FLUMES AND FLUMING IN NORTHERN IDAHO

by
Cort Sims

Idaho Panhandle National Forests
Coeur d'Alene, Idaho

1998

FLUMES AND FLUMING IN NORTHERN IDAHO

LIST OF FIGURES

LIST OF TABLES

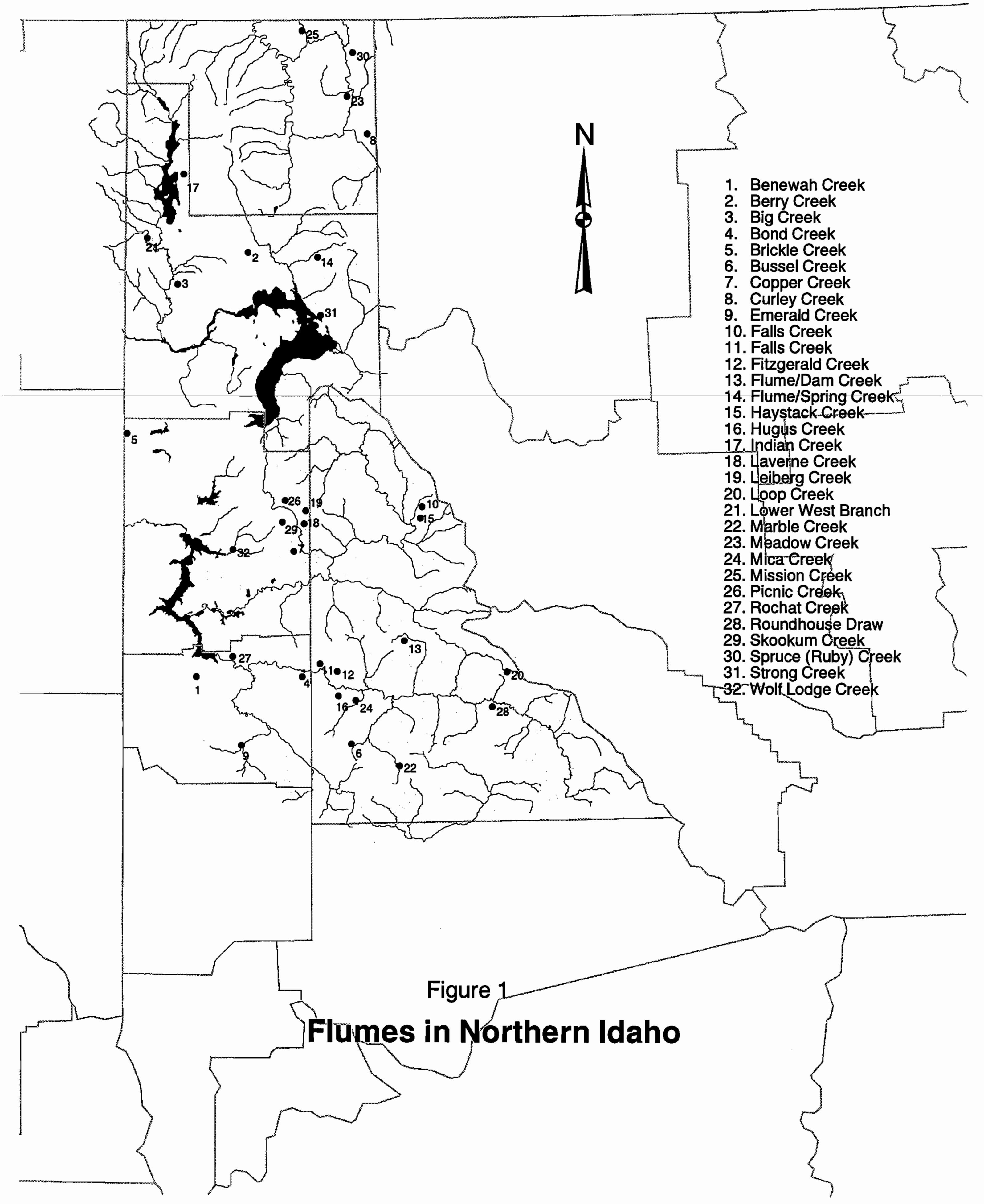

Figure 1

Flumes in Northern Idaho

1. Introduction

More than one person has slipped and stumbled up a stream bed in northern Idaho, convinced that he or she has left civilization far behind, only to be confronted with the remnants of a logging flume. The hiker or fisherman is often left wondering how anyone could build a flume in such a remote location and why they would even bother. This short history summarizes the information about the construction and use of logging flumes in northern Idaho. The remaining physical remnants of these structures are rapidly rotting away and this report will at least preserve some knowledge about these structures.

This report has a practical purpose as an overview of the historical information available on log flumes in northern Idaho. Our intention is that with this report we will be able to evaluate the historical significance of the remaining remnants of the log flumes. This will focus preservation and data recovery efforts on important historical values.

2. History

In the mid-1800s, logging flumes began to be used by inventive lumbermen in the western United States. Soon after the gold and silver discoveries of the early 1880s in northern Idaho the mining industry used flumes to supply water to their mining operations and secondarily to transport mine timbers . But it was only after the turn of the century that lumbermen in northern Idaho began to build flumes especially to move logs out of the woods. In the first third of the 20th century, the primary means for moving logs out of the woods of northern Idaho were, in order of importance: railroads, river driving, trucks, log chutes and flumes. Flumes became the method of choice in particularly rugged areas containing white pine and/or cedar poles (Brown 1934: 119, 215).

The advantages of using a flume over using railroads is that they can be used over steeper grades without greatly increasing construction costs, they can be carried on trestles of lighter construction than used on railroads, they use narrower corridors and they required few workers to maintain and operate. The major draw backs of flumes includes their large initial cost and the fact that they provide only one-way traffic. It always requires some other means to get equipment, supplies and men to the upper end of the flume.

According to Strong and Webb (1970: 115):

> *Floating of logs and timbers from the terminal of chutes to a point on a drivable steam or railroad was the main purpose of the large flumes. There were about 35 flume projects in the Coeur d'Alenes with a total milage probably in excess of 150. There were great decks of logs on rollways along the flumes at the lower terminals of chutes and skidways. Such decks often contained a half million or more feet of logs ready to be rolled into the flowing water.*

Available documents do not record the existence and location of many of the flumes in the Coeur d'Alenes and other parts of northern Idaho. Figure 1 and Table I list the flumes that have at least some historical reference to record their existence. One can only conclude from a comparison of Table I with the above statement, that the total number of flumes in northern Idaho will never be accurately known.

Brown (1935: 224) stated that:

> *Northern Idaho presents ideal conditions for flumes because of (1) size of softwood timber generally cut to 16-foot lengths or shorter, (2) steep gulch-like ravines with heavy stands of timber, (3) abundance of available streams and ample water flows. In flume operation in this region, "hot logging" is generally practiced from about May 1 to December 1, that is, the logs are not decked or banked between skidding and fluming operations.*

3. Flume Design

The logging flumes used in northern Idaho were V-shaped in cross section. This type of flume is easier to construct, uses less material, requires the least amount of water and requires less maintenance (Bruce 1914: 3) than other types (such as the square flume box.)

The comparisons between different angles of the "V" show that the 90 degree angle maintains a log floating so that the length of the sides is minimized while the allowable crook in the logs is maximized. At the same time the clearance of the sides from the floating log is only slightly less than the greatest possible. It is apparent that companies building flumes in northern Idaho heeded such advice such as Martin (1912: 908) who found that ". . . a 90 degree flume is the most advisable one to use. It is obvious that no other than a triangular flume need be considered since only logs are to be floated having a circular cross-section."

Bruce (1914: 5-6) emphaticly endorsed the 90 degree V-shaped log flume design. He lists four areas in which the V-shaped flume excels.

> *(1) It can be successfully operated with less water volume than any other type, since, owing to the "V" form of construction, the water is always held confined or "compact," and therefore has the greatest carrying power for the amount used.*
>
> *(2) There is less likelihood of jams forming, since the narrowness of the flume prevents the material from getting particularly crosswise and forming a "brace" through the ends, "wedging" or pressing against sides of the flume ... The narrow formation of the V-shaped flume keeps the timber running "straight," and according as the volume of water in the flume is reduced the formation of the V keeps the water confined in the smallest possible triangle down which the sides of the flume compel the material to travel.*
>
> *(3) In fluming logs or round timbers the rounded portion of the log settles well down into the V. The water thus confined between the bottom of the stick and the sides of the V constantly tends to lift the log, and this keeps the stick from settling down or rubbing hard against the sides of the flume...*
>
> *(4) In cases where it is necessary to have an unusually abrupt descent in some portions of the grade, the V-shaped flume is best to serve as a "slide" or "slip", or "chute," since it is less likely to become jammed, while the material being handled is held by its own weight in proper position in the center of the V. . . . In such localities and under such conditions the V-shaped flume, when strongly constructed so as to combine both the objects of flume and chute, has been and will be found altogether the most desirable.*

In a typical "V"-shaped flume, the V-shape consists of frame brackets placed approximately every 6 feet with boards nailed on the inside of the brackets to form the V-trough. The boxes, built in sections that varied from 6 to 20 feet long, though 16 feet tended to be the standard size in northern Idaho (Probably related to the standard 16' logs cut in northern Idaho woods). The use of the frame brackets allowed for a relatively light weight but very strong structure.

The construction of the boxes could follow three different procedures. The boxes could be built (1) with two layers of boards or (2) they could be built with one layer of boards lined on the outside with battens nailed between the frame brackets or finally (3) they could be built one layer of boards with continuous battens on the outside and notched into the frame brackets. The double wall flume box makes a stronger flume, but the use of a single wall and battens makes a lighter and less expensive flume. The use of the continuous battens insured that the battens would be held firmly in place, but of course, raised the cost of building the flume (Bruce 1914: 7).

The bottom of the V channel called the "vertex" (Martin 1912: 908) was sometimes filled with a triangular board referred to as a "V-board", "beam" or "backbone". However, some authorities questioned the necessity to go to the extra expense of cutting and installing the V-boards (Bruce 1914: 8). Martin (1912: 908) nevertheless avocated its use.

> *Its use increases the cost of construction but its advantages are obvious. It occupies space not needed especially in log flumes, makes a tight joint in the vertex, and avoids danger of jamming when the water is low.*

Northern Idaho flumes often employed the "V" board.

The diameter of the logs to be floated down a flume influenced the size of the flume [that is the height of the walls]. In northern Idaho, flumes generally had walls from 3 to 4 1/2 foot high.

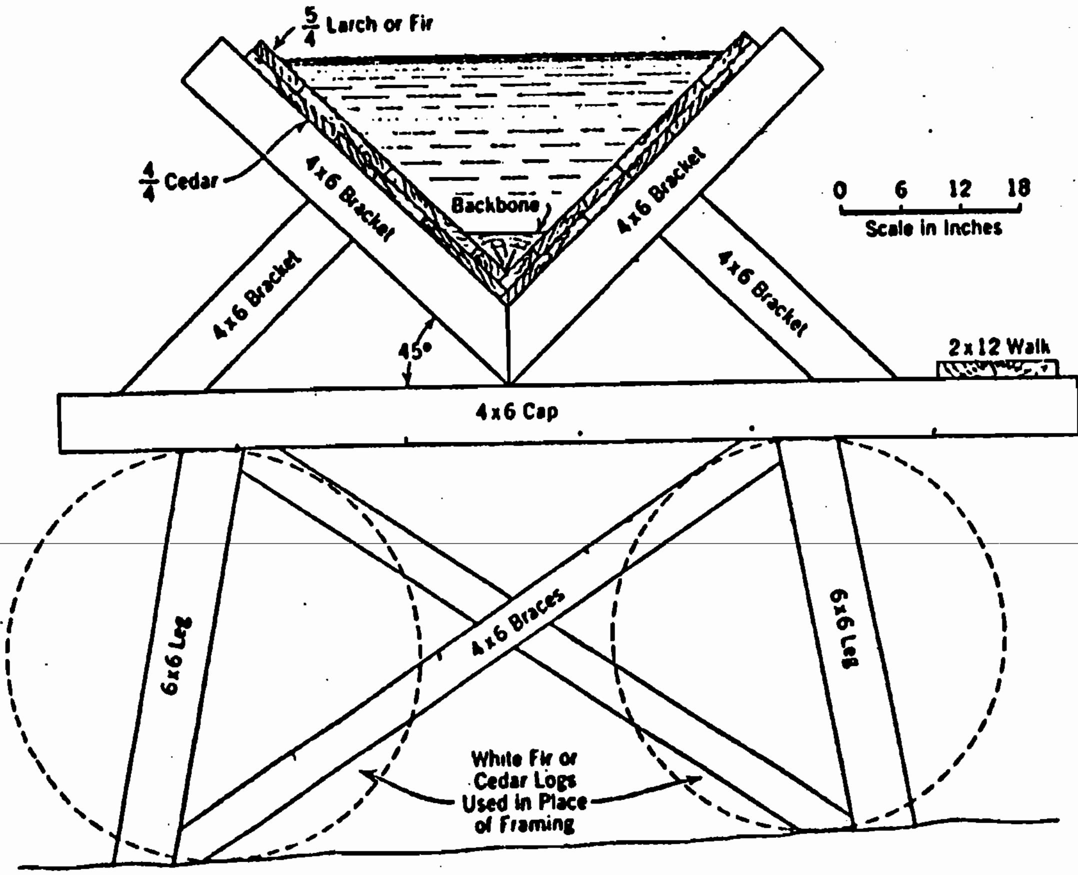

Figure 2. Details of the typical large-sized log flume used in northern Idaho, the main flume having 5-foot sides and branches 3 1/2-foot sides. The dotted circular lines indicate that, in crossing streams, ravines and some of the low places, logs may be used in place of legs. The water level shown in this sketch is found only on comparatively level stretches of the flume. On the steeper grades the water level recedes, and the steepest pitches the logs do not float. On some of the steepest places logs travel faster than the water so that the flume must be reinforced by steel strips to prevent undue abrasion. (Brown 1935:277)

4. Flume Construction

A construction plan for a flume addressed a number of variables from topography, hydrology and the character of the forest products to be transported. Brown (1935: 276) advised that

> *Prior to construction of a flume the forested area to be served by it must be carefully surveyed with reference to locating the flume near or below the main body of timber and to secure an adequate grade for flowage. Competent engineers are employed for the larger and more expensive flumes. For the shorter and more temporary ones, however, rough approximations are used both for the location and construction of the flume.*

Brown (1935: 276- 7) lists the five cardinal principals of flume construction. His list includes: (1) Keep the flume as close to the ground as possible. (This minimizes the amount of framing and trestle work needed). (2) Construct the flume so that the water level will stabilize at a level of about 8 inches below the top of the flume (except in steep areas where this will not be possible. The grades of a well located flume normally are in the 2 to 6 percent range). (3) Locate the flume near the timber to avoid long transportation of logs by horse skidding or log chutes or by tractors. (4) Clear a wide enough right-of-way to eliminate danger to the flume from windfalls, forest fires and rock slides. (5) Construct the flume to allow fast and efficient loading and unloading of logs.

Flumes in northern Idaho transported the only valuable species at the time, western white pine, and in some cases cedar poles. Timbermen accually constructed the flumes from other species, such as white fir, western larch, cedar and Douglas fir.

As noted above, the type of flume used in northern Idaho and in most logging in the western United States operations is the "V" shaped flume (Figure 2). This "V"-shaped flume either rested on two log sills or on a frame work of legs and cross braces. Loggers constructed the flume box of either two layers of boards nailed to bracket frames or one layer of 1 inch boards with battens nailed to the outside seams. The resulting trough had a 90 degree angle with usually a "V" board or "backbone" board nailed in the bottom of the "V" for added strength, to inhibit leakage of water and to decrease snaging by passing logs.

According to Brown:

> *The following are the sizes of sawed lumber and timber customarily used for right-angle V-shaped flumes with 3 to 5-foot sides:*

Parts	*Size*	*Length*
Inside facing	*5/4 x 8" to 16"*	*10' to 16'*
Outside facing	*4/4" x 8" to 16"*	*10' to 16'*
Brackets	*4" x 6"*	*3' to 6'*
Braces	*2" x 4" and 2" x 6"*	*Various*
Caps	*4" x 6"*	*6'6" to 8'*
Legs	*4" x 6" and 6" x 6"*	*2' to 16'*

Some practical considerations in flume construction include (1) insuring that you have an adequate timber supply, (2) insuring that the grades are within the acceptable limits, (3) providing a firm foundation for the flume legs or sills and (4) insuring that there is a adequate water supply for operating the flume (DeWolf 1920: 95-6).

With all of these variables to consider when constructing a flume, DeWolf (1920: 95) recommends dividing the work into four steps which include: (1) the location survey, (2) right-of-way clearing, (3) foundation construction and (4) box construction.

The Location Survey. A proper location survey identified the timber to be removed, the water supply, the grades to be encountered and the curvature needed to negotiate the topography. Assuming that the engineer determined that there is an adequate water supply existed and located the head of the flume in the vicinity of the timber to be removed, the engineer could concentrate on the grades and curves. DeWolf (1920: 96) observed:

> *The grades and curves alone will not only directly limit the amount of timber that can be transported, but they have a direct being on the amount of wear and tear on the structure during operation. Of course a flume project should never be abandoned on account of encountering a steep grade such as 25 or 30 percent or a sharp curve to 30 degrees, but on the other hand, such extremes should be avoided whenever it is possible, and in steep and crooked valleys, that are thickly wooded with timber and brush, a careful preliminary survey, followed up with a location is about the only means by which the best possible grades and alignment can be accomplished.*

Clearing the Right-of-Way. Clearing the right-of-way is a straight forward practical matter of clearing obstructions and reducing the danger from fire or blowdown. To DeWolf (1920: 96):

> *The clearing of the right-of-way for a flume can follow up immediately after the final levels are taken on the same. The width of the right-of-way does not usually need to exceed from 14 to 16 feet, and unlike railroad right-of-way clearing it is not necessary to close cut stumps or grub. Brush should be piled to one side and merchantable logs decked on skids. Smaller logs suitable for foundation material are usually left right on the ground, trimmed and ready to be cut into posts, caps and sills for bent construction. Poles from 4 to 6 inches in diameter are trimmed and laid along the side for bracing material. All overhanging trees whether on or off the right-of-way, if within reach of the flume, should be felled to insure the safety of the flume.*

Preparing the Foundation. The foundation of a flume consists of sill logs or bents (usually 15 feet apart). The normal procedure was to set the sills or bents on the ground without disturbing the surface. Assembly of the bents proceeding with 10 to 12 inch spikes and were in most cases cross braced. Flumes carrying heavy logs, such as Douglas fir, had bents closer together (in one example on the west coast only 8 feet apart, Allison 1921: 43).

Constructing the Flume Box. The standard method of constructing the flume box is to move a portable sawmill to the head end of the flume. The lumber and timbers needed for the flume would be sawn by the mill and the frame brackets assembled. Then the builder would begin constructing the flume down hill floating the box boards and support brackets down the flume as it is built. Loggers used both steam powered and gasoline powered portable mills in northern Idaho.

5. Operation of Flumes

Construction of a flume a expensive proposition. However, it was in their economical operation that flumes justified their use over other means of log transportation. According to Bryan (1913: 410)

> *Flumes are operated by crews that feed the flume; by runners who are stationed at points along the routes where jams are apt to occur; and by laborers who handle the product at the terminal. The runners usually carry a pick-a-roon to aid in handling the floating material. The size of crew required depends entirely on the character of the flume, those with many curves and low grades requiring the most runners.*

In operating a flume, Brown (1935: 280) separates the work into three operations: (1) feeding, (2) running and (3) emptying. To facilitate feeding logs into a flume, logs were either stored in a pond behind the flume dam at the head of the flume or on rollways along the flume.

At the commencement of a fluming operation, the gate on the flume dam would be opened and water run into the flume for about half an hour. Then logs were then either poled through the dam gate from the pond or rolled into the flume from the rollways. Men stationed along the flume roll logs into it and watched for jams.

Some flumes had feeders which replaced water lost through leakage and/or to maintain water level on steeper grades. In still other cases, flume were broken into segments, with each segment ending in small holding reservoir. Such reservoirs acted as "catch basins" or equalizers to maintain an even level of water in the flume.

At the terminus of the flume the usual method was to direct the logs into a pond or river. However, one northern Idaho project involved ending the flume on metal rollers that directed the logs to a loading platform were they could be hoisted onto railroad cars.

Figure 3. Photograph of the Skookum Creek Flume Dam

Figure 4. Photograph of the Loop Creek Flume.

Figure 5. Photograph of the Terminus of the Loop Creek Flume at Adair, Idaho about 1915.

Figure 6. Photographs of an unknown flume located in northern Idaho.

6. Problems, Accidents and Other Stories

The operation of flumes had its unique set of problems and occasionally had its share of unusual accidents and interesting stories. The problems operating a flume often related to flaws in the original design. An example of the problems with a flume related to design is the Bussel Creek flume in the Marble Creek drainage constructed by the Rutledge Lumber Company in 1917. As noted by E. J. Gaffney (DeWolf 1923: 72)

> *. . . we have had some other flumes that didn't work so satisfactorily. . . . The bigger logs would slow up and drag, and the smaller logs would catch up and bunch up, shutting the water off from the logs ahead, resulting in a jam, and very often before we could get the jam out and get word to the man on the dam to shut the gates down our flume would overflow and wash out the underpinnings and our flume would fall. At last we struck on a plan that helped a little about moving that heavy timber. It was hard to move with peavies. We had some V's made and left along the flume at different places where it was likely to jam. When it was likely to jam we would put on one of these V's a short ways ahead of the jam and turn on the water. When the flume filled we were able to work the jam loose then we would pull the V and they would float a little ways and then we would place a V in again. In that way we were able to get the jam out, so when we turned the water on it would float away.*

One of the loggers working on the Bussel Creek flume had a slightly different view (Russell 1979: 268) of the operation.

> *I came down into the U.S. in 1919. My first job was on the drive on Bussel Creek, breakin' down decks under a boss named Fred Ross. We were attempting to flume from a little dam at Camp 1 and the pond would run out of water in 10 minutes and leave the big white pine stuck in the flume.*
>
> *Then they tried to send down double length logs. That was worse. Then they let the flume stand idle on the bank and splashed the logs down the creek.*

On Spruce (Ruby) Creek in 1918 a problem with a suspension bridge carrying the flume across the Moyie River developed because of a log jam. Gibbon (1918: 13) states

> *Shortly before I saw it, this suspension bridge was broken down. A large log was left behind in the flume at the end of a run. At the beginning of the next run came a number of logs which outstripped the water and on reaching the first log punched it along the nearly dry flume in front of them. When they reached the bridge the strain and jarring were so great that the cables on one side gave away at one end and the flume turned over. The damage was soon repaired, however, though a temporary pier has been introduced in the center of the span in case of similar accidents.*

There were other problems besides those caused by design or operation errors. Labor problems caused problems on one flume (Russell 1979: 122)

> *Gazette-Record April 28, 1932 - The Ohio Match flume at Bond Creek was damaged in places by dynamite thought to have been dropped in with lighted fuse and floated down till it went off. Some dissatisfaction has been expressed because local people were not put to work when Ohio opened for the season. The flume was repaired with a much larger crew including some residents of St. Joe.*

Eight years later the April 18, 1940 edition of the Gazette-Record reported that another dynamite blast finally wrecked the Bond Creek Flume for good.

> *Dynamite Blast Wrecked Flume, Two Men Held. $5,000 Damage Result of Explosion Near E. C. Moe Camp Thursday. The flume and dam of the E. C. Moe logging camp on Bond Creek above St. Joe were wrecked by a dynamite blast set off early Thursday evening. The explosion caused damage estimated at $5,000, and has resulted in the arrest of two men, George Kruger and Earl H. Allen, St. Joe, who are being held here.*

The blast occurred about 7:00 o'clock. According to Sheriff O. B. Nelson who made a careful investigation, the dynamite was placed against the upstream face of the dam where the flume takes off. Muffled somewhat by the deep water, the explosion was heard at the camp, 1 1/2 miles away, and is said to have rattled windows in the bunkhouse.

The dam was torn away and the upper end of the long flume which carries logs about six miles to the river, was wrecked. later other sections of the wooden structure were torn away to prevent a log jam, as the pond above the dam carried a full head of water. Sheriff Nelson was called to the scene Friday morning.

On Saturday Sheriff Nelson arrested Kruger and Allen, and preliminary hearing will be Monday morning at 10:00 o'clock before Justice Wm. Cullen. The complaint charging the two men with the dynamiting was signed by O. G. Moe.

Reconstruction of the dam and flume will not be attempted. Instead, Mr. Moe this week began construction of a road into the area, and will bring the logs out by truck. About 25 men were employed at the camp prior to the explosion, but half of them have been laid off, it is reported.

Late in March a car and truck owned by Mr. Moe were camaged when powder was placed in the motors.

Another way flumes could be damaged occurred when logs out ran the water. Burt Russell (1979: 321) remembered this story.

I was down at the lower feeder dam turning water into the flume in 1930 or '31. A gypo logger I was working with was a mile and a half further up and he was supposed to allow me 15 minutes to get down there and another 8 minutes time to run water into the flume.

He didn't wait long enough and here came the logs pouring down 300 yards below me the logs outran the water and was grinding to a stop. Other logs were coming down to hammer into them.

I ran up the flume to tell the logger to stop. But before I got there a quarter mile of the flume had filled with logs and collapsed. That was the end of the Fitzgerald flume.

Some interesting stories related to flumes relate to a daring means to get to the end of the flume by riding a log down. The stories about this are common enough to suggest that this was not an uncommon occurrence. For example, Russell (1979: 311) recalled that

At Falls Creek I drove team a half mile above camp. We didn't carry a bean can. Come noon we'd each jump off there and go into the cookhouse for a hot lunch.

Old Brechard, the flume boss, had a fit. He said, "you young fools will get busted up and then sue the company." He spiked two by fours across the top of the flume so we'd either have to lay flat and go under 'em or jump 'em.

I said, "If you take off them damn obstacles nobody will get hurt."

So the next day or two we jumped 'em. That made it more fun. So Brechard told the camp foreman to dock us $5 every time we road the flume.

That made us mad and we quit and went down to the loading works.

Similar stories are told by Roy Brickle (Russell 1979: 117, 120-1). But probably the all time flume ride story was Ward Smith's (Russell 1984: 272-5)

I was warehouse man at Pritchard for the Wintons and was unloading a carload of hay one day in August 1923 when Reeve Ball, the Wintons head clerk, came out of the office with some strangers in tow. Reeves said, "The men *you sent up to the camps about 5 days ago. One of them was a cook for Camp 2 on Falls Creek. These men are interested in him." Then he introduced Sheriff Galahe from Wallace, Sheriff McCouloch from Everett, Washington and his deputy and a Pinkerton detective from Spokane.*

The sheriff explained that the cook was using an assumed name and was really Bates, formerly known as the Lone Bandit of the Yellowstone. Some years before this he had been holding up sight seeing buses and robbing passengers. To cover his tracks he had used the trick of changing clothes and joining the posse trying to track down the bandit.

But that wasn't why they were after him now. He had served time in the pen at Deer Lodge, Montana for being the Lone Bandit, been released and was in trouble again. Over in western Washington along with another fellow he had set a suitcase in the middle of a country road so it would look like it had been dropped out of a car. Then when a man and wife stopped to pick it up, the two had jumped out with guns. When the driver saw the guns he had thrown the car into gear and tried to get away. Both the woman and man had been shot fatally and dragged off into the brush. But the man lived long enough to describe his attackers.

The sheriff said, "The Law has already caught one of them. We believe this cook, Bates, is the other one."

Reeves broke in, "I told them you could rustle saddle horses and take them up to the Falls Creek camp." It was 16 miles over rough packtrail. We stopped at 7 o'clock in the evening a quarter mile short of the camp were the packbridge crossed the flume. I suggested that we stay where we were until dark. At that time I could slip into camp and wiseup the foreman and clerk, make arrangements for the officers to sleep in the office, then, in the early morning, the arrest could be made when the cook was preparing breakfast. That way they could handle their dangerous criminal in daylight.

Sheriff McCoulock was about to agree with my plan but the Pinderton from Spokane said, "Let's get it over with! Lead us to the son of a bitch and we'll have him in irons in two minutes. So I walked up the catwalk on the side of the flume to camp. The canyon was narrow with timbered sloped rising steeply up each side. The camp was built on both sides of Falls Creek with the flume running through the center of the camp site. The flume, 36 inches wide at the top, was a V shaped trough build of lumber and set on stilts, capable of carrying saw logs at a speed of better than 30 miles an hour. It was fed by a series of small dams and as water was plentiful at this time of year was running two thirds full of water 24 hours a day.

I walked into the office and told foreman John Bradford his cook was a dangerous criminal.

He said, "for a fact I've been damn suspicious of that fellow. First thing, he said he couldn't get his rest if he slept in the bunkroom with the rest of the kitchen crew. Asked me to let him bunk in that little what-used-to-be meathouse across the flume. When we went over there he looked out that wire screen that runs around the top of the walls and asked me ways to get out of camp. Said he was afraid of forest fire. I can see now he was after a good lookout spot in case the law came around."

I told John Bradford the four lawmen needed mackinaws to conceal their uniform jackets so they could come in without arousing suspicion. Then I hurried back in the rapidly deepening dusk and remained at the bridge with the horses. The four were able to make it to the office without attracting any notice. Then the foreman told the camp clerk, Norris Booth, to call Bates to the office on the pretext of not being able to make out some item on the grocery list which the cook had turned in that day.

The officers hid behind the door and behind the counter. The office kept clothes and tobacco and other supplies for sale. Minutes later, Bates walked unsuspecting into the trap. They hand cuffed him without a struggle. He admitted his identity and was so cooperative that the officers were elated they proceeded to the cookhouse with him and sat down to celebrate with cold roast beef and coffee and pie. When they had finished, the prisoner asked if he could pick up his personal belongings. Some of the logging crew was strung out on the flume catwalk, just visiting as Bates and the officers crossed the little footbridge to the meathouse. The bridge had no railings. Two officers walked in front and two followed directly behind him. One of the loggers remarked that the law must have caught another bootlegger - this was during prohibition - and the others laughed and continued talking.

Inside the meathouse they gathered Bates' clothes into two suitcases. Bates complained that the handcuffs were so tight they were cutting off the circulation in his arms. One of the deputies obligingly let the cuffs out several links.

When the procession came out to walk across the little footbridge they were in the same formation as before only now the two officers bringing up the rear each carried a pistol in one hand and the suitcase in the other. When Bates reached the the middle he dived headlong into the swiftly rushing water of the flume. For a couple of seconds the officers only stared. Then, they raised their pistols, but the camp crew was clustered too close to the flume to risk a shot and they dropped them again. And, as one officer told me later, "It is a pretty hard thing to shoot even a known murder handcuffed and floundering helplessly in the water."

One of the officers found his voice and shouted, "Catch the dog! Catch that dog!"

One or two lumberjacks made a half hearted attempt to pull Bates from the flume. One named John Gilbertson, actually sized him by the collar and held him a few seconds. But Bates cried out, "Please let me go! Your're tearing my coat!"

So, big, good natured John released his hold and Bates quickly disappeared down the rushing flume. The last man to see him was Frank Seaman, the barn boss.

Telling about it afterward, he said, "When Bates passed the barn I saw him spring up out of the water like a trout to a fly. Then he rode on sitting upright like a cork.

The first inkling I had that Bates had escaped was when I saw a flashlight and heard Earl Stevens running on the catwalk of the flume. Earl told me between gasps what had happened. Next came Sheriff McCouloch. He said, "Ride like hell for Pritchard! Telephone Sheriff Kirtpatrick of Bonner county to send a deputy with a bloodhound."

Riding down that lonesome trail at a brisk trot I expected any minute that Bates might jump out from behind a tree and attack me. Just before I reached abandoned Camp 7 my horse suddenly snorted and stopped. I hauled out an old, long barreled .45 Colt I had borrowed for the trip. Whatever it was thudded down the trail ahead of me and took to the brush - probably a deer more scared than I was.

I reached Pritchard a half hour short of midnight. By 9:30 the next morning the deputy's hound found man tracks 3 miles below where Bates had made his plunge. A light rain had fallen during the night. The man tracks led into the dense woods at the mouth of Haystack Creek and for some unexplained reason the dog wouldn't follow the tracks any further, the deputy said.

Bates's hat was found floating in the flowage of the dam at the mouth of Falls Creek. I kept the two suitcases in the company warehouse at Prichard till the sheriff from Everett sent for them. They contained several watches and various pieces of jewelry, none of which appeared to have much value. There were two guns, one a .38 Smith and Wesson, and the other a long barreled Colt .45.

So far as I know, Bates was never apprehended.

Morris Jenkins (in Cork 1991) remembered a similar incident on a flume in Bonner County.

Another flume transported logs for a great distance out of [Rapid] Lightning Creek to Pack River. In the early 1920's, two robbers killed the postmaster at Hope during a holdup. One of the robbers was surrounded by a posse in the head of Lightning Creek, but managed to escape. Several months later, when he was captured, he admitted that he had escaped from the posse in Lightning Creek by jumping into the flume and taking a fast ride to Pack River.

7. Flumes in Northern Idaho

(1) Benewah Flume. (T.46N., R.3W.) A photo of the Benewah flume (Andrews 1994: 87) shows a spectacular junction of three branches of the flume, the center one running full of water. The flume appears to be a double walled 12 foot box with a V-board in the bottom. The trestle work is all sawn lumber and the frame brackets are 3 feet apart (also Russell 1979: 117).

(2) Berrry Creek. (T. 59N., R. 2W., Sec. 33, 34, 35, 36)

(3) Big Creek (into Priest River). (T.57N., R.4W., Sec.1, 2, 3, 4, 5, 7, 8)

(4) Bond Creek. (T.46N., R.1E. sec. 28, 34; T.45N., R.1E. sec. 3, 4, 10, 11) Roy Brickle said that (Russell 1979: 119) O'Neil (of O'Neil and Irvine) got the job for the Bond Creek flume for Ohio Match. He said that a man named Hendrickson built the flume. Russell quotes the Gazette-Record of January 1, 1931 that

> *Ohio Match has shut its camps at Bond Creek down for the winter. Next summer it plans another 3 1/2 miles of flume and another set of camps.*

Brickle noted that there was a feeder dam called the "Quigley Feeder Dam" 2 miles below Camp 3 (which was 6 miles up from the St. Joe River).

> *Camp 6 was just above Camp 3. I'd phone Quigley at his feeder dam 2 miles down and tell him to turn his water into the flume. I'd turn my water on and wait maybe 10 minutes before I'd start to roll logs in. When a log dropped into the flume a big fantail went up as the water hit it. The flume was only 48 inches across the top here but at the lower end it was 6 feet wide.*

Russell (1979: 120-3 has photographs of the Bond Creek flume dated 1933, 34, 35. Two of the photographs are of jams on the flume. A photograph shows elevated trestle along Bond Creek with all sawn timber. Russell (1979: 7) stated

> *In 1928 and '29, O'Neil built a little mill up Bond Creek at Camp 1, two miles from the river, to cut lumber for a flume. I built chutes to bring logs to the mill and after the mill finished cutting flume lumber I extended the chutes to the flume pond.*

Roy Brickle relates stories about riding the flume, while his wife remembered walking up the flume catwalk to camp 1. Russell quotes the Gazette-Record April 28, 1932 concerning the dynamite blast already mentioned that damaged the flume (Russell 1979: 122) and a 1940 article in the same paper states that another dynamite blast finally destroyed the flume.

(5) Brickle Creek. (T.28N., R.45E. Sec. 13, T.28N, R.46E. Sec. 13; T.28N., R.46E. Sec. 18; T.53N., R.5W. Sec. 15, 16, 20, 21) A Strong and Webb (1970: 117-8) 1925 photographs shows the flume next to large log decks. The flume was double walled with a V-board in the bottom.

(6) Bussel Creek (includes Lines Creek). (10-SE-523 Bussel, 10-SE-525 Lines) (T.44N., R.2E. Sec. 25, 26, 35; T.44R., R.3E. Sec. 20, 29, 30) Remnants of the flume shows a V-shaped flume with 60" sides.

E. J. Gaffney (DeWolf 1923: 72-3)

But we have had some other flumes that didn't work so satisfactorily. The next flume was on [Bussel] Creek. That flume was five miles long, had a grade of from 2 to 3 miles long, had a grade of from 2 to 3 percent, built in a very rough country, and at a much greater cost that the other flume [Marble Creek]. The reason for holding the grade there to a more uniform grade was because we had much bigger timber than we had on the other flume and had some strong curvatures; there were some curves in that flume 26 degrees. That was a five-foot flume. . . .

A year ago last July we had a very serious fire. It burned our flume and about 140 million feet of white pine.

Wash Applegate states (Russell 1979: 23) that he helped build camp 1 at the head of Bussel Creek. He said the dam was below it, where Lines Creek and Bussel come together. He also stated that Camp 2 was on the other creek (Lines Creek) and was on the flume that emptied into Camp 1 dam. Further, he stated that:

In winter you didn't worry about the 7 or 8 feet of snow in the flume but the big chunks that hung alongside. Those great, big gobs settlin' down could break down the flume. Half a ton of snow or more in each. We'd take shovels and break them off.

James Griffin (Russell 1979: 236) states that

In 1917 . . . . I packed supplies into Rutledge Camps on Marble Creek and a sawmill into Camp 2 on Bussel Creek where they cut lumber for the flume. I packed nails for building the flume, too.

Pete Johnson (Russell 1979: 268) talked about the problems with the Bussel Creek flume already noted in chapter 6.

(7) Copper Creek. (T. 50N., R.1E., Sec. 25, 26, 27)

(8) Curley Creek. (10-BY-234) (T.61N., R.3E. Sec. 3, 9, 10) An article in the *Timberman* (1923: 38) notes that

By August 1 of this year the DeWolf and Ham Company will have completed another important log flume - this one for the Bonners Ferry Lumber Co., of Bonners Ferry, Idaho. This installation is going in on Curley Creek, about 25 miles east of Bonners Ferry, on the Idaho-Montana boundary line. Logs will be delivered into the Kootenai River above the company's mill. This flume will be a mile and a half long and will operate with extreme grades, varying from 1 percent to 30 percent. The dam will be 22 feet high and will impound the water over 30 or 40 acres. There is ample water for continuous operation and enough water will be taken out at the dam to insure successful operation of the steeper grades. These pitches occur while dropping down over a series of rocky benches to the Kootenai, and at these points all breaks will be rounded off by vertical curves. The flume will be 4 1/2 feet deep at the upper end, to accommodate the extra water for the steep grades.

(9) Emerald Creek. (T. 42 N., R. 1 E., Sec. 3, 4, 8, 9, 10)

(10) Falls Creek. (Coeur d'Alene River Drainage). (10-SE-218) (T.50N., R.5E. Sec. 30, 31; T.51N., R.5E. Sec. 6; T.50N., R.4E. Sec 35, 36; T.51N., R.4E. Sec. 2, 3, 4, 9) Strong and Webb (1970: 118) have a 1925 photograph of the flume in use. They also relate the story of the man jumping into the flume to escape the Sheriff. Russell (1984: 272-275) has a sketch map of Camp 2 and flume along with story of man jumping into flume quoted in chapter 6. Russell (1984: 311) also relates the story of flume riding quoted earlier.

(11) Falls Creek (St. Joe River drainage). (T.46N., R.1E. Sec. 2, 3, 11, 14, 23 Andy Porterfield (Russell 1978: 148-9) stated that he started the Falls Creek flume in 1913 for the Valentine-Clark Timber Company. He stated that

> *. . . I didn't know anything about a flume and that was the only way to bring timber out a rocky, not too steep creek bottom. The canyon sides were really steep for logging.*
>
> *I finally got a sawmill up to Doc Brown's place - that was the end of the Falls Creek road. I cut the lumber for the flume and hauled it with wagons on up for the flume.*
>
> *Then the big German, Bill Grotte came up with his crew of builders and cut the flume brackets. It was Bill Grotte that had built the old Benewah flume - I saw it running when I first come in 1911. I am sure it was Bill Grotte that built the Bond Cr. flume later after Falls Cr. for Ohio Match.*
>
> *. . . while Grott's crew was building the upper of the flume I was already using the lower part. When finished it was pert near 4 miles of flume - no branches to it - up the bottom of the main Falls Creek. 3 dams - one at the forks with chutes bringing logs into the dams.*
>
> *We logged first about a mile up Falls Creek on Bill Dittman's homestead. We took white pine but our main purpose was to get cedar poles.*
>
> *We had to put the poles in the flume butt first, you know, to avoid breakage and I flumed the poles separately form the logs.*
>
> *That falls at the mouth of the creek. You couldn't put poles over that falls! So I had the flume built along the hillside and across the ridge to the river about a hundred yards up river from the mouth of the creek.*
>
> *I went down and watched the first poles come racing down the flume and dive butt first off the end 40 feet into that deep eddy. Then the top of the pole would slip over and it would shoot to the surface headed the other way across the river before the next pole hit. We put out 10,000 poles form 20 feet in length to 50 feet. It worked like a charm.*

(12) Fitzgerald Creek. (T.46N., R.1E. Sec. 12, 13, 24) Russell (1979: 119) indicates that the workers on the flume were local residents. Art Darrar (Russell 1979: 166-7) states that

> *O'Neil built that flume in Fitzgerald. They cut the trees out of the way and skidded a little sawmill in pieces three miles right up that steep creek bottom. I didn't see it but that's what they told me. The mill cut the lumber to build the camp and flume to the river . . .*
>
> *Later, about 1927 when Russell and Pugh took over Fitzgerald, I packed a big circular saw, 5 foot 8 inches, up there for Walt Russell so that sawmill could cut lumber to extend the flume up the creek another half mile. That saw was something to pack!*

Wade Onthank (Russell 1979: 321) remembered the destruction of the Fitzgerald flume in 1930 or 31 as quoted in Chapter 6. Bert Russell (1979: 351-354) gives a lively look at a day of fluming on the Fitgerald flume.

> *When I worked at Fitzgerald Creek in 1929, flume time after supper always livened things up.*
>
> *Len McCrea, the boss, stuck his head in the bunkhouse door and called, "Come on, fellas!"*
>
> *Five or six lumberjacks who wern't afraid of water wheeled for the pond. Andy Knutsen and I grabbed a pikepole apiece and ran out across the logs in our calked boots, feeling catty, showing off because a lot of these lumberjacks hadn't been raised around the Coeur d'Alene lake and trained from childhood to run logs like ourselves. And the ones that came to the pond worked mostly from floating walks. (I learned in later years that some of these same*

guys like Lee Carpenter could ride circles around me. They knew they were good men on the round stuff and didn't need to show off.

Len McCrea paced back and forth on the shore of the pond, watch in hand. "Open the gate! Open the gate! I want that flume brim full. Ten minutes from now be ready to shove logs."

This is the curse of fluming logs on a steep flume. You have to let the flume fill far ahead with water before you start feeding in logs or the logs sliding downhill on the water will outrun the water and come grinding to a halt in a dry flume.

On the other hand if you run water into the flume too long there won't be enough water left in the pond to send down all your logs and the pond must be emptied to make room for more logs the next day.

The Fitzgerald flume tipped steeper the last half mile before reaching the river and made logs race so fact they scooped water out of the flume. A feeder dam had been built at the beginning of this steep pitch and a man stationed there to dump extra water into the flume.

So Len McCrea yanked at his mustache and paced the shore and looked at his watch. Although nobody had made a move to feed any logs into the flume, he yelled, "Hold 'em back there! I say, Hold 'Em Back!"

Then he hurried to the cedar tree just below the dam. He cranked the phone there and shouted, "The water get there yet? What's that? I can't hear you. This damn water makes to much noise."

Len hung up the receiver and galloped back to the edge of the pond. "God damn it! she's down two feet already. That fellow at the feeder dam never talks so anybody can hear him. Anyway the water should be over halfway there by now. He paced back and forth even faster, eyeing his watch.

Suddenly at 7 minutes he couldn't stand the suspense. He ran out a floating walk, grabbed a pikepole from the nearest man and shoved a log ahead where the roaring water caught it. The log dived through flying spray into the flume and took off rolling and bobing around the bend with its wet slides shining.

Shove'em in! No God dame it! Hold back. There went two at one. Space'em! Now shove 'em faster. That's too much space."

Logs crowed ahead in the pul of the current like racehorses at the gate.

"Damn it!" Len shouted. "They're jamming!"

I knew Len regarded me as a punk kid who ate like a horse and didn't know beans about skidding logs but here I thought I was king. I ran across the logs close to the spill off and started breaking them loose.

"Hold back there. Let the lad break the jam!"

Five minutes of frenzied activity and Len rushed to the phone, shouting to the man at the feeder dam, Turn your water in! Turn your water in!"

Another five minutes and someone furthest from the sound of rushing water hollered and pointed, "The phone! The phone!"

Len rushed down, came back bawling, "Hold up! Hold up! The logs got ahead of the water. Close the gate."

But we had already emptied most of the logs out of the pond. The floating walks rested on the mud and water funning out the gate was dying to a dribble.

Next morning Len took a crew of us down the flume. Alongside and below the feeder dam the logs lay touching nose to tail in a string a half mile long extending down the steep pitch toward the river.

But the logs had not outrun the water. Len had misunderstood.

The feeder dam man was explaining, "You shulda seen it! Them first big tamaracks come around the bend pushing water in a geyser 50 feet high till there wasn't a drop of water left behind 'em. Not a damn drop. When the big ones come to a stop down below and the other come around the bend and started hittin' 'em, like pile drivers. . . Jesus! I though they'd knock the flume off its stilts and smash--"

Len interrupted. "Here now! You fellows grab ever fourth log and roll it out of the flume. Then space the ones left maybe 4 feet apart."

It took a good half day.

Then Len cranked the feeder dam phone. "You at the camp dam! Give us a little, ay? Watch it!"

Pretty soon the water was gurgling among the logs and Len was shouting into the phone, "A little more, now. Easy does it."

Then after timing with his watch, "One of you boys there. Give me water out of the feeder dam."

After a bit he shouted down the flume to a man standing at the bottom end of the stranded logs. "Has the water worked down there?"

The man waved that it had.

Then to the feeder dam man "Give me a little more water now."

Then he shouted into the phone to camp. Open the gate more ay? I want the flume half full."

In the flume the little logs stirred first, then the big ones began to float. They began to move slowly, bumping one another, the big ones scraping the sides of the flume.

Then the whole long line was in motion.

Suddenly the water from the camp dam came racing around the bend and slid in among them, churning up froth, carrying them faster.

Everybody yelling, "Hey! She's goin'! God damn!"

When the first of the long black line began disappearing where the flume went beneath the Milwaukee railroad track a half mile away, little jets of white spray rose one after another as the logs dived into the Joe river.

(13) Flume/Dam Creek. (T.46N., R.4E. Sec. 21, 27, 28, 29, 32, 33) Clyde Webb (1955: 66) Stated that

Here at McGoldrick's I looked up the foreman, a Frenchman whose name I don't recall. (The Government scaler had quit and pulled out a few days earlier.) He was logging by trail chute into two ponds behind small dams. From these, one on Dam Creek and one on Flume Creek, he would each day open the gates and flume the logs into Slate Creek. A larger dam on Slate Creek would periodically splash the logs down Slate Creek, where they went into the St. Joe River and were driven and towed to the Spokane mill.

Crowell and Asleson (1980: 131) state that "to construct flumes, the company put in a mill at the head of Slate Creek in 1915 . . . "

(14) Flume/Spring Creek (into Rapid Lightning Creek and on to Pack River). (10-BR-89) (T.58N., R.1E. Sec. 14, 15, 24, 25)

(15) Haystack Creek. (T.51N., R.4E. Sec. 15, 16, 17) Brown (1935: 287) states that this flume had a 48-inch side and with a 90 degree V-type flume with a total length of 6,165 feet and an average grade of 7 percent and a maximum curvature of 10 degrees. He states that the flume was built low to the ground without resorting to trestles getting no higher than 6 feet above the ground. He states that (1935: 287)

> *During the dry summer season sufficient water was available for only a 2 hour period of fluming per day, and the capacity of the flume under these conditions was about 1400 logs or 125,000 b.f. daily. This flume carried cedar poles up to 40 feet in length and saw logs up to 36 inches top diameter. Materials used in the construction amounted to 460 feet for each 10-foot bent or 151,800 feet per mile.*

(16) Hugus Creek. (T.46N., R2E. Sec. 6, 7, 18, 19; T.47N., R.1W. Sec 34, 35) Hough (1927: 43-44, 137) gives a detailed description of this flume.

> *To show more fully the use of these flumes and afford a basis of costs the writer will describe the flume built by him on Hugus Creek, near St. Joe, Idaho for the Winton Lumber Co. This flume is seven miles in length. Known as the main line flume with three branches, one, one and a half and one and three-quarter miles respectively. The main Hugus Creek has a flow of only eight second feet at low stage, making impounding dams necessary. This dam is large enough to hold water for a one-hour flood. As much as 100,000 feet of timber is removed in 40 minutes to the St. Joe River, where it floats to the mill at St. Joe, some nine miles below.*
>
> *The three branch flumes were built into nearly dry gulches and depending on the rains in the fall and the rains and melting snow in the spring for removing the crop. Dams were built at the head of each flume and the same method employed as on the main line flume. The one mile flume had some 14 million feet of timber tributary to it and 7000 cedar poles, all of which were removed in two seasons with no trouble. The one and one-half mile flume had no water that would resemble a creek in the summer season, but four million feet of timber were removed and 4000 cedar poles in one season. The logs being decked along the flume during the fall and winter and following spring were removed in a few days. The one and three-quarter mile flume had seven million feet of logs and 4000 poles which were removed in two seasons. This gulch had a set of logging camps and the water supply was not enough to supply the camps the entire season, yet seven million feet of timber were removed at a cost far below any other method that could have been used.*
>
> *The timber of this section is generally small, being 10 to 11 logs to the thousand, though some in the upper part of the main line were three feet in diameter. A flume with four-foot sides was decided on for the main line, three and a half feet for the one mile and three feet for the other two with lining or sheeting of one-inch rough material doubled. Small sawmills of 10,000 to 15,000 feet capacity per day were located along the main line, two and two and a half miles apart, for cutting the material. The flume was started at each mill and the water of the stream diverted into it, the construction material being floated to place from day to day as the work advanced. No material, however, being allowed to get on to the ground after leaving the mill. Only such timber as spruce, red and white fir and tamarack was used in the construction. The progress per day was 320 feet, with the greatest amount in one month of 8000 feet. The branch flumes were smaller and greater progress was made. Here as much as 640 feet was made and 400 feet was an ordinary day's work.*
>
> *The driving power for the small sawmills was steam in some and gasoline in others, with the result that gas has proved the cheaper, though the gas was brought in on mule back or pack train and cost when on the ground 30 cents a gallon. Two elements entering into the use of gas are, first, the fire risk which is nearly, if not entirely eliminated in its use, second, many times these flumes are built in countries that ha no wagon roads, simply pack trails, the mill and engine can be taken apart, loaded on horse or mule back, packed to the place of use, then re-assembled. The writer has built one flume in which the plant has been moved 20 miles in this way. The amount of gasoline used was two and a quarter gallons per thousand feet of lumber cut.*
>
> *The grades of this flume very, being 1 per cent at the discharge end and as high as 16 per cent in some portions of the main line. One of the branches has a 22 per cent grade for 800 feet. As a rule 3 to 6 per cent grades were the ones usually encountered. When the limiting grades of a flume should be is a question. The writer has used as high as 40 per cent with satisfactory results. Care should be taken in the transition from one grade to the other by using long, vertical curves. While it would be desirable to use a little change in grade as possible this flume was intended to receive timber nearly its entire length and must therefore be kept on the lowest ground and close to it, that the*

object for which it was being built might not be defeated, namely, moving timber cheaply. Too much money could not be expended in getting timber into it.

. . . . The cost of this flume has been as follows: The main line, or four-foot flume, cost $9183.35 per mile, or $1.7393 per foot of flume. Together with the impounding dams $9732.09 per mile or $1.8432 per foot of flume. The main flume has two dams, one at the head and one two miles below. The wages pai d were $6 for flume carpenters and $4.50 for common laborers, working eight-hour shifts.

The one and three-quarter mile of three-foot flume cost $6466.49 per mile or $1.2248 per foot of flume. The dam and flume cost $7379.46 per mile or $1.3963 per foot of flume. Wages were $5 per day for flume carpenters and $4 for common labor for eight hours.

The entire flume, dams and branches cost $106,899.13. The timber to be removed is 60 million feet of logs, making a cost of $1.79 per thousand for flume. The cost of upkeep of flume for the year 1925 has been .03 cents per thousand feet of logs flumed and the cost of fluming has been 49 cents per thousand. The number of flume walkers employed has been but one for the entire length of flume with occasional day of extra help for repairs.

(17) Indian Creek. (T. 61 N., R. 4 W. Sec. 13, 14, 22, 23, 27)

(18) Laverne Creek. (T. 50N., R. 1E., Sec. 5,8,9)

(19) Leiberg Creek (including Lavin and Tie Creek). (T. 51N., R.1E. Sec. 20, 21, 28, 29, 31, 32) In Strong and Webb (1970: 116) a 1920 photograph shows a rollway on the flume.

Rudy Vesta (Russell 1984: 234) say that

The flume was 7 or 8 miles long and ever so far apart was a little dam that served as a feeder or booster to put water in the flume to replace what leaked or splashed out. At flume time they'd open a gate of the pond above and here would come a flush of water down the flume. The lumberjacks lined up along the flume and rolled logs in. The problem is to keep the men from putting logs too thick. Two years later I had the job of telling these gypos, "Now, we're gonna sluice and you let 5 minutes of water go by before you dump any logs in because going downhill the floating logs will outrun the water." If you didn't watch them log hungry gypos they'd have the flume halt full of logs before the water comes. The only way you avoid trouble is for the logs to be single file with a space between 'em. I've seen a whole string of logs outrun the water and grind to a stop and ones behind jumping on top of 'em and you've got a jam. Then the logs have to be pitched out over the side of the flume. Now! If that ain't a man's job to pick 'em up, take 'em back to the skidway and roll 'em in again.

Russell (1984: 234) shows a photograph of the Leiberg flume at camp 6 in 1924.

(20) Loop Creek. (T.46N., R.7E. Sec. 8, 17, 20) Crowell and Asleson note that

The most spectacular flume in the area was built in 1915 by C. H. Gregory, a corpulent lumberman who could "walk the legs off a jackrabbit." His flume above Adair, near the mouth of Ward Creek, flowed around the contours of the hill side and anchored itself into the side slopes. It passed over the railroad tunnel and carried logs over a mile before depositing them for pickup near the railroad siding. Remains of the flume can still be seen.

(21) Lower West Branch of Priest River. (T. 56, 57, N., R. 5 W. Sec. 22, 23, 26, 25, 36, 1, 12)

(22) Marble Creek. (10-SE-103, 106, 124) (T.43N., R.4E. Sec. 18, 19, 20, 30) E. F. Gaffney (DeWolf 1923: 72 states that

The first flume is in the upper Marble Creek country, where it was impossible to get the logs or to build a railroad. These conditions made that flume practicable. The flume was about two miles long, a four-foot flume, and it laid from 3 percent to 11 percent. In the spring of the year, when we had plenty of water, we could flume from five to six *hours a day, but as the water got scarce our output was decreased so that at the lower stage of water we could get but two small floods a day, those floods lasting from three to five minutes, we were able to flume from 30,000 to 40,000 a day. But to get that amount we had to have teams skidding at several different places along the flume and in that way we were able to roll into the flume while the head was on. We took about 24 million feet over that flume at an approximate cost of $2 a thousand, including the building of the flume, operating expense and up keep, which was a very satisfactory operation.*

The construction of that flume was cheap and simple. I think it cost about $7000 a mile to build. We hadn't any grading to do, no rock work at all, very little earth work and no trestle work to speak of. We got the flume right down on the ground it won't dry out nearly as fast as when it is up on the trestle, and there is less vibration and it won't open up as easily.

Wash Applegate (Russell 1979: 23) remembered that camp 15 was on Delany Creek, Cucumber Mikes Mahoney's Camp 22 was on Upper Delaney Creek and Camp 10 was on the flume coming down from toward Crater Lake. All of these camps were established to run the flume and supply it with timber.

(23) Meadow Creek. (10-BY-357) (T. 67N., R. 2E., Sec. 14, 15). Fieldwork indicates this was a 19 1/2" flume for transporting ties.

(24) Mica Creek. (10-SE-522) (T.46N., R.3E. Sec. 6; T.45N., R.3E. Sec. 7, 18; T.45N., R.2E. Sec. 22, 23, 24, 27, 33; T.44N., R.2E. Sec. 4) Remnants of this flume standing in Mica Meadows shows a V-shapped flume 68" across the top with 45" sides. The sides were built out of 1 layer of 1" x 12" boards and the flume brackets wee 4" x 6" timbers. It was put together with 6" nails.

Roy Brickle said (Russell 1979: 119) that O'Neil (of O'Neil and Irvine) went broke at Mica Creek. Wash Applegate (Russell 1979: 13) remembered that at first it was O'Neil and Irvine and then they sold out to Herrick. A confusing state that followed in which is that

Kroll put the first logs of the Mica Flume in about '18. Kroll logged Mica for years. They had trouble with the logs bunching up on this flume so they put in another dam about a mile and a half above Engstrom Creek. The whole flume was 10 or 11 miles long.

They first started hauling logs from Engstom Creek on a narrow gauge railroad and unloaded at the dam. That's where Camp 3 was. Later when Blackwells got to logging up on the Hump above Crystal Creek, the Mica people brought a wide gauge engine around on the Blackwell railroad, built a track down the hill and lowered it into Mica Creek.

A photograph caption on page 12 of Russell 1979, says "old Mica Flume last used in the 1930's".

(25) Mission Creek (10-BY-26/146) T.65N., R.1E., Sec. 16) Remnants appear to be a single mainline flume without branches and fed by a single flume dam.

(26) Picnic Creek. (T.51N., R.1W, Sec. 11, 12, 15, 16) Brown (1935: 287) states that

The Picnic Creek flume was 16,500 feet long with a maximum grade of 10 percent and a maximum curvature of 17 percent. Trestles were necessary for approximately half a mile. The average fluming distance was two miles for all classes of timber, and handled logs up to 40 inches in top diameter. The daily output was 90,000 feet. This flume did not carry any poles or piling.

(27) Rochat Creek. (T.46N., R.1W. Sec. 3, 10, 15; T.47N., R.1W. Sec. 34, 35) Bruce (1914: 31) states that

Probably one of the best examples of modern V-shaped log-flume construction is a flume recently constructed on Rochat Creek, near St. Joe, Idaho. This flume, which is unusually large and strongly constructed for the purpose of handling large, heavy logs, and long timbers, is said to have costs approximately $8,000 per mile for the 5 miles of its length. This figure includes the cost of construction of a wagon road and telephone line equipment.

Starbird (1912: 44) states that:

In conclusion, will call your attention to the flume constructed last year on Rochat Creek, near St. Joe, Idaho, for the Milwaukee Land Co., which has demonstrated the advantages to be gained by the use of this and has demonstrated the advantages to be gained by the use of this method of transportation.

The country through which it was built was exceptionally rough and difficult; a narrow rock canyon had to be passed through; the creek bottom was narrow, and fire had the year before swept over the territory and filled the canyon and entire bottom with partially burned timber and windfalls. The decision to build the flume was reached only after it was found impossible to get a railroad in. Its length is approximately five miles. The average grade is about eleven per cent, the steepest curvature 20 degrees.

A wagon road was first built through to where it was proposed to start the flume, and a portable sawmill was installed to manufacture the lumber required. Construction of the flume was started at the mill and the lumber used was shipped through the flume as fast as completed to the head end.

The regular V-box type of construction was used, built up on trestles set 16 feet apart supporting stringers on which the box rested. The trestles were built of 4x8 stringers, sills, posts and caps and cross-braced with 2x6 lateral bracing and round pole supports in center of bent. The brackets supporting the box were built of 4x6 for sills and arms braced with 3x6. The box was built of 2-inch rough plank battened with 1 1/2 x 4-inch strips set in between the brackets which were set two and four feet centers.

The cost of this flume including its six feeders and telephone line and equipment was approximately forty thousand dollars or a little more than eight thousand dollars per mile. It would be hard to find more difficult or expensive conditions for the construction of a log flume than those governing this proposition.

After the flume was completed late last Fall, it laid idle thorough the Winter, covered with snow, which attained a depth of eight to ten feet, and this Spring the water was exceptionally high, but it withstood these severe tests and without any repairing was said to be in as good condition as when completed.

Up to July first of this year between seven and eight million feet of logs have been run through, and the only expense has been loading them into the flume. There has been no patrolmen employed and the only repairing necessary was caused by a couple of trees falling across the structure during an exceptionally severe wind storm.

Experienced loggers who have closely watched it in operation say that its capacity is limited only by the number of logs that can be gotten in.

(28) Roundhouse Draw. (T.45N., R.5E. Sec. 16)Andy Porterfield (Russell 1978: 148) said that about 1913 he built a little flume out of Roundhouse Draw for cedar poles. He did it for Valentine-Clark.

(29) Skookum Creek. (10-KA-112) (T.51N., R.1W. Sec. 28, 33; T.50N., R.1W. Sec. 3, 4) Dooley Cramp (Russell 1984: 45) shows the Skookum Creek flume dam in 1917 and said it was built by Crotty. Brown (1935: 281 shows the same photograph. Strong and Webb (1970: 116) shows a "1923" photograph of a rollway on Skookum Creek flume. A photo of the Skookum Creek flume dam with a 1927 date on te back shows an open log crib structure with a half-moon gate. Also stated on the back that the cost of the dam was $1000 a 1924 date also occurs on the photographs back.

(30 Spruce (Ruby) Creek. (LOC-252) (T.65N., R.2E. Sec. 35, 36; T.65N., R.2E. Sec 31, 32; T.64N., R.3E. Sec 35)

Remnants of the flume that now exist show a single mainline flume with no branches. The flume "V" was 48" across the top, had walls of two layers of 7/8" boards. The flume brackets were constructed out of 4" x 6" timbers. The flume sat on either sawn timber trestles or log cribbing.

Gibson (1918: 12-13) describes this flume as

> *The flume I saw at Ruby Creek . . . measures 50 inches across the top, each side being 36 inches. A part of it is constructed of two thicknesses of one inch planking, the remainder being 2-inch planks with 1-inch fattens fastened over the joints on the outside. Brackets are spaced about 3 feet apart and are constructed in the upper portion of 6 by 4-inch scantlings and in the remainder of 4 by 4 inches. Each bracket consists of 6-foot sill supporting two 3-foot braces each stayed by an 18-inch prop. The brackets rest on longitudinal poles which are raised off the ground by a framework of poles braced together. A 12-inch foot-board running the length of the flume is nailed to the sills on one side.*
>
> *This flume is built in two portions, the upper one 1,280 yards and the lower 4,891 yards in length. The difference in elevation between the upper and lower ends is about 1,500 feet. The gradient varies from 1 in 50 to 1 in 6 1/2. The maximum curve has a radius of 260 feet. In some places the flume is raised about 20 feet above the ground level. . .*
>
> *The upper portion of the flume acts as a sort of collector of the timber. It starts at a dam behind which water is collected. The sluice gate to this dam is raised periodically and water allowed to flow down the flume. While the water is flowing the logs which have been piled up at the side of the flume are rolled into it and are carried down into a pond which terminates the upper and begins the lower portion of the flume. . . .*
>
> *This pond is formed by a dam made from a crib of logs piled on top of one another and ballasted with earth. The water surface is 14,400 square feet and is faced with planks. The maximum height of the dam is 30 feet on the lower side, the length is 120 feet and the width at the top 8 feet and at the bottom 30 feet. . . . The water stored behind it is used to operate the lower flume and is supplemented with such water as can be trapped on the way down, which is introduced into the flume by means of side feeders.*
>
> *Logs are collected in the pond behind the dam. The men at the lower end of the flume telephone up to the men on the dam, who open a sluice gate allowing water to flow down. The depth of water in the flume is usually about 10 inches. After a little water has gone down the men direct logs though the sluice gate and allow them to slide down the flume. . . . When as many logs have gone down as can be conveniently handled at the bottom, they close the gate and allow the pond to fill up again. The timber takes about 7 minutes to travel the distance of nearly 3 miles.*
>
> *In the valley at the foot of Ruby Creek is a river across which the logs have to be conveyed in order to reach the railway. This is done by carrying the flume across a suspension bridge . . which has a span of 176 feet . . . . Thirty-two wire cables are used to support this bridge varying in size from 1 inch to 3/8 inch, apart from 1,000 feet of 1/2 inch hanger cable. . . .*
>
> *The arrangements for delivering the logs at the foot of the flume is most ingenious. . . . a series of iron-rollers are let into the landing. The flume ends in an opening down which the water drops on to a water wheel which causes every alternate roller to revolve by means of a chain and sprocket drive. The first two rollers are toothed, so that they grip the logs and draw them out of the flume. Men roll the logs off the landing on to a sloping platform from which they are easily loaded on to trucks.*

(31) Strong Creek. (T. 57 N., R. 1 E., Sec. 25, 35).

(32) Wolf Lodge Creek. (T.50N., R.2W. Sec. 32; T.49N., R.2W. Sec. 5,6) E. J. Gaffney (DeWolf 1923: 72, 77) stated that

> *Our next flume was in the Coeur d'Alene Lake country, at [Wolf] Lodge. That flume was about two miles long, had a grade of less than 1 percent. The timber was heavy there; yellow pine, tamarack and fir. Like the other flumes,*

we had plenty of water in the spring of the year, but no water in the summer, and could not flume a log at all. That was a truck logging job. We had to truck to the flume. You know that you can't truck when the ground is soft in the spring of the year. So we had to do our logging in the summer, haul to the flume, deck the logs up and flume in the spring of the year. We used "cats" there, too. We also tried sleigh hauling. Sometimes we had some sleighing and sometimes we had some mud. We could not do anything in the winter. That flume cost $11,000 a mile; a four-foot flume. We could have built a railroad in that country and taken out more logs in a few months with a railroad than we took out in three seasons with the flume.

BIBLIOGRAPHY

Allison, A. P.
1921 Flumes for Handling Pacific Coast Timber. *The Timberman.* November p. 42.

Andrews, Ralph W
1994 *Glory Days of Logging, Action in the Big Woods, British Columbia to California.* Schiffer, Atglen, Pennsyvania.

Barton, Dave
1980 *Idaho Panhandle National Forests Oral History Study* (2 vols.). Soil Systems. Blooming-ton.

Brown, Nelson
1934 *Logging-Principles and Practices in the United States and Canada.* John Wiley and Sons. London.

1935 *Logging - Transportation.* John Wiley and Sons. London.

Bruce, Eugene S.
1914 Flumes and Fluming. *Bulletin of the U. S. Department of Agriculture No. 87.* U. S. Govern-ment Printing Office. Washington D. C.

Bryant, Ralph Clement
1913 *Logging, the Principles and General Methods of Operating in the United States.* John Wiley and sons. London.

Chance, David H.
1991 The Lumber Industry of Washington's Pend Oreille Valley, 1888 - 1941. Report prepared for the Colville National Forest. David and Jenniffer Chance and Associates, Moscow.

Cork, Marylyn (ed.)
1991 *Beautiful Bonner: The History of Bonner County, Idaho.* Curtis Media Corporation. Dallas

Crowell, Sandra and David O. Asleson
1997 *Up The Swiftwater, A Pictorial History of the Upper St. Joe.* Musuem of North Idaho. Coeur d'Alene.

DeWolf, Allen H.
1920 Logging Flumes. *The Timberman*, October pp. 95-99.

1923 Construction of Log Flumes. *The Timberman* November pp. 72, 74, 77.

Fisher, W. R.
1896 *Schlich's Manual of Forestry V. Forest Utilization.* Bradbury, Agnew and Co. London.

Franc, Gerald C.
1972 *The Beaver Creek Flume*. Clear Water National Forest. Orofino.

Gibson, H. S.
1918 Forestry and Lumbering in the United States of America. An account of some machines and methods in Use. Simla Bombay, India.

Greeley, A. W.
1938 Marble Creek logging as told by H. J. Richey. Ms on file, Idaho Panhandle National Forests, Coeur d'Alene, Idaho.

Hirasuna, Delphine (ed.)
1984 Logging Flumes, man-made rivers. *The Potlatch Story*, Vol 24, No. 3. pp 6-9. Potlatch Corporation. San Francisco.

Hough, Ulysses B.
1927 Logging Flumes. *The Timberman* March pp. 43-44, 137

Hudson, Lorelea, Sharon Boswell, Caroline D. Carley, Wayne Choquette, Christian Miss, David H. Chance, and Michael A. Stamper
1982 Cultural Resource Overview for the Colville and Idaho Panhandle National Forests and the Bureau of Land Management - Spokane and Coeur d'Alene Districts. (2 vol.) Cultural Resource Consultants. Sandpoint, Idaho.

Martin, J. P.
1912 The Design of Log Flumes. *Engineering News* Vol. 68, No. 20, pp. 908-913.

Millard, Bailey
1903 Flying Down a Fifty-Mile Flume. *Everybody's Magazine* Vol. IX, No. 1. pp. 3-11.

Priest River Times
1972 History of the Log Drive. June 29, 1972.

Robertson, J. E.
1909 The Log Flume as a means of Transporting Logs. *The Timberman*. August pp. 45-6.

Russell, Bert
1978 *Hardships and Happy Times*. Lacon. Harrison, Idaho.

1979 *Swiftwater People*. Lacon. Harrison, Idaho.

1984 *North Fork of the Coeur d'Alene River*. Lacon. Harrison, Idaho.

Simpson, Charles D. and E. R. Jackment
1967 *Blazing Forest Trails*. Caxton, Caldwell.

Society of American Foresters
1918 Forest Terminology. *Journal of Forestry* Vol. XVI, No. 1

Sewell, H. A.
1920 Notes on Economics of Flume Transportation. The Timberman June 1920. Page 43.

Starbird, W. D.
1912 Log Flumes are of economic Value where Conditions are Favorable. *The Timberman* August pp. 42-44.

Steel, Francis R.
Lumber Flumes. *Bulletin of the Harvard Forest Club*. Vol. I. pp. 31-35

Strong, Clarence C. and Clyde S. Webb
1970 *White Pine: King of Many Waters*. Mountain Press. Missoula.

The Timberman
1923 The Construction of Log Flumes, Three Successful Installations in the Inland Empire. pp. 38-9.

USDA Forest Service
1944 *Early Days In the Forest Service, Volume 1*. U.S. Department of Agriculture, Forest Service. Northern Region, Missoula Montana.

1955 *Early Days In the Forest Service, Volume 2*. U.S. Department of Agriculture, Forest Service. Northern Region, Missoula Montana.

1962 Early Days In the Forest Service, Volume 3. U.S. Department of Agriculture, Forest Service. Northern Region, Missoula Montana.

1976 *Early Days In the Forest Service, Volume 4*. U.S. Department of Agriculture, Forest Service. Northern Region, Missoula Montana.

William Richard L.
1976 *The Loggers*. Time-Life. New York.

Wood, Richard G.
1935 A History of Lumbering in Maine. *The Maine Bulletin*. University of Maine. Orono.

Documentary Sources

Museum of North Idaho, photographic collection. Coeur d'Alene

University of Idaho Library, photographic collection. Moscow

GLOSSARY

Apron. a platform projecting down-stream from the sluiceway of a dam to launch well into the stream logs which pass though the sluiceway (society of American Foresters 1918: 2)

Bracket frame. a frame that forms the "V" of the flume. The bracket frame is constructed from a bracket sill on which are placed two arms that form the sides of the flume and shich are held upright by two braces.

Bent. One row of piling or timbers making up the supporting framework of a bridge (McCulloch 1958: 10).

Elephant. The delivery point of a log flume, branched out to increase the ease of handling and storage (McCulloch 1958: 57).

Flowage. a head of water damed up for fluming (McCulloch 1958: 64).

Flume. a wooden water trough on trestles or cribwork to carry logs or lumber to milling or loading points (McCulloch 1958: 64) also called water slide or wet slide in someplaces (society of American Foresters 1918: 73).

Flume box. The trough, supported on a trestle, whch carries the water in a flume system (McCulloch 1958: 64).

Flume chaser. a man who patrols log or lumber flumes to spot jams and watch for needed repairs. also called flumer, herder, flume walker (McCulloch 1958: 64).

Flume tender. a. Same as flume chaser. b. A repairman, part carpenter, part bridgeman, who maintains a flume (McCullock 1958: 64).

Foot plank. The walk alongside a flume, used by a flume herder (McCulloch 1958: 65).

Crib. One of the supports under a logging bridge, flume, or railroad built of round logs laid crib fashion (Society of American Foresters 1918: 15).

Crib dam. a dam built with cribs of logs, filled with stones, and planked on the up-stream face (Society of American Foresters 1918: 15).

Frog. The junction of two branches of a flume (Society of American Foresters 1918: 26).

Hot log. To log and load out direct from the woods to the mill without log being stored or cold-decked at any point along the way (McCullock 1958: 90).

Rollway. a landing where logs are piled up waiting loading or river [flume] driving (McCullock 1958: 153).

Sluice. a log flume. . . to transport logs by water, as in fluming (McCullock 1958: 171).

Station. a point along a flume where a flume tender is stationed; or a place below the head of a flume where more logs are dumped in (McCullock 1958: 181).

V-Board or beam or backbone. a three-cornered piece, formed by splitting a 6x6 timber cornerways, [and] placed at the bottom of the V [of the flume] to economize in the use of water and [which] affords a strengthening timber as well (Hough 1927: 43).

Vertex. The bottom of the flume "V" (Martin 1912: 908).

Table I

FLUMES IN NORTHERN IDAHO

FLUME	LOCATION	DATE	COMPANY	SOURCE	SITE #
1. Benewah Creek	Benewah Co.	1911	Milwaukee Lumber	Russell	
2. Berry Creek	Bonner Co.			Cork 1991	
3. Big Creek	Bonner Co.	1929	Diamond Match	Peterson	
4. Bond Creek	Shos/Benewah Co.	1928-9	Ohio Match	Russell	10-BW-79/SE-646
5. Brickle Creek	Koot/Spokane Co.	1920	Panhandle Lumber	Strong and Webb	
6. Bussel Creek (also Lines)	Shoshone Co.	1917	Rutledge	Russell	10-SE-523/525
7. Copper Creek	Kootenai Co.	1915	McNeil and Irvine	Russell	10-KA-220
8. Curley Creek	Boundary Co.	1923	Bonners Ferry Lumber		10-BY-234
9. Emerald Creek	Benewah Co.			Strong and Webb	
10. Falls Creek (CdA)	Shoshone Co.		Winton		10-SE-218
11. Falls Creek (St. Joe)	Shoshone Co.	1917-18	Valentine-Clark/Rose Lake	Strong and Webb	
12. Fitzgerald Creek	Shoshone Co.	1922	O'Neil	Russell	
13. Flume/Dam Creek	Shoshone Co.	1915	McGoldrick	Strong and Webb	
14. Flume/Spring Creek	Bonner Co.		Diamond Match	Cook 1991	
15. Haystack Creek	Shoshone Co.		Winton		
16. Hugus Creek	Shoshone Co.	1925	Winton	Hough 1927	
17. Indian Creek	Bonner Co.		Diamond Match		
18. Laverne Creek	Kootenai Co.	1918			10-KA-231
19. Leiberg Creek(also Lavin)	Kootenai Co.	1920	Winton	Strong and Webb	10-KA-272
20. Loop Creek	Shoshone Co.	1915	C. H. Gregory	Strong and Webb	10-SE-634
21. Lower West Branch	Bonner Co.	1926	Humbird	Priest River Times	
22. Marble Creek	Shoshone Co.	1915-16	Carey and Harper/Rutledge	Strong and Webb	10-SE-124
23. Meadow Creek	Shoshone Co.	1920	Bonner Tie		10-BY-357
24. Mica Creek	Benewah Co.	1916-8	O'Neil and Irvine/Herrick	Russell/Strong and Webb	10-SE-522
25. Mission Creek	Boundary Co.	1922	A. C. White		10-BY-146
26. Picnic Creek	Kootenai Co.		Winton	Musum of N. I	
27. Rochat Creek	Benewah Co.	1911	Milwaukee Land Comapny	Starbird 1912	
28. Roundhouse Draw	Shoshone Co.	1913	Valentine-Clark		
29. Skookum Creek	Kootenai Co.	1918	Winton	Strong and Webb	10-KA-112
30. Spruce (Ruby) Creek	Boundary Co.	1916	Inland Paper	Gibson	LOC-252
31. Strong Creek	Bonner Co.				
32. Wolf Lodge Creek	Kootenai Co.		Rutlege		

TABLE II

FLUMES	YEARS KNOWN TO BE IN OPERATION																																										
	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Benewah				X																																							
Big Creek																						X																					
Bond Creek																					X	X	X	X	X	X	X	X															
Brickle Creek													X					X																									
Bussel Creek										X	X	X																															
Copper Creek								X																																			
Curley Creek																X																											
Emerald Creek																																											
Falls (CDA)																X		X																									
Falls (St. Joe)						X				X	X																																
Fitzgerald Creek															X					X	X	X	X?																				
Flume/Dam								X																																			
Flume/Spring													X																														
Haystack																																											
Hugus Creek																		X																									
Indian Creek																																									X		
Leiberg Creek														X			X																										
Loop Creek								X																																			
Priest River																			X																								
Marble Creek								X	X																																		
Mica Creek									X																																		
Mission Creek															X																												
Rochat Creek				X																																							
Roundhouse Creek						X																																					
Skookum Creek																																											
Spruce Creek										X	X				X	X																											
Wolf Lodge Creek									X	X	X																																