of latitude and amounted to 35,000 square miles (Blake, "Observations," pp. 73–74). All measures, however, are significantly larger than the Klondike.

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

square mile compared to California. Although California had variations in temperature and rainfall throughout the year, compared to the Klondike it was temperate and hospitable. The ground was never frozen, and the length of daylight varied little in comparison. Most importantly, given the transfer of government from Mexico to the United States and the abolishment of all Mexican laws in 1849, California had no formal mining laws when the first strike was made, and certainly no government infrastructure as existed in the Klondike prior to the rush. The absence of government institutions is the cornerstone of Umbeck's thesis, and is well documented in the historical literature.[60] Rodman Paul notes that after the initial discovery on the American River by James Marshall "there were no well developed American mining codes and no federal regulations other than the general policy that mineral lands not otherwise provided for were not subject to sale or preemption."[61] But he also goes on to point out that the strong presence of Indians in the area also hindered the effective property rights of local miners.

> . . . still another stumbling block was provided by the presence of hostile Indians. . . . In the northwest, . . . the aborigines were a more competent crew than elsewhere in the state, and by utilizing the very difficult terrain of their native habitat they were able to remain in the field, as a real though sporadic menace, . . . Their power was not broken until . . . the American Civil War.[62]

In addition, many of the mining claims in California were held by Chinese and foreigners. The property rights of these miners were often less secure than for others.[63] Thus, for several reasons we can be confident that the general security of tenure on Californian mines was less than the on those in the Klondike. Miners were spread out, property rights were not enforced by government agencies, and the climate did not protect gold in the ground.[64] In California it was not the social custom for miners to share information of a gold strike.[65] This behavior is seen

[60] Umbeck, *Theory*.

[61] Paul, "California Gold," p. 211.

[62] Ibid., p. 95.

[63] Hallagan ("Share Contracting," p. 203) points out that 25 percent of his contract sample contains Chinese miners. Although his sample is taken after the establishment of mining laws, he argues that the Chinese miners did not make capital specific investments for fear of contract breach and racial troubles.

[64] In both the Klondike and California cases, access to water was a constraint. In the Klondike it was often frozen, and in California the creek beds were often dry throughout parts of the year.

[65] La Croix ("Property Rights") in his examination of the evolution of property rights in the 1850 Australian gold fields indicates that information sharing was not the norm there either. Gold was discovered in the Victorian fields in April of 1851, but was not announced in Melbourne until July of the same year—a secret kept for over three months. As in California, La Croix points out that desertion of police and government officials was common (ibid., p.

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

right from the very first discovery. James Marshall was building a sawmill for John Sutter when he discovered some small nuggets in the American River. According to William Johnson "He sought out Sutter and conspiratorially insisted that they lock themselves in a room." Later when Sutter visited the sawmill site for himself he "asked the mill hands to keep the secret to themselves . . ."[66] As is well known, Sutter had no legal title to any of the land, and indeed, was uncertain whether the land belonged to the state or local Indians. When Sutter checked out the find he insisted his workers keep the find a secret. Marshall had told Sutter of the find on 28 January. Nevertheless, word of the find started to leak out; by mid-April a newspaper editor for the San Francisco Star went to the sawmill to confirm the rumors. He found that "At the mill both James Marshall and the Mormon crew, still mindful of Sutter's desire for secrecy, were somewhat closemouthed."[67] Thus three months after the find no official announcement or sharing of information had taken place.

Indeed, it was not until 12 May 1849 that Samuel Brannan rushed down streets in San Francisco yelling "Gold! Gold!" that news of the find "officially" reached the outside world. So unusual is the sharing of information that Umbeck naturally asks: "Why would a miner announce publicly the existence of gold on land to which he had no exclusive rights?"[68] The answer, of course, was that Brannan was not a miner. He was an entrepreneur who had established mining supply stores at Coloma and Sutter's Fort in the mining area, and who had prepurchased virtually all available local mining supplies. According to Holliday (p. 41) he quickly grew rich on profit margins of 500 percent.[69]

Keeping strikes a secret was the common practice in California, not just at the outset, but throughout the rush. Johnson notes that ". . . those who were more successful tended to be secretive about it, not wanting others to crowd in on their discovery. Newcomers who asked for advice on where to start digging were usually directed to locations that had been thoroughly worked over."[70] When William Downie discovered a lot of gold in an area that came to be known as Downieville, he and his partners kept the find a secret as long as they could.[71] Holliday notes

208) and that the state struggled to maintain its legal claim to the territory and its right to tax miners.

[66] Johnson, *Forty-Niners*, p. 26. Umbeck agrees with this interpretation, noting Sutter "tried to keep the discovery of gold a secret from his employees at the fort . . ." (*Theory*, p. 80).

[67] Johnson, *Forty-Niners*, p. 29.

[68] Umbeck, *Theory*, p. 82.

[69] Holliday, *World*, p. 41.

[70] Johnson, *Forty-Niners,* p. 98.

[71] Johnson, 1974, pp. 100–101.

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

many similar instances.[72] For example, quoting Swain's diary (the basis of the book) "Miners practice many arts to deceive others with regard to what they may be doing. Especially this is the case if they are doing well, when they generally say they are doing nothing."

Of course, this difference in information sharing is explained by the difference in the degree of effective property rights. The larger area, the lack of a third-party police, government surveyors, and land registry offices, when combined with the vast stretches of territory led to a situation where miners knew they would be unable to completely defend their mines in light of waves of gold seekers.

BRITISH COLUMBIA

The British Columbia gold rushes of 1858 along the Fraser River and 1862 in the Cariboo provide a similar example as California, and so the discussion will be brief. In the 1850s the region was virtually uninhabited by whites, with only a series of small Hudson Bay forts such as Victoria and Fort Langley scattered across the southern part of the territory. Britain had just lost the Oregon territory to American settlers, and there was concern over the ability to hold British Columbia as well. It was the insecurity of property rights over the entire region which led to the attempt to keep the initial gold finds secret. Beverley Boissery notes:

> It can be no wonder, then, that when the first stories of gold surfaced in today's British Columbia, the government took great care to keep them secret. As early as August 1850 the governor of Vancouver Island, Richard Blanshard, reported to the colonial secretary in London that he had seen "a very rich specimen of gold ore" from the Queen Charlotte Islands, and the Hudsons Bay Company sent expeditions to investigate. The company provided supplies such as explosives and mining tools for one in 1851, and forty men agreed to work for just their share of the profits. The leader of this expedition claimed British possession of the islands and drove away a party of Americans who had heard rumours of another potential goldfield. p. 12, 2003

The governor James Douglas passed the Gold Act in 1859 in an attempt to establish crown ownership over the gold, institute a miner's license, and create gold commissioners. However, unlike the Klondike, the state was never able to police the vast territory, and mining towns were run in a similar fashion as in California. As in California, there was no information-sharing norm. Consider the story of William Dietz.

> A Dutchman, William Dietz, was among them. After deciding to explore the surrounding area by snowshoe, he allegedly fell down a snowbank into the de-

[72] Holliday, *World*, p. 359.

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

> pression of a creek bed and, on a whim, pawed through the snow. When he opened his hand, he saw not only gravel but gold. Staking a claim immediately, he returned to Antler Creek and then traveled to Quesnel Forks for supplies. Unfortunately, he had not been able to hide his excitement. Prospectors traced his snowshoe tracks and, ignoring eight-foot mounds of snow, staked their claims.[73]

In the Klondike, there was no need for tracking.

CONCLUSION

Behavior that looks "altruistic," such as the giveaway of valuable information, is a puzzle for economists. One solution is to argue that individuals like being altruistic, and therefore the behavior is utility maximizing. Another solution is to argue that altruism can survive in an evolutionary environment.[74] Neither of these conjectures fits well with the information sharing during the Klondike rush. A final solution is to suggest the behavior actually had some private benefit, and was not altruistic at all.[75] In the case of the Klondike this latter explanation is a better fit for why miners shared information about strikes to other miners.

Miner behavior outside the mining camp suggests they were not particularly altruistic. Once the gold was in sacks in Dawson, waiting to be shipped out, the miners were careful with it:

> Notwithstanding the confidence that exists among miners, and which had been necessary at the camp, we did not trust the people at Dawson City, . . . so we took turns about in guarding our wealth. Four of us were on duty all the time with Winchesters, while the others amused themselves by strolling about the town.[76]

On the journey out of the Yukon, miners would guard their gold night and day.

[73] Boissery, *Beyond Hope*, p. 36.

[74] See, for example Bergstrom and Stark, "How Altruism," who argue that a gene might be altruistic if behavior is imitated. Likewise, Eshel, Samuelson, and Shaked, "Altruists," also have a model of imitation where the group benefits from altruistic behavior.

[75] Another example of information sharing comes from Greif, "Contract Enforceability," where the Maghribi traders of the late medieval period developed an institution for punishing cheating among trading agents. There the coalition among the Jewish traders supported information flows regarding the behavior of agents who would then be rewarded or punished appropriately. Hence Greif provides another example where apparent altruistic behavior was wealth maximizing.

[76] Stanley, *Mile of Gold*, p. 130.

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

> On the 18th of June, 1897 I left Dawson City on the . . . steamer "P. B. Weare." . . . On this boat the miners loaded their gold, . . . Many of the men would not talk, but with grips, bags, strong boxes, belts, tin tomato cans, and other odd receptacles filled with the glittering metal, sat on guard in their 4 by 6 state rooms.[77]

Rather than altruism, information sharing was simply incentive compatible.

In the Klondike when a strike was made, the lucky miner registered his discovery claim knowing it was secure. When the rush was on for establishing rights to claims adjacent to discovery, there was no expectation that the initial claim was in jeopardy. Regardless of how many other miners showed up, the claim size did not adjust. Unlike the California case, the 30,000 late comers did not force existing miners to redivide the claim sites. Many disappointed simply left, some went and looked elsewhere, some purchased either whole or partial claims, but most went to work on existing sites as employees. Thus, unlike the California case where the mine size shrank, in the Klondike mines ended up having many miners work a specific mine. Miners did not have to subdivide mines in order to defend what they were able to keep.

The property rights were respected because the close to 300 police had no problem protecting 200 miles of creeks. Had the gold rush been spread out across the entire Yukon territory as it had been in California, it seems unlikely any policing would have been effective. However, given the tight concentration of gold, the formal government infrastructure, and the general geographical and climatic constraints, there was little incentive for desertion, and a small area to police. Policing protected the property rights of the miners against jumping, and therefore, did not hinder the incentives to share information on gold strikes, and encouraged miners to maintain legal claim sizes and legally subdivide or amalgamate them through contract.

[77] Sola, *Klondyke*, p. 76.

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

Appendix: Yukon Gold Production

APPENDIX TABLE 1
YUKON GOLD PRODUCTION, 1885–1925
(1,000s of $)

Year	Production	Year	Production	Year	Production	Year	Production
1885	100	1896	300	1907	3,304	1918	3,266
1886	—	1897	2,500	1908	2,820	1919	1,947
1887	70	1898	3,072	1909	3,260	1920	1,660
1888	40	1899	7,582	1910	3,594	1921	1,246
1889	175	1900	9,809	1911	4,126	1922	1,230
1890	175	1901	9,162	1912	4,024	1923	1,032
1891	40	1902	9,566	1913	5,018	1924	1,136
1892	87	1903	12,113	1914	5,301	1925	625
1893	176	1904	10,790	1915	4,649		
1894	125	1905	8,222	1916	4,458		
1895	250	1906	6,540	1917	3,960		

Source: *Annual Report of the Mineral Production of Canada*, 1926, p. 117.

REFERENCES

Allen, Douglas W. "Purchase, Patronage, and Professions: Incentives and the Evolution of Public Office in Pre-Modern Britain." *Journal of Institutional and Theoretical Economics* 161, no. 1 (2005): 57–79.

Allen, Douglas W., and Clyde Reed. "The Duel of Honor: Screening for Unobservable Social Capital." *American Law and Economics Review* 8, no. 1 (2006): 81–115.

Adney, Tappan. *The Klondike Stampede.* New York: Harper & Brothers, 1900.

Anderson, Terry, and Peter J. Hill. *The Not So Wild, Wild West: Property Rights on the Frontier.* Stanford, CA: Stanford University Press, 2004.

Bergstrom, Theodore, and Oded Stark. "How Altruism Can Prevail in an Evolutionary Environment." *American Economic Review* 83, no. 2 (1993): 149–55.

Berton, Pierre. *Klondike: The Last Great Gold Rush, 1896–1899.* Toronto: McClelland and Stewart, 1972.

Billard, Walter. *The Klondyke Mines and The Golden Valley of the Yukon.* Jersey City, NJ: Albert Datz Publisher, 1897.

Blake, William. "Observations on the Extent of the Gold Region of California and Oregon." *American Journal of Science and Arts* 20 (1855): 73–74.

Boissery, Beverley. *Beyond Hope: An Illustrated History of the Fraser and Cariboo Gold Rush.* Toronto: Dundurn Group, 2003.

Canada. *Annual Report of the Mineral Production of Canada.* Ottawa: Dominion Bureau of Statistics, 1926.

Chicago Daily Record, *Klondike, Book for Gold Seekers*. Chicago: Monarch Book Company, 1897.

Clay, Karen, and Gavin Wright. "Order Without Law? Property Rights During the California Gold Rush." *Explorations in Economic History* 42, no. 2 (April 2005): 155–83.

Clements, J. I. *The Klondyke: A Complete Guide to the Gold Fields.* Los Angeles: Baumgardt and Co., 1897.

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

Coolidge, L. A. *Klondike: and the Yukon Country.* Philadelphia: Henry Altemus, 1897.
Dunham, Sam C. "The Alaskan Gold Fields and the Opportunities They Offer for Capital and Labor." *Bulletin of the Department of Labor.* Washington, DC: No. 16, May, 1898.
Ellickson, Robert C. *Order Without Law: How neighbors Settle Disputes.* Cambridge, MA: Harvard University Press, 1991.
Eshel, Ilan, Larry Samuelson, and Avner Shaked. "Altruists, Egoists, and Hooligans in a Local Interaction Model." *American Economic Review* 88, no. 1 (1988): 157–79.
Greif, Avner. "Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders' Coalition." *American Economic Review* 83, no. 3 (1993): 525–48.
Hallagan, William S. "Share Contracting for California Gold." *Explorations in Economic History* 15 (1978): 196–210.
Harris, A. C. *Alaska and the Klondike Gold Fields.* Washington, DC: Library of Congress, c. 1897.
Haskell, William. *Two Years in the Klondike and Alaskan Gold-Fields.* Hartford, CT: Hartford Publishing Co., 1898.
Holliday, J. S. *The World Rushed In: The California Gold Rush Experience*. NY: Simon & Schuster, 1981.
Innis, Harold. *Settlement and the Mining Frontier.* Toronto: Macmillan Co., 1936.
Johnson, William. *The Forty-Niners.* New York: Time Life Books, 1974.
Kirk, Robert C. *Twelve Months in Klondike.* London: William Heinemann, 1899.
Knox, John, and J. Pratt. *All About the Klondyke Gold Mines.* New York: Miners' News Publishing Co, c. 1897.
La Croix, Sumner. "Property Rights and Institutional Change During Australia's Gold Rush." *Explorations in Economic History* 29 (April 1992): 204–27.
Ladue, Joseph. *Klondyke Facts: Being a Complete Guide Book to the Gold Regions of the Great Canadian Northwest Territories and Alaska.* New York: American Technical Book Co., 1897.
Libecap, Gary. *Contracting For Property Rights.* Cambridge: Cambridge University Press, 1989.
London, Jack. "The Economics of the Klondike." *The American Monthly Review of Reviews* 20 (1900): 70–74.
McConnell, R. G. *Report on the Klondike Gold Fields.* Ottawa: Geological Survey of Canada, 1905.
Ogilvie, William. *Early Days on the Yukon.* Ottawa: Thorburn & Abbott, 1913.
Palmer, Frederick. *In the Klondyke: Including an Account of a Winter's Journey to Dawson.* New York: Charles Scribner's Sons, 1899.
Paul, Rodman "California Gold: The Beginning of Mining in the Far West." Lincoln: University of Nebraska Press, 1947.
Sola, A. E. Ironmonger. *Klondyke: Truth and Facts of the New El Dorado.* London: The Mining and Geographical Institute, 1897.
Stanley, William. *A Mile of Gold: Strange Adventures on the Yukon.* Chicago: Laird and Lee, 1898.
Stansbury, Charles F. *Klondike: The Land of Gold.* New York: F. Tennyson Neely, 1897.
Steffens, J. Lincoln. *Life in the Klondike Gold Fields: Personal Observations of the Founder of Dawson.* CIHM/ICMH Microfiche series; no. 16207, 1897.

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press

Stone, Thomas. *Miners' Justice: Migration, Law and Order on the Alaska-Yukon Frontier, 1873–1902.* New York: Peter Lang, 1988.

Treadgold, A. N. C. *An English Expert on the Klondike*. Toronto: George N. Morang & Co., 1899.

Tyrrell, J. B. "Concentration of Gold in the Klondike." *Economic Geology* June (1907): 343–49.

Wilson, Graham. *The Klondike Gold Rush: Photographs from 1896–1899.* Whitehorse, YT: Wolf Creek Books, 1997.

Umbeck, John. *A Theory of Property Rights: With Application to the California Gold Rush.* Ames: Iowa State University Press, 1981.

_____. "Might Makes Rights: A Theory of the Formation and Initial Distribution of Property Rights." *Economic Inquiry* 19 (January 1981): 38–59.

Zaslow, Morris. *The Opening of the Canadian North: 1870–1914.* Toronto: McClelland and Steward Ltd, 1971.

Zerbe Jr., Richard O., and C. Leigh Anderson. "Culture and Fairness in the Development of Institutions in the California Gold Rush." This JOURNAL 61, no. 1 (2001): 114–143.

https://doi.org/10.1017/S0022050707000459 Published online by Cambridge University Press