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Occasional Papers in Archaeology No. 16

THE *A.J. GODDARD*: RECONSTRUCTION AND MATERIAL CULTURE OF A KLONDIKE GOLD RUSH STERNWHEELER

Lindsey Hall Thomas

Yukon Archaeology Programme

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YUKON
Tourism and Culture
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THE *A.J. GODDARD*:
RECONSTRUCTION AND MATERIAL CULTURE OF A
KLONDIKE GOLD RUSH STERNWHEELER

by

LINDSEY HALL THOMAS

ABSTRACT

The *A.J. Goddard*, a steamboat built for the Klondike Gold Rush of 1897-1898, wrecked in 1901 on Lake Laberge, Yukon Territory. It lay undisturbed until its rediscovery in 2008. The complete and undisturbed nature of the wreck site, which is the only known site from this period to show such remarkable preservation, provides an unparalleled opportunity for studying the construction features of one of the Klondike steamboats and its associated material culture.

The wreck of the *A.J. Goddard* is the only known surviving example of a small, prefabricated sternwheeler from the Yukon River's sternwheeler days. Due to the nature of its construction and building material, the *A.J. Goddard* represents a period of vast change in shipbuilding techniques, and is part of the fascinating juxtaposition between traditional wooden boats and a new, prefabricated industrial solution to boatbuilding. Field seasons were conducted in 2009 and 2010 that focused on recording the boat's construction features and artifacts. Select artifacts were recovered for study and display in Whitehorse, Yukon Territory with the intention of creating an exhibit for the Yukon public.

ACKNOWLEDGEMENTS

The *A.J. Goddard* project was a collaborative effort that relied upon the assistance and support of dozens of people and organizations, all of whose contributions were immensely valuable to the endeavor. It was made possible through the generous support of the Yukon Government, the Yukon Transportation Museum, the Texas A&M Nautical Archaeology Program, the Center for Maritime Archaeology and Conservation at Texas A&M University, the Institute of Nautical Archaeology, ProMare, Inc., BlueView Techonologies, OceanGate, Inc., Spiegel-TV, PRM Nautical Foundation, the National Geographic Society and Waitt Foundation (2009), Royal Canadian Geographic Society, the Canadian Conservation Institute, the National Oceanic and Atmospheric Administration, Dr. Kevin Crisman, the fundraising efforts of Dr. James Delgado, Dr. Robyn Woodward, and private donors. The hospitality and acceptance of the Council of the Ta'an Kwach'an in their traditional territory was appreciated immensely.

In addition, the work of John Pollack, Dr. Robyn Woodward, and Douglas Davidge to establish and continue the efforts of Yukon River Survey Project has made an enormous contribution to the archaeology and history of the Yukon Territory, without which the *A.J. Goddard* would still be unknown on the bottom of Lake Laberge. The research would not have been possible without the Yukon River Survey volunteers, many of whom who flew thousands of miles, often paying all of their own expenses, to come to Lake Laberge to help with the field work. Their names and contributions are detailed in the text, as without their efforts the research would be only half finished.

The photographs of Fay Goddard, Donnie Reid, Larry Bonnett, Geoff Bell, and Candy Waugaman were enormously helpful to the process of understanding and reconstructing the vessel. And finally, it was a privilege and an honor to meet Fay Goddard, the grand-niece of Albert and Clara Goddard. Her memories and photographs of her family's adventures contributed greatly to our understanding of the *A.J. Goddard*, and her assistance was greatly appreciated.

DEDICATION

For my grandmother Catherine Hall.
Her strength and wisdom are inspirational.

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INTRODUCTION

The Beginning

In the summer of 2008, a small team of scientists made a discovery in the middle of the Yukon wilderness that revealed the remains of a near-perfectly preserved Klondike Gold Rush sternwheeler. The *A.J. Goddard*, built at the end of the 19th century for the gold rush, was discovered by the Yukon River Survey Project in 2008. The research team, composed of Douglas Davidge, John Pollack, Robyn Woodward, Tim Dowd from the Yukon Territorial Government, and Chris Atkinson, discovered an anomaly on their research vessel's depth gauge that would later prove to be the *A.J. Goddard*. With the assistance of James Delgado from the Institute of Nautical Archaeology, an archaeological field season was conducted in 2009 that was directed by Pollack and Davidge, who kindly allowed the author to participate. The 2009 field season conducted the first dives on the site and laid the foundation for the 2010 field season.

Discovery

On the evening of 16 August 1896, a small group of men and women made a discovery in the depths of the Yukon Territory, Canada that would change the region forever (Figure 1.1). George Washington Carmack was an American who arrived in the Yukon Territory by 1887, if not earlier. He acquired the nickname Siwash George for his admiration of the local Athabaskan tribe called the Tagish, and became a well-known figure in the Yukon Territory in the 1890s. In the summer of 1896, Carmack, his wife Kate, and his friends Skookum Jim and Tagish Charlie (two Tagish men with an interest in prospecting) set off towards Rabbit Creek with the intention of chopping wood to float down river and sell for $25 per 1,000 feet. As the Klondike was known for being potential gold territory and many of the white men in the area were prospectors looking for their big strike, it was natural for them to prospect as they traveled, dipping their pans into the streams in hope of showing a "streak of color" (Berton 2004:44-45). On their way towards Rabbit Creek, they stopped and discussed their plans with another prospector that they knew named Robert Henderson who was panning at Gold Bottom Creek (Ogilvie 1913:125-126).

After promising to inform Henderson if they made a strike, they began trudging through the bush towards Rabbit Creek. Upon arrival, the men parted ways temporarily to hunt moose to replenish their supplies. While separated, Jim went to the river for water and found, scattered on the riverbed, more gold that he had ever seen in his life. The men argued over who would claim the discovery, as Skookum Jim might not be recognized due to the fact that he was Athabaskan. They determined that George Carmack would claim the discovery, while all three men would stake prospecting claims on the river (Ogilvie 1913:129-130). Their fortunes and that of the Klondike changed forever (Berton 2004:46-47). Carmack ceased to think of himself as an Indian from that point on, and none of the men returned to inform Henderson of their find. After measuring out their claims and marking them on the trees according to Canadian Law, the men headed towards Fortymile to officially record their claim (Ogilvie 1913:130-131; Berton 2004:47-48).

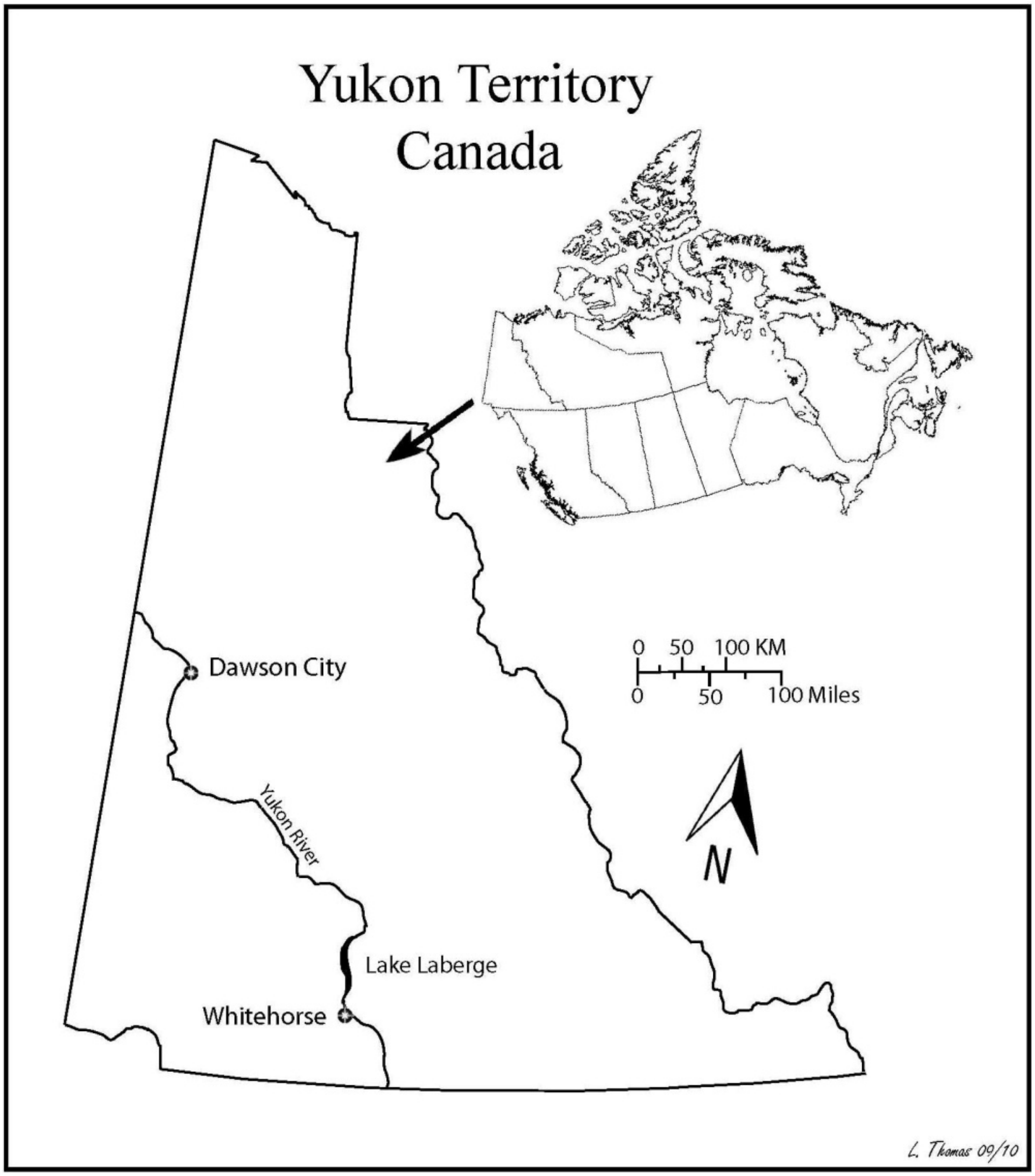

FIGURE 1.1. The Yukon Territory, Canada.

Word Gets Out

Upon reaching Fortymile, a miner's town full of adventuresome prospectors, the men told their fellow miners of the discovery. Many were skeptical, as Carmack did not have a reputation as a prospector and this was not the first big strike they had heard about (Ogilvie 1913:133). Those who believed the men headed for Bonanza, as Rabbit

Creek would soon be called, to stake their claim. Skeptical miners from Circle City eventually followed, arriving to stake claims in February and March of 1897, only to discover that the majority had been staked the previous fall (Ogilvie 1913:205-208). Most of the fortunes to come out of the Klondike during the rush were made by prospectors already in the territory who were able to stake the first claims (Figure 1.2).

There were few opportunities for the miners and surveyor William Ogilvie to notify the outside world of the discovery due to the remoteness of the territory, which was surrounded by harsh terrain and mountains in the south. One chance came in November of 1896 when a man named Captain Moore was leaving the territory, and another when two men departed in January of 1897. Ogilvie took the opportunity to pass on the news, and as a result, a few adventuresome souls heard of the strike and waited until the springtime ice break-up to boat into Dawson and stake a claim (Ogilvie 1913:212-213). The ice broke on 14 May 1897, and when it had cleared by 16 May, approximately 600 people from the outside world who had heard of the Rabbit Creek find crossed over the mountains at the southern end of the territory and rode down the Yukon River in small boats (Ogilvie 1913:216-217).

FIGURE 1.2. Working a claim on Bonanza Creek, Yukon, 1899 (Library and Archives Canada/Credit: H.J. Woodside/Henry Joseph Woodside fonds/PA-016944).

Others waited at St. Michael near the mouth of the Yukon River for large steamboats to make the up-river trip. Many of the hopeful prospectors had no idea exactly where the Klondike was located (Ogilvie 1913:219). Some did not even realize it was located in Canada, expressing surprise over the fact that the Canadian North-West

Mounted Police would be responsible for law and order (Ogilvie 1913:219-220). But the summer of 1897 was the small rush. The big rush would not begin until the first steamboat full of miners laden with gold dust arrived on the west coast of North America in August of 1897.

Gold!

When the steamboat *Excelsior* puffed into San Francisco on 15 July 1897 loaded with gold from the Klondike, the world swiftly received news of gold in Yukon Territory, Canada (Berton 1974:92-93). The rush for the gold fields of the Klondike began as soon as the lucky miners who had ridden in on the *Excelsior* told their tale. Word of the strike came not a moment too soon, as America and Canada had been in the grips of a depression for most of the decade that was the result of a national shortage of the precious metal. Massive migration was spurred on by the weakness of the dollar, which made supplies and outfits inexpensive. Transportation by sea and rail had reached an efficiency level that made it possible for thousands of people to cross the country relatively quickly and inexpensively (Berton 1974:94-95).

Before a year had passed, nearly 100,000 men and women attempted to reach the Klondike gold fields, located near Dawson City, Yukon Territory. All manner of people headed for the Yukon, from pretty girl-adventurers to university graduates and old-country gentlemen (Price 1898:108). Getting to the Yukon was the first great hurdle faced by prospectors intent on reaching the gold fields. Located in northwestern Canada, the territory is very remote and protected by mountain ranges, swamps, and rivers. Though it was possible to travel by land, a journey upon the Yukon River was often inevitable, and everything from hastily constructed rafts to fleets of steamers from San Francisco set out for the Klondike (Berton 2003).

This massive influx of people into a relatively uninhabited wilderness resulted in a population boom that created the Yukon Territory we know today. Competition between the governments of the United States and Canada over the boundary lines of this newly valuable territory resulted in the official formation of the Canadian American border, positioned precisely where the Mounties set up their machine guns at the summits of the passes (Berton 1974:xvii). The towns of Skagway in Alaska, and Dawson City and Whitehorse in the Yukon Territory grew exponentially, and though many of the stampeders did not settle in the Yukon permanently, they laid the foundations for the towns that would shape both the culture and the politics of the territory.

Skagway and Dawson City were similar in many ways. Though hundreds of miles from the heart of the gold rush, Skagway was one of the main access points to the Klondike, and as a result was a true gold rush town. In both towns the stampede quickly turned the wilderness into tent cities and finally into formal towns complete with wooden buildings and law enforcement. Skagway was initially a lawless town, plagued with a wild west mentality brought by the Americans who flooded its shores and elected their own gun slinging lawmen in the way of the American frontier of earlier decades (Berton 1974: xiii-xiv,150). In contrast, Dawson City was a far more ordered and lawful town, benefitting from the presence of the North-West Mounted Police who had been sent to the Yukon Territory many years prior to the stampede, where they were ordered to enforce justice at the miner's town of Fortymile (Berton 1974:xvi).

Canada Prepares for the Rush

Dawson City was a thriving, though very small, gold prospecting town from autumn of 1896, when Carmacks first reported his find, until the spring of 1898. It would not become the enormous and famous bustling hub of activity until the first great wave of prospectors flowed in during the summer of 1898. Due to harsh winter weather that prohibited traffic upon the Yukon River in the winter months, most of the outsiders who learned of the gold rush in August of 1897 had no hope of reaching the gold fields until the following summer. Many purchased their outfits in the fall of 1897, transported them over the coast mountain range during the winter of 1897-1898, and then waited on Lakes Bennett and Lindeman, assembling small boats in preparation for the rush to Dawson when the ice broke in late May of 1898.

Because of the delay caused by winter weather, the Canadian government had time to prepare for the massive wave of prospectors who would come pouring through the territory, both the first swell during the winter of 1898 that would climb over the coast mountains from America into British Columbia and pass through the customs houses there, and the second group that would rush in the boats from British Columbia into the Yukon when the ice broke in May (Strickland 1899:82). The Canadian government took advantage of this, and by sending extra contingents of North-West Mounted Policemen to British Columbia and the Yukon, they were able ensure that the gold rush had relatively little crime and included proper collection of customs fees. In addition to customs posts scattered at the entrance points to the territories and their posts in Dawson City, mounted policemen were stationed at congested places along the trail to ensure order (*Poverty Bay Herald* 1898:4). So strong was North-West Mounted Police's influence over the Canadian side of the trail that gambling sharks (known as "shellmen" for their walnut shell game) lining the American side of the Chilkoot Trail disappeared at the summit, which marked the Canadian border, and were nonexistent on the Canadian side (Figure 1.3) (Price 1898:87). One British journalist stated that the sight of "the old Union Jack, waving above the half-dozen wretched tents in this far-away British outpost, was doubtless a glad sight to both English and American alike, for it betokened law and order and bad business for all who might attempt to defy it" (Price 1898:88).

FIGURE 1.3. Packers ascending summit of Chilkoot Pass, Alaska, 1898-1899 (Library and Archives Canada/ Credit: E.A. Hegg/National Photography Collection (Canada)/C-005142).

North-West Mounted Policeman D'A. E. Strickland was sent north from Vancouver in August of 1898 to help open customs offices across British Columbia and the Yukon. His report provides an enlightening account of the gold rush experience, as well as a history of the event from the perspective of the service, highlighting how the Canadian government prepared for the massive influx of people that could be expected when weather allowed them to travel.

Strickland writes that after an uncomfortable seven day journey upon the steamship *Danube* that departed from Vancouver and arrived in Skagway, he arrived at noon on 28 August 1897 with his company of five men (Strickland 1899:80). They came upon a large tent city that had sprung up in approximately two weeks, an encampment that he called "the most cosmopolitan population in America" for a town of that size. Men and women of all nationalities were present (notably absent, however, were any Chinese), and all were attempting to cross over the Skagway trail, also known as White Pass. Lured by gossip and promotional material that painted a picture of a well-established and developed trail that easily crossed the mountains to Lake Bennett, thousands of stampeders and their horses attempted to negotiate the trail along with Strickland and his crew. Unfortunately for the stampeders, the promotional materials released by profiteers were, in large part, full of lies. The relatively narrow and undeveloped path could not accommodate the thousands of people attempting to cross, and combined with a rainy season that flooded the trail, many were forced to turn back. A shortage of oats and hay resulted in the deaths of thousands of horses along the trail, leading to the tragic moniker "dead horse trail." Strickland and his team turned back as well, and boarded a steamship on 14 September and headed for Dyea, another popular port at the base of the Chilkoot Trail that also lead to Lake Bennett (Strickland 1899:80).

Upon arrival in Dyea, Strickland set about locating members of the local First Nations tribe, many of whom carried baggage over the mountains for a price. He found Isaac, who he reported to be the "chief of the coast Indians," and arranged to pay 38 cents per pound for each of the 8,000 pounds (3,628.73 kg) of gear carried over the pass to Lake Lindeman. Though expensive, competition for their services was fierce, and Strickland was forced to use some quick talking to convince Isaac and his crew not to abandon him for an extra 2 cents per pound offered by another customer (Strickland 1899:81). Seven months later, when the path was no longer as difficult and some level of law and order had been established, it was possible to hire a porter to carry goods over the White Pass for 5 cents per pound (*Poverty Bay Herald* 1898:4). Upon arriving at Lake Lindeman on 25 September, Strickland hired a ferry to take him and his men across the lake so that they could continue on their way to Lake Bennett (Strickland 1899:81). The men then boarded another boat, constructed by the Sergeant Service, and headed down the lake to Tagish, where they would build barracks using tools purchased from prospectors for an exorbitant price (Strickland 1899:81).

By the beginning of November 1897, traffic to and from the Southern Lakes to Dawson City had essentially ceased due to the oncoming winter and a shortage of supplies in Dawson (Strickland 1899:82). Lack of provisions in Dawson City the previous winter resulted in a tragic exodus from the city by those without proper supplies. To prevent a recurrence, the North-West Mounted Police issued an edict that all incoming prospectors must have at least one year's worth of supplies (approximately 2,000 pounds [907.18 kg]), when entering the territory. Those who did not arrive at the Canadian border with the requisite supplies would be turned back (*Klondike: The Chicago Record's Book for Gold Seekers* 1897:42; Berton 1974:154). Men settled down on the banks of the lakes and built cabins to over winter before continuing on to Dawson. The North-West Mounted Police were as busy as ever. Strickland and 20 of his men were sent to White Pass in early February of 1989 where they spent the remainder of the month fighting fearsome blizzards while attempting to build their customs house at the summit. By 27 February the house was finished, and after raising the Union Jack, the customs officers began collecting duty from the stampeders, who began appearing in large numbers by 3 March 1898 (Strickland 1899:82).

Having helped to set up the customs house at the summit of White Pass, Strickland returned to Tagish Lake in British Columbia at the end of March to prepare the Tagish post for May, when the ice would break on the lakes and thousands of people would swarm down the river towards Dawson. When the ice went out on 28 May, Strickland commenced the difficult task of assigning numbers to the boats and recording the names and addresses of the people passing into the Yukon Territory. In all, he recorded the names of approximately 28,000 people from all over the world and registered 4,746 boats at his post alone. The first steamboat to arrive at his post was the *A.J. Goddard* on 3 June. In all, 7,080 boats passed down the Yukon River that year (Strickland 1899:82-84).

Dawson City

The first small-scale rush to the gold fields in 1896 resulted in the tent town of Dawson City, quickly assembled by the miners moving into the area from other gold towns in the Yukon and Alaska (Berton 1974:68-69). There were a mere five houses by January of 1897, one of which housed the famous Joe Ladue's saloon around which the men of Dawson spent many winter evenings in 1896-1897. The town that camped out on the shore of the Yukon River during that harsh winter, digging their pay dirt out of the frozen riverbed, created a society based upon the gold that became increasingly worthless as time wore on. There was such a shortage of supplies that salt became worth its weight in gold, a box of burnt nails sold for $800, eggs cost $1 apiece, and a night on the town at Joe Ladue's saloon could cost $50 (Berton 1974:70-71). Life in the Yukon was incredibly expensive even for the North-West Mounted Police, who had trouble surviving on their salary. Policeman Strickland (1899:85) reports the difficulty of entertaining important guests when a tin of tomatoes could cost as much as $1.50 cents and eggs could be up to $3 a dozen in Tagish. Gold became the most common and cheapest commodity in Dawson (Berton 1974:70-71). Many of the early miners fled the city with their fortunes as soon as the river began running in 1897, jumping on board the steamboats *Portus B. Weare* and the *Alice* for a ride down to St. Michael, Alaska where they boarded the steamers *Portland* and *Excelsior* to head to the west coast of America and deliver news of the gold rush to the outside world (Berton 1974:87).

The thousands of people to arrive at Dawson City in the summer of 1898 quickly developed this tent city into a town of wooden buildings and modern amenities in the middle of the wilderness (Berton 1974:354). Between July 1898 and July 1899, it became one of the largest and most cosmopolitan cities in North America. Dawson quickly developed running water, electricity, steam heat, and a telephone service. There were dozens of hotels, some of which were finer than those in the prospectors' home towns. Motion picture theatres were built, an undeniable luxury at a time when motion pictures were a mere three years old. String orchestras, theatres, glee clubs, and vaudeville companies competed for audiences. Injured miners had the option of three hospitals that featured 70 physicians. Some dance hall girls shrewdly sold themselves for their weight in gold, others dressed in fashions from Paris. The fast life and lively atmosphere of Dawson died almost as quickly as it began, however, when the miners began to leave in July 1899 after scraping as much gold as they could out of the earth. Within months, the town was a ghost of its former self (Berton 1974:354-355).

Boats of the Gold Rush

The remote nature of the gold fields made the development of a transportation system a necessity. Though the foundation of a transportation system had already been laid in the Yukon Territory prior to 1898, it was not equipped to deal with the massive number of people drawn by the lure of gold. The Klondike Gold Rush resulted in a widespread and sophisticated transportation system based upon steamboat travel that would last for more than half a century.

The frantic energy that swept the nation led to the intensive and rapid acquisition and construction of ships to serve the miners and entrepreneurs of 1898. Of the 266 steam vessels operating in the Yukon between 1898 and 1951, 131 were built specifically for the Klondike Gold Rush (Pollack 2009; Affleck 2000:71-85). Many of these boats wrecked on the Yukon River and its tributaries or were abandoned on its shores, and are still visible today. It was a fascinating period of massive mobilization characterized by ingenuity and innovation that changed the Yukon Territory, and can be studied through the surviving boats and documents.

The *A.J. Goddard*

One of those boats, the sternwheeler *A.J. Goddard*, was discovered in Lake Laberge, Yukon Territory in the summer of 2008 by the Yukon River Survey Project. Sitting upright on the lakebed as a result of an October storm in 1901, the *A.J. Goddard* and its cargo have remained undisturbed since the sinking in 1901 (Figure 1.4) (*The Daily Klondike Nugget* 1901). The complete and undisturbed nature of the wreck site, the only known site from this period to show such remarkable preservation, provides an unparalleled opportunity for studying the construction features of one of the Klondike steamboats and its associated material culture.

FIGURE 1.4. The *A.J. Goddard* in late summer 2010 (Photo by Larry Bonnett).

Prefabricated in California and carried over the White Pass in segments, the *A.J. Goddard* was assembled on the shores of Lake Bennett, British Columbia. Though the *A.J. Goddard* is part of the greater Yukon River steamboat tradition, it is quite different from other vessels that survived at Dawson City and other places along the river. In addition to being the only surviving member of the fleet of small steamboats that served on the river at the end of the 19th century, it is also the only surviving example of one of the few pre-fabricated metal vessels in the Klondike. The majority of Yukon River steamboats were built of wood and could be up to four times larger than *A.J. Goddard*, which was a mere 50 ft. long (15.24 m). Like most steamboats built for the western rivers of America, the wooden boats of the Klondike were built according to an oral tradition and without plans, with construction and modification based on a vessel's intended use.

Due to the nature of its construction and building material, the *A.J. Goddard* represents a period of change in shipbuilding techniques, and is part of the fascinating juxtaposition between traditional wooden boats and a new, prefabricated industrial solution to boatbuilding. This publication presents the results of two seasons of field work on the *A.J. Goddard* site conducted between 2009 and 2010. Objectives for the field seasons included recording the vessels' construction features and creating an artifact catalog with the goal of learning more about vessel construction and the material culture associated with a small gold rush era steamboat. Select artifacts were recovered for presentation, study, and display in Whitehorse, Yukon Territory with the intention of creating a permanent exhibit for the Yukon public and visitors.

The nature of the *A.J. Goddard* raises several questions that this work addresses. The *A.J. Goddard*'s design was likely chosen for its portability and the speed with which the vessel could be transported to the Yukon. How is this vessel different from the other steam vessels of the Klondike, and why? The most striking aspect of the *A.J. Goddard* is the fact that it was carried over the Coast Mountain Range. Concessions in the design would have been necessary to make this possible. Are they evident in the vessel's form, assembly, or in the choice of machinery? This study attempts to reconstruct the vessel, for which no plans are known to exist, based upon field data and contemporary sources. Was the prefabricated vessel designed specifically for the Yukon, or was it adopted for use in the north from elsewhere? Was it suited to the Yukon River?

CHAPTER II
STEAMBOATS OF THE GOLD RUSH

Transportation in the Yukon Before the Gold Rush Stampede

The Yukon Territory was very sparsely populated prior to the Gold Rush. Though the indigenous Yukon First Nations people had utilized the Yukon River and its tributaries for thousands of years, the Yukon Territory did not draw the attention of Euro-American speculators until the Hudson Bay Company fur trade expanded into the unexplored Northwest in the late 1830s and 1840s. Based in Montreal, the company was named for the prominent bay in northern Canada where many of their early operations were conducted (Figure 2.1) (Bennett 1978:11). Transportation throughout the Yukon Territory relied heavily upon the inland waterways, and routes established by Euro-American explorers often mirrored those followed by native Yukon First Nations people (Easton 1987:1,4).

Of the many rivers in the Canadian Northwest, Euro-American explorers utilized four major entry points to the Yukon Territory. The Hudson Bay Company employed two major eastern routes in the 1840s. One route approached from the northeast, using the Mackenzie, Peel, Rat, Bell, and Porcupine Rivers to reach the Yukon River and their Company posts established along the way: Lapierre House, Rampart House, and Fort Yukon (Easton 1987:1; Bennett 1978:11). The other eastern route entered through the southeast, following the Liard, Frances, Finlayson, and Pelly Rivers to their posts at Frances Lake, Pelly Banks, and Fort Selkirk (Easton 1987:1).

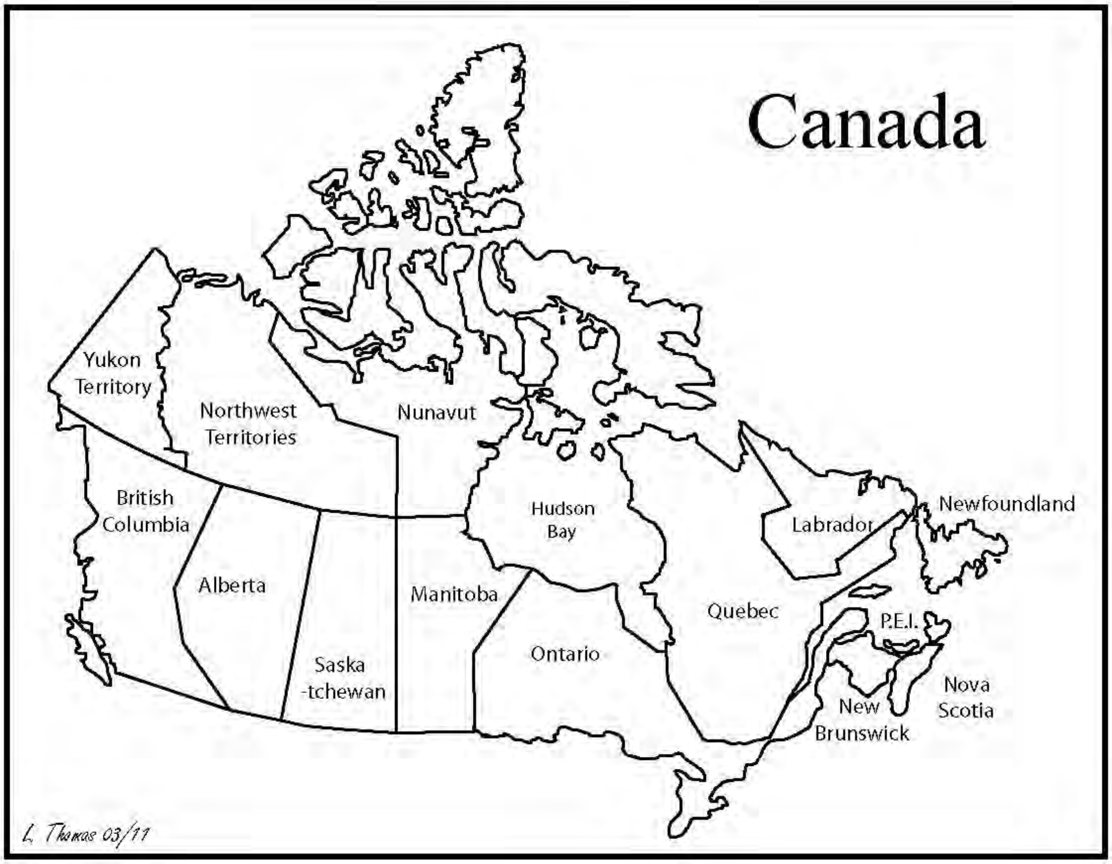

FIGURE 2.1. Canada and its provinces.

Two alternate inland river routes permitted access to other explorers coming from the west and south. Russian and American explorers and entrepreneurs entered via the terminus of the Yukon River in the Bering Sea, near the port of St. Michael, Alaska on Norton Sound. The final route to be established, and the most important, was the southwest route over the Coast Mountain Range. First traveled by Euro-American explorers in the 1870s, the route began at the Coast Mountain Range in southeastern Alaska. After climbing through the passes, these explorers had to build small boats and journey down a chain of lakes – Lindeman, Bennett, Tagish, and Marsh – and then enter the Yukon at its headwaters (Figure 2.2) (Easton 1987:1).

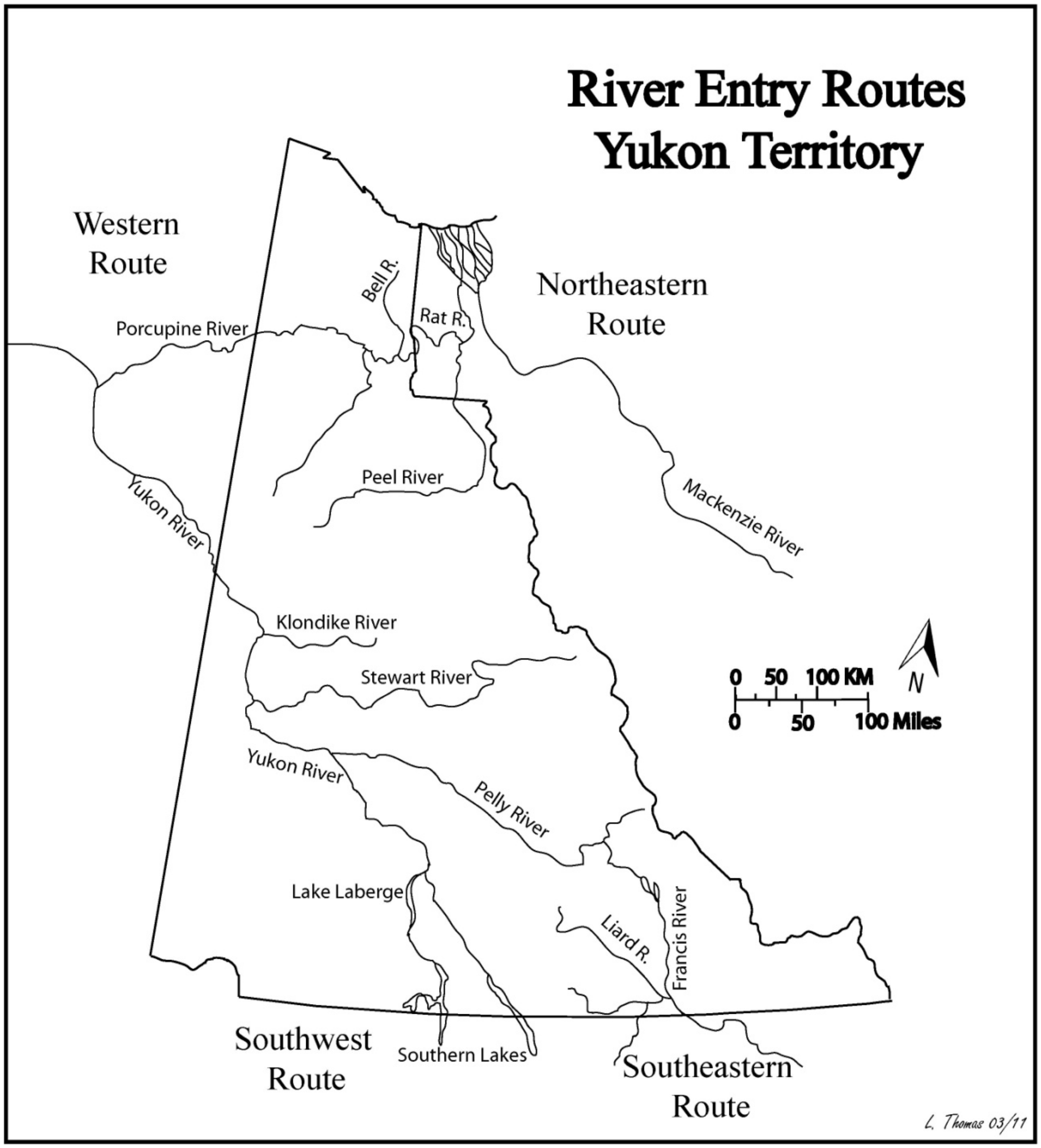

FIGURE 2.2. River routes used to enter Yukon Territory.

Entrepreneurs and steamboat captains learned that the lower Yukon River was accessible through its outlet at the seaport of St. Michael, Alaska. With navigable channels open from June to October, the river was suitable for steam transportation. The Russian-American Telegraph Company launched the first steamboat on the Yukon River in 1866 from this route (Affleck 2000:69; Bennett 1978:17). Built in San Francisco, the small sternwheeler *Wilder* was transported to the Yukon River upon the deck of the larger steamship *Nightingale*. Underpowered and difficult to steer, this first Yukon River steamboat was not well suited to the demanding conditions it encountered; changes would have to be made (Dall et al. 1898:4-7).

Upon the purchase of Alaska by the United States in 1867, the primary entry point for Yukon River navigation switched from the eastern routes established by the Hudson Bay Company to the western route beginning at St. Michael, Alaska. This facilitated the introduction of scheduled steam powered transportation, introduced on 4 July 1869 with the launch of the sternwheeler *Yukon* (alternate spelling *Youkon*) by the Alaska Commercial Company to compete with the Hudson Bay Company. The Alaska Commercial Company began regular service with the *Youkon*, transporting trade goods along the river on the lower (Alaskan) length of the Yukon River (Downs 1992:137; Bennett 1978:17; Easton 1987:34). The *Youkon* first entered Canada's Yukon Territory in August 1874, when it delivered Alaska Commercial Company employees Jack McQuestern and F. Barnfield to Fort Reliance, six miles (9.65 km) from what would become Dawson City (Easton 1987:33-34).

The *St. Michael*, owned by the Western Fur and Trading Company, joined the *Youkon* in 1879. Both of these shallow, 80-foot long (24.38 m) wood-burning steamboats were more powerful than their predecessor the *Wilder*, and were capable of pushing 10-ton barges along the river and making the journey from St. Michael to the Canadian border in approximately 20 days (Bennett 1978:17; Affleck 2000:81).

The real beginnings of a Yukon transportation system developed during the 1880's as more people began to take interest in the Yukon Territory. Their route was limited before the gold rush, however, as sternwheelers only operated on the lower river, between Dawson and St. Michael. A small fleet served the prospectors and traders along the lower river, consisting of the *New Racket*, a small sternwheeler built in 1882 by Edward Schieffelin; the *Arctic*, a larger sternwheeler built in 1889 by the Alaska Commercial Company; and the small fleet operated by the North American Transportation and Trading Company that was launched in 1892 with the *Portus B. Weare* (1892) and the *John J. Healy* (1896) (Bennett 1978:22; Affleck 2000:71-80). The Alaska Commercial Company added to its fleet with the *Alice* in 1895 and the *Bella* in 1896 (Bennett 1978:22).

The Alaska Commercial Company's *Alice* and the North American Transportation and Trading Company's *Portus B. Weare* were the first two boats to carry weary but joyous miners and their golden cargo from the Klondike to St. Michael in the spring of 1897, where they would catch larger ocean-going steamships back to San Francisco. It was not until this trip, and the start of the Klondike Gold Rush stampede in 1897-1898, that the first large-scale steamer traffic developed on the Yukon River (Affleck 2000:69). The Gold Rush would introduce the first steamboat to the upper Yukon River, between Dawson and Bennett, and the mobility provided by the steamboats would begin to alter the landscape (Bennett 1978:17). The difficult nature of Yukon transportation would determine the types and number of boats built to serve on the river, which would in turn influence the formation of the territory.

Into the Wild: How Steamboats Reached the Yukon

The Klondike Gold Rush occurred just outside of Dawson City, Yukon Territory. The first wave of prospectors attempting to reach the gold fields in 1897-1898 had two primary routes for reaching the Klondike, and traveling upon the Yukon River was inevitable. The all-water route via the Bering Sea and St. Michael, Alaska was more comfortable. The land-water route that cut overland from southeastern Alaska was faster, but involved a difficult hike over the Chilkoot Trail or White Pass and down the upper Yukon River (Dall et al. 1898:viii). These journeys would need to be made by the boats of the Yukon River as well. As there were no formal boatyards in the Yukon Territory at the time of the Gold Rush and few vessels operating on the river, any vessel that was to operate on the river needed to be transported there, either whole or in pre-fabricated pieces from one of the ports on the west coast of the United States. The challenges of reaching the Yukon influenced the construction of boats. Vessels taken over the mountains needed to be small enough to be carried in pieces over the passes, and those that traveled upriver from St. Michael needed to make the dangerous ocean voyage under their own steam or be transported in sections on the decks of other vessels.

Gold Rush Ports

The starting points for most vessels transported to the Yukon were located on the west coast of the United States and Canada. While the ports of San Francisco, Portland, Tacoma, Vancouver, and Victoria profited from the gold rush trade, Seattle was the primary hub of transportation connecting the lower 45 states with the Klondike (Figure 2.3)(Berton 2001:113-115). Every American steamboat company was headquartered in Seattle except for one. Seattle's proximity to the Yukon, combined with three transcontinental railroads, made it the most attractive city to shipping companies (Knutson 1997:6).

Shipping companies chose Seattle for its accessibility for constructing and deploying boats, and masses of prospectors chose to travel through this city not only because it sent the most boats to the Yukon, but also because of a clever and aggressive marketing campaign by the city of Seattle to attract them. Erastus Brainerd, a Harvard graduate and news veteran, was the man behind the advertising campaign. His carefully composed advertisements appeared in everything from small town newspapers to letters directed to European heads of state. He succeeded in garnering the attention of millions. As a result, Seattle received five times the Klondike trade that the other port cities did – $25 million to their $5 million (Berton 2001:113-115).

Figure 2.3. Seattle waterfront in 1898 (Goddard collection, courtesy of Albert Goddard).

Aided by the support of Montreal and Toronto based railroad interests, the Canadian port cities of Vancouver and Victoria attempted to compete for the profits to be gained by supplying and outfitting both the prospectors and their boats. Assisted by the Canadian government, the cities imposed customs duties on all foreign goods entering the Yukon Territory. This could have influenced prospectors with the lure of saving money, except that coastal access to the Yukon is cut off by the Alaska panhandle, which would make the prospectors subject to American customs fees as well, thus negating any benefit received from avoiding Canadian customs fees. As Canada had no reliable inland transportation system or route that allowed access to the Yukon, Canadian ports and inland cities could not compete with the American port cities such as Seattle and San Francisco for the Gold Rush outfitting profits (Bennett 1978:27-28).

Gold Rush Steamboat Routes to the Yukon

The All-Water Route

Prospectors and entrepreneurs determined which route they would take prior to departing from a west coast port, as success upon that route was determined by the nature of the vessels' design, not to mention sheer luck. The longer but more comfortable all-water route involved two phases for hopeful prospectors and businessmen, though it was dependent upon the seasons (and the absence of ice) for entry into the Yukon River. The first phase of the 4,000 mile (6,437 km) journey involved traveling from the west coast of North America up the Inside Passage, across the Gulf of Alaska, through the Aleutian Islands, and up the Bering Strait to reach St. Michael before embarking upon the second phase - a steamboat voyage up the Yukon River (Dall et al. 1898:viii). By running upstream on shallower steamboats for 1,600 miles (2,574 km) to Dawson, passengers could travel in relative comfort all the way to the heart of the gold rush (Knutson 1997:5; Dall et al. 1898:viii). Many chose not to take this route, however, as it was initially more expensive and thought to be slower. If it was one of the least traveled by prospectors, this route was the only way for the bigger boats and large quantities of freight to reach Dawson (Bennett 1978:28-30).

Two types of boats were built for the all-water route – deeper drafted steamers and sailing vessels that ferried passengers back and forth from the West Coast to Alaska, and the shallower-drafted river steamers intended for the Yukon River trade. Boats as well as people traveled upon the larger ocean going ships that served the West-Coast-to-Alaska route. Just as *Wilder* was transported upon the deck of a much larger vessel (in this case *Nightingale*), so too were the pre-fabricated vessels of 1897-1898 (Dall et al. 1898:viii). Many vessels were pre-assembled on the West Coast and shipped in pieces to St. Michael, where they were reassembled at the mouth of the Yukon River.

Because the lower Yukon River is navigable only from July to the end of September due to its northern latitude, the people who chose this route had a limited window of time in which to complete their journey (Dall et al. 1898:viii). This, combined with the excitement induced by the gold strike, resulted in many vessels of varied origin attempting to reach St. Michael as quickly as possible. The first boat to depart was the *Al-ki*, on 19 July 1897, a mere four days after the *Excelsior* arrived in San Francisco with word of the gold strike. Upon departure, the boat was overloaded with people, cattle, horses, and supplies, as all boats would be when they made the trip north. Boats that were built for 100 passengers would be sent north with 500 (Berton 2001:126). By February of 1898, there were 41 vessels operating from San Francisco to St. Michael on regular ferry service, and San Francisco was one of the smaller ports (Berton 2001: 124). The passage could cost as much as $1,000 a ticket when the excitement of the Gold Rush was high (Berton 2001: 125).

Some vessels were engaged in regular ferry service between the west coast and Alaska, but others, often in deplorable condition, were sent north on a one-way voyage, with the owners intending to sell them for scrap upon arrival in St. Michael or Skagway, Alaska. These were often the foulest boats to travel upon, and the unlucky and unwitting souls who booked their passage in them did not soon forget it (Berton 2001: 127).

Once in St. Michael, prospectors rushed off the boats in search of a river steamer to take them to Dawson City (Berton 2001: 124; Bennett 1978: 28). This was not an orderly process, however, for prospectors often had a difficult time finding a steamboat to take them on the final leg of their journey (Bennett 1978: 28). As the Yukon River had very few steamboats upon it at the beginning of the Gold Rush, new boats were launched and sent upriver as soon as they arrived in St. Michael, though there were never enough vessels to take all of the excited passengers. Of the boats intended for the river trade, some were built entirely in Seattle, San Francisco, or elsewhere, and were steamed, towed, or shipped in pieces to St. Michael. The fleet of 14 nearly identical sternwheelers built by the Moran Brothers Shipyard at Seattle, along with other vessels, steamed up to St. Michael under their own power. Many of river steamers were carried to the Yukon's mouth as kit boats or towed as barges. The kit boats were assembled at St. Michael before continuing up the Yukon River under their own steam. Due to their shallow draft and flat bottoms designed for the shallow river, the Moran boats had a difficult time during bad weather in the Inside Passage and on the Bering Sea. On 29 June 1898, two of them, *Western Star* and *Pilgrim*, were wrecked as a result of dragging anchors while waiting out a storm near Katmai, west of Kodiak Island. *Western Star* was a total loss, though *Pilgrim* was quickly salvaged. The ten other identical steamers of the Moran fleet arrived in serviceable condition at St. Michael a month later (Knutson 1997: 34-37).

The Land-Water Route

The southern, and partially land based, route across the Coast Mountains in British Columbia was known as the faster, though more difficult, path to the goldfields (Dall et al. 1898:viii). For those who could not afford the all-water route or desired to reach the Yukon as quickly as possible with little regard for hardship (which constituted the majority of prospectors) this was the most popular route (Dall et al. 1898:viii). From the West Coast, the journey began with a steamer or sail boat passage to Juneau, Alaska and then on to the Alaskan coastal towns of Dyea or Skagway to begin the hike over the mountains to the headwaters of the Yukon River (Figure 2.4). These cities were the primary gateways to the Yukon.

The massive number of people clamoring to reach Skagway and Dyea resulted in many boats being built, purchased, or taken out of the boneyard. The clamoring did not stop once passengers were on board the vessels (Knutson 1997:5; Dall et al. 1898:viii; Bennett 1978:27-28). Martha Black, who made the trip herself, said of the experience that:

> The steamer was certainly a "has-been." She was dirty, and loaded to the gunwales with passengers, animals, and freight. Men slept on the floor of the saloon and in every corner. The captain was seldom, if ever, sober, and there were many wild parties. Poker, black jack, and drinking went on night and day, and our safe arrival in Skagway was due probably to the Guiding Hand that looks after children, fools, and drunken men (Bennett 1978:28).

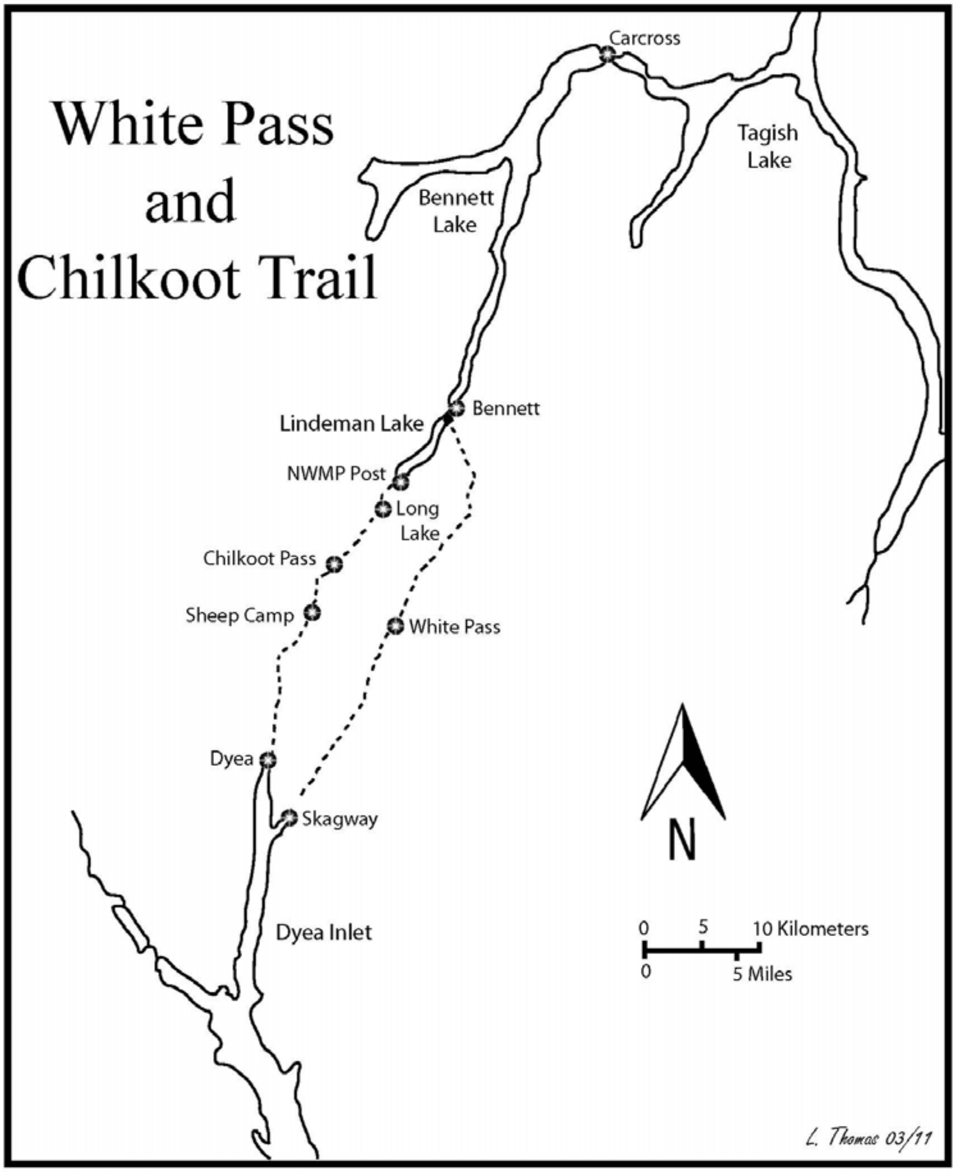

FIGURE 2.4. The primary trails leading over the Coast Mountains.

Though there were six routes over the mountains, those that lead from Dyea and Skagway to Lake Bennett were by far the most popular. The well-known Chilkoot trail lead from Dyea, and had served the majority of prospectors traveling on foot since 1882, when few men were prospecting in the area (Bennett 1978:30). The White Pass departed from Skagway, and though less utilized by the prospectors traveling on foot, it had many advantages that Dyea and the Chilkoot Trail did not. For one, Skagway possessed a harbor, which Dyea lacked. In addition, the inclination of the trail over White Pass was gradual enough that pack animals could walk over it. Just as old boats were sent into the gold rush trade, so too were old horses. Soon known as the Dead Horse Trail, this was the more viable option for prospectors hauling large quantities of freight across the mountains (Bennett 1978:34-35).

Lake Bennett lay on the other side of the mountain range, and an enormous tent city of more than 10,000 people formed there during the winter of 1897-1898. They built the thousands of rafts, scows, and sternwheelers that would take them down the river to Dawson City when the ice broke (Bennett 1978: 35).

Acquisition of Older Vessels

News of the gold strike resulted in a rush to procure ships from anywhere possible, as the prospectors knew well the value of being the first to stake a claim. Immediately after news of gold arrived in San Francisco, prospectors began buying ships from unlikely sources such as Jesuit Priests, who in October of 1897 were making plans to construct a new vessel to take them to the Catholic missions in the Yukon as a result of selling off their original vessel to hopeful miners (*New York Times* 1897c).

Older ships were modified and sent from as far away as Philadelphia. The steamer *Howard Cossard*, a failure upon the Chesapeake three years prior, was overhauled in Philadelphia and outfitted for the Klondike. If the *Cossard* ever made it, it did so under another name, as no record can be found of the ship (*New York Times* 1897b). The old Chinese freighter *Ning Chow* was brought all the way across the Pacific and outfitted for passengers (Berton 2001:125). Mrs. Hannah S. Gould chartered the *City of Columbia* for the Women's Clondyke Expedition, but after wrecking near Tierra del Fuego near Cape Horn, the boat barely limped into Seattle where the women were forced to disband for lack of funds (Berton 2001:124). The steamship *Tartar*, which originally took South African millionaires on pleasure cruises, ended its career carrying hopeful prospectors from Vancouver to Skagway (Price 1898: 61-62). Decrepit boats left to rot on the beaches or abandoned in boneyards were brought back into service, such as the steamboat *Politkofsky* now abandoned at St. Michael (Bennett 1978:28). Though many boats that set out did not make it, at the time, no distance was too far to attempt to reach the Yukon.

Construction of New Vessels

Puget Sound Shipbuilders

By January of 1898, 60 boats were being built in Seattle, 44 of which were constructed by the Moran Brothers (Knutson 1997:3). Though shipwrights often built consort vessels of similar or identical designs, the Moran Brothers of Seattle far surpassed this by constructing 14 essentially identical sternwheelers in 1898. Twelve steamed to St. Michael under their own power, while the remaining two were shipped up as prefabricated kits to Dutch Harbor and St. Michael. Though originally all 14 were contracted by the Yukon Company, they were ultimately purchased by 6 different companies (Affleck 2000:69-71). The Yukon Company dropped out shortly after ordering the vessels as a result of financial difficulties, and the Moran Brothers were forced to find these new buyers prior to setting out for the Klondike in June (Knutson 1997:4,31).

St. Michael, Alaska

The island of St. Michael, located near the mouth of the Yukon River, was one of the primary centers for launching and servicing steamboats upon the river. The gold rush resulted in the massive expansion of transportation facilities at St. Michael. This location (along with the rest of the far north) is relatively treeless or populated with only diminutive trees, and so the majority of vessels built at St. Michael were pre-fabricated steamboats initially constructed on the West Coast and shipped north (Bennett 1978:28). Operating out of Port Blakely, Seattle, Portland, and San Francisco, the Hall Brothers manufactured steamboat materials and shipped them north to be assembled at the Yukon's mouth (Affleck 2000:70).

Inland Shipyards

Not all boatyards were close to the Pacific Northwest, or even located on an ocean coast. Any available facility could be called upon to build boats to profit off of the prospectors. The Alaska Commercial Company, for example, ordered four steamboats to be built at Howard's Shipyard on the Ohio River in Jeffersonville, Indiana. On 10 January 1898, competing railroad companies gathered to bid for the right to ship the Howard-built steamboats and the men required to assemble them to San Francisco. They estimated that 30 freight cars would be required to transport the sections of hull and cabins, machinery, fittings, and 60-75 men to San Francisco, where the men would then re-construct the boats before they set off for the Yukon (*New York Times* 1898c).

Canadian Shipbuilders

Though the majority of boats constructed for the Klondike Gold Rush were built in the United States, several shipyards in Canada were also active. In 1898, the Canadian Pacific Railway built six sternwheelers, the most of any Canadian company, at its freight yards on the north shore of False Creek in Vancouver. Other Canadian shipbuilders who supplied prospectors with sternwheelers include John Todd of Victoria, British Columbia and A. Wallace of the B.C. Iron Works in Vancouver (Affleck 2000:69).

Improvised, Wilderness Shipyards

The greatest number of boats to be constructed in Canada were built on the shores of the Southern Lakes that form the head waters of the Yukon River in British Columbia. Improvised wilderness shipyards, often accompanied by small, quickly constructed towns, produced smaller steamboats suited for the shallow upper Yukon River. Everything from rafts to small steamers (less than 90 ft. [15.25 m] long) were built at these improvised boatyards (Figure 2.5 and 2.6). A tent city of more than 10,000 people formed at Lake Bennett during the winter of 1897-1898; here prospectors built the rafts, scows, and steamers that would carry them down the river when the ice broke in May (Bennett 1978: 35). Lake Lindeman, slightly south of Lake Bennett, was the site of another enormous camp where hundreds of vessels were built. Julius Price, a British journalist, describes the scene:

> It almost baffles description. All along the shore and to some distance up the side hills, boat-building was being carried on with quite feverish activity, and the sound of a steam saw-mill, whipsaws, and hammering and planing, resounded on all sides. Boats there were in all imaginable shapes and sizes, from big unwieldy barges to tiny craft that reminded one of the paper boats dear to childhood (1898:108).

Many boats appeared to Price to have been constructed according to one stock pattern (1898:108).

FIGURE 2.5. Scows on the water and being constructed on land at Bennett (Goddard collection, courtesy of Fay Goddard).

FIGURE 2.6. Bennett City in 1898 (Goddard collection, courtesy of Fay Goddard).

In fact, hundreds of small knock-down boats had been carried over the Chilkoot Trail or White Pass as a common item in many Klondike outfits. Large canoes, complete with a pair of sculling oars, three paddles, two poles, rope, basic repair kit, brass oarlocks, a mast, and a lateen sail with a gaff made from bamboo could be purchased in Vancouver for $100. Called the "Strickland," such a small boat could carry four men and a ton of equipment (Price 1898:56).

Saw mill operations were set up at various points along the lake to serve those who did not bring enough supplies with them or who could not afford the cost of a ready-made vessel, which often ran between $300 and $500 (Bennett 1978:35). Lake Nares featured a timber mill built by the Kerry Mill Company, while on the opposite side of the lake Mr. J.R. Perry owned a timber berth (an area of trees allotted by the government) that cut 150,000 board ft. (45,720 m) of timber in the spring of 1898. A saw mill at Lake Tagish was owned by a Frenchman named Racine (Strickland 1899:84). Those who owned the saws charged for their use, though it was often difficult to hire men to operate them, as prospectors were wary of anything that might delay their arrival in Dawson and thus did not want to commit to a job of indefinite length. Deals were often worked out, whereby men who wanted sawn timber agreed to provide the mill with uncut wood (Figure 2.7) (Bennett 1978:35). As a result of the massive production of boats in the area, timber became scarce around Lakes Tagish, Bennett, and Marsh (Strickland 1898:84). Many of the rafts and small boats built at Lake Bennett were unsafe and unseaworthy. They were poled, rowed, and sailed, depending upon the conditions. Wind was not the only propulsion for the sail, however. Current sails were essentially underwater sails – square pieces of canvas weighted down with rocks and used to catch the current or undertow. They were more useful in deeper water where they did not touch the bottom (Bennett 1978:35).

FIGURE 2.7 Timber from Upper Yukon Company saw mill (Goddard collection, courtesy of Fay Goddard).

In addition to the men building rafts and assembling their knockdown boats, contractors such as King's Sawmill and Shipyard were constructing boats and freight scows. Due to the high demand for water transport, priority was given to the large, square scows of 42 by 12 ft. (12.80 by 3.65 m) that could carry 20 tons and drew between 24 and 26 in. (60 and 66 cm) of water. They were propelled by a square sail when crossing the lakes (Bennett 1978:35). At Lake Lindeman, professional boat builders offered their services upon request, or had boats already constructed and ready for purchase. Some were moderately priced considering the conditions, according to the journalist Price, and could hold three or four men and two tons of provisions, all for the cost of $75. He also saw steel boats built in sections, punts, collapsible boats, and Peterborough and Strickland canoes for sale (Price 1898:108).

Twenty small stern-wheelers were built at Lake Bennett, many of which were framed with local wood cut using saw mills that had been carried over the Chilkoot Trail or White Pass and stationed at the edge of the lake (Affleck 2000:70; Pollack 2009). Companies such as Mitchell, Lewis & Staver Co. supplied entrepreneurs with 'Klondike Saw Mills' as well as steam boilers and engines (Mitchell, Lewis & Staver Co. 1900).

Sternwheelers built on the shores of the Southern Lakes were designed to be shallow enough to navigate the rapids around Whitehorse, that the larger steamers never had to pass though as they came from the north (Affleck 2000:70). In addition, the sheer effort and cost involved in transporting construction materials and equipment over the White Pass or Chilkoot Trail likely discouraged prospective shipbuilders from building the large 200 ft. (60.96 m) steamboats at Lake Bennett.

Shipyard Expansion

It is often the case with gold rushes that those who supply the miners are the most likely to profit. Companies on the east coast quickly took advantage of this opportunity, and speculation was rampant. William Cramp & Sons' Ship and Engine Building Company of Philadelphia established the Star Steamboat Line and were making grand plans by December of 1897 to expand into Seattle, intending to purchase the already powerful Moran Brothers Company. *The New York Times* speculated that they would put up to $10 million into the effort. As this would take time, however, the Cramp's were sending out boats as fast as they could. In addition to purchasing several American Line steamers to send to the Klondike, the *City of Columbia* set out in December of 1897, waved off by officials of the company and their partners (*New York Times* 1897a). A month later, the Cramps were busy overhauling five older boats that they had purchased for the Gold Rush trade (*New York Times* 1898a).

Another Pennsylvania shipbuilder, the Roach Ship-Building Company out of Chester, Pennsylvania constructed two large steamboats in Seattle for local attorney Andrew F. Burleigh's Yukon Company. The *Washington* and *Alaska* were 415 ft. (126.49 m) long, 47 ft. (14.32) in beam, and 27 ft. (8.23 m) in draft. The huge vessels could carry 1,000 passengers, 3,000 tons of freight, and were built specifically to carry people and supplies from Seattle to St. Michael, Alaska. They were outfitted with electric lights and steam heat, along with luxurious sleeping accommodations (Knutson 1997:2-3).

A Variety of Shipwrights

The variety of construction techniques seen on archaeological examples suggests that every available shipwright and apprentice was hastily constructing vessels to meet the demand. Textual sources support this as well. Moran Brothers Boatyards in Seattle recruited builders from Philadelphia in December of 1897 for $0.35 an hour. Their goal was to complete 14 river steamers and 6 barges for the Yukon Company by 1 April, 1898; a period of just three months, which they would complete on 40 acres of tidal flats with 376 men. By April, there were 1,000 men at the Moran Brothers yard alone, with thousands elsewhere (Knutson 1997:3). The similarity of Yukon River steamers to the vessels of the American western rivers also suggests that shipwrights took known and reliable designs and transplanted them north.

Sources of Information About Construction Features

Contemporary Plans

Thus far, contemporary plans of Yukon River steamboats have not been located. Due to the hasty nature of their construction, and the fact that they were based off a simple but tried and true design, plans might not have existed. Like the steamboats on the western rivers of America, the vessels of the Klondike seem to have been constructed according to an oral tradition handed down from shipwrights to their apprentices.

Though these wooden steamboats were built without plans, design and construction followed an established tradition (Custer 1991:13). After the buyer described their needs to the shipbuilder, including the size of vessel, the type of river to be run, and the anticipated cargos, the builder could determine what type of boat was required. The lines for the boat would be taken from a series of half models that the builder had designed for the purpose, and in some cases different vessel types could be combined to create a new hybrid that would meet the buyer's specific requirements (Custer 1997:17). In some cases, a new set of lines could be developed for the hull, though they were not recorded for posterity in a way that would be familiar today (Custer 1997:26). The buyer's budget determined if used or new machinery was chosen for the hull, or if pieces were salvaged from older vessels and used on the new boat (Custer 1997:17,26).

Steamboat hulls evolved rapidly on the inland rivers. Because they were the only truly reliable means of efficiently transporting large quantities of goods and people throughout the west, they made large-scale settlement of the west possible. Their value to the settlers and entrepreneurs resulted in a rapid evolution of steamboat design in order to meet the demand. Trial and error resulted in the western river steamboat that dominated the western rivers of America – the Mississippi, Missouri, Ohio, and Red rivers - during the 19th century.

The men developing the vessels were often practical shipwrights who operated by trial and error until they found a design that worked. They then taught their apprentices, and others followed their designs. There is little written of the way that paddlewheelers were built as it was not in the shipwright's nature to keep a record of their techniques; after all, they knew what worked and did not need to refer to a handbook. Though the shipwrights who designed the earliest western river steamers were east coasters with ocean craft experience, by the 1830s many characteristics of ocean craft that were seen on the first steamers, such as masts or bowsprits, had disappeared in favor of the flat bottomed, shallow draft hulls that borrowed design features from the flatboats that had plied the rivers since the 18th century (Custer 1992:26).

Iron and steel hulls had a number of advantages in their strength and durability, and in some circumstances began to be used to build steamships during the middle of the 18th century (Thiesen 2006:81-86). Unlike wooden steamboats, iron and steel boats were often built with plans; however, many of the steps that characterized the planning and construction of a wooden vessel would have been the same for a metal vessel.

Aspects of the planning phase would have influenced the choice of metal as opposed to wood, as was the case with the *A.J. Goddard*.

Though no technical plans of Yukon River steamboats have been found, contemporary textual sources from other parts of the country have been illuminating. The Marine Iron Works of Chicago, a company that sold prefabricated steamboats of various styles, produced a catalog in 1902 that provides line drawings of the exteriors of the vessels and interesting contemporary thought on the ideal way to construct steamboats.

In one instance, the catalog states that a riverboat hull would need to be strong, with ample cargo space but a light draft. Small and medium sized vessels intended for shallow rivers should have wooden bottoms that would more easily withstand rocks and snags than the thin metal sheets that might otherwise make up their hull. Larger vessels with a deeper draft and larger floating surface that would permit thicker metal plates would do well with a steel hull (Marine Iron Works of Chicago 1902).

Vessels Surveyed to Date

Paintings, photographs, journals, and archaeology provide the majority of the current knowledge about Yukon River steamboat design. As it is the construction of the hull that is of particular interest, archaeology is often the most informative source.

Due to their structural similarity to the steamboats of the Klondike, archaeological surveys of the steamboats of the western rivers of America should be considered when studying the construction of Klondike sternwheelers. Though there are hundreds, perhaps more than a thousand, steamboat wrecks on the western rivers of America, to date only 18 steamboats have been archaeologically surveyed and the data published. The *Heroine* (1832), *Eastport* (1852), *Cremona* (1852), *Arabia* (1853), *Scotland* (1855), *Kentucky* (1856), *John Walsh* (1858), *Homer* (1859), *A. S. Ruthven* (1860), *J. D. Hinde* (1863), *Bertrand* (1864), *Black Cloud* (1864), *Ed. F. Dix* (1864), *Montana* (1879), Caney Creek Wreck (ca. 1845-60), Clatterwheel Wreck (ca. 1840-80), Natchez Watercraft 3 (ca. 1879), and 3Ct243 (ca. 1883) (Kane 2004:34; Corbin 2007). Information gleaned from these wreck sites can help provide context for the construction techniques utilized on the Klondike steamboats and answer outstanding questions.

There are 22 known steamboat hulks scattered throughout the Yukon Territory, along with 2 heritage vessels that have been preserved for posterity. The Yukon River Survey Project team has been locating and recording steamboat hulks throughout the territory since 2005. They have surveyed and published the remains of the steamboats *Julia B.* (1908), *Seattle No. 3* (1898), *Vidette* (1898), *Evelyn* (1908), *A.J. Goddard* (1898), and the *Moyie* (1898) in Kaslo, British Columbia, which is the sister ship to the Klondike sternwheeler *Tyrrell* (1898) (John Pollack 2011, pers. comm.). There are a number of Yukon River sternwheelers being surveyed in Alaska as well, including the *Charles H. Hamilton* (1897), *D.R. Campbell* (1897), *J.P. Light* (1898), and the *Sarah* (1898) (Katherine Worthington 2011, pers. comm.).

Design Influences

The difficulty of navigating the Yukon influenced the types of vessels that were built for the river. The shallow-hulled steamboat designs and construction characteristics selected in the late 19th century would be typical of Yukon steamboats for the next 50 years, until the last steamboat was retired in 1957 (Turner 2007:229).

Shipbuilders and entrepreneurs understood that there were many factors influencing vessel design, but knew that the local environment was the single most important determinant of the eventual design. Shipwrights had to consider the currents and depth of the water, the type of cargo, the intended voyages, the quality of the water that would be used to cool the boiler, and the fuel that would be burned (Marine Iron Works of Chicago 1902).

Though it is unclear exactly what the many and varied shipbuilders of the 1897-1898 fleet knew about the nature of the Yukon River, general western river steamboat designs would serve them well as guidelines for what was required. A fortunate thing it was, as the prospectors of the Klondike had no time to waste, nor the desire to do so. Due to a general lack of knowledge of the exact nature of the Yukon River, combined with many prospectors' underestimation of the size and danger of the wilderness they were about to encounter, it is likely that only in rare circumstances were the first vessels sent to the Klondike modified much beyond their existing generally suitable design (Strickland 1899:86).

The Yukon River is in places a wide, deep, storm-ridden lake, and at others, a shallow, rocky, and rapid rush of water suitable for only the sturdiest of specially designed boats. The first steamboat upon the Yukon River, the *Wilder* in 1866, was underpowered and unsuited to the tempestuous nature of the rapids and currents (Dall et al. 1898:4-7). The vessels of the small fleet that followed the *Wilder* on the lower Yukon River were accordingly improved to better suit the conditions. The first of the fleet, *Yukon*, *St. Michael,* and *Arctic* were slightly more powerful, and being able to tow 10-ton barges, opened the era of large Yukon River steamboats (Bennett 1978:22). The 1898 stampede introduced steamboats into the upper Yukon, which was plagued by dangerous rapids at Miles Canyon and Whitehorse Rapids. The danger was so great that fines were levied by the North-West Mounted Police on boatmen who did not follow the government edict to hire licensed pilots to take them through the canyon and rapids (Bennett 1978:35).

The vessels that steamed from the West Coast to St. Michael at the mouth of the Yukon River may have been built more heavily to withstand the initial journey across the treacherous open sea, as was possibly the case with the Moran Brothers built *Seattle No. 3* (Pollack et al. 2010:178-180). This boat's unusually heavy construction may be a product of the varied boatbuilding designs present in the gold rush vessels due to hasty assembly by any shipwright available to build boats. It is more likely, however, that this particular vessel, and perhaps all of the Moran vessels, were built specifically to withstand the difficult journey across the Bering Sea (Pollack et al. 2010:179-180).

Construction Features of Wooden Steamboats

Though large-scale steam transportation did not reach the Yukon until 1898, rivers very similar in nature had been traversed by steamboats since the very beginning of the 19th century when the west was opened to steam. The western rivers of America, also rocky and shallow at times, lead to a specially designed type of western river steamboat that could carry the maximum amount of cargo for the longest possible working season.

Construction features of the boats studied to date, combined with photographs, suggest that the vessels of the Klondike are similar to the western river steamboats of the continental United States, though more research would help confirm this. Trial and error lead the shipwrights of the western rivers to the long, narrow, flat-bottomed design ideal for the oftentimes turbulent and shallow water. The hull shape allowed the vessels to displace the maximum amount of water and maintain a shallow draft while carrying a large load, effectively increasing their working season (Kane 2004:87-88).

While steamboat hulls in different regions shared many similar features, certain characteristics defined vessel types that were more appropriate for geographical or economic circumstances. The various adaptations form distinct sub-categories of inland river steamboats (Custer 1992:27). Adaptations to develop steamboats of the western rivers was just the beginning of steamboat evolution. As Euro-American settlement advanced across the continent and river travel began to spread westward to California and the Pacific Northwest, so too did steamboat design. The sternwheelers of the Pacific Northwest - in Oregon, Washington, and British Columbia - varied in design. They generally did not have the flat bottoms and hard chines of the Mississippi-Basin, though some did have flat bottoms and rounded bilges (Turner 1984:61; Pollack pers. comm.). Others, particularly some of the lake boats, had deeper and more rounded hulls that resulted in a sleeker, faster design (Custer 1992:27; Turner 1984:61). The shallow water of the Mississippi and its tributaries made flat bottoms a necessity. In addition to decreasing the draft, the flat bottom also allowed the footlings, heavy timbers similar to short keelsons, to form the bottom half of the cantilever truss that gave the hogchains a place to anchor and help keep the hull flat (Custer 1992:27). The hogchains could also terminate into transverse beams or longitudinal bulkheads. The nature of the Yukon River and its tributaries made adopting something similar to the Mississippi River design ideal, particularly considering the speed with which vessels were built or acquired for the gold rush.

As docking facilities were rare along many portions of the western rivers and in the Klondike, the bows of the steamboats were long and rounded to facilitate beaching the vessel along the shore and tying off to a tree at night. Three types of bows characterized western river steamboats: a scow bow, a model bow, or a spoonbill bow. The model bow was the primary type employed upon the western rivers, and featured a sharp entrance that increased the speed of the vessel. Packet boats that carried passengers on a pre-arranged and reliable schedule often employed this type of bow as its speed assisted them in keeping to the schedule (Kane 2004:88-89). The model bow was also common on many Yukon sternwheelers with wooden hulls (Pollack 2010:177). The scow bow was essentially an extension of the flat-bottom that curved upward to the rail. Blocky and slow, but easy and inexpensive to build, this bow type featured heavily in trades that did not rely upon speed. The spoonbill bow did not reach prominence until after the 1870s, and possessed a full, broad entrance that floated more upon the water than the model bow. This increased the boat's buoyancy, which resulted in a shallow draft and greater ease when beaching, as it did not cut into the sediment as much as the model bow (Kane 2004:88-89).

The sterns of sternwheel steamboats were generally simply built structures designed to make room for and support the paddlewheel. Shortly before the hull reached the stern, the flat bottom was raked to a flat, vertical transom that spanned nearly the entire breadth of the boat. The short, steep rake of the stern increased the surface area of the hull's bottom, which improved the buoyancy at the back of the vessel, as well as the hydraulics of water flow to the wheel. This was very necessary, as the paddlewheels were immensely heavy (Kane 2004:90).

The larger wooden steamboats had hard chines, and a very small keel plank or no keel at all. They were strengthened longitudinally to prevent hogging and sagging with longitudinal bulkheads, often three, though sometimes more, as was the case with the *Seattle No. 3*, abandoned at the Dawson Boneyard in first part of the 20th century (Pollack et al. 2010:175). The centerline bulkhead was flanked with parallel bulkheads on either side (Graves 1908; Pollack et al. 2010:175). The bulkheads could be constructed of stanchions, girders, solid wood, or truss built. Solid transverse bulkheads formed water tight compartments in some vessels (Pollack et al. 2010:175).

Truss girders were often positioned beneath the cylinder timbers and engine beds to support the heavy weight of the large steel engines. Except in areas of repair, the large wooden steamboats had single floors joined at a right angle to only one futtock, called a side frame. The chine was reinforced by a cocked hat, a triangular piece of timber wedged into the chine, a bilge keelson chine, or a futtock chine (Pollack et al. 2010:176). Hogging systems consisting of hogposts and hog chains of various dimensions were used to support the boat's hull and often tied into the keelsons and footlings to form a cantilever truss (Custer 1991:13).

According to S.H. Graves, President of the White Pass and Yukon Route, the idea Yukon River sternwheeler would accommodate 100 passengers and a maximum of 300 tons of freight. Its high pressure engines would be strong enough to quickly travel downstream with the engines in reverse, and the hull itself would have a draft of less than 4 ft. (1.2 m). Cocked hats would support the chine, along with a bilge clamp (Graves 1908; Pollack et al. 2010:180).

While the majority of Yukon River steamboats were large wooden vessels characterized by the above construction features, the *A.J. Goddard* was far different. Its construction details are discussed in Chapter V.

CHAPTER III

THE *A.J. GODDARD*

We played a part in one of the world's great dramas. Time has given us the perspective of distance, so we appreciate days of pioneer daring, the half of which can never be told.
-Albert J. Goddard

Albert James and Clara Goddard

On 15 July 1863, during the height of the American Civil War, Albert James Goddard was born on a farm in Muscatine, Iowa to Jesse Tabor Goddard and Elma Maria Underwood Goddard, both Quakers of English descent (Figure 3.1). He had three siblings: Mary Lydia (5 January 1865), Charles Alcott (22 February 1866), and Agnes Maria (31 July 1868) (Fay Goddard 2011, pers. comm.). His varied and eclectic career began after attending the Norton Normal Academy and the Agricultural College of Ames, Iowa, when he began working as a traveling salesman for a crockery business in Minneapolis. In 1886, he married Clara P. Herrick of Mount Pleasant, Iowa (Goddard, Clara:1; Lewis Publishing Company 1903:509-510). In 1888, they sold the Goddard farm and followed members of their family to Washington State. After packing blankets and food for the journey and with less than a $1,000, they boarded a train that would take them to Tacoma. The steamer *T.J. Potter* carried them to Seattle, and a second steamer ferried them across Seattle's Lake Union to Freemont, then little more than a forest (Lockley 1941; Hoffman 1953).

FIGURE 3.1. Childhood home of Albert James Goddard with grandfather Hanson Underwood sitting on the porch (Goddard collection, courtesy of Fay Goddard).

The Goddard's spent their first year in Washington living on the southern shore of Lake Union in a home with six of their family who had proceeded them to Washington (Goddard, Clara:2). Albert, Clara, and Albert's brother Charles, as industrious and hard working as they would prove to be in later years, gathered logs floating in Lake Union to use for the pilings of their new lake-side business in Freemont. The Goddard's had a gift for making things work. Charles Goddard, Albert's younger brother, would be Albert's partner in many business endeavors in the years to come (Figure 3.2) (Fay Goddard, pers. Comm.). They built a machine shop, with a sawmill and wood working shop next door. The company provided a variety of services, from producing plumbing components to repairing wagons and shoeing horses. Within a couple of years, Goddard and his brother Charles established an iron works, which was eventually incorporated under the name Pacific Iron Works. The foundry survived two fires, and the brothers profited from building boats and the first gasoline engines in the Pacific Northwest (Goddard, Clara:2; Lockley 1941).

FIGURE 3.2. Charles and his wife Nina Goddard with son Harold Fay in about 1899 (Goddard collection, courtesy of Fay Goddard).

Curiously, another Pacific Iron Works, perhaps the forebear of Albert Goddard's in Freemont, was established in 1850 in California. The Californian company was large, with foundry, machine, forging, smithing, and pattern departments as well as a boiler and woodwork shop, and a machine tools department. In the 1860s it employed 125 men and had productions valued at $275,000 and $300,000 in 1866 and 1867 respectively. In 1868 this works was owned by Messrs. Rankin, Brayton & Austin, who conducted business under the name of the original firm "Goddard & Co." (Cronise 1868:613). The relationship between Albert Goddard's Pacific Iron Works and the older Californian Pacific Iron Works is unknown.

Eventually, Albert became involved in Seattle politics; he was a natural leader who would pursue such roles for the rest of his live (Fay Goddard, pers. Comm.). He was elected to the City council in 1892 when the resignation of George K. Coyell caused a vacancy. Though he stated that entering politics was not a long time goal of his, he was well-respected within the local government and found that he had a natural aptitude for it, and in 1893 the county committee put him on the Republican ticket for the state legislature (Alaska Yukon Pioneers Application Autobiography). Managing both his political and commercial careers successfully, Goddard saw his company grow quickly while he became a prominent citizen in Seattle (Lewis Publishing Company 1903:509-510).

Building and Transporting the *A.J. Goddard*

When gold fever struck in the summer of 1897, Goddard and his partners were in a position to act quickly, which many were not. The Pacific Iron Works' wealth and steam engineering expertise, combined with its location in Seattle, put Albert, Clara, and their partners in an excellent position to pursue steam travel opportunities in the Yukon. A friend, James H. Calvert, suggested sending two steamboats to the Yukon Territory. Quick to seize opportunity, the Goddards agreed. They formed the Upper Yukon Company with other businessmen from Seattle: President Frank Kilbourne, Vice-President C. P. Stone, Treasurer J. W. Hughes, and Secretary J. H. Calvert. Albert acted as the manager. Intent upon addressing and profiting from the great need for transportation to the gold fields, Albert designed two sectional steal steamboat hulls that the partners had constructed in San Francisco by Risdon Iron Works (Figure 3.3 And 3.4) (Steamer "Goddard" First to navigate Upper Yukon:80; Hoffman 1953; Affleck 2000:70; *Klondike Nugget* 1898a; *Dawson Daily News* 1923; Lockley 1941). In addition, they planned to ship a saw mill north for use in the Yukon, planning to provide timber for those who needed it to build the boats required to reach Dawson. Goddard's Pacific Iron Works in Seattle assembled the saw mill and some of the machinery for the steamboats (Steamer "Goddard" First to navigate Upper Yukon:80; Lockley 1941).

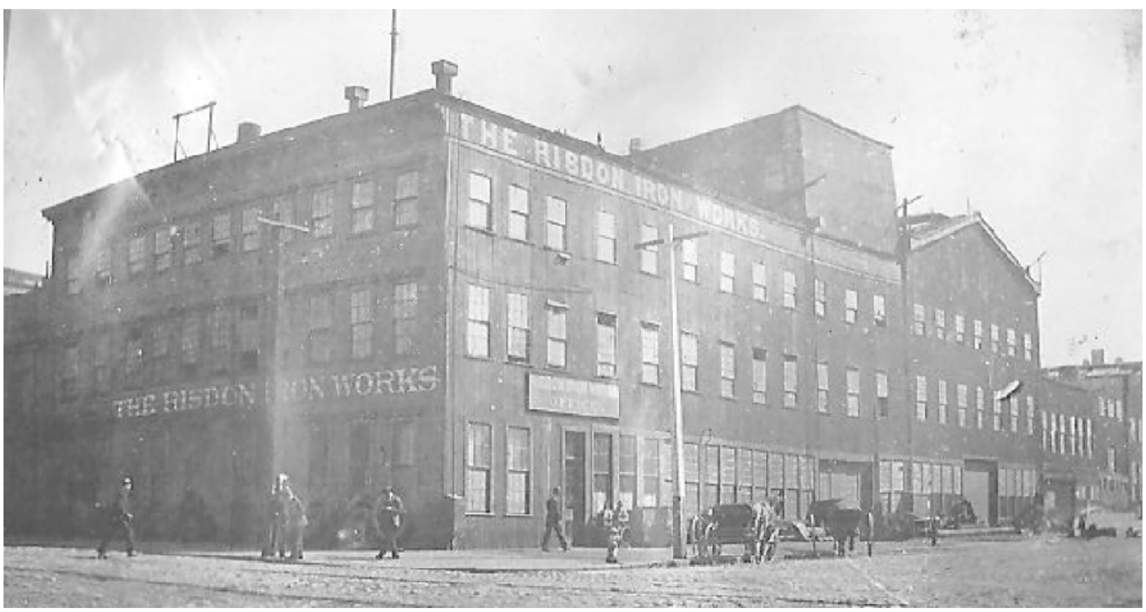

FIGURE 3.3. The Risdon Iron Works in San Francisco (Goddard collection, courtesy of Fay Goddard).

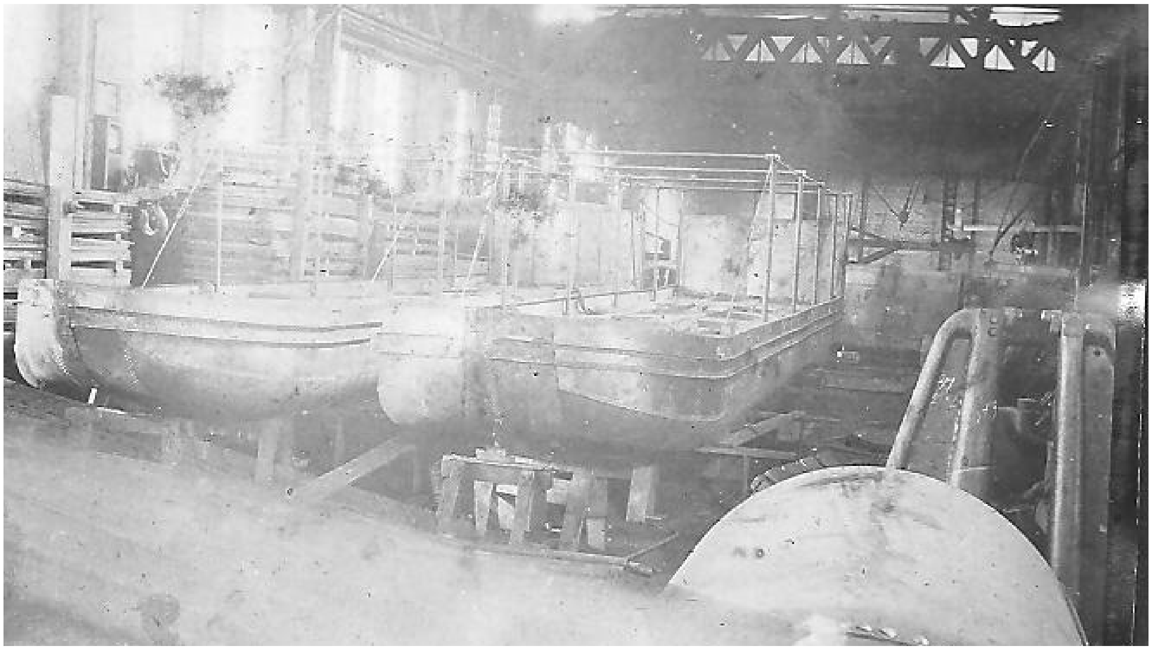

FIGURE 3.4. *A.J. Goddard* and *F.H. Kilbourne* under construction at Risdon Iron Works (Goddard collection, courtesy of Fay Goddard).

By the time the newly-formed Upper Yukon Company departed the West Coast, thousands of people had headed north via steamer to St. Michael, Alaska and the Klondike. There, they would board one of the few Yukon River sternwheelers that would steam upriver to Dawson. Though longer, this route was less physically strenuous than the alternative (Pollack 2009:291). The Upper Yukon Company chose the shorter, but more difficult, route – over to Skagway, Alaska and across the Coast Mountains. The choice to go over the mountains would have been unusual, as transporting their flagship *A.J. Goddard* over the mountains was far more difficult than taking it through the St. Michael all-water route. However, Albert Goddard and his partners did not share the stampeders' goal of reaching the gold fields near Dawson City as quickly as possible. Instead, they hoped to make their profit on the Southern Lakes with their saw-mill and by providing a towing service across the lakes for the boats and scows that would need to cross that water as the first part of their journey (Griffith:80). They would eventually make it to Dawson, but only by traveling downriver from the Southern Lakes. As a result, they were required to climb over the mountains in order to be at the lakes in time to service the stampeders who would want to depart as soon as the ice broke. The *A.J. Goddard* and its consort vessel *F.H. Kilbourne* were disassembled and loaded onto carriages that carried them to the steamship *Dirigo* (Figure 3.5). After ensuring that their cargo was on board, the company departed Seattle and headed to Skagway, Alaska in late February or early March of 1898 (*The San Francisco Call* 1898a, *The San Francisco Call* 1898b, *Dawson Daily News* 1923).

FIGURE 3.5. Pieces of dismantled steamboat loaded into a carriage for transport to the steamship *Dirigo* in San Francisco (Goddard collection, courtesy of Fay Goddard).

Though it is unclear exactly how many people traveled as part of the Upper Yukon Company to Alaska, *The San Francisco Call* records 12 men accompanying two steamboats that match the description of the *A.J. Goddard* and *F.H. Kilbourne* (*The San Francisco Call* 1898b). Bent on adventure, some of the men's wives accompanied them, including Mrs. J. H. Calvert and Clara, who arrived later. Their destination, Skagway, at the head of the White Pass, was little more than a lawless town full of thousands of prospectors when they arrived, though it would become safer and more established within the year as a result of the formation of a Vigilance Committee (*Poverty Bay Herald* 1898:4). Though their chosen route over the White Pass was shorter and would avoid the possible freeze-up that the St. Michael all-water route was in danger of, it was far more difficult terrain. They spent March of 1898 carrying the *A.J. Goddard* in pieces over the Coast Mountain Range along the White Pass. They made use of the White Pass' pack animals and wooden sleighs for moving heavier items. Winter was the best time of year to traverse the pass, as it had been almost impassible during the rainy season due to flooding. The Upper Yukon Company joined frantic stampeders attempting to transport their equipment before the ice melted and halted forward progress (Griffith:80). For approximately nine miles (14.48 km) the trail ran along the Skagway River until rising towards the summit. A climb of several hours lead to an area called "The Ford," only one and a half miles (2.41 km) from the summit, where weary climbers could rest and camp. An entrepreneurial Yankee established a hotel of tents, for which he charged 50 cents per person for a bunk and 75 cents for a meal. Many stampeders gladly took advantage of this opportunity after a long hike. Though described as beautiful for the snow and mountain vistas, which in some cases required snow glasses to prevent blindness, the horrors of climbing the trails were evident all around. Thousands of dead pack animals lined the trails, forcing men and sleighs to pass directly over them (*Poverty Bay Herald* 1898:4). Fay Goddard, Albert's grand-niece, recalls hearing stories of Dead Horse Gulch from her uncle when she was a child. In fact, the deprivations and horrors of the trail were something that would color Albert's future recollections of the journey (Fay Goddard, pers. Comm.).

FIGURE 3.6. The Upper Yukon Company on White Pass (Goddard collection, courtesy of Fay Goddard).

Upon reaching the summit, the stalwart team would have proceeded across the eight miles of Summit Lake in a sleigh through a small canyon onto Middle Lake. The narrowness of the canyon forced the stampeders to cross over the same narrow pass, which resulted in the formation of a dangerous and curving trail. After passing several miles on Middle Lake and a rough trail to Shallow Lake, Log Cabin was the next established camp at the far end of Shallow Lake. Hundreds of tents and a few cabins lay buried in the snow, inhabited by the seemingly never-ending flood of prospectors who camped before continuing on to Lake Bennett, the hardest part of the trail. A short distance away lay the northern end of Lake Lindeman, where the Chilkoot Trail terminated, and slightly further ahead the White Pass terminated at the foot of Lake Bennett. Thousands of men and women milled about at these stopping points with their gear piled up, including sections of boats and machinery, making camp to build their boats or reorganizing their equipment to continue the journey (Figure 3.7)(*Poverty Bay Herald* 1898:4).

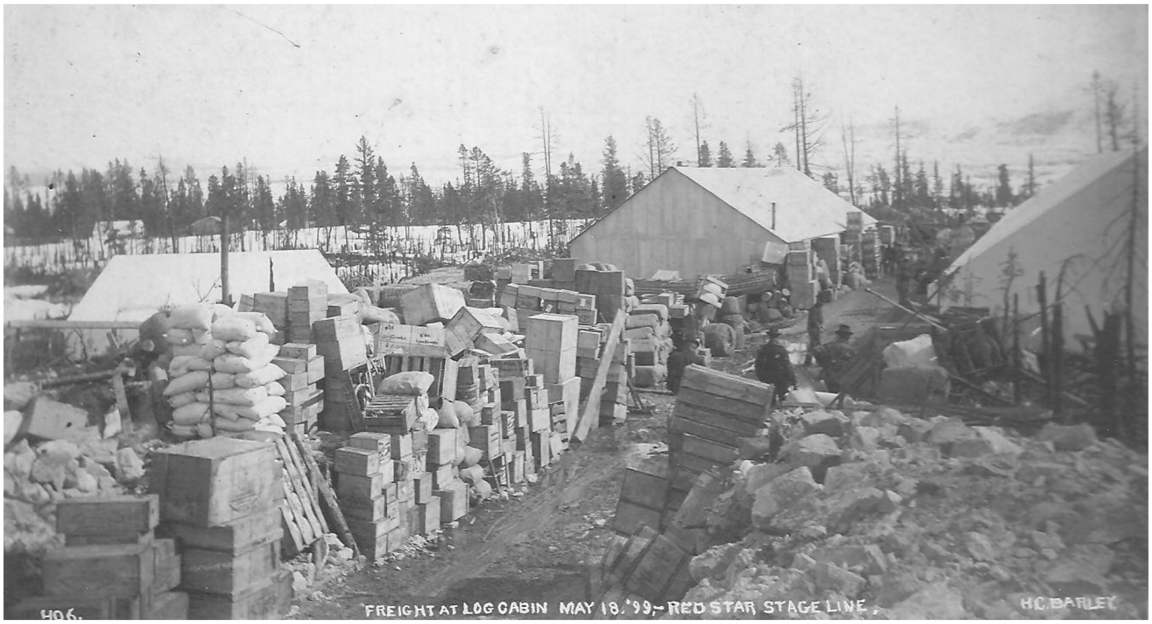

FIGURE 3.7. Freight at Log Cabin on 18 May 1899 (Goddard collection, courtesy of Fay Goddard).

By late March 1898, the Upper Yukon Company had succeeded in hauling the tons of iron, equipment, and ships' fittings over the snowy mountains and treacherous paths along White Pass to Lake Bennett, British Columbia (Neufeld and Norris 1996: 104). Upon arrival they chose their semi-permanent camp site where they established an office and would live and assemble the steamboats until ice broke on the lake (Figure 3.8). It was here that the Upper Yukon Company joined the thousands of men and women living in the tent city of Lake Bennett and hastily building anything that would float (*A.J. Goddard* Builder's Certificate 1898). Sanitation was sorely lacking, and the rising water of the lake due to melting snow accumulated much of the filth. As the lake water was used for drinking, typhoid was rampant; Albert Goddard was struck with a severe case of typhoid fever. His wife Clara arrived during this time and nursed him through the illness. Her presence was no doubt gratefully felt, as she washed, cooked, and cleaned for many people. (Figures 3.9 and 3.10)(Goddard, Albert 1951: 10; Griffith:81; E.A. Hegg 1949).

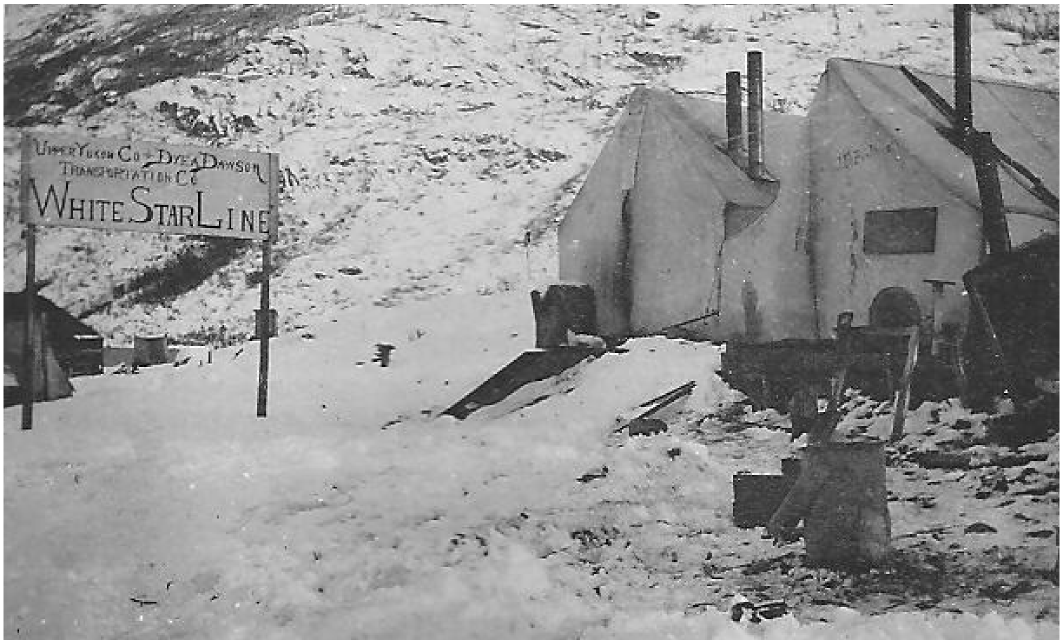

FIGURE 3.8. The Upper Yukon Company White Star Line office at Lake Bennett (Goddard collection, courtesy of Fay Goddard).

FIGURE 3.9. Albert Goddard recovering from fever in the office of the Upper Yukon Company (Goddard collection, courtesy of Fay Goddard).

FIGURE 3.10. Clara Goddard in the Upper Yukon Company's office (Goddard collection, courtesy of Fay Goddard).

Upon his return to health, Albert became active in making the saw-mill operational and assembling the steamboats. Set up along the shores of Lake Bennett, the saw-mill turned out to be a very wise investment. Due to the scarcity of timber as a result of the construction endeavors, wood could be sleighed in from miles away and sold for $250 per 1,000 ft. (304.8 m), 10 times more than the $25 that George Carmack intended to receive for his wood from Rabbit Creek just prior to the gold rush (*Poverty Bay Herald* 1898:4, Berton 2004:44-45). The saw-mill allowed the Upper Yukon Company to construct the small wooden sternwheeler *Joseph Clossett* as well as make a profit by sawing lumber for others (Figure 3.11)(*Daily Alaskan* 1898).

FIGURE 3.11. The sawmill in operation, with Mrs. J. H. Calvert standing near the completed boiler for one of the steamships (Goddard collection, courtesy of Fay Goddard).

The majority of the vessels built at Lake Bennett in 1898 were made from green timber by men with little or no experience (*Poverty Bay Herald* 1898:4). Albert Goddard observed that though some of the hopeful prospectors knew how to build a boat, many of the final products could be considered coffins (Goddard, Albert 1951:10). Members of the Upper Yukon Company, including Albert and Charles, had years of experience building metal boats, which they put to good use when building the two sternwheelers. As a result, they were luckier by far than the thousands of other men and women building rafts, boats, and scows who did so under their own power (Bennett 1978:35; Berton 2003). The Upper Yukon Company's vessels, being larger than most others constructed on the Southern Lakes at the time, must have made an impression on the other stampeders. A New Zealander making the trek to Dawson wrote of the two 60 ton sternwheelers being constructed at Lake Bennett, the fitting and machinery having been hauled over the pass by pack and sleigh (Figure 3.12) (*Poverty Bay Herald* 1898:4). Prior to departing the lakeshore, the Upper Yukon Company registered the vessel at Lake Bennett. Shortly before the *A.J. Goddard*'s trial run on Lake Bennett, secretary of the Upper Yukon Company James H. Calvert signed a Declaration of Ownership on behalf of a Body Corporate on 30 June 1898 (Declaration of Ownership on Behalf of a Body Corporate 1898; Iceton 2010).

FIGURE 3.12. The steamboats *A.J. Goddard* and *F.H. Kilbourne* being assembled at Lake Bennett (Goddard collection, courtesy of Fay Goddard).

The ice began to go out on upper Lake Bennett on 31 May 1898, allowing boats to travel towards the lower end of the lake. Caribou Crossing (now called Carcross) is a narrow channel at the bottom of Lake Bennett was still jammed with ice at this time, as was Marsh Lake. Traditional weather patterns suggest that the other Canadian lakes were still covered in ice as well. While waiting for the ice to leave Caribou Crossing and the other lakes, the *A.J. Goddard* made a trial trip between Bennett and Caribou Crossing to test the boat and its machinery. During the trip the *A.J. Goddard* carried Calvert; Major J.M. Steel, the North-West Mounted Policeman in charge of commanding the Upper Yukon Post; Captain J.W. Raut, a government agent at Lake Bennett; Captain A.G. Wood, a North-West Mounted Policeman; Thomas McMullin, an assistant manager of the Canadian Bank of Commerce at Dawson City; Charles King, a special agent of the North Pacific Railroad for Alaska; and A.J. Goddard, the manage of the Upper Yukon Company. While in the middle of Lake Bennett, the *A.J. Goddard* met a small boat and took on board A.F. King from New York and J. Willison, a Crown Timber Agent. The trial trip was successful (*The San Francisco Call* 1898:3). After receiving its Canadian Registration Papers, the *A.J. Goddard* departed Lake Bennett with the rush of small boats, rafts, and steamers on 2 June 1898 (Figure 3.13).

FIGURE 3.13. Clara Goddard on her husband's namesake at Lake Bennett; the vessel is nearly ready to depart (Candy Waugaman Collection, Klondike Gold Rush National Historic Park, National Parks Service, U.S. Department of the Interior).

It arrived at the Tagish Lake customs house on 3 June, the first steamboat to reach this post (Strickland 1899:84). However, the *A.J. Goddard* did not proceed directly to Dawson City until nearly two weeks later. There are a number of possible reasons for their delay, and it may have been a combination of these factors that kept them on the Southern Lakes. For one, though the ice began to break up at Lake Bennett at the beginning of June, it likely took longer for it to break up completely farther north. The area around Marsh Lake can be particularly difficult to pass through for large vessels when the ice is breaking up. Though the smaller rafts and scows might have made it through, the Upper Yukon Company may not have wanted to risk their new steamboat. Waiting would have also allowed them to make more ferry and towing trips, such as carrying the Northwest Mounted Police to and from the customs outposts. It would also have allowed them to insure that the *F.H. Kilbourne* was operational to run the ferry service on the Southern Lakes before departing for Dawson. As the owners' original plans had been to use at least one of the steamboats to tow the smaller rafts and scows down the lake on the first part of their journey, they may have wanted to keep the *A.J. Goddard* occupied with this until the *F.H. Kilbourne* could take over. However, less people may have required a tow at this point, as a strong wind prevailed for several days during the ice break-up. Impatient stampeders, who would have otherwise benefitted from a tow down the lake that would have saved their strength and given them an edge over everyone else forced to row, decided to use improvised sails in the form of bedding and clothing to catch the wind on the lakes (Figure 3.14). This way, the could sail relatively quickly until reaching the river and flowing with the current all the way to Dawson (Griffith:81;).

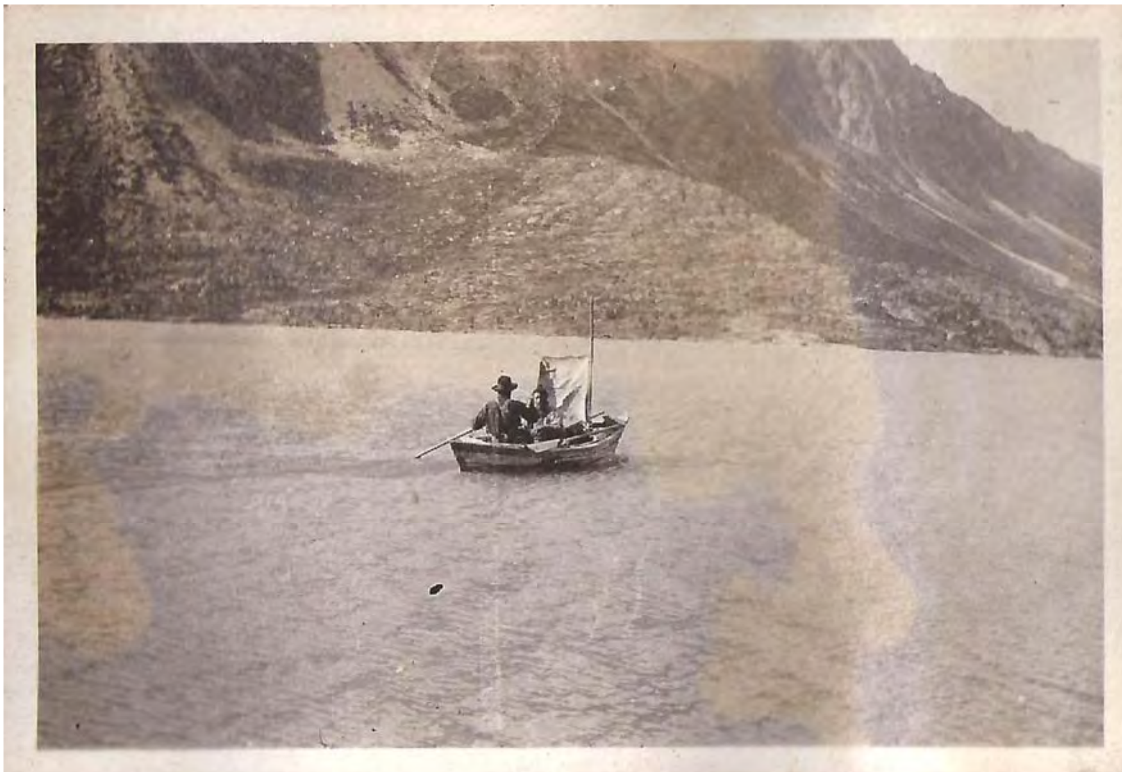

FIGURE 3.14 Boat with gunny sack sail and two passengers (Goddard collection, courtesy of Fay Goddard).

As a result of any or all of these factors, the *A.J. Goddard* stayed on the lakes for two weeks before starting their momentous trip downriver to Dawson. It would be an enormous undertaking, as the small steamboat would be the first of its kind to travel that section of the Yukon River. At midnight on 15 June 1898, the small steamboat departed upper Lake Bennett for the final time with 20 passengers and freight. Though Miles Canyon and Whitehorse Rapids presented no problems, low water at Fifty Mile River delayed them briefly (Goddard, Albert 1951:10). They arrived in Whitehorse on the morning of 17 June with a crew consisting of Captain Goddard, Pilot Richard Knight, and Deckhands J. W. Smart and Ion Johnson. There was likely an engineer and fireman for loading the boiler, though their names have not been located. Passengers to Whitehorse included Charles H. Vines of New York, H. H. Coleman of London, Henry Cheney of Dawson, George Bunt and Frank Hopkins of Cedar Rapids, Iowa, George N. Nodes of San Francisco, I. Swartz of Portland, Oregon, Charles Segnor of Santa Monica, California, J. N. DeMars of Seattle, M. Viera and John Anderson of San Francisco, and William Calvert of Seattle (Griffith:81).

After safely passing through the dangerous Thirty Mile Section of the Yukon River between Lake Laberge and the Teslin River (commonly called the Thirty Mile), the steamboat continued downriver amidst the hundreds of small craft being sailed and paddled to Dawson. Albert photographed much of the journey, including Miles Canyon, Whitehorse Rapids, and Five Finger Rapids. Jubilant stampeders hailed the small steamboat, the first of its kind to be seen on that section of the river. Traversing Five Finger Rapids was an adventure that Albert recalled 50 years later, stating that a five-foot jump off of a small waterfall resulted in a noise that could “be heard for miles” (Goddard, Albert 1951:1).

After a journey of 4 days and 21 hours that covered 435 miles (700 km), the small steamboat arrived in Dawson in the early morning hours of 21 June 1898. When they puffed into Dawson City on board the *A.J. Goddard*, Clara and Albert made history as the first steamboat owners to operate on the Upper Yukon. They landed at the base of Fourth Street in Dawson City on Tuesday, 21 June 1898 to “a royal reception” (Hoffman 1953; *Klondike Nugget* 1898a; *Dawson Daily News* 1923). The men on the shore, along with those rowing and paddling their small boats to reach the gold filled creeks, waved their hats and cheered as the *A.J. Goddard* passed (Hoffman 1953). It had not been an easy journey, and Albert Goddard recalled enduring boiler trouble 11 times due to lack of water. They were grateful to finally arrive in Dawson to the cheers of the inhabitants, many of whom climbed on board the newly arrived steamship and invited the crew out for drinks (They Called Him ‘Columbus’ 1935).

While in Dawson, Captain Goddard was offered gold dust in return for the *A.J. Goddard*. The miner’s wanted the small vessel’s machinery to operate their mines, but Captain Goddard refused and departed Dawson in late June (Griffith:82). In addition to its crew of eight men, the *A.J. Goddard* transported at least 11 passengers and their outfits and gold to Dawson City: Mr. and Mrs. Frank Monroe of Cripple Creek, Ed Goldman of Baltimore, Mrs. Bissell, Miss Anderson, Mrs. Parent, Mrs. Sparing, the Oakley sisters, A.J. Goddard, and Captain Smith. Passengers that had made the trip to Whitehorse may have also been on board, though records have not been found that confirm this. They also carried mail on this first trip, much to the appreciation of Dawson citizens (*Dawson Daily News* 1923). After staying a few days in Dawson City, the *A.J. Goddard* departed on 24 June for Whitehorse with passengers, gold, and 13 sacks of mail and a complete complement of passengers who were charged $200 per ticket (Figures 3.15) (*Klondike Nugget* 1898b; *Los Angeles Times* 1898b:4).

FIGURE 3.15. The *A.J. Goddard* at Dawson City in June 1898 (Goddard collection, courtesy of Fay Goddard).

The return trip up-river was not without incident; the strong current, rapids, and muddy water presented several challenges along the way. Silt in the water near the Stewart River began to cause problems with the pumps, and as they neared Selkirk they realized that they were nearly out of lubricating oil. With no settlements and few people living near the river, the crew had few options for obtaining the oil that they so desperately needed. Captain Goddard learned of a First Nations man living near Selkirk who was using moose tallow to feed his dogs. Equipped with buckets and empty oil cans, Goddard and several crew members set off in search of the man. They purchased 50 pounds (22.68 kg) of moose tallow from him, which allowed them to safely continue their journey (Hoffman 1953; Griffith:81).

By the time the steamboat reached Rink Rapids, it was becoming apparent that the small pump and engines might not be up to the task of propelling the boat through the stronger sections of the river. Ropes had to be used to assist the *A.J. Goddard* on the return trip through Rink Rapids (*Los Angeles Times* 1899:B5). The Thirty Mile proved to be too much for the vessel, and the pumps could not feed the boiler, which was using up water faster than the they could supply it. Larger pumps had be installed, a process that took three days before the vessel could continue through the strong current. The calm waters of Lake Laberge would have been a welcome change, and after smoothly crossing the lake, the steamboat arrived in Whitehorse on 4 July (Figure 3.16).

FIGURE 3.16. Crew and passengers on board the *A.J. Goddard* on 4 July 1898 (Goddard collection, courtesy of Fay Goddard).

The passengers and crew were welcomed by cheering crowds into Whitehorse, and the passengers transferred to the *F.H. Kilbourne* if they desired to travel farther towards the Southern Lakes (Griffith:83-84). Later that summer, the *A.J. Goddard* began operating in the towing business on Lake Laberge (*Klondike Nugget* 1898b; *Los Angeles Times* 1898:4). As for the future plans of the Upper Yukon Company, North-West Mounted Policeman D'A. E. Strickland records that the company purchased another small steamboat named the *Alameda* from a private party, and that the owners of the Upper Yukon Company spoke of building larger steamboats with finer accommodations to profit from tourist traffic that was expected to arrive on the route in the next year (Strickland 1899:84). Albert Goddard returned to Skagway on 18 July 1898, where he was lauded by the local newspaper for his accomplishment on the river (Griffith:84).

Other Encounters with the *A.J. Goddard*

Each year between 1898 and 1901, the *A.J. Goddard* ran during the entire working season on the Yukon River, likely spending most of its time on Lake Laberge, and often risking being trapped in by ice at the close of the season. In November of 1899, the boat became frozen in at the head of Lake Laberge along with another steamer called the *Anglican* and 10 scows (*Los Angeles Times* 1899:2). On 2 July 1898, a group of men moving hundreds of sheep to Dawson reported encountering the *A.J. Goddard* at the mouth of the Little Salmon River, and states that the *A.J. Goddard* was the first steamboat to travel upon the Lewis River. They note that the boat was having a difficult time moving up river, likely due to the small engines that were underpowered for such a current (Wilde 2009:20).

By combining the routes of the *A.J. Goddard* and the *F.H. Kilbourne*, the Upper Yukon Company wisely established a transportation option that allowed maximum success and profit. The *F.H. Kilbourne* operated between Whitehorse and the Southern Lakes at the headwaters of the Yukon, while the *A.J. Goddard* ran the ferry service on Lake Laberge, with other small trip such as the journey upon the Lewis River. Having each steamboat travel only one portion of the route allowed the crew to learn that path well, and thus have a greater chance of avoiding accidents. In addition, townspeople could expect to traverse Lake Laberge on the *A.J. Goddard* and from Whitehorse to the Southern lakes on the *F.H. Kilbourne*. The model was successful, and within a short time of *A.J. Goddard's* construction there were four steamboats, *A.J. Goddard*, *F.H. Kilbourne, Alameda*, and *Joseph Clossett* in service (Strickland 1899:84; Hoffman 1953, *Daily Alaskan* 1898).

Being one of the first steamboats on the upper Yukon River, and rare for its steel hull, the *A.J. Goddard* made an impression on the other stampeders. In one case, journalist Julius Price from London was sent to the Klondike to travel the route of the prospectors and write up his experiences to be published upon his return. He managed his task quickly and by late 1898 a journal of his stories was published in London. He tells of their trip to Dawson, when he and his crew came upon the *A.J. Goddard* while paddling their canoe downriver. They were on the first day of their journey and were traveling along with dozens of other vessels:

> Many boats surrounded us as we quickly proceeded and caught up with them one by one, the lumbering, awkwardly built craft having no chance against our well-constructed canoe, with Boss deftly steering with a paddle. In the far distance, some miles ahead, we could distinctly hear the measured thump of the pistons of a small stern-wheel steamer towing two big barges. I rowed steadily on for some time, till suddenly Harris remarked that he thought we were gradually catching her up. This put an idea into my head, a sort of recollection of the Thames…. Why not catch up the steamer and ask her to give us a tow? For three solid hours I rowed with all my strength, gaining perhaps at the rate of one foot in six, till at last we got within three hundred yards…very soon we were abreast of the steamer.
>
> After some little difficulty, as she had two large lighters full of sheep on either side of her, and there was a strong undercurrent running round them, we managed to hook on, half a dozen men on board looking on stolidly, but offering no assistance. I jumped aboard and made my way to the captain, who was steering, and asked him if we might hang on for a

> little while. He demurred at first, saying he was already late, but eventually consented. So we made fast, and had lunch, which we enjoyed immensely, since we were losing no time. Afterwards Harris and I, armed with a flask of whisky and some big cigars, went up and had a long chat with the captain, which ended in our becoming so friendly that he gave us permission to remain in tow as far as he was going, which turned out to be Lake Tagish, some fifty odd miles on. This was a splendid lift, and I felt well rewarded for my obstinacy in catching him up.
>
> Although not making an excessive speed, as may be imagined, the *J.B. Goddard* kept pounding along at a good steady pace, which was safer for our heavily laden canoe than if she had been a fast boat. The sheep she was carrying – for apart from the lighters her hold was also full – were destined for Dawson. They had been brought in over the Skaguay trail, and were to remain at Tagish for a few days, to give them a chance of recovering from the effects of their long journey before proceeding any further….We did not reach Tagish till past midnight, and at this time we were beginning to get very cold and cramped after sitting so long in the canoe. A strong wind had sprung up, and the spray from the wheel was thoroughly wetting everything… The "lift" we were getting was far too precious and well worth any attendant discomfort, so by the time we reached the steamer's destination we were simply starved with hunger and cold. We had come exactly 56 miles, not so bad for the first day (Price 1898:121-124).

Price's account provides a copy of the mining certificate that he applied for and received at the Tagish outpost dated 7 June 1898, four days after NWMP Strickland records seeing the *A.J. Goddard* at the post (Price 1898:128). The vessel apparently spent some time in the towing business in the two weeks on the Southern Lakes prior to heading for Dawson (Figure 3.17).

FIGURE 3.17. The *A.J. Goddard* towing sheep (Goddard collection, courtesy of Fay Goddard).

1899 – Too Many Sternwheelers

Once the gold frenzy had passed and the smoke cleared, 1899 brought the realization that there were far more sternwheelers on the Yukon River than necessary. Many companies were forced to sell their vessels once they ceased making a profit, such as the Yukon & Hootalinqua Navigation Co. when they sold their steamer *Reindeer* in July 1899 to pay the crew's wages (Affleck 2000:70; *Klondike Nugget* 1899). Many were dismantled and their parts recycled, such as the *Sault Ste. Marie*, whose machinery went to power the North American Transportation and Trading Company's building and dock, according to the *Klondike Nugget* in August 1899 (Affleck 2000:70; *Klondike Nugget* 1899). Albert and Clara Goddard also got out of Yukon Steamboating in time, selling the *A.J. Goddard* in fall of 1899 to Henry Alexander Munn, a Dominion of Canada agent (Declaration of Ownership by Individual 1899; Iceton 2010). The Goddard's loved the Yukon, and in addition to taking many photographs of their journey, they took some time to travel the country. They managed to make at least one trip to the summit of the Chilkoot Trail in July of 1899 (Figure 3.18)

FIGURE 3.18. Clara Goddard at the summit of the Chilkoot Trail on 1 July 1899 (Goddard collection, courtesy of Fay Goddard).

Having sold the *A.J. Goddard*, Albert then purchased the schooner *General Siglin.* According to the *Dawson Daily News* in 1923, prior to its acquisition by Goddard, the schooner was found floating as a derelict in mid-ocean with the skeleton of a man tied to the mast. After running the vessel between Cook Inlet and the Bering Sea for several years, Goddard sold *General Siglin* to a group conducting a trading expedition near the east coast of Siberia. The *Dawson Daily News* records that this party from the *General Siglin* were never heard from again, creating a rather fantastic story in which Albert narrowly escaped a deadly ghost ship (*Dawson Daily News* 1923).

After selling his ghost ship, Albert Goddard returned to Washington and resumed his role as an important member of the Seattle community; a book about the representative citizens of Seattle and King County credits him with "a deep and active interest in all that pertains to the welfare of the city, and his efforts have been effective in advancing the general good along many lines" (Lewis Publishing Company 1903). He was a man with varied interests, and as a result, pursued many different careers upon returning to Seattle. In 1904, he established the A.J. Goddard Bank, of which he was the president for seven years (Figure 3.19) (Lockley 1941). He then became a member of the city council, a post that he occupied for eight years before moving on to become the Chairman of the Streets and Sewers Committee, and finally a member of the Municipal Plans Commission. During his time as Chairman of the Streets and Sewers, he was responsible for laying out many of Seattle's streets, which may account for the fact that his bank was located on a street named after his business partner Kilbourne (Goddard, Clara:3). At some point in the 1920s he was in the homebuilding and contracting business, an endeavor that was important to him as he saved stationary from the company that was passed down along with his collection of Gold Rush photos (*Dawson*

Daily News 1923). He was also a member of a society of lumbermen and mill-machinery men called the Royal Arcanum of the Hoo Hoos Order, and played an important role in promoting funding for the state university (Lewis Publishing Company 1903:509-510).

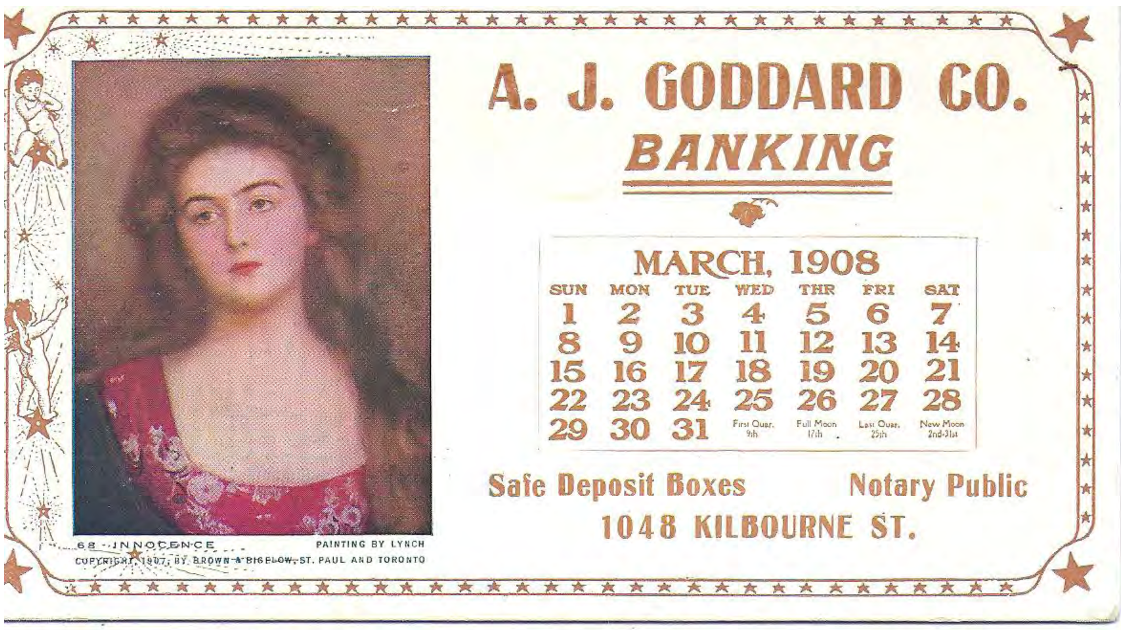

FIGURE 3.19. Advertizing blotter for a bank that Albert Goddard established in Seattle (Goddard collection, courtesy of Fay Goddard).

As for their memories of the Yukon? Albert and Clara Goddard were well aware that they had participated in a momentous historical event. Not only did they take dozens of pictures of their time in the north, they continued their involvement once they returned to Seattle. Albert joined the Alaska Yukon Pioneers in Seattle from its founding, and was eventually elected as president (*Dawson Daily News* 1923). Using the dozens of photographs that he had taken while in the Yukon, Albert gave lectures at various functions about their adventures. He was a creative man, and many of the lectures were accompanied by poetry he had written. In some cases, the lectures were used to raise money for charities such as the Children's Orthopedic Hospital (The Conquest of the Yukon).

Albert and Clara were involved in many parades as well, such as when the Alaska Sourdoughs and the city of Seattle celebrated the 33rd anniversary of the Klondike gold strike with a three day celebration emphasizing its city's role in facilitating the Gold Rush. A parade re-enacted the original stampede, and a miniature *A.J. Goddard* was built into a float with a turning paddlewheel and pouring smoke. It took third place in the parade (*The New York Times* 1929). It was not the first time the *A.J. Goddard* would be made into a parade float. Fay Goddard, Albert and Clara's grand-niece, recalled several events in which land vehicles or other boats were dressed up to represent and celebrate the *A.J. Goddard* (Figure 3.20) (Fay Goddard, pers. Comm.).

FIGURE 3.20. *A.J. Goddard* parade float, with Albert standing in the foreground (Goddard collection, courtesy of Fay Goddard).

Albert and Clara lived happily in Washington State until Clara's death at age 89 in Auburn, WA in 1953. Hailed as a pioneer woman in her obituary and the first female steamboat pilot in the north, Clara's last words suggested she was reliving the day she departed Seattle for the Yukon: "Well, I can go now. I have my suitcase packed and Albert needs me" (Hoffman 1953). Albert Goddard died several years later, on 20 April 1958 (Figure 3.21)(*Seattle Post-Intelligencer* 1958).

FIGURE 3.21. Albert and Clara Goddard in later years (Goddard collection, courtesy of Fay Goddard).

Career After the Gold Rush

The exact chain of *A.J. Goddard's* ownership after its sale by the Upper Yukon Company is difficult to determine due to scarce newspaper coverage and missing editions of the local newspapers. The archival collections at the Yukon Archives in Whitehorse and the British Columbia Archives in Victoria were consulted, along with editions of several local newspapers – *The Klondike Nugget, The Semi-Weekly Klondike Nugget, The Daily Klondike Nugget, Dawson Daily News, Yukon Sun,* and *BC Gazette*. Unfortunately, many issues of the newspapers from the period under concern are missing, and cannot verify the sale of the vessel. Sternwheeler historian Edward L. Affleck tells us in *A Century of Paddlewheelers in the Pacific Northwest* that *A.J. Goddard* was sold by Albert and Clara to Henry Alexander Munn of the Canadian Development Company on 21 October 1899 (Affleck 2000:71). The connection with Munn is confirmed by a Declaration of Ownership by Individual signed by Henry Alexander Munn, a Dominion of Canada Agent, on 17 November 1899 (Declaration of Ownership by Individual 1899; Iceton 2010). It has not, however, been possible to locate a primary reference to the date, 21 October 1899, and the Canadian Development Company. In early 1901, the Canadian Development Company merged with the White

Pass and Yukon Route Company. A newspaper account of the merger, however, lists the names of 14 boats that became part of the company, though the *A.J. Goddard* was not listed among them (*The Whitehorse Star* 1901).

End of the *A.J. Goddard's* Career

The *A.J. Goddard* continued to carry passengers and mail on the upper Yukon River until October 1901, though it likely participated primarily in the ferry and towing business on Lake Laberge after the initial trip to Dawson due to its small size and lack of power, which was unsuitable for the larger sections of the river (*Dawson Daily News* 1923). While photographs show large groups of passengers crowding the decks, by the final journey the crew had dwindled to four members and a passenger who assisted on the final route, perhaps due to the fact that as time passed they became more familiar with the river and did not need as many hands to safely navigate (Northwest Mounted Police 1902:19). On 12 October 1901, the *A.J. Goddard* was caught in a fierce storm on Lake Laberge, part of the Yukon River system. The ship sank quickly, with only two survivors of the original five person crew (*The Daily Klondike Nugget* 1901). The loss of the *A.J. Goddard* would have been particularly hard for the owners as it was uninsured at the time and had been recently overhauled (Railway and Shipping World Co. 1902:45).

Engineer Julius Stockfeld, a 33 year-old American citizen originally from Prussia and one of the two survivors, related the frightful story of the night the *A.J. Goddard* foundered (Dave Davis 2011, elec. Comm.). His account elucidates the circumstances surrounding the wrecking event, though it must be kept in mind that his exhaustion, fear, and the freezing water may have influenced the fantastic nature of his report (North-West Mounted Police 1902:18).

While *A.J. Goddard* was pushing a scow across Lake Laberge on 12 October, 1901, a strong autumn storm blew up that threatened the steamer and the lives of the crew. On board were Captain Edward McDonald of Aberdeen, WA, cook Fay Ransom of Montana, fireman John Thompson of Johnson St., Victoria, a woodchopper named Snyder, and Stockfeld. Stockfeld states:

> It was at least an hour and a half after the boat parted company with the scows that the accident occurred. For some time previous to the disaster the boat had been laboring in heavy sea, the waves rising to a height of at least twelve feet, and in plunging over these the steering gear would often be out of the water thus rendering the boat unmanageable. In passing over one of these heavy swells the vessel breached and turned sideways in the trough of the sea, and being struck by an extra violent puff of wind turned over. It had been apparent for some time previous to this that the vessel could not outlive the storm except by a miracle, and Thompson the fireman had become so unmanned by fear that I had to perform his work as well as my own. One of the fires had been put out by the water and shortly after the other suffered the same fate. I saw there was no use trying to do any more, so crawled over the hurricane deck into the bow of the boat. Thompson was at this time on his knees praying and when he

> saw me he implored me to save him. I threw off his shoes and threw overboard an armful of cordwood and yelled at him to jump overboard and catch on to the wood, at the same time plunging over myself. I started to swim for shore but could not make any headway and turned back in hope of being able to catch a piece of wreckage. When I started to swim for shore I saw McDonald, Ranson and Snyder on the bottom of the overturned boat, and on my return saw that they had been washed off and that McDonald had hold of a piece of wreckage and appeared to be doing all right. I finally got hold of two pieces of cordwood, and being a strong swimmer struck out for shore with the hope of being able to reach it and send assistance. After two hours' desperate struggle, I got within 200 feet of the shore in an exhausted condition, where I was seen by Messrs. Clarke and Ironside and assisted to shore, and after vigorous measures, was restored to life. I told them the story of the wreck, and they went a mile and a half down the lake, got a boat and started for the scene of the accident. They found Snyder lying unconscious in one corner of the pilothouse, which was about three-quarters of a mile out in the lake. Capt. McDonald and Ransome had disappeared. On his restoration Snyder said the pilot house rolled and pitched so much in the heavy seas that it was a hard matter to hold on, and that in a short time Capt. McDonald had complained of the cold and shouted to Snyder, 'Hold on, if you can,' was soon washed off and disappeared.
> The lake was patrolled continuously until the close of navigation with a view to finding these bodies, but no sign of them could be seen, and probabilities are that they will not be seen until next spring, in the lower river, if then. The manager of the U.Y.C. Co., the owners of the steamer, had communicated with their different relatives, and as they had only been hired a day or so there were no wages due them. They left no effects (Northwest Mounted Police 1901:18).

Stockfeld was a brave man, as the traumatizing wrecking event did not keep him away from ships for long. He was hired as an engineer on board the steamer *Peterson* in 1906 and 1907 (Dave Davis 2011, elec. Comm.). Three of his fellow crew members were not so lucky, and their bodies were not found until months after the wrecking event (Figure 3.5). The body of Captain McDonald was not recovered until the following spring when the ice began to run. A party of North-West Mounted Policemen found him approximately two miles (3.22 km) from the original wreck site (*Dawson Daily News* 1902). He left a widow, his children, and parents in Seattle (*Detroit Free Press* 1901:2).

After the Wrecking Event: Site Formation Processes

The *A.J. Goddard's* exact location was lost when the vessel disappeared beneath the waves on 12 October 1901, and the small boat would not be disturbed for more than

100 years. Because of this, the site formation processes that have acted upon the wreck site during the past 100 years have been minimal. Both cultural and natural site formation processes can influence the distribution of a wreck site. Cultural formation processes such as historic and modern salvage have had little influence on the *A.J. Goddard* site due to the rapid nature of the wrecking event and subsequent unawareness of location. The primary natural site formation processes that have affected the *A.J. Goddard* during its wrecking event and the past 100 years are physical and chemical, namely wind, waves, ice, and corrosion. Due to the cold, fresh water, biological site formation processes have been minimal.

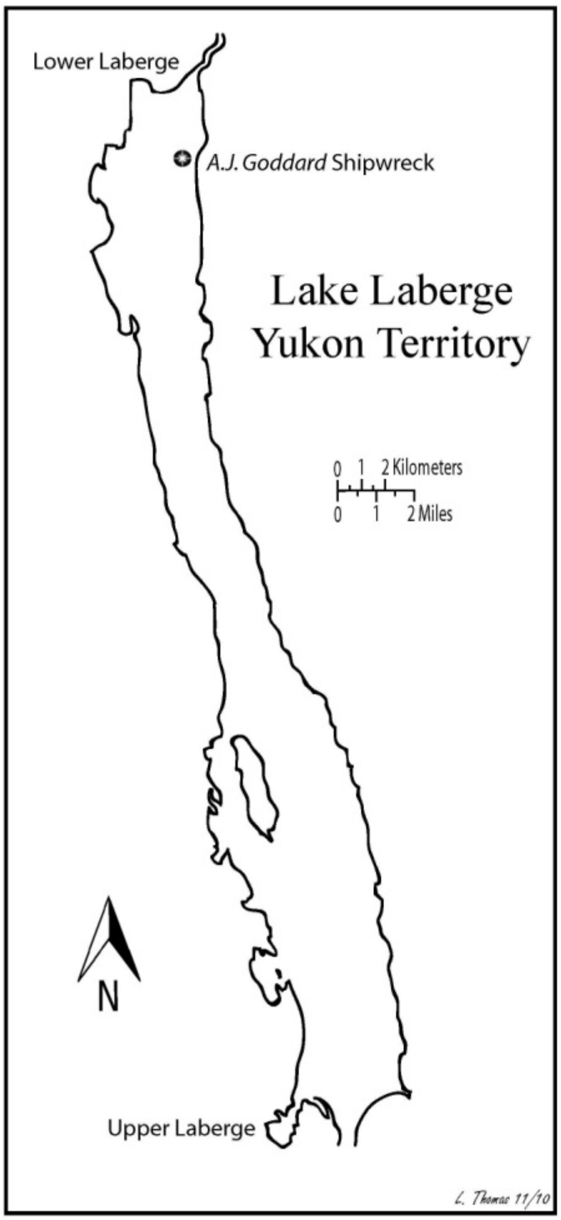

FIGURE 3.5. Wreck site of the *A.J. Goddard*.

Cultural Site Formation Process

Historic salvage can be conducted by fleeing members of a shipwreck or by shipwreck survivors who must find a way to survive until help arrives or they can organize their journey to safety. In some cases, survivors can live off of shipwreck remains for months or years, continually returning to the wreck site to recover necessary supplies. Alternately, historic salvage can be conducted by individuals or companies in later years who use a variety of techniques to recover either cargo or hull and machinery elements for re-use. Modern salvage efforts, when not conducted according to archaeological standards or under proper permits, can often be the subject of lawsuits when conducted by those who are more interested in making a profit off of the artifacts than recording history. Though there were plans in effect in 1902 to raise the *A.J. Goddard,* this was never accomplished due to reasons unknown. While it was certainly technologically feasible to recover the *A.J. Goddard* (larger salvage operations were successfully performed in this era), it is likely that salvors never located the wreck or had difficulty raising the funding (Railway and Shipping World Co. 1902:45). The quantity of artifacts on site has made it clear that no salvage has taken place since the wrecking event, and that the crew did not have time to save much (if anything) before fleeing the ship. In fact, engineer Julius Stockfeld lost his 2nd Class Engineer’s Certificate of Competency during the wrecking event, something that he might have tried to save had he had the time (General Register and Record Office of Shipping and Seamen letter 1903).

Physical Site Formation Processes

While some ships in the north did end their careers as a result of being trapped in and crushed by ice at the end of the season, most ships that wrecked upon the Yukon River did so during their working season, as was the case with the *A.J. Goddard* (Downs 1992:136). Because of this, wind and waves, as opposed to ice, are the greatest contributing factors to site formation during the wrecking event. In his story of the wrecking event, engineer Julius Stockfeld told of the strong winds and 12 ft. tall (3.66 m) waves that lasted for hours and flooded the boilers, leading to the loss of power and steering control which lead to the eventual capsizing of the boat (North-West Mounted Police 1902:18).

While his story describes the terrible nature of the storm, the cold and terror during that dark night may have caused Stockfeld to unintentionally exaggerate the conditions. Lake Laberge was known then for its violent storms as it is today, and those who go into it during a storm rarely come out (Stuck 1917:127). In even the most horrendous conditions, 12 ft. waves are unlikely to occur on Lake Laberge. As for capsizing, the vessel currently sits upright on the bottom of Lake Laberge, 25 ft. (7.62 m) below the surface. Many of the artifacts rest upon the deck or are scattered nearby. Long handled tools such as a shovel are sitting in the sediment and leaning against the hull. Perhaps Stockfeld had seen crew members clinging to the pilothouse, cordwood, or the bottom of a skiff, but it could not have been the bottom of the hull.

Wind and waves may not have capsized the *A.J. Goddard*, but they certainly were the cause of its sinking. However, they ceased to directly influence the site after the boat settled into the sediment 25 ft. (7.62 m) below the surface of the Lake. The boat stayed relatively undisturbed by physical forces after this point, until structural damage was caused to the hogging system and steam pipes at the stern of the boat.

Ice, the primary physical formation process that affects shallow water shipwrecks, has not influenced the *A.J. Goddard* directly due to the depth at which the hull is located. In the case of Lake Laberge, a layer of ice 2 to 3 ft. (0.1-1 m) thick forms on the surface of the lake in late December (Carmack et al. 1987:7). The ice is subject to dynamic forces throughout the year. The lake level fluctuates by 6 to 8 ft. (2-3m) from August to March, with the shallowest point in March (Carmack et al. 1987:6). When the ice forms in December and later when the thaw begins to come in May, the ice is subject to multiple breaking and refreezing sessions (Carmack et al. 1987:1). Ice floes are formed which the wind can push back and forth along the surface of the lake, particularly if some of the ice has melted back from the shoreline. Similar phenomena have been observed at Red Bay, Labrador, where the wreck of the *San Juan* has been influenced by ice floes, and along the shores of Lake Huron where beach wreckage is continually acted upon by ice movement (Bernier 2007: IV-284; Wayne Lusardi 2011, pers. comm.).

Though this ice is clearly too thin to affect the site directly, it may have indirectly caused damage to the hogging system in the stern (Figure 3.6). While it is impossible to determine with certainty what caused this damage, the submerged root mass of a large 45-foot long (15 m) dead tree, called a dead-head, became stuck or anchored upright in the approximate location of the *A.J. Goddard* for two years approximately 20 years ago (Jenine Caruthers 2010, pers. comm. per Doug Davidge). The ice that annually forms on the surface of the Lake surrounded the top of the dead tree at the surface, and any movement by the ice would exert more pressure upon the tree and thus upon the hogging system that it may have been stuck in. If the heavy root mass of the dead tree was indeed trapped in the hogging system, wind and wave driven movement of the ice would have caused great pressure on the tree, bending the hogging system and steam pipes until the tree could break free. The ice would need to move only approximately two ft. (0.61 m) to cause the damage seen on the wreck.

FIGURE 3.6. Damage to the hogging system in the stern (Photo by Larry Bonnett).

Metal corrosion caused by chlorides is an enormous problem for ships wrecked in salt water. Because chlorides are generally only found in concentrated quantities in the oceans, however, the rate of corrosion on the *A.J. Goddard* is relatively low compared with ships wrecked in the sea. The damage is occurring, however, and corrosion product such as orange rust covers the vessel. The bow rail has been corroded through, possibly because it was created from a thinner sheet of steel. The hull and deck are still strong and stable, with only one hole, approximately 2 in. (5.08 cm) square, located 16 in. (40.64 cm) forward of the third hogpost on the starboard side.

Biological physical forces that would normally cause a shipwreck and its associated artifacts to decay – bacteria and wood-devouring shipworms (*teredo navalis*, among other kinds or destructive species), are inhibited by the cold water of northern latitudes, 33 degrees Fahrenheit (0.55 degrees Celsius) in the case of the *A.J. Goddard*. The cold, still water inhibits bacterial growth, which protects the wood, and shipworms are not found in freshwater. As a result, nearly all of the boat's structure and artifacts are present and in good condition on site.

CHAPTER IV
FIELD WORK

Lead Up to the *A.J. Goddard* 2009-2010 Field Seasons

In 2005, John Pollack and Robyn Woodward started the Yukon River Steamboat Survey (YRS), a project that was adopted by the Institute of Nautical Archaeology at Texas A&M University. The team is dedicated to surveying the Yukon River Valley in order to locate, record, and raise awareness about the steamboats of the Yukon River and Klondike Gold Rush. As of 2012, a field season has been held every summer that focuses on locating and recording one or more vessels, and advanced technology such as LIDAR and sonar play a major role in the recording efforts. Among other vessels, the *Evelyn*, *Seattle No. 3*, *Julia B.*, *Vidette,* and *A.J. Goddard* have been recorded using traditional measuring methods, LIDAR, or 3D sonar. The YRS generally invites at least one graduate student on the project with the goal of assisting with the production of MA thesis or PhD dissertations. The author became involved in the Yukon River Survey effort in 2009 when the project directors extended an invitation to join the team and visit the *A.J. Goddard* for the first time.

2008 - Locating the *A.J. Goddard*

Though many people had forgotten the origin of the name, Goddard Point on Lake Laberge was known to local historians and interested citizens as the approximate location of the wreck of the steamboat *A.J. Goddard*. Though float plane pilots have reported seeing the *A.J. Goddard* from the air, it was never possible to determine a specific location from these reports. A Parks Canada Survey of the shipwrecks in Lake Laberge in 1978 raised awareness about the location of the *A.J. Goddard*, but they were not able to locate the vessel (Waddell 1979:66-69). Finding the wreck of the *A.J. Goddard* became a multi-step process that involved many people and took 30 years. Since the late 1980s, a number of surveys had been conducted in the area for the purpose of locating the vessel. In 1986, Norman Easton directed a project involving Douglas Davidge and other members of e Yukon Underwater Diving Association in a survey of the area with a Raytheon DE 719B depth sonar. Though their survey area passed over the *A.J. Goddard* site and reached a depth of 90 ft. (30 m), the survey lines (with a 30 ft. [10 m] swath) were approximately parallel to the keel of the vessel and thus it was missed. Later, Davidge and his friend, Harry Lowry, conducted a survey dive in the area but were not able to locate the *A.J. Goddard*.

The Whitehorse local dive club purchased a Wesmar side scan sonar unit in 1990, and within two years Doug Davidge became the primary operator. He took it to Goddard Point in July of 1997 and located an isolated anomaly that had potential to be the site of the *A.J. Goddard* (Figure 4.1). As foul weather approached, Davidge left the site with the side scan chart and a dead reckoning location, as he had no GPS at the time. As the original scan was done at a 1,600 ft. (487.68 m) scale he was able to determine the distance between the target and shore by using lake level records and a bathymetric map. He determined that the estimated depth of the target was 45 ft. (15 m). Davidge attempted to relocate the 1997 target/vessel in 1998 and 1999 with no luck. The search for the *A.J. Goddard* would not make any more progress for nearly ten years.

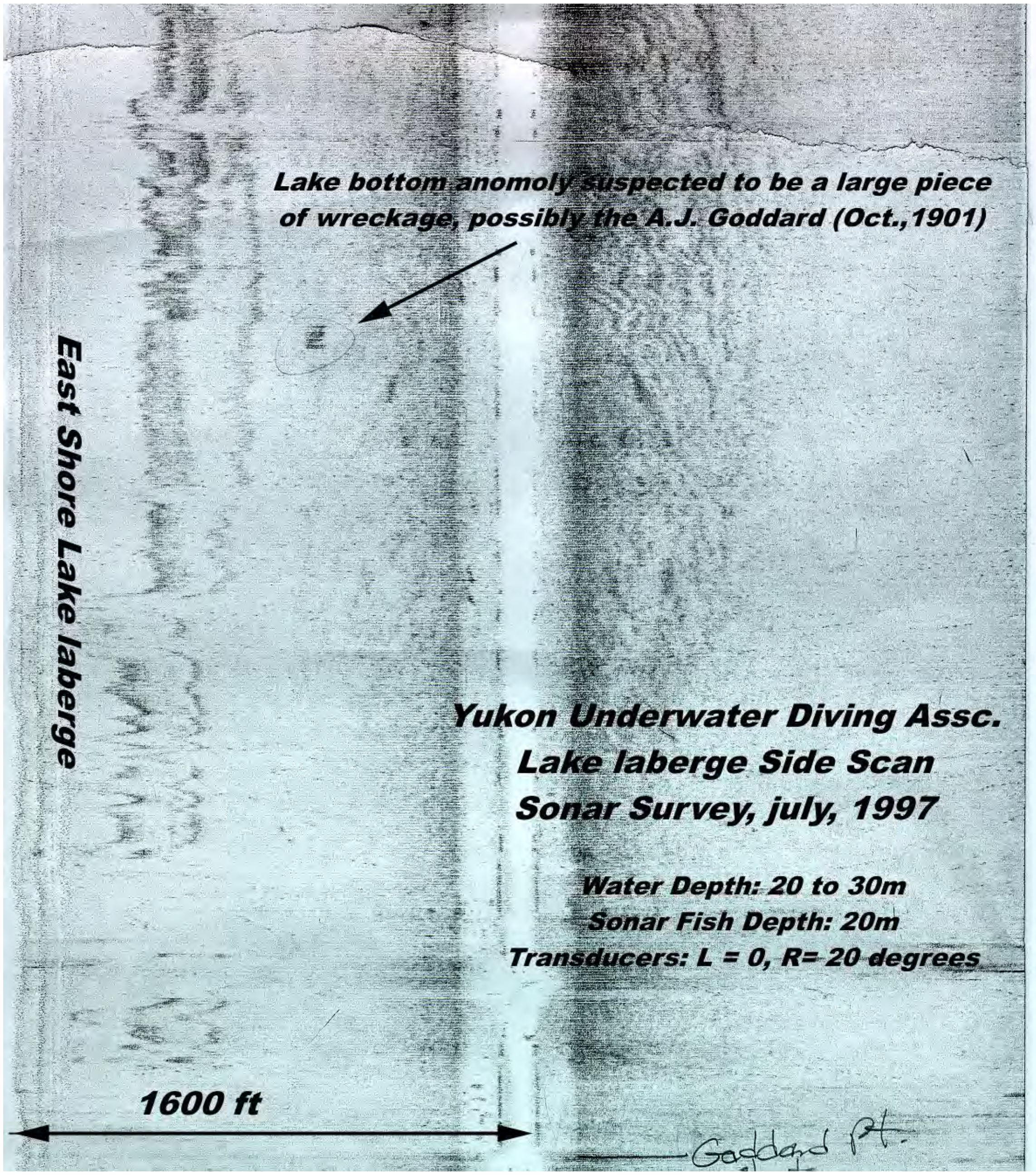

FIGURE 4.1. Sonar data from 1997 (Courtesy of Douglas Davidge).

In 2007, Davidge joined Pollack and Woodward in their efforts to locate and record vessels in the area. Though they discussed the possibility of searching for the *A.J. Goddard*, the difficulty of locating the vessel compared with the need to record other wrecks that were easily accessible on the shore or in the shallows made these wrecks a higher priority. Under threat of fire and vandalism, the YRS project concentrated their next field seasons on recording these vessels. In June of 2008 the Yukon River Survey team, consisting of Pollack, Woodward, Davidge, Chris Atkinson, and Tim Dowd as the boat driver for the Yukon Territorial Government, headed down Lake Laberge in a river boat towards the Thirty Mile. Engine problems resulted in the team stopping off of Goddard Point, and once the problem was fixed they made the impromptu decision to run the side scan unit that they had brought along. They shut it down after 10 minutes due to power issues, and while discussing the problems they were encountering they made slow passes around the approximate location of the *A.J. Goddard* with the depth sonar. They located a distinct anomaly that showed great possibility on the second run, and after several more passes they recorded the GPS location. The team then continued on towards the Thirty Mile to complete the rest of their field season.

It was not until early July of that summer that Davidge had an opportunity to return to Goddard Point. On 5 July, with a fair weather report that was necessary for his small boat and drop camera, Davidge headed to Goddard Point. He relocated the anomaly with the Raytheon DE719B depth sounder and marked its location with a small float. After setting up the drop camera, he returned to the buoy and began to survey. After several slow passes over the site, a drop camera view of the hog post framing and the boat's windlass confirmed that Davidge had indeed found *A.J. Goddard*. He returned again with friends Bonnie Burns and Ken Nordin on 30 August 2008. They deployed an ROV on 31 August, and approached the vessel from the stern, confirming for the first time that the vessel was in an excellent state of preservation, with the entire paddlewheel was still attached and intact (Doug Davidge 2009, elec. comm.).

Location and Description of the *A.J. Goddard's* Wreck Site

The wreck of the *A.J. Goddard* is located approximately 600 feet (200 meters) from shore on the north-eastern end of Lake Laberge, which is part of the Yukon River system that stretches from the headwaters south of Whitehorse, Yukon Territory, through Dawson City, the heart of the Gold Rush, and out to the Bering Sea through Alaska. The wreck lies with its bow facing 78 to 79 degrees True North, with a magnetic north declination of 31 degrees 53 minutes East for NTS Map Sheet 105E06E. The bow points east-northeast to True North and close to north on a magnetic heading of approximately 47 degrees. The site is nearly intact and at the time of the field research had remained undisturbed since the 1901 wrecking event.

2009 - First Full Field Season

As a result of the 2008 discovery of the *A.J. Goddard*, a field season was planned for the following summer. The first full field season at the *A.J. Goddard* site occurred between 1 and 5 June 2009. Lead by YRS Project Director John Pollack and Doug Davidge, the small team included James P. Delgado from the Institute of Nautical Archaeology, underwater photographer Donnie Reid, Tim Dowd as the boat driver from the Yukon Territorial Government, and Lindsey Thomas, a first year graduate student in Texas A&M's Nautical Archaeology Program. The season operated under a Class 1

Archaeological Permit from the Yukon Government that permitted survey but no recovery of artifacts. The priorities were to confirm that the site was the *A.J. Goddard*, to perform a baseline survey of the wreck to create a site plan, to inventory the artifacts, and to photograph the wreck. Three and a half dive days were allotted to complete these tasks.

Reconnaissance

After relocating the site with GPS coordinates, the first dive was successful, with Davidge and Pollack confirming that the site was that of the *A.J. Goddard* and tying a line off to the windlass to mark the location. Donnie Reid photographed the event. The vessel sits upright on the lakebed under 25 to 33 ft. (7.6-10 m) of water. The water depth is dependent upon the season. The majority of the vessel was found to be intact, with only the pilothouse, boiler smoke stack, stove smoke stack, and boat's steering wheel missing. Very little damage is evident on the hull.

A light layer of fine sediment covers the site so that the deck material was indistinguishable and the artifacts were covered in sediment but not fully buried. Burbot (*Lota lota*), a local fish known for burrowing and often living around wrecks and rocks on the lake bed, were observed near the site. The starboard side underneath the hull was dug out, likely by burbot, and disturbed sediment on the deck indicated that the fish do influence the accumulation of sediment on the wreck to some extent.

Recording the Hull

The baseline survey was conducted of the hull was completed by Pollack and Thomas. Due to the boiler's location in the center of the forward deck, it was not possible to run a baseline down the middle of the boat from bow to stern. The baseline was instead offset and placed on the starboard guard of the vessel running from the stern to the forward edge of the boiler. Another baseline was laid down the center of the vessel from the forward face of the boiler to the bow. Measurements were taken using trilateration or baseline offset method and a basic site plan of the deck of the vessel was created. The general shape of the vessel in plan view, along with the locations of machinery, hatches, the hogging system, and steering mechanisms were recorded. The paddlewheel was recorded separately as it existed outside of the parameters of the baselines. The measurements were transcribed into a more legible format and given to John McKay for drafting (Figure 4.2).

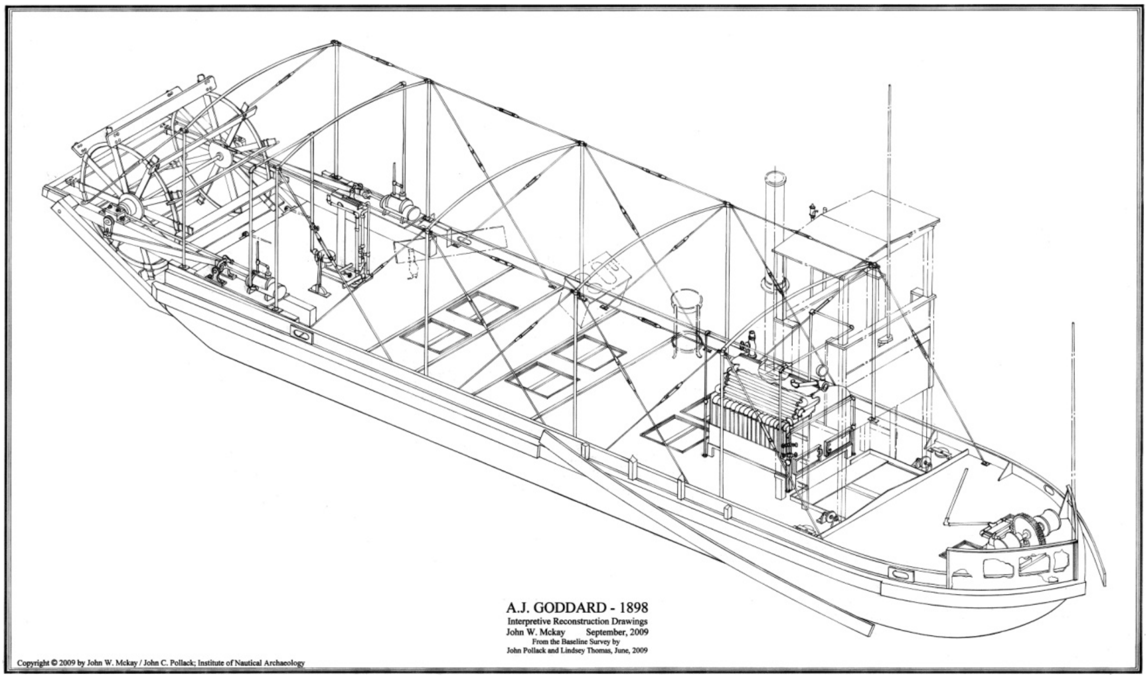

FIGURE 4.2. Perspective drawing of the *A.J. Goddard* created from 2009 field season data (Drawing by John W. Mckay, Courtesy of John Pollack).

Artifacts

Pollack, Delgado, and Davidge conducted a survey that revealed a great number of the boat's artifacts located in the debris field surrounding the site rather than on the deck. The artifacts were marked with numbered flags, and many were photographed on a following dive. A vast array of materials, everything from cooking utensils, shoes, tools, and lanterns were found both on the boat and scattered in the debris field around the vessel. Further work on the site made it apparent that there were many more artifacts. Most of the artifacts were photographed, though none were recovered.

2010 - Second Full Field Season

Following a successful field season in 2009, during which a basic site plan and preliminary artifact catalogue were created, the Yukon River Survey Project returned to the site of the *A.J. Goddard* in June 2010 for a longer field season. The objectives of the 2010 field season were to complete the baseline survey of the wreck site, to create a 3D site plan using the Blue View BV-5000 Mechanical Scanning Sonar, to locate and record all extant artifacts both on and around the boat, and to recover select artifacts for conservation and display at the Yukon Transportation Museum.

Permits for the archaeological work were received from the Yukon Territorial Government's Heritage Branch in Whitehorse prior to the start of each season. A Class 2 permit was requested for the 2010 season as it would allow for the excavation and removal of artifacts, and was granted as removal of artifacts was being conducted at the request of the Yukon Government. With the assistance of Jim Delgado and John Pollack, funding was obtained through a number of sources, which are indicated in the Acknowledgements section.

Creating the Team

In order to ensure the safety of all divers and the efficiency of the project, it was determined that all divers should have extensive cold water and drysuit experience within the past two years, cold water primary and secondary regulators to avoid free flows, a recent medical exam certifying fitness to dive, Divers Alert Network Dive Insurance, and first aid and CPR certifications. In addition, experienced divers with good buoyancy control skills were desired, as the sediment on the *A.J. Goddard* site is so light that all work needed to be completed without touching the bottom. As a result of these criteria, it was not possible to bring other students along on the diving portion of the field work. BlueView Technologies and OceanGate sent a team to deploy the BV-5000, and Speigel-TV sent a team to record the field season for a documentary.

The team was comprised of both professional and avocational volunteers from the United States and Canada. Each team member came to the project with a specific skill set that was invaluable, particularly considering the remote location and the short field season that made efficiency a priority. Team leaders were assigned to different tasks, such as supervising hull recording, coordinating artifact recovery and recording, in-field conservation of artifacts, and underwater photography. In addition to archaeological task team leaders, there were logistical team leaders as well, which were invaluable for day to day operations. These tasks included assisting the BlueView Technologies and OceanGate staff in their operations, coordinating the Speigel-TV crew, filling tanks, keeping the dive log, and supervising health and safety. As the BlueView 3D staff and Speigel-TV crew often required use of the dive boat or the ability to enter the water for filming, this required coordinating with the archaeological team leaders to ensure that work was completed.

Project leader Lindsey Thomas supervised hull recording using traditional methods such as tape measures and slates. John Pollack acted as the logistical coordinator and assisted both the BlueView 3D staff and Spiegel-TV in their operations. Wayne Lusardi, the State Maritime Archaeologist for Michigan and the senior archaeologist on the project was tasked with coordinating artifact recording, recovery, and in some cases, an artifact's return to the site. Doug Davidge assisted with artifact photography and hull mapping. Geoff Bell, a former commercial dive school owner from Vancouver, acted as the Diving Safety Officer and underwater photographer for the project. Tim Vincent, a local Whitehorse Registered Nurse, acted as the health and safety supervisor (his professional care was fortunately never required). Tim Vincent also assisted Lusardi with the recording of the artifacts underwater. Sean Adams, also from Vancouver, managed the compressor and tanks. Mark Thomas, from Atlanta, Georgia, recorded the machinery and steering system.

In addition to the diving team members, there were two permanent team members who acted as support staff for both the divers and the artifacts. Tim Dowd, from the Yukon Territorial Government Heritage Branch, acted as the boat driver for both the 2009 and 2010 season. Valery Monahan, also from the Yukon Territorial

Government Heritage Branch, was the in-field conservator who took care of the artifacts as they came out of the water; she is currently in charge of the conservation of the artifacts that were taken to Whitehorse.

The BlueView and OceanGate staff consisted of four team members who were on site from 6 June to 9 June. Lee Thompson, though he was not able to be in the field, donated the BlueView BV-5000 sonar. Stockton Rush, president of OceanGate, organized bringing the BlueView sonar to the field through his company's Citizen Scientist program. The program assists researchers through the donated support of people interested in participating in scientific research. The *A.J. Goddard* Project's citizen scientists were Gordon Rock and Wayne Loeber, who participated in day to day operations around camp and the preparation of the BV-5000. Jon Robertson, from BlueView Technologies, acted as the equipment specialist for deploying the sonar unit and managing the data. Spiegel-TV was also present with a crew of four (Figure 4.3).

FIGURE 4.3. 2010 camp on eastern shore of lower Lake Laberge (Photo by Wayne Lusardi).

Working Conditions

Due to the harsh diving conditions and the schedules of the volunteer staff, the field season was set at 10 days, 8 and a half of which were available for diving. The first two weeks of June were chosen based upon the schedule of the ice breakup, which generally occurs during the last week of May. Water visibility is at its best immediately after the breakup, which generally takes place over the course of several days. Within a couple of weeks of ice breakup, melt water from higher latitudes flows into the Yukon River and reaches the *A.J. Goddard* site, bringing with it sediment and pollen that can completely obscure visibility.

Unfortunately, the ice broke two weeks earlier than expected, unusual for the region. As a result, the visibility was less than 3 ft. (1 m) on the first dive of the 2010 season. As the dive plans and schedules had been created with the 2009 season's visibility in mind, which had been far better, the schedule and expectations were modified. While it was still possible to complete many of the objectives, work was slowed due to the poor visibility.

Creating the Dive Standards

Though the visibility is at its best immediately after the ice breaks, the water temperature hovers around 37 degrees Fahrenheit (2.7 degrees Celsius), the coldest temperature of the summer. The boat rests in 25 ft. (7.62 m) of water on a hard clay bottom that is covered with a layer of fine silt. Dive times were limited to 45 minutes maximum in order to avoid hypothermia and divers were scheduled to dive twice a day, though some volunteered for a third or fourth dive.

Due to the small size of the site and the fine silt that covers both the boat and the clay bottom, dive teams were limited to four people working in separate areas of the site. Most tasks were performed solo as two team members working together generally disturbed the sediment. Though the visibility was poor, it was possible for divers to locate each other quickly by swimming one circle around the boat. If a diver was in the debris field surrounding the boat, he could be located by following the survey line tape measure that was affixed to the hogposts, which acted as control points (Figure 4.4).

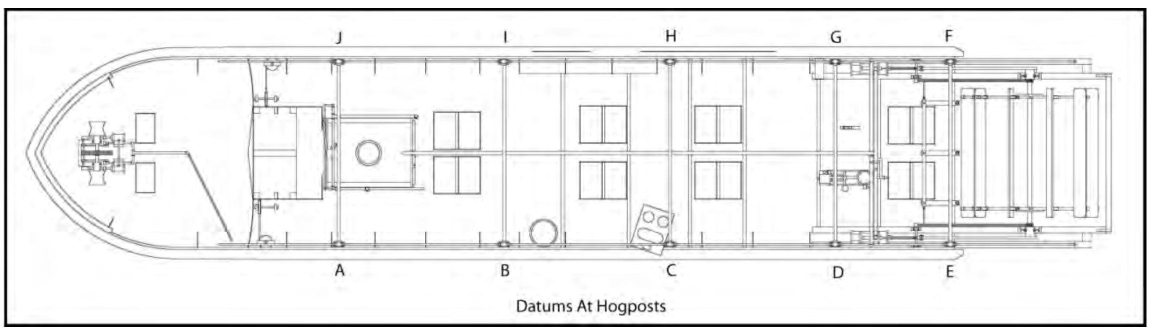

FIGURE 4.4. Hogposts acting as control points.

Recording the Hull

<u>Baseline Trilateration</u>

Using the 2009 site plan as a guide, the team focused on recording the construction features of the hull, including the machinery, steering systems, and hull lines. As bottom time was limited due to the cold water, copies of the 2009 site plan were printed onto mylar and taken underwater to facilitate recording.

The interior of the hull was the priority for recording the construction features, which had not been done during the 2009 season. Due to the vessel's small size and shallow draft, it was not possible to penetrate the hull in order to fully document the interior. It was possible to see inside of the vessel with the aid of a light and the access provided by 12 small hatches, and the majority of the interior of the vessel was recorded by one means or another. A layer of sediment 4 in. (10.16 cm) deep inside the hull prohibited the accurate recording of the bottom of the vessel. Limited probing was conducted to determine the depth of the sediment and the location of frame floors.

With the exception of the missing wheelhouse and steering wheel, the steering system is still intact. While the system is recorded on the 2009 McKay drawing, this information was obtained from photographs and is not entirely accurate as a result. During the 2010 season, the steering system was recorded by Mark Thomas, who followed it from the pulley sheaves on either side of the base of the now missing wheelhouse, along the sides of the vessel, and down to the rudders underneath the stern. Due to the size and location of the paddlewheel, it was impossible to follow the lines to their termination point, though Thomas was able to come close. The boat's power system was recorded in a similar manner, whereby he followed the steam pipes from the boiler, located forward of amidships, to the stern, where the engines were located on either side of the vessel (Figure 4.5). Damage to the steam pipes occurred sometime in the past, likely after the wrecking event, which prohibited a complete recording in the amount of time available. The smaller elements of the paddlewheel and its components were also recorded, which had not been completed during the 2009 season.

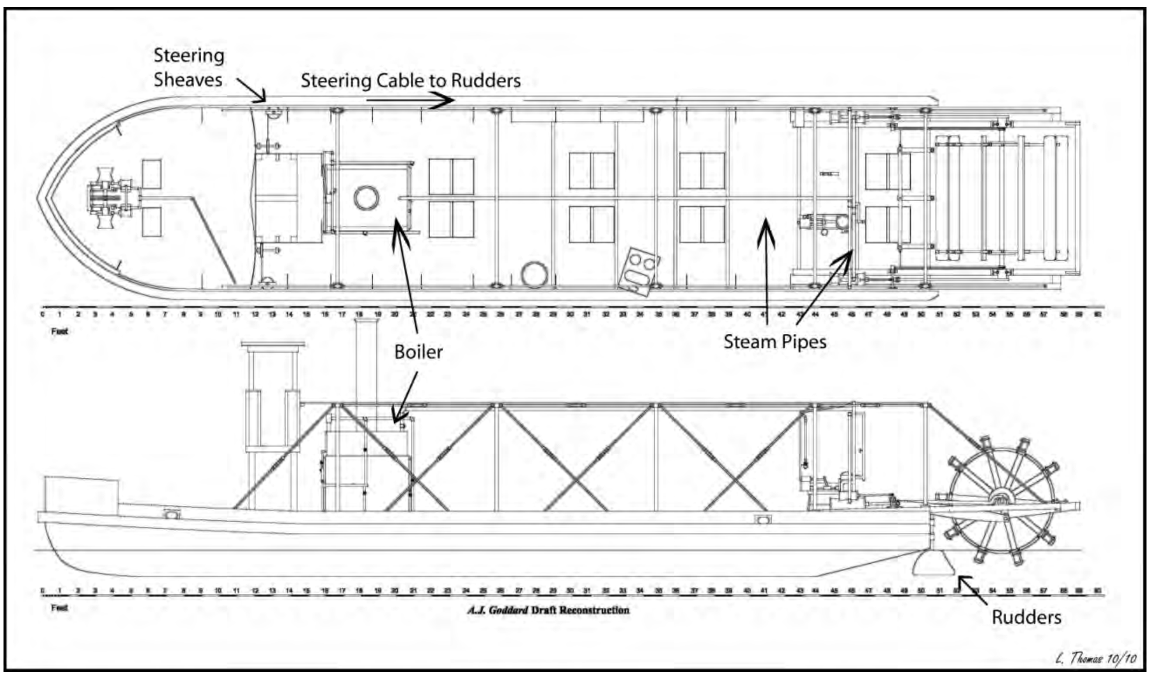

FIGURE 4.5. Route of Mark Thomas' recording efforts.

Over the past 108 years, sediment has built up around the hull of the *A.J. Goddard*, obscuring the shape up to the turn of the bilge. Burbot have burrowed into the sediment along the starboard side, creating a gully in which it is possible to see the bottom of the boat, though it is difficult to access it. This obstructed the hull and prohibited proper lines recording. An attempt was made to record the hull lines using a meter stick and a plumb-bob suspended from a tape measure. The method was primarily successful in the stern, where access was the best. The bow and midships were considerably more difficult, particularly considering the shape of the bow. The BlueView BV-5000 was suspended inside the hull to record the interior, and partial hull lines could be taken from the scans.

<u>BlueView BV-5000 Mechanical Scanning Sonar 3D Site Plan</u>

Through the donated assistance of BlueView Technologies, which develops underwater acoustic measurement and imaging systems, and OceanGate, Inc., a company dedicated to assisting scientific research by pairing researchers with interested volunteers who contribute necessary resources, the 2010 field team had access to the BlueView BV-5000, a high-resolution profiling sonar that is capable of creating a 3D point cloud in minutes. The highly portable unit is capable of capturing both sector and spherical scan data. (Figure 4.6).

FIGURE 4.6. OceanGate Citizen Scientist Wayne Loeber with the BV-5000 (Photo by Mark Thomas).

For the *A.J. Goddard* site, the unit was mounted on a tripod and deployed by divers, though it is possible to affix the unit to a remotely operated vehicle or submarine. The divers were not required to stay underwater while the unit scanned, which saved valuable underwater hours. The unit was deployed 22 times both around and on the vessel and was set to scan different sections rather than making a complete spherical scan, which was unnecessary. Each scan took 6 minutes to complete. Though there are some blank spaces on the plan, the majority of the vessel was recorded (Figure 4.7).

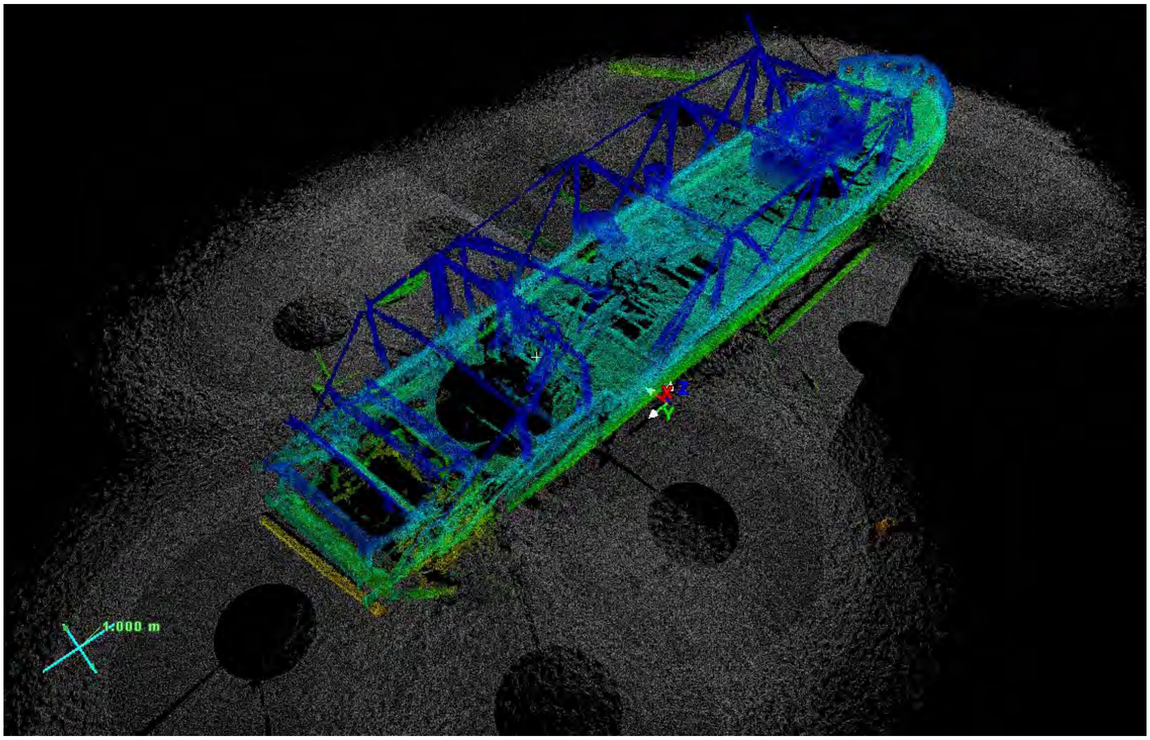

FIGURE 4.7. BlueView BV-5000 scan data (Courtesy of BlueView Technologies and OceanGate Inc.).

<u>2D Imaging Sonar and Searching for the *A.J. Goddard's* Stack</u>

A P900-130 side scan sonar unit, also manufactured and donated by BlueView Technologies, was mounted to the hull of the Carolina Skiff and used to search for the boiler stack of the *A.J. Goddard*. The unit was first used on the *A.J. Goddard*, which appeared very clearly on the computer screen. 100 foot (35 meter) transects were run over the site extending 600 feet (200 meters) north and south of the vessel. Deeper water was also surveyed, and though two anomalies were located, the stack was not.

On 7 June, a Humminbird 1197c SI sidescan sonar unit was also used to scan the wreck site and surrounding area (Figure 4.8). The stack was not located at this time.

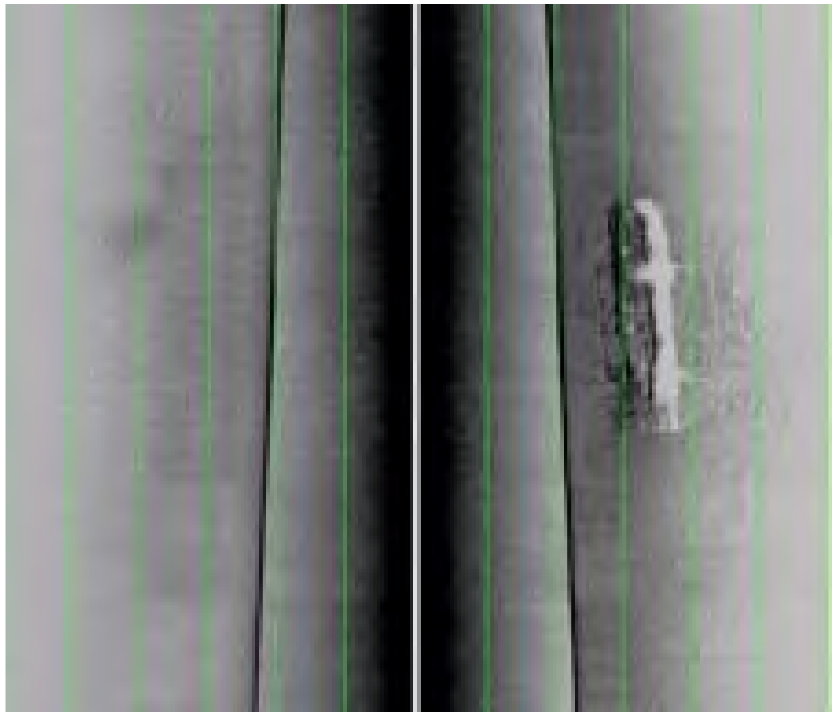

FIGURE 4.8. Humminbird sonar image
(Courtesy of Douglas Davidge).

Analysis of BV-5000 for Archaeology

It is unquestionable that the BV5000 creates impressive and useful imagery and data. The unit is easy to deploy and quickly records thousands of data points, allowing the researcher to create a site plan far more quickly than with traditional methods. In addition, the post-fieldwork processing is much quicker, taking only a fraction of the time. By scaling the point cloud data, measurements can be taken off of the virtual model which assists in creating the reconstruction. In addition, poor visibility does not hinder the system, and the 2010 field season benefited enormously from this (Figure 4.9).

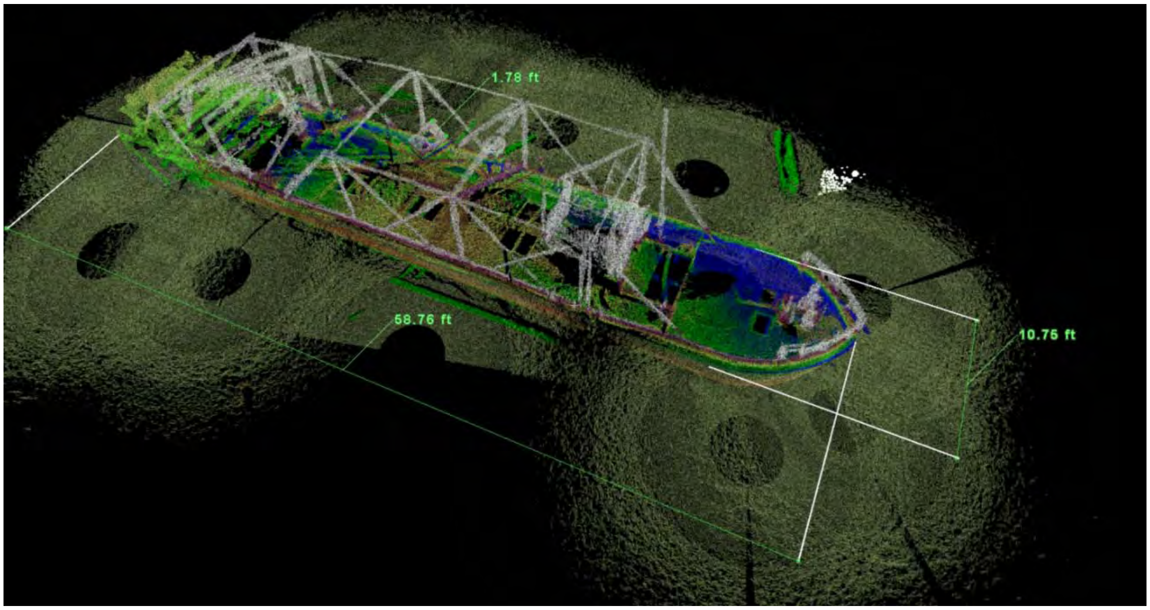

FIGURE 4.9. Measurements being taken from the BV-5000 data (Courtesy of BlueView Technologies and OceanGate Inc.).

Though the BV-5000 undoubtedly assists the archaeologist in recording a vessel, it cannot replace traditional methods. Nor can traditional recording techniques act as a replacement for the BV-5000. Rather, in a circumstance where the maximum amount of data is desired and it is possible to obtain a BV-5000 or similar unit, both methods used together would result in an ideal situation. Not only can the BV-5000 provide divers with an understanding of the layout of the wrecksite, which can take many dives to accomplish in low visibility water, first-hand experience of the wreck underwater allows researchers a frame of reference that helps in understanding aspects of the point cloud that may otherwise be confusing, such as around the engines or boiler.

While the BV-5000 can quickly give an accurate overview of the boat and general dimensions, details such as rivets and small artifacts cannot be captured with the BV-5000. Because of this, it is necessary to continue mapping with a slate and tape in order to obtain more detailed measurements. The most useful aspect of the BV-5000 for the 2010 *A.J. Goddard* project was its ability to be suspended inside remote sections of the hold, which was inaccessible to divers due the small size of the hatches and hold. Hull construction details that were otherwise inaccessible to divers, such as the spacing of deck beams, were visible and measureable on the computer screen within minutes of the scan (Figure 4.10).

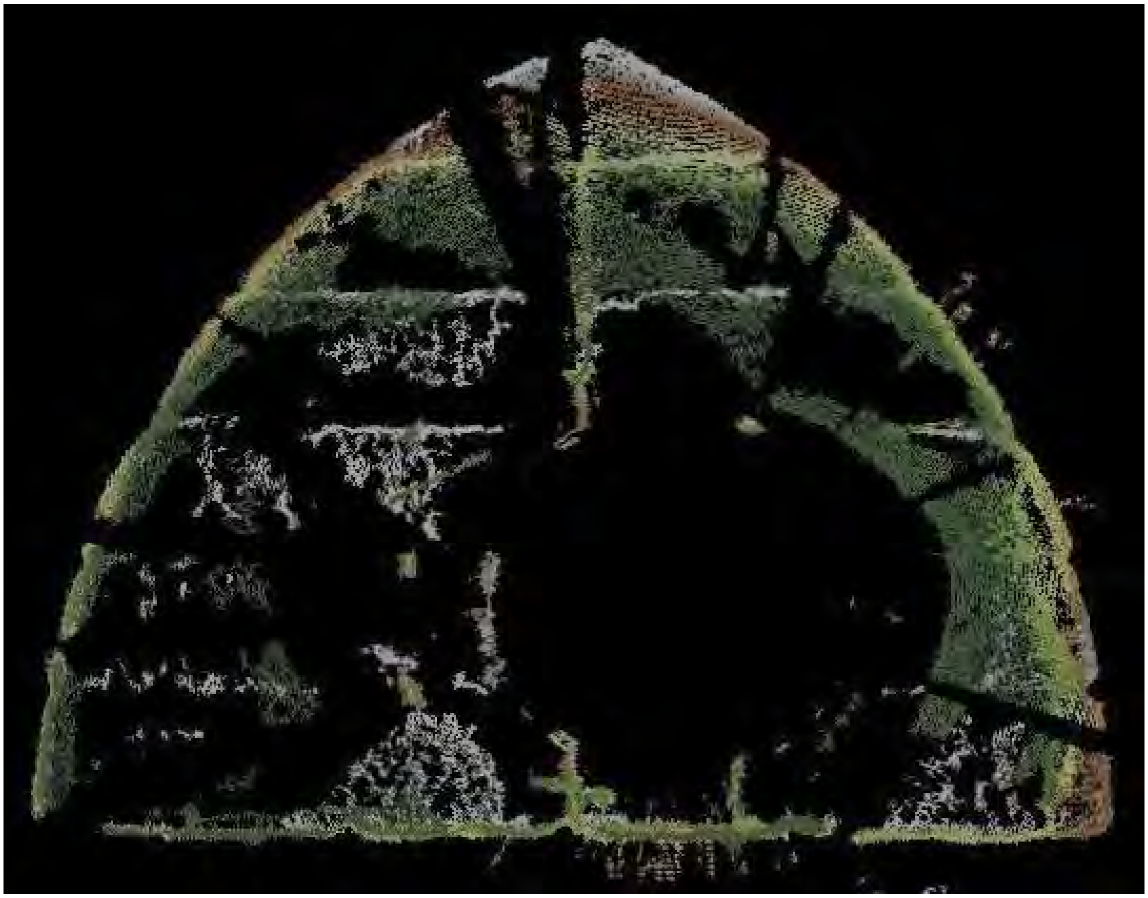

FIGURE 4.10. Interior scan of the *A.J. Goddard's* bow showing deck beams (Courtesy of BlueView Technologies and OceanGate Inc.).

In addition to retrieving construction details, lines information can be obtained by cutting the point cloud data transversely. This is most easily and accurately accomplished on a vessel with one deck, as it is possible to take scans from the interior of the vessel in order to achieve proper lines from the inside of the planking. If this were attempted on a larger multi-decked vessel, the scans would likely need to be taken from the exterior, though it would be necessary to account for the missing section where the bottom of the hull is obscured by sediment. Though it was possible to test this method during the 2010 field season, limited time and sediment obscuring the bottom of the hull prohibited the collection of complete lines data.

Artifacts

More than 100 artifacts lay scattered on and around the vessel. The 2010 field objectives included numbering the artifacts, photographing them in situ, recording their location using baseline trilateration, and recovering select artifacts for conservation and display at the Yukon Transportation Museum. Poor visibility on site made locating artifacts difficult, and though it did not halt the work, it did impede it.

The first phase of recording artifacts involved marking them with numbered flags. Two teams then simultaneously recorded the positions of these flagged artifacts on either side of the vessel using tape measures tied to the hog-posts. This allowed the divers to perform organized search patterns and record the artifacts with trilateration while not losing their way from the wreck. Geoff Bell photographed most artifacts, though he was not able to relocate all of them in the available field time. During the first half of the field season, visibility was poor enough to prohibit photography. As the visibility cleared towards the end of the week, Bell was able to photograph as many artifacts as time permitted. A total of 103 artifacts were located, tagged, and had their positions recorded. Six artifacts were recovered for detailed recording and then returned to the site, though this was done infrequently to avoid damaging the artifacts.

Thirty-one artifacts were recovered for exhibit in Whitehorse, including steam equipment, bottles, personal items, tools, clothing, and kitchenware. Artifacts were selected for educational value as well as their conservation requirements. While some artifacts that required complicated conservation methods were recovered, the majority were chosen because they were both representative of life on board the boat and were relatively easy to conserve. In an attempt to discourage treasure hunters and to keep a record of the recorded artifacts for future field seasons, metal tags indicating the artifact's number were attached to each artifact using zip ties.

Conclusion

Due to the excellent preservation of the site and the small size of the steamboat, it was possible to record much of the *A.J. Goddard's* hull structure and many of the artifacts. Though visibility prohibited photographing and recording all of the artifacts, it did not hinder the BV-5000, which created an enormously helpful plan of the hull. Combining the BV-5000 data with traditional notes made it possible to gain a much fuller understanding of the site.

CHAPTER V
RECONSTRUCTION

Purpose

The primary purpose of this study is to create a reconstruction of the *A.J. Goddard* through an analysis of the hull components documented during the 2009 and 2010 field seasons so that the vessel can be more fully understood within the context of its period. The *A.J. Goddard* is in an excellent state of preservation due to the cold, dark, fresh water of Lake Laberge. The small, pre-fabricated iron vessel is nearly complete, with only the pilothouse and stacks missing from the site. While the shallow hold is difficult to access in order to determine the construction of the interior of the hull, the rest of the vessel is easily accessible. This chapter explores the construction features of the *A.J. Goddard*, how they fit into Yukon River steamboat tradition, and what evidence of its construction methods is visible in the remains of the vessel. The features that are characteristic of Yukon sternwheelers - including hogging systems, the sternwheel, and the machinery - are presented first, while the general construction details of the hull are presented second. The fieldwork from the 2009 and 2010 seasons, combined with historical research, has answered many questions about the *A.J. Goddard*'s construction, but there are many remaining to be answered. These gaps in our knowledge of the vessel will be identified in the conclusion of this work so that possible future field seasons will be able to answer them.

Methodology for the Reconstruction

The short field time available for recording the vessel, a combined 12 days over 2 seasons, made a creative approach to recording necessary. Several recording techniques were utilized, both traditional methods such as baseline trilateration with measuring tapes and writing slates, and more technologically advanced methods such as sonar, which allowed measurements to be taken from the digital data after the field season ended. Many of the basic measurements in the *A.J. Goddard's* plans were obtained through tape and slate measurements taken during the 2009 field season. This includes basic measurements of the paddlewheel. The 2010 season focused on recording the interior of the hull, the machinery, and the lines of the hull. Tape measures and plumb bobs were used for this task, as well as measurements taken off of the 3D point cloud produced by the BV-5000. The nature of the vessel made it so that many of the measurements were taken relative to each other, rather than off of a master baseline.

In many cases, smaller measurements, such as those found on the machinery, were not obtained during either field season and are too detailed to obtain from the 3D point cloud created by the BV-5000. In order to estimate these measurements for the reconstruction, plan view photos of the area in question were imported into AutoCAD 2010. By scaling the photo using a known measurement found somewhere in the photo, the estimated measurements were then taken using the measuring tool in the program. Perspective photos were avoided as they would provide a skewed measurement. While this technique is not as accurate as hand measurements taken on the site, tests indicated that it was within two centimeters of accuracy. Dimensions taken in this manner are indicated in the text. Unfortunately, it was not possible to rely upon contemporary steamboat plans as none are known to exist.

Features of the Vessel: Hull Basics

Dimensions and Overall Shape

One of the smallest steamboats to ply the Yukon River, the *A.J. Goddard's* registration papers record the vessel as having a 50 ft. (15.24 m) length, a 10-½ ft. (3.2 m) beam, and a 3 ft. (0.91 m) depth of hold (Figure 5.1). The stern paddlewheel increased the overall length of the vessel to 59 ft. (17.98 m), and the guards increased the overall beam to 11-½ ft. (3.51 m). Measurements taken with AutoCAD from a photo in which the *A.J. Goddard* appears to be fully loaded suggest a draft of approximately 18 in. (45 cm) (3 ft. [91 cm] was considered ideal for larger steamboats) (Adams and Williams 2002:183). The *San Francisco Call* records in 1898 that a steamboat matching the *A.J. Goddard's* description was being built with a draft of 15 inches (38.1 cm). The same newspaper reports that two vessels matching the general description of the *A.J. Goddard* and *F.H. Kilbourne* were built with the same lines as British military expedition boats sent up the Nile River (*The San Francisco Call* 1898a). Photographs of one of five British steamboats built for the Nile by the Samuda Brothers of London indicate that at least this vessel, and likely its consort ships, do not share similar lines with the Goddard, but there may be other vessels in the historic record that do (Paddle Steamer Kingswear Castle 2011). The *A.J. Goddard* had a displacement of 15 tons (*Klondike Nugget* 1898a). While the hull appears to be identical to its consort vessel *F.H. Kilbourne* in a photo of the vessels under construction, a North-West Mounted Police report from 1902 states that *A.J. Goddard* was listed at 40 tons while *F.H. Kilbourne* was listed at 54 tons (Figure 3.4)(*North-West Mounted Police* 1902). Access to the bottom of the hull is limited, though divers could confirm that the hull has a relatively flat bottom with well-rounded bilges. Photographs of the hull under construction confirm this.

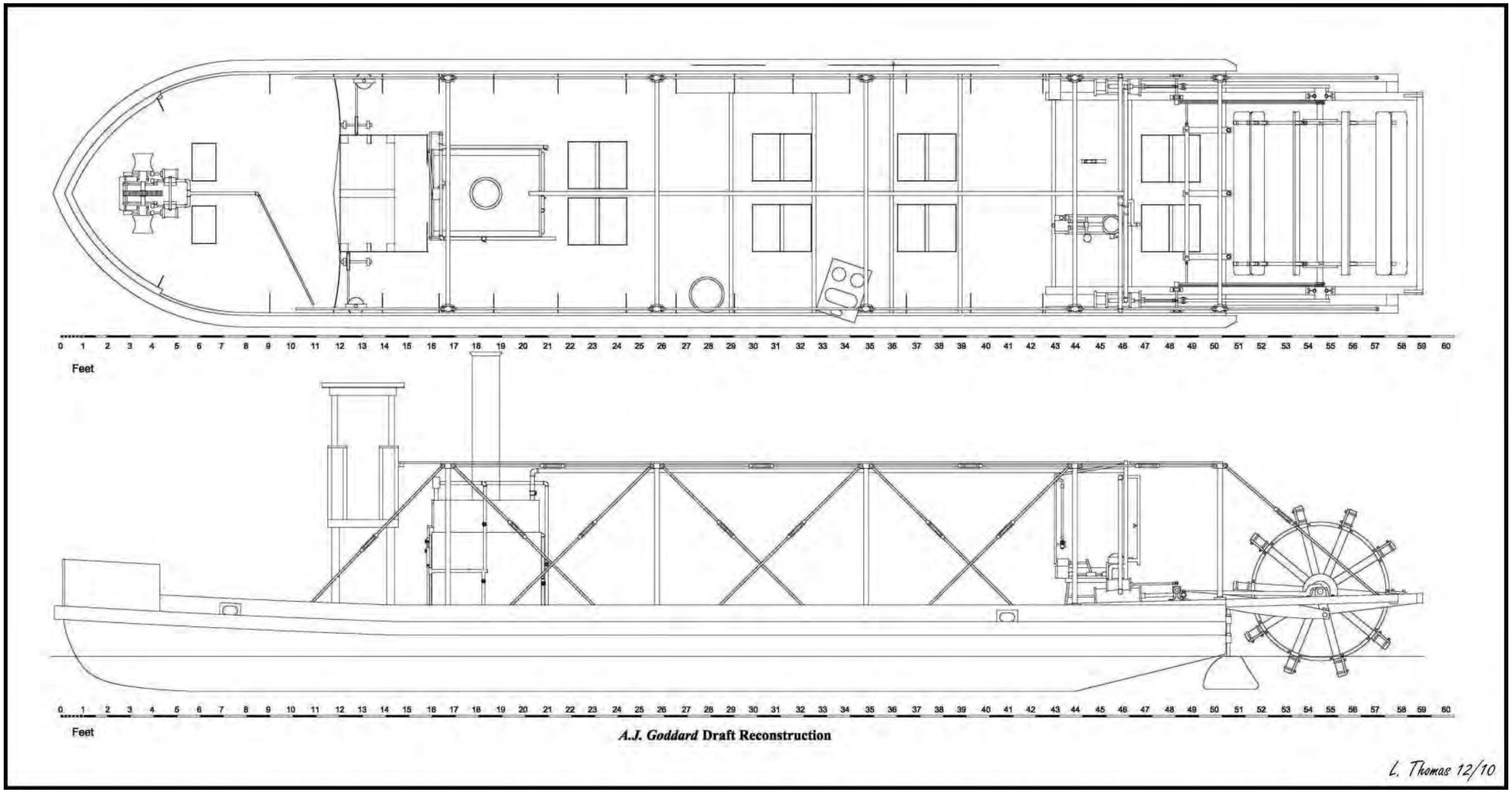

FIGURE 5.1. Plan of the *A.J. Goddard's* exterior.

The stem is relatively full with an easy curve where it meets the keel. There is a dent in the starboard side of the bow, suggesting that the vessel ran aground or afoul of the rapids. Historic photos also suggest that the bow gradually curves up at the sheer, while the stern is level with midships. The ability of divers to inspect the transom was severely limited by the sternwheel. The shape of the transom was partially recorded using a plumb bob and tape. From the partial lines, it appears that the transom is 15-½ in. (39.4 cm) in height at the centerline of the vessel, with rounded corners and a flat tuck. Unfortunately, recovering complete lines for the vessel was not possible without extensive digging, something not included in our 2010 permit conditions.

Iron or Steel?

The *A.J. Goddard* was built at a time when many steamship and sailing ship builders and owners were turning away from wooden hulls and towards iron or steel hulls. Particularly in the case of steam propulsion, a system that developed in conjunction with the adoption of metal hulls, an iron or steel hull was ideal because it was most resistant to fire, torsion, and loosened fastenings from vibration (Thiesen 2006:82). However, due to wood's suitability as a building material for inland river steamboats (see Chapter I), the majority of steamboats operating on the Yukon River and its tributaries were built of wood until the end of the steamboat era in the 20th century. There were exceptions: several steamboats, including the *A.J. Goddard*, were built of iron or steel. The *A.J. Goddard* was built entirely of metal with the exception of the wooden cylinder timbers, bow railing, pilothouse, paddlewheel buckets, tack strips (thin wooden planks attached to the metal deck to act as fastening places for cargo), and the boards forming a roof over the hogging system. When it would have been possible to build a wooden steamboat at the edge of Lake Bennett from local spruce, why did the Upper Yukon Company choose to build the *A.J. Goddard* and the *F.H. Kilbourne* of metal? Likely the fact that Albert James Goddard and his brother Charles owned an iron works that made small metal boats influenced this decision, and may have provided easier access to the sturdier and easier to maintain material.

While Albert Goddard's association with an iron works might suggest this material, steel had replaced iron by this date in many cases. According to R.A. Fletcher (1910:281), the construction of the steel *Rotomahana* by W. Denny and Bros. in 1879 marked the start of steel steamship construction. The trans-Atlantic steamship *Buenos Ayrean* was built by the Allan line in 1881, a company that would go on to experiment with different types of steel hull construction and propulsion methods. Thus began an era in which increasing numbers of steel vessels were constructed in favor of iron, until the material would eventually replace iron altogether (Fletcher 1910:281-283). Albert Goddard agreed that steel was the wiser choice for hull construction, and when designing the specifications for the hulls he chose steel (Albert Goddard Autobiography 1930s:2). Risdon Iron Works, who fabricated the hull, were constructing steel steamboats in 1898. The *San Francisco Call* writes about two steamboats of 50-foot length being built of steel for passenger service in the Yukon. Though no names for the vessels are mentioned, and the newspaper records that they will be sent north to St. Michael (as opposed to Skagway where the Upper Yukon Company's vessels were sent), it is possible that these vessels are the *A.J. Goddard* and *F.H. Kilbourne* (*The San Francisco Call* 1898a).

Characteristic Steamboat Features

Hogging System

As steamboats moved onto the characteristically shallow and energetic western rivers, shipwrights developed hulls more suitable to the conditions that were lighter and more flat-bottomed. This resulted in the disappearance of many heavy longitudinal timbers - including the keel - that provided the primary structural support for the hulls of the eastern riverboats and oceangoing steamships (Custer 1991:12). This, combined with a long hull featuring an extreme length to breadth ratio, heavy machinery placed on the deck, hull twisting due to rapids, and shocks from grounding the vessel against the shore resulted in major hogging and sagging issues (hogging is a phenomenon in which the extreme ends of a vessel sag, while sagging is a phenomenon in which the middle of the vessel sags).

As steamboat design progressed, shipwrights on the western rivers of America developed three design features to improve the structural stability of the hull. Heavy machinery was moved around to more evenly distribute the weight as the length to breadth ratio increased, additional keelsons and longitudinal bulkheads were added to provide extra support within the hull, and eventually hogging systems were added (Hunter 1993:96). Once hulls had grown so long that internal structural support no longer sufficed, hogging systems were added above the deck to further support the ship. Initially of wood and iron composite construction, the western river steamboats developed hogchains of iron rods 1 to 2-1/2 in. (2.54-6.35 cm) in diameter that were attached at the bow and stern and suspended over superstructure posts or masts (Hunter 1993:12).

The curved wooden trusses utilized as some of the first internal longitudinal bulkheads were similar to those used by bridge builders at the time (Custer 1991:12). Though it is unknown exactly when hogchains were developed, a distinct increase in length to breadth ratios for larger steamboats between 1835 and 1841 may have been the result of the introduction of hogchains. Hogchain refinement in the 1840s resulted in increasingly longer vessels (Custer 1991:13). The first known hogchains appear in 1848 on the steamer *Brilliant* (Hunter 1993:99).

Sternwheelers presented particularly difficult problems with hogging. Though the hull of a sternwheeler will float relatively flat and level when first launched, with the heavy sternwheel and engines positioned aft, and the boiler positioned forward to prevent the vessel from being stern heavy, over time the hull becomes distorted, hogging at the ends and no longer lying flat (Custer 1991:12). This put a strain on the steam and water pipe system, threw the machinery out of alignment, shortened the lifespan of the vessel, and increased the draft of the vessel, making it difficult to travel in shallow waters and over sand bars (Custer 1991:12). Because of these factors, it was not until the development of hogchains that sternwheelers appeared on the inland rivers in significant numbers. Despite the many measures taken to ensure a stiff and sturdy hull, the longer vessels were still quite limber (Hunter 1993:99-100). This was necessary for the vessels to survive the frequent groundings when pulling up on shore or hitting an unexpected sandbar, or even to be returned to service when the vessel sank, which was not uncommon.

Hogchains worked by pulling up the ends of the vessel and forcing the middle flat with the compression force formed by the hogchains and posts. The hogchain posts, vertical posts that supported the hogchain along the length of the vessel, were positioned along the sides of the boat. Taller hogchain posts allowed for more leverage to counteract hogging. Sometimes placed for aesthetics and sometimes not, hogchains had three primary functions: to minimize hogging, absorb the sternwheel and machinery vibrations, and evenly distribute the force exerted by the heavy cargo and machinery resting on the vessel's limber hull (Custer 1991:13).

The *A.J. Goddard's* hogging system is composed of 10 vertical hogposts, each 2-½ in. (6.35 cm) in diameter, set into rectangular 4 by 6 in. (10.16 by 15.24 cm) steel or iron bases. The bases are bolted to the deck with four bolts. They are located almost flush with the side of the hull and are spaced approximately 108 in. (274.32 cm) apart, with the exception of the aftermost hogpost, which is positioned almost at the transom. Whether or not they extend below the deck is unknown due to the lack of access below the hull. The two aftmost hogposts are mounted on top of the cylinder timbers. One of the posts has fallen over and shows that it does not penetrate through the cylinder timber into the hold. The three other hogposts, which are positioned forward of the aforementioned posts and bolted to the deck, are all associated with bulkheads. Two of the hogposts, located at approximately amidships, are located directly over their associated bulkheads. The exact relationship between the forward most hogpost and its associated bulkhead is not known due to the difficulty obtaining precise measurements at that point on the vessel, but the pattern likely continues.

The hogchains are a 1 in. (2.54 cm) diameter steel cable, which is generally the smallest size of steamboat hogchain. They extend over the hogposts and at the after ends terminate on the wheel support timbers in the stern, with crossed hogchains forming an X between the hogposts (Figure 5.2). The forward ends of the hogchains disappear below the deck in the bow 16-½ in. (41.91 cm) forward of the coaming of the first hatch. It was impossible to determine where exactly they terminate in the hold. The hogchains' disappearance points and angle at deck level would allow them to terminate at bulkheads near the bottom of the hull; the actual end points of the hogchains within the hull has not been confirmed visually.

On wooden steamboats, the hogchains terminated at the footlings, large wooden timbers aligned longitudinally within the hold and oriented beneath the hogging systems and the cylinder timbers, or at transverse beams or longitudinal bulkheads. Not only did they form a joining point for the hogchains, they also absorbed the vibrations from the engines above. No footlings were evident within the hull, and in fact may not be present on metal steamboats. While it is unclear due to lack of evidence exactly how the hogchains and hogposts terminate below the hull, the following reconstruction is proposed based upon available evidence. Much debate in particular was given to whether or not the hogposts penetrate the hull, as it was impossible to confirm this during the field season due to poor visibility and the hold's inaccessibility. The current hypothetical reconstruction suggests that the hogposts are located directly over the bulkheads but do not penetrate the hull and that the hogchains bolt into the bulkhead approximately 18 in. (45.72 cm) below where the hogposts terminate at deck level. A strong support system is created by the hogposts that work with the bulkheads to create a support structure that utilizes the entire hull, and the hogchains tie into this system and support the ends of the hull. It is also possible that the hogging system, which seems overly sturdy for such a large vessel, was built this way to help support the roof, which could act as a second deck for passengers and baggage.

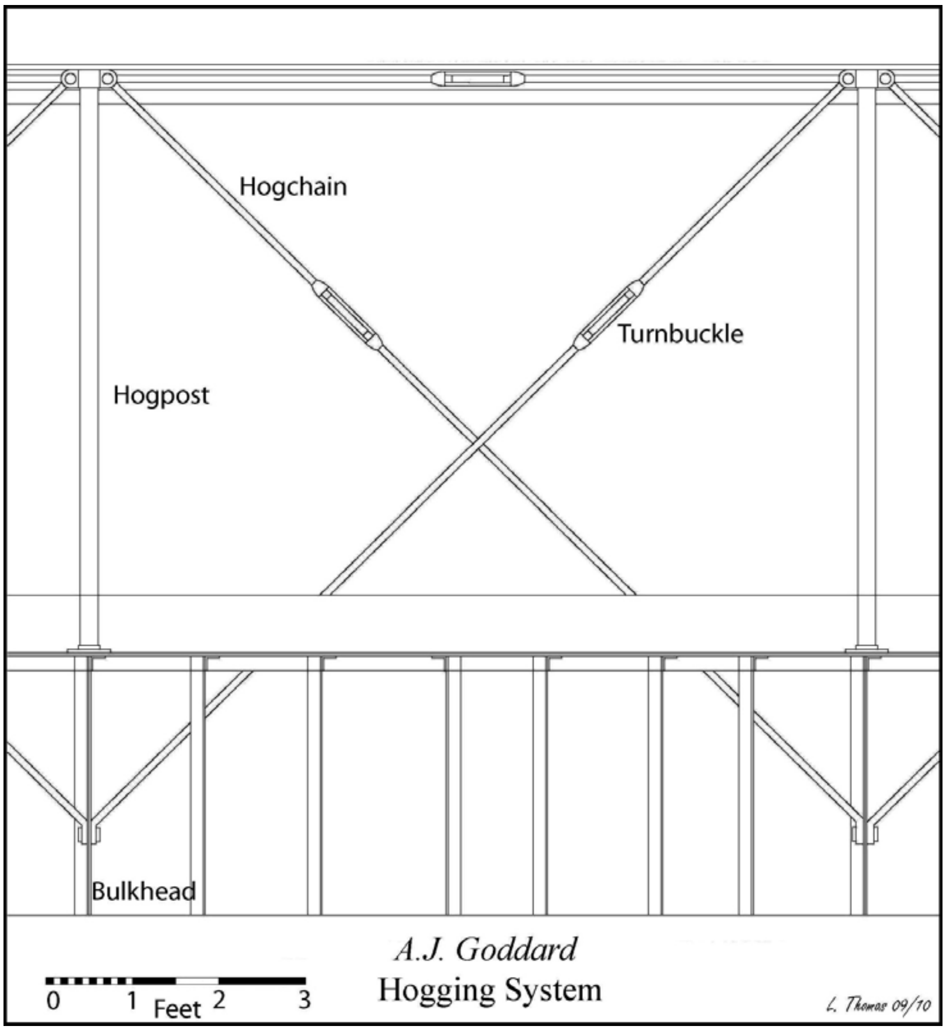

FIGURE 5.2. A hypothetical reconstruction of the hogging system of the *A.J Goddard*.

Turnbuckles

Turnbuckles were metal fixtures with two threaded ends that connected two separate lengths of hog chain. Some turnbuckles had only one treaded end, often the bottom, which allowed only one end of the hogchain to be shortened. Turnbuckles were used to adjust the tension of the hogchains when necessary, such as when the iron steamboats on the western rivers of America were “walked” over sandbars by using the hogchains to alter the shape of the hull (Stewart-Abernathy 2010). More commonly, they could be used to help remove a vessel that had grounded by adjusting the hull. Turnbuckles could be turned using a turnbuckle wrench or a length of iron bar (Figure 5.3). The turnbuckles on the *A.J. Goddard* are approximately 10 in. (25.4 cm) long. Turnbuckles are positioned on each hogchain so that they do not interfere with other turnbuckles where hogchains cross over each other. The shape of the *A.J. Goddard’s* turnbuckles is obscured by concretion, but images from two sources were used to help reconstruct the possible shape (Kane 2004:114; Wilson 1999:23).

Figure 5.3. Turnbuckle Wrench at Yukon Transportation Museum (Courtesy of Yukon Transportation Museum, Wrench, Tools & Equipment for Materials-Metal Working T&E #2009.31.1)

Sternwheel

Though the propeller is a more efficient means of powering a ship, the sternwheel was the superior choice for the early 20th century Yukon River. Not only were they relatively simple and easy to design and build, by their nature they were also easy to repair. The forging, casting, and machine operation that were required for creating the metal components - the bearings, shaft, and cranks - were all commonplace and well practiced methods during the second half of the 19th century. These components were often so sturdy that they could be used for years, being moved from wooden hull to wooden hull in order to save money and time when overhauling a sternwheeler or constructing a new one. They could be repaired while on the river by someone with blacksmithing and carpentry abilities and a portable forge and hand tools. The paddlewheel’s wooden components, such as the buckets and arms, could be cut from trees growing along the river or stored as spares on board in case of emergency (Bates 1994:11).

For a ship that’s greatest advantage is its shallow draft, the paddlewheel is the ideal method of propulsion due to the fact that it is barely submerged, and never descends farther into the water than the draft of the ship. Not only is this ideal for navigating shallow waterways, it protects the center of the paddlewheel from damage that could be inflicted by obstacles in the water (Bates 1994:11). The shallow draft of the sternwheel, and the fact that it is not entirely submerged, makes repair a much easier affair. Not only are drydocks not required (which would be difficult to find in an area as undeveloped as the Yukon), sections requiring repair could be lifted from the water by turning the wheel (Bates 1994:11). In addition, sternwheels are a more efficient method of propulsion than side wheels (Hunter 1993:85). A sternwheel would cause the vessel to draw one-half to two-thirds as much water as a sidewheel for vessels of similar dimensions carrying the same load (Hunter 1993:175).

Though paddlewheels possessed many advantages, the enormous weight of the wheel would be its eventual downfall. A large amount of power is required to turn a paddlewheel, which is subtracted from its overall ability to produce horsepower. In addition, the turning buckets lift large quantities of water, which also caused the vessel to waste power. Their advantages made them a preferred method of propulsion for much after the advent of hogchains in the 1840s, and they were particularly popular in the Yukon. Once propellers were developed and efficiently produced, they quickly replaced paddlewheels (Bates 1994:12-13).

The arms of the *A.J. Goddard*'s sternwheel are 45 in. (114.3 cm) long from the center of the paddlewheel shaft, or 36 in. (91.44 cm) from the outside edge of the flange (Figures 5.4 and 5.5). They are 3-½ in. (8.89 cm) wide and 1-½ in. (3.81 cm) thick. Two bolts affix each arm to the paddlewheel flange. The flange appears to be a typical paddlewheel flange, a thick metal circle with insets for the wooden arms (Kane 2004:124). The diameter of the flange is 18 in. (45.72 cm). The wrought iron circle that reinforces the arms is 34 in. (86.36 cm) from the flange and 1-¾ in. (4.45 cm) wide by 3/8 in. (1 cm) thick.

While steel was once substituted for wood for the buckets, this innovation did not gain popularity due to the difficulty of making repairs. It was far easier to replace a wooden bucket than it was to use a forge to repair steel buckets (Hunter 1993:114). The 10 buckets are 1 in. (2.54 cm) thick and 9-10 in. (22.86-25.4 cm) wide and are attached to each spoke by two stirrups approximately ¾ in. (1.9 cm) wide and ½ in. (1.27 cm) thick. They are positioned approximately 1-¼ in. (3.175 cm) from the edges of the bucket. From photographs, it appears that the arms are attached to the buckets 5 in. (12.7 cm) from the outboard ends of each.

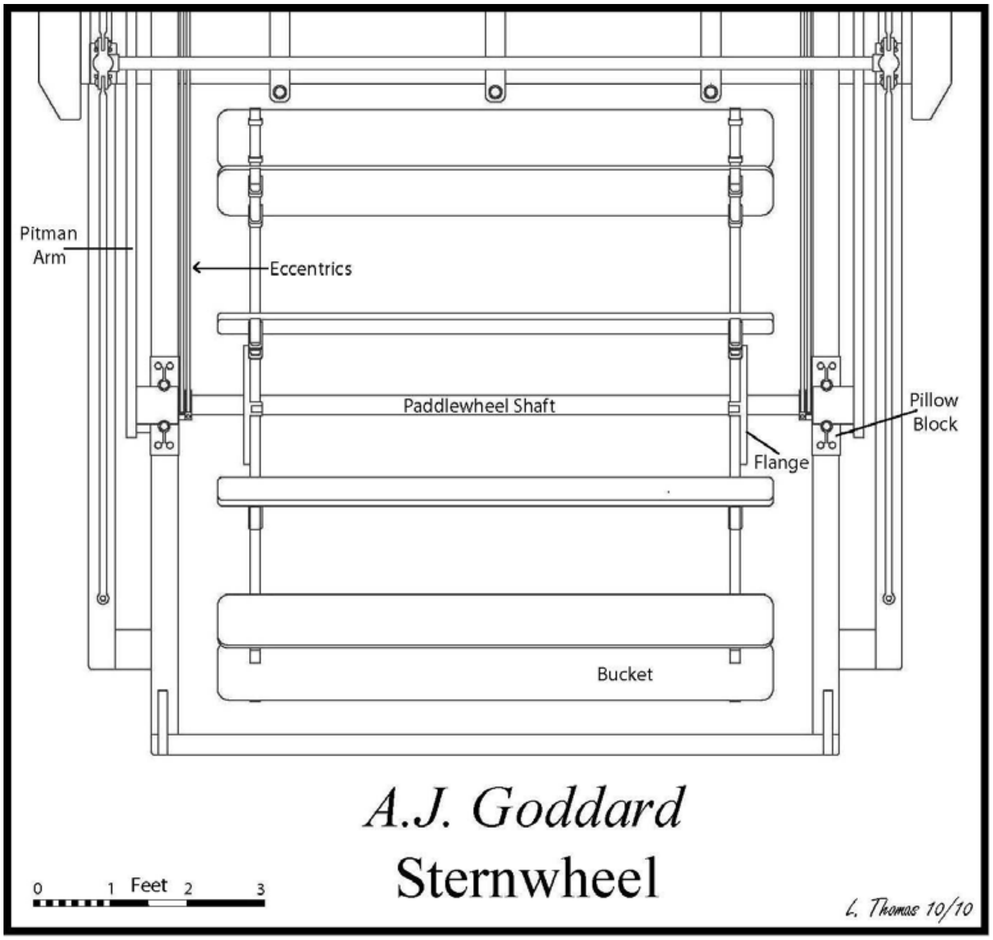

FIGURE 5.4. Sternwheel assembly, plan view.

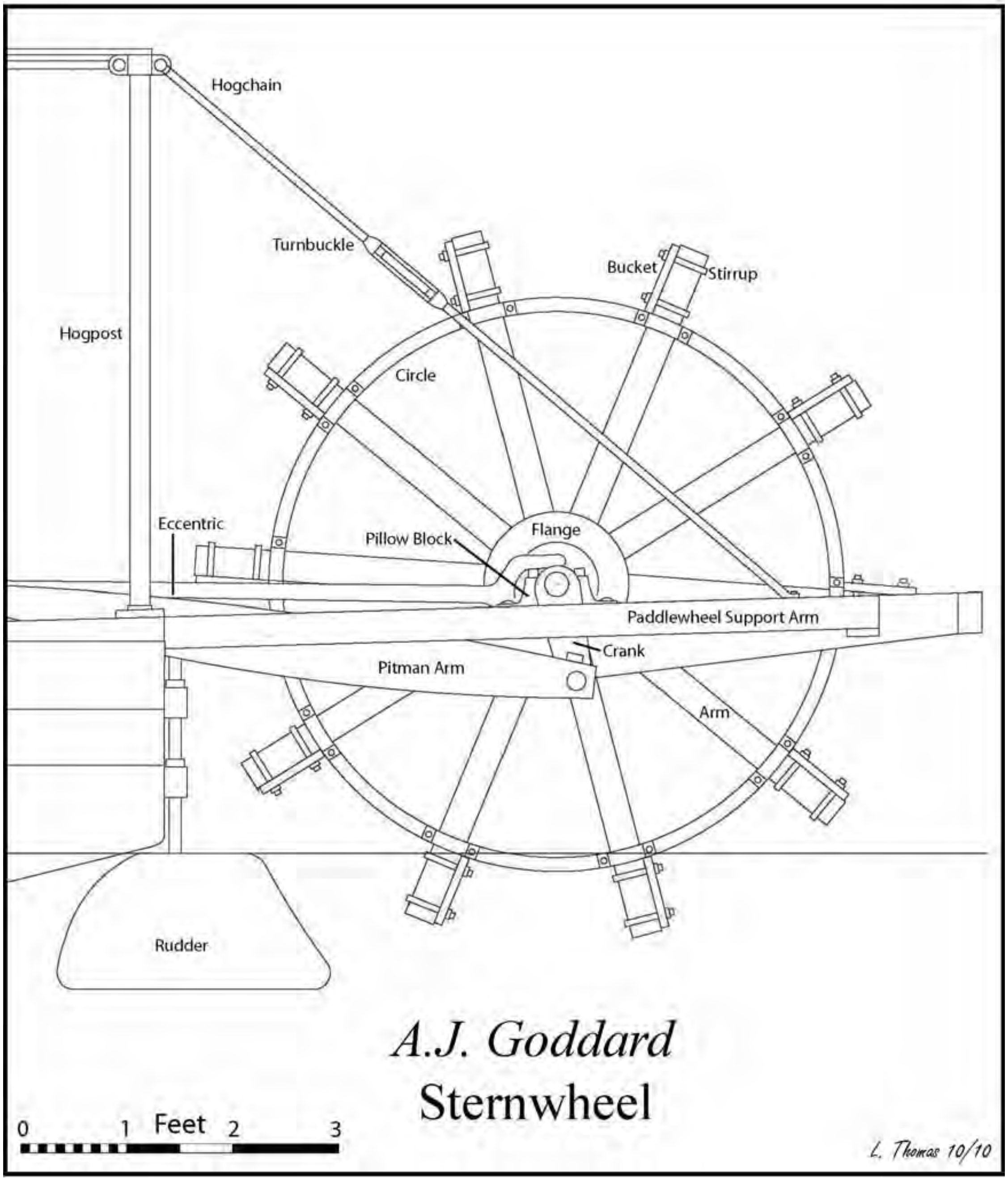

FIGURE 5.5. Sternwheel assembly, profile view.

Crank, Shaft, and Pillowblocks

An iron crank attaches the pitman arm to the paddlewheel shaft and turns the reciprocal motion of the pitman into rotary motion that turns the wheel. The paddlewheel shaft is 3 in. (7.62 cm) in diameter. Based on a photo measurement, the head of the crank where it fits around the paddlewheel shaft is approximately 6 in. in diameter. The crank itself is 17 in. (43.18 cm) long, 4 in. (10.16 cm) of which overlap with the pitman arm. The crank and shaft are suspended on the wheel support beam by a pillow block, a metal fixture that allows a rotating object to attach to a stationary one. The shaft extends through a 3 in. (7.62 cm) hole in the pillow block, the cap of which is bolted to the bottom half with a bolt on either side of the pillow block. There are two additional bolts on either side for holding the pillow block securely on the wheel support beam.

Pitman Arms

Pitman arms translate the reciprocal movement provided by the engine's pistons into circular motion where they join the crank. Pitman arms were often made from wood rather than iron, as is the case with the *A.J. Goddard*. Not only did wood have the advantage of absorbing some of the shock from abrupt halts in motion, it was easier to create such a large pitman arm from wood rather than metal (Hodge 1840:231; Hunter 1993:113). They were often made of pine and had to be carefully monitored for rot or shrinkage. Iron straps could be used to strengthen the wood (Hunter 1993:113). The *A.J. Goddard's* pitman arm is tapered at either end to approximately 4 in. (10.16 cm), while the middle section is 8 in. (20. 32 cm) molded. From photographs, the sided dimensions of the pitman arm are approximately 1-½ in. (3.81 cm). A metal bracket attaches the pitman arm to the piston rod. The connection area is underneath an arched piece of metal that proved some protection to this valuable piece of the vessel. A grease cap reading 'Lunkenheimer' sits atop the pitman arm where it joins to the piston rod.

Cylinder Timbers and Wheel Support

Two cylinder timbers support each engine cylinder. An outboard cylinder timber, sitting flush against the metal toerail at the outboard edge of the deck, supports each engine. They are sided 4-1/3 in. (11 cm) and molded 9 in. (22.86 cm). There is an additional metal or wooden quadrilateral piece fitted to the top of the cylinder timber that supports the engine, possibly a sole plate. It begins just forward of the engine, where it is molded 1 in. (2.54 cm) above the cylinder timber, and rises up to be molded 4 in. (10.16 cm) where it terminates at the transom. It appears that the cylinder timber on the starboard side is slightly smaller than the base of the hogging system, which was installed despite this issue. Although the base of the hogpost extends over the cylinder timber, all of the bolts are in place and the structure is sound. The timbers were likely milled from wood at Bennett Lake, and though it would have been better to fix the problem, this small error appears to have been not worth the effort.

The inboard cylinder timbers extend into the wheel support arm, creating one homogeneous element. From photos, approximately 6 in. (15.24 cm) separates the outboard cylinder timber from the inboard cylinder timber/longitudinal wheel support beam. The wheel support beams are sided 4 in. (10.16 cm) and angle up approximately two degrees at the transom, which helps to structurally support the wheel by providing opposite force to the weight of the wheel. Most, if not all, sternwheelers featured an upward slant to the wheel support timbers. The timber is much wider in the middle, approximately 10 in. (25.4 cm) wide, while it tapers at the aft end to 5 in. (12.7 cm). A spreader bar holds the wheel support timbers apart, with a 2 in. (5.08 cm) space between the back of the wheel and the spreader bar. Iron straps connect the spreader bar to the wheel support arms.

Engines

The high pressure engine was developed in the beginning of the 19th century when its predecessor, the low pressure engine, proved unsuited for rivers with currents. Although it was more dangerous, the high pressure model was smaller, lighter, cheaper, and more powerful. By 1830-1840, efficient high pressure engines for steamboats were in use throughout the country (Sheret 1997:58). The *A.J. Goddard's* engines were built by Pacific Iron Works of Seattle, the company owned by Albert Goddard and his brother. The exact type of engine is currently undetermined, as is the origin of the design. Each engine was set up on either side of the paddlewheel, which would have eliminated the need for a flywheel to make the system run more smoothly, as the paddlewheel would have acted in place of the flywheel (Hunter 1993: 146; Sheret 1997:59).

The engines sit upon four metal feet between that rest on the cylinder timbers, while the cylinder hangs approximately 1 in. (2.54 cm) into the gap (Figures 5.6 and 5.7). As was common with horizontal steam engines, it is positioned at an incline on the slanted quadrilateral platform. The engines are horizontal high pressure engines, each with 2 horse power and a 20 in. (5.7 cm) stroke. The primary cylinder is 24 in. (61 cm) long with an 8 in. diameter and an internal bore of 5-1/2 in. (14 cm). The steam chest for the valves sits on top of the primary cylinder, which is a relatively unusual design. The steam is fed from the boiler into pipes traveling above the hogging system which branch in the middle of the vessel and feed into the steam chests of either engine. The used steam passes from the side of the engine into pipes that join with the condenser, located in the middle of the vessel.

Eccentrics

Western River steam boats of the 19th century typically feature one or more long, wrought iron cams or eccentrics fitted to the paddlewheel shaft on either side of the wheel; shafts or 'reach rods' extended forward of the eccentrics to the steam box on top of each engine cylinder. The eccentrics opened and closed the steam box's slide valves at the appropriate time in the power system's cycle. Having eccentrics and slide valves resulted in responsive vessels ideal for difficult river conditions (Sheret 1997:61). The *A.J. Goddard* had two eccentrics on each side of the wheel, with a grease cap made by Lunkenheimer Steam Co. attached to each eccentric near the shaft (Figures 5.6 and 5.7). The eccentrics connect to the engine slightly inboard of the centerline of the engine and laterally line up with the connection of the pitman arm to the piston.

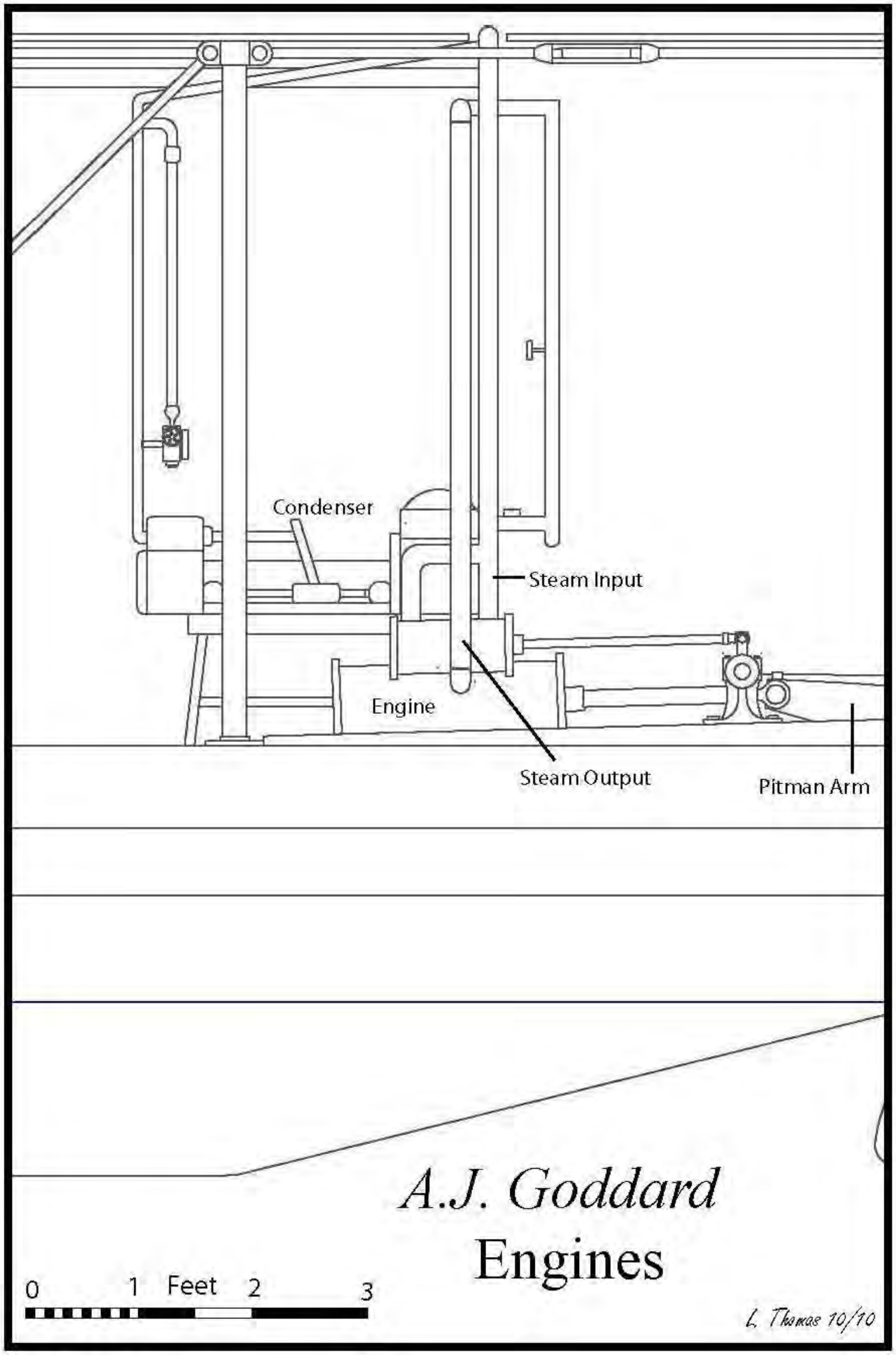

FIGURE 5.6. The *A.J. Goddard's* engines and condenser, profile view.

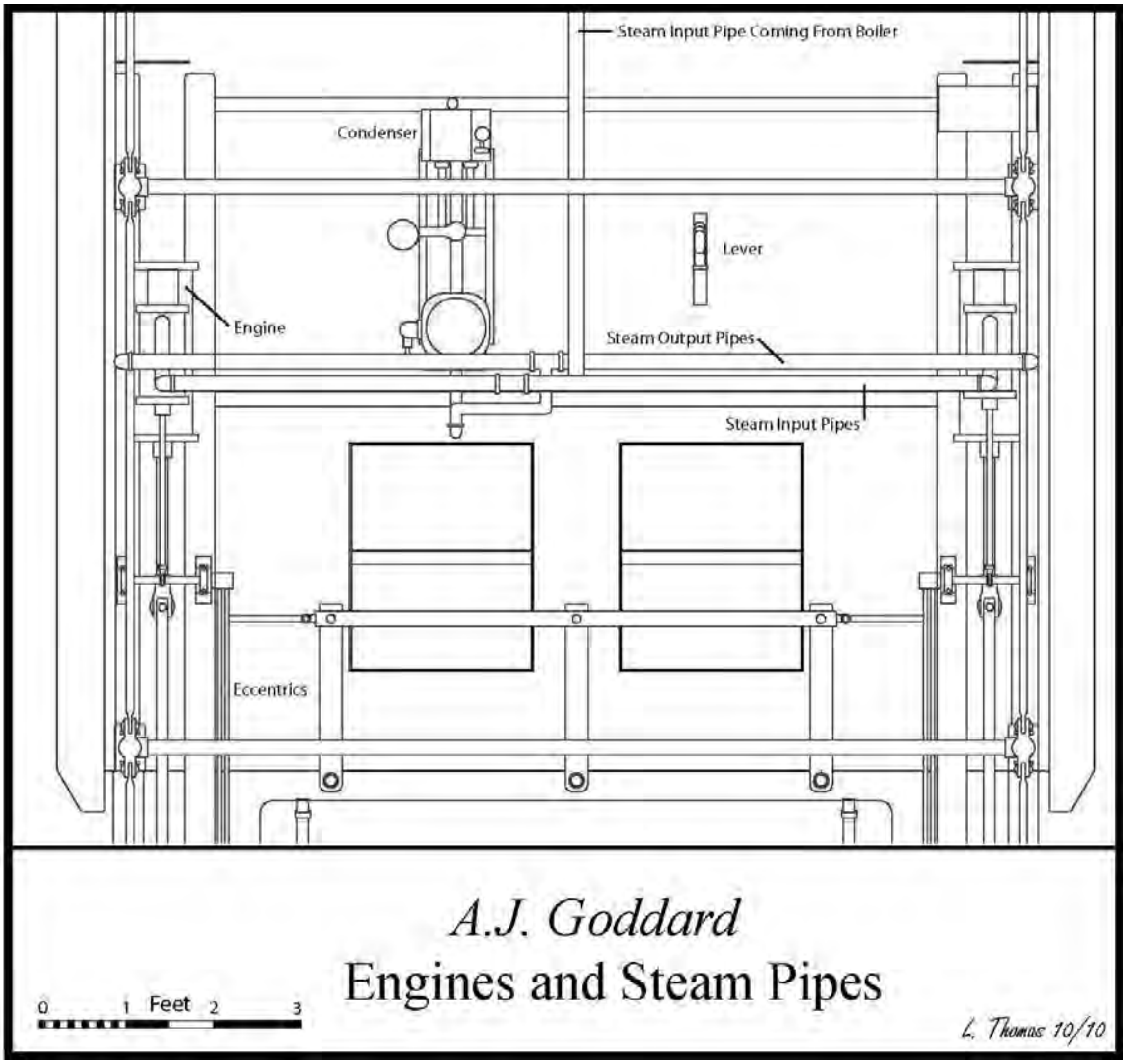

FIGURE 5.7. The *A.J. Goddard's* engines and condenser, plan view.

Condenser and Lever

Spent steam was sent from the engines to the condenser, where it was used to preheat river water before the water was sent to the boiler. During the process of imparting its heat to the water, the steam would often be condensed and sent to the boiler along with the river water. If the steam was not condensed, it could be piped into the boiler chimney to assist with the boiler's draft or sent to the paddlewheel boxes to help retard the formation of ice on the wheel (Kane 2004:122-123). The type of condenser is undetermined at present, as is the manufacturer. The condenser is offset approximately 1 ft. (30.5 cm) from the center of the vessel to port and the lever is located on the starboard side of the condenser. The lever is still thrown slightly forward as if the engineer had no time to disengage it before leaping off of the boat.

Boiler

A nameplate bolted to the front face of the boiler states that it is a Buckley boiler built at the Rochester Machine Tool Works in Rochester, New York (Figure 5.8). The plate reads:

THE BUCKELY
PIPE BOILER
PAT'D MARCH 1895
JULY 1898
ROCHEST MACHINE

This water tube boiler was invented and patented by John Buckley and developed for use on launches and similar small steamers. According to contemporary description, it features easy assembly, the ability to build steam quickly, and a strong, compact design with a low center of gravity (*Cassier's Magazine* 1893:319). The majority of the boiler is composed of straight, horizontal pipes that are similar to each other in size and are protected by steel sheet metal, much of which has been torn away. While the cause of this damage is currently undetermined, the missing sheet metal is not evident on the site, indicating that this damage likely occurred during the working life of the vessel and not during the wrecking event.

FIGURE 5.8. Boiler name plate. (Photo by Larry Bonnett).

All of the screws, threads, and joints that connect the various parts of the boiler are "right-hand," which John Buckley considered integral to its simplified construction in comparison with other boilers. Most pieces of the boiler could be installed or removed without disturbing any other pieces, making assembly and repair easy (United States Patent No. 535,441 1895:1).

The front of the boiler is positioned 18 in. (45.72 cm) from a large hatch that stored the firewood. The fireman could stand in this narrow space and feed wood into the boiler (Figure 5.9). The bow rail that was installed sometime after the *A.J. Goddard* began working the river provided the fireman with a small measure of protection from the spray on Lake Laberge. It should be noted that the date July 1898 on the boiler name plate may indicate that the boiler itself was added after the *A.J. Goddard* had been operating the Yukon for some time (perhaps replacing an older boiler) due to the fact that the vessel made its first trip in beginning of June. Alternately, this may have a been marketing gimmick intended to make the boiler appear very new.

FIGURE 5.9. Boiler and largest set of hatches (Photo by Larry Bonnett).

The firebox doors face forward and measure 12 in. (30.5 cm) by 15-¼ in. (3.34 cm). The port firebox door is swung open and the unburned wood is inside, attesting to Stockfeld's account of the crew frantically manning the boiler until the very last moment. Stockfeld, the engineer turned fireman, worked until the last minute possible to stoke the flames so that the *A.J. Goddard* could maintain its course towards shore and keep its bow pointed into the waves, their only hope for survival. Had the firebox doors faced aft, which would have protected the doors from excess spray as well as made it easier for the engineer to reach the doors, *A.J. Goddard* may have survived the storm that sank it.

John Buckley states that it was designed as a coal boiler, though other types of fuel could be used as well (United States Patent No. 535,441 1895:1). The Upper Yukon Company's choice of this boiler is unusual considering that they would have known wood was the primary fuel in the Yukon. While a firebox designed for coal is not ideal for burning wood as it is smaller and shallower with smaller grate openings, wood could still be burned (Hunter 1993:269). It is possible that the grate within the firebox was replaced with one more suited to efficiently burning wood, though this could not be confirmed during the field season. Though the boiler's firebox was intended for coal, the compact and easy-to-repair features in Buckley's design, along with its low center of gravity, made the boiler seem ideal to *A.J. Goddard's* builders for use on the fast and violent rapids of the Yukon River.

Steam Gauges

Two steam gauges have been located on the wreck. The boiler gauge is affixed to the forward face of the boiler, connected to the pipe that carried steam to the pistons. This gauge kept the fireman informed about the pressure within the boiler. The partially obscured letters _ _ _ CHELL, L_ _ _ _ & S_ _ _ _ _ _ _ _ appear on the gauge face. Old advertisements reveal that the boiler gauge for the *A.J. Goddard* was made by Mitchell, Lewis & Staver Co. in Seattle, Washington. The company specialized in supplying men and women headed for the gold fields of the Yukon. They manufactured both boilers and engines, automatic hoists and conveyors, and Klondike saw mills. In addition, they supplied wire rope, oar [sic] cars and buckets, ore crushers, drill steel, and shafting (Mitchell, Lewis & Staver Co. 1900).

Another steam gauge (JiUT-5:64), associated with the engines, was recovered from the stern of the vessel where it had broken free of its original attachment. Made of brass, iron, and glass, the space behind the glass is filled with an oil/hydraulic fluid and water mixture. The face of the gauge reads "Puget Sound Machinery [D]epot Seattle, Wash. American Steam G[auge] Boston 1-200 lbs." The Puget Sound Machinery Depot was established in Seattle in 1887, and by 1900 was the largest business of its type on the west coast. They manufactured all manner of steam machinery, from boilers and engines to pipes and valves (Puget Sound Machinery Depot 1900).

Steam Whistle

The steam whistle (JiUT-5:34), which fell into the sediment sometime during or after the wrecking event, was originally attached to the forward side of the boiler, from which it received the steam required to produce its characteristic shriek. Two pipes lead up from the boiler, one to the whistle and one to the safety valve. The pilot could have reached out of the pilothouse behind him to adjust the safety valve or to use the whistle to signal other vessels.

The steam whistle and the safety valve were made by the Crosby Steam Gage and Valve Co. of Boston, Massachusetts (Figures 5.10 and 5.11). Both elements have the name of the company stamped into the brass in very small letters that wrap around the curved surface of the whistle and valve. The steam whistle features elaborate castings and several separate parts. At this phase of conservation, it is not possible to search all of its components for marks. One mark was found, however, stamped on the bowl. Less than a ¼ in. in height, it reads CROSBY STEAM GAGE & VALVE CO BOSTON US PATENT JAN 30 1877. On the angled surface at the bottom of the whistle, where it inserts into the iron steam pipe, are the stamped numbers "4344". The safety valve exhibits another stamp on the main curved surface of the whistle cylinder that reads CROSBY STEAM GAGE & VALVE CO BOSTON USA PATENT JAN 25 1878 and MARCH 20_ _. The final markings after 20 are impossible to read due to damage or an incomplete stamp impression.

FIGURE 5.10. Steam whistle. (Yukon Government).

FIGURE 5.11. Safety valve. (Yukon Government).

By the time the Upper Yukon Company purchased the steam whistle, the Crosby Steam Gage and Valve Co. had been in business for more than 25 years, selling their wares through catalogs. Though they made several different types of whistles, the *A.J. Goddard* features what is likely the 4-in. (10.16 cm) Original Single Bell Chime Whistle with a side valve. The *A.J. Goddard's* whistle has minor structural damage and was recovered attached to a segment of steam pipe assembly, making its type impossible to confirm, currently. After conservation treatment, the whistle will be available for detailed examination which should allow identification. The company's 1897 catalog states that their 4 in. (10.16 cm) Original Single Bell Chime Whistles (No. 3 in the catalog) produce the first, third, and fifth tones on the musical scale, and are less discordant than other whistles, making them ideal for passenger travel. In addition, they could be heard from a greater distance than most whistles. While they were used extensively on locomotives, the catalog also states that similar larger whistles are specially adapted for use on transatlantic steamships. If the whistle were purchased from the 1897 catalog, it would have cost $18.00 (Crosby Steam Gage & Valve Co. Catalog 1897:85-86).

Windlass

Windlasses were a vital piece of equipment for Yukon River steamboats, as they were used to help warp the vessels up Five Finger Rapids and assisted with towing barges. Prior to the construction of the windlass assistance system at the rapids, it was almost impossible for steamboats to make the return journey to Whitehorse due to the powerful force of the current. The *A.J. Goddard's* windlass was a later addition to the vessel, as it is missing from the first known photo of the ship taken at Lake Bennett in 1898. The name plate on the windlass indicates that it was made by the Northwestern Iron Works Builders in Seattle, WA (Figure 5.12).

FIGURE 5.12. Windlass plaque indicating builder (Photo by Neil McDaniel).

The *A.J. Goddard* used a steam powered windlass that was located in the bow of the vessel (Figure 5.13). The two small engines that powered the windlass received steam from the boiler, which fed the steam through a 1 in. (2.54 cm) pipe that extended below the deck on the port side. The pipe reappears at deck level on the port side approximately 6 in. (15.24 cm) forward of the first set of hatches. It travels diagonally across the deck until it reaches a point approximately 1-½ ft. (45.72 cm) from the after end of the chain locker hatches. The pipe joins a larger pipe 1-½ in. (3.81 cm) in diameter at this point and eventually splits off into two pipes that feed into each engine.

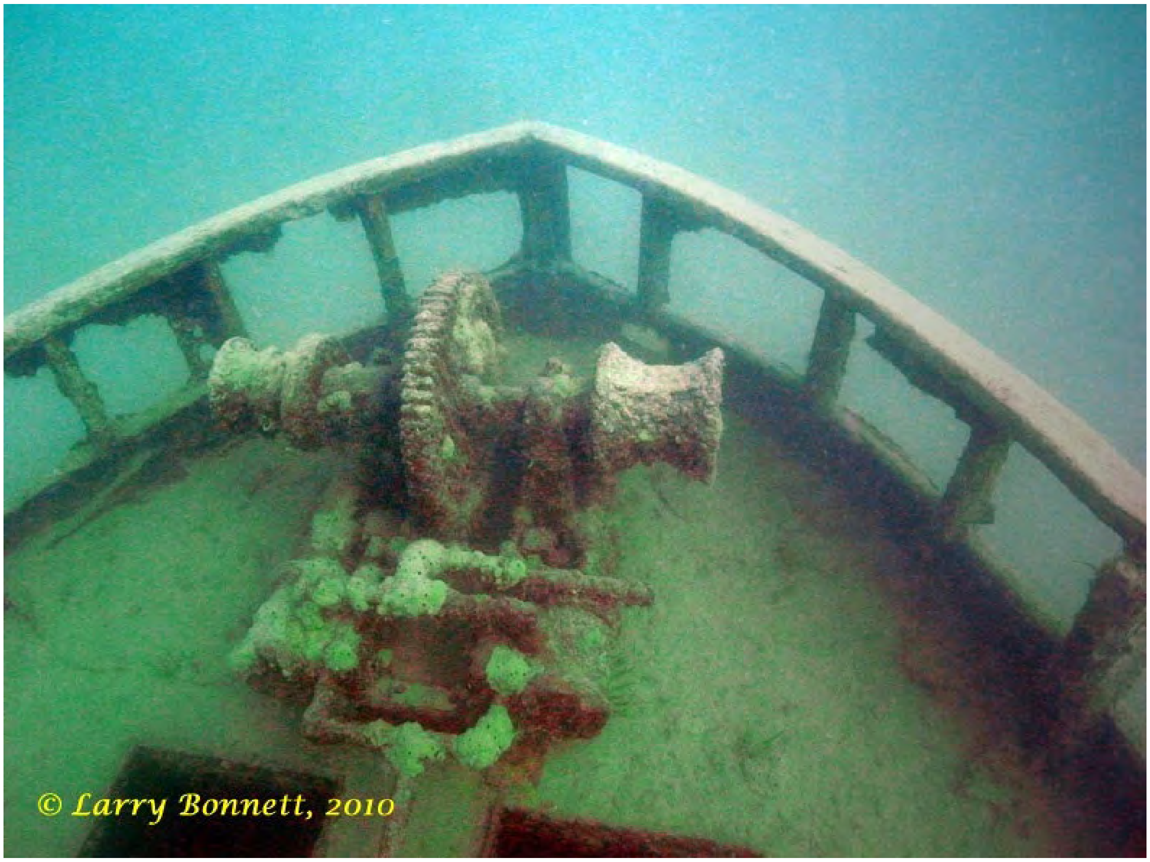

FIGURE 5.13. Windlass (Photo by Larry Bonnett).

The windlass spur gear has a 20 in. (50.8 cm) diameter. The windlass drums are 10-½ in. (26.67 cm) in diameter and 9 in. (22.86 cm) long, with a cable still wrapped around the port windlass drum. The small engine has cylinders that are 8-½ in. (21.59 cm) long and approximately 4-½ in. (11.43 cm) in diameter. They are separated by a space of approximately 8-¼ in. (21 cm). The entire system sits on a metal frame that is bolted to the deck.

Features of the Vessel: Hull Construction

Bulkheads

Bulkheads were used to improve the strength of the hull and to supplement the strength of multiple keelsons (Hunter 1993:97). Solid watertight bulkheads also provided some protection against sinking in the event that the hull was punctured. A variety of bulkhead types have been identified on Yukon River steamboats. Wooden vessels featured both solid transverse and longitudinal bulkheads as well as truss built bulkheads. Metal vessels such as the *A.J. Goddard* utilized the same types of bulkheads.

The *A.J. Goddard* features five solid transverse bulkheads and truss built longitudinal bulkheads.

The solid, transverse bulkheads are made of steel or iron that is ¼ in. (.64 cm) thick (if they are made of the same sheet metal used for the deck). Rivet lines in the deck directly over the bulkhead suggest that the bulkhead is riveted to a 2 in. (5.08 cm) angle iron deck beam. This would help secure the bulkhead more thoroughly to the deck (Figure 5.14) [bulkheads are indicated by "B"]).

The locations of the *A.J. Goddard's* solid transverse bulkheads were identified by using a yard stick to probe inside of the hull parallel with the deck until each bulkhead was reached. The hatches were labeled first, second, and third based upon their relationship to the bow of the vessel; the locations of the bulkheads were then recorded on the construction plan using the distance they were offset from the hatches. The forwardmost bulkhead is located 17 in. (43.18 cm) aft of the after edge of the chain locker hatches. The second bulkhead is located 36 in. (91.44 cm) aft of the first set of true hatches. The third bulkhead is 14-½ in. (36.83 cm) aft of the after edge of the second set of hatches. It is believed that the angle iron faces aft, as this maintains the approximate deck beam spacing pattern. The fourth bulkhead is 28-1/3 in. (72 cm) aft of the third hatch. It is proposed that the supporting angle iron faces forward, as this maintains the approximate deck beam spacing pattern (see below for details). We know that the fifth and final bulkhead is located more than 45 in. (114.3 cm) aft of the opening of the fourth hatch, but our inability to measure beyond the distance made it impossible to determine its precise location. The other bulkheads are approximately 108 in. (274.32 cm) apart and located directly underneath hogposts; if this pattern applies to the aftmost bulkhead as well, its position is 60 in. (152.4 cm) aft of the fourth hatch.

Various types of trusses were used to strengthen the hulls of the lightly built river steamers, including tie-rods, cross-bracing, and trusses (Hunter 1993:97). The longitudinal bulkheads were not solid bulkheads, but rather diagonally-braced trusses. The *A.J. Goddard's* trusses are formed from 2 in. (5.08 cm) angle iron that cross to form an X and joined each end to a T bar stanchion (Figure 5.15). The T bar is 2 in. (5.08 cm) wide at the top of the T and 1 in. (2.54 cm) long at the bottom. In one case, the T bar stanchion supporting the large longitudinal carling running beneath the large forward hatch is slightly different, being 4 in. (10.16 cm) at the top of the T and 1 in. (2.54 cm) at the base.

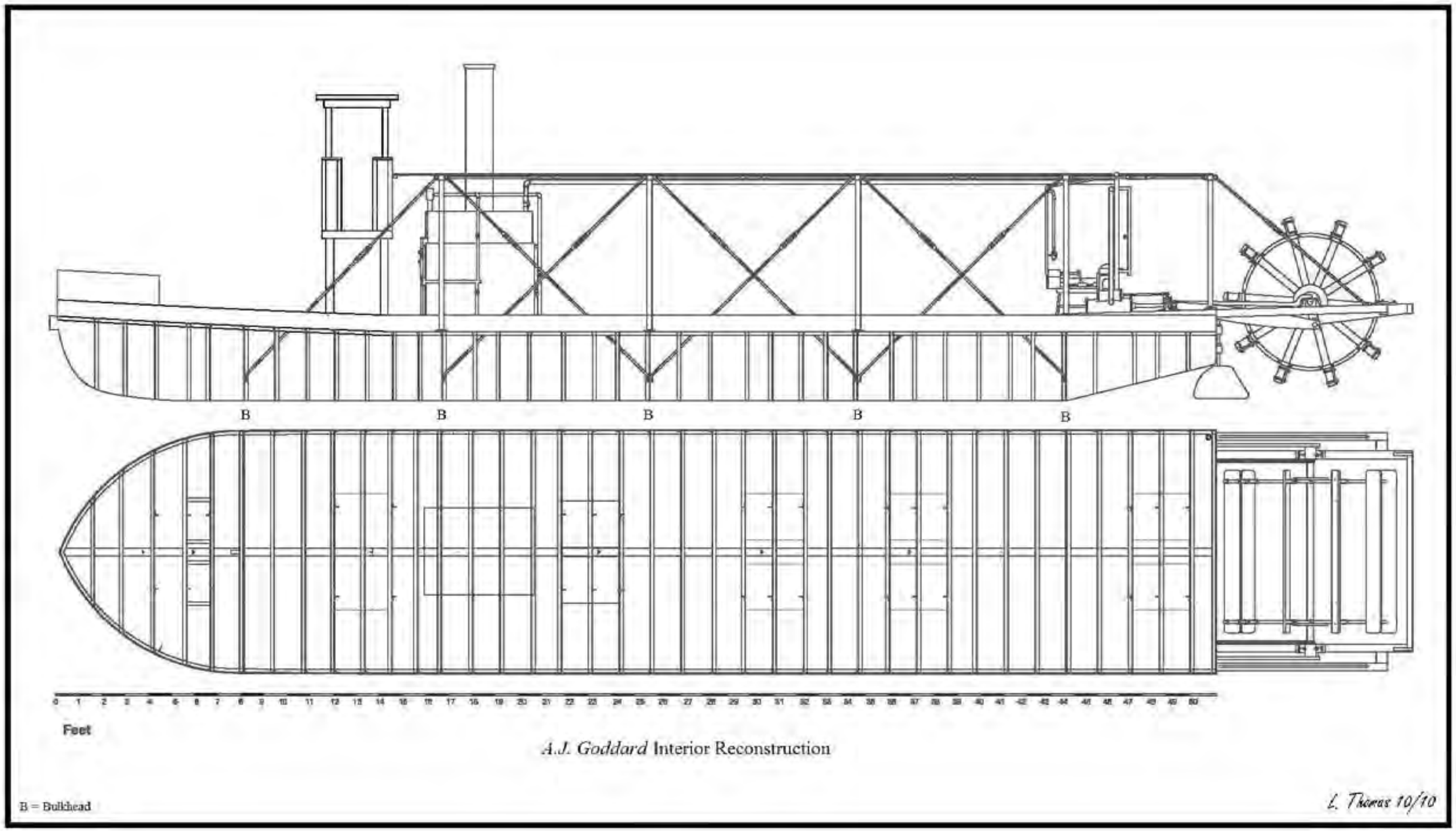

FIGURE 5.14 Plan of the *A.J. Goddard's* interior.

FIGURE 5.15. Diagonal trusses inside the hold (Photo by Geoff Bell).

Deck Beams

The 39 deck beams, like many other structural features of the hull, are made of 2 in. (5.08 cm) angle iron that face either forward or aft. The beams that support the forward edge of a hatch face forward, while the deck beams that support the after edge of the hatch face aft. This allows the hatch coaming, which appears to be made of 2 in. (5.08 cm) angle iron, to be riveted to the underlying deck beam and form a more complete coaming around the hatch. The deck beams that run through the middle of the hatches face forward or aft with no discernable pattern.

Average beam spacing was determined by measuring the deck beams that were visible. The visible deck beams are the ones that support the hatches, which allow access to the beams. The majority of the beams, those supporting the hatches aft of the boiler, are 14 in. (35.56 cm) apart. This spacing likely has to do with the size of the hatches – 30 in. (76.2 cm) longitudinally – and the deck beam position at each edge and directly through the middle of each hatch. This allows for 14 in. (35.56 cm) spacing exactly. The two pairs of hatches in the bow – the large hatches forward of the boiler, and the chain locker hatches – are supported by beams that are spaced differently. The chain locker hatch deck beams are separated by 12 in. (30.48 cm), which is the longitudinal length of the hatch opening. The hatch in front of the boiler has deck beams spaced both 13-¾ in. (34.925 cm) and 12 in. (30.48 cm).

Less direct methods were used for determining the location of deck beams that could not be seen but were associated with another fixture that could be measured. For example, the location of a bulkhead indicates that a beam is likely present at the top of the bulkhead. In another case, one frame was located through a hole in the hull, indicating that a deck beam is attached to it where the frame terminates directly underneath the deck. The BV-5000 was used in the bow to determine the spacing of the 6 deck beams forward the first bulkhead. Photos of the interior of the ship, as well as contemporary examples such as the steamer *Tyrrell*, indicate that a deck beam would be joined to the top of the frame.

The deck beam attached to the only known frame location is located 12 in. (30.48 cm) aft of the third pair of hatches. A bulkhead is then located 13-½ in. (34.29 cm) aft of that deck beam, with the next hatch coaming 12-½ in. (31.75) aft of this. Essentially, there are enough known and suggested locations of deck beams to indicate that the spacing may not be exact, but rather vary between approximately 12 in. (30.48 cm) and 14 in. (35.56 cm). There are occasional instances where the spacing may be as little as 10 in. (25.4 cm) or as much as 15 in. (38.1 cm), though this happens rarely. For example, a bulkhead is located 15 in. (38.1 cm) aft of the chain locker hatches' after deck beam, indicating that its associate deck beam is either 13 in. (33.02 cm) or 15 in. (38.1 cm) aft of the chain locker frame depending upon the direction that the angle iron is facing.

As the deck beams are connected to the frames, stanchions, and bulkheads, the variation in deck beam spacing would also mean a variation in the spacing of some of those elements as well. Slight, and sometimes not so slight, variation in the spacing of frames or other construction elements is to be expected on ships. The variation in deck beam spacing would not be surprising if the *A.J. Goddard* were a wooden vessel built under trying circumstances. However, the fact that the *A.J. Goddard* was a prefabricated metal ship likely constructed from plans and sent to the wilderness in sements with directions for re-assembly raises the question of how much modification to the design was possible. How much of this spacing variation is due to the shipwright's ability to make slight modifications to the design in order to save time or cut corners? Many, or all, of the holes for rivets would have been drilled before the pieces were shipped north - how many of the holes that determined the placement of the beams were drilled before, or in the wilderness, making assembly much less precise?

Stanchions

Stanchions are also made of two-inch angle iron and are riveted to the deck beams and presumably to stringers underneath. They help to support the hatches and run in two parallel lines down either side of the vessel, approximately 40 in. (101.6 cm) from the sides of the vessel. Because they are riveted to the deck beams, the spacing between the stanchions varies with the spacing of the deck beams. There is a larger molded metal stanchion attached to the center of the forward edge of the first bulkhead that is molded approximately 6 in. (15.24 cm) and sided 2 in. (5.08 cm).

Frames

Metal and composite ships of the 19th century featured iron frames, often made of angle iron, as were the floors (Grantham 1858:24). The *A.J. Goddard's* frames were made of 2 in. (5.08 cm) angle iron, similar to the deck beams, stanchions, and other construction features. Due to poor visibility, locating frames within the hull was limited to finding holes in the hull and manually searching for framing. One frame was located this way, and was found to be 16 in. (40.64 cm) forward of the third hogpost. The frame faced forward, though the pattern could vary as the deck beams join to the frames at the clamps and thus determine their direction. Following the deck beam pattern, it is very likely that an angle iron deck beam was just aft of this frame and is facing aft. Photographs taken later in the summer when visibility had improved confirm that a frame is associated with each deck beam.

Clamps

Photographs indicate 2 in. (5.08 cm) angle iron acts as clamps where the deck beams and frames join at the hull beneath the deck (Figure 5.16). The top of the deck beam connects to the bottom side of the clamp lip. It is proposed that the frame is riveted to the inboard face of the clamp.

FIGURE 5.16. 2 in. (5.08 cm) angle iron clamp underneath deck (Photo by Larry Bonnett).

Hatches

Due to the shallow nature of the hull and the many bulkheads, five pairs of hatches and a set of smaller chain locker hatches provide access to the hold (Figure 5.17). The majority of the hatches are identical, though the chain locker hatches and the forwardmost pair of hatches (forward of the boiler) are different from the remaining four, which are all aft of the boiler.

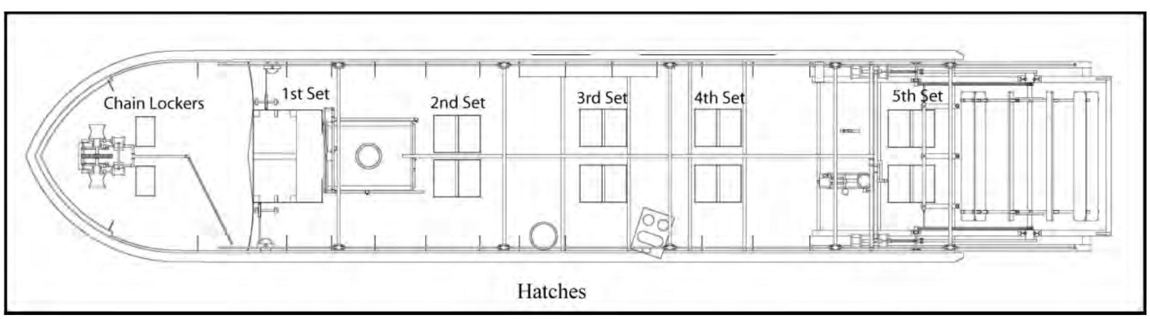

FIGURE 5.17. Hatch locations.

Chain Locker

The chain locker is located slightly aft of the windlass; access is provided by two small rectangular hatches that measure 13 in. (33.02 cm) longitudinally and 19 in. (48.26 cm) transversely (Figure 5.18). The hatches are separated by 13 in. (33.02 cm) of deck and have iron coaming that is sided ¼ in. (0.64 cm) and molded 2 in. (5.08 cm). While it is impossible to confirm at this point, it is likely that the hatch coaming is made of the ubiquitous 2 in. (5.08 cm) angle iron, with one lip of the angle iron tucked beneath the deck and on top of the supporting deck beam.

FIGURE 5.18. Chain lockers aft of windlass (Photo by Larry Bonnett).

Forward-Most Set of Hatches

The forward most set of main hatches is located directly in front of the boiler. They are square in shape with 28 in. (71.12 cm) sides and are separated by a 4 in. (10.16 cm) wide longitudinal metal T-beam king plank that runs down the length of the vessel and makes up the top of an interior truss and provides support to the deck. The hatch coaming is sided ¼ in. (0.64 cm) and molded 4-3/4 in. (12.07 cm). It extends 17 in. (43.18 cm) aft of the after edge of the hatch, enclosing a section of deck at the after end of the hatch. Overall, the coaming measures 45 in. (114.3 cm) longitudinally and 60 in (152.4 cm) transversely. At the forward edge of the hatch the coaming does not extend straight athwart the ship, but rather is curved at either edge of the hull to join the toerail at a point 4 in. (10.16 cm) forward of the front edge of the hatch. Its purpose may be to prevent water that splashed over the bow from flowing into the hatches and down the rest of the deck.

Main Hatches

There are four pairs of hatches aft of the boiler that are all essentially identical in design. They measure 30 in. (76.2 cm) longitudinally and 24 in. (60.96 cm) transversely. Each hatch is surrounded by coaming that is molded 2 in. (5.08 cm) and sided ¼ in. (0.64 cm). As with the chain locker hatches, it is likely that 2 in. (5.08 cm) angle is iron riveted to the deck beams to support the edges of the hatches. The spacing between each hatch within the pairs varies; the first pair of hatches are separated by 5 in. (12.7 cm) of deck, while the after pairs of hatches are separated by 12 in. (30.48 cm) of deck. There is no pattern to the longitudinal spacing of the pairs of hatches. The second pair is 65 in. (165.1 cm) aft of the first pair of hatches (which are forward of the boiler), the third pair of hatches is 45 in. (114.3 cm) aft of the second pair, and the fourth pair approximately 96 in. (243.84 cm) aft of the third pair. Each pair of hatches provides access to sections of the hold that are enclosed by the bulkheads.

Deck Plates

The deck of the *A.J. Goddard* is made of small steel plates that are fastened together with rivets that have approximately ¾ in. (1.9 cm) heads. The deck plate sizes were obtained by measuring from the centers of the rivet lines that connected the plates, and these are the measurements presented in this reconstruction. As the deck plates likely overlap where they are riveted together, 1 to 2 in. (2.54-5.08 cm) can be added to the sizes of the plates. From bow to stern, seven rows of deck plates of various sizes are riveted together; the rows match up with the sides of the chain locker hatches so that the hatches fit neatly into the pattern rather than cutting into any of the plates. The outboard rows of deck plates measure 11 in. (27.94 cm) athwartships, while the rows inboard of this measure 23 in. (58.42 cm) athwartships. The next rows inboard measure 21 in. (53.34 cm) athwartships, with a single row of deck plates measuring 11 in. (27.94 cm) athwartships running directly down the middle of the hull.

While time limitations prohibited measuring the longitudinal dimensions of all of the deck plates, three were measured. The deck plates just aft of the chain locker measure 15 in. (38.1 cm) longitudinally. The deck plates just aft of the second set of hatches measure 18-1/2 in. (46.99 cm) longitudinally. A plate that was not located next to a hatch was measured and was found to be 27-1/2 in. (69.85 cm) longitudinally. The plates not located next to hatches probably measure around 27-1/2 in. (69.85 cm) as well.

Just aft of the chain locker hatches, the deck plates are riveted directly over the deck beam that supports the after edge of the hatch. It is likely that the other deck plate seams are on top of the deck beams and riveted through them for extra stability and support. Longitudinal rivet lines correspond with the locations of the carlings supporting the outboard sides of the chain locker hatches. It is possible that the other longitudinal lines of rivets for deck plates are on top of other carlings, though it was not possible to determine if there are carlings under those rivet lines.

Fasteners

A blacksmithing station was set up at Lake Bennett in order to assemble the *A.J. Goddard*. Rivets with ¾ in. heads were used to fasten the deck plates together. Though time constraints limited the number of measurements that could be taken to determine rivet spacing, it was found that at least one set of deck plate rivets were spaced 3-½ in. (8.89 cm) center to center. The size of some of the deck plates does not allow all rivets to fit uniformly into this 3-½ in. (8.89 cm) spacing scheme, however. While the 21 in. (53.34 cm) wide deck plate does allow the rivets to perfectly fit into this scheme, the 23 in. (58.42 cm) and 11 in. (27.94 cm) deck plates do not.

Riveting patterns for the hull can be seen in an image from 1898 with Clara Goddard standing near the pilothouse (Figure 5.19). It appears that both single and staggered double lines of rivets are used for the hull plates, though corrosion has obscured these rivets at the wreck site. Staggered double lines of rivets are used to join the hull plates along the horizontal axis and in some places along the vertical axis, while frame stations are indicated by single lines of rivets. A wale is attached with a single line of rivets.

FIGURE 5.19. Rivet pattern on hull (Candy Waugaman Collection, Klondike Gold Rush National Historic Park, National Parks Service, U.S. Department of the Interior).

Tack Strips

Wooden tack strips for securing cargo and other items are attached to the deck slightly forward and aft of each main hatch abaft the boiler. Likely made of local fir and stretching fully athwart the vessel, the strips are mounted 1 in. (2.54 cm) above the deck to allow water to flow through or lashes to be tied around. They are molded 1 in. (2.54 cm) and sided 2 in. (5.08 cm). There is an additional tack strip not located near a hatch, but positioned slightly aft of the forward edge of the cylinder timbers and terminating at the inboard cylinder timbers. It is likely that the ends of the other tack strips are affixed to the small toerail on either side of the vessel. The four strips positioned around the midships area of the vessel are spaced 33 to 39 in. (83.82 to 99.06 cm) apart. Their placement does not follow a regular pattern, though the logic behind their placement is undetermined.

The tack strips would have been useful for holding objects in place on the deck by means of lashing them to the tack strips. They could have easily been removed and replaced, and thus wearing out the tack strips was probably not a concern of the crew. The field season did not allow time to search the strips for use wear, and thus determine the approximate age of the strips.

Toerail

An inverted L shaped metal toerail surrounds the outboard edge of the deck of the vessel, separating the deck from the guard rail. It is molded 8-½ in. (21.59 cm) above the deck and the top is bent 1-1/2 in. (3.81 cm) inboard towards the interior of the hull at a 90 degree angle. The toerail is made of ¼ in. (0.64 cm) thick iron. There are two hawse holes on each side of the vessel that penetrate the toerail at the bow and stern.

Hawse Holes

Oval hawse holes are cut into the 8-½ in. (21.59 cm) molded toerail at the bow and the stern of the vessel. One pair is located just aft of the bow rail that rises above the toerail, and the other pair approximately 9 ft. (2.74 m) forward of the stern. They appear to be reinforced by a surrounding metal plate and sit flush on the guards. The hawse holes are 4-¼ in. (10.8 cm) tall and 7-¾ in. (19.69 cm) long.

Wooden Guards

Originally developed to extend beyond the top of the hull to protect and brace the wheels on sidewheelers, guards proved to be so useful in adding deck space and walkways that they continued being used on some sternwheelers, even though they no longer served any primary structural purpose (Hunter 1993:91-92). The *A.J. Goddard* has small wooden guards that serve to protect the hull from rubbing against other vessels, which was common when vessels were rafted off to each other in Dawson City where there were far too many vessels to line up neatly on the shore of the town. For those times when the *A.J. Goddard's* deck was so full of cargo as to make movement impossible, the guards are wide enough to be walked upon if one were holding onto the hogchains. While dangerous, this would have been a feasible way to go from bow to stern on the vessel. They appear to be a later addition to the hull, as photos of the *A.J. Goddard* at Lake Bennett show the vessel loaded in the water and guardless (Figure 3.13). The guards are molded 7 in. (17.78 cm) and sided 6 in. (15.24 cm). They extend 5-1/2 in. (13.97 cm) beyond the transom and are tapered in plan view. Though most of the guards are still in place, the forward edge of the port guard has come unfastened from the stem and a section of guard timber at the port side midships has become unfastened on the forward end.

Guard Shelves

The starboard guard features two boards that are sided ¼ in. (0.64 cm) and molded 3 in. (7.62 cm). They sit vertically (edge-up) upon the guard and are bolted to the toerail with 3/8 in. (0.95 cm) bolts with 1-¾ in. (4.45 cm) heads. The vertical boards sit 2-¾ in. (7 cm) away from the toerail and are located at the after end of the vessel, one between the B and C hogposts and the other between the C and D hogposts. The forward shelf is 36 in. (91.44 cm) long, and the after shelf is 84 in. (213.36 cm) long. Their purpose has not yet been determined (Figure 5.20).

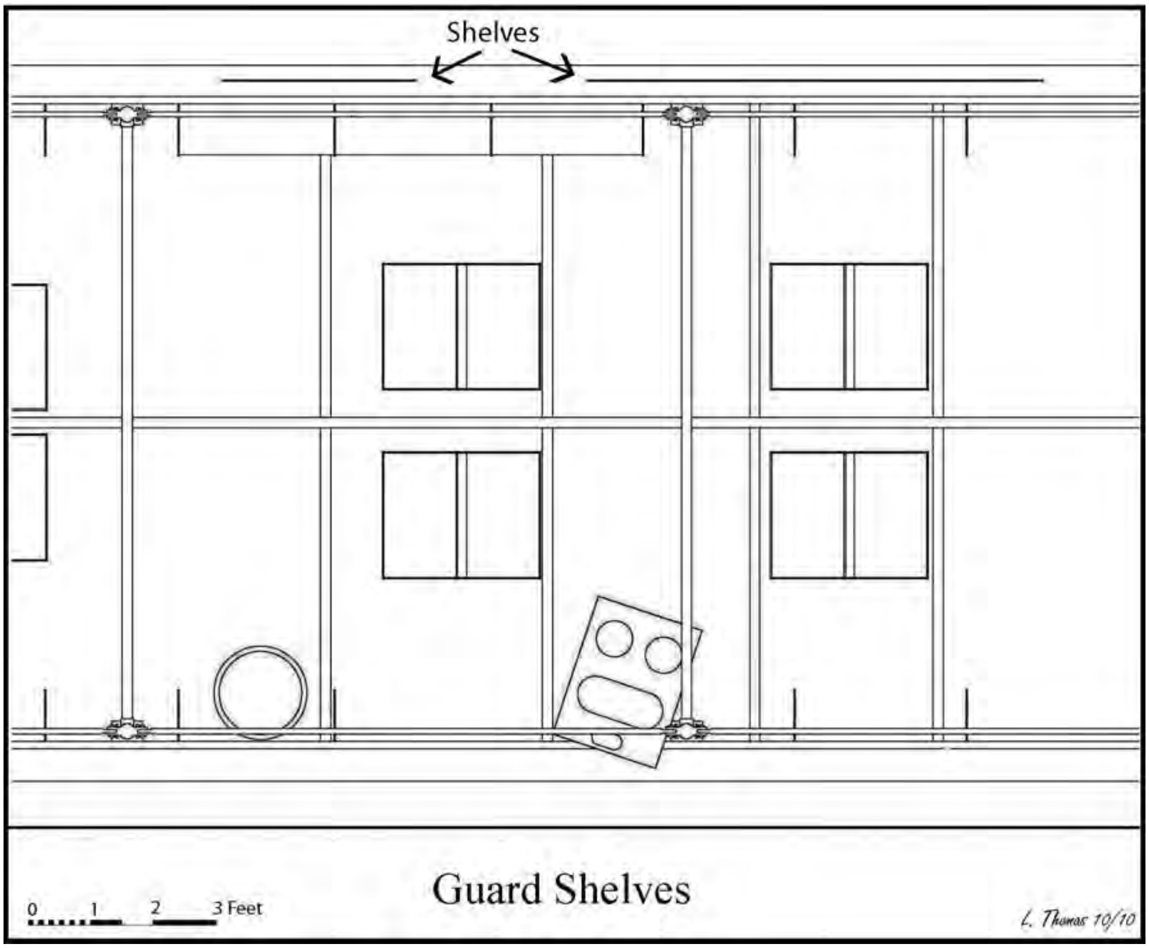

FIGURE 5.20. Vertical guard shelves.

Steering System

When the *A.J. Goddard* sank in 1901, it was steered from a pilothouse that was supported on 4 posts approximately 3 ft. (91.44 cm) above the deck (Figure 3.1). It was replaced sometime during its career with a wider, higher, and fully enclosed pilothouse with glass windows (Figure on page 158). The second house was swept away during the storm that wrecked the *A.J. Goddard* and all evidence of the pilothouse and its supports have disappeared from the deck of the vessel. Measurements taken from photographs indicate that the second pilot house was approximately 7 ft. (2.13 m) athwartships and 4 ft. (1.22 m) longitudinally. It was raised approximately 5 ft. 6 in. (1.68 m) above the deck. The first pilothouse built for the *A.J. Goddard* was selected for the reconstruction plan and its dimensions were reconstructed from photographs using AutoCAD as a measuring aid.

The pilothouse was located directly over the largest hatch and shared similar dimensions with the hatch. The lack of evidence for the pilothouse or its supporting stanchions on the deck suggests that the stanchions may have extended into the hatch and been secured in place within the hull. Further fieldwork is required to confirm this. The original pilothouse was a small roofed structure accessible by ladder and open on the sides to the elements. Its elevated position allowed the pilot a wider field of view. Obstacles in the boat's path could be more quickly seen and avoided.

The steering wheel, located on the forward interior of the pilothouse, had metal steering cables extending off either side of the wheel down to two vertically-oriented pulleys bolted to the deck on either side of the now-missing structure (Figure 5.21). The pulleys are attached to a horizontal spindle, which allowed adjustment when necessary. Though part of the cable broke away when the pilot house fell off, most of it is still present in the pulleys and on the deck. The cable feeds through the upright pulley and extends across the deck into a horizontal pulley bolted to the top of the deck. The cable then travels down the sides of the vessel underneath protective triangular metal knees that are sided a ¼ in. (0.64 cm) and extend 10 in. (25.4 cm) inboard from the toerail. The cable disappears between the cylinder timbers and feeds back to the three rudders. It presumably feeds into another horizontally mounted pulley that allows it to make a right angle turn to attach to the rudders, though this was not located during the field season due to inaccessibility. The cable terminates at its attachment point on the bar that connects the rudder arms.

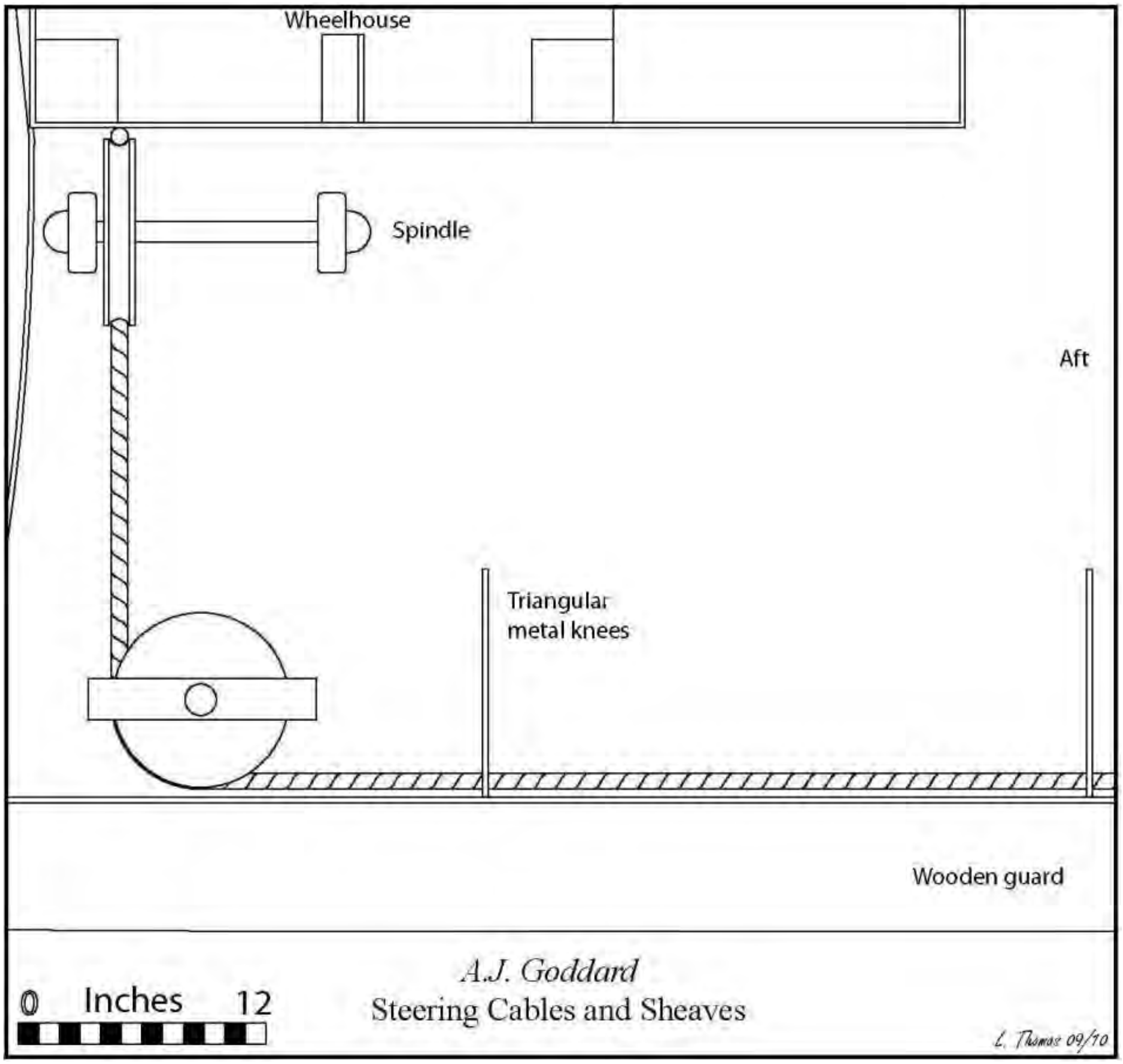

FIGURE 5.21. Steering tackle (Drawing by author and Mark Thomas, 2010).

Rudders

The *A.J. Goddard* possesses three stern hung rudders that are joined by a connecting rod that controls and unifies their movement (Figure 5.22). The rudder blades are buried in the sediment, which prohibited complete recording of the rudders. From the rudder stock they extend forward beneath the transom and aft beneath the wheel. The shallow draft and the obstruction provided by the wheel result in an unusual shape that is intended to maximize the water surface area and power. The rudder arms, which are connected to the shafts, are 20 in. (50.8 cm) long and 3 in. (7.62 cm) wide. Shape and dimensions of the rudder blades shown in the plans are estimated from photos. Due to the fact that approximately 70 percent of the rudder blades are buried in sediment, the reconstruction is not entirely accurate.

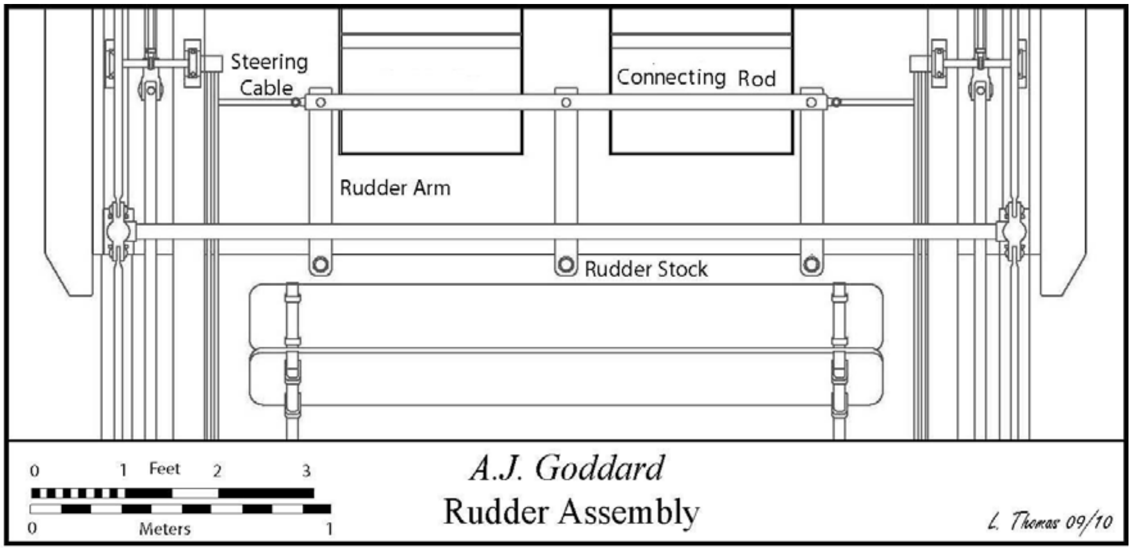

FIGURE 5.22. Rudder assembly.

Wooden Roof

Attached to the top of the hogging system is a wooden roof made of boards that protected the crew and passengers from the elements. The longitudinally-fitted wooden boards that make up the roof have since fallen through the hogging system and are now resting on the deck. Though no measurements were obtained, field and historic photos suggest that the boards were approximately ¾ in. (1.9 cm) thick. A historic photo of the *A.J. Goddard* shows a larger laterally positioned timber, approximately 2 (5.08 cm) in. molded and 2-½ in. (6.35 cm) sided, nailed to the forward underside of the boards just aft of the pilothouse. This would have kept the boards together and provided more support. Crew members and passengers can be seen sitting upon the roof, which would have been necessary when the boat's main deck was crowded with large cargos and passengers.

Bow Railing

The railing at the bow is supported by four wooden stanchions; it is approximately 24 in. (60.96 cm) tall and is 3-½ in. (8.89 cm) sided. It is an addition to the vessel sometime during its later life, as it is not visible in the photo of the *A.J. Goddard* at Lake Bennett when the boat was first launched. A ¼ in. (0.64 cm) metal sheet surrounds the stanchions and was originally painted with the name of the boat. It is very delicate and is almost entirely corroded away. The bow railing would have protected the pilot and fireman from spray on Lake Laberge.

Conclusion

Though corrosion has covered much of the metal hull of the *A.J. Goddard*, favorable preservation conditions in Lake Laberge have resulted in a nearly-entirely intact hull. It was possible to reconstruct much of the vessel based on the data gathered during the short field seasons in 2009 and 2010, though there are still many questions remaining to be answered.

CHAPTER VI
LIFE ON BOARD

Introduction

Steamboats provided one of the few reliable and efficient modes of transportation throughout the western rivers of United States and Canada. Because of this, they were an unavoidable and vital aspect of life during the 19th and early 20th centuries. As one of more than 200 steamboats that served on the Yukon River at the end of the 19th century and in the beginning of the 20th, the *A.J. Goddard* is part of the greater Yukon River steamboat tradition. Utilizing the only reliable route through the Yukon wilderness for hauling cargo and delivering supplies to remote towns, steamboats were part of everyday life for people living along the river in the summer and fall. Whether they worked on board the steamboats or were only passengers, most Yukoners experienced life on board the boats to some degree.

The steamers of the western rivers of United States were known for the opulence of their first class quarters. While Klondike steamboats shared many construction features with the western river steamboats, photographs and journals indicate that the steamboats of the Klondike were far more utilitarian in décor and passenger lifestyle, with more basic accommodations and fare when compared with their southern counterparts. This is likely due in part to the remote nature of the Klondike wilderness, the passengers, and the hasty nature with which the ships were ordered and constructed for the Klondike Gold Rush. The barren and simple gold rush steamers could have received face lifts, but this was apparently rare on the Yukon. The *Sarah, Susie,* and *Hannah* were three of the finest, modeled after the Ohio River steamboats, and had quality accommodation for 150 passengers, but could carry 500 "in the manner of the country," meaning that those passengers slept in any free space available upon their own blankets (Downs 1992:147).

With the exception of select individuals traveling in first class comfort upon one of the few high-end steamboats, most passengers traveling on the Yukon River during the Gold Rush experienced something similar to traveling upon the western river steamboats as a deck passenger. One Yukon passenger complained that "she is not at all a harbor of comfort," while another wrote a letter of complaint regarding the steamboat *Hope*, being dreadfully offended that in addition to paying $25 for the ticket, one must "sleep in one's own blankets, cook for self, pay $1 for inferior grub, and occasionally cut wood, etc…" (Downs 1992:13). This was often the norm for deck passengers on board the steamboats of the western rivers of United States, and with few exceptions it was the only option for travel during the Gold Rush due to the fact that bunks on board were in such high demand. As on the western rivers, passengers were expected to assist with chopping and loading wood, fighting fires, freeing the vessel from sandbars, and many other little tasks (Downs 1992: 13). Because the larger sternwheelers could consume up to five cords an hour when running hard, an enormous amount of wood chopping was required. This can still be seen in the altered landscape, where smaller new-growth trees grow closer to the river and the larger trees are farther away.

Chopping wood in the winter for the summertime steamboats provided much needed income for local farmers and pioneers (Downs 1992:22).

The lives and responsibilities of crew members on board Yukon River steamboats were remarkably similar to those of steamboat crews on the western rivers of the United States. The larger steamboats generally featured a crew of 12 to 17, though smaller steamboats could operate with far fewer (Downs 1992:14). The *A.J. Goddard* was one of the smallest and most utilitarian members of the fleet, and as a result of the vessel's small size and crew, life on board was surely different from life on larger vessels (Figure 6.1). The *A.J. Goddard* ran its first trip to Dawson with a crew of eight men (*Klondike Nugget* 1898a). By its last journey, the boat was running with a crew of four men and a passenger but had at least eight specific job responsibilities: that of captain, pilot, engineer, fireman, blacksmith, cook, woodchopper, and deckhand (*Dawson Daily News* 1901). As a result of the small crew size, many responsibilities were shared, and a close relationship between crew members likely developed.

FIGURE 6.1. The *A.J. Goddard* loaded with crew and passengers on Lake Laberge (Alaska State Libraries, Image P34-009).

Captain and Pilot

The captain held ultimate authority on the vessel, being responsible for its operation, cargo, passengers, and crew. On a large vessel he likely held a more administrative position, managing the crew who dealt with the day to day operations while he insured that all ran smoothly. Upon smaller vessels like *A.J. Goddard*, the captain shouldered multiple responsibilities along with the other crew members, such as piloting or assisting the engineer. When the captain did not act as pilot, another person managed that task.

In many cases, it was the captain's or pilot's knowledge that made the difference between a successful voyage and a failed one (Downs 1992:14). Though the captain sometimes served as pilot on the Yukon River, this was prohibited on certain dangerous sections. As with the Mississippi and Missouri Rivers, it could take years to learn the turns and shallows of the Yukon River, particularly on the rapids (Adams and Williams 2002:184-185). Parts of the Yukon River have a powerful current that required extensive skill from the captains, pilots, and engineers to navigate. Passengers marveled at the combined talents of boatmen when they directed their vessels around bends in the river or into complicated berths, oftentimes using a post or tree to hold the vessel in position against the current. Running against the current required constant vigilance to avoid driftwood and eddies, while running downstream through rapids could be a terrifying experience requiring great ability to safely pass around the dangers. "Handling these boats was no place for the indecisive" (Adams and Williams 2002:184).

Sections of the Yukon River were so dangerous that captains did not always have the knowledge of the river to guide their vessel safely through the rapids, particularly during the Gold Rush when many were navigating the river for the first time. Experienced pilots joined the vessel for the more dangerous parts of the journey. After the trip through Miles Canyon and the Whitehorse Rapids had claimed several lives, the North-West Mounted Police required that each boat be navigated by a skilled and licensed pilot. Offenders could expect to face the $100 fine. This often entailed picking up a pilot above or below the hazardous zone, who often charged between $20-25 to navigate the pass. Skilled individuals could make up to 10 trips per day (Bennett 1978:35).

River traffic was heavy on the Yukon at the time of the Gold Rush and collisions were a frequent occurrence. One of the most important duties of the pilot was therefore to keep the vessel away from other steamboats. The primary tool used to accomplish this (other than clever steering) was to signal approaching vessels, particularly at night, through the use of lights and the boat's steam whistle. Other crew members and passengers, as well as the owners of the cargo, relied upon the pilot to keep the boat safe from the many dangers on the river, including collision with other vessels. Evenings could be spent beached along the river to avoid sandbars or boats that were not visible in the dark (Wilde 2009:35).

At the time of *A.J. Goddard's* last journey, the captain was Edward McDonald of Aberdeen, Washington, who perished during the wrecking event (*North-West Mounted Police* 1902). In the case of *A.J. Goddard*, a small vessel in the middle of the wilderness, it is likely that the position of captain was more casual than on board a larger vessel, where formality maintained the chain of command. The small size of the vessel made communication relatively easy at all times, and the bond forged during the uncertain and exciting trip to the Yukon may have resulted in the formation of a close relationship between the initial crew members. In addition, the small size of the vessel, lack of privacy, and the sharing of duties may have encouraged the formation of personal as well as professional relationships between the crew and the captain.

Engineer

The engineer was responsible for overseeing the vessel's machinery. A steamboat engineer possessed a job that was both as difficult and as necessary as that of the pilot's, though they rarely enjoyed the same prestige or pay. In the case of the *A.J. Goddard*, the engineer was charged with the task of maintaining the high-pressure horizontal steam engines, the boiler, and the steam operated windlass. Of these many tasks, the most important responsibility of the engineer was to man the engines at the command of the pilot (Hunter 1993:262). The engineer manipulated his go-ahead lever, his back-down lever, and his steam valve based upon signals from the bridge, bell signals transmitted through wires, the engine room telegraph, or simple shouted orders on smaller vessels (Adams and Williams 2002:184). The engineer had to be constantly on the alert to start, stop, change speed, and reverse the engine upon orders from the pilot. When the steamer *Ora* completed its first run on the river through the Whitehorse Rapids, the engineer collapsed from exhaustion and fright after keeping *Ora's* engines responsive to the pilot's command in the midst of the dangerous rapids. Afterwards, "the captain had hard work to persuade him to continue the trip" (*Los Angeles Times* 1898a:B5).

The boat, crew, and its passengers relied upon the engineer to avoid boiler explosions and to keep the steam strong enough for the pilot to navigate around rapids and other dangerous sections of the river (Hunter 1993:262). Communication between the pilot and engineer were pivotal to success, though not always a given. According to Captain Howard Adams, a steamboat captain on the Yukon River, feuds could rage between the captains and engineers that resulted in landing problems, such as approaching the shore at a hazardous speed (Adams and Williams 2002:184).

The work of the engineer was often stressful, as he and the fireman were responsible for any explosions that might occur. This was not an unusual occurrence. In addition, the strain that a hogging, sagging, and twisting boat could put upon the steam engines and its various pipes resulted in frequent small breaks, cracks, and failures. Because the boat rarely stopped while en-route to its destination, there were no great gaps of time during which the engineer could make repairs. With few, if any, repair facilities along a given route, the engineer had to be prepared to fix any damage himself with the tools and expertise he had available. He was often a blacksmith, mechanic, carpenter, and all-round handyman on board the vessel if he was going to keep the engine functioning properly (Hunter 1993: 261-263).

At the time of the wrecking event, *A.J. Goddard's* engineer was Julius Stockfeld, who survived to tell his story to the North-West Mounted Police. In true multi-tasking and multi-skilled engineer fashion, he took over the post of the fireman John Thompson as well as his own when panic set in among the crew (*North-West Mounted Police* 1902).

Fireman

The fireman often reported to the engineer. His job was to load wood into the boiler's firebox to ensure that there was an appropriate amount of steam for the engines (Hunter 1993:453). The lot of the fireman was often a difficult, hot, grimy, and unpleasant task that required an unexpected and unacknowledged amount of skill. He had to ensure that an appropriate amount of water was always inside of the boiler, and that it was producing the correct amount of steam. Too little, and the pilot could lose control of the vessel when the paddlewheel could not work properly. Too much, and the boiler might explode. In the event of an accident, the fireman was often the first to be injured or killed, and as a result, he bore a heavy load of responsibility for the lives of the crew and passengers as well as his own.

Large vessels often hired many firemen. In addition to possibly sharing some duties with the engineer, the fireman could be counted among the deck crew when any type of heavy lifting was required, or the boat required all hands for a task. The difficult nature of the fireman's work, however, was reflected in higher pay and two four-hour shifts as opposed to the longer shifts that characterized work among the deck crew (Hunter 1993:453).

Cleaning the boiler was perhaps the least pleasant task that the fireman could look forward to. As it was impossible to carry a large enough supply of clean water to fuel the boilers, river water was used, which would be variably clean or dirty depending upon the season. While early and late summer on the Yukon is characterized by relatively clear and clean water, in the middle of the season it is a muddy brown mess. This mud settled out in the boiler and eventually needed to be removed. Fortunately for the fireman of the *A.J. Goddard*, technology had advanced during the second half of the 19th century and introduced settling and cleaning aids called blowout valves and mud drums, which made cleaning the boiler far easier than it had been in the past (Hunter 1993:264).

The fireman was also responsible for ensuring that the appropriate type of fuel was always available. They were often quite selective about the type of firewood if given the choice. Though coal replaced wood in the more populated areas of the world by the time *A.J. Goddard* was plying the waters of the Yukon, wood was still the fuel of choice in the remote wilderness of the territory. Wood was quantified by the cord, a stack that was essentially four feet high, four feet wide, and eight feet long (1.22 m by 1.22 m by 2.44 m) or 128 cubic ft. (39.01 cubic m) (Hunter 1993:266-269).

The deck crew assisted the fireman in procuring the wood, chopping it down if necessary, or merely helping to load it if a wood camp provided cut wood for a fee (Hunter 1993:266-269). This was not the case when *A.J. Goddard* first traveled the river for the Klondike Gold Rush, but after enough vessels were present, wood camps were established. Evidence of the massive exploitation of the forest for steamboat fuel can still be viewed in the landscape when viewing the old-growth and new-growth trees aligned along the riverbank (new-growth trees are grouped closest to the water).

While wood was the fuel most commonly used on the *A.J. Goddard,* one piece of coal (possibly dropped on site by another vessel) was located on the wreck site. The patent for *A.J. Goddard's* boiler notes that it is for burning coal, and while it could be used for wood, this was not ideal due to the shape and size of the firebox (United States Patent No. 535,441 1895:1). A combination of both coal and wood could be used, and while it is possible that this was done upon occasion, it is more likely that the coal was used in the blacksmith's forge to produce a hotter fire to more efficiently work iron.

The fireman on board the *A.J. Goddard* at the time of its sinking was John Thompson of Johnson St., Victoria (*North-West Mounted Police* 1902). Though he was not stuck below decks in the stifling heat of the boiler rooms that characterized larger seagoing vessels, the fireman's work upon the deck was an unpleasant clash of the heat from the boiler and the cold wind of the Yukon spring and fall. Much of the work would have been conducted while standing below the pilothouse, doubtless an uncomfortable place (Figure 6.2). Working during storms would have been a particularly unpleasant task, as the boat was protected by little more than a canvas sheet battened down over the hogging posts. Photographs of *A.J. Goddard* indicate that a bow rail was added to protect the fireman from the spray on Lake Laberge sometime after the *A.J. Goddard* began working in the Yukon.

Figure 6.2. A crewmember in 1898-1899 on the *A.J. Goddard* beneath the pilothouse (Goddard collection, courtesy of Fay Goddard).

Blacksmith

With thousands of miles separating the *A.J. Goddard's* crew from the next big city and the repair facilities that could be found there, it was vitally important to have a blacksmith, particularly when traveling by steel steamboat. At the start of the Klondike

Gold Rush, there were no blacksmith repair shops in Dawson City, and certainly none along the Yukon River. It was up to the crew to repair any damage to the vessel in order to continue their work. If something were to break, the engineer had most of the equipment that he needed to make repairs, including a forge and workbench with an anvil.

While it is possible that sometime during the boat's career the *A.J. Goddard* had a person specifically designated as the blacksmith, it is not probable. According to the *A.J. Goddard's* last engineer, Julius Stockfeld, there was no one with that specific title at the time of the wrecking event. It is likely that a deckhand or the engineer took on the job of blacksmith when necessary.

Carpenter

With few repair stations and towns along remote rivers, carpenters were essential to the maintenance of successful steamboats that hoped to reach port in a reasonable amount of time. Some of the larger vessels were known to have carried carpenters who focused on maintaining the woodwork of the vessel, such as on the large steamboat *Julia B.* of the Yukon River (Adams and Williams 2002:144). It was not always necessary to have a crew member dedicated to carpentry, however. Smaller steamboats often had crew members with carpentry skills, such as the engineers, rather than a dedicated carpenter. With its mostly-metal construction and machinery, the *A.J. Goddard* likely had modest carpentry repairs.

Cook

On a large vessel meant to carry many passengers, the cook could be part of the steward's department, within which there was one steward, a cook, waiters, and galley staff depending upon the size of the vessel. Prior to prohibition, there was often a bartender (Downs 1992:15). A purser and freight clerk were also on board the larger steamboats, but these duties were likely the purview of the captain of *A.J. Goddard* (Downs 1992:15).

The cook on board *A.J. Goddard* at the time of the wrecking event was a man named Fay Ransom, who traveled from Montana to work on the Yukon River, possibly lured by the prospect of gold and then convinced to stay to work the rivers (*North-West Mounted Police* 1902). On small vessels such as *A.J. Goddard*, the cook was often paid only one and a half times as much as the deck hands (Hunter 1993:446). Meals were often of poor quality, made from canned and dried food that could be transported reliably in the wilderness and eaten on the deck (Hunter 1993:453).

Deck Hands and Woodchoppers

There were usually a number of deck hands on board larger steamboats whose job was primarily dedicated to handling freight and those tasks not dealt with by specialized crew members. Larger steamboats often carried four or more deckhands, and as the steamboats frequently departed in morning they spent long evenings loading many tons of freight onto the boat (Downs 1992:15). A larger steamboat, the Hudson

Bay Company's *Beaver* in British Columbia, carried six woodcutters, and even they were not enough to keep up with the demand of the boilers (Downs 1992:17).

Because they did not need a specific skill set, deck hands were often a mix of unskilled and inexperienced labor from the river towns and professional boatmen hoping to work their way up the ladder to pilot or captain (Hunter 1993:447). They fit into the crew and on the boat where ever necessary and possible, and even on the largest boats they slept and ate wherever they could find a place to lay their head (Hunter 1993:451-452). In the case of the *A.J. Goddard*, an open decked vessel with no closed in quarters of any kind, the crew slept upon the cargo or in an open space upon the deck.

The work of the deckhands was varied, and included assisting with wooding the boat, hauling cargo and freight, manning the windlass and pumps, and assisting with anything else required of them. As they did not stand regular watches but were instead subject to being "on call," they often had more leisure time than pilots or engineers. If the river was difficult or the water low, the job of the deck hand could be far more difficult and punctuated with fewer breaks (Hunter 1993:453).

There was no one on board the *A.J. Goddard* who held the specific title of deck hand at the time of the wrecking event, but there was a woodchopper named Snyder (*North-West Mounted Police* 1902). The engineer who survived to tell of Snyder did not know the rest of his name or where he was from, unlike the other crew members, whom he did know. It seems that Snyder may have been new to the crew. Had *A.J. Goddard's* voyage been longer, Snyder may have begun to take on other deckhand tasks in addition to wood chopping.

CHAPTER VII
ARTIFACTS

Introduction

Due to favorable conditions that have preserved and protected the wreck of the *A.J. Goddard* and its artifacts, the site has a nearly complete sample of material culture from one small Yukon River sternwheeler. There was no time for the crew to save their belongings during the wrecking event, and as a result, most aspects of work and life on board the steamer are represented through the extant material culture. This is fortunate, as no other known wreck of a Yukon River steamboat retains its entire artifact collection intact.

In many ways, the composition of *A.J. Goddard's* artifact collection is what we might expect to see on board a small working steamboat in the middle of the wilderness. There were many tools of various sizes and types that allowed the crew to care for the vessel, durable and common dishware, ships fittings, and a few items of clothing. The personal items found on board the steamboat were a surprise, however, and provided unexpected insights into aspects of Klondike life at the turn of the century.

The high energy wrecking event scattered most artifacts around the vessel, creating a debris field extending at least 30 feet (9.14 m) in all directions, though items still rest upon the deck. 103 artifacts were recorded using trilateration and photography, many of which were never removed from the lake. Thirty-one artifacts were recovered, recorded in detail, and returned to the Yukon Transportation Museum. Historical sources have shed light on the outfitting of the boat. Though the 2010 field season gathered data on dozens of artifacts, many more likely remain unseen and unidentified. This chapter discusses basic artifact categories, while more detailed information and images can be found in the appendix.

Navigation Artifacts

The *A.J. Goddard* worked on a busy and dangerous river, and avoiding underwater hazards and other vessels at night would have been a primary safety issue. Becoming lost would not have been a concern because the route was predetermined, set within the boundaries of the river, and the pilots often knew much of it by heart. Some of the items that would have assisted with navigation and the work of the pilot can be found on the site, though many larger ones have disappeared. Of the structural remains missing from the site, the majority are related to the pilot's work. The pilot operated the vessel from the wheelhouse, which allowed this individual to have the clearest view possible of the river and its associated dangers. The pilothouse and wheel were only tenuously attached to the boat, and they broke off and floated away during the wrecking event, with two crew members clinging for their lives (*Dawson Daily News* 1901).

Smaller navigation-related artifacts remained on the site, however. The steam whistle (JiUT-5:34), which lay in the sediment along the port side the vessel, is one of the largest detached artifacts found on the site. More information about the whistle can be found in Chapter V. It was recovered for conservation, which is described further in the Discussion Chapter. Part of a lantern's wick mechanism was recovered (JiUt-5:81), and a brass signal lantern was found concreted to the outer edge of the deck near the stern along with a green glass navigation light, possibly the starboard running light (JiUT-5:66 and JiUt-5:55). These would have been used while traveling or tied up at night to signal other vessels and indicate *A.J. Goddard's* location as well as the direction of travel to prevent collisions. Two clear glass lantern chimneys were found as well (JiUT-5:12 and JiUT-5:50), though these may have been used to light the boat at night rather than for signaling.

Steam Fixtures and Machinery

The major steam fixtures – boiler, engines, condenser, and windlass – remain on the site in excellent condition. More information can be obtained on these elements in Chapter V. Smaller artifacts associated with the machinery can be found scattered around the site and will be discussed in this chapter.

Artifacts associated with the boiler include a shovel (JiUT-5:24) that is resting alongside the hull on the port side of the vessel near the bow, and another in the debris field on the port side (JiUT-5:32). The fireman would not have been shoveling much coal as he might have been if he worked in other areas of North America where this fuel was readily available and the infrastructure was in place to support coal-fired vessels. Rather, the shovel would have been used to stoke the boiler to keep the heat up and evenly distributed, to remove ashes and cinders from the boiler, snow and ice from the deck, or digging while ashore. The one piece of coal (JiUT-5:60) on site was found in the debris field, though there may have been more scattered farther away. This coal could have been intended for the forge or stove.

Five axes were found on the site, both on the bow near the windlass (JiUT-5:3, JiUT-5:67) and in the debris field on the starboard side (JiUT-5:6) and port side (JiUT-5:65, JiUT-5:82). While some may have been spares or cargo, or intended solely for carpentry or firefighting, this number provided an axe for each of the five men on board at the time of wrecking, suggesting that all hands took part in wooding the boat. Spare wood that may have been stacked upon the bow is no longer on the deck. The engineer Stockfeld records throwing off armfuls of wood for the fireman Thompson to cling to while the boat was sinking (*North-West Mounted Police* 1902:18). Most of it likely scattered and floated away when the boat sank. Wood that was to be fed to the boiler is located in the hatches just forward of the boiler. The surviving firewood is cut into relatively small pieces approximately 18 in. (45.72 cm) long, suitable for the *A.J. Goddard's* small firebox.

Grease caps affixed to the windlass and pitman arms indicate that they were made by the Lunkenheimer Co. of Cincinnati, Ohio, an enterprise still in business today. In 1897 the company made a variety of brass grease cups, the simplest of which can be seen on the *A.J. Goddard* machinery (Lunkenheimer Co. 1906:353-356). Valves and connectors from the steam pipes (JiUT-5:25, JiUT-5:76, JiUT-5:78, and JiUT-5:97) can be found in the sediment around the vessel, some with the turning knobs still attached. These may be scattered around the site due to damage to the steam pipes above the engines.

Blacksmithing Station and Other Tools

A functioning blacksmith's station was critical to self-sufficiency along the Yukon River, particularly for a metal-hulled vessel such as the *A.J. Goddard*. A small forge with a rotary bellows pump is bolted to the deck on the port side amidships (Figure 7.1). While early photographs of the *A.J. Goddard* do not show the forge in its current location, it has not yet been determined when or how the forge arrived on board the vessel. The team of men assembling the *A.J. Goddard* at Lake Bennett must have brought along a forge in order to rivet the hull components together, but whether or not this is the forge currently on board the *A.J. Goddard* is unknown.

The forge may have been purchased through a catalog, from another boat, or directly in Dawson or Whitehorse once the crew realized it would be useful for repairing the *A.J. Goddard* along the sparsely populated river. Alternately, it may have been the property of the engineer when he signed on, as the *A.J. Goddard* had different crew members throughout its career. This seems unlikely, however, as it is a very large tool for an engineer to carry along with him. Regardless of how or when the forge came to be on board the *A.J. Goddard*, it appears to have been a relatively common type. A photograph of the Log Cabin camp near the White Pass shows a similar or identical forge being used by a blacksmith named Albert Hartshorn (Neufeld and Norris 1996:178). Another similar forge can be found at the Dawson City Museum (accession no. 1999.366.1).

FIGURE 7.1. Forge on the deck (Photo by Larry Bonnett).

Similar, or possibly identical, forges have been identified in the 1897 edition of the *Sears, Roebuck & Co. Catalog*, and can likely be found in other catalogs as well. A comparable forge in the *Sears, Roebuck & Co. Catalog* from 1897, Item No. 11602, sold for $6.30. The lever forge featured an 18 in. (45.72 cm) diameter round hearth, pipe legs, a 30 in. (76.2 cm) height, and a weight of only 65 pounds (29.48 kg). The catalog specifies that the forge is ideal for farmers and those wishing to make small repairs, though true blacksmiths probably needed a larger forge. This could indicate that the forge on board the *A.J. Goddard* may have been too small to be the one that was used to assemble the *A.J. Goddard* at Lake Bennett (*Sears, Roebuck & Co. Catalog* 1897:78).

Other blacksmithing tools remain on the site as well. Slightly aft of the forge is a blacksmiths bench with a vise bolted to the inboard end of the bench, along with a large anvil sitting on the cylinder timbers 1 ft. (30.48 cm) aft of the bench. The anvil has tipped over since the wrecking event. A pair of blacksmith tongs (JiUT-5:71) fell off the boat when the ship wrecked, and are now lying in the sediment on the starboard side.

A variety of carpenters' tools were found on board the vessel, scattered on both sides, indicating they were likely on the deck at the time of the wrecking rather than inside the hold. This conglomeration of tools included a drill brace and bit made of iron and wood (JiUT-5:96), and was located next to the port side of the hull, almost directly below the aft guard. A pry bar (JiUT-5:8) is located farther from the boat on the port side. A mallet (JiUT-5:61), made of wood with iron straps, is resting underneath the paddlewheel. Unidentified tools and tool handles can be found in the debris field on either side of the vessel, possibly broken tools that the men were saving to repair. A whetstone for sharpening tools (JiUT-5:94), a lead patch (JiUT-5:90), and shears (JiUT-5:58) were found in the sediment on the starboard side of the boat, and an auger handle (JiUT-5:94) on the port side.

A drill brace with a 6 in. (15.24 cm) sweep that is similar to one found on site is listed in the *Sears, Roebuck & Co. Catalog* 1897 edition for $1.14. For that price, the purchaser received the latest improved barber ratchet brace with alligator jaws and a ball bearing head. Though the 10 in. (25.4 cm) size is most common and ideal for general work, the catalog states that the 6 in. (15.24 cm) sweep size is favored by electricians (*Sears, Roebuck & Co. Catalog* 1897:521). *A.J. Goddard* was outfitted with a great variety of tools that would have served in all manner of construction and repair circumstances.

Kitchenware

Though the galley is little more than a stove upon the deck, most aspects of food preparation and consumption on board the vessel are evident on the site. The stove rests upright, though slightly tilted, on the port side of the vessel. According to old photographs of *A.J. Goddard* in service, the stove was originally on the starboard side of the boat with a small stack that fed through a hole in the roof above and allowed the smoke to vent over the passengers' heads. The stack could not be seen on the site, however, and was possibly lost during the wrecking along with the boiler's stack. The stove is made of cast iron and was fueled by wood, though coal may have been used when it was available.

A large cooking pot (JiUT-5:23) has settled into the sediment near the starboard side of the hull, while another (JiUT-5:73) is on the port side. White/gray and white/blue enamelware kitchen items are scattered around the hull, including a pitcher (JiUT-5:36) on the starboard side of the vessel, cups (JiUT-5:17, JiUT-5:87, and JiUT-5:93), at least two plates (JiUT-5:5 and (JiUT-5:35), and two bowls nestled together (these were seen on the last day and have no artifact number). Some of the kitchenware has the name of the manufacturer printed on the bottom. One of the white and blue enamelware plates (JiUT-5:5) has a blue transfer print mark on the bottom of the plate that reads McCLARY’S FAMOUS DEEP ENAMELWARE. Called a “Captain of Industry” in Canada by *The Canadian* magazine, John McClary introduced the system of branch distribution warehouses to Canada in the 19th century in order to more efficiently distribute his stoves and kitchenware (Carlyle 1908:542-544).

Kitchenware similar or identical to items on the steamboat wreck can be located in catalogs. A light gray with darker gray mottling enamelware metal cup (JiUT-5:17) with a strap handle is comparable to a nearly identical blue one that can be found in the *Sears, Roebuck & Co. Catalog* from 1897. They cost 11 cents each, or $1.54 per dozen (*Sears, Roebuck & Co. Catalog* 1897:587). This item was returned to the wreck site by the 2010 research team due to advanced corrosion that would make conservation with positive results difficult if not impossible. The variety of kitchenware suggests it may have been owned by individual crew members, or that the *A.J. Goddard’s* galley collection grew haphazardly over the years.

Two small bottles of foodstuffs and medicine were recovered. A partially full bottle of what is likely vanilla essence (JiUT-5:28) was recovered 80 percent full, along with a blue glass bottle that reads: "BROMO-SELTZER EMERSON DRUG CO. BALTIMORE MD." Bromo-seltzer is a commonplace medicine administered for upset stomachs. What is possibly a prohibition era bottle due to its inscription, marked FEDERAL LAW FORBIDS SALE on one side, and OR RE-USE OF THIS BOTTLE on the other side was also discovered in the debris field, possibly tossed off of a small boat traveling down the lake decades after the *A.J. Goddard* sank (prohibition occurred in Canada in the 1920’s). It would have likely contained whiskey or another hard liquor.

Clothing

The *Chicago Record*, which had been sending journalists to the Yukon Territory to report on gold findings for two years prior to the great rush published a list of a year’s required clothing in the Klondike (Chicago Record 1897:v-vii). Jack Carr, a Yukon mail carrier, was one of the many former prospectors who published outfitting lists during the rush; his is included in *The Chicago Record’s Book for Gold Seekers*. While it is uncertain whether the final crew on board the *A.J. Goddard* had come north for the rush, it is highly possible they consulted one of these lists prior to departing for the Klondike (Chicago Record 1897:46). Depending upon the location and time of purchase, outfits varied greatly in price, making it wise to purchase many goods before arriving in the Klondike. A Seattle outfitting house created a list comparing prices of a complete outfit of clothing in both Seattle and at Forty Mile in the Yukon, with prices listed at $276.00 and $805.00 respectively (Figure 7.2). While these prices may be exaggerated to improve the sales of the Seattle outfitter, they do reflect the level of extreme price variation during the gold rush (Chicago Record 1897:49).

Figure 7.2. Seattle outfitting shop (Goddard collection, Courtesy of Fay Goddard).

Shoes (JiUT-5:4, JiUT-5:545, and JiUT-5:95), one sock (JiUT-5:96), and a garment that could be a shirt or a light-weight coat (JiUT-5:1) are among the items of clothing found on the site. Three partial vegetable-tanned leather shoes from different pairs were recovered from the sediment surrounding the vessel. Nail patterns in the heels suggest that all of the shoes belonged to different pairs. Machine stitching shows that all were factory made. Jack Carr's list of supplies includes 2 pairs of shoes and two pairs of heavy snag proof boots. Tellingly, shoemakers thread and an awl are at the top of his clothing list (Chicago Record 1897:48). The shoes are all worn down on the outside of the heel, suggesting they belonged to the crew rather than with the cargo. In his report of the wrecking, engineer Julius Stockfeld recalls removing the shoes of one of his friends to help him swim, and presumably did so himself as well:

> Thompson was at this time on his knees praying and when he saw me he implored me to save him. I threw off his shoes and threw overboard an armful of cordwood and yelled at him to jump overboard and catch on to

the wood, at the same time plunging over myself." (*North-West Mounted Police 1902*:18).

One sock was located and recovered for conservation. Treatment has revealed the sock to be dyed black and once cleaned and dried that it will be sturdy enough to be fitted around a pillow for exhibit. A stitched piece of fabric that may be the remains of a wool shirt or jacket were recovered as well, though its delicate condition will require display while laid flat rather than upon a three dimensional stand. Jack Carr's Klondike outfit list calls for two heavy overshirts and one dozen pairs of heavy wool socks (Chicago Record 1897:48). While the wool shirt is made of a relatively thick and sturdy material, the sock is a lighter fabric, perhaps worn as an under-layer beneath a heavier sock. Other small pieces of textile have been recovered, but are too small to identify without more study.

Miscellaneous

A small cream colored ceramic mug, possibly a shaving mug or marmalade jar (JiUT-5:39), was recovered for exhibit, though no shaving brush or razor to accompany it were located. A small square magnifying lens (JiUT-5:99) was found as well. Period magnifying lenses found in the *Sears, Roebuck & Co. Catalog* for 1897 indicate that there were a number of types, including prospector's magnifying lenses and linen testers designed for counting the number of threads per inch in cloth. They range in price from 48 cents for the linen tester to $1.95 for the prospectors magnifying glass, while simple magnifying lenses could cost as little as 18 cents (*Sears, Roebuck & Co. Catalog* 1897:131).

A full corked bottle of ink was discovered in the sediment near the vessel. The manufacturer embossed their insignia into the bottom: CARTER'S 1897 MADE IN U.S.A. Based in Boston, the firm (then called William Carter & Bros.) became prominent in 1861 through the introduction of an ink with added color that was suitable for both writing and copying. The firm joined with J.P. Dinsmore of New York (a businessman selling Carter's Inks from his home) and eventually expanded its offices to Chicago and New York (Carter's Inks 2011; Carvalho 2007:131). In 1895 the original owner, John W. Carter of Boston, died, and his partner Mr. Dinsmore retired, resulting in the firm's name change from William Carter & Bros. to The Carter's Ink Co. (Carvalho 2007:131). The Carter's Ink Co. remained a successful company, and in addition to ink, they sold adhesives, typewriter ribbons, and carbon paper (Carter's Inks 2011). Historic images indicate that some of the bottles came with stickers on the bottle's front featuring the company's label - perhaps the *A.J. Goddard*'*s* ink bottle did as well, though it has since dissolved. Their production of ink was prolific: dozens of antique bottles from the same production line as the bottle found on the *A.J. Goddard* site can be purchased online in a variety of colors for anywhere between $6 and $80 as of January 2011 (Carter's Inks 2011).

A Berliner Gramophone (JiUT-5:26), two compete records (JiUT-5:26 [same number as gramophone]) and one partial record (JiUT-5:9) were found on the site. The gramophone is possibly a hand-crank/spring style Berliner Style 5-Trademark or

Trademark-Late Model dating to 1897 or 1899 (Canadian Conservation Institute 121376:1-2). The disks and player are currently undergoing conservation at the Canadian Conservation Institute (CCI) in Ottawa, and according to the Infrared Spectroscopic Analysis of the gramophone disks performed by CCI, the Berliner records were made of hard rubber. The conservators at the CCI have managed to recover the names of the songs that were on the records.

The Berliner 1645Z record contains the song *The Harp That Once Thro' Tara's Halls*, which was recorded on 9 November 1897, in New York at J.W. Myers bar. The Berliner 991Z record contains the song *Ma Onliest One*, recorded on 17 April 1896 by Len Spencer. *Ma Onliest One* was written by well known American vaudevillian Fay Templeton and is a minstrel song. *Ma Onliest One* was the disk last played by the crew, as it was the one attached to the player when recovered. The third disk, which was found in far worse condition, reveals only part of its title:

Jul 1, 18_7
E. BERLINER
(E)- U
Dez-Vous Waltz
estra

This record could possibly be a recording of *Rendez-Vous Waltz* by the Metropolitan Orchestra, Berliner 1464. Alternately, the missing letter may say only Orchestra, rather than Metropolitan Orchestra. The (E) and U could be take numbers, though it is more probable that they are performance codes, (E) for clarinet solos and U for spoken, perhaps indicating that there is a spoken introduction. The disks are too corroded to recover audio directly from the disks (Richard Green 2011, elec. comm.).

An advertisement for the *Canadian Music Trades Journal* in 1901 shows a similar, possibly identical, gramophone for sale, along with three records, for $15 (*Canadian Music Trade Journal* 1901:3; Library and Archives Canada). While it is impossible to determine if the player was purchased from the Montreal outlet (the location of the Canadian Berliner headquarters) it is interesting to note that the gramophone could be sold as a kit for a relatively low price, particularly when compared to other gramophones. The 1897 Sears, Roebuck, & Co. catalog sold a cylinder player with no cylinders for $25, while the 1902 edition sold different brands of gramophones with no records for $20 (*Sears, Roebuck & Co. Catalog* 1897:505; *Sears, Roebuck & Co. Catalog* 1902:164). While the *A.J. Goddard's* gramophone was a relatively low priced model, $15 was still quite a large sum to spend for an entertainment device (Figure 7.3) (Valery Monahan 2011, elec. comm.).

FIGURE 7.3. Berliner Gram-o-phone advertisement (Library and Archives Canada/*Canadian Music Trades Journal*/AMICUS 113380/Vol. 2, #6, May 1901, Page 3).

Music was a vital part of the Klondike Gold Rush, and many miners recorded their experiences with music during the rush in their journals. From the lively dance hall performances to lonely prospectors humming a tune, music was a way to cope with the difficulties of living and working in the Yukon at the turn of the century. Journal accounts indicate that those who made music a part of their trip into the Klondike often coped far better than those who did not (Murray 1999:1). More than 100 songs are associated with the Klondike Gold Rush, though it was not the first gold rush to be accompanied by characteristic songs or music. The California Gold Rush was accompanied by music as well, with San Francisco and Sacramento flourishing centers of music (Murray 1999:3).

A variety of music was popular during the gold rush, including minstrel songs and music of the Gay Nineties (Murray 1999:xii). Minstrel shows, which became popular in the 1820s, featured performers in blackface performing their concept of African American music. A simple style that was easily adapted by amateur performers, minstrel shows and songs were common during the Klondike Gold Rush (Murray 1999:214). *Ma Onliest One* would have fit in easily in the Klondike. *The Harp That Once Thro' Tara's Halls*, an Irish tune, was a popular song that can still be found easily today, unlike *Ma Onliest One*. Other Irish songs from the Klondike Gold Rush include *Irish Washerwoman* and *The Irishman's Shanty* (Murray 1999:221-223). Waltzes, such as *Rendez-Vous Waltz* found on the *A.J. Goddard* site or *Dear Evelina, Sweet Evelina* were also popular during the gold rush (Murray 1999:227).

Outfitting the Vessel

Many of the *A.J. Goddard's* steam fixtures came from all over the United States: Seattle, Boston, Rochester, and Cincinnati. While it is possible that they were ordered new from their original manufacturer, the *A.J. Goddard's* rush to reach the Klondike suggests that this was not the case. Instead, many of these items may have been purchased used and cobbled together to quickly outfit the vessel, or found new from various dealers in the Upper Yukon Company's hometown of Seattle. The boiler gauge was purchased from Seattle while the boiler itself originally came from New York. The two were fitted together to create a working system. It appears that the Upper Yukon Company went to wholesale suppliers such as Mitchel, Lewis & Staver Co., which could have been the suppliers of wire rope and any number of the other artifacts found on board the boat.

Some of the other artifacts, such as the forge or dishes, can be found in the 1897 issue of the *Sears, Roebuck & Co. Catalog*. Presumably they were available from other mail-order companies as well. If they were obtained while the ship was already in the Klondike, then they very well may have come from one of these catalogs. Alternately, many of the artifacts could have been purchased in Seattle by *A.J. Goddard's* crew and carried into the Klondike.

Life On Board

Many of the *A.J. Goddard's* artifacts are what one would expect to find on a small working vessel in the middle of the wilderness. With few towns along the river and thousands of miles between *A.J. Goddard's* crew and the nearest big city, their self sufficiency is reflected by the tools and forge found on board the vessel. The tool collection represents the variety of responsibilities required to operate a small steamboat. The small size of the crew and the number of responsibilities represented on board the vessel indicates that these men had a number of skills and shared responsibilities, which was not unusual. Working on the *A.J. Goddard* would have been labor intensive and difficult at times.

The luxury items reveal another, perhaps unexpected, aspect of life on board such a small and utilitarian vessel. While many of the larger western river steamboats were known for their luxurious accommodations, the steamboats of the Klondike were far more utilitarian. The vanilla, however, suggests that their diet was not as basic and uneventful as one would expect. Though the record player could have been cargo, the singular nature of the item and the fact that it was in use with a record on the turntable suggests that the crew themselves were using it to fill the hours and lighten the atmosphere. Music was undeniably important during the gold rush, and the *A.J. Goddard's* crew was willing to care for a bulky and unwieldy gramophone to play the music popular of their time. If thousands of miles of ocean, river, and mountains did not stop fresh grapes, cigars, and lemonade from reaching Dawson City for the Gold Rush, it may be no surprise to find such things on board the smallest and most utilitarian member of the Yukon River steamboat fleet.

CHAPTER VIII
DISCUSSION

Introduction

Quickly constructed in the middle of the wilderness by adventuresome men and women, the *A.J. Goddard* is truly a product of the gold rush mentality. The small steamboat, its history, its wreck, and its artifacts paint a vivid picture of a fascinating time, place, and people, and this boat is just one of the many unusual stories of the Klondike Gold Rush. Historic research and field seasons at the *A.J. Goddard* site raise a number of questions about the vessel. What did this steamer mean to the Yukon Territory during the gold rush? Was it suited to its task and environment? What is the *A.J. Goddard's* place today as an historic artifact and part of Yukon and Canadian culture? Are its story and importance limited to Canada?

The *A.J. Goddard* During the Gold Rush

The *A.J. Goddard* was the first steamboat ever to arrive at Dawson from the upper Yukon River and one of a relatively small number of steamboats to operate on the river's upper reaches during the summer of 1898 (*Dawson Daily News* 1923). The story of *A.J. Goddard's* transport and construction in the wilderness is unusual, truly a fantastic example of ingenuity and effort, more so considering the lack of infrastructure in place to facilitate the endeavor. The limited river transportation system that existed prior to the Klondike Gold Rush changed drastically within the course of months due to the sternwheelers that arrived on the river by the dozens. Small sternwheelers such as the *A.J. Goddard* opened the Upper Yukon River to steam travel, and Albert and Clara Goddard became known as pioneer explorers and steamboat operators on the northern rivers (Lewis Publishing Company 1903:509; Hoffman 1953).

Was This Design Suitable?

Speed and Portability

Speed was essential to reaching the gold fields in order to profit. Not only was it important to quickly acquire a vessel, one had to choose the most expedient route to the gold fields. While plans for *A.J. Goddard* may exist, they have not yet been located. "Build It Yourself" steamboat kits were common at the end of the 19th century, allowing capable men and women in remote locations to purchase a boat via catalog or from a supplier and assemble the vessel themselves. The Marine Iron Works of Chicago, a company that sold prefabricated steamboats of various styles, produced a catalog in 1902 that allowed customers to purchase the vessel in various states of assembly and complete the process themselves (Marine Iron Works of Chicago 1902). Though Albert Goddard would have had access to such catalogs had he desired them, his personal experience with metal boat building lead him to design the vessels himself. After they were built, both the *F.H. Kilbourne* and *A.J. Goddard* were disassembled into sections for relatively easy transport.

In addition to quickly obtaining a vessel, the Upper Yukon Company needed to determine the most efficient route to the gold fields, which would in turn influence the design of their chosen steamboat. Of the routes that led to the Klondike, going over the Coast Mountain Range was by far the shortest. Though it meant exponentially more effort, the owners of the Upper Yukon Company knew that hauling their boats over the mountains was the fastest and most reliable route to the gold fields.

Transportation limitations likely played a role in determining the types of machinery chosen as well. The larger machinery and assemblies would have been the most difficult things to carry over the mountain, particularly the boiler. Wisely, the owners of the Upper Yukon Company chose a Buckley Water Tube Boiler. The inventor of the Buckley Boiler emphasized in the patent that it featured a compact design, as well as easy assembly and repair (Figure 8.1). It could be transported in many smaller pieces and assembled on the other side of the mountains. All of the screws, threads, and joints that connect the various parts of the boiler are "right-hand," which John Buckley stated to be integral to its simplified construction in comparison with other boilers. In addition to choosing a boiler that was relatively easy to transport and assemble, the Upper Yukon Company chose a boiler that was suitable for the Yukon River. The choice of a water tube boiler was relatively rare for the Yukon, but its relative light weight, fuel efficient operation, ease of repair, and ability to build steam quickly and deliver high pressure made the boiler an excellent choice for the *A.J. Goddard* (John C. Pollack 2011, pers. comm.).

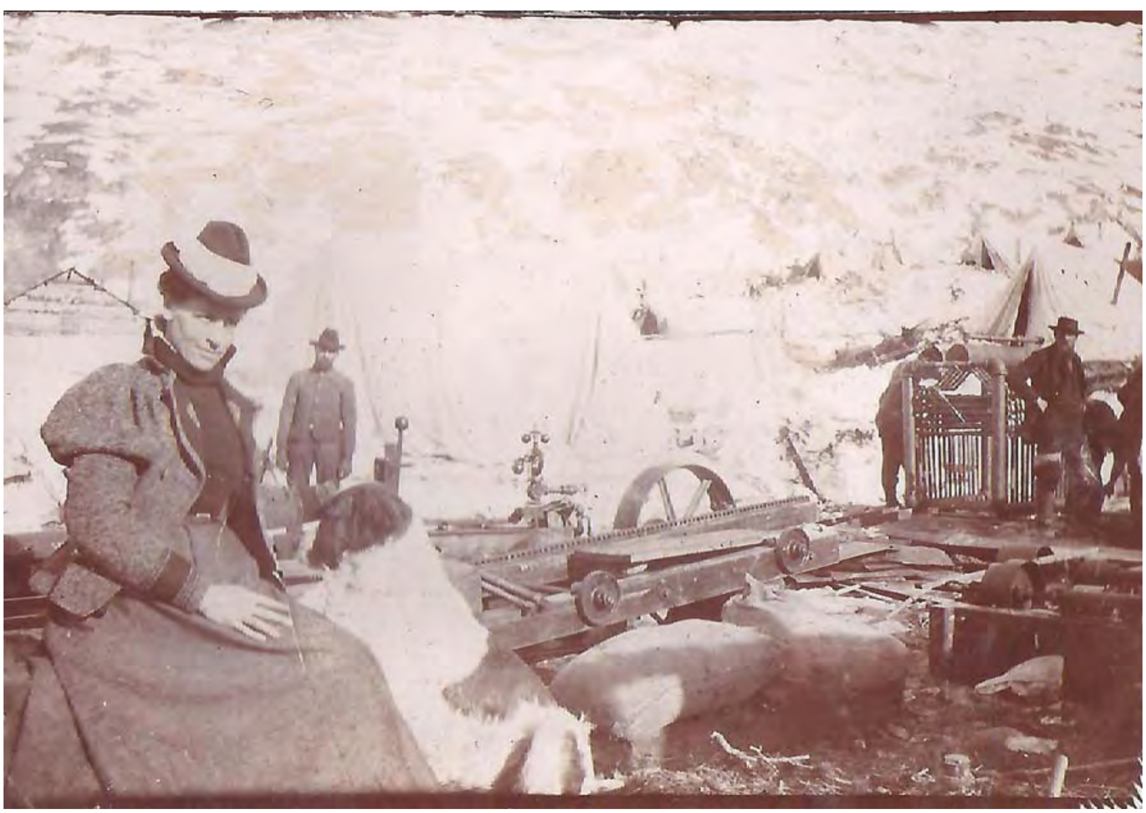

Figure. 8.1. Sawmill and boiler under construction with Mrs. J. H. Calvert in foreground (Goddard collection, Courtesy of Fay Goddard).

One interesting aspect of the boiler is that it was designed as a coal boiler, and the *A.J. Goddard's* owners knew that they would be using wood for fuel. While a firebox designed for coal is not ideal for burning wood as it was smaller and shallower with larger grate openings, wood could still be used (Hunter 1993:269). Though the boiler was not quite "perfect" for the job, its other beneficial features compensated for this, particularly considering the fact that the Upper Yukon Company was operating under a deadline.

Assembling the vessel in the wilderness would have been one of the last hurdles faced by the Upper Yukon Company. Unlike traditional wooden steamboats in the Klondike, kit vessels were built according to accompanying instructions. This does not mean that the directions were followed 100 percent of the time, however. Albert Goddard's familiarity with the vessel from designing the specifications would have made it easier for him to begin assembling it at Lake Bennett with his partners; he may have even seen it under construction at Risdon Iron Works. In addition, he and his brother Charles, and possibly other members of the Upper Yukon Company, had experience with building smaller metal boats from their days doing so at their Pacific Iron Works. They would have had an understanding of how small steel boats should go together, and possibly felt comfortable deviating from the instructions when they knew how to complete a task from experience.

For example, there was likely a designated pattern for all of the stanchions that supported deck beams underneath the hatches. Each group has a unique pattern, though, or no pattern at all, possibly because each set was constructed by a different man, and it did not truly matter if they were assembled precisely according to the instructions. In addition, there is no discernable pattern for the direction that the deck beams face. It seems like the assembly instructions were followed where necessary, but were disregarded for the small details, much like building pre-fabricated kit furniture today.

Suited for Its Environment? – Modifications

The *A.J. Goddard's* design shares common elements with the *Tyrrell*, a 142-foot steamboat abandoned at the Dawson City Steamboat Boneyard, where 7 steamer hulls were abandoned in the early 20th century (Affleck 2000:84). *Tyrrel* and *A.J. Goddard* both feature a simple and uniform construction method utilizing angle iron for the deck beams, carlings, stanchions, and frames, solid transverse bulkheads, similar fastening patterns, and method of arranging and joining the deck beams and carlings beneath the deck. The simplicity of this design is suited to the Klondike wilderness for ease of repair, but it is not necessarily a design that was developed specifically for use on the Yukon River. Instead, it is part of the larger tradition of the newly developing field of metal hull construction. Similar design and construction features can be found in numerous ship-building guides from the 19th century. These metal and composite vessels were far more common outside of the Klondike wilderness, where the traditional wooden boatbuilding methods were predominant.

The haste with which steamboats were built and procured for the gold rush resulted in a variety of vessels being sent to the Yukon. While many shipwrights understood the nature of the Yukon River, few, if any, were directly familiar with its conditions. It was not until the vessels arrived in the Yukon and served some time upon the waters that shipwrights and captains began to fully understand the river and modify their vessels to make them ideal for the environment. Indeed, this is what happened to the *A.J. Goddard*, which was designed for the Yukon River but modified to suit the realities of the far north once it was there. The *A.J. Goddard* is an unusual vessel, and unlike the majority of Yukon River steamboats. Ease of portability and assembly influenced its design as much as the qualities of what would be effective on the river.

With this in mind, how suited was the *A.J. Goddard* for its intended environment, and what types of modifications were made once it was in the far north? One of the most distinct characteristics of the *A.J. Goddard* is its small size. In addition to making it possible to carry the vessel over the Coast Mountain Range, the *A.J. Goddard's* petite dimensions made it possible to navigate through the narrow Upper Yukon River and pass through the Whitehorse Rapids and Miles Canyon. In the beginning of its service, at least one newspaper journalist considered the *A.J. Goddard* to be "well built for that service" (*Klondike Nugget* 1898b). With time, however, the Upper Yukon Company found that the vessel was too small to easily operate on the larger sections of the river. The engines were too small to fight the current upstream through the rapids, and it could have been more dangerous for the small and underpowered steamboat when it traveled downstream through the particularly dangerous and violent sections. In addition, the exposed nature of the deck made the *A.J. Goddard* a difficult boat to work on for long trips when compared to the larger steamboats that had more enclosed spaces for crew and passengers to work and rest. The Upper Yukon Company eventually switched the *A.J. Goddard* to running the ferry service on Lake Laberge, possibly as early as after the first trip from Dawson (*Dawson Daily News* 1923).

Experience on the river resulted in other modifications as well. Photos of the boat indicate that the windlass was not added until after the first trip to Dawson, possibly because it was not needed during the first trip down-river and so it was not worth the effort required to haul it over the mountain. Having a windlass would have assisted with handling barges when the *A.J. Goddard* began towing other vessels on Lake Laberge (the small sternwheeler would have towed by pushing barges ahead of itself of tying them off to the side). Photographs indicate that the forge may have been added at a later date as well, though precisely when is difficult to determine. It was a vital piece of equipment on board the steamboat, however, as the ability to make repairs while between ports was essential.

Other modifications made to the vessel include the addition of the splash rail at the bow, which protected the open boiler doors and the pilot and fireman from spray on Lake Laberge. Photographs indicate that the vessel was designed without a splash rail, and it would not have been absolutely necessary on a river. The size of Lake Laberge and the waves that it could produce made the addition important when the boat began to run the ferry route on the lake. A sturdier, higher pilothouse with windows replaced the original open pilothouse, which would have made navigating more comfortable and provided a better view of the river's hazards. Photographs indicate that the roof was altered as well. It was extended to enclose the pilothouse, which added additional structural support to the house that balanced upon four wooden stanchions, as well as provided extra seating, which can be seen in contemporary photographs. When the main deck was filled with cargo and passengers, this seating area would have been welcome on fine weather days.

The change in the *A.J. Goddard's* route and the modifications to the vessel suggest that Albert Goddard designed a hull that was generally suited to the Yukon River and could be easily modified to improve its ability to operate on the river. His priority was choosing a boat that could be transported and assembled, and steam machinery that would be both powerful and lightweight for its size. While the *A.J. Goddard* would have benefitted from larger boilers and engines, which was restricted by the small size of the vessel, the Upper Yukon Company did choose carefully when selecting the water tube Buckley Boiler. In fact, the date on the boiler plate (July 1898) indicates that it may be a later addition to the hull, perhaps replacing an old or unsuited boiler, though this has not been confirmed through historical sources.

Suited for the Remote, Wilderness Environment?

The *A.J. Goddard* was essentially a very small floating town. When sent to the Yukon in the winter of 1897-1898, the Upper Yukon Company was aware that their boat was going into a true wilderness. Towns and trading posts were small, far apart, and not well equipped to serve the prospectors of 1898. With the exception of Dawson City and Whitehorse, the majority of the river remained remote and ill equipped for steamboats needing repairs over the entirety of *A.J. Goddard's* career.

Just as each person who walked across the Coast Mountain Range was required to carry their 2,000 pounds (907.18 kg) of supplies, the steamboat crews also needed to be self sufficient if they were to have any hope of surviving the Klondike. The artifacts visible on the site indicate that the men and women on board the *A.J. Goddard* were prepared to take care of themselves and their boat with little to no assistance from those on shore. What was essentially a river voyage was planned as if it were an ocean voyage, with the exception of relying on water from the river and the wood available on shore for fuel.

The blacksmith's station ensured that any small repairs could be completed without major delay, which was vital for steel steamboat in the middle of the wilderness. The deck crew was outfitted with a full complement of tools and equipment, enabling them to make most of the necessary repairs when far from port.

The galley was relatively complete, and though small, it was certainly sufficient for the crew that operated the *A.J. Goddard*. An example of nearly every type of kitchenware has been found on site, and more will likely be found upon return to the wreck. Though supplies were available in Dawson and Whitehorse, they were not always reliable or affordable. As it was generally steamers such as the *A.J. Goddard* that brought the townspeople of Dawson their annual rations until the introduction of the railroad, the *A.J. Goddard* could not always rely upon restocking at Dawson when it ran that route (if it did, indeed, run that route more than once). Whatever they needed was likely picked up in Whitehorse, which would have been more convenient when the *A.J. Goddard* switched to the Lake Laberge towing route.

Personal effects such as ink and a gramophone even provided opportunities for entertainment along the river, for which the crew were willing to pay dearly. Though a relatively inexpensive machine when compared to other gramophones, the Berliner found on *A.J. Goddard* was still quite expensive at $15 for the player and three records.

Historic Preservation and the *A.J. Goddard* Today

The Klondike Gold Rush helped to shape the Yukon Territory that we know today. Though the rush is long over, it is still very much a living history that is embraced by both the local population of the Yukon as well as the outside world. Due to the international nature of the gold rush, which quickly captured the imagination of the world in the late 1890s, the history of the Klondike Gold Rush is one that citizens from many countries share.

Evidence of the gold rush and stampeders remain scattered across the landscape – old mining camps, steamboats, even an altered tree line from the wood camps – can be seen by anyone hiking through the woods or visiting Whitehorse and Dawson City. Because of the well-preserved and widespread nature of the historic and cultural heritage, the Yukon Government has taken a proactive approach to developing and maintaining a cultural heritage program that protects its historic and cultural resources. In the case of a shipwreck, this involves determining ownership, designation as a historic site, protection of the site, and outreach and education for the public, much of which is coordinated through exhibits by the Yukon Transportation Museum.

Ownership

Throughout the world, the discovery of a new shipwreck is often accompanied by the overarching question of ownership. When vessels of particular historical importance or monetary value are discovered, the question of ownership can become the subject of lawsuits and legal battles between private corporations and government agencies. To limit this, laws have been developed to help determine possession. As with many other countries, Canada has a system in place for determining ownership of a shipwreck, which falls under the Canada Shipping Act of 2001, Part 7.

Determining ownership is a process that involves several steps. In order to identify the proper owner, a Receiver of Wreck notification is issued in local newspapers. Notification for the *A.J. Goddard* was released on 25 June 2010 by the Receiver of Wreck, officer of the government of Canada in the *Whitehorse Star*, the *Boreal*, and the *Canada Gazette*. It requested that anyone with knowledge of the ownership of the *A.J. Goddard* contact the Receiver of Wreck at Transport Canada in Edmonton, Alberta by 2 July (*Whitehorse Star* 2010). The office allowed an extra two weeks for responses, though none were received.

In addition to placing the Receiver of Wreck notification in local newspapers, research was conducted by the Cultural Services Branch of the Yukon Government to determine the last owner of the *A.J. Goddard*. Though the ownership of the *A.J. Goddard* changed hands at least once, and possibly twice, during its career, determining exactly who purchased the vessel and when is impossible due to missing records (see Chapter III for more information) (Iceton 2010). As a result of being unable to identify the last owner in historical accounts, and the fact that no one contacted the Canadian Government regarding ownership of the *A.J. Goddard*, the vessel was released to the Yukon Government in a letter from Transport Canada, dated 28 July 2010. Under the Historic Resources Act Part 6, Section 66(4), Yukon Government assumed ownership.

Designation and Protection

Determining ownership of the vessel is only the beginning of historic preservation in the Yukon. Yukon Government, with assistance from John Pollack and Douglas Davidge, nominated the site for territorial designation; the nomination identifies the site's significance and detailed information about the vessel. The nomination was submitted to the Yukon Heritage Resources Board, an advisory board that evaluates the nominations and makes recommendations to the Minister in Yukon Government that is responsible for heritage. The site was then evaluated according to the following criteria: is it a rare or representative site type, does it fall within an exceptional time period, is it an example of unusual or exceptional technology, does it exhibit cultural value through association with an important event or person, and does it possess scientific value due to exceptional preservation, diversity, uniqueness, quality, or context (Yukon Heritage Resources Board 2011)?

As an important historical and cultural resource that met all of the criteria for a Yukon Historic Site, the *A.J. Goddard* was deemed worthy of protection. The Minister supported the Board's recommendation that the *A.J. Goddard* be designated as a Yukon Historic Site under the Yukon Historic Resources Act (HRA). Site designation provides the *A.J. Goddard* with an extra level of legal protection through Parts 4 and 6 of the Historic Resources Act, and makes it part of a system that helps to promote an appreciation for the historic resources of the Yukon Territory through Part 3, section 24 of the act (Yukon Historic Resources Act, 2009).

Designation involves a process similar to that of determining ownership. Prior to designating the *A.J. Goddard* as a Yukon Historic Site, a notice of intent was released to the public that allowed interested parties to object within 30 days. The notice was also broadcast over radio and television. If issued, the objections would be referred to the Yukon Historic Resources Appeal Board according to Part 3 of the Yukon Historic Resources Act (Yukon Historic Resources Act Part 3). The notice of intent issued for the *A.J. Goddard* stated the government’s intention to designate the *A.J. Goddard* shipwreck as a Historic Site, along with a circular parcel of land 7.60 hectares in size surrounding the vessel and the objects within, at a point 574 ft. (175 m) west of the eastern shoreline of Lake Laberge (*Whitehorse Star* 2010). No objections were raised, and the site was officially designated on 6 June 2010, in the middle of the 2010 field season.

Outreach

In the spirit of providing visible and accessible cultural heritage, the *A.J. Goddard* site has been opened to visitors. Due to the sensitive nature of a shipwreck site, and the allure of souvenir hunting, precautions have been put into place to protect the *A.J. Goddard* and its artifacts. Though the *A.J. Goddard* was carrying no gold at the time it sank, the artifacts themselves are valuable to souvenir hunters for their cultural significance and association with the shipwreck. With this in mind, the 2010 field team attempted to record as much information as possible about the artifacts that were left on the lake bed. This documentation provides base line data for ongoing monitoring of the site and its artifacts in the event that they are one day illegally removed from the vessel. However, the short field season and the wealth of artifacts made it such that there is still much information left to be discovered regarding the material culture of *A.J. Goddard.*

Not only do the *A.J. Goddard* artifacts provide valuable historical and archaeological information about life on board the vessel and the material culture associated with Yukon River steamboats, they tell the story of the boat in a very visual and poignant way. One of the greatest appeals of the *A.J. Goddard* site is that everything is the same as it was when the boat sank. It is a true time capsule.

In order to preserve the *A.J. Goddard* and yet make it available for people to visit, there are a number of safeguards in place. The Yukon government made it possible for recreational divers to visit the site if they obtain a permit from the Cultural Services Branch of the Yukon Territorial Government. Accessibility for recreational divers was made available after the *A.J. Goddard* was nominated as a historic resource, which occurred during the 2010 archaeological field season to ensure that the field team had time to record as much of the vessel as possible before visitors arrived. One short season, from June until the end of September, resulted in 20 visitors to the site.

Due to the remote nature of the shipwreck, it is necessary for most divers to charter a dive boat to take them to the site. Up to this point, the local dive shop owner, Larry Bonnett, has organized the dive trips, taken out the permits for his clients and taken all of the visiting divers to the site. Mr. Bonnett, along with some other members of the Whitehorse and Laberge communities, feels a strong sense of stewardship of the *A.J. Goddard*. This provides the site with an extra level of protection, as visitors to the *A.J. Goddard* are monitored. Mr. Bonnett ensures that all divers are aware that the dive site is protected under the HRA, makes sure artifacts are not touched, and makes it clear on his website and during the dives that the vessel is a protected historic resource. Yukon Government maintains a list of divers, their contact information, and dates of the dives.

Conservation of Artifacts

The 2010 season of the *A.J. Goddard* project operated under a Class 2 permit from Yukon Archaeological Sites Regulation, which permits the removal of artifacts from an archaeological site in addition to allowing non-invasive recording of the site. Due to the sensitive nature of artifact removal and care, a team of conservators and museum specialists from the Yukon Cultural Services Branch, the Yukon Transportation Museum, and field archaeologists gathered prior to the field season to determine which types of artifacts to recover and the parameters within which selections would be made. This was done to eliminate the issue of recovering too many artifacts to conserve, or artifacts too difficult to conserve, with the project's resources. While it was possible to form a basic idea of what would be recovered, it was clear that it would be necessary to make decisions regarding recovery while in the field. A specialist from the Yukon Cultural Services Branch and representative for the Yukon Transportation Museum's collections, Valery Monahan, joined the field team in order to provide on-site conservation expertise and to make the final decision regarding what would be recovered and kept.

During the 2010 field season, 31 artifacts were retained from the *A.J. Goddard* site. They were sent to the Yukon Transportation Museum for conservation, conducted under the supervision of Monahan. The majority of the artifacts stayed in the Yukon for conservation, though the E. Berliner gramophone and the steam gauge were sent to the Canadian Conservation Institute in Ottawa for conservation due to their delicate nature and so that advanced equipment could be used to identify materials.

Most of the artifacts that were recovered are relatively simple to conserve and were found in stable condition. The empty glass bottles and lantern chimney needed little attention; they were cleaned with a dilute detergent and water and are now ready for display. Metal artifacts are generally small and artifacts or artifact components made of copper alloy are well preserved. Most metal artifacts will be mechanically cleaned, dried and given protective coatings. The large steam whistle and steam pipe assembly will be treated at the Yukon Transportation Museum using electrolytic reduction, a process that may take up to two years.

Textiles, some of which are still in good condition, underwent successive baths in fresh, deionized water to remove silt and contaminants. When necessary, mild detergent, gentle manipulation, and sponging have been used to clean, unfold and properly orient the fabrics. Iron corrosion was removed from the dyed sock using a commercial iron stain product, and light mechanical work has been used to remove pieces of iron concretion that adhered to the shirt. Once clean, the textiles are air dried. Wood (such as the base of the gramophone), and vegetable-tanned leathers (the footwear), will be treated in polyethylene glycol solutions before being freeze-dried.

Unknown materials from significant artifacts were identified by the Canadian Conservation Institute using Infrared Spectroscopic Analysis. In the case of the gramophone records, small samples were removed from the front and back of the disks and analyzed by Fourier Transform Infrared Spectroscopy in the Attenuated Total Reflectance mode using a Travel IR ATR spectrometer from Sensir Technologies. The resulting spectra closely resembles that of degraded rubber, though a high component of silica and silicates indicates that these may have been used as a filler in the rubber or are a natural component of the surrounding silt on the bottom of Lake Laberge.

Exhibit

Upon the return of the artifacts to the Yukon Transportation Museum at the end of the field season on 11 June 2010, a series of open houses were scheduled for visitors to view the artifacts. Titled 'Oh My Goddard', the name of the exhibit conveyed the general excitement that was the result of the extensive news coverage. The artifacts were placed in shallow bins full of water in the Yukon Transportation Museum so that they could be viewed by the public while conservators and museum specialists Valery

Monahan, Casey McLaughlin, Cathy Ritchie, and Heather Jones gave casual tours and answered questions. Two hundred visitors took part in these behind-the-scene tours.

A second exhibit, called “A Very Personal Kind of Wreck: Finding the *A.J. Goddard*” premiered in November 2011 in downtown Whitehorse. The exhibit explored the research behind the project by displaying both the technology used to record the ship and the impressions of the researchers who worked on it. Technology was used frequently throughout the exhibit, and images were displayed on televisions and iPads, while researchers impressions were available through iPods. The exhibit itself, which was inspired by pride of place, was aimed at a seasonal local Yukon audience.

Once treatment on the artifacts is completed, they will be incorporated into a more permanent Yukon sternwheeler exhibit at the Yukon Transportation Museum that will open in summer of 2012. Though the shipwreck site is open to visitors, its remote nature and difficult conditions for diving make it unlikely that most of the population of Whitehorse or visitors will be able to see the site first-hand. The permanent museum exhibit will be far more accessible to visitors and locals, thus allowing a greater number of people to view and learn from the artifacts from the *A.J. Goddard*.

Upon completion of conservation, all artifacts will be incorporated into the exhibit. Lack of storage space and a desire to preserve the intact nature of the wreck site resulted in only display artifacts being recovered from the wreck site. Some artifacts are in such good condition that they will be displayed “in use,” such as the sock, which will be fitted onto a three dimensional mount. The treated record player will be mounted on a wooden base to give an idea of what it would have looked like when in use, though it will be visually clear which pieces are historic and which are modern. Recordings of some of the songs from the records will be played.

Modern Personal Interpretations

While the *A.J. Goddard* exhibit at the Yukon Transportation Museum is a professional interpretation of the *A.J. Goddard* designed to share its history with the public, there have been a number of modern personal interpretations of the steamboat as well. Upon the rediscovery of the *A.J. Goddard* in 2008, Brooks Martin and his family in Montana built a scale working model of the steamboat and donated $100 to the *A.J. Goddard* project (Figure 8.2) (Martin 2009).

Inspired by the discovery of the *A.J. Goddard* and by other Canadian songwriters who have written about historic shipwrecks, Kim Beggs of the Yukon wrote a song about the steamboat titled *SS* Goddard *Shipwreck* (Kim Beggs 2011, elec. comm.). As with many fantastic tales from the past, ghost stories live on about the *A.J. Goddard*, including one set at the ranger cabin at Sheep Camp on the Chilkoot Trail in which a man’s voice can be heard saying “Come on Clara, it’s not much farther, we’re almost there…” (McCluskey 2011). An alternate ghost story involves the appearance of the ghost of Fay Ransom’s mother, who reportedly leapt from a bridge in 1907 in sorrow over the death of two of her sons and her husband (Fisk 2008).

FIGURE 8.2. Model of the *A.J. Goddard* built by the Martin family (Photo by Brooks Martin).

CHAPTER IX
CONCLUSION

Future Research

As with many archaeological and historical studies, research into the *A.J. Goddard* has revealed many new questions regarding its place in history, the vessel's construction features, material culture, and future conservation and heritage preservation efforts. The field seasons on the *A.J. Goddard* and the years of research have attempted to gather as much data as possible, and by synthesizing it in this study, to determine the questions remaining to be answered.

Hull Construction

Most shipwrecks are missing substantial portions of their structure, which results in a researched hypothetical reconstruction of the vessel. As there is no way to answer remaining questions through the missing archaeological remains, this is the only way to develop an understanding of the hull. While it would have been possible to create hypothetical reconstructions for structural elements of the *A.J. Goddard* that were not recorded during the field season, this was not done due to the intact state of the vessel on the bottom of Lake Laberge. The wreck is simply waiting to be surveyed again. Hypothetical reconstructions could only hope to be partially correct, while future field work will provide definitive answers. The questions remaining to be answered are laid out below.

While the BV-5000 addressed many issues regarding lack of time for recording the vessel, gray areas in our understanding of the hull construction remain, particularly in the interior of the hull. An attempt was made during the 2010 season to record the vessel's hull lines using traditional methods as well as the BlueView unit. While it was possible to obtain partial lines for the bow and stern through a combination of both methods, the sediment surrounding the hull prohibited this, particularly around the bilge at amidships. Excavation of the sediment within the hull and around the bilges would allow complete hull lines to be recorded in the future, which is necessary for a true understanding of the vessel. The majority of Yukon River steamboats had square or angular chines, and while it is clear that the *A.J. Goddard* has a curved bilge, the exact nature of this curve is uncertain.

In addition to obscuring the bilge, sediment within the hull obscures the bottom 4 in. (10.16 cm) of interior construction. As a result, the type of keel or keel plank is unknown, as is the type of join between the longitudinal truss built bulkheads and the bottom of the vessel.

While it was possible to partially record and obtain an idea about the sizes and layout of the deck plates as well as the fastening pattern, particularly for the longitudinal lines of rivets, this task is far from complete. The frames are made from 2 in. (5.08 cm) angle iron; are they made of more than one piece? How are they attached to the keelson, if there is a keelson? Do the hogposts terminate at deck level directly above the transverse bulkheads as this study's reconstruction suggests? How is the transom constructed, and what does the interior of the extreme forward end of the bow look like? Though many of the deck beam locations were recorded with certainty, what about the others? Is all of the wood local spruce as it is suspected to be? What are the paths of the steam pipes below the deck? What type of condenser was used? Is the location of the aftermost set of hatches on the current reconstruction correct?

Artifacts

While the 2010 team attempted to record as many artifacts as possible, there are many still unidentified. How many more artifacts are surrounding the wreck? Of the artifacts that were identified but not recorded due to lack of time, what are their dimensions? Poor visibility for most of the season prohibited artifact photography – 33 numbered artifacts were not found and photographed within the few good visibility days. In addition, many of the artifacts remaining underwater were not measured. Do any have identifying marks? Are there maker's marks on the forge or stove? Exactly how far does the artifact debris field extend, and in what direction? Where have the larger artifacts gone, such as the stacks for the boiler and the stove, and portions of the pilot house? These could indicate more about the path of the *A.J. Goddard* as it fought the waves the night that it sank. An analysis of hull design and gross tonnage, combined with wave modeling, could perhaps indicate more about the wrecking.

History

Are there truly no plans in existence for *A.J. Goddard*? Though many people in both Canada and United States have searched, it was impossible to locate them during the course of this study. Where are Albert Goddard's notes from designing the vessel? Construction instructions must have existed to assist builders in assembling the vessel, but where are they?.

We know little of the nature of this vessel's construction in the wilderness, but photographs do indicate that large sections were transported intact. Spacing between structural elements, such as the deck beams (and therefore the frames and stanchions as they are all riveted together) is far more irregular than expected. While spacing variations of several centimeters between frames on a wooden vessel would not be strange, why is the pattern of the *A.J. Goddard's* deck beams so erratic? An ability to make slight modifications in order to fit the various pieces together would be incredibly useful – did the wilderness shipwrights have this flexibility in construction? Patterns of stanchions indicate that they installed them with little regard for pattern, were they able to do this with more complicated modifications to the original design, like precise spacing of deck beams?

Who else owned the *A.J. Goddard* once the Upper Yukon Company sold it, and what type of cargoes did it carry? In addition to the many members of the *A.J. Goddard* field and research team, skilled researchers and archivists across Canada and the United States have searched databases, archives, and personal collections for these answers with little luck (Iceton 2011, Robert Schwemmer 2010, elec. comm.). Hopefully there are more answers hidden away in collections that have been missed.

Preservation

How has a year of visitors affected the *A.J. Goddard*? How will 10 years of visitors affect it? Are all of the artifacts still in place? Did the artifact tags work as a deterrent to theft as the field team and Cultural Services hoped they would? The Yukon is not immune from the depredations of treasure hunters; will the laws protecting the *A.J. Goddard* save it from this threat? Has the hull itself been disturbed in anyway? Will corrosion accelerate with time, as has happened with the USS *Arizona*?

Concluding Thoughts

During 1898, the Yukon Territory developed a rich maritime culture as hundreds of rafts, canoes, barges, and steamboats flooded the area. Though the rush of vessels was over by 1899, the maritime landscape of the region was forever changed. Sternwheelers would ply the waters of the Yukon River until 1957, when the last steamer, the *Keno*, was retired (Turner 2007:229). At least 266 sternwheelers operated in the Yukon between 1898 and 1957, 131 of which were built specifically for the Klondike Gold Rush (Affleck 2000:71-85; Pollack 2009).

The enormous demand for transportation in 1897 resulted in a mass mobilization across the country. Condemned or retired vessels were brought back into service, and anything that was relatively seaworthy, from steamers to schooners, was sent towards the Yukon (Berton 2001:125). According to a newspaper from January 1898, "any old thing, so long as it would float, was sent north" (*New York Times* 1898b). Some ships were converted to their new task of traveling the Yukon River, while others were renovated or built anew in cities from Philadelphia to St. Michael, Alaska. Some were prefabricated and carried over the Chilkoot Trail or White Pass, such as the *A.J. Goddard*, while yet others were built and sailed across the Bering Sea, either alone or in convoys. These vessels transported the thousands of men and women who would shape the Yukon for years to come.

The *A.J. Goddard* is not a unique vessel, though it is unusual. Of the 266 sternwheelers that operated on the Yukon River, the majority were large multi-decked wooden vessels. *A.J. Goddard* is the only surviving example yet found of one of the smaller steamboats, and of the Klondike sternwheelers still scattered along the bank, it is the best-preserved in its original form. Work thus far has revealed that the *A.J. Goddard* possessed a simple design and construction. It appears that the need to carry it over a mountain influenced its design as much as the qualities of the Yukon River. Modifications were made over the course of its short career to make it more suitable, but its tragic end indicates that it was not a good choice for open-water navigation, though it admirably and successfully fulfilled its mission of serving throughout the gold rush. Though it was not ideally suited for the river and lakes environment for which it was built, the quickness and ingenuity with which the vessel was constructed made it one of the few vessels, out of the thousands that set out for the Yukon in the summer of 1898, to actually make it to Dawson in time for the gold rush without being delayed by ice in the north, as so many were.

The intact state of the wreck and its cargo, which remain virtually undisturbed as a historic site open to visitors, provides a tangible link to the past. This, combined with the story of Albert and Clara, provide a detailed view of the life and times of one of the small sternwheelers that served the prospectors of 1898. Afloat for less than four years, the short story of the *A.J. Goddard* is one that truly conveys the ingenuity and perseverance against terrible odds that characterized the short-lived, but passionate, Klondike Gold Rush.

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APPENDIX A

ARTIFACT CATALOG

More than 100 artifacts are scattered on and around the hull of the *A.J. Goddard*. The locations of the artifacts were recorded using relative measurements to the hull and trilateration off the hogposts, which were labeled A-J for clarity. The locations of artifacts on or very close to the hull were recorded in relation to hull construction features, and these descriptions are provided with each artifact. Positions of artifacts that were relatively far from the hull were recorded using trilateration measurements taken from the hogposts. The trilateration measurements are provided in the catalog and are labeled with the hogpost designation letter and the offset distance from the hogpost. For example, an artifact that was offset 7 feet from the C hogpost is indicated by C 7 ft. (2.13 m). Due to the fact that one of the aft starboard hog posts is missing, a steam pipe to the engine was used as the G control point (Figure A.1). The positions of the artifacts on the site can be viewed in figure A.2.

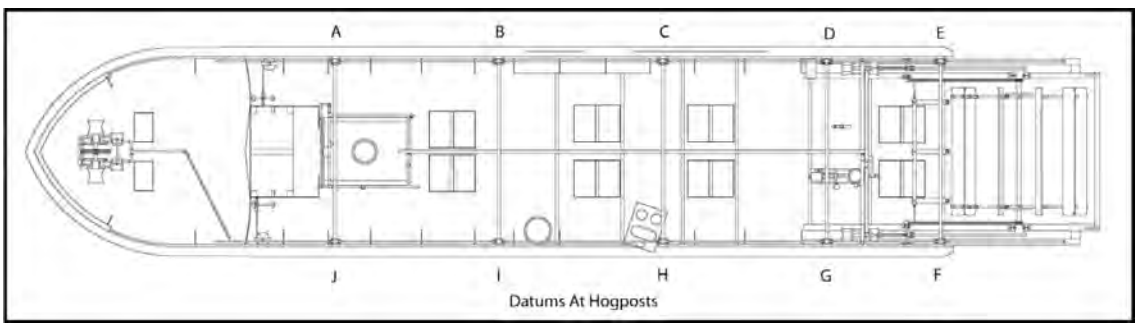


FIGURE A.1. Hogpost control points used to record the locations of artifacts.

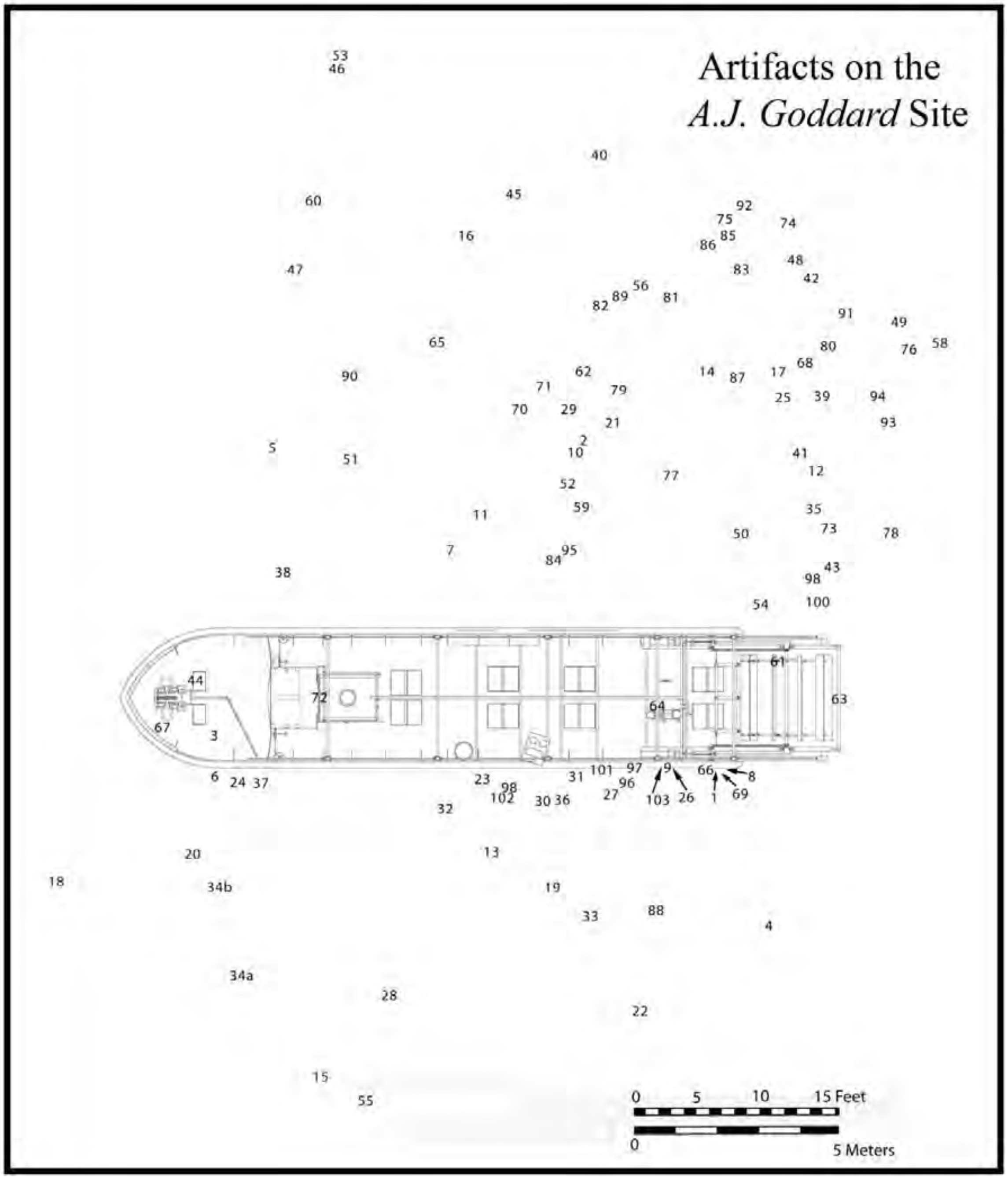
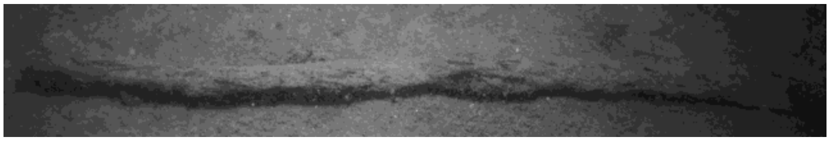


FIGURE A.2. Positions of artifacts on the site.

Tools

JiUt-5:3



Wooden axe handle
Site location: On the deck.
Dimensions: Length - Approximately 3 ft. (91.5 cm); Width – Approximately 1-1/2 in. (3.8 cm)

JiUt-5:6

Iron and wood axe.
Site location: 8 ft. 10 in. (2.7 m) forward of J hogpost

JiUt-5:8

Iron Pry Bar.
Site location: H 14-3/4 ft (4.5 m), F 16-9/10 in. (0.43 m)

JiUt-5:21

Iron tool, possibly a socket wrench.
Site location: A 28 ft. 8-9/10 in. (8.76 m), E 20 ft. 11-1/5 in. (6.38 m)
Dimensions: Length – Approximately 12 in. (30 cm)

JiUt-5:24

Iron and wood shovel.
Site location: J 8 ft. 6-2/5 in. (2.6 m) F 40 ft. 4-1/5 in. (12.3 m)
Dimensions: Shovel Head Length – Approximately 12 in. (30 cm); Handle Length – Approximately 3 ft. (91.5 cm)

JiUt-5:32
Iron and wood shovel.
Site location: J 10 ft. 2 in. (3.1 m), F 24 ft 3-3/10 in. (7.3 m)

JiUt-5:37
Wooden tool handle.
Site location: J 7 ft. 3/5 in. (2.15 m), F 39 ft. 4-2/5 in. (12 m)
Dimensions: Handle Length – Approximately 3 ft. (91.5 cm)

JiUt-5:49
Wooden tool handle, possibly an auger handle.
Site location: E 28 ft. 10-1/2 ft (8.8 m), A 52 ft. 5-9/10 in. (16 m)

JiUt-5:52
Box made of sheet metal with a square cross section.
Site location: A 22 ft. 11-3/5 in. (7 m), E 18 ft. 8-2/5 in. (5.7 m)
Dimensions: Length – Approximately 10 in. (25.4 cm); Width – Approximately 6 in. (15.24 cm)

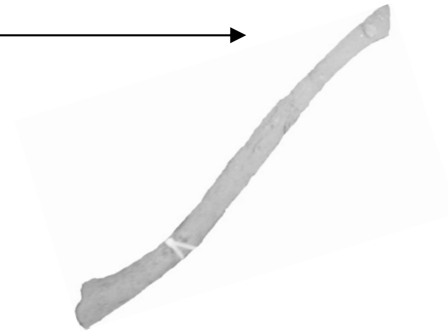
JiUt-5:58
Metal shears, concreted open and resting in the sediment.
Site location: A 54 ft. 5-1/2 in. (16.6 m), E 28 ft. 10-1/2 in. (8.8 m)
Dimensions: Length – Approximately 6 in. (15.24 cm)

JiUt-5:59
Unidentified tool, unknown material.
Site location: A 22 ft. 8-4/5 in. (6.93 m), E 17 ft. 2-7/10 in. (5.25 m)

JiUt-5:61
Wooden and wrought iron mallet. Wood handle and head with two iron bands wrapped around extreme ends of head. Handle is a separate piece inserted into head. Iron alloy bands encircle the ends of the head to support the working surfaces. Wood is black (waterlogged) and has some iron corrosion. Handle is thin (possibly eroded) in middle and toward the proximal end. The iron bands are approximately ¾ in (1.91 cm) wide.
Site location: 3 ft. 6-1/10 in. (1.07m) from starboard side under the sternwheel
Dimensions: Length overall – 12-1/2 in. (31.75 cm); Handle length – 9 in. (22.86 cm); Head diameter – 8-3/5 in. (21.85 cm); Handle diameter – 3-1/2 in. (8.89 cm)

JiUt-5:65
Wood and iron axe, double bit head.
Site location: E 34 ft. 8-1/2 in. (10.58 m), A 25 ft 7-9/10 in. (7.82 m)

JiUt-5:67



Slightly curved wood axe handle with flared base and metal pin through the head. It is missing the iron axe head.
Site location: 8 in. (20cm) to port of windlass on deck.
Dimensions: Length – Approximately 3 ft. (91 cm)

JiUt-5:69

Wood and iron drill brace.
Primarily made of iron, the drill brace has two wooden handles, a circular one at the top and a cylindrical one at the midsection. A drill brace with a six in. sweep similar to this one is listed in Sears, Roebuck & Co.'s 1897 catalog for $1.14. For that price, the purchaser would receive the latest improved barber ratchet brace with alligator jaws and a ball bearing head. Though the 10 in. size is most common and ideal for general work, the catalog states that the 6 in. sweep size is favored by electricians (Sears, Roebuck & Co. Catalog 1897:521).
Site location: Underneath port stern.
Dimensions: Sweep – 6 in. (15.24 cm); Length overall – Approximately 15 in. (38 cm)

JiUt-5:71

Iron tool, possibly blacksmith tongs.
Site location: A 26 ft. 10-4/5 in. (8.2 m), E 25 ft. 7-1/10 in. (7.8 m)

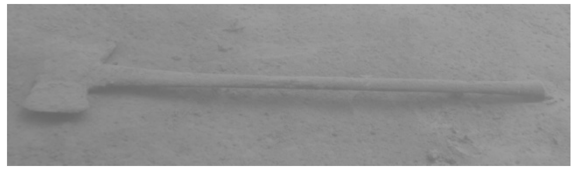
JiUt-5:74

Tool handle, possibly that of an auger.
Site location: A 49 ft. 10-2/5 in. (15.2 m), E 34 ft. 1-2/5 in. (10.4 m)

JiUt-5:78

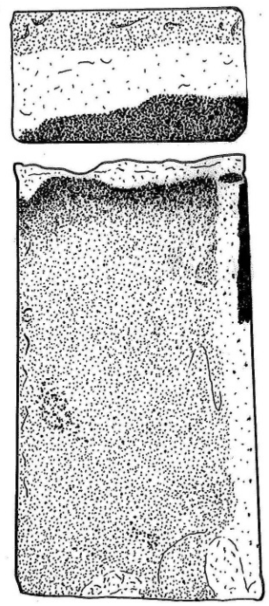
Valve with screw knob.
Site location: E 14 ft. 7-1/5 in. (4.45 m), A 45 ft. 11-1/5 in. (14 m)

JiUt-5:82

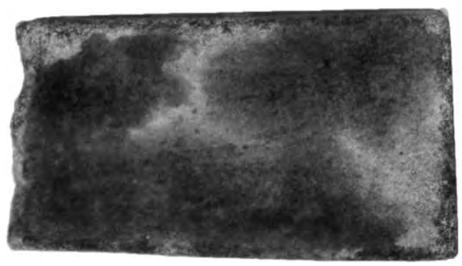


Wood and iron double bit axe.
Site location: E 34 ft. 1-2/5 in. (9.04 m), A 34 ft. 9-3/10 in. (10.6 m)

JiUt-5:94 / 2010.25

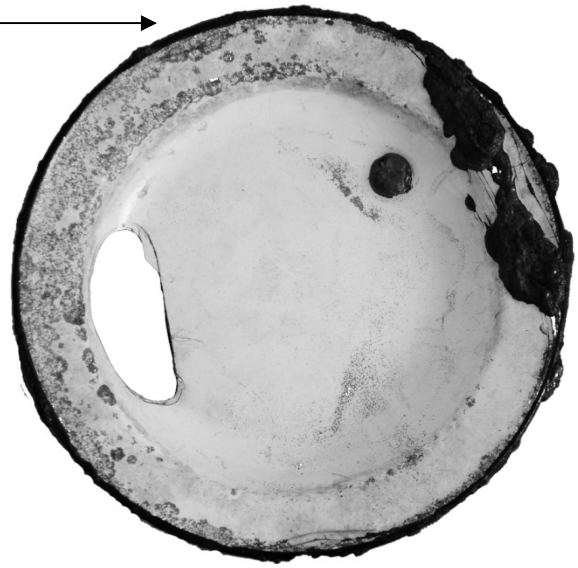


Rectangular stone Whetstone, shows use wear. Stone is tan and brown with green and black tints.
Site location: A 48 ft. 10-3/5 in. (14.9 m) E 22 ft. 11-3/5 in. (7 m)
Dimensions: Length - 3-9/16. (9.05 cm); Width – 2-4/5. (7.11 cm); Thickness – 1-1/10 in. (2.3 cm)



Galleyware

JiUt-5:5



Round enamelware metal plate. Glaze is white with a dark blue rim 1/8 in. wide. Mark in blue transfer print on the center of the underside: "MCCLARY'S FAMOUS DEEP ENAMELWARE". Part of bottom is corroded away, glaze cracking and flaking. . Called a "Captain of Industry" in Canada by *The Canadian* magazine, John McClary introduced the system of branch distribution warehouses to Canada in order to more efficiently distribute his stoves and kitchenware (Carlyle 1908:542-544).
1/6 in. x 1/6 in. (0.42 cm) just below lip.
Site location: A 40 ft. 10-1/5 in. (12.45 m) E 16 ft. 9/10 in. (4.9 m)
Dimensions: Diameter – 10 in. (25.4 cm); Height – 3-2/5 in. (8.64 cm)

JiUt-5:13 / 2010.7

Slender, transparent green glass bottle with sloping shoulders and no marks and rolled lip, possibly blown into the mold. Small chip of less than 1/6 in. x 1/6 in. just below lip. Horizontal striations visible in glass.
Site location: J 14 ft. 11-5/10 in. (4.56 m) F 21 ft. 1-9/10 in. (6.45 m)
Dimensions: Height – 9-9/22 in. (23.9 cm); Main diameter – 2-1/2 in. (6.35 cm); Mouth diameter – 1 in. (2.54 cm)

JiUt-5:17

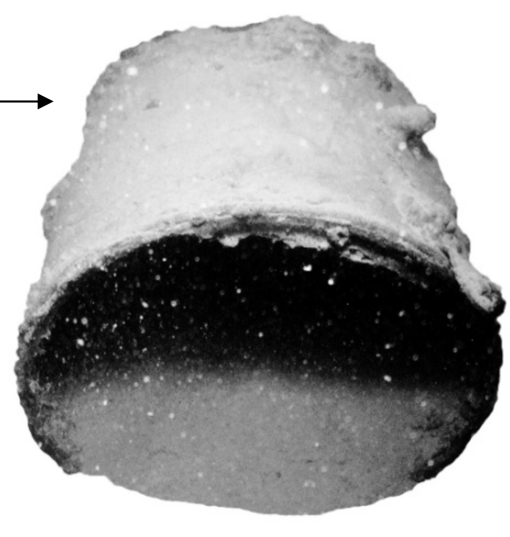
Enamelware metal cup with rolled rim and strap handle. Glaze is light grey with darker grey mottling. No maker's mark visible. Hole in bottom, enamel has heavy deposit of iron corrosion product. Cup is very fragile. The cup is comparable to a nearly identical blue one that can be found in the Sears, Roebuck & Co. catalog from 1897. They cost 11 cents each, or $1.54 per dozen (Sears, Roebuck & Co. Catalog 1897:587).
Site location: E 22 ft 6-1/10 in. (6.86 m), A 42 ft 7-3/5 in. (13 m)
Dimensions: Height – 2-13/25in. (6.4 cm); Diameter – 4-5/8 in. (11.75 cm)

JiUt-5:18 / 2010.90

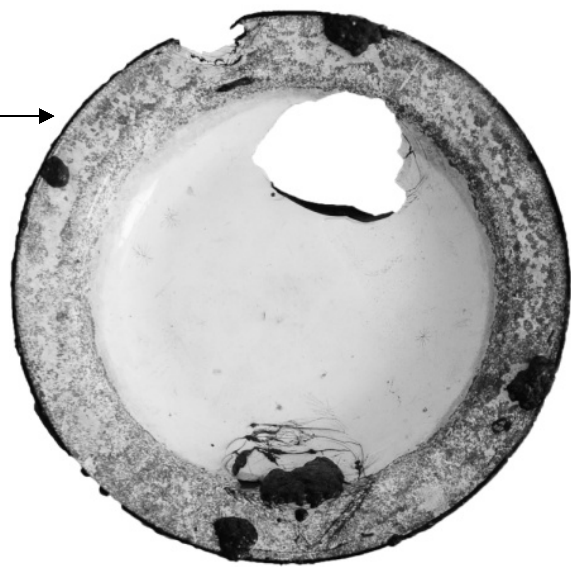
Slender, pale blue-green glass bottle with rounded shoulders, straight sides, and a flaring neck. Mold-blown with an applied lip mark on bottom "P". Matte finish is probably the result of glass deterioration post-sinking. Few small bubbles, no chips or cracks. Possibly for rum, lemon hart, or whiskey.
Site location: J 23 ft. 11-2/5 in. (7.3 m), H 41 ft. 1/10 in. (12.5 m)
Dimensions: Height – 11-13/59 in. (28.5 cm); Diameter – 3-1/10 in. (7.87 cm)

JiUt-5:23

Pot made of sheet metal or cast iron with circular cross section. Iron corrosion product and concretion cover the pot, which is tipped onto its side and partially buried in sediment.
Site location: J 12 ft. 11-9/10 in. (3.96 m), F 19 ft. 4-3/10 in. (5.9 m)
Dimensions: Height – Approximately 10 in. (25.4 cm); Diameter – Approximately 12 in. (30.48 cm)



JiUt-5:28 / 2010.12
Square, clear glass bottle sealed with cork and white metal, possibly foil. Bottle has vertical mold seam visible from just below shoulder to bottom of rim. Horizontal seam mold just below shoulder. Unknown contents, aroma and color suggest essence of vanilla.
Site location: J 12 ft. 11-9/10 in. (3.96 m), F 19 ft. 4-3/10 in. (5.9 m)
Dimensions: Height - 6-8/9 in. (17.5 cm); Width of body - 3-7/20. (8.5 cm); Width of mouth – 1-1/3 in. (3.4 cm)



JiUt-5:35
Round enamelware metal plate. Glaze is white with a brownish black rim. No maker's mark. Plate has 2 holes in bottom. Glaze is spalling around holes. Lip heavily stained with algae. Several areas of raised iron corrosion/concretion.
Site location: E 12 ft. 5-3/10 in. (3.8 m), A 40 ft. 4-1/5 in (12.3 cm)
Dimensions: Diameter - 9 -9/22 in. (23.9 cm); Height – 1-5/8 in. (4.13 cm)

JiUt-5:36

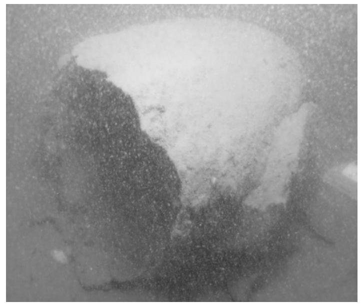
Enamelware metal pitcher, globular body with high sloping spout and applied handle, which is missing. Glaze is white with a brownish black rim. No maker's mark is evident. Enamel is chipping and cracking, particularly around the edges and broken sections.
Site location: F 14 ft. 1-3/10 in. (4.3 m), J 18 ft. 6-2/5 in. (5.65 m)
Dimensions: Height – 6 in. (15.24 cm); Diameter of body – 3-3/4 in. (9.53 cm)

JiUt-5:45 / 2010.16

One pint bottle of molded, transparent brown glass. Embossed words on shoulder read "FEDERAL LAW PROHIBITS SALE" on one side and "OR RE-USE OF THIS BOTTLE" on the other side. On both broad sides just above the base are raised letters: "ONE PINT". Bottom reads "64 D11 36" on three lines (one number directly below the last). Top of neck is threaded. Glass is dirty but appears stable.
Site location: A 38 ft. 10-1/2 in. (11.85 m), E 40 ft. 4-3/10 in. (12.31 m)
Dimensions: Height - 8-1/9 in. (20.6 cm); Width broad side - 4-9/10 in. (12.45 cm); Width narrow side – 1-7/8 in. (4.76 cm); Diameter of mouth – 1 in. (2.54 cm)

JiUt-5:48

Large cup with curved sides that connect to a rounded bottom. Possibly made of tin. Artifact identification tentative.



Site location: E 31 ft. 5-9/10 in. (9.6 m), A 48 ft. 6-7/10 in. (14.8 m)

Dimensions: Length – Approximately 6 in. (15.4 cm); Diameter - Approximately 4-1/2 in. (11.43 cm)

JiUt-5:56

Mug made of unknown material.

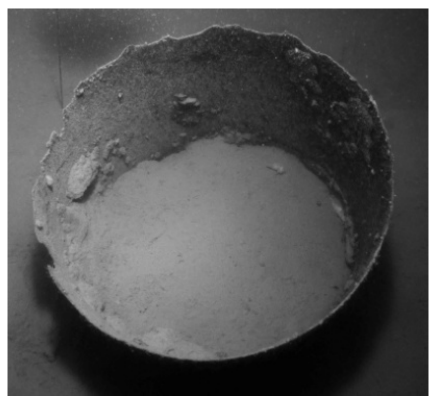
Site location: E 29 ft. 6-3/10 in. (9 m), A 36 ft. 8-9/10 in. (11.2 m)

JiUt-5:73

Large metal pot with straight sides, a flat base, and a simple rim. No handle is evident. It is sitting upright and partially filled with sediment. Light corrosion product covers the pot.

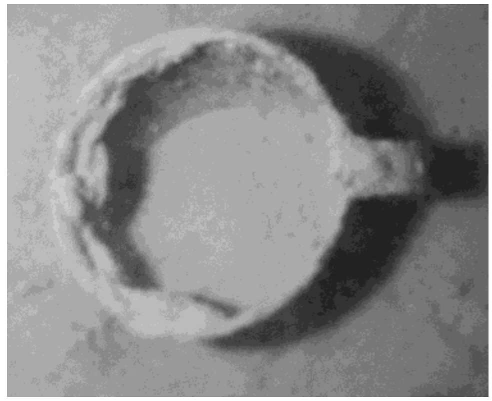
Site location: E 11 ft. 9-7/10 in. (3.6 m), A 41 ft. 1/10 in. (12.5 m)

Dimensions: Diameter - Approximately 12 in. (30.48 cm)



JiUt-5:87

Enamelware metal cup with small strap handle. Sitting upright in sediment.
Site location: E 21 ft. 7-8/10 in. (6.6 m), A 39 ft. 1-7/10 in. (11.93 m)



JiUt-5:93

Enamelware metal cup.
Site location: A 48 ft. 10-3/5 in. (14.9 m), E 21 ft. 7-3/5 in. (6.6 m)

JiUt-5:98 / 2010.29

Three prong iron fork associated with concreted enamelware plates.

Left and middle prong are broken, and handle is wide and wrapped in dark fabric.
Site location: J 14 ft. 9-1/5 in. (4.5 m), F 18 ft. 8-2/5 in. (5.7 m)

Ship Parts

JiUt-5:10

Iron Concretion with gaskets.
Site location: E 20 ft. 10-2/5 in. (6.36 m), A 24 ft. 10-2/5 in. (7.58 m)

JiUt-5:15 / 2010.8

Rectangular iron door latch mechanism with rounded ceramic door knobs attached.
Site location: J 25 ft. 2 in. (7.67 m), H 31 ft. 2 in. (9.5 m)

JiUt-5:20

Wood and iron single sheave block, partially buried in sediment.
Site location: J 13 ft. 3-2/5 in. (4.05 m), F 44 ft. 7-2/5 in. (13.6 m)

JiUt-5:22

Wood plank.
Site location: J 32 ft. 1-4/5 in. (9.8), F 21 ft. 3-9/10 in. (6.5 m)

JiUt-5:25
Iron Y pipe splitter.
Site location: E 20 ft. 2-1/2 in. (6.16 m), A 41 ft. 4-1/10 in. (12.6 cm)
Dimensions: Length – Approximately 16 in. (40.64 cm)

JiUt-5:29
Metal piece, possibly a crankshaft.
Site location: A 26 ft. 11-1/5 in. (8.21 m), E 22 ft. 11-3/5 in. (7 m)

JiUt-5:30
Nine unidentified slender iron pieces covered with concretion and connected together. Possibly 9 parallel fasteners. Undetermined length is buried in the sediment directly next to the hull.
Site location: J 17 ft. 7/10 in. (5.2 m), F 15 ft. 5 in. (4.7 m)
Dimensions: Conglomeration Length – Approximately 12 in. (30.48 cm); Conglomeration Width – Approximately 10 in. (25.4 cm)

JiUt-5:31
Tie rod.
Site location: J 20 ft. 2/10 in. (6.1 m), F 10 ft. 2 in. (3.9 m)

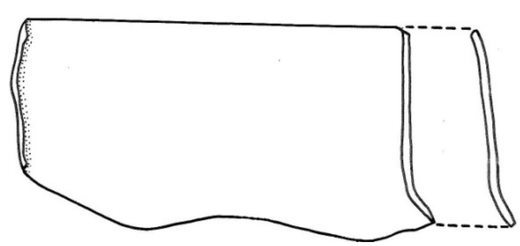
JiUt-5:34

Cast copper alloy 4 inch chime steam whistle and safety valve attached to sections of iron steam pipe assembly. The steam whistle, which fell into the sediment sometime during or after the wrecking event, was originally attached to the forward side of the boiler, from which it received the steam required to produce its characteristic shriek. Two pipes lead up from the boiler, one to the whistle and one to the safety valve.
The steam whistle features elaborate workmanship and several separate parts. At this phase of conservation, it is not possible to search all of its components for marks. One mark was found, however, stamped on the bowl. Less than a ¼ of an in. in height, it reads CROSBY STEAM GAGE & VALVE CO BOSTON US PATENT JAN 30 1877. On the angled surface at the bottom of the whistle, where it inserts into the iron steam pipe, is the stamped the numbers "4344".
The steam whistle and the safety valve were made by the Crosby Steam Gage and Valve Co. of Boston, Massachusetts. Both elements have the name of the company stamped into the brass in very small letters that wrap around the curved surface of the whistle and valve.
Site location: Whistle End – J 18 ft. 8-2/5 in. (5.7 m), F 43 ft. 11-3/5 in. (13.4 m); Pipe End – J 13 ft. 7-2/5 in. (4.15 m), F 43 ft. 5-3/5 in. (13.25 m)

JiUt-5:38

Wood plank tapered at end due to damage.
Site location: A 6 ft. 11-1/0 in. (2.11 m), E 37 ft. 8-4/5 in. (11.5 m)
Dimensions: Length – Approximately 2-1/2 ft. (6.35 cm); Width – Approximately 4-1/2 in. (11.43 cm)

JiUt-5:41 / 2010.15



Fragment of clear, flat plate glass.
Site location: E 16 ft. 1-7/10 in. (4.92 m) A 40 ft. 1-1/5 in. (12.45 m)
Dimensions: Height - 3-7/10 in. (9.4 cm);

Width – 1-1/2 in. (3.81 cm); Thickness – 1/10 in. (0.25 cm)

JiUt-5: 42

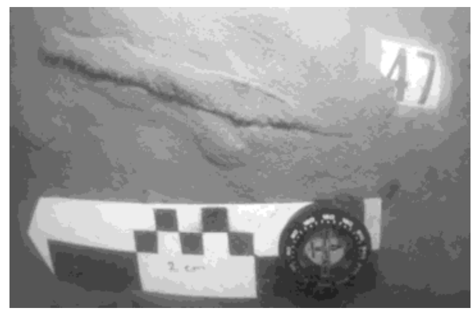
Iron rod.
Site location: A 48 ft. 6-7/10 in. (14.8), E 30 ft. 2-3/5 in. (9.21 m)
Dimensions – Length – Approximately 2 ft. (61 cm)

JiUt-5:43

Wood.
Site location: A 40 ft. 3/10 in. (12.2 m), E 8 ft. 2-2/5 in. (2.5 m)

JiUt-5:47

Unidentified artifact resting in sediment near vessel, possibly an extra turnbuckle.
Site location: E 30 ft. 6-1/10 in. (9.3 m), A 46 ft. 11 in. (14.3 m)
Dimensions: Length – Approximately 10 in. (25.4 cm)



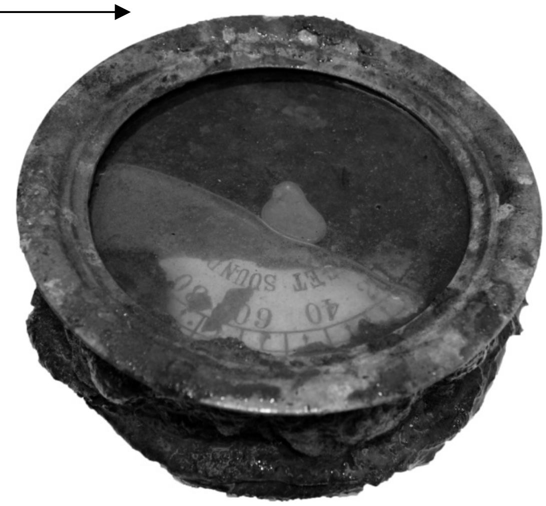
JiUt-5:53

Iron rod.
Site location: A 48 ft. 7-9/10 in. (14.83 m)

JiUt-5:55

Green glass navigation light. Incomplete in two pieces. Main piece is made of brass sheet with curved green glass globe. Secondary piece is a brass fitting with a threaded iron bolt.
Site location: J 27 ft. 2-4/5 in. (8.3 m), F 40 ft. 4-1.5 in. (12.3 m)
Dimensions: Length main piece – 7-9/16 in. (19.21 cm); Width main piece – 5-5/8 in. (14.28) cm; Length secondary piece – 3 in. (7.62 cm); Width secondary piece – 1-9/10 in. (4.82 cm)

JiUt-5:64 / 2010.20

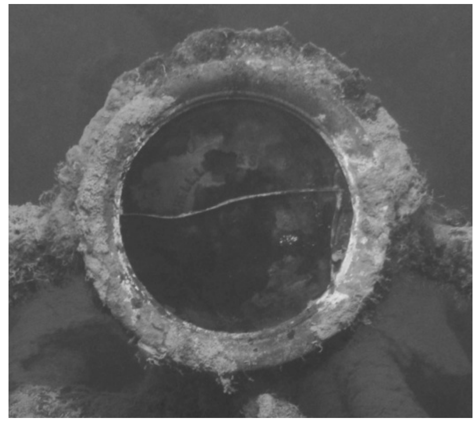


A steam gauge, associated with the engines, was recovered from the stern of the vessel where it had broken free of its original attachment place. Made of brass, iron, and glass, the round iron band is sandwiched between copper alloy rims and faced with curved clear glass. The space behind the glass is filled with an oil/hydraulic fluid and water mixture. The face of the gauge reads "Puget Sound Machinery [D]epot Seattle, Wash. American Steam G[auge] Boston 1-200 lbs." The Puget Sound Machinery Depot was established in Seattle in 1887, and by 1900 was the largest business of its type on the west coast. They manufactured all manner of steam machinery, from boilers and engines to pipes and valves (Puget Sound Machinery Depot Poster 1900).
Site location: Starboard side of steam control station
Dimensions: Diameter – 6-1/5in. (15.75 cm); Height – 2-5/8 in. (6.67 cm)

JiUt-5:68

Pipe.
Site location: E 23 ft. 1-9/10 in. (7.06 m), A 44 ft. 1-1/2 in. (13.45 m)
Dimensions: Length – 15-3/4 in. (40 cm)

JiUt-5:72



Boiler steam gauge. The artifact is fitted to the forward face of the boiler, connected to the steam pipe. The partially obscured letters _ _ _ CHELL, L_ _ _ _ & S_ _ _ _ _ _ _ _ appear on the gauge face. Old advertisements reveal that the boiler gauge for the *A.J. Goddard* was made by Mitchell, Lewis & Staver Co. in Seattle, Washington. The company specialized in supplying men and women headed for the gold fields of the Yukon. They manufactured both boilers and engines, automatic hoists and conveyors, and Klondike saw mills. In addition, they supplied wire rope, ore cars and buckets, ore crushers, drill steel, and shafting ("Mining in Alaska" 1897-1898).
Site location: Forward face of boiler

JiUt-5:76 / 2010.22

Pressure or safety valve of cast bronze. The steam whistle system, which includes the pressure valve, fell into the sediment sometime during or after the wrecking event and was originally attached to the forward side of the boiler, from which it received the steam required to produce its characteristic shriek. Two pipes lead up from the boiler, one to the whistle and one to the safety valve. The steam whistle and the safety valve were made by the Crosby Steam Gage and Valve Co. of Boston, Massachusetts. Both elements have the name of the company stamped into the brass in very small letters that wrap around the curved surface of the whistle and valve.
The safety valve exhibits a mark on the main curved surface that reads CROSBY STEAM GAGE & VALVE CO BOSTON USA PATENT JAN 25 1878 and MARCH 20_ _. The final markings after 20 are impossible to read due to damage or an incomplete stamp impression.
Site location: J 18 ft. 8-2/5 in. (5.7 m), F 43 ft. 11-3/5 in. (13.4 m);
Dimensions: Length - 5-10/77 in. (13 cm); Width - 4-24/25 in. (12.6 cm); Thickness – 2 in. (5.08 cm)

JiUt-5:88

Wood plank.
Site location: In line with the C hogpost on the starboard side.

JiUt-5:84

Wood planks.
Site location: J 28 ft. 10-1/2 in. (8.8 m), F 13 ft. 5-2/5 in. (4.1 m)

JiUt-5: 90

Lead patch.
Site location: A 21 ft. 3-9/10 in. (6.5 m), E 38 ft. 4-3/5 in. (11.7 m)

JiUt-5:101 / 2010.37

Iron spike
Site location: H 6 ft. 2-4/5 in. (1.9 m) aft in front of vice, associated with #96 and #97

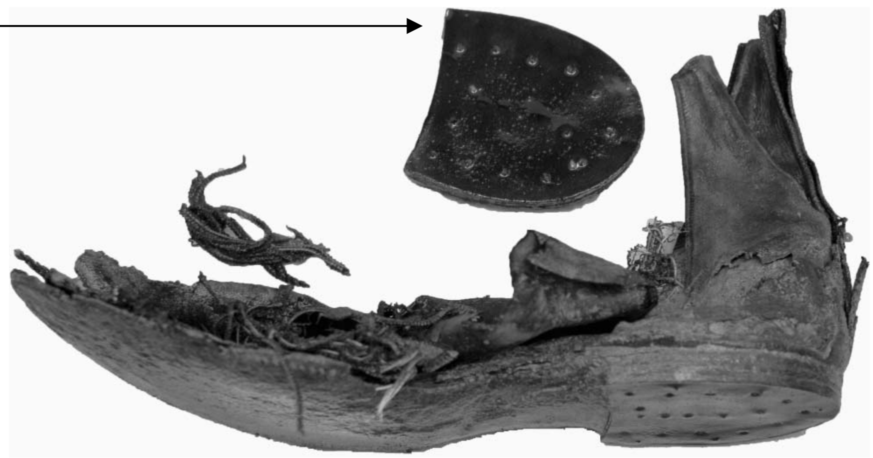
Clothing

JiUt-5:1

Several fragments of dark textile, possibly made of wool.
Site location: 20 in. (0.5 m) Forward of F hogpost on rail

JiUt-5:4 / 2010.5

Incomplete shoe with unknown lacing pattern. Machine-stitched, vegetable tanned leather, elastic-sided with one inch stacked leather heel and iron nails. Nails have corroded and allowed heel to separate from hose. Heel is worn down. Matching shoe was not found. Site location: F 3 ft. 11-1/5 in. (1.2 m), 16 ft. 9/10 in. (4.9 m) from the side of the hull



JiUt-5:27

Incomplete shoe made of vegetable tanned leather with unknown lacing. Shoe was not recovered from site.
Site location: J 23 ft. 11-2/5 in. (7.3 m), F 9 ft. 2-1/5 in. (2.8 m)

JiUt-5:54 / 2010.18

Incomplete shoe for the right foot machine stitched of vegetable-tanned leather. Sole is complete, attached to fragments of welt and upper. 1 inch leather stacked heel with iron nails found detached. Heel is worn down. Matching shoe was not found.
Site location: E 3 ft. 7-3/10 in. (1.1 m) & 3 ft. 3-2/5 in. (1 m) from wheel
Dimensions: Length – 11-3/10 in. (28.7 cm); Width – 2-23/25 in. (7.42 cm); Thickness – 1-1/10 in. (2.79 cm)

JiUt-5:95 / 2010.26

Incomplete shoe made of vegetable tanned leather and unidentified fiber. Shoe sole and upper section and rectangular loose fragment. Heel is worn down. Matching shoe was not found.
Site location: A 20 ft. 1/5 in. (6.1 m), E 16 ft. 9/10 in. (4.9 m)

JiUt-5:96 / 2010.27

Black wool sock, light weight material. Front of sock is torn away.
Site location: 6 ft. 2-4/5 in. (1.9 m) aft of H hogpost, in front of vise

JiUt-5:102 / 2010.36
Unidentified small wool textile fragment. Woven and dyed. Found concreted to enamelware plates and the fork (JiUt-5:98). Site location: J 14 ft. 9-1/5 in. (4.5 m), F 18 ft. 8-2/5 in. (5.7 m)

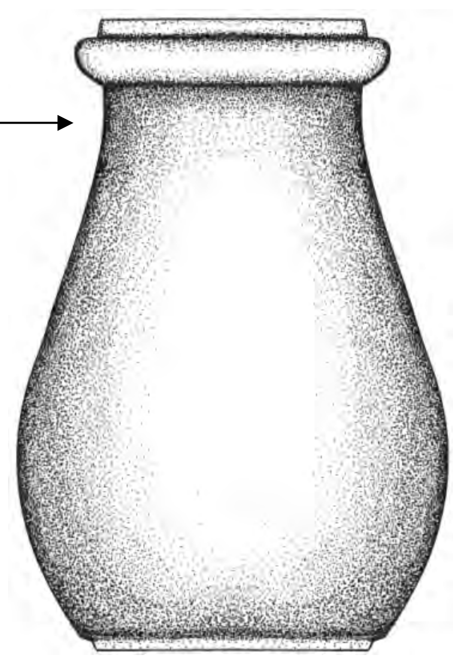
JiUt-5:103 / 2010.38
Two unidentified small wool textile fragments. Woven and dyed. Found associated with the spare record (JiUt-5:9).
Site location: 8 ft. 2-2/5 in. (2.5 m) forward of F hogpost

Lighting

JiUt-5:12

Broken fragment of clear glass lamp chimney. The size and shape of the broken rim fragment suggest part of a chimney lamp
Site location: E 15 ft. 3-1/10 in. (4.65 m),
A 41 ft. 6-4/10 in. (12.66 m)
Dimensions: Height 3-21/92 in. (8.2 cm);
Width – 2-1/2 in. (6.35 cm);
Thickness – 1/10 in. (0.254 cm)

JiUt-5:50 / 2010.17

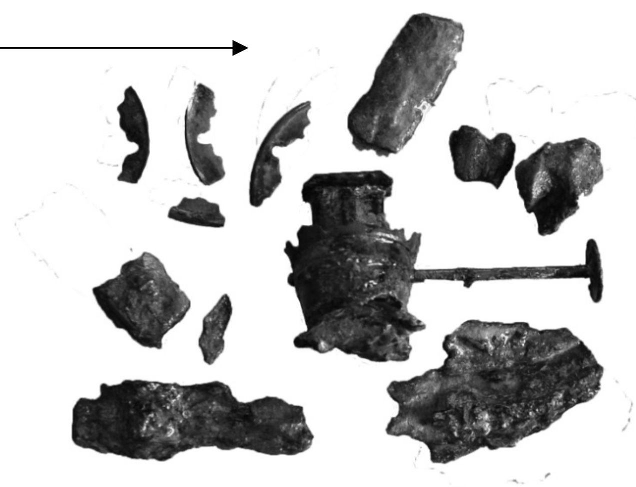


Clear glass lamp chimney. Molded clear glass with vertical seam from top to bottom rims. Circular cross section and globular body. Bottom and top rims worn.
Site location: E 8 ft. 6-2/5 in. (2.6 m), A 34 ft. 2-3/5 in. (10.43 m)
Dimensions: Height – 6-1/3 in. (16.09 cm); Diameter at base – 3-1/3 in. (8.47 cm); Diameter at midsection – 4 in. (10.16 cm)

JiUt-5:66 / 2010.21

Incomplete Brass reflector light in two pieces: brass sheet light bearing mark with glass front missing and a brass sheet fuel reservoir with wick remnant. Brass light has adjustable wire handle and maker's plate attached to top of lamp. Plate reads "WM PORTER'S SONS – MAKERS – 27 _EARL ST. N., 17." Top of lamp is bent.
Site location: 1 ft. 7-7/10 in. (0.5 m) forward of F hogpost
Dimensions: Height – 11 in. (27.94 cm); Width – 4-1/3 in. (11.01 cm)

JiUt-5:81

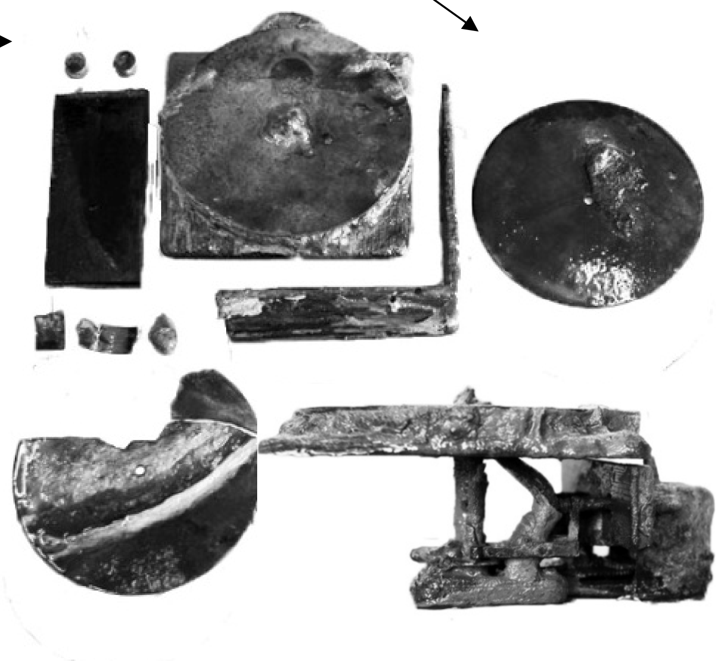


Lantern wick holder. Holder made of a combination of cast and pressed sheet metal, a copper alloy, possibly brass. There are textile fibers that may be the wick visible in a crushed area. The main piece is hollow with a circular cross section to contain the wick. A wick adjusting rod passes through this. The proximal end has a circular finial with a raised dot decorative pattern, the distal end projects through the other side of the wick holder. Below this is a tube with a rectangular cross-section the piece is broken below. Copper alloy ranges from orange to brown to green. Some fragments too corroded to identify. Just below the turning mechanism are remnants of a pierced work flange. Four of the twelve fragments are part of this. The remaining seven are sheet metal bits with thick iron concretions.
Site location: A 38 ft. 6-3/5 in. (11.75 m), E 28 ft. 2-3/5 in. (8.6 m)
Dimensions: Height – 2-7/8 in. (7.30 cm); Width – 2-4/5 in. (7.11 cm); Thickness – 1-1/10 in. (2.79 cm)

Music

JiUt-5:9 / 2010.6
Hard rubber record in two fragments.
Site location: 8 ft. 2-2/5 in. (2.5 m) forward of F hogposts
Dimensions: Diameter – 7 in. (17.78 cm) when complete

JiUt-5:26
Berliner gramophone with record attached "Ma Onliest One" and another record associated. Incomplete gramophone in 8 fragments, made of wood, copper and iron. Record made of hard rubber. A hand crank, spring style model, it is potentially a Berliner Style 5-Trademark or Trademark-Late Model dating to 1897 or 1899. The Berliner 991Z record contains the song *Ma Onliest One*, recorded 17 April 1896 by Len Spencer. *Ma Onliest One* was written by well known American vaudevillian Fay Templeton and is a minstrel song. *Ma Onliest One* was the disk last played by the crew, as it was the one attached to the player when recovered.



An advertisement for the *Canadian Music Trades Journal* in 1901 shows a similar, possibly identical, gramophone for sale, along with three records, for $15 (*Canadian Music Trade Journal* 1901:3;Library and Archives Canada). While it is impossible to determine if the player was purchased from the Montreal outlet, the location of the Canadian Berliner headquarters, it is interesting to note that the gramophone could be sold as a kit for a relatively low price, particularly when compared to other gramophones.
Site location: J 27 ft. 6-7/10 in. (8.4 m), F 5 ft. 1 in. (1.55 m)
Dimensions: Height – 6-8/9. (17.49 cm); Width – 8-1/2 in. (21.59 cm)

Miscellaneous

JiUt-5:19 / 2010.10

Sample from rubber mat.
Site location: J 20 ft. 8 in. (6.3 m), F 17 ft. 11 in. (5.46 m)
Dimensions: Length – 1-57/77 in. (4.42 cm); Width – 15/79 in. (0.48 cm); Thickness – 1/10 in. (0.254 cm)

JiUt-5:33

Copper fragment.
Site location: J 24 ft. 3-3/10 in. (7.4 m), F 17 ft. (5.2 m)

JiUt-5:39 / 2010.14

Small cup – possibly marmalade or preserves jar or a shaving mug. Ceramic handleless cup with a circular cross-section tapering slightly to a flat base with a groove just below the lip. Glaze is white or cream-colored. No visible maker's mark. Stained, glaze cracked.
Site location: E 21 ft. 1-1/2 in. (6.44 m), A 44 ft. 3-1/2 in. (13.5 m)
Dimensions: Height – 2-3/4 in. (7 cm); Diameter at bottom – 2-1/3 in. (5.93 cm); Diameter at top – 2-2/3 in. (6.77 cm)

JiUt-5:44

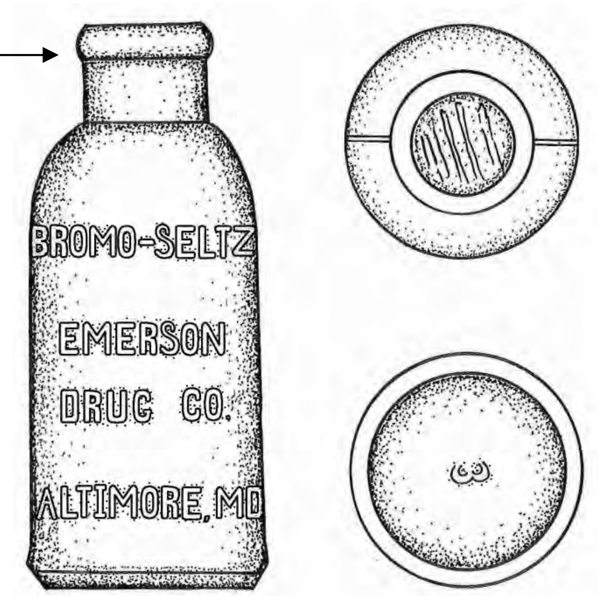
Wood box with no top stored in chain locker.
Site location: In forward starboard chain locker.
Dimensions: Length – 18-1/2 in. (46.99 cm); Width – 13 in. (33 cm); Depth – 10 in. (25.4 cm); Wall thickness – ½ in. (1.27 cm)

JiUt-5:60

One lump of coal.
Site location: A 35 ft. 9/10 in. (10.69 m)

JiUt-5:63 / 2010.19

Translucent blue glass bottle with cork and contents (liquid and crystalline solids). Raised letters on glass: "BROMO SELTZER EMERSON DRUG CO. BALTIMORE MD"
Site location: Immediately below paddlewheel spreader amidships
Dimensions: Height – 4 in. (10.16 cm); Width of body – 1-5/8 in. (4.13 cm); Width of mouth - 1 in. (2.54 cm)

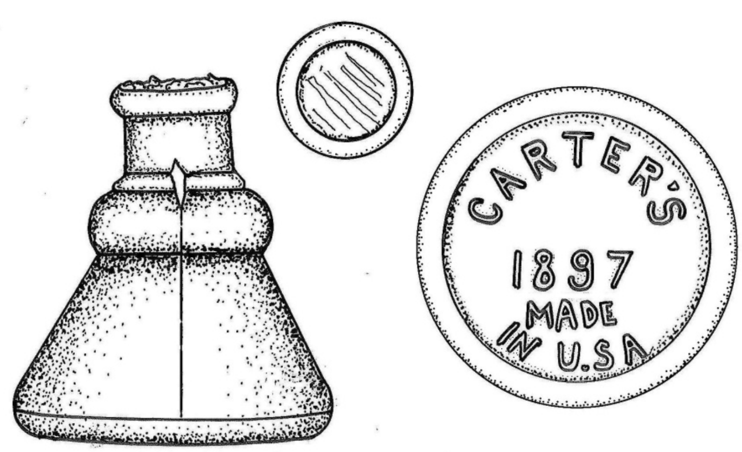


JiUt-5:79

Broken base of glass bottle, of what is possibly a medicine bottle.
Site location: A 30 ft. 8-9/10 in. (9.37 m), E 22 ft. 11-3/5 in. (7 m)

JiUt-5:80 / 2010.23

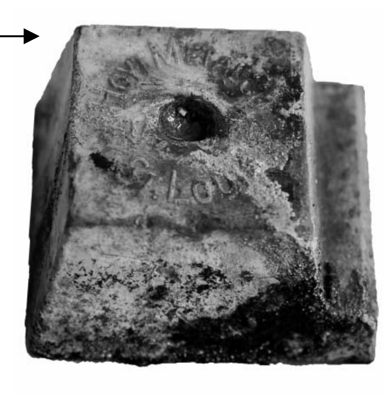
Carter's Ink bottle. Ink well shaped. Dark brown molded glass bottle with cork. Appears to be full, likely with ink. Bottle is flat bottomed with a tapering circular cross section. Vertical seam visible from just above bottom of neck to top of base on one side. Cork looks dark (waterlogged/stained) and is recessed into neck slightly. Raised letters on bottom read" "CARTER'S 1897 MADE IN U.S.A.".



Based in Boston, the firm became prominent in 1861 through the introduction of an ink with added color that was suitable for both writing and copying. The firm joined with a man known as J.P. Dinsmore of New York and eventually expanded its offices to Chicago and New York (*The Story of Carter's Inks* 2011; Carvalho 2007:131). In 1895 the original owner, John W. Carter of Boston, died, and his partner Mr. Dinsmore retired, resulting in the firm's name change to "The Carter's Ink Co." (Carvalho

2007:131). The Carter's Ink Co. remained a successful company, and in addition to ink, they sold adhesives, typewriter ribbons, and carbon paper (*The Story of Carter's Inks* 2011). Historic images indicate that some of the bottles came with stickers on the bottle's front with the company's label - perhaps the *A.J. Goddard*'s ink bottle did as well, though it has since dissolved away. Their ink was prolific; dozens of bottles from the same production line as the bottle found on the *A.J. Goddard* site can be purchased online in a variety of colors for anywhere between $6 and $80 as of January 2011 (*The Story of Carter's Inks* 2011).
Site location: E 25 ft. 4/10 in. (7.63 m), A 46 ft. 7 in. (14.2 m)
Dimensions: Height – 2-1/2 in. (6.35 cm); Diameter at base – 2-1/2 in. (6.35 cm); Diameter at mouth – 1 in. (2.54 cm)

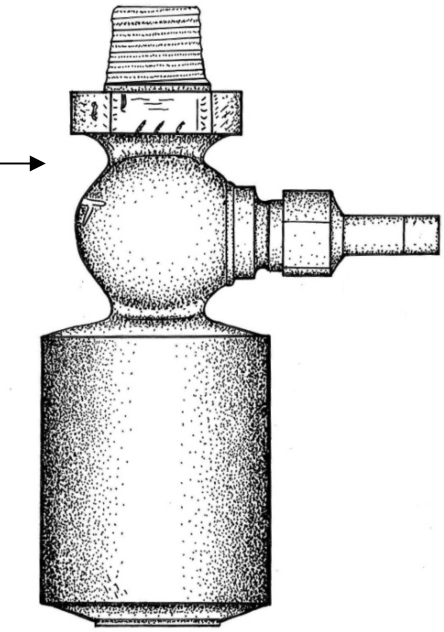
JiUt-5:83 / 2010.24



Solid lead block. Lower 1/3 of block a flattened pyramid shape with rectangular base. Upper 2/3 square in section. Top features a central hole 1/3 in. in diameter and ¼ in. deep partially filled with iron corrosion. Raised lettering in a circle around the hole reads "HOYT METAL CO. ST LOUIS" with the word "STA RD" running across the middle. The slightly concave base is stamped with the number 3.
Site location: E 30 ft. 2-1/5 in. (9.2 m), A 44 ft. 7-2/5 in. (13.6 m)
Dimensions: Height – 1-22/57 in. (3.52 cm); Width – 3-2/5 in. (8.64 cm)

JiUt-5:92

Lead oval.
Site location: A 48 ft. 3-9/10 in. (14.73 m), E 35 ft. 1-3/10 in. (10.7 m)



JiUt-5:97 / 2010.28
Valve made of copper alloy, possibly brass.
Threaded top joint.
Site location: 6 ft. 2-4/5 in. (1.9 m) aft of H hogpost, in front of vice

JiUt-5:99 / 2010.30
Magnifying lens or linen tester. Folds open. Rectangular copper alloy housing for magnifying lens is double hinged at right angles. One end is an open square, the other has a circular opening and there is a clear glass lens inset into the center.
Period magnifying lenses found in Sears, Roebuck, & Co. catalog for 1897 indicate that there were a number of types, including prospector's magnifying lenses and linen tests, designed for counting the number of threads per inch in cloth. They range in price from 48 cents for the linen tester to $1.95 for the prospectors magnifying glass, while simple magnifying lenses could cost as little as 18 cents (Sears, Roebuck & Co. Catalog 1897:131).
Site location: E 7 ft. 2-3/5 in. (2.2 m), 3 ft. 3-2/5 in. (1 m) from wheel
Dimensions: Length when extended - 3-21/92 in. (8.2 cm); Height when opened - 2-3/5 in. (6.6 cm); Width of folding top - 1-5/8 in. (4.13 cm); Width of base - 2 in. (5.08 cm).; Lens diameter - 1-1/10 in. (2.79 cm)

JiUt-5:100

Gear mechanism. Copper alloy, iron, and white metal.
Site location: E 7 ft. 2-3/5 in. (2.2 m), 3 ft. 3-2/5 in. (1 m) from wheel
Dimensions: Diameter – 1-5/8 in. (4.13 cm)

Unidentified

JiUt-5:2

Two unidentified small metal blocks.
Site location: A 25-32/39 ft. (7.87 m), E 21 ft. (6.4 m)

JiUt-5:7

Unidentified.
Site location: A 12 ft. 4-4/5 in. (3.78 m), E 24 ft. 7-3/10 in. (7.5 m)

JiUt-5:11

Possibly a radiator
Site location: A 15 ft. 9 in. (4.8 m), E 23 ft. 8-1/5 in. (7.22 m)

JiUt-5:14

Iron Concretion
Site location: E 22 ft. 3-7/10 in. (6.8 m), A 37 ft. 4 in. (11.38 m)

JiUt-5:16

Unidentified mass.
Site location: E 39 ft. 10-3/10 in. (12.15 m), A 34 ft. 3-4/5 in. (10.46 m)

JiUt-5:40

Iron concretion
Site location: A 44 ft. 11-2/5 in. (13.7 m), E 41 ft. 1/10 in. (12.5 m)

JiUt-5:46
Unidentified object.
Site location: A 46 ft. 7 in. (14.2 m)

JiUt-5:51

Iron Concretion
Site location: A 14 ft. 9-1/5 in. (4.5 m), E 35 ft. 1-3/10 in. (10.7 m)

JiUt-5:57

Unidentified object.
Site location: No information

JiUt-5:70
Unidentified object.

Site location: A 24 ft. 1-2/5 in. (7.35 m), E 26 ft. 3 in. (8 m)

JiUt-5:75

Iron concretion.
Site location: A 46 ft. 7 in. (14.2 m), E 34 ft. 4-3/5 in. (10.48 m)

JiUt-5:77

Long concretion
Site location: A 29 ft. 11-1/10 in. (9.12 m), E 14 ft. 3-7/10 in. (4.36 m)

JiUt-5:85

Iron concretion.
Site location: E 32 ft. 9-7/10 in. (10.0 m), A 45 ft. 3-3/10 in. (13.80 m)

JiUt-5:86

Iron concretions.
Site location: E 32 ft. 5-4/5 in. (9.90 m), A 44 ft. 1-1/2 in. (13.45 m)

JiUt-5:89

Iron concretions.
Site location: A 36 ft. 1-1/10 in. (11.0 m), E 29 ft. 6-3/10 in. (9.0 m)

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