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SPECIAL BREW: INDUSTRIAL ARCHAEOLOGY AND HISTORY OF THE KLONDIKE BREWERY

David V. Burley and Michael Will

With Appendix A: Photogrametric Drawings of the Klondike Brewery ca. 1912
by Robert Mitchell

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SPECIAL BREW

INDUSTRIAL ARCHAEOLOGY AND HISTORY OF THE KLONDIKE BREWERY

David V. Burley and Michael Will
Department of Archaeology
Simon Fraser University
Burnaby, B.C., V5A 1S6

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With Appendix A by Robert Mitchell, Parks Canada, Winnipeg - Photogrametric Drawings of the Klondike Brewery ca. 1912.

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1
INTRODUCTION

The Klondike gold rush of 1897/1898 moulded Dawson City into the quintessential boom town, one in which short term and aggressive entrepreneurial zeal was able to extract as much from the miners as the miners were able to take from the creeks. Yet for some, expectations went well beyond the short term. This town, it was believed, had the potential to become Canada's San Francisco of the north. At the beginning of the twentieth century, one could hardly question the analogy. Dawson City not only survived the exodus of gold seekers in 1899, it had become the commercial centre and political capital of the Yukon Territory. For the business man with vision, success was beyond question.

This report is about the O'Brien Brewing and Malting Company, one of the longer-lasting and, at least initially, more successful post gold-rush business ventures in the Yukon. Otherwise known as the Klondike Brewery, it was situated in Klondike City on the opposite shore of the Klondike River from Dawson City (Figure 1). The O'Brien Brewing and Malting Company began operations in April 1904, with extensive newspaper coverage of its construction and opening. We believe the brewery was more than an interesting business venture on the Dawson City landscape. In 1904, it formed a symbol of stability and a verification of the town's anticipated prosperity. The brewery closed unceremoniously in 1920 when prohibition came in full force to the Yukon.

Our interest in the O'Brien Brewing and Malting Company was stimulated foremost by academic concerns. The brewery was founded by Thomas William O'Brien, an energetic capitalist, miner and Yukon politician whose influence and range of businesses were instrumental in Yukon history. A chronicle of this site thus reflects and potentially informs upon many of the larger economic and political issues of early twentieth century Yukon life. On a global scale, the brewery represents an industry which itself was enmeshed in a dramatic state of technological transformation. Since O'Brien's plan was to build as modern an operation as was possible, one modeled closely upon San Francisco breweries of the day, the study and its implications extend far beyond the mouth of the Klondike River. Understanding this industry, and how it faced the many logistical and other constraints

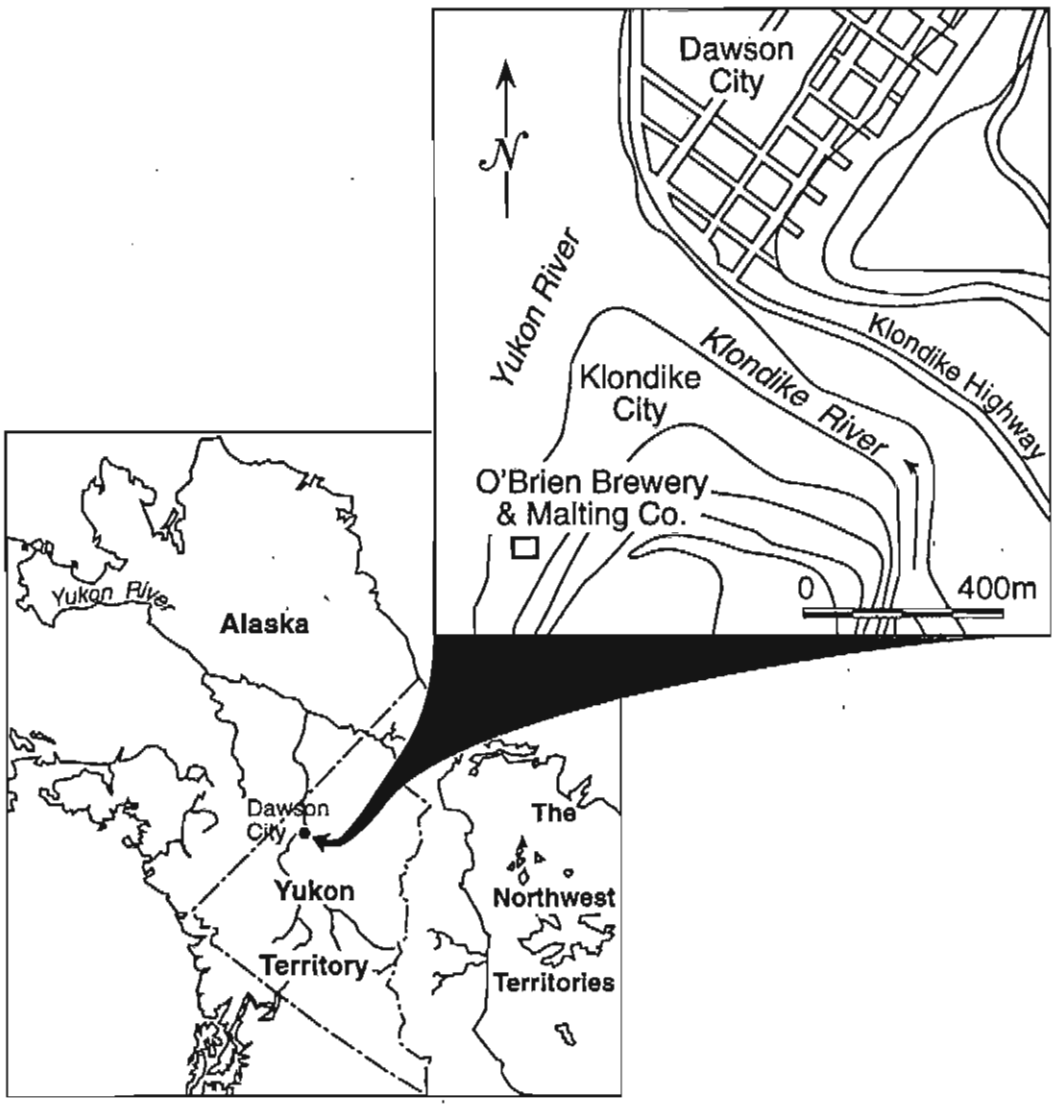


Figure 1. Dawson City, Klondike City and the O'Brien Brewing and Malting Company Site.

imposed by Dawson City's isolation, provides an additional and little documented narrative to existing accounts of brewing history in North America.

Academic research aside, this study also was intended to gather data for and recommend a course of action to meet longstanding resource management problems related to the site. The location of the brewery is well known in modern day Dawson City, its surface marked by cellar features, remnant industrial equipment, and mounds of early 20th century beer bottles. The bottles have long attracted collectors to the locale who, according to residents, have severely reduced the size of the mounds. How much destruction has occurred, and to what extent this has altered site integrity had not been documented. In 1977 Klondike City came under an additional threat, one in which total destruction appeared preeminent. The townsite is situated on delta lands of the Klondike River that had never been dredged. Since the area potentially represents a valuable property for modern day gold production, claims were filed and test holes dug in anticipation of larger scale operations (see Dobrowolsky 1998a: 52-56 for a review). These activities were opposed by public and government interests concerned with historic preservation. Also opposed to mining was the Tr'ondëk Hwëch'in First Nation whose traditional village of Tr'o-ju-wech'in occurs within the area (Dobrowolsky 1998a, Dobrowolsky and Hammer 2001).

Mining threats and First Nations concerns were not resolved until May of 1997 when the Government of Canada procured the rights to Klondike City. The land base subsequently was returned to the Tr'ondëk Hwëch'in, who, under the First Nations final agreement, are to develop sympathetic land uses in keeping with its importance as a heritage site. In concert, and as a further condition of the agreement, an inventory and assessment of archaeological sites on the Klondike City property was required. This was undertaken by Yukon archaeologist Thomas J. Hammer (1999). That project consequently provided us with an opportunity to carry out a two week archaeological investigation of the brewery proper.

In sum, our research into the Klondike Brewery, and the report that follows, has a number of different objectives. Integrated within a resource management context, we present the details of our assessment of brewery features, their context, and their integrity. At the same time, nevertheless, we attempt to take these data beyond resource manage implications

to place the O'Brien Brewing and Malting Company within the history of Dawson City, the Yukon, and the early twentieth century brewing industry in North America. We believe the story of the Klondike Brewery to be an interesting and informative footnote for all three areas, and we offer our data, interpretations and speculations accordingly.

The Field Project and Site

Archaeological field work was carried out between 30 July and 13 August 1998. The site, as first encountered, was covered in dense underbrush and litter mat, making an examination of surface features extremely difficult. Much of the field work, as a result, involved widespread and intensive site clearing, the survey for and exposure of surface features and artifacts, and the preparation of a rudimentary site map. Limited test excavations were undertaken to probe subsurface remains and identify the origins or nature of brewery features. Our ultimate field goal was to position and reconcile remnant architectural features with historic photographs of the site. This would serve heritage planning needs as well as provide interpretive context for industrial features, surface artifacts and other remains.

Our field studies indicate that the brewery site complex includes three spatially discrete components. These are ideally mapped on Figure 2, with reference made to road allowances as laid out in official government survey of 1897. The largest component is the brewery proper. It consists of foundation outlines, footings, cellars, and surface artifacts of three adjoining structures. The brewhouse, fermentation, aging operations, steam plant, offices, and storage areas were housed in these buildings. The second component occurs opposite and to the rear of the brewery on the east side of Mountain St. This structure was the brewery cooperage, it being marked on the ground by large quantities of barrel hoops, many still strung together in sets of graded sizes. The final component is an extensive bottle dump now buried within and eroding from the bank of the Yukon River to the front of the brewery. Scattered pieces of brewery equipment are also present along this bank.

In addition to archaeological field work, archival research was carried out at the Klondike National Historic Sites, the Dawson City Museum and the Yukon Territorial Archives. This work sought both primary and secondary source documentation as well as

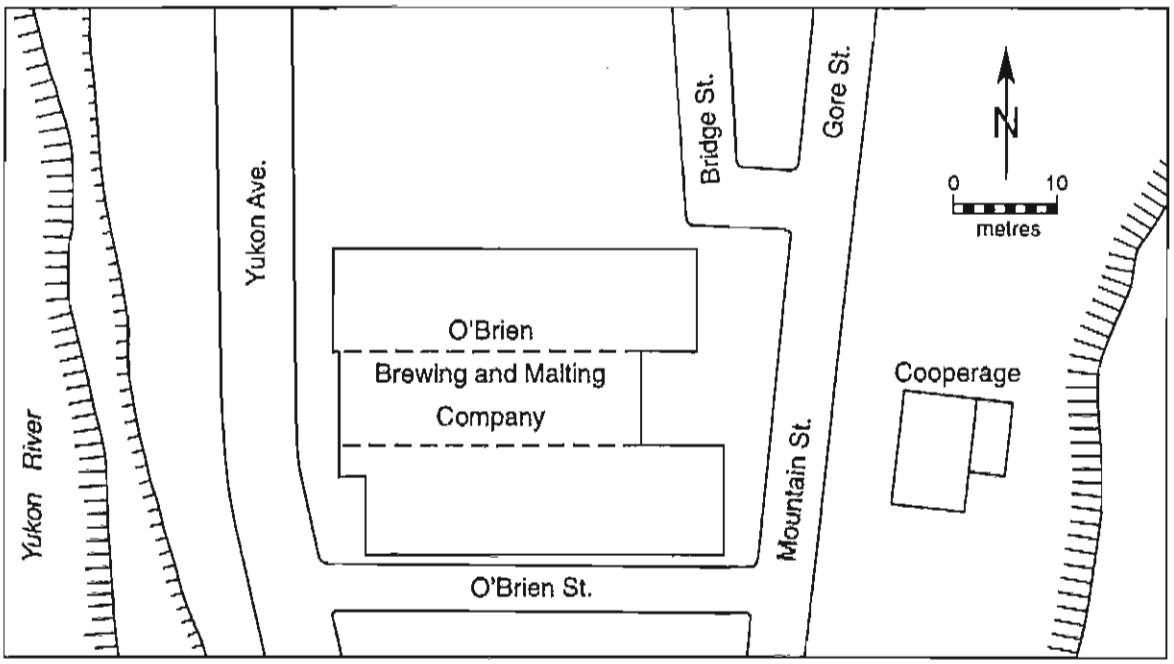


Figure 2. O'Brien Brewing and Malting Company (Klondike Brewery) and Cooperage, Klondike City.

historic photographs related to the brewery and its operations. More recent research has been undertaken at the Provincial Archives of Alberta (Edmonton) and the Glenbow Museum Archive (Calgary), as well as through correspondence with the Anheuser-Busch Company of St. Louis. The latter was a principal turn of the century brewer whose bottle manufacturing plants (Adolphus Busch and the American Bottle Company) indirectly provided much of the Klondike Brewery bottle stock.

Previous Studies and the Klondike Brewery

There have been several studies carried out on different aspects of the Klondike City locale over the past quarter of a century. Some have been in the interests of Parks Canada's heritage concerns (Minni 1977, Carter 1990), others were conducted in response to mining threats and/or as part of lands claim research by the Tr'ondëk Hwëch'in First Nation (Ingram 1989, Skuce and Hogan 1991, Hogan and Skuce 1992, Kormendy and Henry 1993, Dobrowolsky 1998a) while a small number of others fall under the umbrella of individual research interests (Ross 1990, Johnson 1997, Mitchell 1996). Among this group are three studies of critical interest for current research of the brewery site, its operations, and its buildings. These serve as significant resources from which we draw much of the contextual information for this report. In this they deserve an acknowledgement at the outset.

The earliest of the three was conducted by Parks Canada researcher Brian Ross (1990) who carried out an archival inventory of sources relevant to both the O'Brien Brewing and Malting Company and its owner Thomas O'Brien. Although he found only limited documentation for the business operations of the brewery, he was able to cross list O'Brien with published articles in the Yukon Sun, the Dawson Daily News and the Yukon World. He also compiled a list of brewery advertisements for these newspapers and identified brewery personnel in Dawson City directories. Ross's study resulted in an unpublished manuscript of "chronological notes" that was placed on file with Parks Canada and in the Yukon Territorial Archives. The document is of further value for it includes not just the bibliographic sources, but copies of the published materials to which these relate.

The second study, a highly detailed history of Klondike City and its sites, was carried out between 1995 and 1998. Undertaken by Helene Dobrowolsky its objectives was to provide background data for the Dawson City Museum and the Tr'ondëk Hwëch'in in their efforts to stop Klondike City from being mined. Dobrowolsky's work is incorporated within three documents - an integrated history of Klondike City and the site of Tr'o-ju-wech'in (1998a), a series of chronological notes on the Klondike City property from 1874 to present (1998b) and a bibliographic compilation of Klondike City's written, map, and photographic records (1998c). Each provides direct references to the Klondike Brewery as well as Thomas O'Brien's other business concerns.

Finally, the third study of importance relates to the photographic record of Klondike City generally, and the brewery site specifically. Period photographs of the townsite provide a critical data base for archaeological consideration as they include several overview panoramas and other images in which brewery structures are visible (see Dobrowolsky 1998c: 11-26, 40-47). Employing photogrametric techniques and computerized graphics, Robert Mitchell (1996) has used these photos to sketch external building facades and to hypothesize internal floor plans and dimensions. This work provided an architectural template for "ground truthing" and revision in the field. With only very minor alterations required, and under Mitchell's authorship, we include it here as Appendix A.

2

HISTORICAL CONTEXT OF THE KLONDIKE BREWERY

To provide a historical and archaeological context for the present study, we must necessarily examine the Klondike Brewery through three considerations. First, the company cannot be separated from its owner Thomas O'Brien (Figure 3). His background, his aspirations, and his expectations of economic development in an emerging Yukon Territory are critical factors for understanding not only the origins of the brewery but its persistence. Related to this, the brewery must be generally positioned within the economic and political history of Dawson City, for it is a consequence as well as a reflection of that history. Second, the brewery represents a product and industrial technology of the early twentieth century. The types of beer and other commodities that were produced, the machinery by which they were produced, and the means by which they were packaged and marketed articulate the brewery with the outside world. At the same time, however, they reflect local conditions, challenges and consumer demands. Finally, if the archaeological record of the brewery is to be interpreted, contextual discussion must be concerned with its physical manifestations. This requires a structural history of the buildings, associated features, and changes in these over time. Such a history needs to extend beyond the brewery's closure to identify post abandonment land uses that have created and/or altered the site's archaeological record.

From Birth to Death - Thomas W. O'Brien and the Klondike Brewery

The obituary of Thomas William O'Brien published in the Dawson Daily News of 25 August 1916 provides a meticulous review of his early life, from his birth in Simcoe County, Ontario in 1862 to his initial participation in the Klondike gold rush. Adding the more recent events of O'Brien's entrepreneurial and political activities from 1899 to his death, Eric Johnson (1993) compiles a more complete biography for this man. In respect of these details, O'Brien can be characterized by two observations - one based on fact, the other on inference. Of the former, there can be little question that he was an energetic

Figure 3. Thomas William O'Brien, owner of the Klondike Brewery.

and industrious businessman, a capitalist committed to the planning and implementation of new endeavours. As decreed by the Dawson Daily News, he was owner of "nearly everything in the catalogue" (18 October 1905) and "the man with the thousand jobs" (19 February 1906). As to our inference, O'Brien appears to have held a vision of Dawson City and the Yukon Territory in which long term economic prosperity was beyond question. Even in the face of Dawson's severe depopulation and economic depression after 1910, he continued to promote and plan new ventures. In the end, O'Brien became one of the most noted Yukoner's of his day, one whose funeral literally closed down Dawson City business and government operations for its duration (Dawson Daily News, 25 August 1916).

O'Brien entered the Yukon in 1887 as a would-be miner after several years of homesteading and various other employments in western Canada. In partnership with William Moran, he began his first commercial establishment in 1894, a trade store in Circle City, Alaska. A second operation was opened in Forty Mile in 1896 but, with news of the Klondike strike, O'Brien immediately went to the gold fields to stake his claim and purchase others. Among these claims was No. 1 Eldorado from which he realized $250,000.00. This, according to the Dawson Daily News (25 August 1916), was reinvested largely in mercantile interests as well as property holdings in Dawson City and Klondike City. Predominant among the mercantile endeavours was a third branch of the O'Brien and Moran store in Klondike City. This store/warehouse is clearly identifiable in an 1897 photograph as a long log building facing the Yukon River (Figure 4). In 1904, as to be discussed, it and two adjacent structures were extensively remodeled to house the brewery.

With a Klondike City retail outlet established, O'Brien became involved in various other investments - some as principal financier, a few as minor partner. The Klondike Brewery aside, these other businesses included the Yukon Sun Newspaper, the Pioneer Tramway Company, the Dominion Hotel, the Monte Carlo Saloon, the Klondike River toll bridge, the Dawson Whitehorse Navigation Company, the O'Brien Stage Line, and the Klondike Mines Railway. Most proved to be unprofitable while one, the Pioneer Tramway development of 1899, led O'Brien into considerable public controversy (see

Figure 4. Klondike City looking north to Dawson City, October 1898. Yukon Archives Photograph 2159/VPL Coll. The O'Brien and Moran trading store is the long log building in the center left. The building that was eventually converted into the Klondike Brewery cooperage is the log building immediately to its right.

Johnson 1993). Perhaps because of his property holdings in Klondike City, O'Brien appears to have formed an early commitment to the development of this community. He was in part responsible for its change of name from "Lousetown" (Dobrowolsky 1998a: 33), and his business investments kept the town alive even after Dawson City itself had begun to fall into decline.

O'Brien's anticipation of business success was founded upon long term expectations for the development of Dawson City as a regional entrepot and government centre. The town's mercurial rise had been an outgrowth of the boom town phenomena associated with many other gold or silver strikes throughout the west. Unlike many of these other towns, however, it did not fall into decline when the rush was over. The gold fields were proven to have a substantial volume of placer gold that could be mechanically mined through corporate consolidation over a much longer period of time. The population of Dawson City was expected to stabilize at around 10,000 people, and merchants, politicians and others were promoting it as a highly respectable metropolis, and a hub for northwestern Canada (see Guest 1978). Territorial Commissioner William Olgilvie convinced the Canadian Government of that vision in 1900. The consequential inflow of money to construct architecturally designed buildings for government administration, a post office, a court house, and a commissioner's residence provided Dawson City with all of the physical appurtenances of a territorial capital and, at least symbolically, identified the town as a permanent centre. When one added in the town's churches, banks, hospital, theatres, fraternal orders, warehouses, docks, numerous retail outlets as well as municipal services including a fire department and water supply system, it is easy to understand O'Brien's optimism.

O'Brien's reasons for founding a brewery were most likely profit driven. He had been involved heavily in the retail trade of liquor from his Klondike City store and no doubt realized a sizeable return on his stock. As recounted by the prospector Jimmy Delaney, "whiskey was the main thing sold" and O'Brien went to great lengths in its promotion (cited in Dobrowolsky 1998a: 34). Beer prices also were exorbitant during the height of the Klondike gold rush. The American vice-consul in Dawson City states that "beer in barrels containing eight dozen bottles [was selling for] $100 per barrel" (Arno

Press 1974: 537). A London newspaper correspondent similarly observed that Milwaukee beer sold "at 8s to 10s per quart bottle; Bass ale and Guinness stout, at 10s to 12s" while the "beer manufactured at Dawson City brought £2 2s per dozen quarts, and £19 2s per barrel of twenty-five imperial gallons" (ibid.). The Dawson City beer presumably was brewed at the "Dawson City Brewery" whose product was advertised as "invigorating" in a 3 August 1898 edition of the Klondike Nugget.

High prices for beer, as those for other commodities, were a boom town aberration. By no later than 1902, the Dawson City Brewery appears to have ceased operation since its owner, T. Z. Krozner, is no longer listed in the Dawson City Directory. Other retailers similarly were finding themselves in a precarious position, resulting from a decreasing population, intense competition, and product oversupply (Archibald 1981). These problems further extended to Alaska. In a supplemental volume to the Western Brewer published in 1903, the brewing industry there was described as having little profitability due largely to the size of the market, the expense and difficulty of obtaining raw materials, and prohibitory measures (Arno Press 1974: 537).

Notwithstanding these limitations, O'Brien and six other investors submitted an application for incorporation of the O'Brien Brewing and Malting Company on 24 December 1903. Capital stock was set at $200,000.00 with 2,000 shares to be sold for $100.00 each. Of the original investors (Table 1), five held 24 shares, presumably providing a working capital of $12,000.00. O'Brien was listed in the incorporation documents as having a single share, but with the following provision:

> ... the said Thomas O'Brien agrees to sell and the said Alexander John Gillis, on behalf of the Company, agrees to purchase that certain parcel of ground situate in Klondike City Addition to Dawson City, and more particularly described as Lot Numbered One (1) in Block Numbered Two (2), comprising an area of 200 feet by 100 feet, more or less, together with all buildings, erections, cellars and vaults thereon, and all appurtenances thereto belonging, for $53,000., to be paid and satisfied by the delivery to the said Thomas W. O'Brien of 530 fully paid up shares in the capital stock of the Company...

The property in question held his warehouses, and through this sale O'Brien realized a 77 percent controlling interest in the brewery. As cited by Johnson (1993: 2), the company

Shareholder	Profession	Address	Number of Shares
Thomas W. O'Brien	Merchant	Klondike City	1
Alfred Thompson	Physician	Dawson City	24
John R. Howard	Merchant	Dawson City	24
Daniel H. Mackinnon	Barrister	Dawson City	1
Tyra F. Lawson	Miner	Dawson City	24
Alexander J. Gillis	Dentist	Dawson City	24
Hector A. Stewart	Farmer	Dawson City	24

Table 1. Shareholders listed in the application for incorporation of the O'Brien Brewing and Malting Company Limited. The value of each share was set at $100.00. Thomas O'Brien received 530 paid up shares after transfer of his Klondike City property to the company for construction of the brewery.

was granted incorporation on 1 February 1904. In addition to the business of "brewers and malsters", it was given approval to undertake a wide range of commercial activities from spirit importers to real estate.

Fabrication of the brewery from three adjacent buildings of the O'Brien and Moran trade store/warehouse complex was contracted to George J. Mero with work beginning on 20 January 1904 (Yukon Sun 21 January). Quite amazingly Mero's contract required that he complete the task by 5 February, a time span of but 15 days. That he and his crew of 14 carpenters were successful is indicated in a Yukon Sun article of 29 January titled "Hop Distillery Nearly Finished". This was followed by another on 19 February in which brewery progress was headlined as "Nearly Ready to Brew" and that "Brewer Expected Today - Will Bring With Him All The Necessary Articles to Make the Brewery Pass the Inspection of the Custom's Officer".

The depth of newspaper coverage on brewery progress marks it as a notable event on the Dawson City landscape, possibly to the point where it was taken as a symbol for longer term prosperity. Not only would it produce a beer that was due to "make this camp famous" (Yukon Sun 29 January 1904), but it would be done "at a cost that will enable the company to put any other beer out of the contest" (Yukon Sun 19 February). The brewmaster, Charles E. Bolbrugge, was described as one of the very best brewers of San Francisco (ibid.), and O'Brien was given to state that his home grown beer would "make the Pabst article taste like soda water without any soda in it" (Yukon Sun 29 January). The opening of the brewery took place on 14 April 1904 (Henderson 1911).

Thomas O'Brien's involvement in Yukon history is not limited to his entrepreneurial machinations. In 1900 he entered the world of politics, unsuccessfully running as a Liberal for one of two positions as Yukon Councilor. A subsequent revolt within the party over the policies of Commissioner Frederick Congdon led O'Brien to again enter the political arena in 1905. This time he was successful in winning a two year term for South Dawson as leader of the Yukon Independent Party, it incorporating the disgruntled liberal faction. In acknowledgment of O'Brien's leadership role (Morrison 1968: 69-70), and/or the fact that party meetings were frequently held at the brewery

(Dobrowolsky 1998a: 34), party members were known as "Steam Beers" or "Steams". O'Brien's political motivations were not entirely divorced from his business interests. His political campaign of 1905 not only condemned Congdon's policies as being corrupt, and for impeding Yukon growth, but of specifically "ruining the territorial brewing industry" (Morrison 1968: 70). These concerns undoubtedly were instrumental in the Yukon Council's passage of a July 1907 "memorial" in which a tax of fifty cents per gallon was levied on foreign beer beginning in November of 1908 (Yukon Morning World, 1 October 1908).

Correspondence of 25 January 1911 from the Honorable Frank Oliver, Canadian Minister of the Interior, to Commissioner Alexander Henderson sought information on the amount of foreign, British, and domestic beer "consumed in the Yukon Territory from year to year until the last recorded returns". Import figures for "in bond" and "consumed" beer were provided by the Collector of Customs while the Collector of Inland Revenues gave number of gallons "produced in the Yukon since the opening of the O'Brien Brewery". Incorporated in Tables 2 and 3, and graphed in Figure 5, the results of this survey are insightful. First it is clearly evident that the Klondike Brewery initially gained a substantial market, with its 1904 production of 55,679 gallons being increased by a full 19 percent in 1905. Consumed imports, on the other hand, dropped in volume by 47.5 percent between the 1904/1905 and 1905/1906 fiscal years. The Klondike Brewery's success was not long lived, and a chart of its production illustrates an abrupt and sharp fall after 1908. O'Brien may have blamed Congdon's policies in his political rhetoric of 1905, but even he could not deny the dwindling population of Dawson City; by 1909 it had declined to 2,000 individuals (Archibald 1981: 101).

It seems clear from early newspaper reports that O'Brien held optimism that his product would be accepted widely, and it would capture "all the down-river trade" (Yukon Sun, 19 February 1904), presumably including Alaska. Yet the Klondike Brewery was never able to seriously penetrate the cross-border market with but one shipment of Alaska-bound beer taking place by 1911 (Henderson 1911). O'Brien's failure to gain an export market is not surprising in light of the pre-prohibition brewing industry in Alaska. In Fairbanks alone, the Barthel and Arctic Breweries were in direct

Fiscal Year	Beer Imported in Bond	British Beer Imported in Bond	Beer Consumed out of Bond
1901-02	22278 gal	2510 gal	19758 gal
1902-03	20614 gal	2524 gal	26894 gal
1903-04	18756 gal	6150 gal	24518 gal
1904-05	33008 gal	2228 gal	22563 gal
1905-06	10190 gal	1300 gal	11863 gal
1906-07	10201 gal	1590 gal	9167 gal
1907-08	12840 gal	2400 gal	10368 gal
1908-09	17676 gal	2454 gal	12822 gal
1909-10	4008 gal	342 gal	12422 gal
1910-11	8600 gal	660 gal	12800 gal

Table 2. Imported beer held in bond and consumed in the Yukon Territory as provided by the Collector of Customs. These numbers were provided in 23 February 1911 correspondence between A. Henderson,Yukon Territorial Commissioner, to Honourable F. Oliver, Canadian Minister of the Interior (YTA, RG 91: 39-27030).

Year	Beer Produced at the O'Brien Brewery
1904	55570 gal
1905	68748 gal
1906	57786 gal
1907	57308 gal
1908	50561 gal
1909	43112 gal
1910	31305 gal

Table 3. Beer produced in the Yukon Territory since the opening of the Klondike Brewery on April 14, 1904, as provided by the Collector of Inland Revenue. These numbers were provided in 23 February 1911 correspondence between A. Henderson,Yukon Territorial Commissioner, to Honourable F. Oliver, Canadian Minister of the Interior (YTA, RG 91: 39-27030).

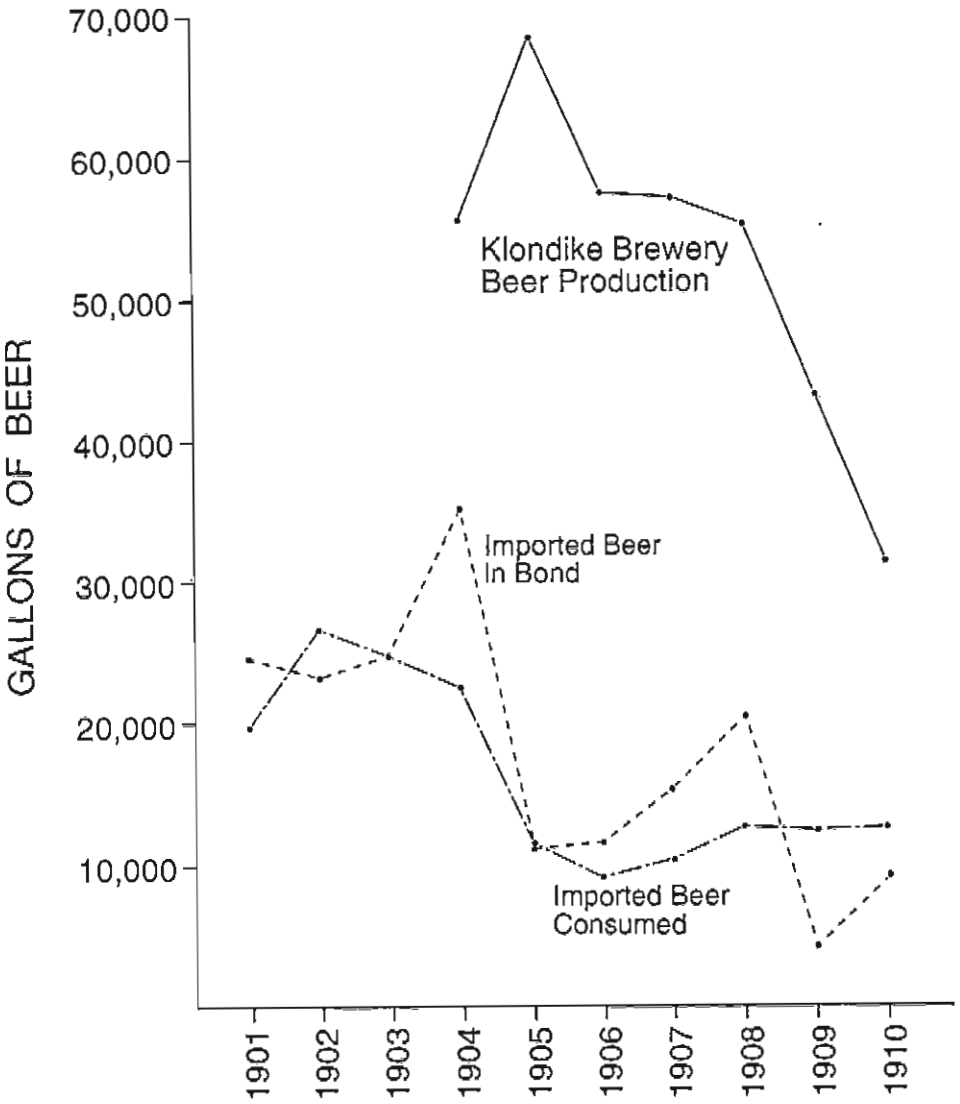


Figure 5. Klondike Brewery beer production, imported beer in bond and imported beer consumed in the Yukon Territory 1901-1910. The figures for beer in bond and consumed were calculated on the basis of a fiscal year rather than a calendar year. Thus the number for 1901 is actually fiscal year 1901/1902. Also see Tables 2 and 3.

competition (Bowers et. al 1998) while at least three other breweries were present within the state (Arno Press 1974: 537).

O'Brien turned to a highly colorful advertising campaign in the Dawson Daily News to enhance his brewery sales after 1909. His adds revolved around three themes, with many incorporating a photo of his Klondike City plant fronted by a horse drawn beer wagon as well as he and his staff (Figure 6). Of these themes, the first celebrated Klondike beer in Klondike imagery. It was "The Sourdough's Favorite Beverage" (17 August 1913) and "The Beer that Made Klondike Famous and Milwaukee Jealous" (17 August 1915). The second theme emphasized the product's "home grown" origin and the benefits of buying local. It was, the adds proclaimed, "The Beverage That Keeps the Money in Klondike" (ibid.) and its purchase would "Support One of the Pioneer Industries of the City" (17 August 1917). The third theme seems a curious one today for it solicited "Family Trade" (22 December 1916) and emphasized the "healthful" and "vigorating" qualities of the product. Asking the readers to "Hear the Doctor", beer was claimed "necessary for digestion" by helping food to "assimilate" and by ensuring "a healthy tone to the stomach" (9 December 1913). One must wonder whether this latter campaign was, at least in part, a response to the local growth of a temperance movement. The strength of that movement was witnessed in 1916 when a prohibition referendum was defeated in the Yukon Territory by but a three vote margin (Guest 1982: 230).

In the early years of brewery operations, O'Brien's role appears restricted. He is listed as company president in Polk directories for Dawson City, but the brewery had at least four different managers until 1911 (Table 4). The initial brewmaster, Charles Bolbrugge also appears to have been replaced very quickly, though he returned to the company by 1911. Relative to brewery employment, heated correspondence between Managing Director D. M. Samson on 12 May 1909 to the Crown Timber and Land Agent in Dawson City provides direct information. Objecting to a sawing operation being erected opposite the brewery site on Yukon Ave., and the possibilities of getting sawdust in the beer, he notes that the plant employs "thirteen men, and part of the season fifteen, and have expended to date upwards of $120,000 in wages alone..". Many of these individuals and their roles are listed in Table 4. No doubt because of a shrinking if any

Figure 6. Klondike Brewery ca. 1912. Thomas W. O'Brien is to the rear of the delivery wagon and dressed in a suit coat. Yukon Archives photograph564, National Archives of Canada Photograph.

Name	Position	Dates Noted
Adam, M.	Secretary-Treasurer	1919
Bolbrugge, Charles E.	Brewmaster	1905/6, 1911/12
Brazel, George	Bottler	1905/6
Brazel, Thomas	Bottler	1905/6
Brazil, Robert W.	Bottler	1915/16
Campbell, Robert R.	Manager	1905/6
Carlin, Wayne D.	Driver	1909/10
Case, John	Driver	1907/8
Cullin, Charles E.	Book Keeper	1909/10
Detling (also itt and ett) Wm. F. Ass.	Eng. > Engineer	1909/10,1911/12, 1917/18
Dionne, Gilbert	Engineer	1905/6
Drugan, Chas.	Bottler	1917/18
Eckhart, Jos. A.	Brewmaster	1917/18
Eads, Murray S.	Secretary	1917/18
Eflinger, Reinholdt	Brewer	1905/6
Gatt, Joseph	Bottler > Brewer > Brewmaster	1905/6, 1907/8, 1909/10
Howard, John R.	Manager	1904
Hoven, Chas.	Bottler	1909/10, 1911/12
Kavetzki, Edward	Clerk	1917/18
Lemieux, Eugene C.	Bottler	1917/18
Lindsay, John	Driver	1905/6
Neimeitz, Fred	Bottler	1907/8, 1909/10, 1911/12
O'Brien, Chas. T.	Book Keeper	1915/16
O'Brien, Henry	Bottler	1909/10, 1911/12, 1915/16
O'Brien, Jos. P.	Bottler	1909/10, 1911/12, 1915/16
O'Brien, Thomas W.	President > Pres.-Mgr.	1905/6, 1907/8, 1909/10, 1911/12, 1915/16
Pearse, F. Howard	President	1917/18
Ponzo, John G.	Clerk	1917/18
Richardson, John	Driver	1905/6
Sansen, D.M.	Labourer	1907/8
Seely, Alexander	Production Delivery	1914
Segbers, Joseph A.	Manager	1915-17
Stingle, Joseph W.	Engineer	1907/8
Turner, Rudolph	Brewmaster	1907/8
Valaer, Tobias	Engineer	1905/6
Vinnicombe, F. William	Watchman >Manager	1907/8,1915/16, 1917/18
Vogt, C.	Bottler	1907/8
Wettering, Otto	Helper	1911/12
Wilson, Charles J.	Manager	1907/8

Table 4. O'Brien Brewing and Malting Company Employees as Given in Business Directories and other sources of information.

profit margin, O'Brien assumed the role of manager after 1911 with his teenage sons Henry and James added to the payroll as "bottlers". His health beginning to fail, O'Brien sold his interests in 1915 to Joseph Segbers (Dobrowolsky 1998a: 36) with F. W. Vinnicomb then appointed manager. Vinnicomb had been listed as brewery "watchman" in 1907/1908.

Thomas W. O'Brien died in August 1916. The temperance movement by that time had been successful in ridding the Territory of its saloons and many of the other available liquor outlets. In the fall of 1919, all alcohol sales were temporarily suspended, a situation that was made permanent in February of 1920 (Guest 1982: 230). Although the O'Brien Brewing and Malting Company had been involved in the bottling of non-alcoholic beverages over its history, without its brewing operation it would be impossible to survive. By 1920 one must also wonder whether prohibition simply brought an end to a business that had been on the verge of collapse for nearly a decade. A 11 November 1919 notice in the Dawson Daily News announced what may have been the company's last annual meeting to be held on the same day at 8 PM.

Beer Production, Marketing and other Such Matters

At the turn to the twentieth century, the brewing industry on the west coast of North America was vibrant. The earlier cited supplement to the Western Brewer in 1903 lists a total of 55 independent breweries operating in California, Oregon and Washington State (Arno Press 1974: 533-536) while in British Columbia no less than 31 others were plying their trade by 1905 (Yenne 1986: 132). A few, such as the Olympia Brewing Company, had already grown into a massive industrial operation. The majority were considerably smaller and on a scale comparable to the one O'Brien planned for Dawson City.

The brewing industry is a complex one with its history of technology extending back over several hundred years. It also has a terminology of its own, the basics of which are provided in Appendix C. The manufacture of beer involves a series of five rudimentary steps: 1) preparation of the malt and hops; 2) production of a wort through mashing with the malt; 3) brewing of the wort with the addition of hops; 4) primary

fermentation through the addition of yeast; and 5) aging in which carbonation occurs or is added. Prepared malts and hop extracts could be imported in bulk, and this was the case at the Klondike Brewery in spite of its incorporation as "malster". In announcing that work on the brewery was nearly finished on 29 January 1904, the Dawson Daily News confirmed that "the malt [and hops] left San Francisco on Wednesday last" and that it "could not be obtained anywhere short of the California metropolis". This continued in later years as indicated in a 1912 advertisement in the Yukon Order of Pioneers Membership book in which "the best Bay Malt in California and Simon Hops" were listed (Figure 7). The remaining four stages, from the production of a wort to secondary fermentation and aging, including bottling, would have structured the Klondike City plant layout and operations. These processes required a dedicated series of tuns, storage vats and other equipment in addition to the brew kettle. The brewery further required a cooperage to produce and repair the many barrels and kegs that it would need for its product.

A general description of the interior layout of the Klondike Brewery, and its equipment, are given in two 1904 newspaper articles. Titled "Home Grown Steam Beer", the earliest of these occurs in the Yukon Sun of 21 January (republished in Yukon Sun on 23 January). This story announced George F. Mero's success in being awarded the contract for "transforming the three store and ware room buildings in Klondike City owned by T. W. O'Brien and William Moran, into a modern brewery". The article then goes on to list some of Mero's tasks as well as his construction and/or installation of brewing equipment.

> Besides remodeling and practically reconstructing the buildings, making inclined floor and several steam-tight compartments, he will also construct two [sic] beer vats of the following dimension: Eight feet six inches diameter, by nine feet high; ten feet six inches by eleven feet; seven feet, six inches by ight [sic] feet; eight feet by eight feet; one of 4,000 gallons capacity, four of eight feet six inches by nine feet, and one of rectangular shape, eight by sixteen by two feet.
>
> A copper brewing kettle is being made by Tinners Blair & Johnson, in the making of which one ton of copper will be used. Contracts for engines, pumps and steam fittings have not yet been awarded but will be during the next few days.

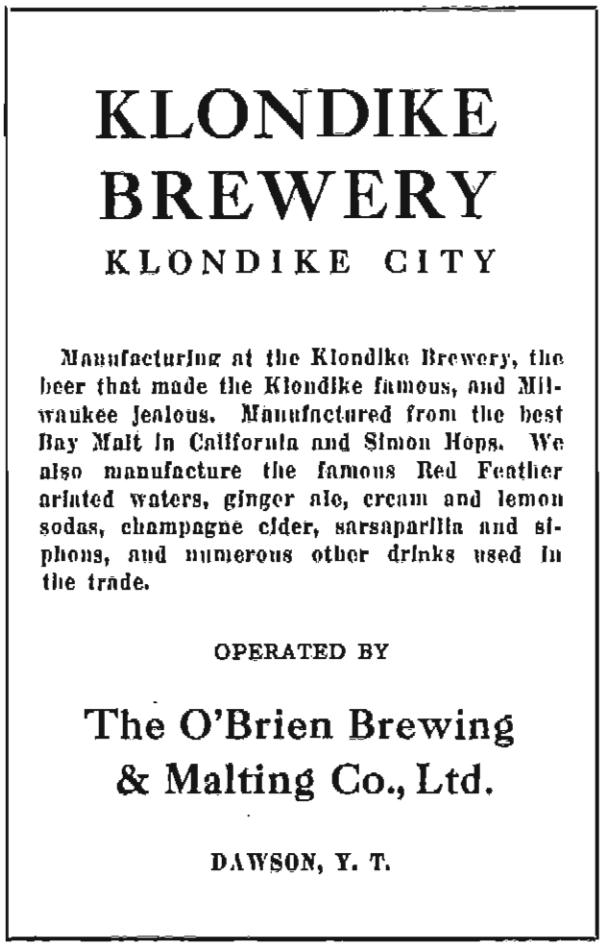


Figure 7. Klondike Brewery Advertisement in a 1912 Yukon Order of Pioneer Membership Book. The original volume is in the Dawson City Museum Archives.

> With the plant now being installed, Mr. O'Brien, president of the brewing company, estimates that 1,200 gallons of beer can be turned out daily and that capacity can be greatly increased at but little cost should the trade warrant.

A Dawson Daily News article of 19 February 1904 speaks more specifically to the organisation and design of the plant, albeit it also provides a radically inflated estimate for output.

> The O'Brien store at the end of Main Street is the brewery proper. The top story, ground floor and basement are all filled with the plant. An addition has been built to the side of the main building for use as a boiler room, and from it the power will be furnished.
>
> In the rear of the main building are the vats and hot water tanks. The basement is used as a cold storage room, where the beer will be brought to the proper temperature. The front of the building contains the cooling tank and the storage tanks, consisting of five large tuns of a capacity of 2,000 gallons each. The capacity of the brewery will be 15,000 [1500?] gallons per day. The business office is also in the front of the building, and the best of material and workmanship characterize the plant.

Errors notwithstanding, these articles are the only known accounts of the interior of the Klondike Brewery and its equipment.

It is difficult to infer from the above Newspaper reports whether the Klondike Brewery deviated from a typical turn of the century brewery operation. Upon his first inspection of the plant, Brewmaster Bolbrugge did comment on his satisfaction with its scale and quality (Yukon Daily Morning World, 1 March 1904), suggesting it fell within the industry norm. That the plant was housed in part within a multi-story building also implies use of the "tower principle", a long standing brewery plan in which gravity flow was maximized in the mashing, boiling, and fermentation stages (Arno 1974: 76-77). The objective was to minimize pumping requirements in light of a power supply limited to steam and manual labour.

The earliest recorded advertisement for the Klondike Brewery, boldly announced that "Lager Beer is Now on the Market" selling at "$24 per Barrel, $18 per Keg, $3.50 per Doz" (Dawson Daily News, 30 September 1904). The advertisement also announced that, in addition to "Blue Label Lager", "Red Label Steam Beer" was available. Lager

requires slow fermentation at relatively low temperature, and the advertisement most likely proclaimed the plant's initial run of lager. Steam beer, on the other hand, is fermented quickly at room temperatures and could be turned out as kegged draft "in just a few weeks" (Downard 1980: 181, also see Appendix B). It would have been the Klondike Brewery product first sampled by Dawson City imbibers, as expressly anticipated in the Yukon Sun headline of "Home Grown Steam Beer".

The origins of steam beer lay with mid-nineteenth century San Francisco breweries, and steam beer may constitute the only "uniquely American brewing process" (Yenne 1986: 69). West coast breweries had a difficult time acquiring ice for low temperature fermentation of lager. Consequently they experimented with and developed a beer where fermentation and clarification took place in shallow open pans at a higher temperature range (Appendix B). The two foot deep rectangular vat described in the Yukon Sun article was most likely for this purpose. Because fermentation resulted in a very flat beer, "special fermenters" (Downard 1980: 181) had to be added for kraeusening within the keg. This led to very strong carbonation which, when the keg was tapped, gave off the appearance of a release of steam.

Other than steam beer and lager, the Klondike Brewery produced several other products over its history. The earliest variation from the basic two types was its run of "Genuine Bohemian Bock" in 1905. To mark this occasion, the brewery proclaimed May 24th, 1905 as the Yukon's first "Bock Beer Day" where "all up-to-date saloons will have this beer on tap" (Dawson Daily News, 17 May 1905). This product subsequently was marketed in bottles as "O.B.B. & M.C. Bohemian". Additionally, the brewery produced "Special Brew" (probably a later name for its lager) as well as a "Porter", "Champagne Cider" and "Ginger Beer" (Figures 8 and 9). The 1912 Yukon Order of Pioneer membership book advertisement further identifies "Red Feather ariated [aerated] water", "ginger ale", "cream and lemon sodas", "sarsuparilla" [sarsaparilla], "siphons" and "numerous other drinks used in the trade" (see Figure 7). Various adds in the Dawson Daily News also list the brewery as sole agents for "Lovera Cigars" which, in later years, was expanded to include "Sweeps, Invincible, Bull Dog, Saratoga, Club House and Banderas" (Dawson Daily News 22 December 1916).

Figure 8. Klondike Brewery label reproductions from the private collection of Brian Denman, Vancouver

Figure 9. Klondike Brewery labels from the collection of Mrs. Anna Hanulik, Dawson City.

Several original labels for the above noted brews and non-alcoholic beverages are presently in the possession of Mrs. Anna Hanulik of Dawson City. As Mrs Hanulik recounted in an August 1998 interview, some forty or fifty years ago she and her father had gone on a walk to Klondike City and the brewery site. During this trip, her father found a large bundle of beer and other labels which had been covered with moss and litter mat. It also is interesting to note that some of these labels were for products of the Eldorado Bottling works, a non-alcoholic beverage company operating in Dawson City from circa 1897 to 1901 (Carter 1990: Entry 38). Mrs Hanulik's Eldorado labels include "Strawberry Soda", "Strawberry Syrup" and "Vanilla Syrup" . Since these labels were found intact at the O'Brien site, we speculate that O'Brien originally may have purchased supplies and equipment from the Eldorado plant for use in his own non-alcoholic bottling operation. This being the case, and taking our speculations one step further, it also is possible that he purchased or salvaged equipment from the earlier Dawson City Brewery as well.

For the majority of its history, the Klondike Brewery sold its product wholesale to saloons, hotels, and retail outlets. Like the Dawson City population, this market was evershrinking, in part due to government imposed restrictions on liquor licenses. Dawson City had 21 saloons in 1902 but that number was reduced to 13 in 1905 and only six in 1909 (Stuart 1980: 21). In an attempt to offset this problem, an agent for the brewery purchased Del's Place in 1915, renaming it the Red Feather Saloon. A 17 August 1915 advertisement in the Dawson Daily News then proclaimed that the brewery would "sell direct to the consumer, thus cutting out the middleman, and giving his profits to our patrons". It also advertised "All Drinks and Cigars 2 for 25 ¢". Yet saloon licenses in Dawson City were under threat of cancellation, and the Red Feather was unable to gain a hotel license for continued sales of alcohol (ibid.: 49). The experiment in direct marketing failed, and the Red Feather Saloon closed its doors no later than 1 November 1915.

The Klondike Brewery Site in the Longer Term

Klondike City was officially surveyed into building lots and road allowances in

the fall of 1897. By this time, according to Dobrowolsky (1998a), the Tr'ondëk Hwëch'in peoples had abandoned their village at Tr'o-ju-wech'in and removed themselves to Moosehide. An 8 October 1897 photograph illustrates that the townsite had quickly developed along the riverfront on its southern end. A myriad of buildings were in various stages of construction with the largest being the O'Brien and Moran Trading Post fronting Yukon Ave. As described earlier in the Dawson Daily News article of 19 February 1904, this log building was the one converted by Mero into the "brewery proper". It was the brewhouse where the production line had been housed. Also illustrated in the 1897 photograph is a log house immediately inland of the trading store. This house was eventually transformed into the cooperage for brewery operations.

A sequent photograph of Klondike City in September of 1898 illustrates little change in the landscape adjacent to the O'Brien and Moran property (see Figure 4). By 1900, two notable events had occurred. First, the O'Brien and Moran store was operating from a building to the north (Figure 10). Presumably, then, the log building had been converted exclusively into a warehouse. Second, a long wood frame building with vertical siding had been erected to the south of the log structure. Separated from it by the width of a building, it too was eventually transformed in 1904 into the brewery's storehouse. Photographic coverage does not illustrate when a third, intervening structure was built. That it was present in 1904 is indicated in the Yukon's Sun's description of Mero converting "three store and ware room buildings".

Mero's contract with O'Brien called for renovations and service installations to be complete within a 15 day period as we have noted previously. We described this as amazing given the scope of work, and the fact that it was being undertaken in late January/early February when temperature extremes of minus 40 degrees Fahrenheit or lower might be expected. As reported in the various news accounts of his progress, Mero's conversion of the three building complex entailed both internal renovations as well as external structural modifications. Of the former, he was said to be building "inclined floors", laying in the steam pipes and other services, as well as building the numerous vats that would be required. Of the latter, the only major reported task is the building of an addition for the steam plant. However, the completion of second stories on

Figure 10. Klondike City 1900. National Archives of Canada PA 17132. The O'Brien and Moran store is the building with the false front. The two longer buildings on the extreme right of the photograph were transformed into the Klondike Brewery in 1904.

the back third of the northernmost building and for the entirety of the central structure may also have been components of work. These upper floors were instrumental to the installation and organization of brewing equipment based on the tower principle. A circa 1905 photograph of the brewery also illustrates a shed-roof addition off the back wall of the northern structure extending its length to the edge of the property limit (Figure 11). This, too, was likely constructed by Mero.

Photographs of the brewery from its opening to its closure are not abundant. Those that are available suggest little if any structural modifications were made to the plant during its period of operation. The Klondike Mines Railway roundhouse was built immediately to the south of the brewery in 1905, and two sets of narrow gauge track were laid along Yukon Ave. to its front. Steam pipes were also run from the brewery's boiler to the roundhouse to supply it heat. The Klondike Mines Railway was another of O'Brien's companies and its first identified cargo "was a load of liquid joy from the brewery" (Yukon Daily Morning World 26 May 1906). Separating the brewery off from the railway was a road allowance or tract given the name O'Brien Avenue (see Figure 2). In the1905 photograph, a platform had been constructed within or on the edge of this tract for the storage of beer kegs. Later photographs illustrate that chordwood was being stacked here as well.

The post 1919 period for Klondike City similarly has a limited number of photographs illustrating Klondike Brewery buildings and their demise. A 1922 photograph of Yukon Ave. from the water shows little change from earlier times, indicating that brewery structures were maintained in the immediate years following its shutdown (Figure 12). Similarly, a Yukon Archives picture (89/12.PHO 385.340) of Klondike City taken from the bluffs above Dawson City continues to illustrate intact brewery buildings nine years later in 1931. By this time, the smokestack for the steam plant was no longer visible and it, presumably, had toppled. Although we cannot verify it in documentary sources, we speculate that the brewery was being maintained in an operational state for a possible reopening, or for sale of its equipment. The latter, in fact, did occur in 1933 when the production line "was dismantled and shipped to Fairbanks by George Webber, master brewer" (Carter 1990: Entry 38). We believe the Fairbanks

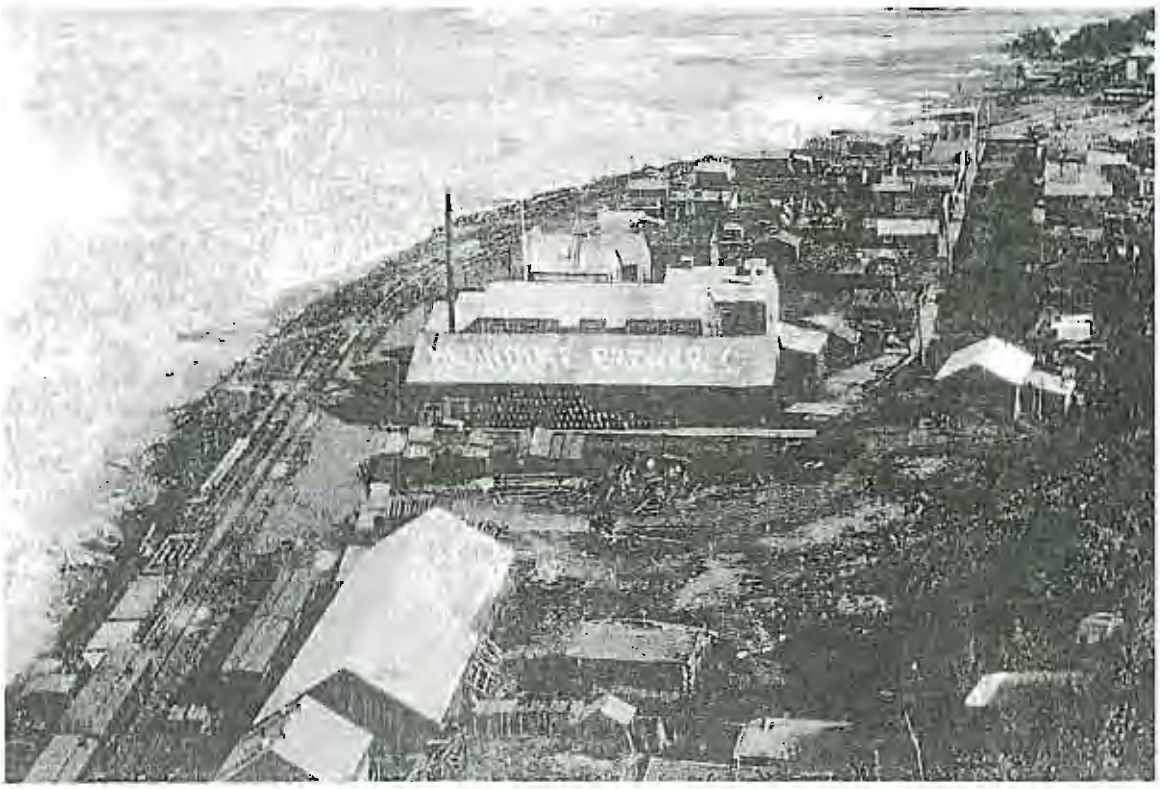


Figure 11. Klondike Brewery ca. 1905. The photograph is from a post card in the private collection of Brian Denman, Vancouver.

Figure 12. Klondike City 1922. Yukon Archives P141,400, Finnie Collection. The Klondike Brewery is in the center right of the photograph.

plant to which reference is being made was the Pioneer Brewery which opened in 1934.

By the 1940s most buildings in Klondike City had been either dismantled for firewood or had fallen into a severe state of decay. Klondike City continued to house a small number of individuals (see Dobrowolsky 1998a: 46-47), but business operations of any sort had long ceased. As for the brewery site per se, it appears to have entered the archaeological record almost immediately after the removal of its brewing equipment. Visiting the site in the late 1940s, Philip Allen (1992: 243) provides confirmation through a photograph he titles "The Broken Brewery Boilers Last Batch". No longer protected by a building, the brewery's water tank had completely rusted through, while it and the steam boiler to its front were now overgrown with brush.

Historical details of the O'Brien Brewing and Malting Company have all but disappeared in the memories of Dawson City residents but the brewery site in Klondike City continues to be well known. Marked on the ground by its steam boiler, it is locally renowned for mounds of turn of the century beer bottles. As lore now holds, these bottle "dumps" formerly were several feet higher but have been severely depleted over the years by collectors. That this collection activity has involved excavations is widely evident across the site. Collection of other artifacts from the brewery is known to have taken place and this, unfortunately, continues into the present.

3

ARCHAEOLOGICAL RECORDING OF THE KLONDIKE BREWERY PROPER

Prior inventories of Klondike City by Minni (1978), Ingram (1989) and Hogan and Skuce (1992) identified a series of features thought to be associated with the Klondike Brewery. Hogan and Skuce (1992: 32) give the most in-depth description as these features existed in October 1991:

> A large L-shaped building depression is evident and was measured, a boiler and other artifacts, metal pipe, squared timbers, a steam engine and a water reservoir remain. A bottle dump was located, the slight remains of a foundation were located on the north and west sides but the east and south ends of the building were indeterminate.

The remains of the cooperage were further identified through the presence of barrel hoops and a large bottle dump. Hogan and Skuce were hindered in their recording abilities by snow cover and frozen ground, and a more definitive ground plan for the brewery was not possible during their survey.

Archaeological field work conducted in 1998 at the Klondike Brewery proper, as outlined in the introduction, was exploratory. The description given by Hogan and Skuce continued to characterize the complex, but the area had become densely overgrown or was difficult to observe due to tangled piles of previously cut slash. Our field goals, consequently, were threefold. The first was to clear the site of existing brush and slash so that building outlines, features and artifacts could be observed. This also involved the raking and removal of leaves and other surface cover. The second objective was to locate and mark the corners for the three adjoining structures comprising the complex. Mitchell's brewery drawings provided an overall ground plan as well as a series of approximate dimensions for assessment (see Appendix A). Controlled test excavations in corner locations as well as expedient shovel tests to identify buried foundation posts also were employed. The third objective was to map building outlines, surface features and brewery related equipment/artifacts. Observations made in the preparation of this map provide the data set from which general inferences of brewery layout and use can be

drawn. With the exception of a very small number of specimens recovered in test excavations, artifacts were not collected during this component of work.

Brewery Buildings

Based on historic photographs, Robert Mitchell was able to provide an overall planview for the brewery proper in which three adjoining structures are depicted (Appendix A). As detailed in our structural history, the northernmost building was the O'Brien and Moran store built in 1897. Although we cannot give the exact date for the remaining two buildings, the southern one was in place no later than 1900 with the central structure built between then and 1904. Once the site area had been cleared of vegetation and ground cover, remnant building foundation features were able to be located (Figure 13). Combined with test excavations, these data allowed us to identify the exact position of individual structures on the ground. They also give limited insight into building architecture and use.

Photographs indicate that the original northern building was of horizontal log construction with notched log corners. To extend building length beyond the length of individual wall logs, five approximate spans of 20 ft were tenoned into grooved vertical upright posts in a "Red River frame" construction style. A second story over the building's back third, as well a shed-roofed extension of approximately 16 ft length at the back, was added in 1904. The base logs of the original structure were set upon an earthen berm retained by logs. Because the berm was not disturbed on the north and east walls during brewery modifications, it was easily identified during the 1998 field project (Figure 14). Test excavations of 1 x 1 m in each of the northeast and southeast corners were able to define exact corner positions. These data indicate that the original building was 28 ft wide (north/south) and 102 ft long (east/west). The building floor was set on squared posts, most being 8 x 10 in. size. Post spacing is estimated to have been 9 ft 6 in. off-centre, although several are irregularly positioned. Nonconforming posts may have been added to strengthen floor load for the brewery operations. Excavation of the northeast corner recovered a concentration of plain, thick, pressed paper that was used as an interior covering over the wall logs. The small number of other artifacts recovered from

Figure 13. View of the northern half of the Klondike Brewery site, looking east.

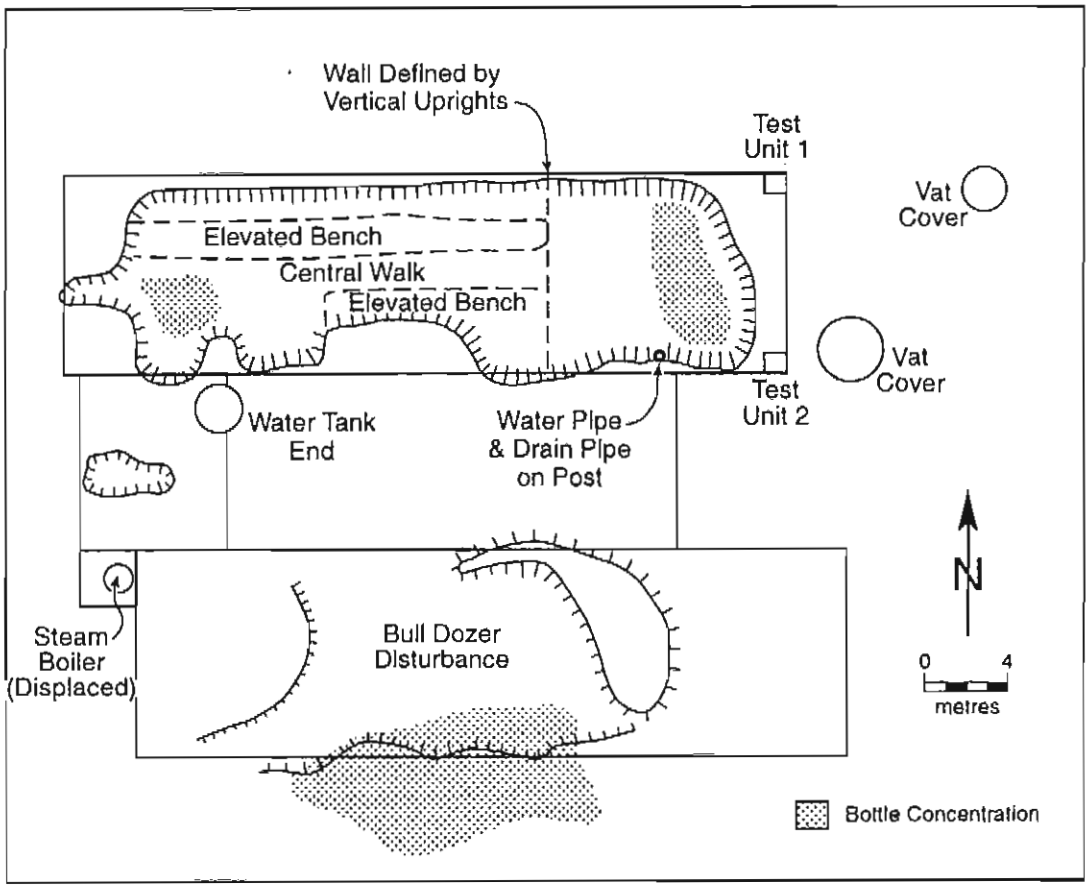


Figure 14. Klondike Brewery building complex and site features, August 1998. Foundation posts for individual buildings are not plotted.

test excavations, most being wire construction nails, have limited interpretive potential (Table 5). Structural features for the back shed-roofed extension were not discernible on the ground or in the test units.

Within the perimeters of the northern building was the "L-shaped" depression identified by Hogan and Skuce (1992). This is "L-shaped" in so far as areas having greatest depth give this appearance. On the whole there is a much larger depression with different elevations and attributes (see Figure 14). As we interpret this, it includes a full-height cellar on the southwestern end, a central walkway down its length, and a crawl space or a more limited height cellar on the eastern end. An external entrance to this cellar may have been centrally positioned under the west wall of the building beneath the front door stairs. The more shallow eastern cellar was separated off by a north/south bearing (?) wall now defined by a series of three upright posts. What were probably elevated storage benches had been excavated on either side of the central walk. These seem to have been retained by cribbing, and it also is possible that the platform surfaces were planked.

The central building was two story, of wood frame construction, with a single story shed-roofed addition to house the steam plant off its front, western end. The original building is presently defined by a series of round log posts upon which floor sills had been set. Posts were set in saw dust on 8 ft centers while remnants on top of one post indicates the use of 4 x 6 in. sills. The building is 25 ft wide with its full length being 84 ft 6 in., including the steam plant. The eastern wall is recessed 16 ft from the southeast corner of the original northern log building. Beneath the steam plant addition was a small cribbed cellar of approximately 8 ft (E/W) by 6 ft (N/S) dimensions.

The third structure of the brewery complex was a single story, wood framed warehouse. Fieldwork was able to identify the east wall corner posts for this building, while the edge of a slight depression defines the western front wall. Building dimensions were consequently defined as 100 ft long by 30 ft wide. Remnant rounded log sill posts were approximately set on 9 ft centers. A small shed addition was also built off the northwest corner. Now represented by a slight depression (10-15 cm deep), it is 8 ft by 8 ft in size. This building, unfortunately, has been heavily disturbed by a bulldozer from

	Unit NE Corner	Unit SE Corner	Total
Glass Sherds			
bottle fragments	-	2	2
window glass	3	-	3
finish with HBC foil	-	1	1
Crown Caps	-	2	2
Common Wire Nail/Spike			
1.5 in.	2	-	2
2.5 in.	4	5	9
3 in.	4	5	9
3.5 in.	1	-	1
4 in.	4	11	15
5 in.	-	1	1
8 in.	1	-	1
Machine Cut Nail			
3.25 in.	1	-	1
TOTAL	20	27	47

Table 5. Artifacts recovered from excavations in the northeast and southeast corners of the northern building of the Klondike Brewery Complex. HBC foil is from a Hudsons Bay Company rye whiskey bottle.

earlier mining activity in the area. The bulldozer push begins off the southwest corner and, running on a diagonal, ends in a mounded pile of sediment and other materials in the eastern half of the building. (Figure 14).

Brewery Features and Equipment

Newspaper accounts from 1904 identify the northernmost building as housing the majority of brewing operations. Surface artifacts and service features for this building attest to this identification. Most notable in this regard are several pieces of water pipe of 1.25 in. diameter. Angled pieces at the western cellar entrance suggests the water originated in the adjacent boiler room and was run lengthwise down the building. In the eastern end along the south wall, the pipe was bracketed to a wooden post and angled upward through the floor (Figure 15). Adjacent to this post is a 3 in. drain possibly marking the location of a sink. In so far as this back part of the building is the area where mashing and brewing was taking place, water would have been of critical importance for beer production and for the cleaning of tuns, brew kettle and other equipment. The original source of the water has not been identified.

In addition to pipes, the full-height cellar in the southwest end of the building and the lower crawl space in the eastern end are filled with complete and broken bottles, barrel hoops and bungs, corks and crown caps, domestic artifacts, tools and assorted other materials. Test excavations to more completely identify the nature of these deposits were not carried out. The bottles, barrel hoops and closures undoubtedly result from bottling activities although it is uncertain whether this took place at the front or rear of the building. Side plate covers from a "Perfection Bottling Machine" were originally found within the back cellar depression by Skuce (1998 Pers. Comm.)(Figure 16). This machine was patented in 1901 and was able to fill bottles with a wide variety of closure types (Figure 17). Skuce also reported the presence of an elaborately decorated crown capping device in 1991, but this has since been removed by a collector.

The shed-roofed addition identified as the boiler room has the densest concentrations of machinery and features. Included in its cellar depression are a pump,

Figure 15. Close-up view of 3 in. diameter drainpipe and 1¼ in. diameter water pipe situated at the eastern end of the cellar depression along the south wall. Photograph taken looking south.

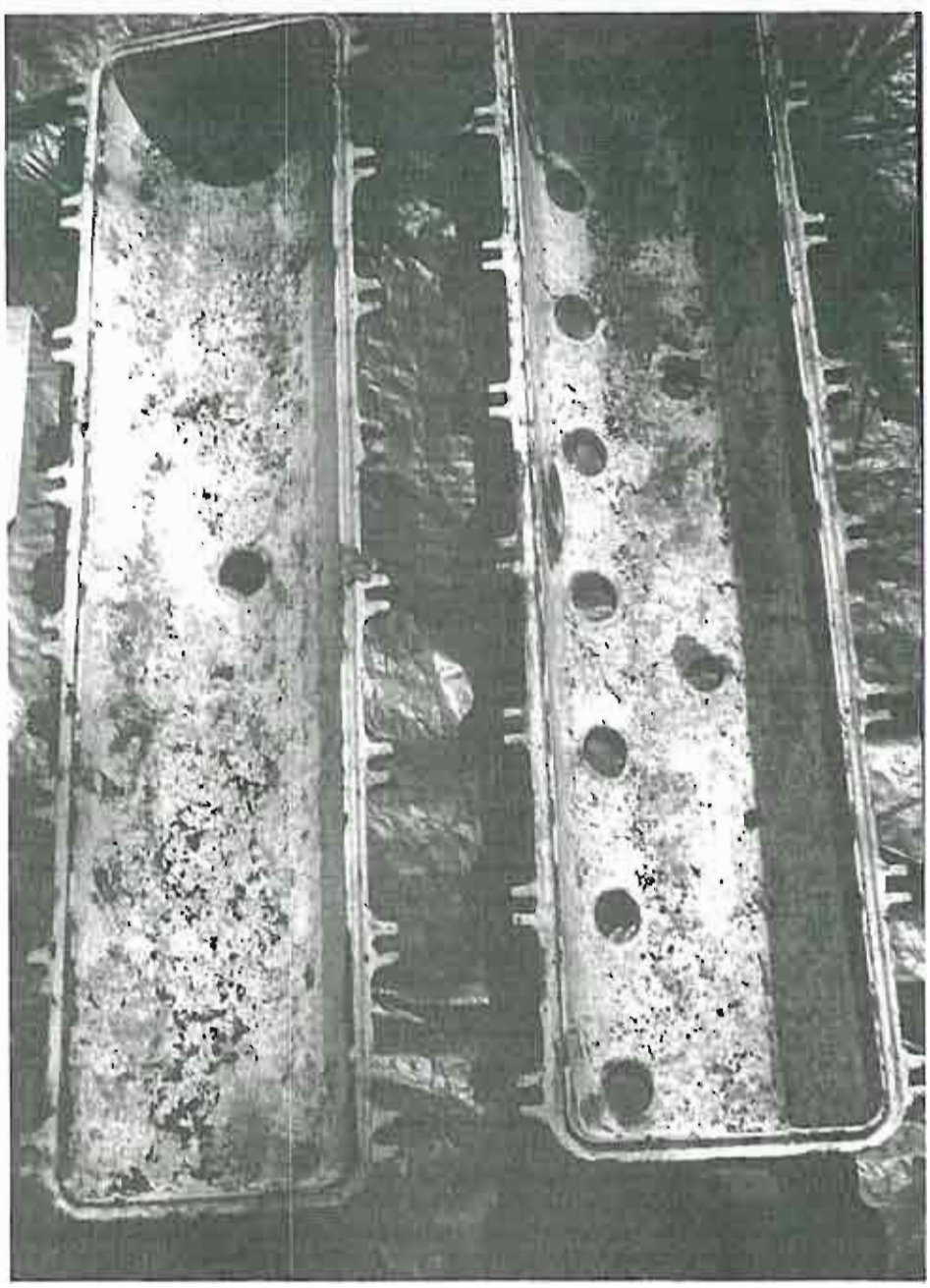


Figure 16. Body plate covers for the Perfection Bottling Machine found at the Klondike Brewery site.

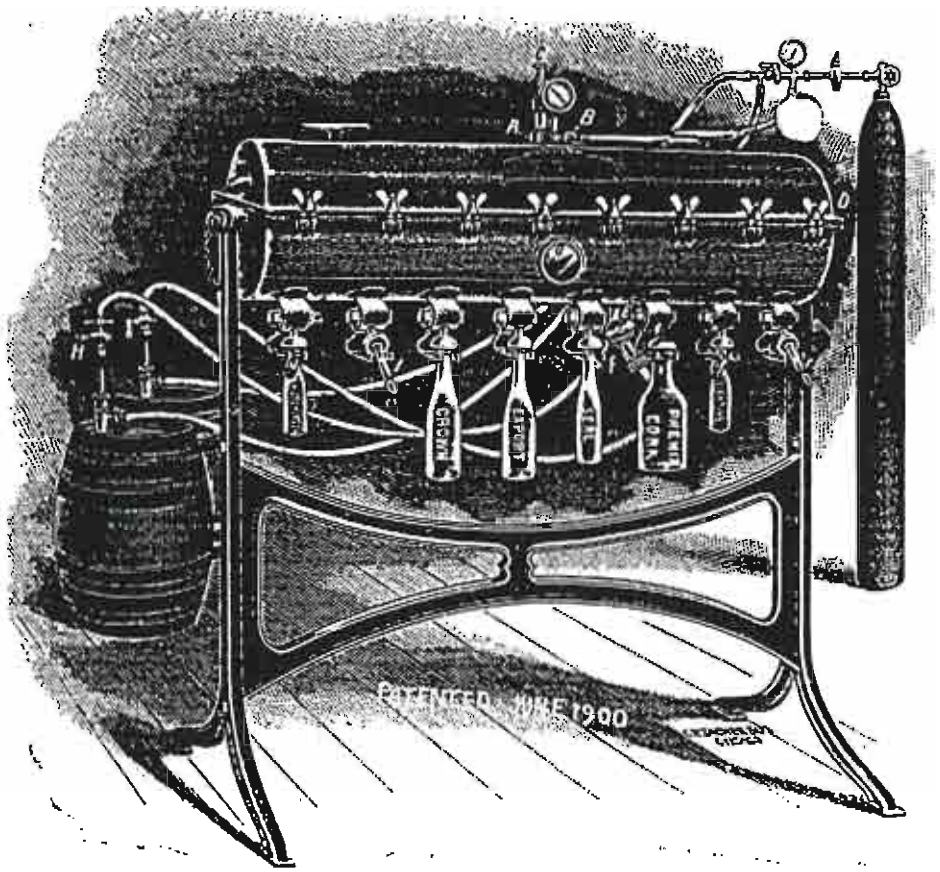


Figure 17. Perfection Bottling Machine, patented June 1900. Drawing is taken from Perfection Bottling Machine Company letterhead, 141-143 Clinton Street, Chicago, Illinois, in correspondence of 11 September 1902 to the Calgary Brewing and Malting Company. Correspondence on file with the Glenbow Archives, Calgary.

the end of a drying hopper (?), and numerous other materials and fittings (Figure 18). Adjacent to this depression are the remnants of a collapsed water tank having a 6 ft 10 in. diameter and an approximate length of 10 ft. This tank, set on its side, was supported by an under-series of wooden rests set on I-beams. It has an estimated storage capacity of 2700 U.S. gallons. The late 1940s photograph of this tank by Allen (1992: 243) also illustrates that the steam boiler had been positioned to its front.

The steam boiler, presently, is one of the most recognizable industrial features of the brewery. Displaced to the south of its original location in the boiler room, it has a diameter of 3 ft 4 in. and is 7 ft 4 in. high (Figures 14 and 19). A small section of its former 50 ft smoke stack remains on top (see Appendix A front facade). The boiler face plate has been removed, but a series of inspection marks are inscribed on its surface. These indicate that the boiler was completed on 20 July 1900 and that inspections had taken place on 27 August 1907 and 22 August 1913. A review of Yukon Government Sessional Papers also reveals that boiler inspections took place on at least two other occasions. One of these was in 1915 when Joseph W. Stingle, Territorial Boiler Inspector, described two operational "Clyde" type boilers with 45 and 18 horsepower capacities (Government of Yukon Territory 1915). The second, also by Stingle, was in 1918. During that inspection he alternatively described the 45 horsepower boiler as a "Scotch Marine" and the 18 horsepower one as a "Vertical Tubular" (Government of Yukon Territory 1918). The 18 horsepower vertical tubular is the boiler present at the site today.

With the exception of a scattered assemblage of firebricks on the surface of the south building area, additional service features or artifacts were not observed within the perimeters of the remaining two structures. The bricks include five different types and three different manfacturer's marks. What they may have been used for is not apparent.

External Features

Areas adjacent to the brewery proper were not intensively examined for artifacts or external features. Nevertheless, two large galvanized and riveted vat covers are present

Figure 18. Boiler room area and cellar depression container a pump, the end of a drying hopper (?) and various other materials. Photograph looking east.

Figure 19. Klondike Brewery 18 horsepower vertical tubular boiler. The boiler has been displaced from its original site in the brewery. Photograph looking north.

to the back of the northern building (Figure 14). The largest of these has a 9 ft 6 in. diameter. It has been hinged in the middle and appears to have been cut away from the vat when it was removed. The second, which has a diameter of 5 ft 6 in., is cone-shaped with handles on either side (Figure 20). A rectangular hole, through which a tree now grows, has been cut into the top. With both vat covers being outside of the brewery proper, it seems likely that they were placed here in 1933 at the time the brewing equipment was dismantled and taken to Fairbanks. The function of the vats can only be speculated upon, but it seems likely that they were part of the wort cooling process once it had been drained from the brew kettle, or from a fermentation tub (see description in Appendix B).

We have noted that the southern wall of the storehouse along O'Brien Ave. was partially disturbed by the bulldozer push. Also partially displaced in this area was a concentration of whole and broken bottles (Figure 14). Photographs indicate that a platform had been built here and this variously was used for storage of kegs, barrels, chord wood and other items (see Figure 11). The presence of bottles indicates that they, too, were stored on the platform at the time of brewery closure. Shovel test excavations to define the building wall line indicates that a klinker (burned coal slag) matrix had been deposited on the ground surface beneath the platform. With a depth of approximately 30 cm, this material would have improved drainage and created a compacted level surface. Steam engines of the Klondike Mines Railway burned coal when available, and cleaning of their fireboxes provides a source origin for the klinkers.

Summary and Observations

The 1998 investigation of the Klondike Brewery was limited in scope. We sought to define brewery buildings on the ground as well as record structural features and artifacts where present. To this extent, the project was a success. Building corner locations were evident and marked, brewery foundation remnants and post patterns have been documented, and other features and artifacts have been plotted on a site map. We believe that the overall archaeological record for the brewery proper is largely intact. After the brewing equipment was sold in 1933, buildings were dismantled, probably for

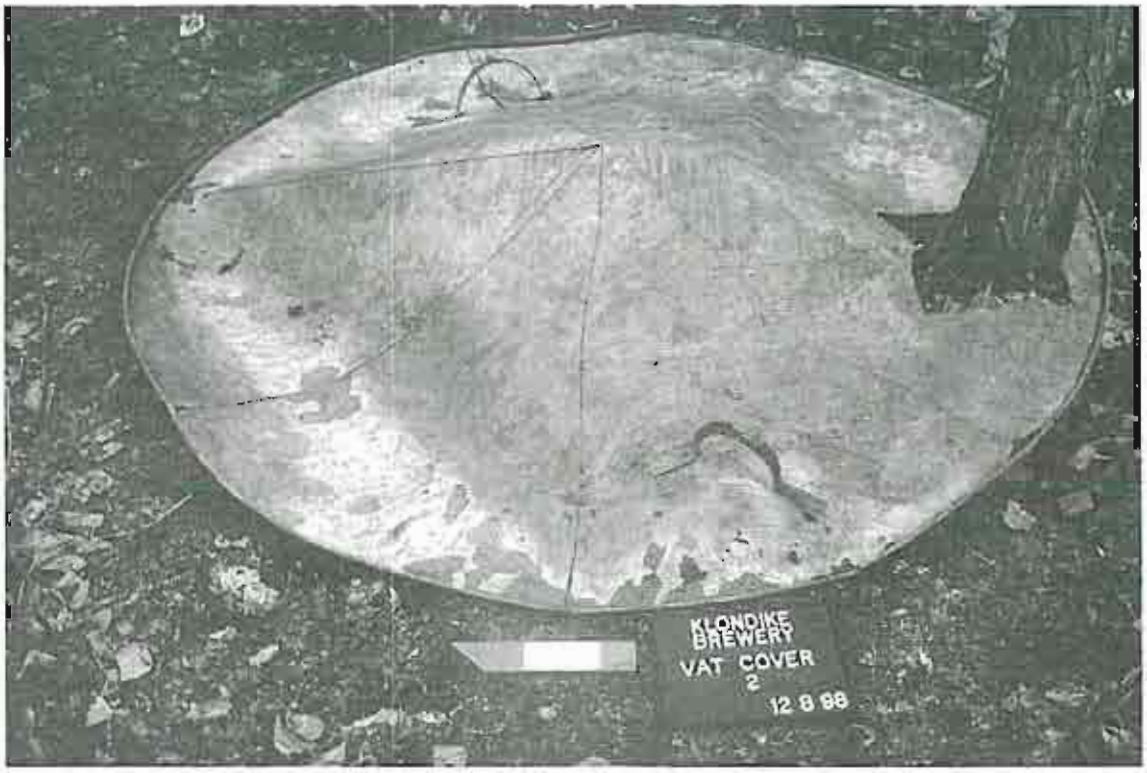


Figure 20. View of 5 ft. 6 in. diameter cone-shaped vat cover with handles situated along the east side of the northern building.

use as firewood by the few remaining Klondike City residents. The site quickly would have become overgrown with its present day archaeological record becoming established. Some disturbance by artifact collectors has occurred since that time, but this has not radically altered research potential. The only significant impact on the site was caused by a recent bulldozer push across subfloor deposits of the southern structure. Based on a comparison to other undisturbed areas of this building, few *in situ* materials or features seem to have been present.

Of the brewery proper, equipment and features of the steam plant are most complete. The steam boiler, water storage tank, pumps, and other equipment remain *in situ* or close to their original location. Least intact, unfortunately, is the brewhouse and its apparatus. Sale and subsequent removal of brewing equipment appears to have been reasonably complete. This minimally included the copper brew kettle, mash tun, warm beer cooling vat and all of the associated fittings. We suspect that the different wooden vats used for primary fermentation and aging were also taken as associated metal strappings were not observed. Perhaps most surprising, the Perfection Bottling Machine and the Crown capping device were left behind. More efficient technologies with greater capacity well may have been developed by 1933.

4

ARCHAEOLOGICAL RECORDING OF THE COOPERAGE AND RIVERFRONT BOTTLE DUMP

Although field research largely focused on the brewery proper and its associated features, two additional components of the O'Brien Brewing and Malting Company complex were identified and investigated. The first was the remains of a cooperage and bottle dump situated to the rear of the plant on the opposite side of Mountain St. (see Figure 2). The second is indicated by a dense scatter of fragmented bottle glass and other materials on the Klondike City shoreline. This latter assemblage originates from a large, brewery-associated bottle dump deposited over and along the Yukon River bank. Both the cooperage and river bank dump components were recorded on site maps and probed with test excavations to assess integrity and research potential.

The Klondike Brewery Cooperage

The cooperage building was constructed by October 1897 and appears on early photographs as a typical log cabin with a porch or small extension off its northeast corner (see Figures 4 and 11). That it was part of O'Brien's original trade store complex is indicated on a 1901 Dawson City Museum photograph (Olgilvie 1994.123.51). This not only illustrates the close proximity of the cabin to O'Brien's warehouse, but the presence of a boardwalk connecting the two. It cannot be verified through newspaper accounts but we suspect the cabin was immediately converted into a cooperage/work room from the outset of brewery production. Because of the nature of cooperage activities and the refuse it creates, a separate building would have been appropriate, if not required.

In 1998 the cooperage site was densely overgrown (Figure 21). Survey in this area was able to locate previously documented surface exposures of complete and broken bottles as well as tangled stacks of iron barrel hoops, many wired together in sets of graded sizes. How these surface remains related to each other, or to foundation remnants for a former building, initially were unclear. Partial site clearance and expedient shovel

Figure 21. South end of the cooperage site with stacked barrel hoops in the foreground. Photograph looking northwest.

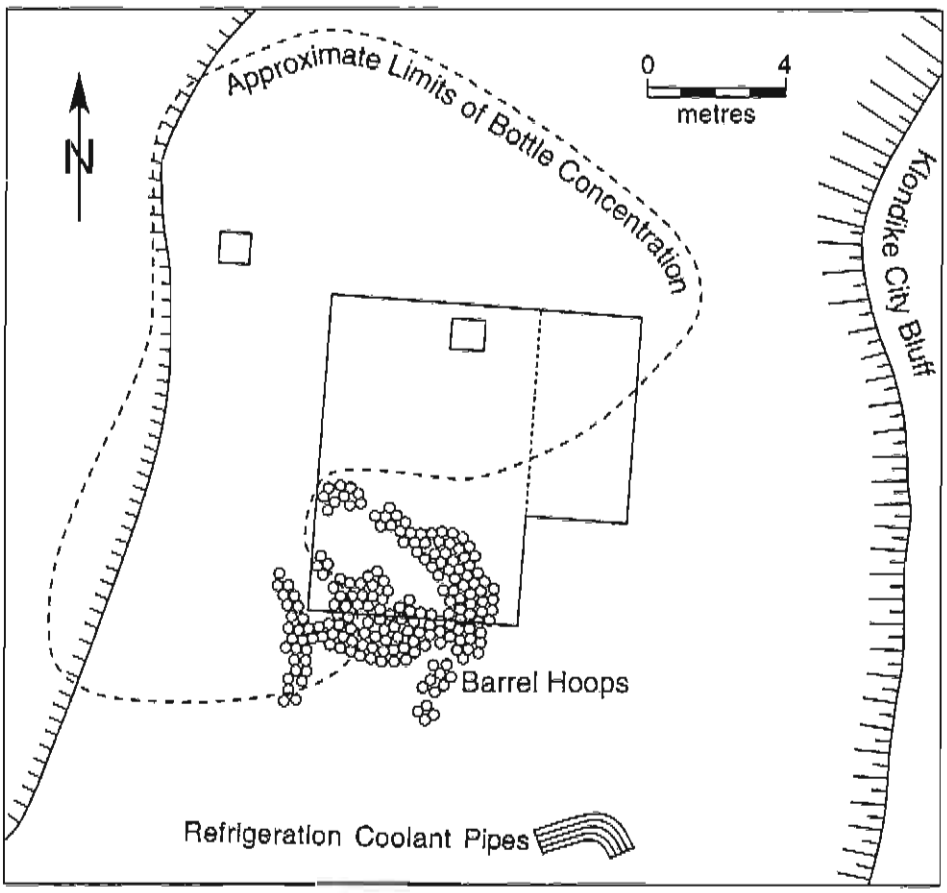


Figure 22. Klondike Brewery cooperage building and feature outlines, August 1998. Klondike Brewery is located to the west, as oriented in Figure 2.

testing to determine building outline and corner locations were successful in delimiting the original structure (Figure 22). This building was 31 ft N/S by 20 ft E/W with the shed extension off the northeast corner being 10 x 20 ft. Packed concentrations of whole and broken bottles occur outside of the building's northern and western walls. Test probes further indicated that these bottle deposits extended inside the building in the northern-most rooms. The iron barrel hoops were located on the southern end of the structure both within and to the outside of the south wall. Scattered over the surface of the cabin were metal straps, keg bungs, corking guides (?), pipes of various types and assorted other materials, the majority of which could not be identified as to function. A shovel test in the southeast corner encountered a concentration of pitch used for the sealing of kegs and vats.

Excavation of 1 x 1 m test units inside and outside of the building provide interesting insights into the origins and nature of the bottle assemblage as well as a limited number of other brewery related artifacts (Table 6, Figure 23). The initial excavation unit was placed off of the northeast corner to test the depth and integrity of what then appeared as a bottle dump. This unit was taken to a depth of 25 cm below surface with the entire matrix consisting of densely packed bottles and glass sherds mixed with root mat. Once through the glass, the remains of three adjacent wooden barrel ends were exposed as well as underlying klinker fill (Figure 24). The klinker fill was identical to that outside of the south wall of the brewery. At the cooperage, it had been used to raise the surface elevation and create a level and hard-packed platform. Based on this excavation, we argue that the glass assemblage did not originate from intentional dumping. To the contrary, it appears to have been bottle stock that was being stored in wooden barrels set on-end on a leveled platform west and north of the cooperage. These bottles included both clear and dark brown colors but nearly all had Crown type finishes. As the barrels disintegrated, their contents were deposited on the surface giving the hummock-like appearance of a dump. Collecting activities may have had a selective impact on the bottle assemblage over the years but it seems unlikely that these deposits were considerably higher or more extensive in the past.

EXTERIOR UNIT				
Category	**Material**	**Artifact Type**	**Description (mm)**	**Number**
Beverage Containers	Glass	Bottles & Bottle Glass	Quart Sized Lager Beer, Liquor and Miscellaneous Bottles	MNI=194
Brewery Related	Metal	Valve	Brass valve which may have been used in conjunction with barrel bungs	(n=1)
	Cork	Cork Stoppers	Fragments of cork stoppers	(n=2)
	Metal/ Cork	Crown Closure	Corrode crown closure – stamp mark unidentifiable	(n=1)
	Lead	Lead Seal	Fragment of corked bottle lead foil seal	(n=1)
Structural	Metal	Pipe Caps	Threaded caps to seal off ends of pipe	(n=2)
	Metal	Nails	Wire pulled	(n=4)
Misc..	Metal	Loop	Metal loop used for securing leather strapping	(n=1)
	Leather	Strapping	Fragments of leather strapping	(n=3)
INTERIOR UNIT				
Beverage Containers	Glass	Bottles & Bottle Glass	Quart Sized Lager Beer, Liquor and Miscellaneous Bottles	MNI=236
Brewery Related	Metal	Valves	Brass valves and threaded sleeves which may have been used in conjunction with barrel bungs	(n=13)
Food Related	Metal	Tin Slip Lid	Partially corroded embossed slip lid (:...STEE.../[M]ADE/...CREAM/... OWDER)	(n=1)
Furnishings	Metal	Light Socket	Suspending type light socket/fixture	(n=1)
Structural	Glass	Window Panes	Two window pane fragments	(n=2)
	Metal	Nuts/Bolts	Bolts/Nuts vary in size with either square or hexagonal head; one threaded pipe	(n=7)
	Metal	Nails	Wire-pulled and machine cut	(n=3)
	Metal	Washers	Large diameter washers – typically used with threaded rods to hold structural components together	(n=3)
	Metal	Miscellaneous	U-shaped wall clamp and door jamb plate	(n=2)
Tools	Metal	Chisel	Heavy chisel/driving wedge with flared cutting edge	(n=1)

Table 6. Summary of artifact assemblages recovered from the 1 X 1 m test units excavated within and directly outside of the cooperage building site. MNI (minimum number of individuals) figures were tabulated based on the total number of bottle bases with greater than fifty percent intact.

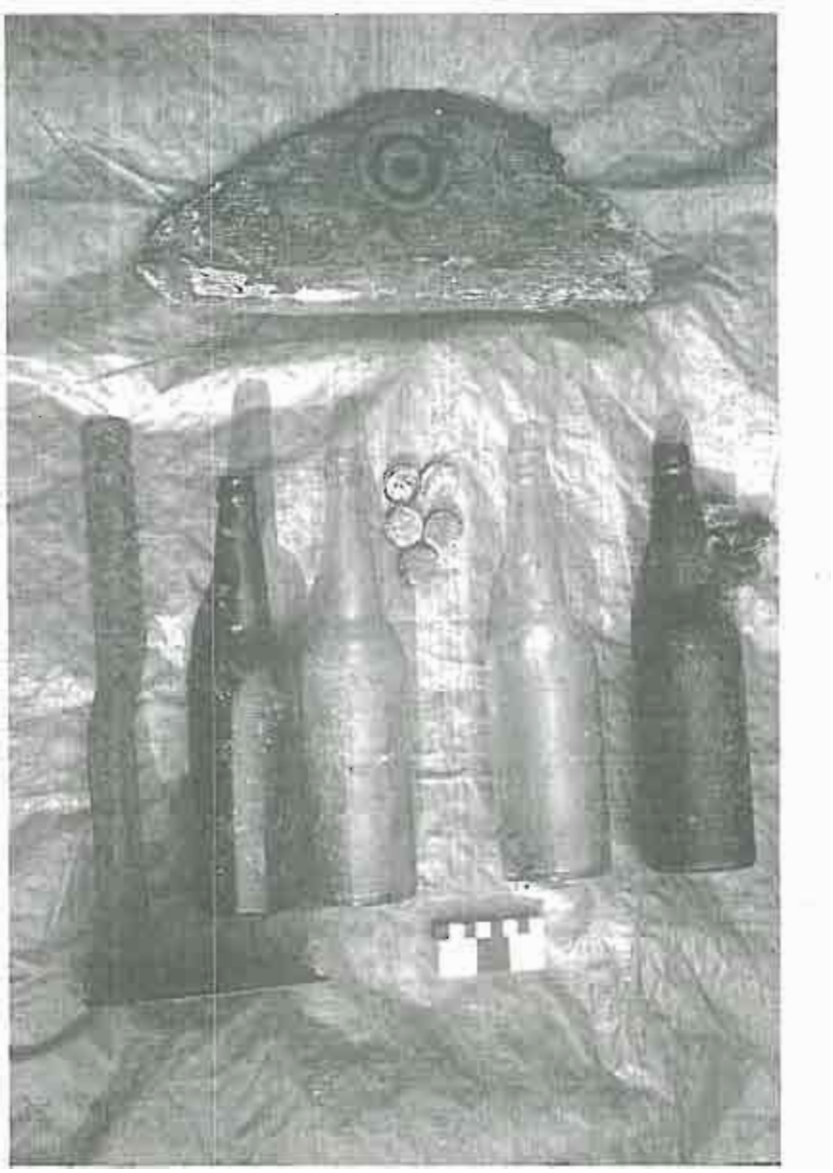


Figure 23. Collage of artifacts recovered from the cooperage site excavation units and from the surrounding area.

Figure 24. Exposed barrel ends at the bottom of the excavation unit placed off of the northwest corner of the cooperage building. Photograph looking west.

The second 1 x 1 m unit was positioned to the inside of the northern wall of the cooperage. The objective for this unit was to assess the origins of the bottle glass concentration inside the building as well as examine architectural remains of the cabin. Taken to a depth of between 25 and 35 cm below surface, this excavation also indicated that the bottles had been stored in barrels. In this case a barrel had collapsed on its side, and barrel staves were found over and under the bottle assemblage (Figure 25). Unlike the case in the previous excavation, nearly all of the recovered bottles had cork stopper type finishes. As Crown finished bottles would have been the norm in the later years of brewery production, the internal cooperage assemblage most probably was in storage as a backup bottle supply. The excavation also exposed remnants of the cabin floor and understructure. These include 6 in. wide N/S floor boards set edge to edge overlying an earlier floor or subfloor set on a SW to NE diagonal. A single E/W joist was positioned 3 ft in from the north wall.

Given the preceding observations, we offer the following interpretations. The cooperage structure was divided into a north and south room plus the addition. The south room served as the cooperage proper where barrels and kegs were assembled and repaired. Both surface artifacts, the distribution of barrel hoops outside and inside this room, and the presence of pitch support this interpretation. The northern room, on the other hand, appears to have been used for storage, predominantly including a supply of older cork stopped bottles that were being held in reserve. Elevated platforms on the north and west sides of the buildings also were used as storage locales for bottles packed in barrels. In so far as these were outside of the building, and the bottles have Crown type finishes, this must have been a temporary holding area for bottle returns. Cooperage remains and artifact collections are less disturbed than was the case at the brewery proper. Consequently we believe that little material was removed from the structure in 1933 when the plant equipment was sold. The barrels also may have begun to disintegrate by this time, making the removal of bottle stock a difficult and time consuming task.

Figure 25. Exposed barrel staves and floorboards at the bottom of the excavation unit placed along the inside of the north wall of the cooperage building.

The Riverfront Bottle Dump

Broken bottles and assorted glass fragments are now scattered on the Yukon River shore from the southern end of Klondike City downstream for a distance of over 250 m. This collection is different from bottle concentrations at the brewery and cooperage. While the typical beer bottle form employed by O'Brien is present, so too are a variety of liqueur, champagne, spirits and other types. In 1998 the source of this material was easily located. Riverbank erosion and bottle collector excavations had exposed a thick buried lens of glass immediately to the front of the Klondike Brewery. Obviously originating as refuse from the O'Brien operation, the bottle dump's spatial extent and assemblage integrity was not apparent from surface remains. A single 1 x 1 m test unit and a series of shovel test probes were excavated to gather this information.

The 1 x 1 m test unit was positioned on the inland edge of a lower terrace 4 m to the east of the riverbank bottle lens (Figure 26). The upper 10 cm of this excavation revealed a series of sterile laminated flood deposited silts. Below this is a densely packed glass stratum extending to a depth of 70 cm below the surface. Although predominantly consisting of whole and fragmented bottles, this also included crown caps, bunched up balls of paper labels, light bulb fragments, soda siphon pieces and a variety of other materials (Table 7). The bottle assemblage includes an interesting diversity in form and closure type as outlined in our subsequent analysis (Figure 27). As for dump origins, we speculate that the brewery collected all of the bottles it could acquire from Dawson City early in 1904. After sorting and retaining bottles of roughly equivalent type and closure, the remainder were discarded over the riverbank. Later refuse from the brewery, and especially that associated with the bottle cleaning operation, was dumped here as well. This included paper labels from Klondike Brewery bottles as well as a variety of other beers and mineral waters. The discard of Klondike Brewery bottles, many with crown caps still in place, is further indicative of breakage at the plant.

To assess the spatial extent of the bottle dump, systematic shovel tests at 2 m intervals were excavated north/south along the shoreline while others were placed inland of the bank. These indicate that the dump occurs over a distance of 30 to 35 m along the

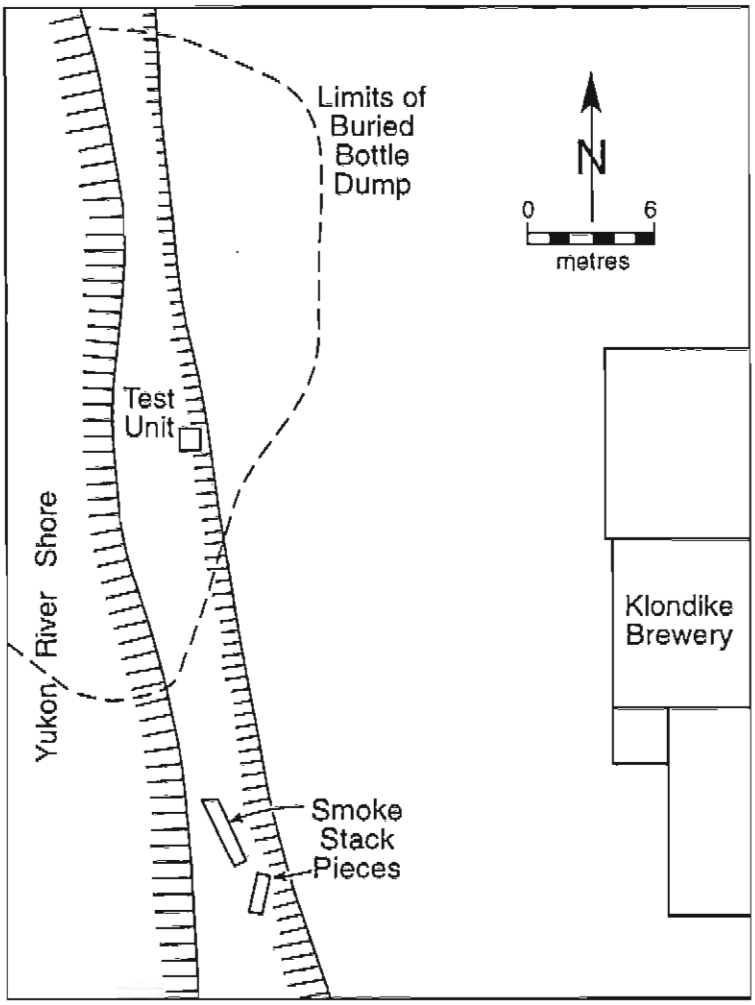


Figure 26. Klondike Brewery riverfront bottle dump, August 1998. The limits of the dump were determined using systematically spaced shovel tests.

Category	Material	Artifact Type	Description (mm)	Number
Beverage Containers	Glass	Bottles & Bottle Glass	Quart Sized Lager Beer, Liquor and Miscellaneous Bottles	MNI=359
Brewery Related	Cork	Cork Stoppers	Fragments of cork stoppers	(n=25)
	Metal/ Cork	Crown Closure	Corroded crown closure – stamp mark unidentifiable	(n=286)
	Metal/ Cork	Crown Closure	Corroded crown closure – marked with Klondike Brewery logo	(n=75)
	Paper	Labels	Clusters of used bottle labels from the brewery and other companies	(n=4)
	Rubber	Seals	Rubber seal with pull tabs	(n=10)
	Lead	Lead Seals	Fragment of corked bottle lead foil seals	(n=2)
Food Related	Bone	Animal	Butchered bone fragments	(n=2)
	Metal	Tin Can	Corroded sardine tin	(n=1)
Personal	Rubber	Shoe	Segment of rubber boot	(n=1)
Structural	Glass	Window Pane	Fragments of window panes	(n=13)
	Metal	Nails	Wire pulled	(n=5)
	Rubber	Hose	Fragments of reinforced hose	(n=2)
Misc.	Brass	Cartridges	Rifle cartridge shells	(n=2)
	Metal/ Bone	Knife	Small partially corroded jackknife	(n=1)
	Metal	Steel	Fragments of metal plating or strapping	(n=12)
	Metal	Tin Cans	Fragments of tin cans	(n=6)
	Metal/ Glass	Light Bulbs	Fragments of light bulb filament and socket	(n=3)
	Metal/ Glass	Finish Closures	Glass stopper and metal threaded cap	(n=2)

Table 7. Summary of artifact assemblage recovered from the 1 X 1 m test unit excavated along the riverfront bottle dump. MNI (minimum number of individuals) figures were tabulated based on the total number of bottle bases with greater than fifty percent intact.

Figure 27. Collage of bottle types recovered from the 1 X 1 m riverfront excavation unit (left to right: Plymouth Gin, navy rum, soda beverage bottle, G.H. Mumm's & Co. champagne and Booth's Gin).

shore and up to 10 m inland with an estimated spatial extent of circa 250 m^2. The density of glass undoubtedly varies over this area but the sheer abundance of complete and broken bottles is impressive. In total we estimate that it includes no less than 175 m^3 of densely packed bottle fill. Indeed from the 1 x 1 m unit alone, the minimum number of individual bottles using base counts was 359, of which 16 were complete. This assemblage also is significant for it represents a cross section of alcohol, wine and beers available in Dawson City. In short, it is a microcosm of turn of the century drinking behaviors in the Klondike.

Other Features

Along the river bank and in areas adjacent to the cooperage are scattered pieces of equipment and artifacts with clear associations to the brewery. In the case of the former are two large segments of smoke stack from the vertical tubular boiler already described. Near the latter are hand tools, furniture parts and fragment of the many other artifacts left behind when the brewery closed its door for the last time in 1920. Of particular note is a series of interconnected curved pipes that were stacked 6 m to the southeast of the cooperage building (Figures 22 and 28). These, as best as we can determine, are cooling pipes from an artificial refrigeration unit. Refrigeration would have been of critical importance in the slow fermentation process and storage of lager. However, since the technology for large scale refrigeration in the brewing industry had only taken place in the latter decades of the 1800s, and it was most commonly employed in mass commercial brewing operations in the south, its appearance in the Klondike Brewery seems surprising (see Arno Press 1974: 184).

Summary and Observation

Recording and test excavations at the Klondike Brewery cooperage and a riverfront bottle dump have defined two additional components with considerable interpretive potential for the O'Brien Brewing and Malting Company site. In the case of the cooperage, structural remains, equipment and surrounding features are well preserved. The cooperage would have been a critical operation for the brewery and the opportunity to gain a relatively complete insight into this aspect of the industry currently exists.

Figure 28. Stacked series of artificial refrigeration coolant pipes near the Klondike Brewery cooperage. Photograph looking east.

Equally interesting are the bottle concentrations around and within the building. We can only approximate the number of complete bottles that potentially remain based on our test excavations. We suggest, nevertheless, this assemblage could include well over 3000 specimens. The presence of corked stopped bottles inside the building compared to Crown finished types outside also provides an interesting pattern, one related to reserve storage versus active reuse.

The research potential and implications of the river front bottle dump also seem considerable. They reflect and inform upon a number of activities at the brewery, particularly those related to the collection, recycling and cleaning of the bottle supply. Perhaps more importantly, this component of the site presents a microcosm of alcoholic and other beverage consumption in Dawson City *circa* 1904. In this it incorporates a wealth of information that may not be acquired from other sources.

5

THE KLONDIKE BREWERY BOTTLE ASSEMBLAGE

In the preceding section we describe the excavation of three 1 x 1 m units in the cooperage and riverfront bottle dump. Our original intention was to undertake an expedient infield analysis of recovered materials; the volume of bottle glass made this task impossible and the quality of the assemblage warranted more indepth examination. Consequently a large collection of glass was removed for study at Simon Fraser University. Our analysis here focuses upon complete specimens, base segments, and necks with finishes. These allow us to make some general statements about the number of bottles represented in the excavations, the types of bottles and closures employed by the brewery, distributional patterning at the site, the different companies and locations at which these bottles were originally manufactured, the probable means by which the bottles were acquired, and the diversity of products that were initially collected and discarded in the riverfront bottle dump. To give this discussion context, we first briefly discuss the dynamic nature of the bottle manufacture industry in the period preceding the opening of the brewery.

Bottles and Closures at the Turn of the Nineteenth Century

Just how far back the bottling of beer extends in North America is unknown, but it is interesting to note that in the latter decades of the eighteenth century the United States Congress was providing tax incentives and loans to encourage the production of "black quart bottles" for this purpose (Arno Press 1974: 183-184). Certainly by the 1860s and the advent of a large scale commercial brewing industry, both domestic and imported bottled beer was commonplace. Glass bottle manufacture was a labour intensive

endeavour with individual bottles blown into moulds and the finish applied by hand or with a lipping tool. Bottles used for beer characteristically were corked, secured by a wire loop, and most frequently sealed with a lead zinc or tin foil wrapping. In the late 1800s several alternative closure types were patented, some gaining a degree of popularity. Charles de Quillfeldt's 1875 invention of the Lightning Stopper was one, a contrivance that greatly facilitated bottle refilling (Shackley 1999: 8). Of these types, the most significant in the long term was the crown cap closure invented by William Painter and patented in 1892. This is the crimped-on metal bottle cap that continues to be commonplace today. Yet, and in spite of the numerous innovations, the Western Brewer (Arno Press 1974: 112) continued to describe the cork and wire closure method as the brewing industry norm as late as 1903, and on the eve of the Klondike Brewery's founding.

Within the history of bottle manufacture, the crown cap closure had a role to play well beyond its use as a beverage bottle stopper. Shackley (1999: 8) has recently implied that, at least in part, it initiated a revolution in turn of the century bottle production technology itself. Crown cap closures required bottle lips that were perfectly standardized, a feature that could not be guaranteed with lipping tools that were rarely of uniform size and character. Painter and Michael Owens invented the semi-automatic bottle machine in 1895 to accommodate this problem, a technology in which neck and lip were produced automatically. In 1903 Owens subsequently invented the fully automatic bottle machine. Automation dramatically decreased cost and increased bottle production output and availability. In this, the roots of the modern day bottle industry were laid. Both mould blown and Owen's type machined bottles are present in the brewery collection.

The majority of the bottles with base markings recovered from the Klondike Brewery can be associated with bottle manufacturing plants of the Adolphus Busch Glass

Company in Illinois. Adolphus Busch was the son-in-law and heir to Eberhard Anheuser, the founder of the Anheuser-Busch Brewing Empire. This company envisioned an expansion of the industry from a regional presence in the midwest in the 1860s, to one that shipped beer throughout the United States, and especially into an ever expanding western market. For long distance transport the beer needed to be preserved. Anheuser-Busch accomplished this through pasteurization beginning in 1873, and through the use of railway freight cars packed with ice (Anheuser-Busch n.d.). In 1876 Anheuser-Busch introduced Budweiser, a lager beer that gained great popularity, particularly among German and East European immigrants. To show off and emphasize Budweiser's pale lager colour, it was bottled "in aqua rather than amber glass knowing that pasteurization would preserve the beer" (Shackley 1999: 4). Aqua coloured Adolph Busch (Budweiser ?) bottles are a major constituent of the assemblage recovered in 1998 and may well have been the modal type sought by the brewery.

The Klondike Brewery Site Bottle Collection

While the bottle collection from the Klondike Brewery site was recovered from only three excavation units, it nevertheless is large. Using a count of bases to determine minimum number of individual specimens, 712 bottles are present (Table 8). When partial bases (less than 50 percent intact) are added to this number, the number of bottles could be as high as 893. We also believe that each of the three units provides a representative sample for its associated bottle concentration. This being the case, comparison of the types and diversity of specimens in these units allows us to make some specific interpretations relative to site activities.

Analysis has been concerned with base markings, closure types, production technique, general form, and colour. Several thousand body and shoulder sherds have yet to be analysed, but the outcome of that task will provide only limited new data and

Location	Complete Specimens	Base Count (>50% Intact)	Base Count (<50% Intact)	Minimum Number of Individuals	Maximum Number of Individuals
Riverfront	16	343	104	359	463
Cooperage Exterior Unit	24	131	39	155	194
Cooperage Interior Unit	18	180	38	198	236
TOTAL	*58*	*654*	*181*	*712*	*893*

Table 8. Summary of the bottle assemblages recovered from the three excavation units at the Klondike Brewery site.

should not alter current interpretations. Bottles for the cooperage and riverbank dump area are examined individually.

The Klondike Brewery Cooperage Assemblage

The excavation units at the cooperage were specifically located to test bottle concentrations inside and outside of the structure. Each provides a roughly comparable assemblage size, although a greater number of complete specimens (24 as opposed to 18) came from the external unit. As we have described in the preceding chapter, the bottles from these units originate from similar contexts. That is, as excavation features illustrate, both collections were being stored in wooden barrels at the time the brewery closed. They represent the brewery's bottle stock, and illustrate the modal type(s) sought by O'Brien, and the degree of variability that he was willing to accept.

From this group as a whole, we can describe the typical Klondike Brewery bottle as having a bulged neck, rounded shoulders, a straight cylindrical body with a 22 to 24 fluid ounce (650 - 710 ml) capacity (Figure 29). Beyond this there exists considerable variation within bottle types present. Aqua coloured bottles tend to be dominant as noted above, but other clear glass, amber glass, and brown glass bottles are present. Like the case with Budweiser, the aqua glass bottles may have been used for lager with the darker coloured bottles reserved for bock or porter. This, however, is speculation. Also present in the collection are several bottles with embossed company logos unrelated to the Klondike Brewery. Of these, "Vancouver Breweries Ltd, Vancouver and Victoria, B.C." and "Victoria Brewery, Victoria, B.C." are the most common. A single example of a clear glass bottle embossed with "Lemp Brewery, St. Louis, Missouri" also came from within the cooperage. Bottle base marks indicate the bottle stock originated from several different manufacturers (Tables 9 and 10). The numerous mould numbers, even from the same manufacturer, also indicate subtle variations in bottle types. O'Brien, we must

Figure 29. Klondike Brewery bottle and crown cap with logo. The bottle is 28.9 cm in height. The crown cap has a diameter of 2.9 cm. The paper label is a reproduction owned by Brian Denman, Vancouver.

Base Markings	Company	Date Range When Base Mark Was In Use	Total Number Of Identified Base Marks	Number Of Different Mould Numbers
AB (Interlocking)	Adolphus Busch Glass Man. Co. (Belleville, Ill. 1886-1907) (St. Louis, Mo. 1904-1928)	1904-1907	26	20
A. B. Co.	American Bottle Co. (Chicago, Ill. 1905-1916) (Toledo, Ohio 1916-1929)	1905-1929	4	4
A.B.G.M.Co.	Adolphus Busch Glass Man. Co. (Belleville, Ill. 1886-1907) (St. Louis, Mo. 1904-1928)	1886-1928	1	1
P C G W	Pacific Coast Glass Works (San Francisco, Cal.)	1902-1924	2	2
ROOT	Root Glass Company (Terre Haute, Ind.)	1901-1932	3	2
W F & S	William Franzen & Son (Milwaukee, Wis.)	1900-1929	4	4
W. G. Co.	Wightman Glass Company (Parker's Landing, Pa.)	1900-1930	3	3
WOOSTER	Wooster Glass Company (Wooster, Ohio)	1900-1904	19	1
MISCELLANEOUS	Unidentified Base Markings		24	
NO BASE MARKS			87	
Totals			**155**	**37**

Table 9. Summary of bottle base marks from the external 1 X 1 m excavation unit placed by the cooperage.

Base Markings	Company	Date Range When Base Mark Was In Use	Total Number Of Identified Base Marks	Number Of Different Mould Numbers
AB (Interlocking)	Adolphus Busch Glass Man. Co. (Belleville, Ill. 1886-1907) (St. Louis, Mo. 1904-1928)	1904-1907	3	2
A. B. Co.	American Bottle Co. (Chicago, Ill. 1905-1916) (Toledo, Ohio 1916-1929)	1905-1929	97	39
A.B.G.M.Co.	Adolphus Busch Glass Man. Co. (Belleville, Ill. 1886-1907) (St. Louis, Mo. 1904-1928)	1886-1928	29	20
ROOT	Root Glass Company (Terre Haute, Ind.)	1901-1932	42	4
S B & G Co	Streator Bottle & Glass Co. (Streator, Ill.)	1881-1905	2	1
W F & S	William Franzen & Son (Milwaukee, Wis.)	1900-1929	2	1
MISCELLANEOUS	Unidentified Base Markings		12	
NO BASE MARKS			11	
Totals			198	67

Table 10. Summary of bottle base marks from the 1 X 1 m excavation unit placed within the north end of the cooperage.

conclude, was concerned with a degree of standardization in his packaging, but he was by no means a perfectionist in this regard.

The most interesting variation in the cooperage bottle collection occurs in the different finishes that are present (Figure 30). Collectively the assemblage has several cork-stopped finish types as well as crown finishes. Closure forms within the bottling industry were in a state of transformation in 1904, as described, and this is represented here. O'Brien was well aware of the problem and to accommodate it he purchased a Perfection Bottling Machine that was capable of filling bottles with a number of different closure types (Figure 17). The distribution of different finishes at the cooperage also is of note as cork and crown cap closures are inversely represented in each of the excavated units. For the interior excavation, corked bottles account for 96.9 percent of the total while crown finishes are found on 98 percent of the external unit specimens (Table 11). In the latter years of brewery production crown cap closures would have dominated. We infer, therefore, that old bottle stock was stored in barrels within the cooperage while the exterior platform around the building was used as a temporary collection area for crown cap bottle reuse.

Riverside Dump Assemblage

The riverside dump is estimated to include an area of at least 250 m^2 within which 175 m^3 of densely packed bottle glass is present. From the single 1 x 1 m excavation undertaken in 1998, we estimate a minimum number of 343 bottles present, again using bottle base counts (Table 8). Sixteen of these specimens are complete. Also recovered from the excavation unit was a small amount of brewery related materials as identified in the preceding chapter.

Analysis of the bottle assemblage was similar to the cooperage collection, with our examination focused upon base marks, finish types, colour and body form attributes.

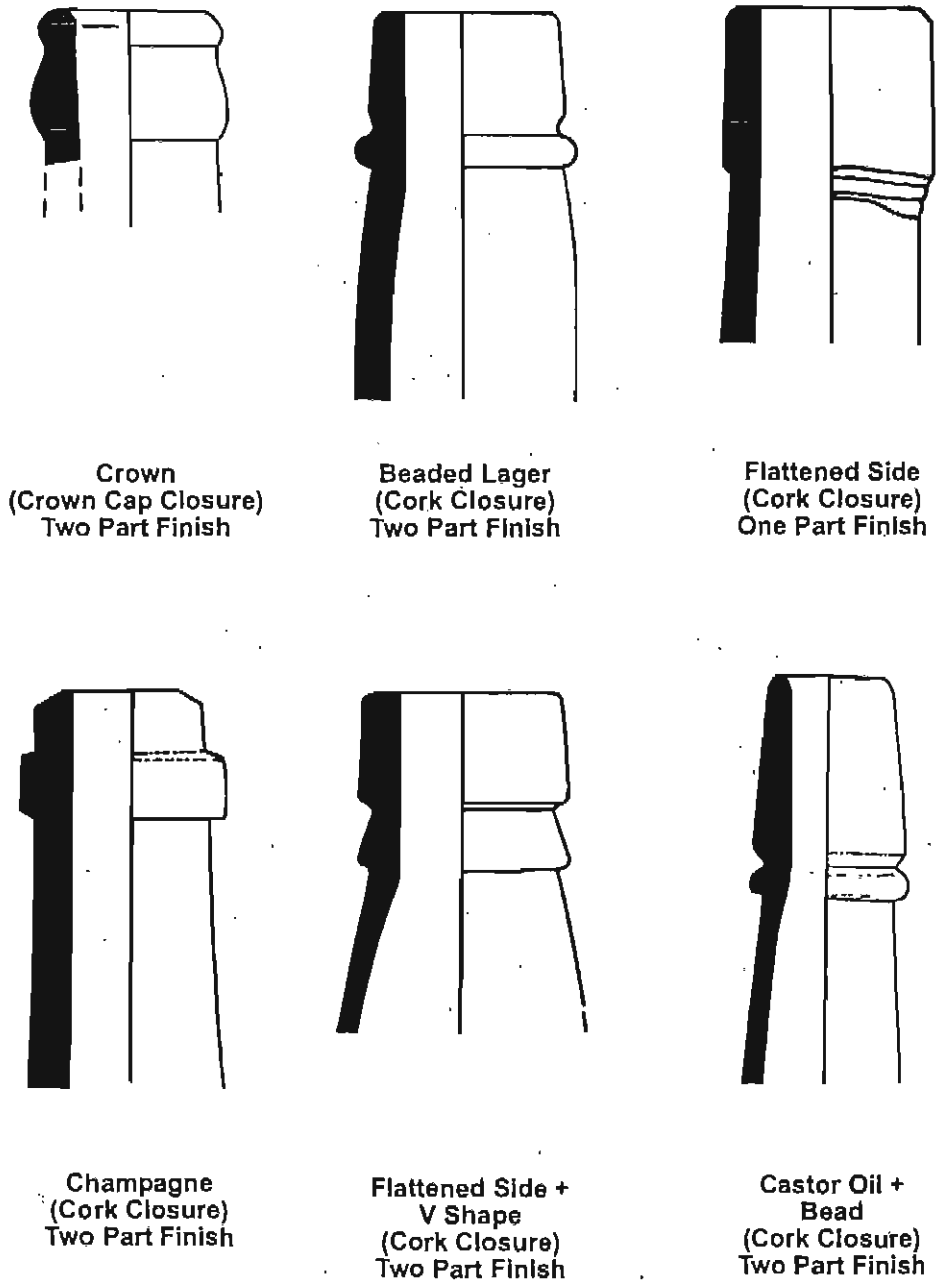


Figure 30. Illustration of the various types of bottle finishes identified within the Klondike Brewery collection. Some of the finishes were reproduced from Jones et al. (1985).

Location	Crown (Crown Cap) Two Part	Beaded Lager (Cork) Two Part	Flattened Side (Cork) One Part	Champagne (Cork) Two Part	Flattened Side + V-Shape (Cork) Two Part	Total
Exterior Unit	148	1	1	1		151
	98%	0.66%	0.66%	0.66%		99.98%
Interior Unit	4	116	8		1	129
	3.1%	89.9%	6.2%		0.8%	100%

Table 11. Summary of the bottle finishes identified from the 1 x 1 m excavation units placed in conjunction with the cooperage site.

Whereas the cooperage had but a single generalized bottle type we have described as Klondike Brewery stock, a greater diversity of bottle types was present in the dump. This included a range of specialized bottles for liqueur, spirit, champagne and soda beverages. In some cases intact neck foils, preserved paper labels still adhering to the bottle bodies, or embossing can be used to identify the product and its manufacturer. Included here are Mumms Champagne, Booth's Gin, Plymouth Gin, J. A. Henessey Cognac and Vermouth (Figure 27). This diversity is difficult to explain if the Klondike Brewery had purchased a dedicated bottle supply for its initial use. Rather, it supports an interpretation that the brewery collected a full range of bottles from Dawson City in 1904 and, after sorting, discarded specimens that did not fit its immediate need. We suggest, therefore, that the bottle dump potentially presents a microcosm of drinking behavior for the turn of the century Klondike.

While there exists a diversity of bottle types in the riverbank dump, analysis of the collection also reveals numerous examples of the form typically employed by the brewery. The majority of identifiable base marks are from bottles manufactured by the Adolphus Busch companies (Table 12) and many of the shoulders and finishes are identical to those from the cooperage. This indicates that the dump continued to be used after brewery operations began, and that it served as a repository for bottles broken during day to day activities in the plant. As it reflects upon brewery operations, it is interesting to note that nearly 79 percent of the finishes are of the crown cap type with a large number of these (n=48) having the Klondike Brewery bottle cap still in place (Table 13). This distribution suggests that the crown cap closure became the dominant form early on in brewery production, despite the retention of a cork stopped bottle reserve.

Finally it is noted that four clusters of paper labels were recovered from the excavation unit. These labels initially were thought to have been discarded Klondike Brewery labels. After the separation of one of the bunches, it has been possible to

Base Markings	Company	Date Range When Base Mark Was In Use	Total Number Of Identified Base Marks	Number Of Different Mould Numbers
AB (Interlocking)	Adolphus Busch Glass Man. Co. (Belleville, Ill. 1886-1907) (St. Louis, Mo. 1904-1928)	1904-1907	61	31
A. B. Co.	American Bottle Co. (Chicago, Ill. 1905-1916) (Toledo, Ohio 1916-1929)	1905-1929	14	11
A.B.G.M.Co.	Adolphus Busch Glass Man. Co. (Belleville, Ill. 1886-1907) (St. Louis, Mo. 1904-1928)	1886-1928	2	2
ROOT	Root Glass Company (Terre Haute, Ind.)	1901-1932	2	2
S. G. Co.	Giles-Clough Glass Company (Redkey, Ind.)	1896-1898	2	2
W F & S	William Franzen & Son (Milwaukee, Wis.)	1900-1929	16	9
W. G. Co.	Wightman Glass Company (Parker's Landing, Pa.)	1900-1930	1	1
WOOSTER	Wooster Glass Company (Wooster, Ohio)	1900-1904	1	1
MISCELLANEOUS	Unidentified Base Markings		43	
NO BASE MARKS			217	
Totals			**359**	**59**

Table 12. Summary of bottle base marks from the 1 X 1 m excavation unit placed along the riverbank dump.

Crown (Crown Cap) Two Part	Flattened Side + V-Shape (Cork) Two Part	Beaded Lager (Cork) Two Part	Flattened Side (Cork) One Part	Champagne (Cork) Two Part	Castor Oil + Bead (Cork) Two Part	Misc.	TOTAL
239	21	11	7	6	3	17	304
78.62%	6.91%	3.62%	2.30%	1.97%	0.99%	5.59%	100%

Table 13. Summary of the bottle finishes identified from the 1 x 1 m excavation unit placed along the river bank dump.

identify several types of mineral water, imported beer, and liquors (Figure 31). The manner in which these were clumped together suggests they were skimmed from a soaking tank during the bottle cleaning process. These, too, add to our understanding of alcohol availability in Dawson City in the early 1900s as well as the bottles that were being selected for reuse by the brewery.

Summary and Observations

The bottle collection recovered from the Klondike Brewery in 1998 is only a small sample of the assemblage present on site. As we have suggested, however, it appears representative of the individual bottle accumulations at the cooperage and within the river bank dump. Because the cooperage bottles represent bottle stock being stored by the brewery, they generally give insight into the modal bottle type sought by O'Brien. This bottle was standardized in overall form and size but little concern was given to colour, subtle variations in shape, or even the use of bottles with embossed logos from other breweries. Diversity in the bottle collection also facilitates insight into some of the brewery operations. The differential distribution of finishes within and outside of the cooperage have led us to argue that, at the time the plant closed down, cork stopped bottles were being stored as a reserve while crown cap bottles were the principal active stock. The relative absence of cork stopped bottles on the riverbank, and the high incidence of bottle finishes with intact crown caps, further suggests corked bottles were replaced very early on in brewery operations.

A second interpretation deriving from our documentation of bottle diversity suggests that bottle stock was neither purchased new nor from a recycled bottle supplier. Rather, and as clearly indicated in the riverside dump, they were collected from the available bottle supply in Dawson City. After initial sorting, nonconforming bottles were then discarded along the Yukon River shore. We do not have specific numbers for

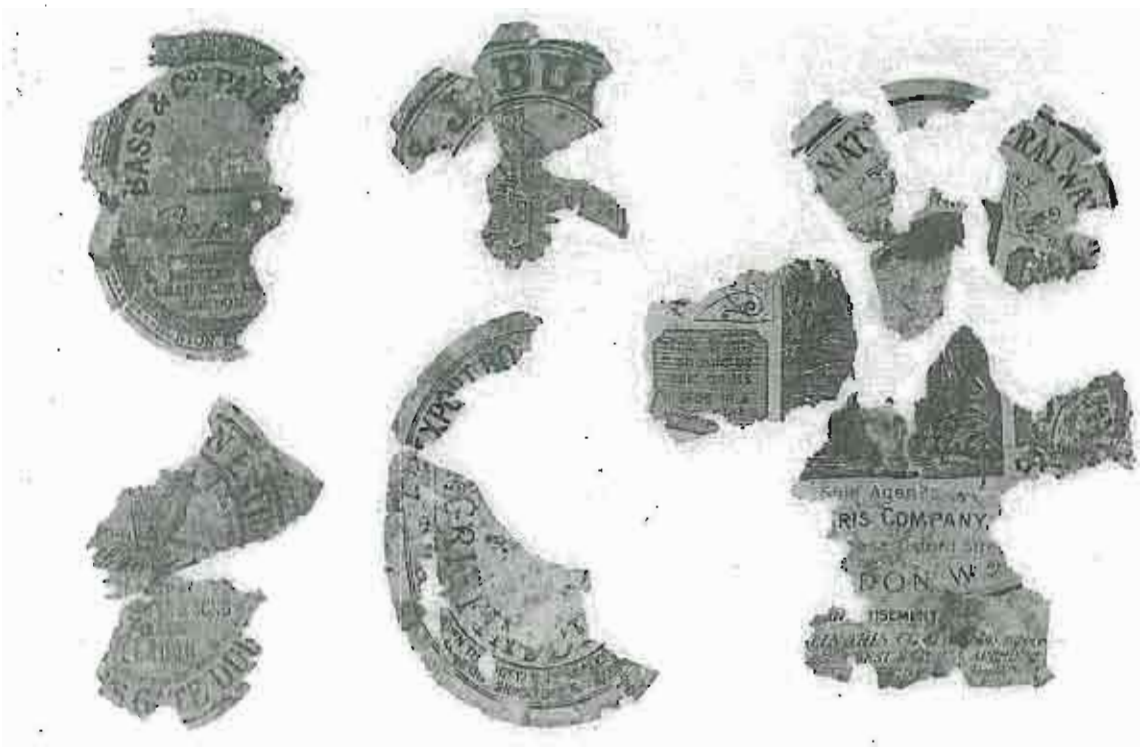


Figure 31. Samples of the labels recovered from the 1 X 1 m test unit excavated along the riverbank dump (upper left – Bass & Co. Pale Ale; lower left – Guinness Stout; top center – E & J Burke Scotch Whiskey (?); lower center – Griffin Brewery; right – mineral water).

Dawson City *per se*, but beer shipment figures from Anheuser-Busch to the Northern Commercial Company in Fairbanks for the years 1911-1917 gives some indication of how potentially large the used bottle pool may have been, even from a single southern brewery (Anheuser-Busch n.d.). Over that period of time, Anheuser-Busch shipped a total of 107, 562 dozen quart bottles of beer northward, and it is extremely unlikely that any of the 1,290,744 empties were sent back. The only exclusive Yukon shipment registered by Anheuser-Busch was to R. Lowe and Company of Whitehorse who imported 770 dozen quarts of beer in 1914.

Finally, we again emphasize that the riverbank bottle dump presents a microcosm of turn of the century Dawson City alcohol consumption. Several different spirits, imported beer, champagne, and mineral waters can be identified not only from the bottles but from a collection of preserved paper labels removed during the bottle cleaning process. These data amplify the significance of the collection and its value for preservation and research.

6

DERIVATIVE NARRATIVE

It always is difficult to write a conclusion for an archaeological site report, at least one that goes beyond a mere listing of information presented and recommendations for future research. As is outlined in introductory remarks, our goals for the Klondike Brewery project were academically stimulated, but also were concerned with heritage preservation planning. It was the latter that dominated our work in the field, for preservation necessarily requires a basic understanding and recording of the site and its varied features. We believe the project has been a success in these respects, with archaeological details of Chapters 3 and 4 providing the required data. The conclusion to our original report to the Yukon Heritage Branch and the Tr'ondëk Hwëch'in First Nation, in a related fashion, was dominated by site management recommendations. These ranged from the implementation of immediate measures to stay bottle collecting activities, to longer term issues of site use and public interpretation. We have decided not to subject the reader to the details of that counsel here. Rather, in these final few paragraphs we consolidate our historical and archaeological data into a narrative abstract on the O'Brien Brewing and Malting Company and its place in Yukon history.

Our narrative inevitably starts with the founder of the brewery, Thomas William O'Brien. Arriving in the Yukon in 1887, O'Brien was an individual who came to understand, accept and appreciate the exigencies of the territory's harsh northern climate and geography. His reason for being here, at least initially, was grounded in personal gain. Yet his fortunes were not for export. With over $250,000 to his credit in 1898 from one gold claim alone, it would have been easy to move south to start new endeavours. In truth, as we have reported, and Eric Johnson (1983) has written about at length, O'Brien's life was a virtual game of monopoly and the Dawson City landscape was the board on which he played. He bought and sold steamships, hotels, saloons, a railway, a newspaper and assorted other businesses, not the least of which being a brewery. He did this in good economic times, but more often in bad. When he died in

Dawson City in 1916, he was buried on the hillside cemetery and given due honour as a respected member of the Order of the Eagles and of the Yukon Order of Pioneers. O'Brien was in all true respects what Yukoner's call a "sourdough", and it was a brand we believe that coloured his motivations and his business sense throughout the entirety of his life.

We do not seek to slur Thomas O'Brien as some misguided entrepreneurial visionary predetermined to failure. Dawson City at the turn of the century gave him much to put faith in. It was a town that not only survived the boom/bust cycle of one of the last great gold rushes on earth, but it was a town trying to transform itself into one of the principal social, economic and political centres in northwestern Canada. If Dawson City's street car system, electric lights, municipal services, fraternal orders, schools, churches, and all of the other amenities of a respectable community blinded O'Brien to the reality of the longer term, he was joined by many others. Among this group was the Prime Minister of Canada, Sir Wilford Laurier and his Cabinet. Commissioning Dawson City as the territorial capital, large sums of government money were invested for architecturally designed buildings and for other accoutrements of political infrastructure. The future must have appeared bright indeed, and if not prosperous in the decades to come, the Dawson City economy would at least be stable. And in response to even the greatest of pessimists, O'Brien could always respond that there was gold. Harder to retrieve after 1898, and more difficult to find in the hinterlands, but it was still there for the taking.

In spite of his passion for the north, O'Brien was not without connections and a business network in the outside world. We have not explored this network to any considerable extent and do not know if the source documentation exists to actually do so. What we do know is that O'Brien's trade stores with William Moran as well as the many other businesses in which he became engaged, required as much an understanding of consumer goods and technological innovation as it did adroit business skills. Thus it was not surprising to find references in newspaper accounts to O'Brien's travels to San Francisco and other outside centres. In all probability it was during one of these trips that he became interested in and gained insight into the rapidly changing brewing industry

in western North America. Imported beer in bottles had always been an expensive commodity in Dawson City, but one with a well developed and profitable market throughout the territory. A local alternative with a credible product could undercut cost and put, in the words of one local newspaper account, "any other beer out of the contest" (Yukon Sun 19 February 1904).

The west coast brewing trade was a late development relative to other parts of the North American continent. The first industrial based brewery in California, William Bull's Empire Brewery, was not established until 1849 in San Francisco. Yet almost immediately the industry boomed, as San Francisco developed as entrepot to the California gold fields and as a staging point for immigrant groups coming to the territory. By 1880 the number of breweries in San Francisco alone had expanded to over 40, and the signature of its trade, steam beer, was widely being produced. Techniques of pasteurization and refrigerated rail cars further allowed the growing midwest brewing empires, not the least being Anheuser Busch and Pabst, to flood the western market with their products. Anheuser Busch went so far as to market Budweiser in an aqua coloured bottle, presumably to show off its golden lager hue. We have no idea what nineteenth century steam beer or lagers tasted like relative to today's fare, but we suspect they would not be well received. In fact as Steven Shackley (1999: 1) recently quoted from American Mercury Magazine, Budweiser was considered to be so inferior that "St. Louis rowdies were known to project mouthfuls of it back over the bar". The only original west coast steam beer brewery still in operation is the Anchor Brewing Company on Mariposa Street in downtown San Francisco. It produces a palatable brew today, but one we assume tastes slightly different from the time it was turned out in "ten to twelve days from mash tub to the glass" (see Appendix A).

The year 1904 in Dawson City was by all accounts a pivotal one, where economic realities of a declining population were beginning to supersede the upbeat forecasts of only a few years earlier. In the planning of his brewery, we have stated that O'Brien was blinded by optimism as well as by his sincere dedication to the Yukon Territory and its development. Yet at the same time, we must also note that his personal investment in the brewery seems to have been a secure one without considerable risk. His controlling

interest was gained through the investment of property and buildings, while the working capital for construction was raised through the sale of shares to company stock holders. In point of fact, after incorporation there continued to be 1348 outstanding and unsold shares valued at $100.00 apiece. If even a limited number of these were disposed of, and no doubt they were, the cash flow for brewery development would be substantial. The construction of an up-to-date San Francisco steam brewery in Dawson City in 1904 was not all that astonishing when viewed in this light. And to ensure the product was competitive, O'Brien recruited a San Franciscan brewmaster Charles Bolbrugge and imported the best "Bay" hops and malt that money could buy.

Our understanding of the O'Brien Brewing and Malting Company facility is not well developed. Photographs do not go inside the front door, nor beyond a few all too brief newspaper stories do archival accounts enlighten us on the industrial plant or its brewing operations. Those few references in combination with the archaeological record support a story in keeping with the overriding concern for an up-to-date facility. The heart of a brewery, as continues to this day, is its copper kettle. In this the tinners Blair and Johnson were consigned to its construction, with no less than one ton of copper committed for the task. To feed the kettle from the mash tun by gravity flow, a second story was added over the end of the former trade store effectively converting it into the brew house. Yet gravity flow could be used only so far, and what appears to be the most modern of steam plants with boilers of 45 and 18 horsepower capacity were put in place to provide power for the pumps, steam coils for boiling, and heat for the plant as a whole. The Klondike Brewery's modern contrivances did not stop there. From the Perfection Bottling Machine Company of 141 Clinton Street, Chicago, Illinois, one of the most recently patented bottling devices was ordered and imported. This machine, had the ability to adapt to virtually any type of bottle finish, and it gave the brewery a measure of flexibility in an area of the brewing industry that was undergoing a radical state of transformation from bottles with wired down corks to crown cap closures. But most notably in the sense of technological innovation in the brewing industry of the day, O'Brien installed an artificial refrigeration plant. This might have been be a necessary requirement for the slow fermentation of lager in San Francisco or elsewhere in the south,

but its seems a most curious addition to a building in the Yukon Territory where refrigeration is all but guaranteed for nine months of the year.

O'Brien's brewery implemented but one cost cutting measure from its inception. Rather than importing personalized bottle stock in which to sell the product, it was decided to recycle existing bottles from Dawson City. We can certainly understand his reasoning, for the number of bottles discarded on the Dawson City landscape since 1897 must have begun to be overwhelming. How the bottles were collected is not recorded, but it is easy to envision brewery workers sorting through the different shapes, sizes and colors of literally tens of thousands of these containers, from Mumm's champagne to Hcnessey cognacs. Our studies tell us that they worked with a template in mind, one based on a standardized form and volume. The remainder, quite expediently, were tossed over the Yukon River bank to the front of the brewhouse. We have found it interesting that in assembling its bottle stock, the brewery stored both bottles with cork stopped and crown closure finishes. Perhaps O'Brien was uncertain whether sufficient numbers of the latter were present to support his need. Perhaps he was planning a special brew in which corked bottles seemed a more appropriate alternative. But whatever his motivations, the archaeological evidence indicates a quick conversion to the crown cap type, and this again kept the brewery abreast with the most modern of industry standards. We also find it interesting that O'Brien had no qualms in using even bottles with competitor names embossed into the glass. To personalize his product, he commissioned a series of quite attractive labels on which they, and his bottle caps, clearly displayed the brewery's logo, an interlocking and highly stylized KB symbol.

Our earlier presentation of brewing statistics, beer importation and beer consumption for the years 1901 to 1910 illustratc without a doubt that O'Brien had success in gaining a majority of the market. He did in fact put other beers out of the contest. From 1904 to 1908, his market required a production of between 50,000 and 60,000 gallons annually, and it involved a range of different products from steam beer to lager to bock. The brewery proved to be a viable, if not highly profitable endeavour and O'Brien's interests in those same years expanded. On the political front he gained the South Dawson seat, and the brewery social room was used as a centre for political

strategizing. O'Brien also became engaged in other commercial enterprises, significantly including the Klondike Mines Railway. In 1908, he even was able to gain a 50 cent per gallon duty on import beer, a tax that must have been significantly prohibitive for its time. But all of this mattered little. As the Dawson City population continually declined, so too did its economy and its outlook for the future. The ever-shrinking market for Klondike beer could not be reversed, and the problem was exacerbated by the rise of prohibition forces throughout the territory. No matter what O'Brien planned, from colourful advertising campaigns, to export into Alaska, to selling the product directly, he met failure and the brewery's future appeared inevitable. In 1915, and in poor health, O'Brien sold his company interests. Full scale prohibition in 1920 delivered the final blow to this most interesting aspect of Yukon history.

Our research into the Klondike Brewery provides no more than preliminary observations derived from an all too brief field visit and an archival study largely dependent on others. The consequential story, nevertheless, seems an intriguing one for its insight into the Dawson City past and for its reflections upon the western North American brewing trade as a whole. The Klondike Brewery does have an archaeological integrity worthy of preservation and for future archaeological concern. We hope someday that this project may be completed in a far more comprehensive manner.

7

REFERENCES CITED

Allen, Phillip 1992. *One Came Late.* Quality Colour Press Inc., Edmonton.

Anheuser-Busch n.d.. Notes on the Adolphus Busch Glass Manufacturing Company and Comparative Sales Listings for 1911-1917. Anheuser-Busch Archives, St. Louis, Missouri.

Archibald, Margaret 1981. *Grubstake to Grocery Store: Supplying the Klondike, 1897-1907.* Canadian Historic Sites Occasional Papers in Archaeology and History, Number 26, pp. 5-150, Parks Canada, Ottawa.

Arno Press 1974. One Hundred Years of Brewing, A Supplement to the Western Brewer, 1903. Arno Press, New York (original published by H. S. Rich and Company, New York).

Bowers, Peter, M., Catherine M. Williams, William H. Adams, Mary Ann Sweeney, Amy F. Steffian and Robert M. Weaver 1998. The California Saloon. In Peter m. Bowers and Brian L. Gannon (eds.), *Historical Development of the Chena River Waterfront, Fairbanks, Alaska: An Archaeological Perspective*, CD-ROM, Alaska Department of Transportation and Public Facilities, Fairbanks.

Carter, Margaret 1990. Eldorado Bottling Works and O'Brien Brewing and Malting Company. In Ken Elder (ed.), *S.I.A. Study Tour of the Yukon and Alaska*, Entries 37 and 38, Society for Industrial Archaeology, Ottawa.

Dobrowolsky, Helene 1998a. Hammerstones: A History of Tr'o-ju-wech'in & Klondike City. Unpublished report prepared for Yukon Historical and Museums Association, Tr'ondëk Hwëch'in First Nation, Dawson City Museum and Parks Canada, Dawson City, Yukon.

Dobrowolsky, Helene 1998b. Chronological Notes on Tr'ondëk Hweëch'in and Klondike City. Unpublished report prepared for Yukon Historical and Museums Association, Tr'ondëk Hwëch'in First Nation, Dawson City Museum and Parks Canada, Dawson City, Yukon.

Dobrowolsky, Helene 1998c. Klondike City Bibliography: Sources Relating to the Tr'ondëk Hweëch'in and Klondike City. Unpublished report prepared for Yukon Historical and Museums Association, Tr'ondëk Hwëch'in First Nation, Dawson City Museum and Parks Canada, Dawson City, Yukon.

Dobrowolsky, Helene and Thomas J. Hammer 2001. Tr'ochëk: The Archaeology and History of a Han Fish Camp. Yukon Tourism Heritage Branch, Whitehorse.

Downard, William L. 1980. *Dictionary of the History of the American Brewing and Distilling Industries.* Greenwood Press, Westport, Connecticut.

Government of Yukon Territory 1915. Parliamentary Sessional Papers, Dawson City.

Government of Yukon Territory 1918. Parliamentary Sessional Papers, Dawson City.

Guest, Hal 1978. *Dawson City, San Francisco of the North, or Boomtown in a Bog: A Literature Review.* Manuscript Report Number 241, Parks Canada, Ottawa.

Guest, Henry J. 1982. City of Gold: Dawson, Yukon Territory, 1896-1918. Unpublished PhD Dissertation, Department of History, University of Manitoba, Winnipeg.

Hogan, Barbara and Greg Skuce 1992. Report on Klondike City Field Recording and Survey, Part One. Unpublished report prepared for the Dawson City Museum and Historical Society and Heritage Branch, Government of Yukon, Whitehorse.

Ingram, Rob 1989. Yukon Heritage Inventory Phase III, Part 2. Unpublished report prepared for Heritage Branch, Government of Yukon, Whitehorse.

Johnson, Eric L. 1993. Biographies - Thomas William O'Brien. Unpublished manuscript on file, Dawson City Museum, Dawson City.

Johnson, Eric L. 1997. *The Bonanza Narrow Gauge Railway, The Story of the Klondike Mines Railway.* Rusty Spike Publishing, Vancouver.

Kormendy, Ed and Percy Henry 1993. Lousetown Oral History Survey Report. Unpublished report prepared for Dawson First Nation Land Claim Branch, Dawson City, Yukon.

Minni, Sheila, J. 1978. *Archaeological Exploration of the Klondike Historic Sites 1976 and 1977.* Manuscript Report Number 309, Parks Canada, Ottawa.

Morrison, David R. 1968. *The Politics of the Yukon Territory, 1898-1909.* University of Toronto Press, Toronto.

Ross, Brian D. 1990. Chronology of Information Available Regarding Thomas W. O'Brien and the Klondike Brewery. Unpublished report on file Parks Canada, Dawson City.

Shackley, M. Steven 1999. Ninety-nine Bottles of Beer on the Wall: The Evolution of American Beer Containers as a Reflection of Industry, Transportation, and the Settling of the West. Unpublished paper presented to the Society for Historical Archaeology Meetings, Salt Lake City, Utah.

Skuce, Gregory and Barbara Hogan 1991. Field Recording of Klondike City. Unpublished report prepared for Heritage Branch, Government of Yukon, Whitehorse.

Stuart, Richard G. 1980. *Dawson City: Three Structural Histories.* Manuscript Reprot Number 383, Parks Canada, Ottawa.

Yenne, Bill 1986. *Beers of North America.* Bison Books, Greenwich, Connecticut.

APPENDIX A

PHOTOGRAMETRY
O'BRIEN BREWING AND MALTING COMPANY STRUCTURES
KLONDIKE CITY, YUKON

by

Robert Mitchell
Parks Canada
Winnipeg, Manitoba

First of all, let me admit that the method I used in the case of these drawings is a combination of assumptions and science. My original intent was to produce drawings of buildings that I could use to construct models for a future model railway of the Klondike Mines Railway. As such, extreme accuracy was not a requirement, as long as a reasonable likeness was the result. Using this method, the overall measurements are reasonably accurate, but as the elements become finer and more detailed (such as window frame sizes), the accuracy obtained is less as "guesstimation" is involved.

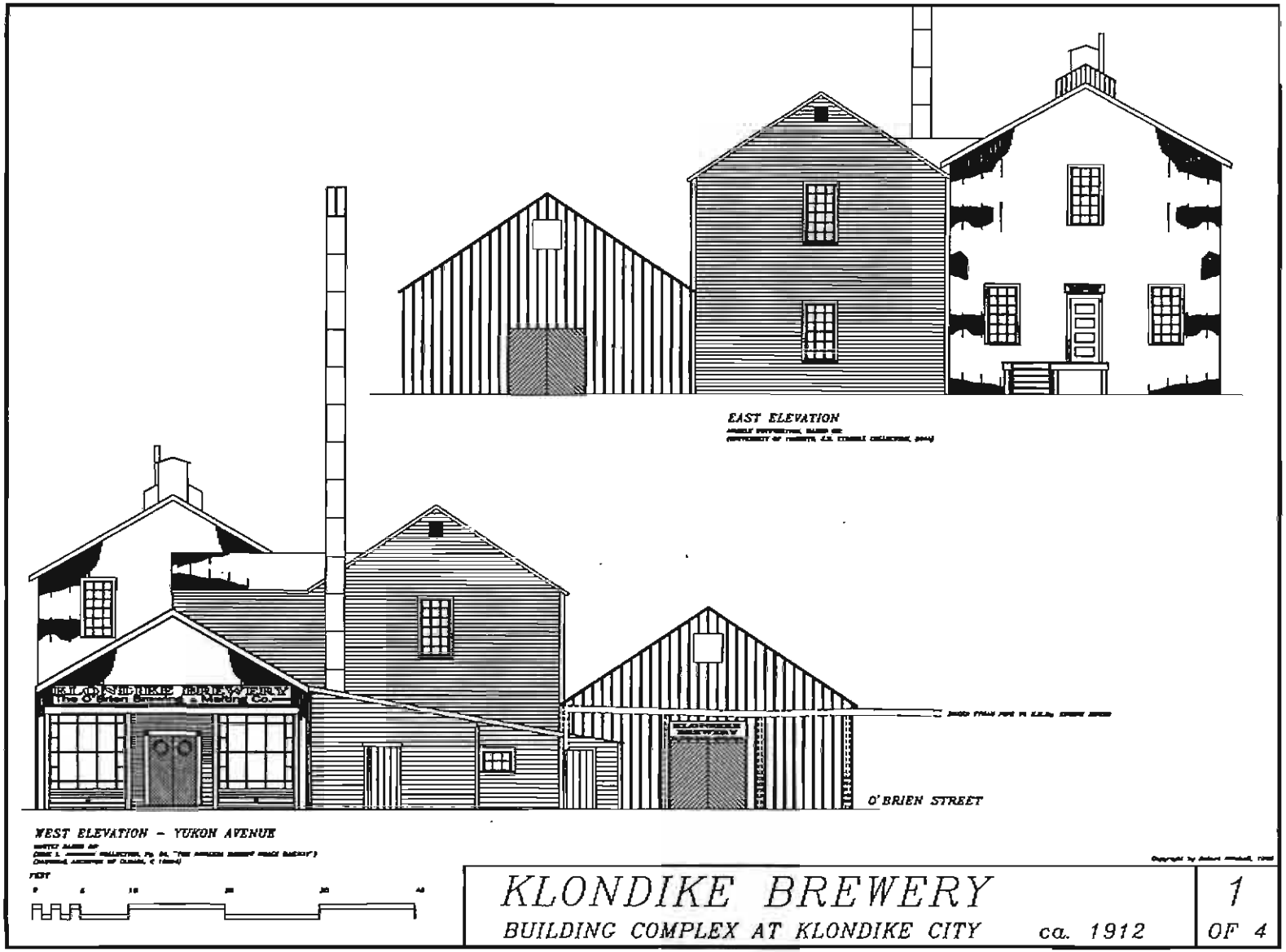
The purely scientific method for this process is called reverse perspective analysis, and it is used to provide fairly accurate drawings of fairly flat surfaces from single photographs. It is an involved precision drafting process, using optical and geometric principles to evaluate the photograph and produce the drawings. My method takes as its basis some o the simpler processes in reverse perspective analysis.

In the case of the O'Brien Brewery, the lot frontage on Yukon Avenue is about 85 feet, which was scaled from a historical map of Klondike City. (It should be noted that the typical lot frontage in Klondike City is 50 feet, which allows comparisons with adjoining structures.). This measurement provides a rough horizontal distance to work from. The vertical scale was estimated from a photograph with people standing up against the front of one of the main structures, after assuming a typical height or the people. Other elements, particularly door heights could also be used for assumed vertical scale, with the caution that "grandiose" structures tend to have bigger doors than the standard house. The easiest photographs to work from are those taken straight on to the

face of the structure/elevation being worked on. Using the previously determined scales, the elevation and all of its elements can easily be drawn, in fact, almost traced from the photograph. Obtaining measurements from photographs that are taken oblique to the structure's elevation involves a little more work. Working on a good photocopy of the picture, enlarged if you wish, a vertical line is drawn through the element that was used to obtain the vertical scale. Projecting the lines of horizontal elements (such as window sills) back to this vertical line will give you the heights of these elements, by comparison with the known scaled element.

Due to perspective, horizontal dimensions are trickier to obtain from oblique photographs. Vertical lines are drawn up the outside edges of the building. Projecting the lines of the horizontal elements (window sills, etc.) o these vertical lines will give a series of rectangles. Taking the largest rectangle possible, lines are drawn from the vertices to give an "X" inside the rectangle. Drawing a vertical line through the intersection of the "X" gives the mid-point of the structure. Thus, if you know the building is twenty feet long, this new line will be ten feet from either edge of the building. This also creates new, shorter rectangles which, after drawing "X"s and associated vertical lines, will allow you to determine 5 ft, 2.5 ft, etc.. You can continue this process *adinfinitum* to precisely determine horizontal positions, or you can apply judgement after drawing a few verticals to fairly accurately determine the horizontal position and size of the individual building elements.

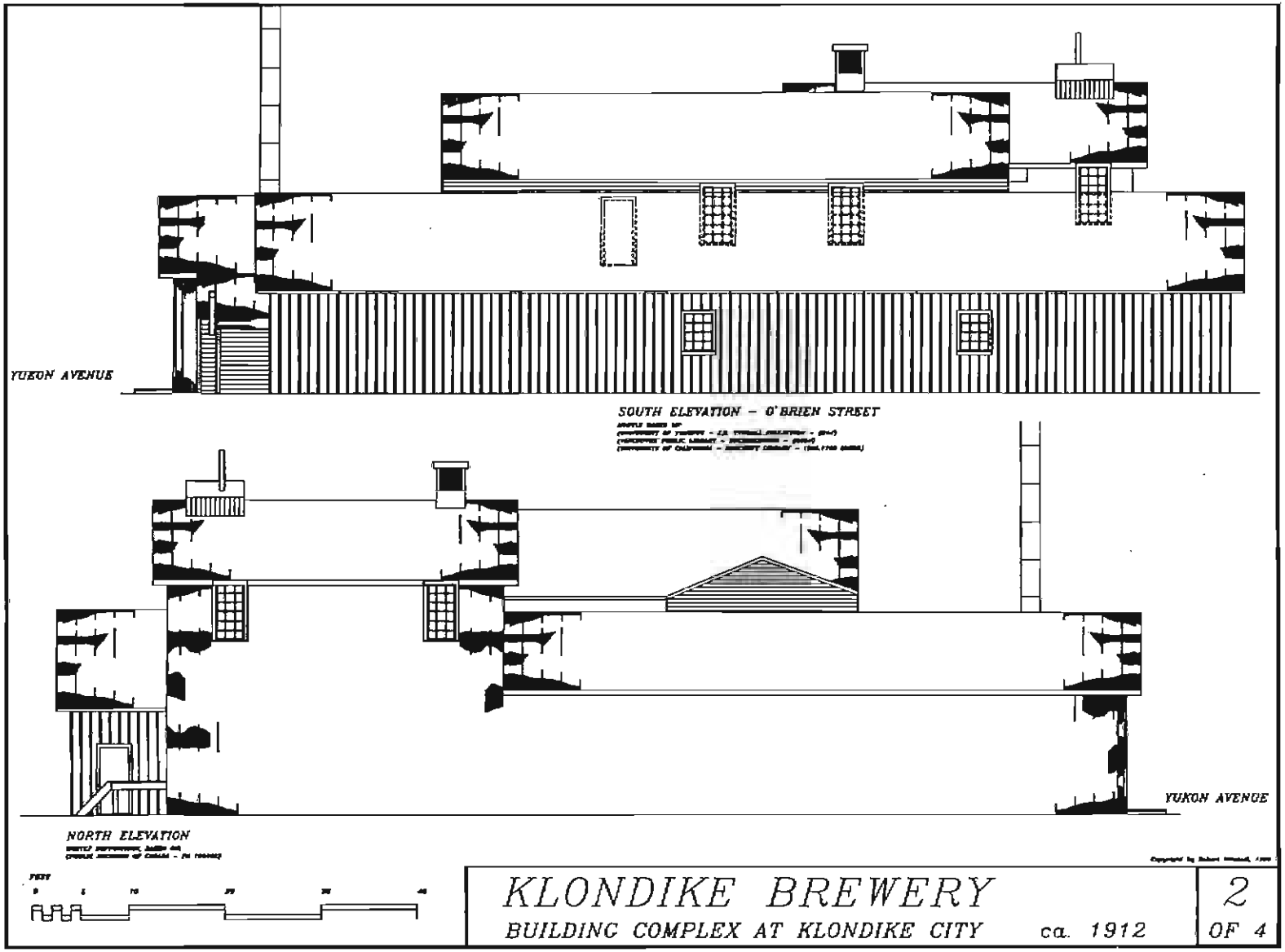
While not the most accurate of methods, this method does produce reasonable representations of the structures being looked at for "first pass" evaluations, illustrations purposes, and for building models. For a more accurate version of reverse perspective analysis, consult "Simple Photogrametry" by J. C. C. Williams (1969) Academic Press Inc., London and New York.



KLONDIKE BREWERY

BUILDING COMPLEX AT KLONDIKE CITY ca. 1912

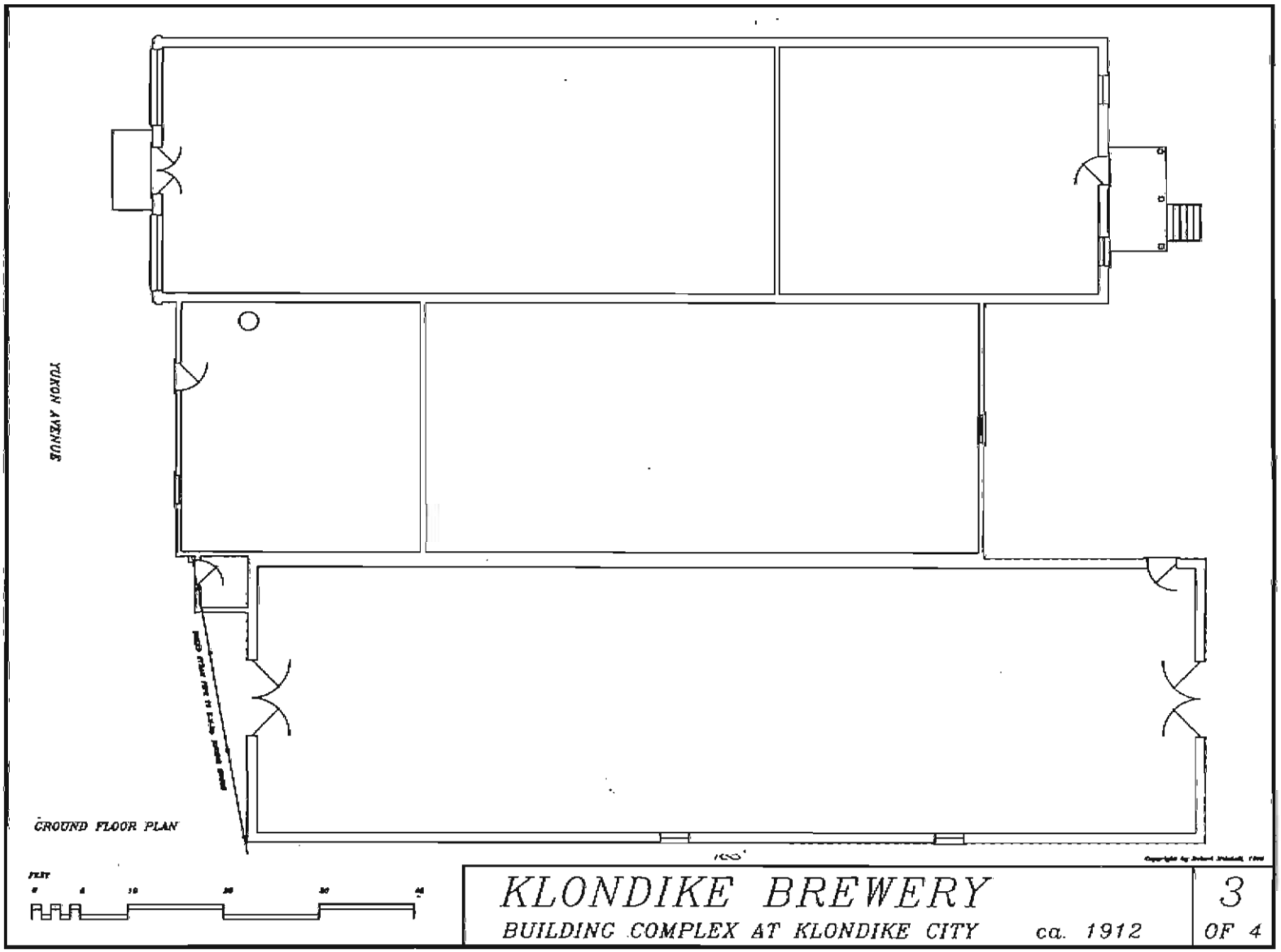
1 OF 4



KLONDIKE BREWERY

BUILDING COMPLEX AT KLONDIKE CITY ca. 1912

2 OF 4



KLONDIKE BREWERY

BUILDING COMPLEX AT KLONDIKE CITY ca. 1912

3 OF 4

KLONDIKE BREWERY

BUILDING COMPLEX AT KLONDIKE CITY ca. 1912

4 OF 4

APPENDIX B

PACIFIC COAST STEAM BEER DESCRIPTION AND RECIPE

The following description of steam beer production was first published in The Western Brewer on February 15, 1898. Its author, John Buchner, was employed by the John Weiland Brewery of San Francisco. The version copied here was taken from a 1903 supplement to The Western Brewer titled "One Hundred Years of Brewing" (Arno 1974: 360). Steam beer was a principal product of the Klondike City plant and we believe the account to follow is as close to the recipe as can be found.

> Although it is erroneously asserted by some writers that steam beer is top fermentation, it, nevertheless, is bottom fermentation, and the fermentation proceeds at the high temperature of from 12° to 16° R. (60° to 68° F.).
>
> In a typical steam brewery the buildings are all constructed of wood, the mash tub likewise. As the steam beer mash is made according to the English downward mashing method, a considerable amount of water is employed during mashing, and therefore the mash tub has to be comparatively large. Raw grain, or other substitutes are used but seldom; old-timers use barley malt exclusively, which produces an article just the right thing for the pure malt beer apostles! The wort is boiled in a copper kettle with direct fire, and the first wort usually weighs from twelve to fourteen per cent Balling.
>
> Ice machines, or any other construction of beer-cooling devices, are unknown in a steam beer brewery. All the refrigeration necessary is brought about by a wooden cooling vat lined with tin, and in some breweries a fan set in motion at intervals, so as to withdraw the hot air and bring the cool air in contact with the surface of the hot wort, which should lie from two to three inches high in this cooling vat. At about two to four o'clock the following morning after brewing, the wort is cooled down to 58° to 60° F., whereupon it is run into the fermenting tub. Should there be any exceptionally hot nights, which is very seldom the case, swimmers with some ice are hung into the beer when it enters the fermenting tub.
>
> When the beer reaches the fermenting tubs it may either be pitched at once, or after a couple of hours, with from one-third to one-half pound of yeast per barrel. In about twelve to eighteen hours the beer comes into *kraeusen*, where it is kept for several (six to eight) hours, when it is run into the clarifier, where the fermentation is allowed to continue until completed.
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> The clarifier is a four-cornered wooden vessel about twelve inches deep and large enough to hold the contents of one fermenting tub. The objects of the clarifier are twofold: (1) To prevent a high rise in temperature during fermentation by exposing a

large surface of the beer to the surrounding air; (2) to accelerate the clarification of the beer by means of the shallowness of the clarifier. The temperature of the clarifier never rises above the temperature of the cellar, which is usually kept during the summer between 60° and 70° F., and during the winter it seldom goes below 45° or 50° F., in which case it would be necessary to heat the cellar. The fermentation in the clarifier is usually completed in two days, when the cellars are kept at a temperature of 60° to 70° F. Should the temperature run somewhat lower than this, three days will be sufficient. The beer, if otherwise properly brewed, should, after the fermentation is completed, have an apparent attenuation of fifty to sixty per cent and be quite clear in appearance.

From the clarifier the beer is racked directly into half barrels, where it receives an addition of about fifteen to twenty per cent of *kraeusen*, together with some fining. In four to six days the beer has raised the sufficient amount of steam (a pressure of fifty to sixty pounds per square inch) in the package, and it is therefore necessary that the kegs should be well made and sufficiently strong to resist this high pressure. When the kegs have been filled for about three days they are brought to the saloon in lots of from twelve to twenty half barrels and placed in two rows upon a long stand or rack, where they are allowed to remain at rest for one or two days, when they are tapped by the saloonkeeper. To draw the beer from these half barrels requires some skill and experience and is best accomplished in the following manner: The faucet key should be held firmly and raised slightly upward without turning the same , to release the exceedingly high pressure.

When steam beer is cleanly and properly brewed from good material, it is a pretty fair drink, when the weather is not too warm, which is not often the case here (in California). At any rate, it tastes better than the raw hopped, bitter and turbid ales. Steam beer is allowed from ten to twelve days from the mash tub to glass.

APPENDIX C

GLOSSARY OF BREWING RELATED TERMS

Barrel - normally, a 31 US gallon container for draft beer that served as a standard volume measure. A beer barrel might also refer to a container in which bottled beer was packaged for sale. In this case a barrel generally would hold eight dozen quart bottles.

Bock – a dark brown bottom fermentation beer using roasted malt. Traditionally bock beer was made in the spring, being brewed originally in Bavaria for the Easter celebration.

Hops - dried female flowers of the vine *Humulus lupus* that is added to the wort in the brew kettle to give flavor and character to a beer.

Keg - a type of packaging for draft beer holding eight US gallons or less. Historically a keg is also referred to as a quarter-barrel.

Kraeuseniug – a process where a percentage of young, still fermenting beer is added to previously fermented beer to add carbon dioxide and produce effervescence.

Lagering – derived from the German word for storehouse or to store and refers to the process of storing beer in casks to enhance the flavor. In North America, lager refers to a bottom fermentation beer that has been stored at low temperatures prior to bottling.

Malt – a grain, frequently barley, that is allowed to germinate and then dried or kilned. During malting, enyzmes are produced that will convert the starches in grain to sugars, maltose and dextrin.

Mash – a mixture of ground grains that is steeped in water, strained and then boiled. After straining and boiling the liquid is referred to as a wort.

Porter – a top fermenting malt beverage that is the predecessor to stout. It is a heavy, darker product. In color, malt, and hop flavor, porters are intermediate between stout and ale.

Ruh - the period of time in which secondary fermentation occurs in bottom fermentation beers such as lager. This is a rest period allowing for a clarification of the beer and a slight increase in alcoholic content. The temperature of the cellar or the room in which the ruh casks are maintained just above the freezing point.

Steam Beer - employs a bottom-fermenting yeast like lager, but it is fermented quickly at room temperature (approximately 65 degree Fahrenheit) with a percentage of kraeusen added to the keg or barrel for added effervescence. Steam beer originated on the Pacific Coast of the United States.

Tun, Tub, Vat - often used interchangeably, they are large vessels, usually cylindrical, used in the mashing, cooling, clarification, storage or other stages of beer production.

Wort – the liquid that results from boiling a mash of grain. After cooling, yeast is added to begin the fermentation process.