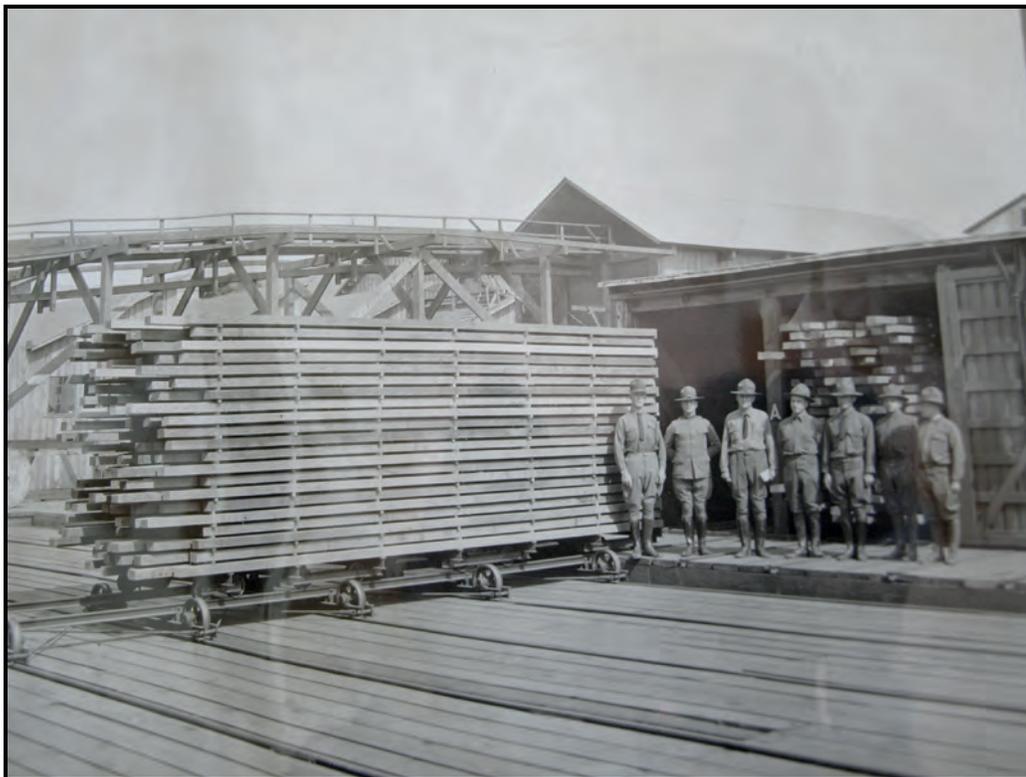


**THE U.S. ARMY SPRUCE PRODUCTION DIVISION AT VANCOUVER
BARRACKS, WASHINGTON, 1917-1919**



March 1, 2013

Prepared for Ft. Vancouver National Historic Site
National Park Service
Contract P11PX842-51

Prepared by East Slope Cultural Services, Inc.
Ward Tonsfeldt, PhD, Principal Investigator

**THE U.S. ARMY SPRUCE PRODUCTION DIVISION AT VANCOUVER
BARRACKS, WASHINGTON, 1917-1919**

March 1, 2013

Prepared for Ft. Vancouver National Historic Site
National Park Service
Contract P11PX842-51

Prepared by East Slope Cultural Services, Inc.
Ward Tonsfeldt, PhD, Principal Investigator

(Cover photo: Aircraft-grade wing stock enters the dry-kiln
at the Cut-up Plant. Photo from NARA, College Park, MD)

Contents

Introduction.....	iii
<u>Chapter I Overview of the U.S. Army Spruce Production Division and Spruce Production Corporation.....</u>	<u>1</u>
Mobilizing Sitka Spruce for the War	
The Summer of 1917	
The Advent of Colonel Disque	
Solving the Labor Problem	
Solving the Production Problem	
Aftermath	
<u>Chapter II Personnel and Policies in the Spruce Production Division.....</u>	<u>21</u>
Getting Started	
Communications	
Management—Military Organization and Officers	
The Roster, 1918	
Labor—Finding the Spruce Soldiers	
Life in the Logging Camps	
Life at the Cut-up-Plant	
Clothing	
Medical Services	
What the Soldiers Had to Say	
<u>Chapter III Building and Operating the Vancouver Cut-up Plant</u>	<u>50</u>
Genesis and Concept	
Building the Main Mill	
Other Parts of the Mill	
Equipment in the Mill	
Cutting Aircraft Stock	
<u>Chapter IV Railroad and Spruce Production</u>	<u>75</u>
Logging Railroads	
Branch Lines	
The SP&S Hub with Service to Vancouver	
Rail Facilities at the Cut-up Plant	
Traffic	
<u>Chapter V The Spruce Production Corporation and the Beginnings of Military Aviation at Vancouver, 1917-1925</u>	<u>105</u>
Pearson Field Overview	
Aviation Culture at Vancouver Barracks	
Aviation During the War Years	
The Spruce Production Corporation Takes Over	
The Flying Field, September 1919-September 1921	

Chapter VI <u>Significance of the Spruce Production Division</u>	122
Air Power and the War	
One Hundred Million Board Feet	
The Supremacy of Spruce	
The Labor Problem Revisited	
Sabotage and Vigilante Violence	
Dissolution	
One Hundred Years Later	
Appendix A Published Sources Cited.....	146
Appendix B Revelant Holdings, NARA, College Park, MD	155
Appendix C Relevant Holdings, NARA, Seattle, WA	161
Appendix D Selected Bibliography of Secondary Sources	167
Appendix E Notes on the Railroads Supplying the SPD	192
Appendix F Authorization to Built the Cut-up Plant.....	201
Appendix G Glossary.....	203

INTRODUCTION

This report discusses the formation and operations of the U.S. Army Spruce Production Division and its successor agency, the Spruce Production Corporation, during World War I. The Spruce Production Division (SPD) was a hybrid military/industrial organization that provided special lumber for manufacturing military aircraft in Europe and in the U.S. At its peak, it consisted of nearly 30,000 officers and men from the U.S. Army Signal Corps. It had administrative offices in Portland, Oregon. The military command for the organization was located at Vancouver Barracks, Washington. Soldiers attached to the SPD were stationed in lumber mills and logging camps throughout western Oregon and Washington from the Canadian border south to Coos Bay. Vancouver was the Division's central place. Between February and November, 1918, the SPD built and operated a large re-manufacturing plant at Vancouver that produced 139 million board feet of aircraft-grade lumber.

Despite the brevity of its period of activity, and the ephemeral nature of wood-and-fabric aircraft construction, the SPD participated in several themes important in 20th century U.S. history. These include the acquisition and management of strategic natural resources, government intervention in social and political disputes, and cultural response to rapid technological change. Now, nearly 100 years after the events of World War I, these themes can be seen to echo through most of the last century.

When the Americans entered the war in April, 1917, they were completely unprepared for the pace of technological change on the Western Front. European military aircraft technology was so volatile, and American aviation was so backward, that the British and French Allies asked the Americans not to build any combat aircraft. Surprisingly, the Americans agreed to build only training planes for the war. This was despite that fact that aircraft design and production facilities in Britain and France were strained to the breaking point.

The situation at home in 1917 was also uncomfortable. Disruptive strikes, vigilantism, sabotage, and open violence between social classes were occurring in many parts of the country. The American public was told that their safety was threatened by “an unseen foreign hand” bent on their destruction. The Pacific Northwest was especially afflicted with political violence. The Everett Massacre in 1916 and the Centralia Massacre in 1919 bracketed the dates of World War I.

Securing a supply of a strategic material deemed essential for the military is common enough in wartime. Enriched uranium in recent times has its historical antecedent in many other periods. The material in World War I was high-grade lumber from the Sitka spruce—an obscure tree found in the coastal rainforests of the Pacific Northwest. Exactly how the European Allies stumbled upon Sitka spruce as the best lumber for aircraft remains a mystery, but they asked for 100

million board feet of lumber from this species for their war effort. In 1916—when the Europeans began buying Sitka spruce from Northwest mills—the tree yielded only 10% aircraft-grade lumber. The quota of 100 million board feet set for 1918 would require that one billion board feet of Sitka spruce be cut, and approximately 900 million board feet be rejected. Logging a minor species on this scale could obviously not be sustained. The old-growth forests where the spruce lived were fragile and the total accessible volume of Sitka spruce was estimated at no more than four billion board feet—four years' supply.

One of the SPD's successes was finding new milling methods to increase the yield of aircraft-grade lumber. Another success was finding alternative species to substitute for Sitka spruce. The SPD met the 100 million board feet quota with half Sitka spruce and half other species. They also produced about 60% aircraft-grade material from their logs. On the social front, the SPD also found an effective stop-gap solution to the unrest crippling the Northwest lumber industry. By creating the Loyal Legion of Loggers and Lumbermen, the SPD got labor and management to agree to end strikes, lockouts, and sabotage in exchange for eight-hour working days, health and accident insurance, and a pension fund. The arrangement did not last long, but it worked long enough to get through the war.

As we move toward the centennial of World War I, it is appropriate that we make details of this period available for public interpretation. Fort Vancouver NHS offers excellent potential for archaeological investigations that can make the period come alive by revealing the material culture of the spruce soldiers and their times.

CHAPTER I

OVERVIEW HISTORY OF THE U.S. ARMY SPRUCE PRODUCTION DIVISION AND THE SPRUCE PRODUCTION CORPORATION

The U.S. Army Spruce Production Division was a branch of the Signal Corps Aviation Section during World War I. Its purpose was to ensure that the United States produced over 100 million board feet of Sitka spruce lumber for the Allies to manufacture military aircraft. The U.S. entered the war on April 6, 1917, and the Army established the Spruce Production Division (SPD) on November 17, 1917. During the summer of 1918—about nine months later—the SPD phased out operations and transferred all of its assets to the Spruce Production Corporation. This was a government corporation which continued to produce aircraft lumber for the remainder of the war. By the end of the war in November, total production of aircraft lumber had reached 139 million board feet, more than meeting the goal established in 1917.

In September of 1919, ten months after the Armistice, the Spruce Production Corporation (SPC) began to liquidate the logging equipment, railroads, sawmills, and timber lands that the SPD had accumulated. The timber lands were sold on contract, so the SPC's life was artificially prolonged as it continued to manage the sales contracts for the government until 1946. In reality, the government spruce production program lasted only a year, from November 1917 to November 1918.

Reduced to its simplest terms, the Army's venture into lumber production seems short-lived and perhaps a little anomalous. Strange things happen during wars. It is easy to relegate the SPD to the category of activities that seemed like a good idea at the time but do not, perhaps, bear too much scrutiny after the fact. The Army's own initial reports on World War I military aviation (E.S. Gorell, *Final Report*, 1919, and W.C. Sherman, "Tactical History," 1921) do not mention the Spruce Production Division or Spruce Production Corporation.¹ None the less, the spruce program accomplished its purpose of manufacturing adequate supplies of aircraft lumber for the war. It also had lasting impacts on the lumber industry in the Pacific Northwest.

¹ Both of these reports have been re-published by the Office of Air Force History. Maurer Maurer, ed., *The U.S. Air Service in World War I*, Vol. I (Washington DC, 1978).

Mobilizing Sitka Spruce for War

Sitka spruce (*Picea sitchensis*) is one of the several species of conifers that make up the coastal forests of Southeastern Alaska, British Columbia, Washington, and Oregon. Its range is usually described as extending from Northern California to Sitka, Alaska, no more than 50 miles inland from the ocean. Most descriptions of Sitka spruce note that it is larger than other spruce trees found in America, reaching heights of 180' and a basal diameter larger than five feet.² The name "Sitka" is used consistently in the literature of both botany and of aircraft engineering. It was sometimes referred to as the "silver" spruce in the press during the World War I years. At least one recent source lists "silver spruce" as an alternative name for Sitka spruce.³



Figure 1-1 Classic Signal Corps photo of Sitka spruce taken in 1918. Note the scale of the tree and stump, the dense forest surrounding it, and the size of the logs. (Photo, NARA, College Park, MD)

The Sitka spruce trees were mixed with fir, hemlock, and cedars in most coastal forests in the Pacific Northwest. There were some relatively pure stands, but they were an exception to the usual pattern. Because of this mixed distribution, it was very difficult to gauge the total extent of the spruce resource. The Army estimated that the total volume of Sitka spruce in Alaska, Washington, Oregon, and California at 18 billion board feet.⁴ Of this volume, only about four

² See, for example, Warren Randall, Robert F. Kenniston, and Dale M. Bever, *Manual of Oregon Trees and Shrubs*, (Corvallis, 1975) 67.

³ <http://treesandshrubs.about.com/od/selection/tp/Spruce-Trees-and-Shrubs.htm>

⁴ Anonymous, *History of the Spruce Production Division*, (Portland, 1919), 3.

billion were considered accessible for logging. The USDA Forest Service concurred that a volume of four billion board feet of Sitka Spruce was accessible, but set the total volume slightly higher.

Most Sitka spruce was logged with other species. Prior to the war, it was not a particularly desirable part of the mix. Spruce lumber of all species was useful for some specialized applications like musical instruments, but there was very little demand for spruce in general. Spruce destined for instrument-making could be provided by lumber mills on the east coast closer to locations where instruments were made. Since the west coast was far from the instrument-making centers, Sitka spruce lumber was sold as low-cost products including box shoo and lath.⁵ It was not especially suitable as framing lumber, and could not compete with Douglas fir. A high percentage of spruce lumber was free of knots—or “clear”—which would normally have made it desirable for millwork. Because of the hard winter-wood lines in the grain, however, spruce was difficult to run through planers or shapers. As a result, there was no real market for Sitka spruce before 1916.

I found that spruce was a by-product of the fir logging operations. It had never been a desirable commercial lumber and was only logged by the fir operators because in their operations they came to a tree now and then. The great, virgin, and relatively dense stands of spruce had been avoided because of the low value and light demand for the lumber.⁶

In 1914 the U.S. Bureau of Corporations published its massive report on the U.S. lumber industry, simply titled *The Lumber Industry*. Data from this report established that Sitka spruce had a very small role in U.S. spruce production. Spruce of all species was not a widely-used lumber, but what little spruce made its way to market in the U.S. came mostly from the Appalachian states, especially New York and Pennsylvania. Appalachia produced 72.5 % of the spruce, the Pacific coast produced 16.5%, and the Great Lake states produced 7.5% of the spruce. Other lumber-producing areas made up the remaining 3.5% of the cut.⁷ Sitka spruce was found only on the west coast, so it would be confined to west coast lumber shipments. Another west coast species, Engelmann spruce, also contributed some volume to the total west coast spruce production. As a result, Sitka spruce would have accounted for no more than 15% of the total spruce produced, and perhaps less.

Despite its obscure position in U.S. lumber production, European aircraft manufacturers discovered the Sitka spruce, found on the opposite side of the globe, sometime during the winter of 1915-1916. The British military could have had access to Sitka spruce from British Columbia, but spruce production in B.C.

⁵ The anonymous authors of the Army’s *History of the Spruce Production Division* list other spruce products including organ pipes, windmill slats, ironing boards, trunks, and (prophetically) casket shoo.

⁶ Bryce P. Disque, “Preface” to *History of the Spruce Production Division*, 1919, ii.

⁷ U.S. Bureau of Corporations, *The Lumber Industry* 3 vols., (Washington DC, 1914) vol. II, 682.

was limited. The British showed a great deal of interest instead in U.S. west coast lumber mills, but the amount of Sitka spruce available in the spring of 1916 was not nearly enough for the European aircraft industry. In January of 1917, Neil Cooney, manager of a Grays Harbor mill reported that "...there is an unlimited demand for aeroplane spruce stock, at exceedingly high prices." Ralph Burnside, President of the Willapa Lumber Company wrote that "...Spruce has probably been our most spectacular wood this past year [1916] due to the abnormal demand from Europe for aeroplane stock." He went on to note that "...there is also an increasing demand from aeroplane manufacturers in this country."⁸ Prices for high-grade Sitka spruce were rising to the level of \$100/thousand board feet—four times the value of Douglas fir. Nevertheless, lumbermen were not completely enthusiastic about the product. It remained difficult to log, and yielded only a small percentage of lumber that met the grade standard for aircraft. Spruce lumber that did not meet the aircraft grade standard, called "side-cut," was still worth very little.

In February of 1917 the British embargoed all shipments of softwood from the U.S. to Europe, except for airplane spruce destined for the Allies' aircraft plants.⁹ This effectively ended the export of fir, pine, and other softwoods to Europe, which had been an important part of the west coast mills' business. As the British perhaps intended, the embargo encouraged the coastal mills to cut more aircraft spruce. In April, 1917, the North Bend Mill and Lumber Company in Washington was reportedly devoting its entire output to aircraft spruce stock. In July, the governments of Britain, France, and Italy sent a delegation of military aviation men to Oregon and Washington to "obtain the co-operation" of west coast mills in "turning out the quantities of spruce needed for the aircraft program of the United States and her Allies."¹⁰ They estimated their need at 117 million board feet for a 12-month period through the summer of 1918, or at least 10 million board feet each month. They were also concerned about the quality of the lumber and wanted to establish appropriate grading standards and inspection procedures. The agreed-upon price was to be \$150 per thousand board feet for high-grade wing-beam stock, and an average price of \$105 for all other aircraft stock.

By the summer of 1917, the situation was coming into focus. The European and some American aircraft manufacturers had discovered Sitka spruce, found their way to the west coast of Oregon and Washington, and asked for about 10 million board feet of the product to be delivered to Europe each month. There was perhaps four billion board feet of Sitka spruce "on the stump" with reasonable access, so the resource was available. The mill owners were eager to sell the aircraft manufacturers as much of this specialized lumber as they could produce.

⁸ "Pacific Coast Spruce," *The Timberman*, (Feb., 1917), 35.

⁹ "Embargo," *The American Lumberman*, (Feb. 17, 1917), 25.

¹⁰ "Pacific Coast Spruce Placed at the Disposal of the United States and Her Allies," *The Timberman*, (August 1917), 40.

The U.S. Government lent its support to aircraft production, much as it had to other products deemed essential for the war. In September of 1916 Congress had created the United States Shipping Board to stimulate ship building. In April, the Shipping Board created the Emergency Fleet Corporation, which was to actually build ships for the war through private businesses. Then in May, Congress created a sister organization—the Aircraft Production Board. This new organization would oversee and coordinate all aspects of military aircraft production.¹¹ The Aircraft Production Board then created the War Emergency Spruce Council, which in turn spawned the Pacific Aircraft Spruce Production Board.¹²

Despite the favorable prices and the patriotic appeal, the mills were not producing enough spruce to meet the quota of 10 million board feet each month. The Board sent Major Charles R. Sligh to Portland in May, 1917, to investigate the spruce situation. Sligh was a furniture manufacturer from Grand Rapids, Michigan, who had volunteered for military service as “dollar-a-year” man. He reported back to the Aircraft Production Board in July that what was needed to increase spruce production was for the government and the aircraft manufacturers to cooperate and bring the mills into line. As the authors of *History of the Spruce Production Division* note, Sligh did not “as much as mention the labor problem, though this proved to be probably the most difficult problem to be met.”¹³

The Aircraft Production Board then sent a detachment of Signal Corps Aviation Section officers to Portland to establish an office in the Yeon Building, in the heart of Portland’s downtown lumber district. At that time, early in the summer of 1917, “the idea persisted in Washington that nothing was necessary in relation to the production of spruce save the establishment of rigid inspection on the coast together with the general oversight by a Government representation.”¹⁴

The Summer of 1917

The first two decades of the 20th century were years of labor activism and radicalism throughout the U.S., and especially the West. Workers in the traditional crafts, such as machinists, were represented by craft unions, often affiliated with the American Federation of Labor (AFL). Less-skilled workers such as loggers, farm workers, and construction laborers were usually not organized by the craft unions. They were not left out of the union movement, however, because they were organized by other groups who were often much more radical than the AFL unions. Conspicuous among these on the West Coast

¹¹ H.A. Van Dorn *Government-Owned Corporations* (New York, 1949) 243.

¹² See the account of proliferating agencies in *The Timberman*, (August 1917), p. 31-41.

¹³ *History of the Spruce Production Division*, 6.

¹⁴ *History of the Spruce Production Division*, 6.

were the Western Federation of Miners, the Puget Sound shingle-weavers unions, and the Industrial Workers of the World. These were aggressive and energetic groups. Western Federation of Miners member Albert Horsely (aka Harry Orchard), for example, assassinated former Idaho Governor Frank Steunenburg in 1905, probably with the support of his organization.¹⁵

During these years, the Industrial Workers of the World (IWW) built a solid following among the “homeless, womanless, voteless, migratory workers in the West,” particularly in lumber, agriculture, and maritime employment.¹⁶ The IWW, based in Chicago, organized loggers in the Lake States and then moved into the logging camps and mill towns of the Western States in the first decade of the century. Other west coast labor groups active on the “lumber front” in the summer of 1917 included the shingle weavers unions in Puget Sound, and several AFL loggers’ and mill workers’ unions.

As the west coast lumber manufacturers prepared to meet the European Allies’ demand for spruce during the summer of 1917, the labor groups prepared some demands of their own. On March 5 and 6, the IWW organized the Lumber Workers’ Industrial Union in Spokane. Their organizing convention formulated demands for better wages, improved camp conditions, and an eight-hour day. The convention also set a strike date for July unless the lumbermen met their demands. Puget Sound shingle weavers convened in Seattle in May and made similar demands, setting a July 17 strike date. The AFL International Union of Timber Workers agreed to join in negotiations and strike with the other groups.¹⁷

The lumbermen were unwilling to meet the workers’ demands, and on July 16, 1917, the strike began. The supply of logs at the mills diminished, and by August 1, no more than 15% of the lumber mills on the West Coast were running.¹⁸ The result was a rare combination of frustrated parties: the workers saw their best chance for improved working conditions at hand; the lumbermen saw their golden opportunity for war-time profits slipping away; while the politicians and military authorities watched U.S. production of lumber for shipbuilding, aircraft, and cantonments plummet.

Neither the workers nor the lumbermen had any intention of compromising. They had been at each other’s throats too long. Each side turned the strike into a political showcase. Spokesmen for the manufacturers blamed nefarious foreign agents:

¹⁵ The leader of the Western Federation of Miners, “Big Bill” Heywood, defended by Clarence Darrow, was tried and acquitted of participating in the murder.

¹⁶ Vernon Jensen, *Lumber and Labor* (New York, 1945) 106. For the IWW, see Melvin Dubovsky, *We Shall Be All* (Chicago, 1969); Robert L. Tyler, *Rebels of the Woods: The IWW in the Pacific Northwest* (Eugene, Oregon, 1967); Harold Hyman, *Soldiers and Spruce: Origins of the Loyal Legion of Loggers and Lumbermen* (Los Angeles, 1963).

¹⁷ Jensen, *Lumber and Labor*, 125.

¹⁸ Jensen, *Lumber and Labor*, 126.

At close range it appears that the powerful, unseen, foreign hand, which has directed this campaign of industrial unrest, is bent solely on the destruction of the social fabric. When the entire facts are known this country will be shaken to its very depths.¹⁹

The IWW opposed all capitalist wars on general principles. They took the opportunity to raise the workers' consciousness about political as well as industrial matters:

I love my flag, I do, I do,
Which floats upon the breeze,
I also love my arms and legs,
And neck, and nose, and knees.
One little shell might spoil them all,
Or give them such a twist,
They wouldn't be of use to me.
I guess I won't enlist.²⁰

When the summer was over, the season's total production of spruce lumber barely reached three million board feet, and only 10% of that was of aircraft quality. The 30 million promised to the European aircraft manufacturers was simply not there. The Allies were justifiably angry and the US government was humiliated.²¹ The loggers blamed the lumbermen and the lumbermen blamed the loggers, but as historian Harold Hyman points out, "neither lumberman nor worker, AFL nor IWW had clean hands" in the matter.²²

The Advent of Colonel Disque

Major strikes were nothing new in 1917, of course, and President Wilson had created the National Mediation Commission to help labor organizations and industry groups find common ground. This agency had some success with the copper miners in Bisbee, Arizona, the southern telephone workers' strike, and the Chicago meat packers' strike. But "settlement of the lumber strike defied the exertions of the war-emergency agencies and officials of the national, state, and local governments."²³

General John J. Pershing, commander of the American Expeditionary Force, was about to leave with the first U.S. troops for France in June of 1917. The lumber situation reportedly weighed heavily on his mind. Without lumber to build aircraft, cargo ships, and cantonments for housing his troops, the American Expeditionary Force (AEF) was unlikely to have a successful campaign. He also worried that the IWW openly advocated sabotage and "striking on the job" to

¹⁹ [George Cornwell] *The Timberman*, (July 1917), 1.

²⁰ Tyler, *Rebels of the Woods*, 117.

²¹ Gerald W. Williams and Gail F. Evans, "Over Here, Over Here: The Army's Spruce Production Division and the War to End All Wars," On file, Olympia, Washington, Olympic National Forest.

²² Hyman, *Soldiers and Spruce*, 52.

²³ Hyman, *Soldiers and Spruce*, 1.

slow production in certain industries. Pershing was reportedly suspicious of all labor groups and believed that the IWW and similar groups were motivated by foreign agents. The IWW influence might spread like a virus into the whole working class. According to most sources, Pershing wanted an Army officer in place in the Pacific Northwest, reporting to Pershing's staff, who could monitor labor problems and lumber production.²⁴ Secretary of War Newton D. Baker shared Pershing's concerns and approved preliminary plans for a military agent in Oregon. Pershing's staff contacted Col. Brice P. Disque, who had a solid reputation as a cavalry officer as well as some unique abilities to organize and manage civilian business activities.

Brice P. Disque was an unusual individual. He was born in Ohio in 1879. He was not successful in his attempt to enter West Point, and so he enlisted in the Army as a private in 1897. He distinguished himself during the Philippine campaign, and won a Regular Army commission in 1899. He settled into the peacetime Army after the war and served in a series of routine assignments. In 1915 he returned to Manila in the Philippines and took command of a lackluster Army maintenance group known as the Army Land Transport Corral, Canal, and Shops. He completely re-organized the unit, motivated the troops, and took on major engineering projects with great success. Running out of work to do for the Army, he petitioned his superiors to let him bid on civilian jobs. He did so, and ended the year with a profit from contracted operations.²⁵ In December of 1916 Disque resigned from the Army to assume the position of Warden of the Michigan State Penitentiary at Jackson, Michigan. Here he applied his organizational skills in the prison farms and shops, and by the end of the 1917 fiscal year the prison showed a profit of \$371,000. When war broke out in April, 1917, Disque asked to be re-instated in the Army. On May 7, he received a telegram asking him to report to Washington, DC, where he learned of his new assignment.

Disque agreed to investigate the spruce situation in Oregon and Washington and spent the next five months learning about the importance of aircraft in the war, the background of labor movement in the West, and the lumber industry. During this period he made several important contacts including James Scherer, President of the California Institute of Technology and organizer of the California Defense Council; Howard E. Coffin, Chair of the Aircraft Production Board; and Carleton H. Parker, on-the-ground "examiner" and labor negotiator for the Cantonments Adjustment Commission. This commission secured lumber and other building supplies for military cantonments—an endeavor that anticipated the work of the SPD. These three mentors were all involved with production of *materiel* for the war and had first-hand knowledge of labor problems vis-à-vis national defense.

²⁴ Hyman, *Soldiers and Spruce*, 27. Hyman cites Disque's speculation in his notebooks (University of Oregon Special Collections) about Pershing's motivation in selecting him and sending him to Portland.

²⁵ Hyman, *Soldiers and Spruce*, 31.

Disque also met during the summer of 1917 with AFL national labor leader Samuel Gompers. Gompers and Disque apparently got along quite well at first. Disque learned about the struggles of organized labor from Gompers. He developed a more nuanced view that rejected IWW radicalism (as did Gompers) but appreciated the role of labor unions in the industrial mix.²⁶ Later, Disque's relations with Gompers would sour.



Figure 1-2 Spruce Production Division officers at Grant House, Vancouver Barracks. Col. Disque in front row, center (Signal Corps photo, 1918, NARA, Seattle).

During the tumultuous summer of 1917, Disque finished his work in Michigan and watched events in Oregon and Washington. The 1917 strike proved that Pershing's concerns were well-founded. The IWW and other radical groups were perhaps not influenced by foreign powers or subverting the entire working class, but they certainly were capable of disrupting the war effort. Without sufficient lumber, aircraft production in England, France, and Italy slowed. Construction of cantonments slowed. The Allied Expeditionary Forces (AEF) troops required cantonments, including barracks and service buildings, as the winter of 1917 approached.

²⁶ Hyman, *Soldiers and Spruce*, 64.

Disque reported his conclusions from the summer to Pershing: “the shortage of labor and the hostile attitude of labor has been responsible for much of the loss in production [of aircraft spruce].”²⁷ He then reported to the Aircraft Production Board with eight specific recommendations which they granted:

- (a) Twelve Signal Corps Air Service squadrons be assigned to Vancouver (WA)
- (b) Authority to organize 60 additional squadrons
- (c) Squadrons to be assigned as needed with 12 in reserve at Vancouver for emergencies
- (d) Pistols and rifles to be issued to the 12 squadrons at Vancouver
- (e) All squadrons equipped for AEF duty in France should the spruce situation clear up
- (f) Entire Army canvassed for men with experience in logging
- (g) Army to recruit experienced loggers
- (h) Army to provide officers as needed to command squadrons

He then proposed creating a new, more ambitious organization to deal with the lumber problems, the Spruce Production Division. He formulated a five-point “general policy” for guiding the new agency:

- (a) Impress upon the industry the need for speed in production
- (b) Instruct the industry in careful manufacture
- (c) Stabilize prices
- (d) Encourage innovation
- (e) Determine possibility of riving spruce²⁸

In his report to General Pershing, Disque emphasized the damage done by labor’s “hostile attitude,” which Pershing was prepared to hear. In his report to the Aircraft Production Board, he presented a plan for a substantial military presence on the ground in Oregon and Washington. Finally, in his five-point general policy for the proposed Spruce Production Division, he addressed shortcomings of the mills and lumbermen. Putting these three pronouncements together, we can deduce Disque’s plan. He needed to address the labor situation; he needed to create a military cadre in the Pacific Northwest that could—if necessary—provide armed intervention; and he needed to get the mill owners off dead center and producing more spruce.

On November 17, 1917, Disque returned to Portland and established his headquarters for the Spruce Production Division in the Yeon Building, cheek-by-jowl with lumber brokers, mill owners, and other lumber industry insiders.

Solving the Labor Problem

Disque took a two-part approach to the labor problem. He offered to place regular Army troops in logging camps and lumber mills to supplement the civilian

²⁷ Disque, “Historical” [1919] Disque Papers, University of Oregon Special Collections, Eugene, OR.

²⁸ Twelve recommendations and five-point policy from Disque, “Historical” [1919] Brice P. Disque Papers, University of Oregon Special Collections, Eugene, OR.

employees. These men were enlisted soldiers, trained, armed, and serving under military discipline, but they would do the work of loggers or mill workers. The presence of troops diminished the mill owners' worry about labor shortages, as well as concerns about sabotage, strikes, or "striking on the job." At the same time—in the fall of 1917—he organized the Loyal Legion of Loggers and Lumbermen (LLLL). This was an idea that Disque apparently adopted from Carlton Parker, who was the labor mediator for the Cantonments Adjustment Commission, a civilian organization similar to the SPD.²⁹ As early as December, 1917, Disque sent SDP Signal Corps officers out to camps, mills, and mill towns to enlist members for the LLLL.

Policies for stationing troops in logging camps and lumber mills were covered in an SPD policy statement, "the Employment of Soldiers in Private Camps and Mills."³⁰ Soldiers would be available after January 1, 1918, to work in the camps and mills. All lumber companies could apply for troop labor, but they had to meet some important requirements:

- 100 board feet of aircraft quality spruce shipped per man, per day
- Soldiers to receive the same pay as civilian workers
- Soldiers to be charged the same board fees as civilian workers
- Military sanitary regulations to be followed in camps
- One to four soldiers in each squadron assigned for "military reasons"
- Army to provide all medical attention for soldiers and civilians
- Recreation rooms to be provided in camps or mill bunkhouses
- Bathing facilities to meet military standards and inspections
- Latrines to meet military standards and inspections
- Bunkhouses to meet military standards and inspections
- Special rooms for drying wet clothing to be provided
- Officers to have separate mess and sleeping quarters

In December, this initial policy statement was supplemented by SPD Bulletin #3, which was a more detailed list of requirements for sleeping facilities, latrines, bathing facilities, messing facilities, and recreation rooms. By May of 1918, 62 logging operations in Oregon and Washington had soldiers working with their regular men.

The most important element of Disque's plan for labor peace was to institute the eight-hour day. This had been the core issue in the demands of all labor organizations in the July 1917 general strike. The lumbermen were adamant (or apoplectic) about the issue and would not concede. The eight-hour day was already becoming a trend in other industries by this time, however. For example, the federal government had mandated eight-hour days for all railroad workers through the Adamson Act in 1916. Disque brought about the eight-hour day in

²⁹ Hyman, *Soldiers and Spruce*, 66-80.

³⁰ Brice P. Disque Papers, University of Oregon Special Collections, Eugene, Oregon.

the lumber industry through the Loyal Legion whose members needed to sign a pledge supporting the eight-hour day among other reforms. The LLLL enlistment drive began with Disque's officers going to mills and camps in the Coast Range. Membership in this critical area reached 80,000 by June of 1918.³¹ Because Spokane and the Inland Empire in general was such a hotbed of radical unionism, the LLLL was extended into eastern Washington and Idaho. This area produced no spruce, and the pine lumber that it did produce was not suitable for aircraft, but establishing chapters of the LLLL probably headed off potential problems as loggers moved from one area to another.

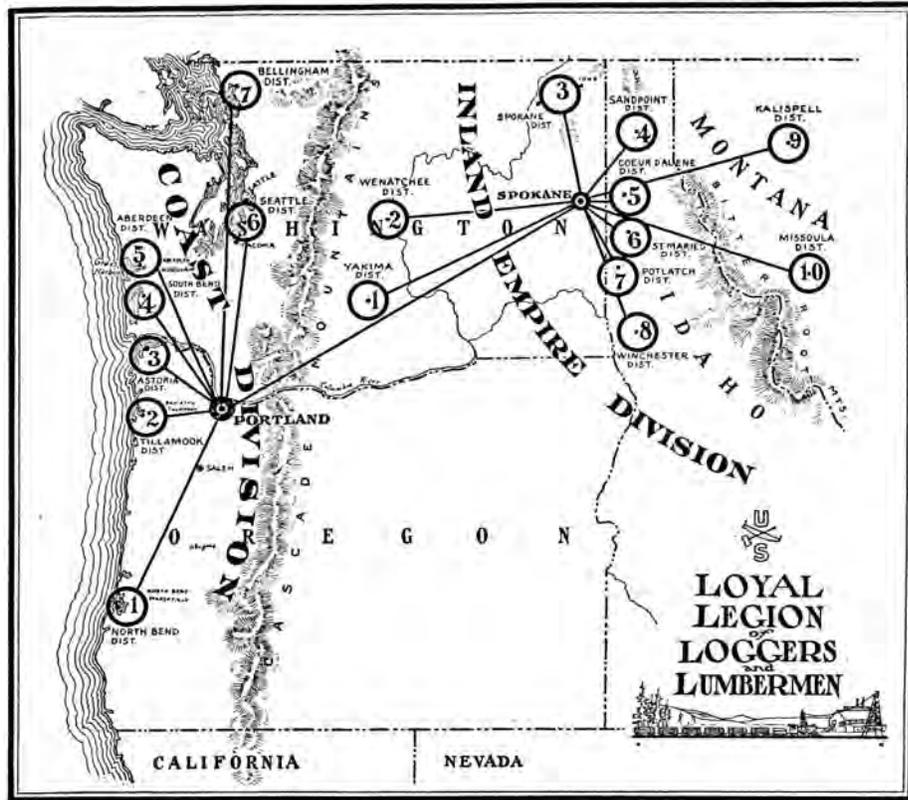


Figure 1-3 Map of LLLL divisions and chapters. The Inland Empire division produced no spruce but men there were enlisted in the Legion as a political measure.

The LLLL “Articles of Incorporation” listed the following objectives:

- To maintain the basic eight-hour day
- To ensure equitable wages and efficient work
- To standardize working and living conditions in camps and mills
- To create a community spirit promoting public welfare
- To encourage cooperative hospitals for the sick and injured and families of members
- To provide health and accident insurance and old age pensions
- To institute employment services

³¹ *History of the Spruce Production Division*, 18.

- To further recreation and education in camps and mills.

The SPD required its soldiers to join the LLLL, and it also required the managers of the mills and camps to join the LLLL. All members took an oath committing themselves to the organization's goals. These two groups were relatively easy targets. The soldiers had no choice, and the lumbermen had no choice if they wanted the security that soldiers provided in their operations. Getting civilian loggers and mill workers into the group was much more difficult. By no coincidence, the objectives of the LLLL echoed the objectives of the IWW and other unions.³² The LLLL adopted most of the goals that the radical unions had espoused and unsuccessfully tried to implement. Because the LLLL included both the lumbermen and the military, wage and hour issues could be discussed in the context of national defense.

The lumbermen were especially sensitive about the eight-hour day. Loggers were paid an hourly wage and they traditionally worked 10 to 12 hours during the summer months when the days were long and the weather dry. Giving up a portion of those long summer days meant losing production that could not easily be made up in the dark, rainy winter. Yet, the eight-hour day reduced accidents and improved the workers' attitudes. In the end, the lumbermen agreed in late February, 1918. Disque celebrated by sending Samuel Gompers the following telegram: "Entire lumber industry Pacific Northwest goes on basic eight-hour day March first".³³

For the duration of the war, the LLLL contributed to the fragile labor peace prevailing in the Pacific Northwest lumber industry. After the war, the LLLL continued in many areas of the West through the Depression and into the World War II years. The mill owners generally supported it, feeling that it created better dialogue than more conventional unions.

Solving the Production Problem

The labor issue was half of Disque's assignment, and it was perhaps paramount in General Pershing's mind, but increasing aircraft spruce production up to the 10 million board feet/month mark was the more basic task. Logging Sitka spruce was difficult because of the mixed stands on the coast. When it was found, usually with fir and cedar, it was large and awkward to handle. The logs could be moved only by rail, and railroad construction on the rugged coast hills could exceed \$50,000 per mile. Obviously a substantial volume of timber needed to be cut to pay for every mile of railroad built.

³² For an excellent presentation of the IWW issues, see James Rowan, *The I.W.W. in the Lumber Industry*, (Seattle, 1919), 6-7.

³³ Disque to Gompers, Box 3, folder 3, Brice P. Disque Papers, University of Washington Special Collections, Seattle, WA.

The method of producing aircraft spruce that began in 1916 was to cut the spruce where it was found in the forest, then buck it into logs, yard the logs to a landing, load them onto rail cars, and haul them to the mill. There the spruce logs were cut into lumber. All the logs from the tops of the trees were limby and contained too many knots for aircraft use. These formed part of the “side cut” of ordinary run-of-the-mill spruce boards. The best clear logs from the lower trunk had to be quarter sawn on the mill’s headrig to produce aircraft quality lumber with straight or parallel grain lines. This was a tedious process in which the log had to be turned by hand on the carriage and squared up for each pass through the big saw. Even with careful quarter sawing, the sawyer might discover spiral grain, a hidden knot, or another defect deep inside the log. With any defect at all, the board would not be suitable for aircraft use and be relegated to the “side cut” pile. Then the remaining clear boards would be cut to final size with a band re-saw, or a gang saw, run through a planer, and dried in the dry kiln. Number 1 aircraft spruce boards needed to have straight grain free of “shakes, spiral, or curly grain,” clear on all four sides, with 50% of the boards over 18’ long.³⁴ Estimates varied, but lumber of this quality comprised no more than 10% of most spruce cut. One grade lower, “#2” or “G” grade aircraft spruce, was also suitable for some aircraft use, adding perhaps another 5% of the tree to the product. Again, estimates varied, but most agree that the target of 100 million board feet of aircraft spruce lumber would require about one billion feet of spruce logs.³⁵

Before Col. Disque and the Army arrived on the scene, Oregon and Washington loggers and mill men considered ways of getting better yields of aircraft spruce. Spruce loggers organized a “Rived Spruce Council” during the summer of 1917, and made presentations at industry meetings during the late summer and fall.³⁶ One radical method proposed at the Council meeting was to split the logs lengthwise before they were taken from the woods. This was known as “riving” and it was used in redwood logging when the logs were too big for conventional yarding and hauling. Riving spruce was beneficial because the splitting followed the grain, ensuring straight grain “flitches” for the sawmill. The flitches could yield much more of the #1 aircraft stock than logs run through the mills.³⁷ The flitches were also significantly smaller and lighter than the massive spruce logs, so they had an added advantage. Motor trucks could haul them to the mill, and truck hauling was much less capital-intensive than railroad logging.

For the next year, controversy simmered over riving versus conventional logging. Both methods were used, and both seemed to work. The arguments against riving were (a) that it was difficult and tedious to split a 20’ log vertically with hand tools in the woods, and (b) that it wasted too much of the log’s volume. Disque was an early advocate of riving, which he saw as a solution to the problem

³⁴ “Pacific Coast Spruce,” 40.

³⁵ [George Cornwell, ed.] “Organize a Spruce Regiment,” *The Timberman*, (October, 1917), 1.

³⁶ “Spruce Manufacturers Meet in Centralia,” *The Timberman*, (September, 1917), 48E.

³⁷ Lt. Col. Reuben Hitchcock to Maj. M.H. Ray, Jan. 4, 1919, Correspondence file, Brice P. Disque Papers, Special Collections, University of Washington, Seattle, WN.

of getting better quality airplane stock, and the problem of moving the huge spruce logs in the woods, especially during the winter and spring of 1918 when no new logging railroads could be built because of persistently wet weather. Most loggers were not interested in riving, but the Airplane Spruce Company in Grays Harbor County, WA; the Warren Spruce Company in Clatsop County, OR; Grant Smith - Porter Bros. in Tillamook County, OR; and several small loggers were willing to supply rived spruce flitches to the SPD, beginning in February and March, 1918. These logging companies operated on a cost-plus contract with the SPD, so they were paid for their costs plus a mark-up.³⁸ Most logging was done on a contract basis, but unknown factors in riving made firm bids very difficult, so cost-plus bidding was used. This practice was to cause Disque and the SPD problems during the congressional investigations after the war.



Figure 1-4 Riving a Sitka spruce log with splitting wedges and jack (Photo,NARA, College Park, MD).

After February, 1918, the SPD had its own re-manufacturing plant running at Vancouver Barracks. By using innovative milling methods, the new mill increased the amount of #1 stock produced from sawn spruce cants so that the cants were equal to the flitches in yield. Also, the SPD soldiers were building eleven new logging railroads into the woods to remove spruce logs. The SPD shifted away from riving at that time, and converted its riving operations in the woods to conventional logging operations.³⁹ Some riving operations continued in

³⁸ Hitchcock to Ray, Jan. 4, 1919.

³⁹ Hitchcock to Ray, Jan. 4, 1919.

locations not served by rail, and in Tillamook County, Oregon, where the operator preferred to rive the logs in the woods. These sources sent rived flitches to Vancouver through November of 1918.

Another strategy for increasing the production of aircraft stock was to look at alternatives to Sitka spruce. Sitka spruce had significant advantages over other woods because of its strength-to-weight ratio. Additional advantages of Sitka spruce were the high percentage of clear wood on each tree, its ability to be kiln-dried without distorting, and its availability in 18' lengths. Other woods from the Pacific Northwest were suitable for aircraft lumber as well. Production records show that the SPD produced aircraft lumber from Sitka spruce, Douglas fir, and Port Orford cedar. These woods were also strong and light, and were available as old-growth timber with a high percentage of clear lumber.

Douglas fir was apparently the best substitute for spruce. It was adequately strong and light, although not as good as Sitka spruce in this respect. In the summer and fall of 1917 when spruce production was low, European governments were ordering aircraft grade fir. The Italian government ordered 25 million board feet of fir in August.⁴⁰ The grade specified was "ship decking grade" which was clear and vertical grain, with 95% of the lumber to be three inches thick and six inches wide or wider. Acceptable lengths needed to average 24'. The price was \$55 per thousand board feet. The British government ordered 300,000 board feet of aircraft grade fir in November, 1917, at the same price.⁴¹

Henry Suzzallo, President of the University of Washington and member of the Washington State Defense Council was a staunch supporter of Col. Disque and the SPD, but was opposed to using fir.

The theory of using straight grain fir as a substitute [for spruce] must be abandoned. It is 25% heavier, reducing the speed approximately 10 to 12 [miles per] hour or decreasing carrying load. The present use of fir is for school machines and proves nothing.⁴²

Suzzallo's remark that fir was used for "school machines" suggests that the fir was used for training planes manufactured in Europe and the U.S. The Italians produced the Caproni three-engine bombers during the war, and the 25 million feet of fir were probably destined for these machines. Spruce may have been the material of choice for pursuit aircraft and fir for training planes or bombers. Production records from the SPD for November 1, 1917- November 1, 1918 show that the agency shipped a total of 79.5 million board feet of aircraft spruce and 59.5 million board feet of aircraft fir. Aircraft fir constituted 42% of the SPD

⁴⁰ "Douglas Fir Export Take Contract for Twenty-five Million Feet Airplane Fir Stock," *The Timberman*, (August 1917), 37.

⁴¹ "Airplane Fir Situation," *The Timberman*, (November, 1917), 64QQ.

⁴² Henry Suzzallo to Felix Frankfurter, Jan. 3, 1918, Brice P. Disque Papers, Correspondence file, University of Washington Special Collections, Seattle, WA.

total production. The SPD also cut Port Orford cedar logs, but released no figures on cedar lumber production in the total cut.

Data for the three species in the mix at the Vancouver cut-up mill are available, however. They show that the Vancouver mill began receiving cedar in May of 1918. Through October, Vancouver continued receiving sawn cants and rived flitches of cedar to reach a total of 4.78 million board feet of cedar to be manufactured into lumber. Through October, the mill produced a total of 4.1 million board feet of cedar and shipped a total of 2.9 million board feet of cedar. The difference between total cedar lumber made and total lumber sold suggests that the market for airplane-quality cedar was not as firm as it was for spruce or fir.

The most ambitious element of Disque's plan for increased production was to acquire the industrial capacity needed to control the production of aircraft lumber from tree to finished boards. This required the SPD to build a centralized mill that could make all the spruce lumber, therefore ensuring that the milling process was efficient and that the lumber met consistent grading standards. The new mill—called the Cut-up Plant—would be staffed by SPD soldiers and located on the largest Army base in the Pacific Northwest, Vancouver Barracks. To supply this new mill with raw material, the SPD would acquire spruce timber on the stump in areas where Sitka spruce was the dominant species. This meant that the spruce forest could be logged with a minimum number of trees of other species complicating the work. The two areas that looked most promising were the Olympic Peninsula in Washington, and the Oregon coast in Lincoln County.

Disque developed this plan during the fall of 1917. Work on the first part, the Vancouver mill, began on December 14, 1917. The mill was complete by February, requiring only 45 working days. The Vancouver mill could accept logs, flitches, or cants from mills located in Oregon or Washington that were on contract to the SPD. It began sawing lumber in February. The next phase was to acquire timber. Stands rich in spruce had not been highly valued in the past, but now, with the huge demand for spruce, timber owners were re-considering their options. The SPD acquired timber near Forks, Washington, west of the Olympic Range. Disque also identified a tract of timber located on the central Oregon coast and owned by the Blodgett Company, of Michigan. Henry Blodgett, owner of the Oregon tract, was very reluctant to sell to the government, although the price was favorable.

Both the Olympic Peninsula and the Lincoln County coast were rather remote areas, nearly inaccessible by road and not reached by existing railroads. The SPD would need to build substantial new railroad lines to reach them. The new lines would need to be built to higher standards than logging railroads and capable of accommodating rod locomotives with heavy trains at good speeds. The railroad on the Olympic Peninsula would cross rivers and mountains, requiring expensive bridges and tunnels. The railroad in Lincoln County, Oregon,

would require a ferry across Yaquina Bay and a long bridge across Alsea Bay. Both railroads would be about 40 miles long. Since neither area was served by a convenient saw mill, the SPD would build its own mills in Port Angeles, Washington, and Toledo, Oregon. Contractors would log the timber, but the mills—like the new mill at Vancouver—would be run by the Army with soldiers doing the work.

At the heart of Disque's plan was the railroad network of the Pacific Northwest. This was made up of three categories of lines. First were the local lines that would bring the logs, cants and flitches out of the mills. The Chicago, Milwaukee, and St. Paul Railway operated the railroad on the Olympic Peninsula that connected to the mill at Port Angeles. The mill at Toledo was served by the old Corvallis and Eastern, now part of the Southern Pacific system. These railroads would get the timber into the grid. The Spokane, Portland, and Seattle would get the material to the mill at Vancouver. Finally the major transcontinentals—the Northern Pacific, the Great Northern, and the Union Pacific—would get the finished lumber to Atlantic ports for shipment to Europe or to aircraft factories in the Midwest or on the East Coast.

For the SPD, then, the final solution to the spruce production problems was to build and control its own industrial system. Folk humor related that Disque “came to see and stayed to saw.” The SPD built thirteen railroads in all, eleven of which were small logging railroads scattered along the coasts of Oregon and Washington. Dozens of privately-owned mills participated in the SPD program, each contributing spruce cants for shipment to the Vancouver mill. Once the Vancouver Cut-up Plant was running after February of 1918, however, the small private mills were no longer producing their own finished spruce aircraft stock. The situation with aircraft fir was not so clearly defined. The Monarch Mill Company in Portland, for example, produced aircraft fir for the Italian government contract, and sent the lumber from Portland to Italy via steamship.⁴³ This was an unusual case and the only clear example that we have of aircraft lumber that did not go through the SPD grading and shipping system.

Aftermath

October, 1918, was the last full month of lumber production for the Spruce Production Corporation (SPC). In General Order #34 (November 22, 1918) Disque outlined the process for dissolving the operation. Officers and soldiers on duty with the SPD were to remain at their posts until relieved. All records were to be boxed up, labeled, and stored. All government logging operations were to end. Mills were to send the last of their cants to the Vancouver mill. The SPC would

⁴³ Photos in the Brice P. Disque Papers, University of Oregon Special Collections show aircraft fir stacked on a dock and the steamship (presumably loaded with aircraft fir) leaving Portland bound for Italy. The photographer is not identified, and they do not appear to be standard Signal Corps publicity photos.

buy logs remaining at the mills, if the mills wanted to sell at government prices. The Vancouver cut-up mill would discontinue cutting aircraft stock and begin cutting conventional commercial lumber until its stock was used up. All equipment and supplies would be collected at terminals for shipment to Vancouver. Enlisted men working in logging or construction would return to Vancouver for discharge.

The SPC arranged a massive sale of its equipment and supplies, held at the mill in Vancouver in September, 1919. Also on the block were the mills in Port Angeles and Toledo, the spruce timber and timberlands, and the major railroads the SPD had built. The disposition of goods was followed by the demolition and salvage of the Vancouver mill, which was finally completed in the winter of 1925.

In the early months of 1919 rumors of Army Air Service mismanagement began to circulate. Major Howes, an Army Intelligence officer, was detailed to conduct investigations. Howes investigated all programs of the Air Service, but concentrated on aircraft production programs, including the SPD. He communicated his preliminary findings (and suspicions of mismanagement) to the Inspector General's Department.⁴⁴ Howes' report, sent as a telegram forwarded to Secretary of War Baker became known as the "Howes telegram." Congress intervened to investigate the alleged mismanagement with Representative James A. Frear (R-Wisconsin) chairing the investigating committee. Disque and senior officers of the SPD/SPC were subpoenaed, along with numerous lumbermen, engineers, and contractors involved with spruce production and SPD railroad construction. Although the inquiry was wide-ranging, a reading of the transcripts reveals that the bone of contention was the cost-plus contract with Siems, Carey-H.S. Kerbaugh Company and the construction of SPD railroad #1 on the Olympic Peninsula. This was indeed an expensive and perhaps unnecessary railroad, costing in excess of \$12,000,000 for 40 miles of main line. It was not finished when the war ended, and neither the railroad nor the new mill the SPD built in Port Angeles was ever used by the Army.

The investigations found that no evidence of "graft or dishonesty" was produced, and that the "Howes telegram" was not justified. Howes' report was answered by a second report prepared by Major M.H. Ray, also of Army Intelligence. It castigated Howes, Lt. Col. Reuben Hitchcock, and junior members of the SPD officer cadre who "indulged in too much criticism" of their superior officers. Disque, who had left the Army and the SPC by this time, was deeply humiliated by the investigation and felt that he had been victimized by Washington politics. Historian Harold Hyman remarks that "he bore tender

⁴⁴ Complete transcripts of the investigation published as *Hearings of the Select Committee on Expenses in the War Department*, (New York, 1919). See also Hyman, *Soldiers and Spruce*, 332-334; "Representative Frear to Head Spruce Investigation" *Portland Oregonian* Aug. 12, 1919, p.8; "Memorandum for the Chief of Staff" June 18, 1919, RG 165, Entry 13, National Archives and Records Administration, College Park, MD; "Spruce Production Investigation Under Way," *The Timberman*, (August 1918), 44.

wounds for the rest of his life... from the rough handling the legislators meted out to him.”⁴⁵

By February, 1925, all traces of the Vancouver cut-up mill were gone, with the exception of two office buildings moved to a new location and used for the Pearson Air Field headquarters. The equipment was sold and distributed throughout the lumber industry in Oregon and Washington. The timber holdings were sold on contract. The mill at Port Angeles was dismantled. The mill at Toledo had a long and varied history and remains in use now, after nearly 100 years, as a pulp mill for Georgia-Pacific Lumber. None of the thirteen SDP railroads has continued in use. Disque went on to a rewarding career in business. Some of the SPD and SPC men remained in the Army after the war, but most were “demobed” and returned to civilian life.

⁴⁵ Hyman, *Soldiers and Spruce*, 333.

CHAPTER II

PERSONNEL AND POLICIES IN THE SPRUCE PRODUCTION DIVISION

Getting Started

When Col. Brice P. Disque established command of the Spruce Production Division (SPD) on November 15, 1917, it existed only on paper. At the high point of its operations about eight months later it consisted of perhaps 30,000 officers and men. The rapid creation and growth of the SPD was truly remarkable, but it was characteristic of the Army's commitment to pursue the war with all possible energy and haste. Prior to April 7, 1917, the U.S. had followed a policy of non-belligerence under the leadership of President Woodrow Wilson. Wilson saw the U.S. role in the European conflict as a mediator, trying to move both sides to reciprocal accommodations that could end the hostilities. When that strategy failed, and the Germans began a policy of unrestricted submarine warfare in the winter of 1917, Wilson reluctantly took the U.S. into the war.¹ Unlike the President, the U.S. military and much of the popular press were eager to join the conflict. The Army needed to make up for lost time.

In April, 1917, the Army was seriously understaffed. Previous conflicts with Spain and Mexico had not prepared the U.S. for a world war fought on multiple fronts by mechanized and sophisticated forces. The spring and summer of 1917 was a period of intense activity aimed at swelling the ranks of the military. Soldiers needed to be inducted, screened for health, organized into units, equipped, conditioned, and trained for specialized jobs. More importantly, they needed to be acculturated to military life and expectations. Crucial among these expectations was unquestioning patriotism. The first decades of the 20th century were times of significant immigrations into the U.S., especially from Europe. Recruits might be first-generation Americans with roots and families in Germany, Austria, Bulgaria, or Turkey—the Axis countries. Or, they might be recent immigrants who were still nominally citizens of those countries. Some European countries were non-aligned in the conflict—including Switzerland and Finland—and they counseled their citizens not to participate in the war.

Perhaps the most difficult aspect of preparing the U.S. for war was the cultural change needed to turn civilians into soldiers, or at least into citizen-soldiers. In a recent essay, military historian Robert L. Goldrich argues that the U.S. military through the first half of the 20th century was composed of citizen-soldiers who were recruited for major conflicts then returned to civilian life. He

¹ Davis Trask, "The Entry of the USA into the War and its Effects," in *The Oxford Illustrated History of the First World War*, ed. Hew Strachan, (Oxford, 1998), 239-243.

contrasts this to nineteenth-century Europeans who made a career of serving in more or less continuous foreign or colonial wars.² Americans were willing to serve in the war, but they wanted their service to be significant. Secretary of War Baker kept the Allied Expeditionary Force (AEF) from serving in amalgamated forces with British or French units. Under the command of the redoubtable (and intractable) General “Black Jack” Pershing, American forces were assigned to the Western Front in France, despite their lack of experience. Pershing refused to send the AEF to any assignments in “secondary theatres” of the war, such as the eastern Mediterranean, the Middle East, or Africa.³

Disque’s challenge was to build a military organization that would manufacture lumber—a necessary but rather ordinary product. Making this duty palatable to patriotic young men was no easy task. The soldiers’ initial perception of the SPD was not entirely favorable. The Pacific Northwest was still a remote and little-known part of the U.S. in 1917. It was wet and uncomfortable in the winter months. Logging and mill work were not glamorous or particularly “military” in most people’s minds. Despite their humdrum nature, these jobs required a level of effort and commitment—and potential for danger—not far removed from other military activities.⁴ Data from the Washington Industrial Insurance Commission for 1916 showed over 3,000 logging-related injuries reported in 1916. If we assume a workforce in Washington of 350,000 men, this is a rate of reportable accidents of around 0.085%. About 240 of these injuries, or 3%, resulted in fatalities or disability.⁵

A complicating factor for Disque was that the SPD soldiers would be serving in the mills and camps along with civilians doing the same work. Loggers and millworkers in the Pacific Northwest were notoriously resistant to authority. The ones working during the war would be older—beyond draft age—and would be cynical veterans of years in the woods. Many had been organized by the IWW or at least listened to its message. Loggers were often discontented with their working and living conditions, and they expressed their frustration by simply walking off the job whenever the spirit moved them.⁶ Another job would be available in another camp. These camps and mills were prime recruiting grounds for the radical labor groups that had brought the west coast lumber industry to a

² Robert L. Goldrich, “American Military Culture from Colony to Empire” *Daedalus* (Summer, 2011) 58-74.

³ Trask, “Entry,” 243.

⁴ The level of danger in logging and mill work was no doubt high but is often exaggerated in popular literature. Records from newspapers, industry, and government sources do not reveal extreme levels of injury, but these may not be entirely trustworthy. The SPD had an ambitious medical program but the Division Surgeon’s records do not document a high level of work-related injury. See p. 27. For a contrary view, see Andrew Mason Prouty, *More Deadly than War: Pacific Coast Logging, 1827–1981* (New York, 1985).

⁵R.W. Vinsedge. “Report of the Accident Prevention Commission,” *The Timberman*, (November, 1917), 64D.

⁶ Richard A. Rajala, “Bill and the Boss: Labor Protest, Technological Change, and the Transformation of the West Coast Logging Camp, 1890-1930,” *Journal of Forest History* (October, 1989) 170.

halt during the summer of 1917. Disque apparently believed that these groups acted at the behest of “alien enemies and domestic agitators in Washington and Oregon.”⁷ We may discount Disque’s early observation about “alien enemies,” but the west coast lumber industry in 1917 was clearly a difficult place for young, impressionable men who were new to Army life. Disque was keenly aware of this challenge:

The commanding officer desires to point out the fact that the situation calling this Division into existence is the outgrowth of the present national emergency and is without precedence for guidance. Soldiers will be working side by side with civilians. The differences, hardships, and grievances of one will be those of another, but the thought must constantly be borne in mind that we are soldiers of the United States engaged in what the Secretary of War and the General Staff of the Army consider one of the most, if not the very most important single endeavor of the nation to win this war. With this constantly before us, our endeavor must be to allow nothing to delay us, to thrust aside all obstacles and by our co-operation, enthusiasm, and patriotism set such an example for our fellow civilian workers that their grievances and wrongs will be forgotten, and that their energies and experiences become united with ours in the big task before us.⁸

To help with this “big task before us” Disque had a substantial group of volunteer advisors chosen from the lumber industry and the government. During the spring and summer of 1917, he had met with numerous political luminaries who would serve as advisers and sounding boards, including James Scherer (National Defense Council), Samuel Gompers (American Federation of Labor), Henry Suzzallo (Washington Defense Council), and Carleton Parker (Cantonments Adjustments Board). In December of 1918, Secretary of War Baker urged Disque to “be surrounded by a group of advisers to protect the interest of the Government in the purchase of lumber.”⁹ Asking lumbermen to protect the government in the lumber business could be seen as inviting the wolves to watch the sheep, but Disque chose his advisors wisely and formed good working relations with them, to judge by their correspondence.¹⁰ They, in turn, brought Disque’s commitment to the LLLL and the 8-hour day back to the industry. Members of this informal council of lumbermen included (but were not limited to) the following:

Mark E. Reed	Simpson Logging Company
George Long	Weyerhaeuser Timber Company
Alex Polson	Polson Logging Company

⁷ Disque to Chef Signal Officer, Nov. 27, 1917, Correspondence File, Brice P. Disque Papers, University of Washington Special Collections, Seattle, WA.

⁸ Spruce Production Division, U.S. Signal Corps, Memorandum No. 2, Dec. 3, 1917, ARC 3914140, General Orders, Spruce Production Division records, NARA, Seattle.

⁹ “Notes from Meeting on January 3, 1919,” Brice P. Disque Papers, University of Oregon Library Special Collections, Eugene, OR.

¹⁰ Disque seems to have gotten along with the lumbermen quite well, especially J.J. Donovan of Bloedel Donovan. See correspondence between the two in the Brice P. Disque Papers, Correspondence File, University of Oregon Library Special Collections, Eugene, OR.

Simon Benson	Benson Timber Company
J.J. Donovan	Bloedel-Donovan Lumber
J.H. Bloedel	Bloedel-Donovan Lumber
Timothy Jerome	Merrill and Ring Lumber Company ¹¹

When the Spruce Production Corporation succeeded the Spruce Production Division in the summer of 1918, the corporate Board of Directors included some members of the original advisory group:

General Disque	President, Spruce Production Corporation
Col. C.P. Stearns	Vice-President, Spruce Production Corporation
W.M. Ladd	Ladd and Tilden Bank
J.J. Donovan	Bloedel-Donovan Lumber Company
A.S. Benson	Benson Timber Company
Mark E. Reed	Simpson Logging Company
H.M. Bevis	Loyal Legion of Loggers and Lumbermen ¹²

Communications

Disque and the SPD command also believed in keeping the troops well-advised. This was critical in maintaining continuity of effort among the 30,000 SPD troops scattered around Oregon and Washington. The SPD communications system published rules and policies as well as material intended to reinforce unit pride and commitment. Many aspects of the SPD soldiers' lives were governed by written policies which were themselves organized into a hierarchical structure. The Division Adjutant had the responsibility of recording all orders and policy decisions, and disseminating this information throughout the division.

The most important SPD publication was the General Orders of the Spruce Production Division, which recorded all standing orders and arranged them in a numerical system that could be accessed by an index. The "Weekly Bulletin" (not to be confused with the LLLL *Monthly Bulletin*) was a weekly newsletter prepared "solely for the information of officers in command." This publication had a cumulative index for easy reference. Divisional "Memorandums" were prepared and circulated as needed for policy statements and updates. Topics ranged from "Aliens, enlisted, naturalization of" to "Wearing of overcoats and raincoats." These were also indexed. "Mimeographs" were a separate set of notices that seem similar to "Memorandums" and were apparently distributed on policy issues. They were indexed as well. Sample topics beginning with "F"

¹¹ Robert E. Ficken *Lumber and Politics: The Career of Mark E. Reed* (Santa Cruz, 1979) 36. Disque's circle of contacts in the industry was substantial and the "advisory group" appears to have been informal. Most of the contacts are recorded in his notebooks, Brice P. Disque Collection, University of Oregon Special Collections, Eugene, OR.

¹² *History of the Spruce Production Division*, 83.

include such diverse entries as “Fly Traps and Fly Paper,” “Federal Reserve Bank,” and “Favors Sought Through Influencing Members of Congress.”

In addition to official communications for Army personnel, there were publications of general nature for SPD civilian workers, LLLL members, and outside audiences. These included *The Monthly Bulletin*, *Spruce*, and *Straight Grain*. *The Monthly Bulletin* was the house magazine of the Loyal Legion and had a circulation of 90,000 issues each month.¹³ *Spruce* was published by Seims, Carry-H.S Kerbaugh and dealt mostly with the Spruce Railroad #1 on the Olympic Peninsula. *Straight Grain* was the regimental newsletter of the Second Provisional Regiment—the soldiers operating the Vancouver Cut-up Plant. The SPD also maintained a Lyceum office, directly under the command of Division Headquarters in Portland. This office published the weekly “War Summary,” which was a typewritten account of each week’s activity on the Western Front, complete with maps and illustrations.

The magazines and the “War Summary” were intended to foster pride in the Division and a sense of patriotism. The SPD also had posters showing men and women working in the spruce woods. Beyond this mild propaganda there is little record of overt political action on the part of the Division. The Signal Corps Command asked for a list of all citizens of Axis nations (Germany, Austria, Bulgaria, and Turkey) and naturalized U.S. citizens from those countries serving in the SPD at Vancouver Barracks. There were 15 spruce soldiers from Germany, 55 from Austria, and four from Turkey.¹⁴ Another request from the Signal Corps Command asked the SPD to provide a list of Swiss citizens. The one Swiss citizen located was duly advised of his right to claim exemption from service but decided to remain in the U.S. Army. He was required to notify the Swiss Legation of his decision.¹⁵ At one point, SPD units were to identify all personnel who were registered voters in Wisconsin. Unfortunately, there are no documents explaining why an upcoming election in Wisconsin was important to the Division.¹⁶

Management—Military Organization and the Spruce Officers

Disque needed to create a military organization for civilian work. He mentioned in Memorandum No. 2 that the Spruce Production Division was

¹³ Donna Sinclair, *The Waking of a Military Town*, (Vancouver, WA, 2003) 89.

¹⁴ Commanding Officers Signal Corps Cantonment to Commanding Officers Vancouver Barracks, December 15, 1917, ARC 601796, Correspondence, Spruce Production Division Papers, NARA, Seattle.

¹⁵ CO 441st Aero Construction Squadron to CO Signal Corps Cantonment, March 4, 1918, ARC 601796, Correspondence, Spruce Production Division Papers, NARA, Seattle.

¹⁶ Lt. Walter A. Grayson to Spruce Production Division Command, Vancouver, March 15, 1918, ARC 601796, Correspondence, Spruce Production Division Papers, NARA, Seattle.

“without precedence for guidance.” This is not completely accurate. There were other similar military-industrial agencies in shipbuilding and armaments, but they were definitely unusual. Evidence from several documents suggests that Disque and his colleagues tinkered with the SDP organization plan until they found a balance of required military activities—such as accounting and record keeping, guard duty, medical service, quartermaster, ordinance, etc.—with the business of getting out the logs and lumber. Many of the positions on the production side were highly specialized and could only be filled with industry veterans. Most of these men were essentially volunteers, called the “dollar-a-year” men, who were given a military rank by courtesy. George F. Breece, for example, was a successful mill owner who joined the SPD as Supervisor of Production, and was given a Reserve Army commission as a Lieutenant Colonel. Disque himself held a Regular Army commission, but he had been out of the military for several years before asking to be re-instated for active service during the war.

Officers were assigned to the Spruce Production Division from other parts of the Army. Five days after Disque took command on November 15, 1917, the first group of officers—numbering 105—arrived in Vancouver from the Presidio, San Francisco. Disque put these officers to work in the new organization, but detailed 12 of them to begin recruiting loggers and mill workers for the Loyal Legion in Washington’s camps and mill towns. These new officers were mostly recent graduates of Officers’ Training programs. As recently-commissioned officers, they probably lacked military experience but may have had business and management experience in civilian life.

It is likely that the SPD benefitted from officers who were new to the military and not too committed to the “spit-and-polish” aspects of military life. Command of a detached squadron would place an officer in a remote location, with poor communications, supervising a group of soldier-loggers who no doubt knew more about logging than he did. This situation called for flexibility and tact—qualities not always present in more seasoned officers. Disque prepared a confidential memorandum for the officers who would be commanding the detached squadrons in camps and mills. In it, he reminded the officers that their duty was to get out the spruce and to that end they would be “present in person with the troops in their command” while they were working in the woods in all weather and in all locations. Officers would wear full uniforms at all times.



Figure 2-1 SPD officers in camp wearing uniforms and campaign hats (Photo: NARA, College Park, MD).

Logging work would be “laid out by the Company’s civilian foreman or superintendent,” and the officer’s job was to supervise the men so that a “full measure [of labor] is given for the pay received.” Officers would often be on their own and would act as a final authority on many matters. “Hundreds of questions will arise requiring good sense, judgment, and tact on the part of the Squadron Commanders....These problems will have to be solved by the officers in charge on the ground without outside help, with the thought constantly before them of greater spruce production.”¹⁷ Disque encouraged the officers to keep up the men’s morale. Recreation was seen as critical to keeping the mood light during the wet winter months. Officers should “instruct their men on the progress of the Great War” and encourage their patriotism. Proper activities and good fellowship would keep the men’s minds “filled with healthful and wholesome thought.”

Disque was able to bring one experienced officer into a key position in the new Division. When he had been assigned to duty in Manila in 1914 he had met Major C. P. Stearns and was impressed by his abilities. He requested that Stearns be brought into the SPD from assignment in Hawaii. For the next year, Stearns would be Disque’s second-in-command. There is no evidence that Stearns or any of the officers had previous experience with aircraft or lumber, although some

¹⁷ “Confidential Letter of Instructions for Officers of Detached Squadrons,” ARC 5049512, General Records, Spruce Production Division Papers, NARA, Seattle.

perhaps did. Experience in these areas was not a factor in selecting officers for the SPD. On the contrary, the Army funneled men with experience in logging or lumber manufacturing into the 10th and 20th Forest Engineers, which were formed to log the forests of France and set up American-style saw mills.¹⁸ Disque was able to divert some of these men to the SPD after November, 1917.¹⁹

The Signal Corps, Aviation Section, was the military organization responsible for the SPD, but it apparently provided few officers when the SPD was forming. Most people in the Aviation Section were pilots or aviation support staff, and they were needed for flying in France or in training programs in the U.S. On July 18, 1914, Congress had passed the Hay Bill, which restructured the role of aviation in the Army and authorized continuous training and flight pay for pilots. If a substantial number of Army aviators had been assigned to the SPD, there would have been some provision for them to keep in practice with their flying and to earn their coveted flight pay.

An early draft of the organizational structure shows the relations of the Division Headquarters (Portland), the Cantonment Headquarters (Vancouver Barracks) and the detached squadrons in the camps and mills.

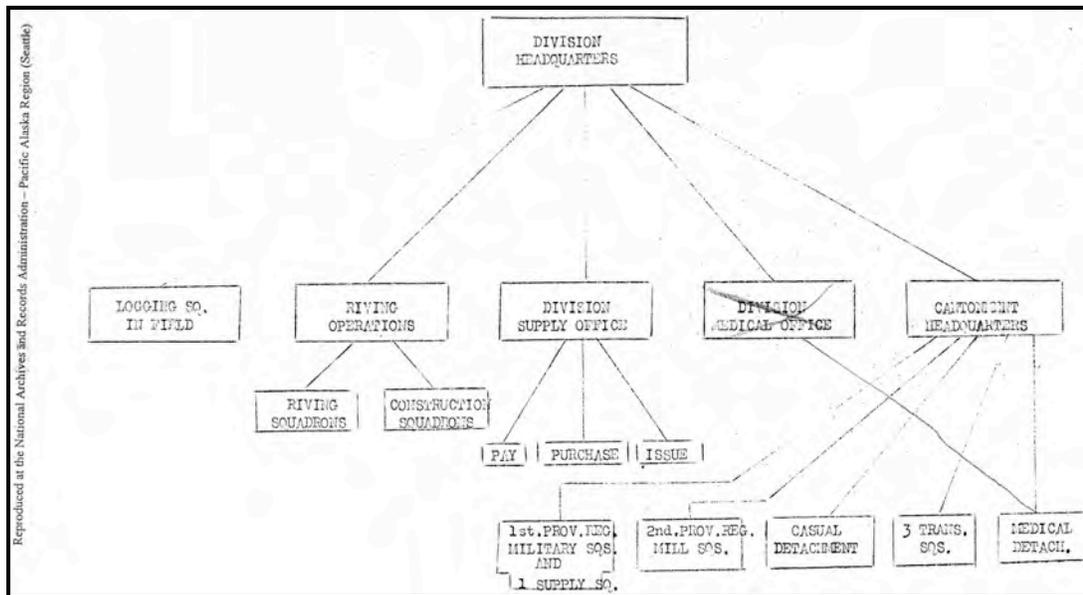


Figure 2-2 Very early organization plan, later modified in pencil, perhaps by Disque himself, to move the Medical Office to the Cantonment (Vancouver) level. Date of the plan was probably the early in the fall of 1917, and the modifications likely date from the winter of 1918. (NARA, Seattle)

¹⁸ The Army's 10th and 20th Forest Engineers were analogous to the SPD, but operated in Europe, cutting ordinary lumber for cantonments. The best account of these units is Lt. Col. W.B. Greeley, "American Lumberjacks in France," *American Forestry*, 25 (June, 1919) 1093-1108.

¹⁹ Gerald Williams, "What Did You Do in the Great War, Grandpa?" 1999, on file USDA Forest Service Office of Communication, Washington DC.

This copy of the plan was revised in pencil at some point to re-align the Medical Office to the Cantonment (Vancouver) level. It also shows the importance Disque attached to riving logs rather than sawing them. After June of 1918, the SPD no longer emphasized riving. In this early plan, Portland HQ supervised the following areas: (1) conventional logging operations, (2) riving operations together with construction, (3) division supply and accounting, (4) the medical office, and (5) the Vancouver operation. Vancouver supervised the First Provisional Regiment (Guard Squadrons on garrison duty), the Second Provisional Regiment (squadrons stationed in the contract mills), the Casual Detachments (provisional and *ad hoc* groups), the Transportation Squadrons (trains, trucks, cars), and the Medical detachment.

In November of 1917, Disque committed the SPD to building its own mills and logging railroads. This decision turned the early organization plan on its head. Construction, land acquisition, and railroad right-of-way were critical tasks that needed more emphasis. The Vancouver Cut-up Plant would require a regiment of soldiers to operate it. Activities in Toledo, Oregon, and Port Angeles, Washington, would need timber lands, railroads, and mills. All of this would take more staff, more money, and more autonomy.

The 1918 Roster

By mid-summer, 1918, the SPD was re-organized according to the following system:

I. Headquarters, Portland

Division Commander (Col. B. P. Disque)

2 aides (Capt. A. McAndrews, Capt. E. Freeman)

Military Staff

Chief of Staff (Col. C.P. Stearns)

2 assistants (Captain O. M. Masey, Major P.L. Abbey)

Division Adjutant (Major C. M. Cope)

Division Surgeon (Col. J. W. Sherwood; Col. R. Ebert)

Division Engineer (Major W.A. Welch)

Division Inspector (Captain F.L. Gerlach)

Division Liaison Officer (Major Fred Ledbetter)

Division Supply Officer (Major R.S. Eskridge)

Division Intelligence Officers (Captain George Gund)

Division Personnel Adjutant (Capt. A. Lee)

Division Ordinance Officer (Lieut. L.C. Campbell)

Division Quartermaster (Maj. M. Lebedre)

Industrial Department (Major P. L. Abbey)

Production Staff

Manager Government Operations (Col. Reuben Hitchcock)

Manager Lumber Production (Col. G.E. Breece)

Manager Fir Production (Major E.G. Griggs)

Manager Logging (Major Watson Eastman)

Manager Legal Department (Major J.E. Morley)

Disbursing Officer (Captain Crisp)

II. Military Districts

Vancouver Military District

Headquarters Staff (Col. Van Way)

First Provisional Regiment (Guard squadrons 1-14) (Major R. C. Hill)

Second Provisional Regiment (Cut-up Plant Squadrons 15-28) (Major J.A. Baur)

Third Provisional Regiment (Transportation) (Capt. T.E. Markley)

Fourth Provisional Regiment (Construction in Lincoln Co.) (Capt. R.D. Grant)

Casual Detachment (Provisional Companies)

Puget Sound Military District (Clallam County, Port Angeles)

Headquarters

Commanding Officer (Col. E.E. McCammon)

Adjutant

Sanitary Inspector

Sergeant Major

Clerk

Grays Harbor and Willapa Bay Military District

Headquarters

Commanding Officer (Col. Henry T. Bull)

Adjutant

Sanitary Inspector

Sergeant Major

Clerk

Clatsop Military District (Astoria to Tillamook)

Headquarters

Commanding Officer (Col. R.C. Hill)

Adjutant

Sanitary Inspector

Sergeant Major

Clerk

Yaquina Bay Military District (Lincoln Co., Toledo, Waldport)

Headquarters

Commanding Officer (Col. J. D. Rearden)

Adjutant

Sanitary Inspector

Sergeant Major

Clerk

Coos Bay District

Headquarters

Commanding Officer (Col. H.L. Franch)

Adjutant

Sanitary Inspector

Sergeant Major

Clerk

III. Production Districts

Yaquina Production District

Supervisor (Captain L.H. Brown)

Engineering Officer

Accountant

Property Officer

Lewis and Clark Production District

Supervisor (Mr. John B. Yeon)

Engineering Officer

Accountant

Property Officer

Aberdeen Production District
 Supervisor (Mr. T. Hutchinson)
 Engineering Officer
 Accountant
 Property Officer

Raymond Production District
 Supervisor (Mr. L.B. Porter)
 Engineering Officer
 Accountant
 Property Officer

Coos Bay Production District
 Supervisor (Mr. A.W. Callow)
 Engineering Officer
 Accountant
 Property Officer

Clallam County Production District
 Supervisor (Major Mott Sawyer)
 Engineering Officer
 Accountant
 Property Officer²⁰

This system effectively separated the military side from the production side. Each military district reported to Division HQ in Portland, and each production district also reported to Portland. Division HQ (Disque and his aides) had direct charge of industrial relations, the Loyal Legion, public information, the Lyceum, and the office managers. Vancouver supervised the Cut-up Plant and Transportation, as well as the Guard Squadrons and the Provisional Companies. The Guard Squadrons were conventional troops on garrison duty at Vancouver Barracks and available to respond to problems such as strikes, sabotage, fires, or natural disasters like forest fires or floods. They were used to fight forest fires in August, September, and October of 1918.²¹ The summer of 1918 was noteworthy for its fire season. More than 300,000 acres of public and private timber burned, and as much as three billion board feet of timber was destroyed.²²

The July 9, 1918, date for this revised plan is interesting since it coincided with the Army Appropriations Act of July 9, 1918, (Sess. 2, ch. 143, 40 Stat. 845). This legislation authorized creation of the Spruce Production Corporation (SPC) and enabled it to take over lumber manufacturing from the Spruce Production Division. The SPC was a hybrid military/civilian organization. The new organization plan for the SPD would provide a convenient transition to the SPC since the separation of military and production areas was clear. The Military districts were staffed by Army officers, and the Production districts were staffed by civilians. Again, titles can be confusing since many “dollar-a-year” civilians were given a courtesy rank.

²⁰ This organization of Spruce Production Division is taken from General Orders No. 1 (July 9, 1918), ARC 4913140, General Orders, NARA Seattle; and *History of the Spruce Production Division*, 10-14. The *History* shows comparative organization charts for the SPD and the SPC and supplies names.

²¹ *History of the Spruce Production Division*, 68.

²² “Forest Fire Losses for 1918,” *The Timberman*, (November, 1918), 35.

Labor—Finding the Spruce Soldiers

The soldiers who made up the ranks of the Spruce Production Division came into the organization through enlistment, recruitment, and conscription. For the most part, they were assigned to duty in one of the following locations:

- in logging camps with the detached squadrons,
- in mills with the detached squadrons,
- on construction jobs with the SPD Engineering groups,
- on construction jobs with contractors,
- in the Vancouver Cut-up Plant.

As we have seen, a small percentage of the men were assigned to the First Provisional Regiment Guard Squadrons for garrison duty at Vancouver Barracks. This was as close as any SPD men came to conventional soldiering. Even this group found themselves called to unusual duty, such as fighting forest fires in the summer and fall of 1918.

There were some misconceptions about the SPD soldiers. They were sometimes seen as primarily loggers and mill workers rather than real soldiers; they were accused of cowardice because they were not in the trenches; their extra pay was considered unfair; and their physical condition was often disparaged. Like most rumors, each of these accusations contained some element of truth. The SPD recruited experienced loggers and mill workers whenever possible, including transferring men out of other branches of the Army for duty with the SPD if they requested a transfer. Some of these men were probably motivated by their disinclination for trench warfare as much as by any enthusiasm for logging. The SPD soldiers were paid regular loggers' or mill workers' wages in addition to their military pay if they worked in commercial mills or camps. And, the SPD accepted Limited Service Men (LSMs) who had physical issues that prevented their deployment in combat.

The first group of enlisted men assigned to the SPD arrived at Vancouver Barracks on December 4, 1917.²³ These 5,000 men were re-assigned from the "National Army." It is difficult to see how they could have been selected for logging or mill working skills in just 20 days, but some apparently were. The induction program for new SDP troops was supposed to take two weeks, but Disque sent a telegram to Merrill and Ring Logging in Seattle on December 16 saying that he could provide "skilled men of all classes" as well as "unskilled." Merrill had asked for 150 men, and Disque urged the firm to "increase your number if necessary."²⁴ A few days later, Merrill and Ring wrote that they needed 20 fallers and 24 buckers to report to their camp immediately after

²³ *History of the Spruce Production Division*, 8.

²⁴ Disque to D. Merrill (Merrill and Ring Logging), December 16, 1917, Correspondence File, Brice P. Disque Papers, University of Washington Special Collections, Seattle, WN.

Christmas. In January, 1918, they would need hooktenders, chokermen, rigging slingers, loaders, knotters, signal men, firemen, engineers, and graders.²⁵ The graders were probably unskilled laborers, but the rest of the men would have had experience in logging or the construction trades. It is likely that some men in this first group of soldiers were assigned to the SPD by their choice, and some were assigned by other means.

Within a few months, the SPD had worked out a procedure for inducting experienced men from civilian life into its ranks. President Woodrow Wilson had issued his proclamation to start conscription for all men aged 18-25 on April 28, 1917. The system required registration for the draft and then review and selection by local draft boards. The SPD induction policy dovetailed with the broader national draft. Men of draft age could apply for “voluntary induction into the Spruce Production Division, Bureau of Aircraft Production.” The applicant needed to apply to the SPD and “keep in touch with his Local Board” during the review process.

Information required by the SPD included the following:

- (a) Name
- (b) Order Number
- (c) Serial Number
- (d) Color
- (e) Present Classification
- (f) Physical Qualifications (as given to you by your Medical Advisory Board)
- (g) Present Address
- (h) Designation of Local Board
- (i) Designation of nearest Local Board (if applicant is at another address than his registry address)
- (j) Occupation which you are following, or for which you consider yourself best fitted.²⁶

Men in draft classifications 2, 3, and 4, and Limited Service Men in class 1 were eligible for service in the SPD, but men in class 1 who were not determined Limited Service were not eligible. These men would have been prime candidates for service with the AEF in France. When a volunteer was selected, his local draft board would be notified by the Provost Marshall General, and the volunteer would be inducted for duty with the SPD. If the applicant chose to enlist rather than wait for induction, the same policy pertained. “Experience for enlistment is the same as for induction. Only men above the draft age [18] and not over 40 years of age with good logging or lumbering experience can be used.” All

²⁵ Merrill and Ring Logging to Disque, December 18, 1917, Correspondence File, Brice P. Disque Papers, University of Washington Special Collections, Seattle, WN.

²⁶ “Employment of Soldiers in Private Camps and Mills,” July 9, 1918, Regulations of the Spruce Production Division, 67, ARC 4913140, General Orders, Spruce Division Papers, NARA Seattle.

candidates “must be fit for the manual logging work of the Division.... There is no present call for clerks.”²⁷

These special processes of induction and enlistment provided a cadre of men who were experienced in the lumber trades. If a logger or lumber worker in Oregon or Washington chose, he could enlist in the Army, yet remain close to his home and do what he did in civilian life. Military records and the few personal accounts written by spruce soldiers show that the SPD was a diverse organization, however, made up of men from all backgrounds and all regions of the country. For example, a roster listing the 504 men of the 17th Spruce Production Squadron shows that they came from most of the 48 states and three Canadian provinces. Seventy-two of the men were from Washington and Oregon, for 14% of the total. The most common state of origin was California. Lumber-producing states other than the west coast, such as Pennsylvania, the Great Lakes states, or the southern pine states did not contribute as many men as California, Oregon, and Washington.

Once the new spruce soldiers arrived at Vancouver Barracks from whatever background, the SPD set about integrating them into the division.

Upon arrival at the cantonment at Vancouver Barracks...troops will be organized into squadrons of 150 men. The experienced woodsmen with each new detachment will be equally distributed throughout the newly organized squadrons.²⁸

The new troops would remain at Vancouver until they were needed in camps or mills. During this time they would go through the SPD training, which apparently substituted for military basic training for inducted or enlisted men. The period for training was estimated at three weeks. The program included the following:

(1)	Physical training	13 hours
(2)	Infantry drill close order	50 hours
	Extended order	
	Minor tactics	32 hours
	Security and information	
	Attack and defense	
(3)	Lectures and instruction	22 hours
	Airplanes in war	
	Field fortifications	
	Topography	
	Other military subjects	
(4)	Lectures or instruction	18 hours
	Manual guard duty	
	Customs of the service	
	Sanitation	
	TOTAL	135 hours

²⁷ “Employment of Soldiers in Private Camps and Mills,” 70.

²⁸ Spruce Production Division Memorandum #3, December 4, 1917, ARC 5049398, Vancouver Records, Spruce Production Division Papers, NARA, Seattle.

In addition to this course for the recruits, there was a Commissioned Officers' School held six nights each week "for the principal purpose of thoroughly preparing officers to instruct their troops the next day."²⁹ The recruits' day began with reveille at 6:20 AM and ended with taps at 11:00 PM. Their day was divided into six periods alternating drill with lectures and instruction.

Life in the Logging Camps

The heart of the SPD's mission and its most controversial activity was assigning troops to work for private lumber companies in their camps and mills. This was at the center of the strategy that Disque had worked out with Carleton Parker and his other advisers. By placing troops in the workplace, the SPD could be confident that there would be sufficient labor to get the spruce out of the forest and on its way to the Cut-up Plant. At the same time, the presence of troops would ensure that civilian workers could not disrupt production as they had in July and August of 1917 during the general strike. By May of 1918, soldiers were stationed with 61 lumber companies, many operating multiple camps. These extended from Bellingham, Washington, on the north, to as far south as Powers, Oregon, near Coos Bay.³⁰ The program accomplished what it was intended to do. There were no major labor disruptions for the remaining months of the war, and lumber production was generally adequate, especially after July of 1918.³¹

On the other hand, living conditions in many of the camps and in the mills' boarding houses were not initially up to Army standards for sanitation and hygiene. Disque visited logging camps in the fall of 1917 and was said to be dismayed at what he found in some camps.³² He recorded that conditions were sometimes worse than what he had seen in prisons in the Philippines. He was not comfortable sending U.S. soldiers into those places. Disque's thinking and early experiences coalesced into a policy statement formulated in December of 1917 as "Employment of Soldiers in Private Camps and Mills."

The document began with a format for "Application for Troop Labor" that the lumber companies had to submit. The application asked for the number of soldiers requested, the number of civilian workers employed, the quantity of spruce produced, certification that "living accommodations are ready for the men," and certification that the company had been unable to hire civilians for their needs. Most importantly, the company had to ship 100 board feet #1 aircraft

²⁹ Spruce Production Division Memorandum #3.

³⁰ "Logging and Milling Firms Employing Soldier Labor," May 2, 1918, Brice P. Disque Papers, University of Oregon Library Special Collections, Eugene, OR.

³¹ This is not to say that the SPD did not expect more spruce. Bulletin #54 (June 15, 1918) castigated "All Employers of Soldier Labor" that the production of spruce was "not commensurate with the labor furnished."

³² Hyman, *Soldiers and Spruce*, 110.

spruce lumber or its equivalent in cants or flitches each day for each soldier employed. Since most of the cants and flitches would find their way to the Cut-up Plant, the SPD could audit the lumber companies reasonably well, and remove soldiers from operations that did not meet the quota.

The whole question of pay for the soldiers was vexing. Disque did not want the lumber companies to get free labor, nor did he want the soldiers to be paid by both the Government and the companies for the same jobs. A workable policy eventually took form. The lumber companies would pay the soldiers standard wages set by the Loyal Legion for each skill level or special job. Soldiers would pay the companies for their room and board, at the same rates as other workers did. The soldiers would also need to buy their own clothing and boots appropriate for logging. Loggers in coastal areas wore specialized outfits including waterproof “tin” pants and jackets and caulked boots. The Army would provide “all medical attention necessary for soldiers” and the “medical men” would “render any service required by civilian workers” but the lumber companies had to pay for medical supplies “used in treating civilians.”³³ At the end of each pay period,

The government pay of each soldier will be certified to the management of the camp in which he is working, on a prescribed form, once each month and this amount will be deducted from the soldier’s wages by the camp management and transferred to the Disbursing Officer of this office.³⁴

One other provision was that each detachment would have one to four enlisted men with them “for military reasons” who would not work for the company and who would draw no pay. Their room and board would be paid directly by the Army.

Under the broad heading of living conditions, the Army specified exactly what had to be done if the soldiers were to live in logging companies’ camps. In some instances, the SPD created its own camp for the soldiers, using conventional squad tents and portable buildings. The medical officers would inspect water supply for the camp and the latrines. They would also inspect cooking facilities, food storage, and mess halls. The detachment leaders and the medical officer would inspect sleeping quarters for cleanliness, and soldiers would muster for personal inspection each day.

The camps were to have a recreation room available for soldiers and civilian workers. This would be a separate building “sufficiently large to contain” all men in camp “for recreation and entertainment purposes.” The room was to be lighted and heated and furnished with tables and chairs for writing and reading.³⁵

³³ “Employment of Soldiers in Private Camps and Mills” p. 70-17.

³⁴ “Spruce Production Division Bulletin #6,” December 11, 1917, ARC 5049512, General Records, SPD, NARA, Seattle.

³⁵ “Spruce Production Division Bulletin #5,” December 3, 1917. ARC 5049512, General Records, SPD, NARA, Seattle.

These rooms would not have been found in most logging camps prior to the SPD. In regular military camps—like the cantonments at Vancouver Barracks—outside organizations including the Red Cross and the YMCA staffed the recreation rooms to provide books and magazines and writing materials. The YMCA provided staff and supplies for recreation rooms in SPD camps beginning in the summer of 1918. Areas served included logging camps in Grays Harbor and Raymond districts in Washington and Clatsop County and Lincoln County in Oregon.³⁶ In addition to free items available from the YMCA or Red Cross, most logging camps had some version of a company store where loggers could buy tobacco, gum, snacks, and clothing. Many of these purchases were traditionally made on credit, with the bill being settled at payday. Soldiers could receive credit from these stores, and the Army would intervene if they failed to pay their bills.



Figure 2-3 Shower house, showing hot-water tank and heating stove (Photo: NARA. College Park, MD).

Bathing facilities or shower houses were another innovation introduced to many camps by the SPD regulations. The shower house was to have hot water available at all times. There would be at least three showerheads for each 25 men. The shower house was to be enclosed and protected from the elements. Heating and lighting are not specifically mentioned, but we can assume that these amenities were necessary. Each shower house was also to have one wash basin for each five men in camp. Soldiers were admonished to shower at least twice a week. Latrines could be connected to sewers or they could be “earth closets” at least eight feet deep. One seat must be available for each eight men. The seats must be covered with hinged wooden covers when not in use. The latrine, like the shower house, must have a suitable enclosure to protect users from the elements. Both latrines and shower houses were to be inspected.

³⁶ “The Y.M.C.A. in the Spruce Woods,” *The Timberman*, (July, 1918), 36.

Sleeping facilities were to be designed for 25 men, but could be expanded to accommodate 50 men if necessary. Five hundred cubic feet of air space must be available to each man, and the bunkhouses must be well ventilated. A window measuring four square feet or larger must be provided for each man in the bunkhouse. The bunkhouse must be heated. Some bunkhouses were built with “dry rooms” adjacent to them. The wet climate meant that loggers’ clothing was usually sodden and a heated space to dry the wet garments made life much more comfortable. The Army would provide each soldier with a blanket. The company was to provide sheets, pillow, and pillowcase which would be washed each week for a fee set by the company. Blankets were to be aired twice each week as weather permitted. One difficult point for many companies was the requirement that all workers be provided with expensive steel bunks and new mattresses. Traditional wooden bunks and aged mattresses harbored bedbugs. Steel bunks had wire springs and tubular frames, leaving no place for vermin to hide.

After the end of the war, *Engineering News Record* published a brief article about SPD camp 1-H at Raymond, Washington. This camp was erected by the Army and operated by the Warren Spruce Company. There were 100 men in the camp. Water came from a spring box fitted with an electrical pump and it was piped to the camp. The men lived in squad tents, six men to a tent, with wooden floors and wooden side walls 4’ high. The three latrines were 90’ from the camp area. There was a separate orderly tent, perhaps for the soldiers attached to the squadron for military reasons. There was a recreation tent, a dry house, and a bath house in close proximity. Medical services consisted of a hospital tent, a doctor’s tent, and a medical commissary. Food services consisted of a kitchen, cook’s tent, meat house, mess hall, commissary, store house, and company store. There was a tool shed and a saw filer’s shop. The Commanding Officer and the company foreman had separate quarters.³⁷

The Warren Spruce Company fed their men for an average cost of slightly over 36 cents per meal. This represented the cost of the food, preparation and serving, and a 10% mark-up. To prepare 90 meals, the cooks used 5.67 pounds of sugar, 12.26 pounds of flour, and other items for an average of 2.08 pounds of food/meal. Historian Joseph R. Conlin has written an excellent essay on diet and nutrition in the lumber industry. He points out that food in logging camps and mill boarding houses was generally good and plentiful after about 1880 when the industry moved into the west and south, leaving the dismal New England winter camps behind.³⁸ Even IWW activist James Rowan, no friend of the lumber industry, noted that “in most lumber camps, the food was fairly substantial and plentiful, as was necessary to enable the men to endure the long hours and hard work.”³⁹

³⁷ “How Soldiers were Quartered and Fed in Spruce Production Camps” *Engineering News Record* (January 9, 1919) 105.

³⁸ Joseph R. Conlin “Old Boy, Did You Get Enough of Pie? *Journal of Forest History* (October, 1979) 164-184.

³⁹ Rowan, *The I.W.W. and the Lumber Industry*, 7.

Loggers indeed required plentiful amounts of substantial food, and were quick to leave camps where the provisions or cooking was not up to their standards.⁴⁰ Companies realized that food was important to the men and that a good cook and a well-stocked larder was a relatively inexpensive way to keep the crews working. Since the men paid for their food, good food added no financial burden to the company. Estimates set loggers' nutritional requirements at between 6,000 and 9,000 calories/day. Food available included fresh meats, as evidenced by the meat house at camp 1-H, canned vegetables, fresh and canned fruit, fresh root vegetables, and baked goods including bread, pies, and other sweets. Canned condensed milk was a standard condiment in the early decades of the 20th century that is no longer a major part of contemporary diets. It was widely used as a sweetening and enriching agent for coffee, on baked goods, and on fresh fruit. Conlin provides a list of over 50 foods commonly served in camps in Washington, Oregon, California, and the Lake States.

Life at the Cut-up Plant

Life was simpler for the men assigned to duty at the Vancouver Cut-up Plant. They were detailed to construction or mill work. These are difficult and demanding jobs, but less so than logging. As an added bonus the mill work was conducted indoors, no small consideration during the winter months. The trade-off was that Vancouver Barracks was an official Army post where military customs were more closely observed than in isolated camps in the coastal rainforest.

The Cut-up Plant ran three shifts each day and employed around 5,000 men. The soldiers lived in cantonments and squad tents near the plant. Because men were working in three eight-hour shifts, kitchens, bakeries, mess halls, recreation rooms, and other facilities had to operate 24 hours each day. Soldiers at Vancouver Barracks had access to the town, and to recreation opportunities on the post. The YMCA and the Red Cross both had a presence at the Barracks. In December of 1918, after the Armistice, the Victory Theatre opened on the post. The person in charge, Captain Walter Jessee, told the troops that "this is our own theatre, designed by ourselves, built from our own funds by our own hands, and is being operated wholly by ourselves."⁴¹ The theatre offered films, vaudeville shows, "amateur nights," and boxing.

⁴⁰ W.B. Armstrong, "Food Conservation in the Logging Camp," *The Timberman*, (November 1917), 62. See also Kenneth Ross, "Report on Cook House Management," *The Timberman*, November 1917: 61.

⁴¹ "Memorandum, December 20, 1918", ARC 5049512, General Records, Spruce Production Division Papers, NARA, Seattle.



Figure 2-4 Soldiers at the Cut-up Plant posing with pipes. Note the variations in their uniforms (Photo: OSU Special Collections, Corvallis).

Soldiers off duty could also visit the Post Exchange to get tobacco products, drug store items, and sundries. Inventory records from the 1st Provisional Regiment Exchange show that tobacco products were the most widely-stocked item. Cigarettes available included the following:

- Camels
- Lucky Strikes
- Chesterfields
- Fatimas
- Sweet Caporal
- Home Runs
- Omars
- Piedmonts
- Imperials.

Tobaccos available in pocket cans or other containers included these:

- Beechnut
- Mail Pouch
- Tuxedo
- Velvet
- George Washington
- Sure Shot
- Union Leader
- Peerless
- Prince Albert.

For pipe smokers, there were “Orinoco” pipes (\$2.25) and “Frank” pipes (\$4.00). Health products included mysterious “tablets” at \$1.15/dozen, Palmolive shampoo, witch hazel, pine tar expectorant, marshmallow lotion, Mentholatum, Musterole, Vaseline, Listerine, peroxide, and Epsom salts. Soldiers with lower digestive-tract issues could find relief with Aromatic Cascara or Chocolax. Sundry items available at the PX included decks of playing cards, soldiers’ diary books, matches, the Laird and Lee Dictionary, pocket signal disks, and “Double Sheets Tanglefoot.”⁴² Tanglefoot was a popular brand of fly paper, which caught flies and other insects indoors.

The men working in the Vancouver mill were predominantly SPD soldiers, with a leavening of civilians in specialized jobs. Civilians presumably lived off-base in Vancouver or Portland. After the construction period, the SPD consolidated the technicians into Spruce Squadron No. 113, which was designated the Engineering Squadron and was commanded by the Division Engineering officer. The squadron was composed of “necessary mill-wrights, carpenters, painters, machinists and other mechanics.” All officers and enlisted men currently engaged in these trades would be transferred to the Engineering Department, and civilians would be “carried on the Cut-up Plant payroll under the supervision of the Division Engineer.” This group was charged with “all maintenance, repairs and extension, as well as new installments in the Cut-up Plant.”⁴³ They were to be quartered in the “immediate vicinity of the Cut-up Plant.” Other specialized positions within the Cut-up Plant would have included the head sawyers, lumber inspectors, dry-kiln supervisors, and the engineers operating the boilers. Men for these positions could have been available from the ranks of military personnel, but with the war in Europe increasing the demand on the Army, they were likely to have been civilians like the mill-wrights and machinists.

All saw mill managers, whether military or civilian, lived in constant fear of fire. Wood dust, dry lumber, overheated machinery, and open waste burning were an inflammatory mix. In July, 1918, a part of the First Provisional Regiment (Squadrons 1-14) was organized into a fire department for the Cut-up Plant. The fire department consisted of the Fire Marshall (a commissioned officer) three assistant marshals, and 24 fire guards. Guards were divided into three shifts and stationed on the mill and shed roofs, on the mill floors, in the basements, and throughout the yard. The soldiers working in the mill were assigned to fire stations and were drilled on fire procedures each week.⁴⁴ The guard regiment also posted guards who patrolled the mill’s perimeter. These were independent of the fire department, and were apparently on the lookout for sabotage or theft, although they would have been an added level of fire security.

⁴² “First Provincial Regiment Exchange, Inventory sheets 1, 2, 3” ARC 5013065, Provisional Regiment Records, Spruce Production Division papers, NARA, Seattle.

⁴³ “General Orders No. 8, July 24, 1918,” ARC 4913140, General Orders, Spruce Production Division papers, NARA, Seattle.

⁴⁴ “General Orders No. 4” ARC 4913140, General Orders, Spruce Production Division Papers, NARA. Seattle.

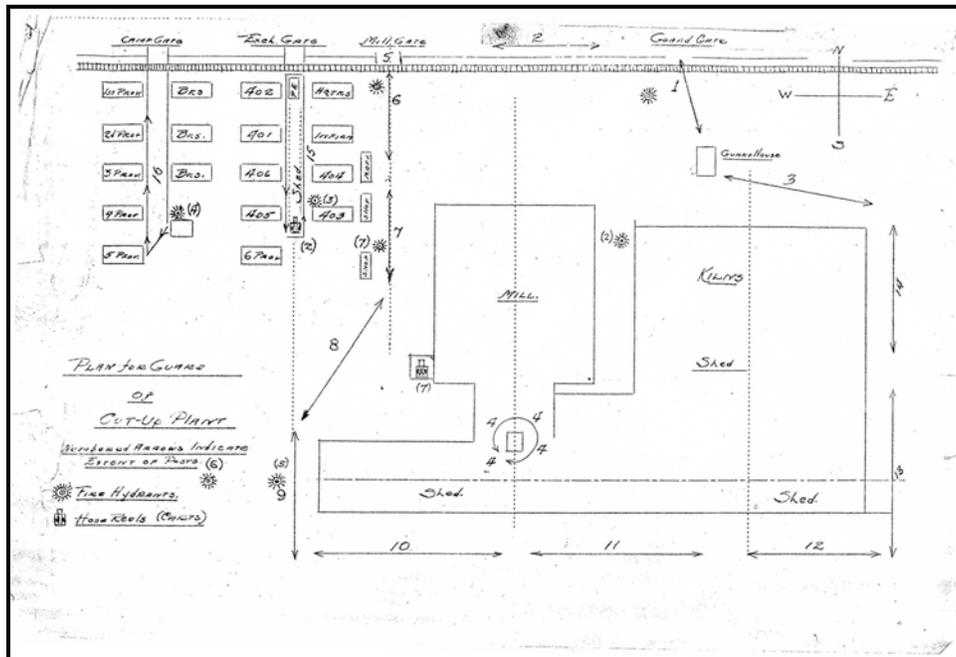


Figure 4-5 Guard patrol sectors for the Cut-up Plant. Sectors 1-14 were the routes the guards walked during their patrols to provide security to the Cut-up Plant (NARA, Seattle).

Clothing

Whether a soldier was on detached duty or stationed at Vancouver Barracks, clothing was a significant issue. The Army issued uniforms, which were supposed to provide a uniform appearance for the troops, with appropriate insignia of unit and rank. Army uniforms were well-made woolen clothing designed for use in military activities including combat. The clothing issued to each soldier consisted of the following items:

- Overcoat
- Poncho
- Slicker
- Belt
- Breeches
- Drawers
- Gloves
- Hat
- Leggings
- Shirts
- Stockings
- Undershirts.⁴⁵

⁴⁵ "For Information of Officers Conducting Detached Squadrons to the Field" May 4, 1918. ARC 4913136, Casual Detachments, Spruce Production Division Papers, NARA, Seattle.

The uniforms were not especially suitable for logging or mill work, however. Wet conditions, heavy abrasion, mud, and machinery took their toll on the fabric. Sawdust made wet wool almost unbearable to wear for any length of time. As a consequence, spruce soldiers purchased civilian work clothes, boots, and gloves, and substituted these items for their uniforms. There was a steady stream of memos and orders concerning uniforms and dress. Most railed against the non-military appearance of spruce soldiers. Photographs show that they mixed items from their uniforms with items of civilian clothing (see figure 2-6).

General Order No. 10 made it clear that mixing of clothing like this was not acceptable. “All officers of this command are enjoined to vigorously suppress all slovenliness of personal dress and the wearing of non-regulation outer clothing by enlisted men.”⁴⁶ This standing order, prepared in August (1918), ran counter to General Orders, #163 which said that “the articles of uniform clothing...are for military use only and enlisted men on logging duty will provide themselves with the necessary logging clothing for use while actually employed at logging.”⁴⁷ The only article of uniform clothing to be worn on logging duty was the campaign hat. Photos of soldiers working in logging, construction, and mills (as figure 2-6) show them wearing the campaign hat with civilian work clothes. Apparently the logic of wearing civilian clothing was extended to construction work and mill work in addition to logging. Since soldiers did not have a special clothing allowance, they needed to make do as well as possible with a mix of military and civilian clothing.

⁴⁶ “General Orders No. 10” August 7, 1918, ARC 4913140, General Orders, Spruce Production Division Papers, NARA, Seattle.

⁴⁷ “General Orders, Regulations of the Spruce Production Division, Clothing, #163” July 9, 1918, ARC 4913140, General Orders, Spruce Production Division Papers, NARA, Seattle.

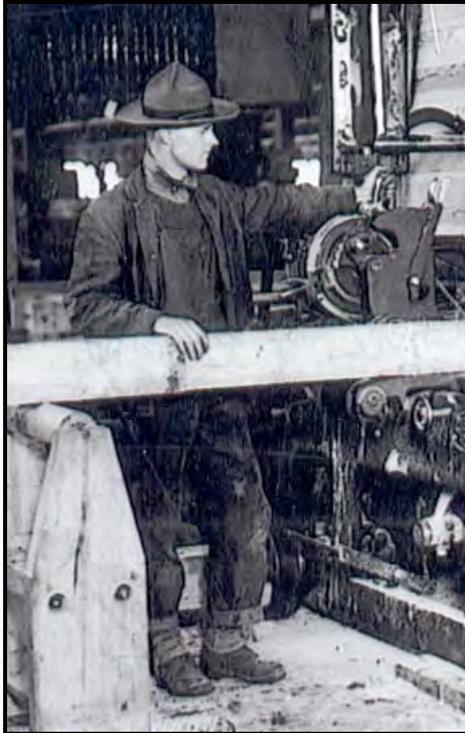


Photo 2-6 SPD soldier working in the Cut-up Plant. He wears his Army issue campaign hat, his issue shirt with collar up to keep sawdust out, his civilian coat, civilian dungarees, issue gaiters, and civilian boots. No insignia of unit or rank is visible (Photo: NARA College Park, MD).

Soldiers were required to take care of their uniforms, of course, but the uniforms were vulnerable to the hazards of logging and millwork. For the soldiers stationed at Vancouver, laundry and repair services were available on the post. For the detached soldiers, military clothing in need of repair had to be shipped to the Division Quartermaster at Vancouver and then shipped back, with appropriate bills of lading documenting the shipment. Shoes issued by the Army were to be repaired in Vancouver as well.⁴⁸ We can assume that the Division Quartermaster made every effort to repair shoes and clothing as quickly as possible. Nevertheless, a more expedient system was apparently necessary, for we find in “Regulations of the Spruce Production Division, Clothing, No. 165” that “commanding officer[s] of troops in the field are directed to make arrangements with some nearby shoe repairer to repair the shoes of the enlisted men of their commands.” This applied to government-issued shoes only: logging boots would be repaired at the soldier’s expense. Local “shoe repairers” would submit a voucher for their work at the end of each month and the Division financial office would pay them. In general, then, “cleaning and laundering of

⁴⁸ “General Order No. 46” August 22, 1918, ARC 4913140, General Orders Spruce Production Division Papers, NARA, Seattle.

clothes in the possession of the soldier will be done at his expense; repairs will be done at the expense of the Government.”⁴⁹

Medical Services

The Division Surgeon coordinated medical services for the SPD. The first Surgeon was Major Blackmoore, who reported for duty on November 20, 1917. He was succeeded by Lt. Col. J.W. Sherwood, who was in turn succeeded by Col. Rudolph G. Ebert.⁵⁰ Col. Ebert was a career medical officer who had been instrumental before the war in developing medical facilities at Vancouver Barracks, including the Post Hospital.⁵¹ This hospital was built in 1904 and had a capacity of 48 beds. During the war, five temporary buildings were added to the rear of the hospital, and some tents were placed in service to raise the number to 356 beds. This number was extended by the construction of the Red Cross convalescent house in 1919, too late for the war, but very beneficial to veterans recovering from wounds or diseases.⁵²

The *History of the Spruce Production Division* characterized the “medics’ mission” as follows:

There were...some distinctive phases of work of medical men in connection with the Spruce Production Division. Speaking by and large, the medical problem may be summed up in the words “living conditions” under the two-fold aspect of camp sanitation and food conservation. There were also, of course, the usual questions as touching the care of the sick, which arise in any military organization, augmented by the hazard of injury to the men, owing to the nature of the work in which they were engaged.⁵³

Two epidemics in 1918 threatened the troops. These were an epidemic of cerebro-spinal meningitis in March and the great influenza epidemic of September, October, and November. Men living in crowded barracks or camp conditions were especially vulnerable to contagious diseases, and the 1918 influenza was extremely contagious. The SPD lost 182 men to the influenza, for a death rate calculated at 6 per thousand or .0623%, well below the national average.⁵⁴

⁴⁹ “General Orders, Regulations of the Spruce Production Division, Clothing, #166”, ARC 4913140, General Orders July 9, 1918, Spruce Production Division Papers, NARA, Seattle.

⁵⁰ *History of the Spruce Production Division*, 75.

⁵¹ Ward Tonsfeldt and Catherine C. Atwood, “Historic Structures Report for Vancouver Barracks, West Barracks,” (Seattle, 2002), 46ff..

⁵² Tonsfeldt and Atwood, “Historic Structures Report, Vancouver Barracks, West Barracks,” 2002, 67.

⁵³ *History of the Spruce Production Division*, 74.

⁵⁴ Recent scholarly accounts of the world-wide influenza pandemic of 1918 place the mortality rate of the world’s population as a whole in the 3-6% range, roughly 10 times higher than the SPD mortality rate. See, for example, John M. Barry, *The Great Influenza: The Epic Story of the Greatest Plague in History*. (New York 2004).

The SPD organized medical services on a hub-and-spokes model. Vancouver Barracks had hospital and dental surgery buildings designed for less than 1000 men. The number of men in the SPD required expansion of the treatment centers, and a great increase in the medical staff. By the end of the war, there were 400 enlisted men and over 150 officers in the medical department.⁵⁵ In addition to the physicians and medical personnel at the Post Hospital at Vancouver, each detached squadron needed medical services. Roughly half of the medical staff was at Vancouver and half with the detached squadrons.

Additional medical personnel were assigned to duty with the Loyal Legion of Loggers and Lumbermen. During the fall of 1917 and the winter of 1918, the Loyal Legion increased membership as workers and lumbermen in areas outside the spruce belt joined. The SPD had extended the range of the LLLL so that it could influence the Northwest lumber industry as a whole. The Spokane District included members of the lumber industry in eastern Washington, Eastern Oregon, Idaho, and Montana. Since sanitation and health services were parts of the LLLL commitment, Army medical staff investigated over 900 camps with a population of perhaps 100,000 men.⁵⁶

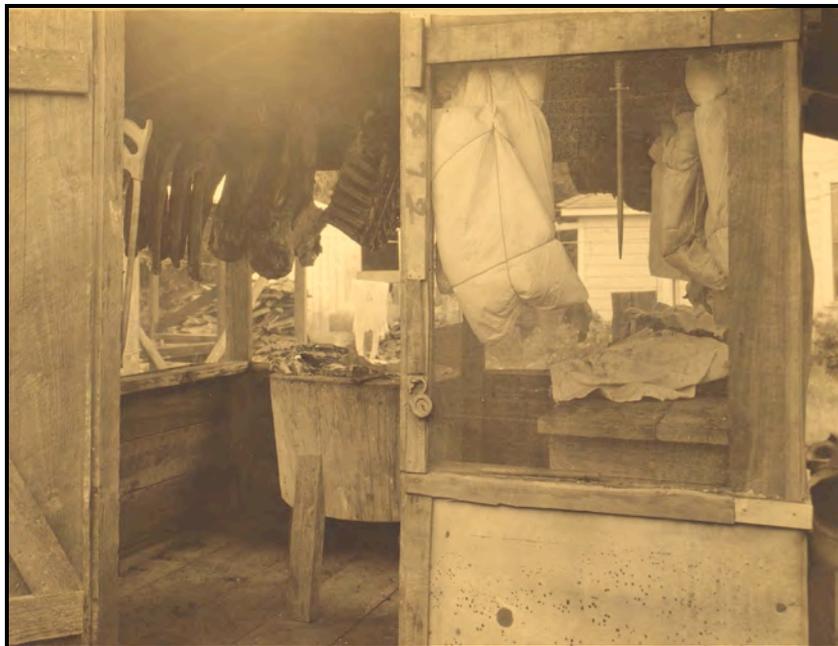


Figure 2-7 Meat storage meeting LLLL standards. Note that there is no refrigeration but the meat house is screened and provided with a wooden floor. The sides of meat are wrapped and the meat is hanging. Fresh meat was delivered daily in most camps (Photo: NARA, College Park, MD).

The result of this investigation was a report and set of sanitation standards for LLLL camps and mills prepared by Dr. Thorfin Tharaldsen, Army doctor and

⁵⁵ *History of the Spruce Production Division*, 74.

⁵⁶ *History of the Spruce Production Division*, 75.

LLLL medical officer.⁵⁷ Tharaldsen’s standards for camp sanitation and for handling and preparing food were widely disseminated and became part of the LLLL requirements for participating lumber companies. Tharaldsen also pursued standards for nutrition. After the war, the LLLL standards remained in effect for all camps and mills affiliated with the organization. As historian Joseph Conlin has shown, food and cooking standards were generally high in the logging camps and mill boarding houses. “The food is plentiful, various, and usually well-cooked.”⁵⁸ However, the level of waste was also high and the meals were often prepared with an eye to meeting loggers’ need for high caloric intake rather than proper nutrition. “Pounds [of food] per man in the logging camps exceeded that of any other industry in the world. It was double the Army ration.” While the quantity of food was high, the variety did not always include fresh fruit or vegetables. “Two to four kinds of meats were nearly always on the table and three to six sorts of pastry.”⁵⁹ The Army argued that better planning would produce meals with less waste of food, and with better nutrition, which would lead to better health. We do not know how successful the LLLL was at getting loggers to eat broccoli, but the program did call attention to nutrition and personal health.

Men in the detached squadrons (and civilians) who required medical care in the camps could be treated by the camp medical officer and admitted to the camp infirmary. For more serious problems, men were sent to the Post Hospital at Vancouver Barracks. Major Sanford B. Whiting was medical officer for the Yaquina Bay District, composed of at least 15 separate squadrons assigned to construction work in Toledo, Newport, South Beach, and Waldport. He sent 43 men to the Post Hospital during the week of August 27, 1918. Their health problems were listed as follows:⁶⁰

Hernia	8 men
Heart Problems	6 men
Varicose veins	5 men
Rheumatism	4 men
Mental deficiency	2 men
Flat feet	2 men
Leg injury	2 men
Tuberculosis	2 men
Old injuries	2 men
Arm injury	2 men
Appendicitis	1 man
Bullet wound	1 man
Asthma	1 man

⁵⁷ “Sanitary Requirements for Camps,” *The Timberman*, (July, 1919), 68.

⁵⁸ *History of the Spruce Production Division*, 77.

⁵⁹ *History of the Spruce Production Division*, 77.

⁶⁰ “Yaquina District Weekly Reports, August 27, 1918,” ARC 5049346, Surgeon’s Records, Spruce Production Division papers, NARA, Seattle.

Lead poisoning	1 man
Indigestion	1 man
Bright's disease	1 man
Undiagnosed	2 men

The hernias and the arm and leg injuries were probably work-related, but the other problems seem to be what we might expect from a group of men physically active and living out of doors. Minor work-related injuries—such as cuts and bruises—would have been treated at the camp infirmary and are not included on this list. Later in the fall, of course, influenza would have added to the number of men sent to Vancouver.

What the Soldiers Had to Say

The number of first-person accounts of life in the Spruce Production Division is less than we might wish. The most extensive is a memoir by Sgt. Floyd Marsh, published as *Twenty Years a Soldier of Fortune* (Portland, 1976). In addition, several sets of letters have been archived. These are the letters of Pvt. Oliver Mattheissen at the Washington State Historical Society Library in Olympia and three additional sets of letters in the archives at Fort Vancouver. There is a single letter from Pvt. Arthur Newby published in the USDA Forest Service newsletter *Six-Twenty-six* for July, 1918. Finally, some oral history interviews with former members of the SPD were transcribed and archived at the Olympic National Forest Supervisor's Office in Olympia, Washington. Some of these have been transferred to the National Archives and Records Agency in Seattle, Washington.⁶¹

One of these oral informants was Lloyd Lamb, who served with a detached squadron. His unit lived in squad tents erected by the Army:

It was a ...square tent, with a...three foot [framed wall around it]. [The canvas sides of the tent] came right over the [wall] and down....It kept out all the wind and came up to a point...with a hole in the top so you could put in a pipe for a stove....There wasn't much danger of fire, and anyway...you're there all the time except when you go to work. So you can watch it pretty close. Then those camps were every two miles apart, with about two hundred men in each camp...it varied a little but not very much.⁶²

Floyd Marsh was born in Oklahoma and joined the Army in December 1916, enlisting in the Field Artillery. He transferred to the Medical Corps and was stationed at Fort Warden near Port Townsend, Washington. Later, Marsh

⁶¹ The oral tapes and transcriptions were prepared by Nina Carter, who was associated with Evergreen State College in the late 1970s. Carter then apparently placed them on file with the Olympic National Forest. The Forest Service apparently transferred the transcripts to the Olympic National Park, and Park staff placed the transcripts in the NARA Seattle archive. These are archived in RG 95, Olympic NF History Files, Spruce Division Box 6, File: Werges

⁶² Lloyd Lamb interview, cited in Evans and Williams, "Over Here, Over Here," 8

was assigned to screening recruits for the SPD, then forming at Vancouver Barracks. “If it hadn’t been the Major telling me this, I would have thought it was some kind of joke. I had never heard of the Spruce Division.”⁶³ During the initial SPD staffing, Marsh reports that four physicians and six medics “examined and mustered in” over 2000 recruits in five days. Marsh was then transferred to Waldport where he operated the camp infirmary. The medical staff at Waldport consisted of one physician, two privates, and Marsh, who was by then a sergeant. Marsh shuttled back to the Post Hospital at Vancouver, then was assigned to operate the dispensary for the division medical center in Toledo. During August and September of 1918, Marsh noted that the energy level was diminishing:

Not only did we medics slow down and lose interest, but the entire camp seemed to lose interest in what they were doing. One could walk through the camp at any time of day and the only activity would be poker or a craps game. They were even taking up some of the rail track. It began to look as if they had found something better to make planes with—or that the war was winding down.⁶⁴

Marsh then went back to Vancouver to assist with the mustering out of the SPD troops. His final post was at Fort Wright, near Spokane, Washington.

Marsh was perhaps an unusual “Sprucer” because he had no prior experience with the lumber industry and no particular enthusiasm for the Army. He liked his work as a medic, but his real interest lay in gold mining which he pursued for most of his life. Historian Gerald Williams finds a contrary example in Arthur Newby, who was in the Forest Service before the war. When war was declared, he enlisted. In the fall of 1918, Newby volunteered to transfer from the Coast Artillery to the SPD because he thought his logging experience “might be worth something.”⁶⁵ Newby was enthusiastic about his camp:

We have an excellent camp here, which is clean and sanitary. We live in bunk houses built on [railroad] car trucks, about 60 feet long and divided into three rooms each. There are ten men to each room. We have all the modern luxuries—steam heat, electric lights, hot and cold running water, and last but by no means least, we have the very best eats on earth. They give us all we want and “variety” is the password.⁶⁶

He was also enthusiastic about his unit and their role in the war:

There are about fifty boys here, a fine bunch, and they are sure cutting timber like real loggers....We are all satisfied and we are glad to be here doing what we can to beat Fritz, and we will.⁶⁷

⁶³ Floyd Marsh, *Twenty Years a Soldier of Fortune*, (Portland, 1976) 28.

⁶⁴ Marsh, *Twenty Years*, 33.

⁶⁵ Arthur C. Newby, “From a Private in the Spruce Production Division,” *Six Twenty-six*, (July 1918), 4.

⁶⁶ Newby, “From a Private,” 5.

⁶⁷ Newby, “From a Private,” 4.

CHAPTER III

BUILDING AND OPERATING THE CUT-UP PLANT

In December, 1917, work began on the Spruce Production Division (SPD) remanufacturing mill on the polo field at Vancouver Barracks. The genesis of the idea for the Cut-up Plant probably rests with Col. Disque, and he likely developed it in the fall of 1917 when he was meeting with industry committees in Portland. In the “Historical” manuscript he prepared in 1919, Disque has the following to say about the Cut-up Plant and the Army’s venture into lumber manufacturing:

It was soon found that the industry could not expand to meet the Government’s requirements [for aircraft lumber] and that the Government must take steps to supplement the output of the industry.

It was found early in October [1917] that mills were not equipped to cut to grain and that much valuable spruce was being spoiled. A cut-up plant to operate at Vancouver Barracks, under the charge of the Division, was decided upon.¹

Disque dates the beginning of construction on the Cut-up Plant as December 14 or 15, 1917. The period of construction lasted 45 days, and the plant’s great saws began turning on February 7, 1918. Mrs. Disque threw the switch that started the motors as part of a ceremony held for the occasion. Col. Disque spoke at the ceremony, noting the military history at Vancouver Barracks stretched back to the time of General Ulysses S. Grant in the early 1850s.

Genesis and Concept

In SPD publications and pronouncements, the Vancouver mill was referred to as the Cut-up Plant, generally capitalized. Technically, it was a large re-manufacturing mill, designed to cut cants and flitches of spruce, fir, and Port Orford cedar into aircraft-grade lumber. The cants were large rough boards and beams cut from logs in the mills under contract to the SPD. They varied in dimensions from timbers over 12” square and over 20’ long to boards no more than 3” thick. All were cut on the mills’ head saws to make the grain-lines in the wood parallel to the edges of the boards, a configuration known as “straight grain.” The flitches were sections of logs that had been rived, or split lengthwise, in the forest. These also had the grain running parallel to the long axis of the

¹ Brice P Disque, “Historical,” Brice P. Disque Papers, University of Oregon Special Collections, Eugene, OR.

wood. The lumber companies producing the flitches simply washed off the mud from the forest, and sent them on rail cars to the Cut-up Plant.

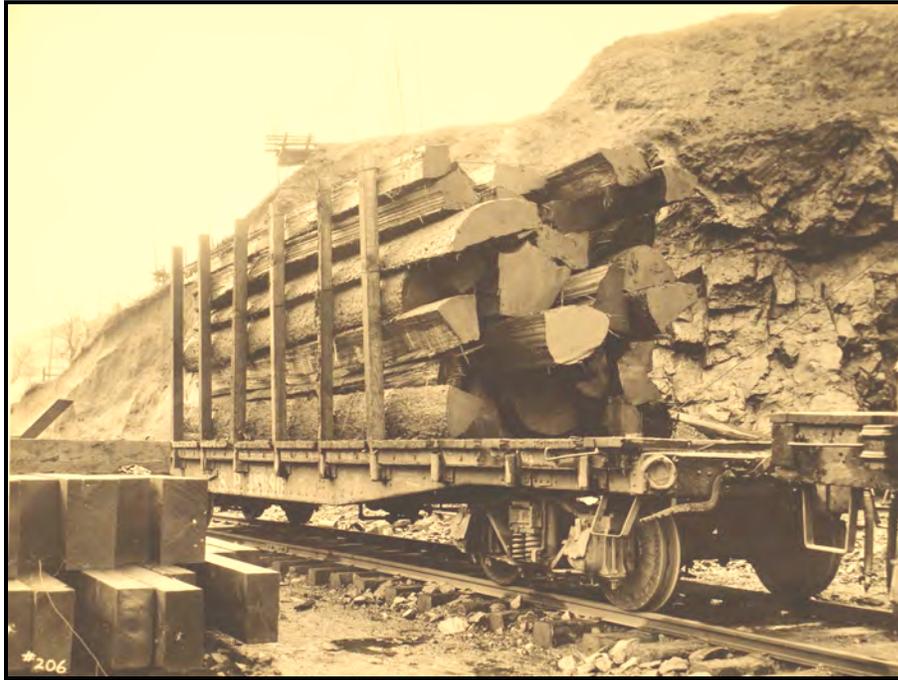


Figure 3-1 Spruce flitches from a riving operation in the woods loaded on flatcar for delivery to the Cut-up Plant. Timbers on lower left may be trestle timbers or possibly spruce cants (Photo: NARA, College Park, MD).



Figure 3-2 Slab cants being loaded into gondola car for delivery to Cut-up Plant. This green spruce cant weighs hundreds of pounds. The men are guiding it, but a crane is doing the lifting. Note that worker on the left is a soldier, wearing uniform hat and shirt. Worker on the right is a civilian, older and wearing dungarees (Photo: NARA, College Park, MD).



Figure 3-3 Square timber cants in a mill pond being loaded onto gondola cars by a rail-mounted McGiffort loader (Photo: NARA, College Park, MD)

Remanufacturing mills were nothing new in 1917. In lumber industry parlance, making logs into boards was “manufacturing,” and making boards into finished products was “re-manufacturing.” Most saw mills of the period attempted to add as much value to their lumber as possible by making it into finished products. Raw boards of fir, pine, or spruce were not nearly as valuable as products made from the boards. So the mills tried whenever they could to turn out finished products made from the lumber they produced. Most mills made wooden box shooks, moulding, siding, cooperage stock, and other simple products. More sophisticated mills made windows and doors, interior cabinets, wainscoting, and other high-value building materials. Perhaps the most extreme example was the Kinzua Lumber Company in Wheeler County, Oregon, which turned pine logs into a complete line of pine furniture.

Sometimes manufacturing and re-manufacturing were conducted by separate mills or by separate businesses. A sash and door factory, for example, made doors and windows and other building products, either using lumber produced in the company’s mill or buying the lumber from other suppliers. When the process of manufacturing wood products was broken up into separate mills for each step, located in distant places, it was technically known as “milling-in-transit.” For example, the Hines Lumber Company located in Burns, Oregon, had a primary mill located in Seneca, 30-odd miles away. Logs came to Seneca and were cut into cants that were finished at the main mill in Burns. The argument for milling-in-transit was that the logs could be reduced to rough boards or cants in a

mill devoted to this activity. Bark, edgings, mill-ends, and culls would be discarded at the primary mill. Then the more valuable product could be shipped to the remanufacturing mill and cut into the final goods with the specialized planers, shapers, moulders, and other machinery needed.

The merits and defects of milling in transit were widely discussed in the lumber publications and at various lumbermen's conferences.² For ordinary operations, transportation rates and market factors determined the practicality of milling-in-transit. For the SPD, the advantage was that the difficult and specialized process of cutting aircraft stock could be centralized in a mill built for this purpose. Before the Cut-up Plant, the yield of #1 aircraft stock that the regular mills could expect from a spruce log was about 10%. In the Cut-up Plant the yield rose to 60%.³ The tributary mills, which numbered about 50, could make the basic cuts so that all material shipped to Vancouver would produce a high yield. The Cut-up Plant was equipped with the specialized technology and personnel needed to ensure a consistent high-quality product.

The potential problem with the Cut-up Plant, or any other milling-in-transit operation, was moving the product from one mill to another, and on to the market. The most successful milling-in-transit systems in the lumber industry relied on company-owned railroads to move the logs, cants, and lumber. For example, the Weyerhaeuser mill in Klamath Falls, Oregon; the Oregon Lumber Company mill in Baker, Oregon; and the Hines Lumber Company mill in Burns, Oregon, all owned and operated the railroads they used. Without the security of a captive railroad, the mill was at the mercy of a public carrier that could run out of empty boxcars. Car shortages, as they were known, meant that logs, lumber, or cants sat on the loading dock until a boxcar could be found to haul the product to the next stop. As a government agency during the war, the SPD had priority for rail cars, but when the transit system did not run smoothly, production was inevitably delayed.

Building the Cut-up Plant was a monumental step for Disque and the SPD. As *The Timberman* pointed out, it was unusual for the military to move into industrial production even during wartime.

Announcement of the remanufacturing plant in Vancouver, Wash. sets a new precedent. The United States through the enlisted men in its Army is to engage in the manufacture of vitally needed airplane parts. What will be done at Vancouver, if present plans work out, will be an example for the lumber industry at large... Thus far our soldiers have not gone into the woods—though that too may come—but the employment of enlisted men in a Government-owned and operated remanufacturing plant is a long step toward the same end...⁴

² See, for example, "Abolish the In-Transit Feature," *The Timberman*, (September, 1917), 1.

³ *History of the Spruce Production Division*, 49.

⁴ "The Production of Spruce," *The Timberman*, (December, 1917), 1.

Disque was extremely excited about the new plant and Secretary of War N.D. Baker was receptive to the idea, and approved it. The following telegram shows Disque at his most energetic and the Commanding Officer of Vancouver Barracks perhaps less enthusiastic:

Several carloads of material for the cut-up plant will arrive Monday. Indispensable that Commanding Officer Vancouver Barracks be notified by Adjutant General that Secretary of War approved building of plant at post. Site selected is old polo grounds between quartermaster stables and river. Satisfactory to post quartermaster. Should have this authority tomorrow and plant will be in operation before February first. Am sure this will completely solve entire spruce problem.⁵

Building the Main Mill

We can assume that there was some annoyance when the SPD with its hybrid military-industrial activity moved onto Vancouver Barracks. The SPD was not a particularly good guest. Spruce soldiers set up tents and temporary buildings all over the post. Disque kept his offices in Portland, but his officers and men were stationed at Vancouver Barracks. The spruce squadrons assigned to duty in logging camps and mills relied on Vancouver Barracks for induction services, medical care, pay, uniforms, and other Army needs. Over 5,000 men were assigned to duty in the Cut-up Plant at its height of production in the summer of 1918. Col. C.W. Van Way, an SPD officer, replaced the former Commanding Officer of the Barracks in 1918.⁶

A memorandum dated December 13, 1917, formalized the portion of the post that the SPD would occupy, and also clarified the terms of railroad access, water, power, and sewage. The mill and administrative buildings would cover a large quadrangle in the southeast corner of the post. Bounded by the public road that is now 5th Street on the north, the mill would extend east to the Military Reservation east boundary, then south about 800', then west to a point extended from a now-lost north-south fence line, which it would follow back to the public road (see figure 3-4 for public road, military reservation east boundary, and section lines). The fence line may have followed the line between sections 26 and 27. The open area adjacent to the mill area on the south would be a storage yard, and another storage yard would be to the west of the mill, east of the wood sheds.⁷

Railroad service from the Spokane, Portland, and Seattle Railway main line was provided by a switch and a spur that served the post's wood sheds and coal sheds, located to the west of the mill site (See figure 3-4 for the original

⁵ Disque to Signal Equipment 51, December 7, 1917, RG 165, Vancouver Barracks file, National Archives and Records Administration, College Park, MD.

⁶ Tonsfeldt and Atwood, "Historic Structures Report for Vancouver Barracks, West Barracks," 79.

⁷ Descriptions of the property boundaries in Memorandum, December 13, 1917, RG 165, Spruce Production Division Decimal File, Vancouver Barracks file, NARA, College Park, MD. This document is reproduced in its entirety in Appendix E.

configuration of this spur). The spur was built on a trestle to reach up to the main line which was on a high fill that also served as a levee for the river. A short siding and a scale house were located on the spur. To accommodate the Cut-up Plant, the spur was to be divided with another switch south of the warehouses into spurs "A" and "B." Spur "A" would run east and west parallel to the public road to the north of the mill complex, and spur "B" would run parallel to spur "A" but on the south of the mill complex. Spur "A" would be divided into a northern spur serving the wood and coal sheds, and a southern spur with numerous sidings to accommodate trains arriving with cants and flitches from the contract mills. Spur "B" also had several sidings so it could serve departing trains loaded with finished aircraft stock. Supplies and equipment could come into the mill area on either siding.

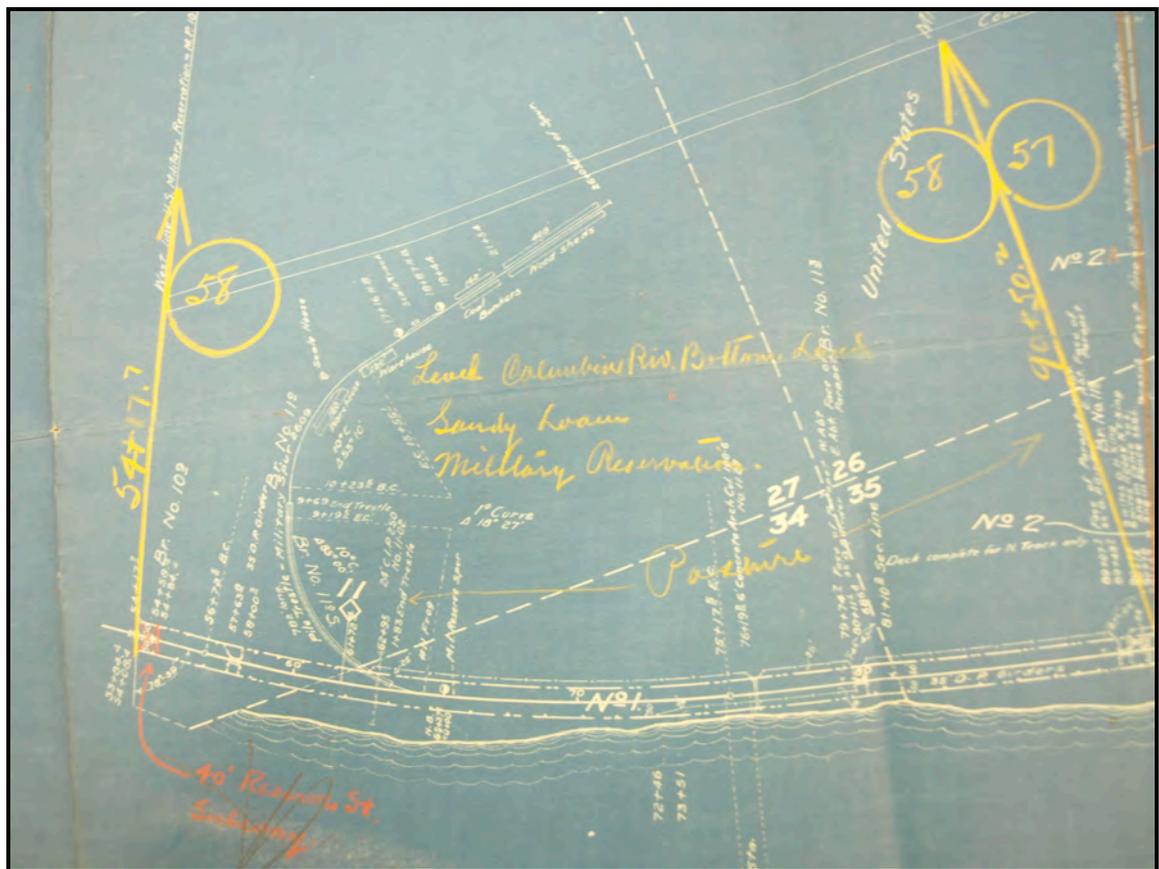


Figure 3-4 Map of the SW corner of the Vancouver Barracks Military Reservation, drawn some time before December, 1917. The Cut-up Plant and main storage area would occupy most of the SW ¼ of section 26. An additional storage area assigned to the plant would occupy part of section 27. The spur shown served the wood sheds, coal sheds, and warehouses for the post (Map from NARA, College Park, MD).

The new mill would use the post's water system for potable water and fire protection only. Other water supplies for the boilers would be arranged by the SPD. The SPD would subscribe to Portland Railway Light and Power Company

for its electricity. Sewerage is mentioned but not clarified in the December 13 memorandum.

The railroad spurs were crucial to operating the mill, but they were not in place when construction began. All lumber, concrete, and other building materials had to be hauled to the site, often from Portland on the south side of the Columbia River. Motor trucks provided the means to move materials and mill machinery. New roads had not been built. Heavy traffic and the endless winter rain turned existing roads into hub-deep mud. The construction crew, numbering 700 to 800 soldiers, was quartered in cantonments on the north side of the post, about 1.5 miles from the mill site. They needed motor truck transport to their work and back to the cantonments each day.⁸

H.S. Mitchell provided design and engineering for the Cut-up Plant, and supervised construction with his two sons, Walter and Guy F. Mitchell. He was a mill superintendent at the Crossett-Western Lumber Company in Portland, and a “dollar-a-year” volunteer. Mitchell apparently remained at the plant after the main mill was finished to supervise continuing construction and to serve as civilian construction manager. *The Timberman* describes Mitchell as a “man of recognized standing in the industry,” but we do not have much detail about his career or other projects. *The History of the Spruce Production Division* simply mentions that Disque and four consultants selected Mitchell as the man “to build this mill.” Mitchell worked without much supervision and “From first to last...Mr. Mitchell remained in charge of the operation.”⁹ Retail dealers supplied the lumber and other building materials for the mill through the conventional military acquisition process. The machinery was difficult to find, and often had to be shipped to Vancouver from an “unconscionable distance.”¹⁰

Mitchell chose the design for the main mill with some thought to ease of operation and construction. The structure measured 348’ north to south and 288’ east to west, for a total of 100, 224 square feet. The mill faced north to accept cants from the “A” railroad spur sidings located about 100’ north of the mill building. The north end of the mill building consisted of six parallel gable-framed structures set with their gable ends facing north. Each was 48’ wide and approximately 50’ long. The 48’ bays were clear-span—i.e. unsupported by interior posts or walls except between the bays. Perimeter walls were 20’ high. The plans dated February 15, 1919, show the bays with gable roofs. The mill was built with the bays framed with modest gambrel roofs, however, as is clearly shown in most photos and some plans.

⁸ *History of the Spruce Production Division*, 72.

⁹ “The Production of Spruce,” 1; *History of the Spruce Production Division*, 46.

¹⁰ *History of the Spruce Production Division*, 47.

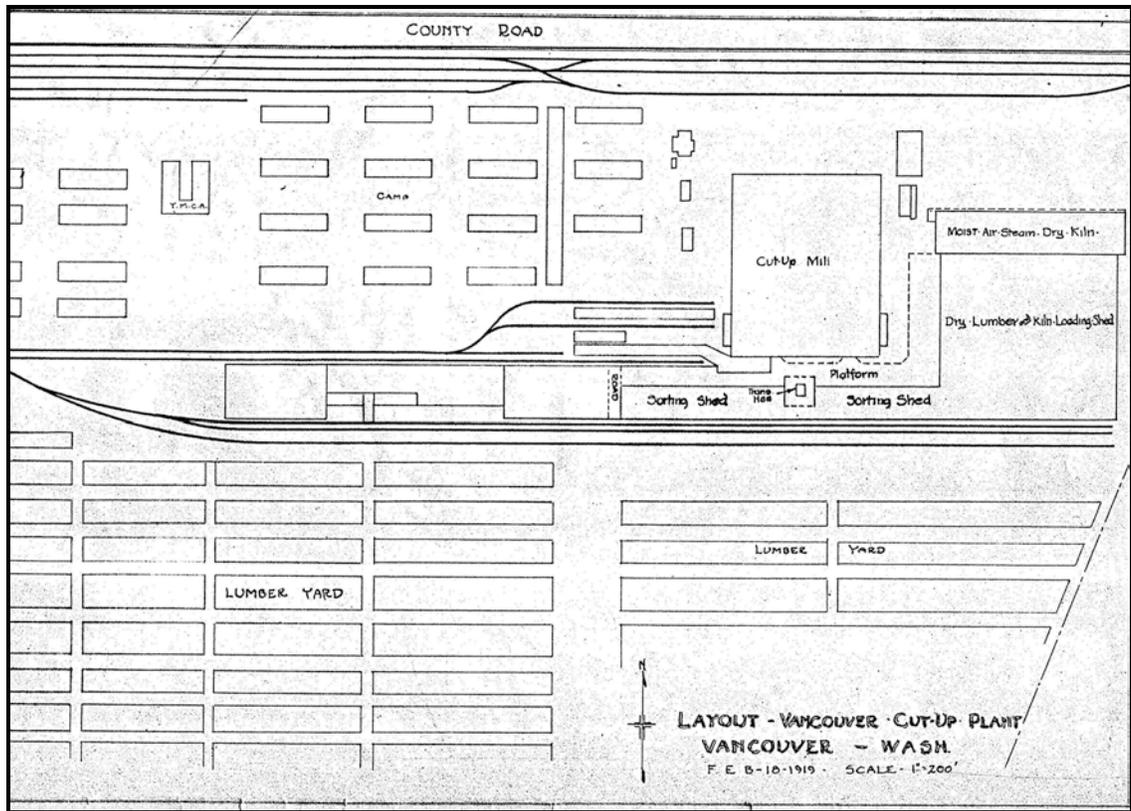


Figure 3-5 Diagram of Cut-up Plant, showing rail spurs and major buildings (Diagram from NARA, Seattle).

South of the six conventionally-framed bays, the roof framing on the main mill changed to a sawtooth pattern. This framing was common in industrial structures after about 1840 in the U.S. and Europe.¹¹ The great advantages of sawtooth roof design included its simple shed framing, strong triangle roof structure, and skylights over the working area. Because the skylights were set on the vertical, they were less prone to leaking. The skylights on the Cut-up Plant and most other sawtooth buildings faced the north so that the light would be uniform through the day and the building would remain cooler in the summer.

¹¹ Becky Hunter Bradley, *The Works: Industrial Architectures of the United States* (New York, 1999), 192ff.



Figure 3-6 Cut-up Plant under construction, January 1918, looking southwest. Note the modest gambrel roof framing in front (north) and the sawtooth roof behind it. Timber framing elements including posts, beams, rafters, diagonal braces, and girts are visible on the incomplete gable ends of the bays. The railroad sidings in the foreground are not complete (Photo: NARA, College Park, MD).



Figure 3-7 Main mill showing gable framing at the north end and sawtooth framing on the south. View from NW corner, looking SE. Timber framing elements including posts, beams, and girts are visible on the incomplete sides of the sawtooth framing (Photo: NARA, College Park, MD).

Plans and construction photos show that the building was framed with large timbers as most mills were. Framing for the sawtooth part of the mill relied on simple shed framing with the posts extending to the peak of each “tooth” to hold a top plate, which carried the rafters. The rafters angled back from the top plate to a second plate on the next post. The rows of posts, each comprising a “tooth” in the framing pattern, were 40’ apart. Additional posts would have been placed on even increments within the rows, probably on 20’ centers, to carry the plates and the rafters. Unfortunately, this framing feature is not shown on the plans. There were horizontal girts around the perimeter of the building to hold the vertical siding. The junctions of the posts and the girts or joists were supported by diagonal brackets. The plans we have do not show any foundation details beyond a simple post-and-pier arrangement that was common to mills at the time.

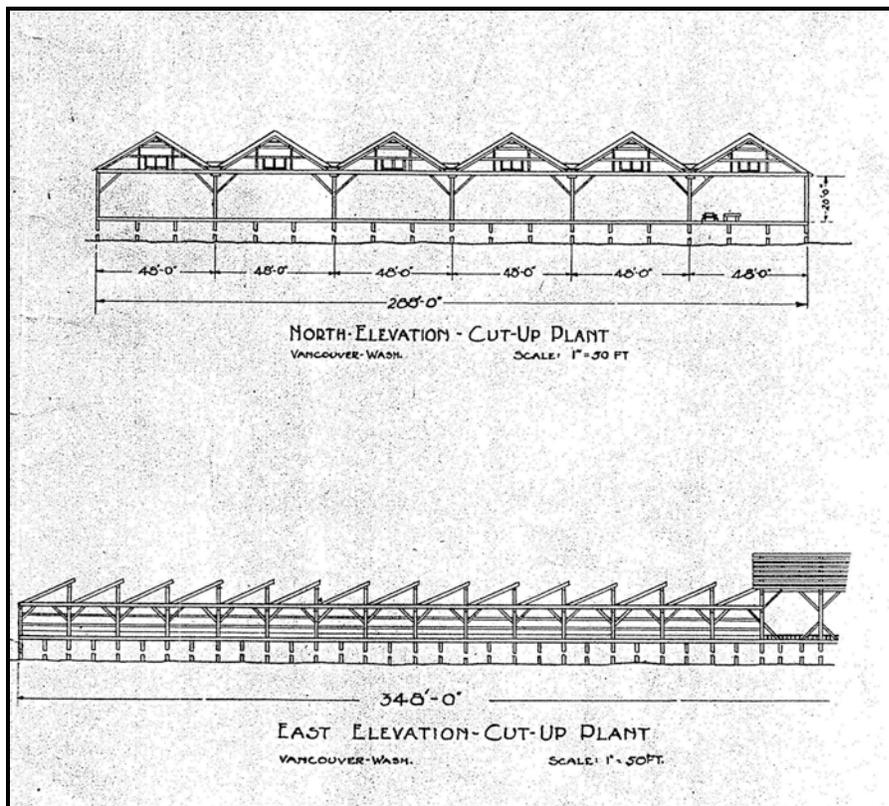


Figure 3-8 Framing of the main mill. North elevation at top, east elevation bottom. Scale is not accurate. (diagram from NARA, Seattle)

Sawtooth buildings had some disadvantages. They required interior support, as shown in photos and in the plans. This might explain why Mitchell used two framing styles. The Cut-up Plant had clear-span construction at the end where the raw material was coming into the mill and going through the head saws. Then the part of the mill devoted to re-sawing smaller boards had sawtooth

framing and interior posts. Another disadvantage of sawtooth framing was that every sawtooth had to have extensive guttering and enough crown to carry rain water or snow-melt to the sides of the structure.

Other Elements of the Cut-up Plant

The main mill building was completed in 45 days, a record time, but construction of the rest of the mill complex continued for the life of the plant. The huge silo-type waste burner was not completed when the plant ceased operation in the fall of 1918. In addition to the main mill, the Cut-up Plant had a dry kiln battery, boiler house, fuel house, sorting sheds, loading sheds, loading platforms, machine shop, office buildings, repair shop, blacksmith shop, and numerous unidentified structures. Mixed into the mill area were cantonments for the soldiers, including latrines, kitchens, mess halls, with hundreds of tents erected wherever there was space.

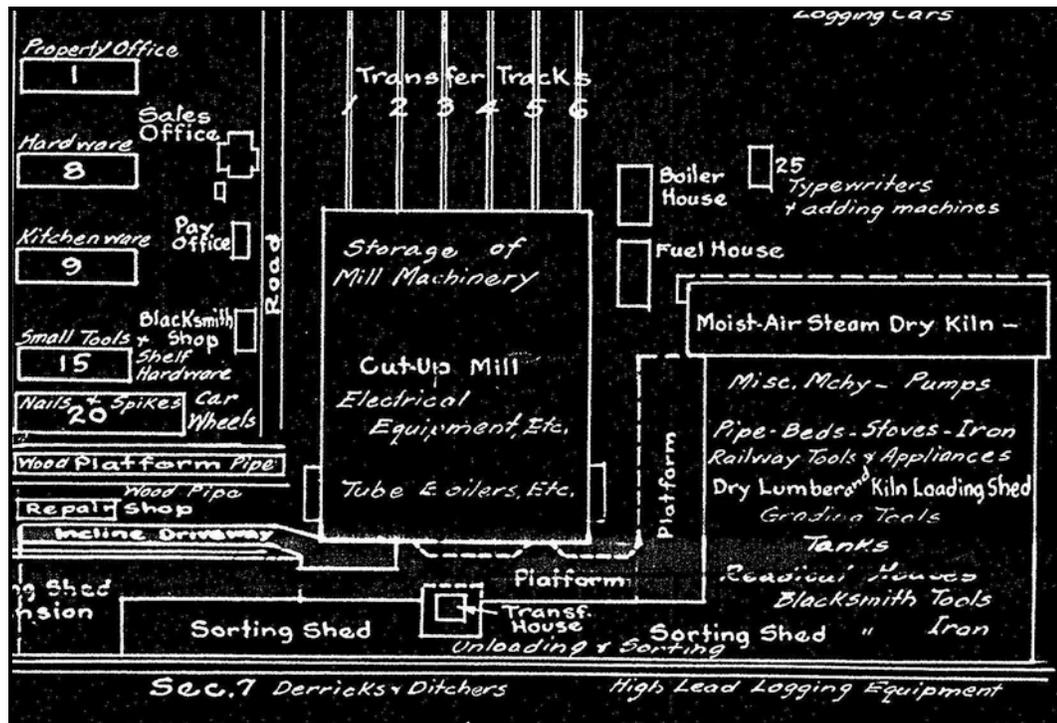


Figure 3-9 Blueprint of the eastern portion of the mill complex. This figure from 1919 is a copy of an earlier blueprint annotated with locations of materials stored at the mill for the September, 1919 sale of SPC equipment and supplies (Diagram from NARA, Seattle).

Kiln Battery

Some of the aircraft-grade lumber was dried in the kilns. There were 26 kiln chambers fitted with tracks for kiln-cars. The cars were loaded with green lumber, rolled into the kiln, and the lumber dried with steam until it reached a specific moisture content. The kiln at the Cut-up Plant was designed by Harry D.

Tiemann. Tiemann was a former professor at Yale and subsequently senior researcher in the USDA Forest Products Laboratory at Madison, Wisconsin, after 1909. He developed the theory and practice of kiln drying woods, and wrote two books on the subject, as well as numerous articles. Tiemann-style kilns, protected by various patents, were the standard of the industry after about 1912. The dry kiln required steam to heat the lumber and maintain consistent moisture as it dried. Steam was generated at the boiler-house, which is visible in photos as five steel smokestacks, but not shown on all plans for the mill. In many mills, the boilers supplying the kiln with steam also generated electricity or ran steam engines in the mill. The Cut-up Plant was all-electric, but the electricity was supplied by a local utility.

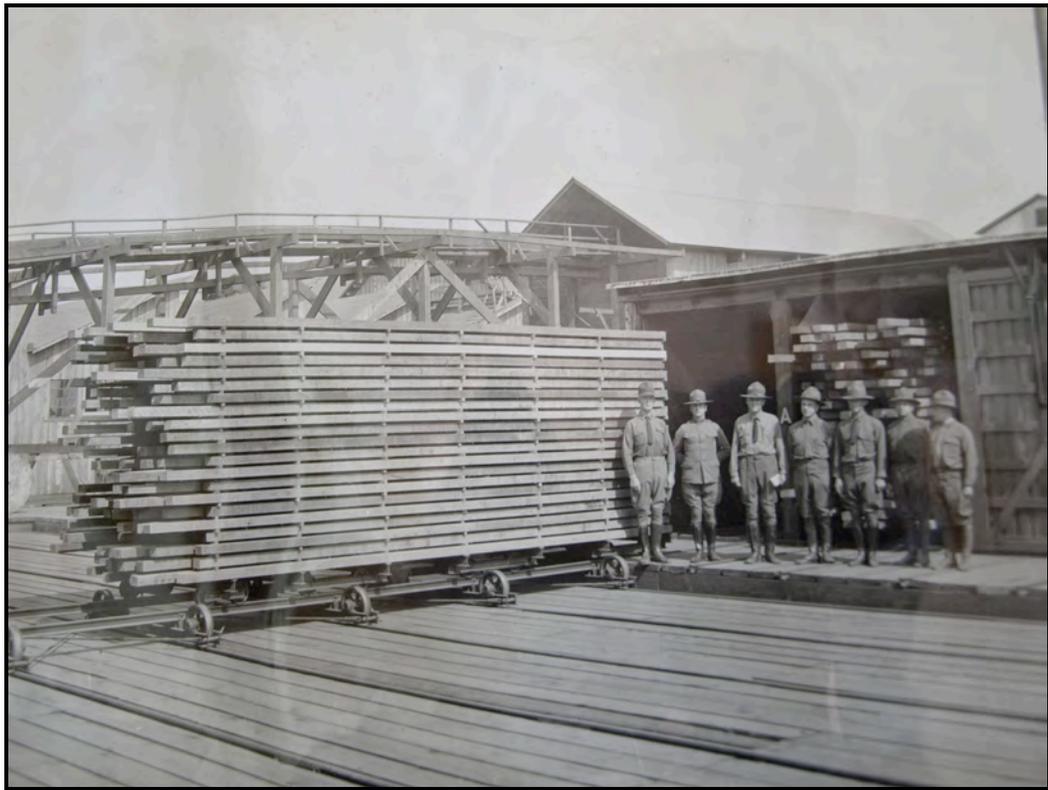


Figure 3-9 Wing-beam stock (over 18') on kiln cart ready to charge one of the 24 kiln chambers. Structure in background is apparently the chain bringing sawdust from the mill floor to the fuel house or boiler house (Photo: NARA, College Park, MD).

The kiln chambers were 15' high, 15' wide, and 80' long. Each chamber could hold 39,000 board feet of wing-beam stock, for a total of 936,000 board feet of per charge. The spruce took 18 days in the kiln to dry completely. Since the Cut-up Plant could cut 1,000,000 feet of aircraft stock each day at full capacity, the battery could obviously not dry the complete run of lumber. The wing-beam stock was probably kiln dried and the shorter boards were not. Some shorter boards were air-dried in the sheds, and some were no doubt shipped green.¹²

¹² *History of the Spruce Production Division*, 50-51.

Sheds and Platforms

Platforms were elevated from the ground and finished with a smooth wooden deck. They were built at the level of the rail cars to facilitate loading. The sheds were large gable-roofed structures with their decks under cover. Both were areas for handling and sorting lumber, and both were necessitated by Vancouver's rainy climate. Without the platforms, the soldiers would have had to move the lumber on carts through the mud. Sheds protected the workers and the lumber from the rain.



Figure 3-11 Platform and sheds, view to the east. Main mill in the background, painted white. The five stacks were from the boilers, probably fired with wood waste. This platform and the sheds are between the two tracks on the "B" spur. Circular structure on left is the base for the wood waste burner which was not completed (Photo: NARA, College Park, MD).

Service Shops

There were three service shops in the mill complex. These were the repair shop, the blacksmith shop, and the machine shop. The repair shop and the blacksmith shop were located in the south east corner (see figure 3-9). The machine shop is not labeled in this diagram, but evidence from other plans places it as building #20, midway between the repair shop and the blacksmith shop. The machine shop would have had large machine tools including lathes and horizontal mills for fabricating parts for the mill machinery. The machinists and millwrights who operated the shop were highly-skilled technicians—probably

civilians—hired for their manual skills and resourcefulness. The position of head mill-wright was critical to the success of any mill.

An important part of the service and maintenance routine was the filing of saws to sharpen them. This was usually scheduled so that saw blades were changed after each shift. Circular saws had inserted teeth that could be changed if they were broken. Band saws had integral teeth and were made of a softer alloy that could flex but resist breaking. Figure 3-15 (p. 67) shows two filing rooms attached to the main mill building on the north-east corner. Each filing room is shown with a jig for holding the circular blades and a clamp, shear, and forge for working with the band saw blades. In conventional mills, the filing shop was located in the clearstory above the head rig. The huge band saw blades could be pulled up into the shop with a hoist. The Cut-up Plant did not have band saw head rigs. The circular saw blades from the head saws and small band re-saw blades would have been easier to handle.

In the blacksmith shop, smiths and laborers would have had charge of working ferrous metals by hand on the forge, anvil, and trip-hammer. The forge would have been used for heating stock to be shaped and for forge welding, a process requiring significant skill. Blacksmiths could fabricate and repair edged tools, chains, cable accessories, fastenings, and parts like carriage dogs that were subject to breakage in ordinary use. World War I was a time in which new arc welding technology was becoming widely-used, especially for ship building. Arc welding could have been used in the blacksmith shop as well.

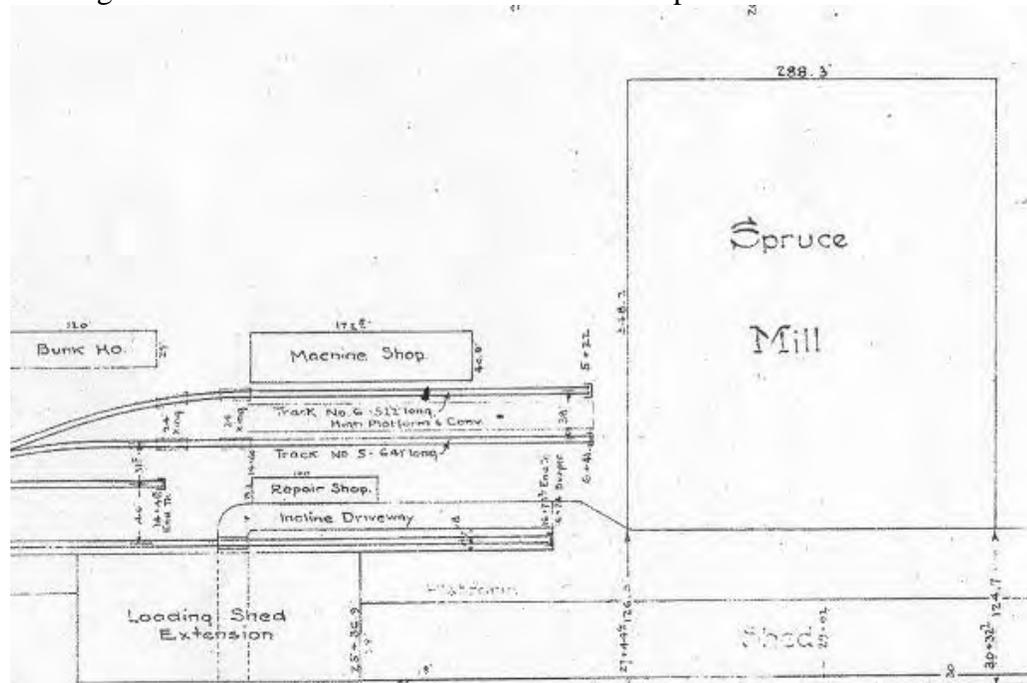


Figure 3-12. Another plan of the mill complex showing the machine shop in relation to the repair shop, the main mill, and the loading platforms and sheds (Diagram from NARA, Seattle)

One interesting question is whether the mill had facilities to cast ferrous metals, such as furnaces, a pattern shop, or a complete foundry. The convenience of having this capability in-house would have been important to a 24-hour, three-shift operation like the Cut-up Plant. Disque was very knowledgeable about ferrous metal technologies and foundry work, since he had operated a large foundry in Manila when he was commanding officer of the Army Land Transport Corral, Canal, and Shops.

Offices

The Spruce Production Corporation had two office buildings at the mill. Its main offices were in Portland, however, at the Yeon Building. During the sale of SPC assets, the office buildings were used as administrative centers for the sale. These buildings were later moved to Pearson Field, about 100 yards to the east, where they are still in use. They constitute the only extant parts of the Cut-up Plant complex.

Boiler House and Fuel House

The boiler house and fuel house are shown adjacent to the kiln battery. This installation is not described in any literature on the Cut-up Plant, but we can make some assumptions about its purpose. The boilers would have fed steam into the kiln battery. Stacks visible in photographs indicate five boilers. The rated horse power for the boiler house was 1500, so we can assume there were five 300 hp. boilers. In many mills, the boilers also ran turbines and generators to produce electricity for the mill, but the Cut-up Plant used commercially-generated power from a local utility. As in most mills, wood waste was the fuel for the boilers. Sawdust from the main mill was collected under the mill floor, then moved by conveyers to the fuel house.¹³

¹³ “Vancouver Spruce Plant Progressing” 45.

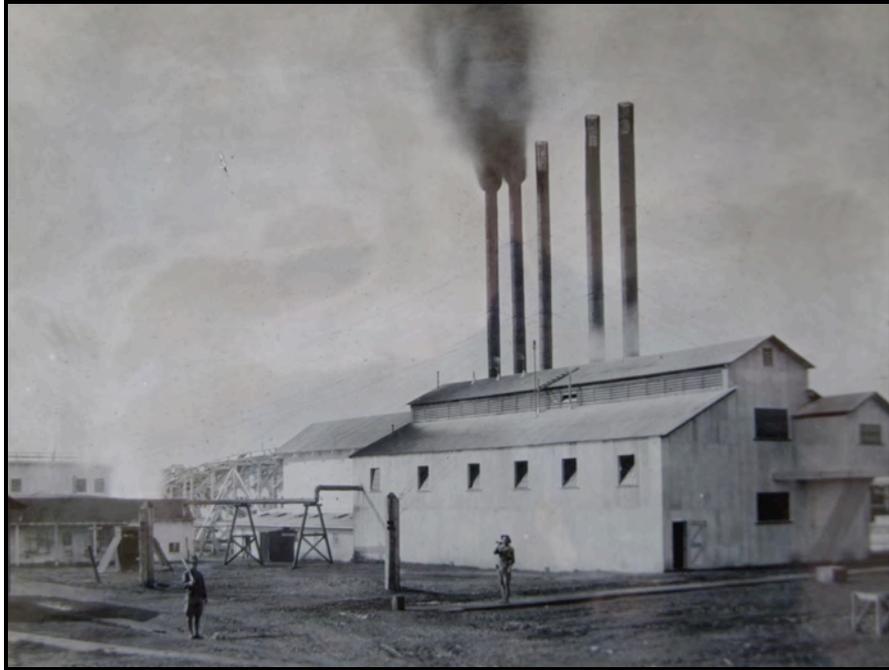


Figure 3-13 Fuel House, view from SW. This structure stored sawdust and other wood waste for boiler fuel. The five boiler stacks are visible behind the fuel house. Note the soldier standing guard (Photo: NARA, College Park, MD).

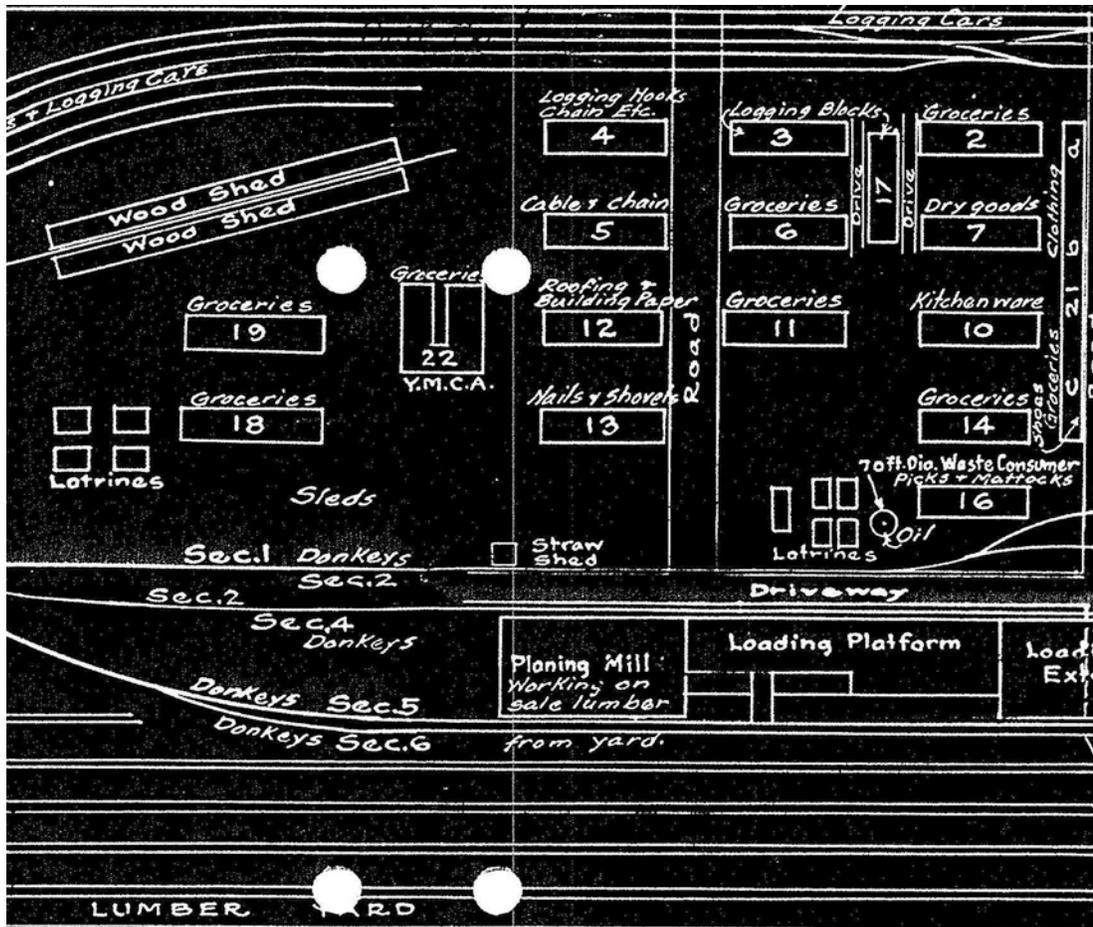


Figure 3-14 Blueprint of the western portion of the mill complex. This figure from 1919 is a copy of an earlier blueprint annotated with locations of materials stored at the mill for the September, 1919 sale of SPC equipment and supplies (Diagram from NARA, Seattle).

Planing Mill

This part of the mill complex housed the planers which provided a smooth surface on the lumber. The aircraft stock was probably shipped with two sides planed. The wing beams may have been shipped with all four sides planed. Planer blades would have required frequent sharpening, which was done on a grinding machine likely located in the planing mill for convenience.

Waste Burner Base

This 70' diameter concrete structure was to be the base of a silo-type waste burner. It is not drawn in the blueprint, but it is written in as "70' dia. waste consumer" in its correct location. A round object near the burner location is marked as an oil tank, and the size is not consistent with the burner base. The burner was not completed by the time the mill ended production in the fall of 1918. These burners were features of most sawmills in the western states. They

consumed sawdust, edgings, mill ends, and other wood waste. Some of the waste would have gone into the boilers for fuel, but much of it was too wet or simply too much for the fuel supply. For most mills, starting with whole logs, waste included slab wood from the outside of the log and bark. These were not a problem at the Cut-up Plant since the cants and flitches were much cleaner than logs. None the less, waste disposal is a significant problem, and the Cut-up Plant operated all its short life without a burner. Waste may have been fed to the boiler fires, or it may have been hauled off site. The burner base remained a landmark long after the rest of the mill was gone.

Latrines

Two sets of latrines are shown on the west side of the mill complex, one near the burner base and one on the western edge of the property. These would have served the troops living in cantonments and tents in the mill area, as well as men working in the mill. The nature of waste disposal for the latrines is not clear. The agreement for locating the mill on the polo field suggests that sewerage would be necessary, but we have no details about connections with municipal or Barracks systems. Coverage in *The Timberman* noted that “a complete sewerage system will be installed” in the mill.¹⁴ Facilities serving over 5,000 men would have required a septic system connection, or a very extensive drain field.

¹⁴ “Vancouver Spruce Plant Progressing” 45.

Equipment in the Mill

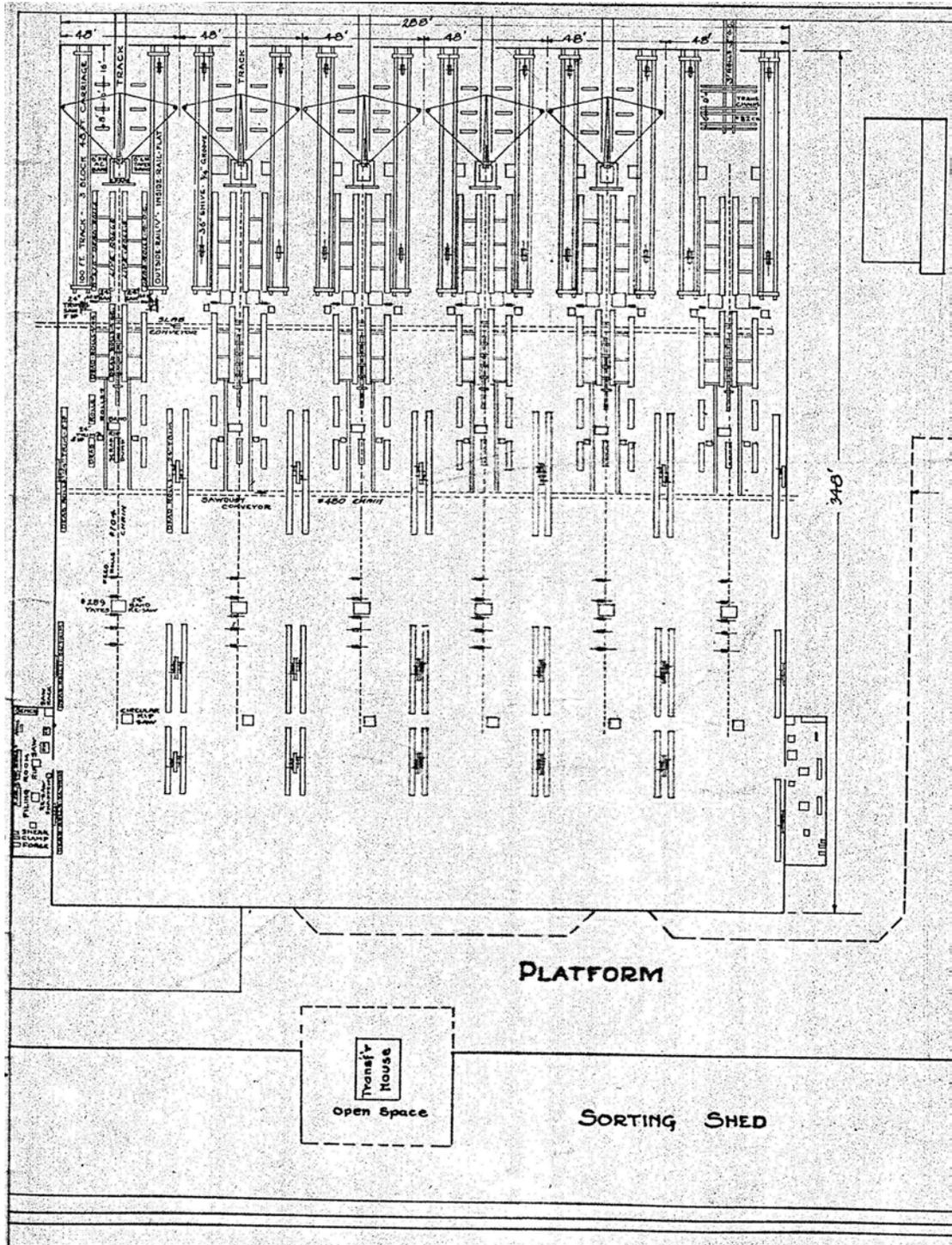


Figure 3-15 Plan of the main mill with some equipment shown. North is at the bottom in this view (Plan from NARA, Seattle).

The main mill, shown in figure 3-15 (p. 68), held the equipment for cutting the cants and flitches into aircraft-grade boards. In this view, the progress of material would start at the bottom, which is the north end of the building. At this end, the building is divided into six bays, each with a door. Cants came into the building on rail-mounted carts, as shown in figure 3-16 and 3-17 below. Finished lumber to be sent to the kiln battery or drying sheds would come out the south end of the mill, the top in figure 3-15. Sawdust and other wood waste was collected on conveyors under the mill floor and sent to the fuel house or the boiler house. The first saws were the largest, and were designed to cut the timbers into boards. In lumber industry parlance, the first saw is the “head rig,” which is usually a huge band saw capable of cutting through a 6’-diameter log. For the Cut-up Plant, this capacity was not necessary. “This plant did not attempt to handle an entire log, but only a rived cant [flitch] or those sawn in the commercial mills.”¹⁵

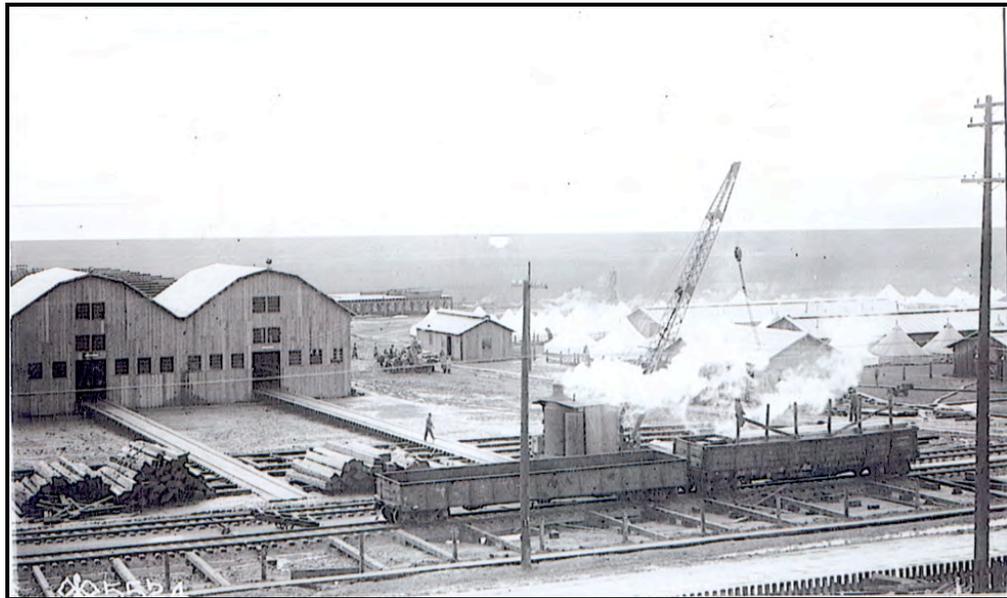


Figure 3-16 Unloading cants and flitches from gondola cars sent from the contract mills in Oregon and Washington. The locomotive crane unloaded the material and stacked it onto rail-mounted carts to be wheeled into the mill (Photo: NARA, College Park, MD).

¹⁵ *History of the Spruce Production Division*, 48.

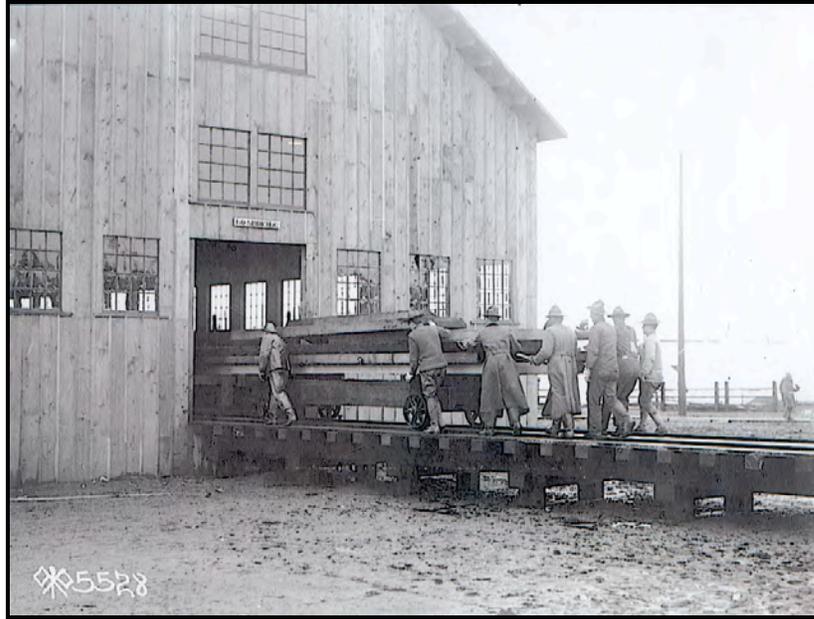


Figure 3-16 Soldiers wheel cants into the westernmost of the six mill bays. Note men working in their uniforms (Photo, NARA, College Park, MD).

Once the cants or flitches were inside the mill, they were handled by electric overhead cranes and placed on carriages described as “Allis-Chalmers 3- and 4-block type.”¹⁶ These carriages were presumably powered by electric winches instead of steam, as with the more conventional steam-powered “shotgun” carriages. The carriages held the cants as they ran on carriage rails through the head saws. The head saws were circular saws, with 48” blades working in sets of two—right hand and left hand—for each of the six carriages. A cut could be made on either side of a cant as needed. The head saw rigs were made by Portland Iron Works. The head saws are shown on figure 3-15 (p.67) as “circular rip saws” indicated by a square in the center of each of the six carriage rail lines. At the end of the carriage tracks, the lumber went onto “live” or powered rollers to table edgers and Yates 54” band re-saws. These would make a second rip or longitudinal cut to reduce the thickness of the boards.

After passing the band re-saws, the lumber would go onto 48’ 3-block carriages for the rest of their journey through the mill. Each of the six saw lines had two carriages and over 100’ of track. At this point, the lumber had progressed about 50’ to the end of the gable-framed part of this mill and into the sawtooth-framed part. The rest of the mill—about 300’ in length—was devoted to getting aircraft stock of the highest grade from the lumber. This was slow work for the mill men, requiring careful examination of every piece of lumber, and good choices about where to cut. Each of the six saw lines had a battery of machinery to accomplish this. Saws in each line consisted of two table edgers, which cut edges of the boards parallel to the grain; two band re-saws, which

¹⁶ Information on equipment from plans (figure 3-13) and “Vancouver Spruce Plant Progressing,” 45.

ripped the boards into smaller dimensions; and eight 24” circular trim saws which cross-cut the boards to length, or cut out defective material. At the end of the 350’ journey through the mill, the lumber was sorted for size and grade and put on carts for the dry-kiln or drying sheds.

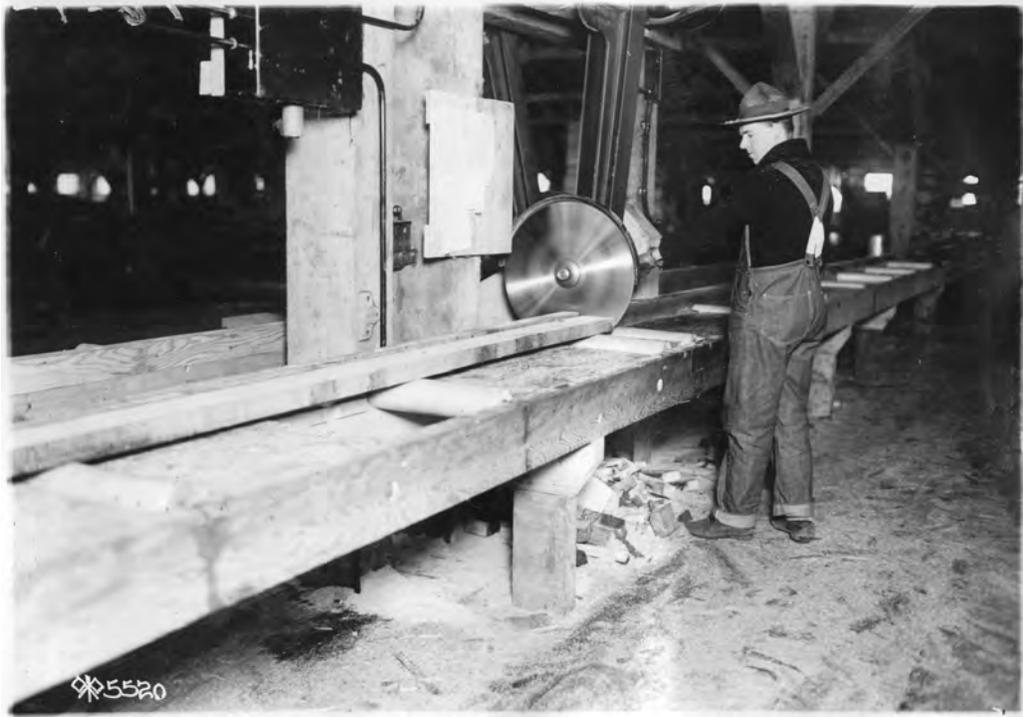


Figure 3-18 SPD soldier/millworker operating a 24” trim saw in the back of the mill. Note the uniform campaign hat worn with millworker’s dungarees and flannel shirt. This part of the saw line used un-powered or “dead” rollers so that the worker could trim the board to its best length or cut out defect (Photo: NARA College Park, MD).

Cutting the Aircraft Stock

The basic purpose of the SPD was getting a satisfactory amount of aircraft lumber to the Allies’ aircraft plants. Disque’s decision that his agency needed to build their own mills to manufacture the product in the fall of 1917 came in response to the poor showing conventional mills had made during 1916 and 1917. “There was not a commercial mill on the coast that was equipped to saw straight-grain spruce.”¹⁷ Building the Cut-up Plant provided the equipment and the facility, but getting good yields of aircraft-grade lumber depended more on the sawyers’ skills than the machinery. Early in 1917, the commercial mills were getting only about 10% strait grain aircraft stock from their logs. By the summer of 1918 the yield was much improved. Most of this improvement can be attributed to better understanding of how to cut this difficult product.

¹⁷ *History of the Spruce Production Division*, 46.

The milling-in-transit program required that the commercial mills on the coast first cut the logs into smaller cants. Disque had said that the Cut-up Plant “would entirely solve the whole spruce problem,” but when it began running in February, 1918, “the results obtained during that month were very unsatisfactory.”¹⁸ The Cut-up Plant was taking in rived flitches and sawn cants. The rived flitches produced adequate yields of aircraft lumber, but amounted to only 30% of the material needed to meet the production goals of 10 million board feet/month. Sawn cants coming from the commercial mills were not producing an adequate amount of high-grade stock. The fir mills on the coast were not accustomed to cutting lumber for grade, since most of their product was used for framing lumber. They would cut a log into “thick flitches running six to eight inches in thickness at the head saw,” then run the material through a gang-saw to produce 6” x 6” or 8” x 8” cants. The gang-saw cut these cants parallel to the outside edge of the material coming off the head saw. Some had grain parallel to the edge, but most did not and were accordingly “cross grained” and useless for aircraft stock.¹⁹

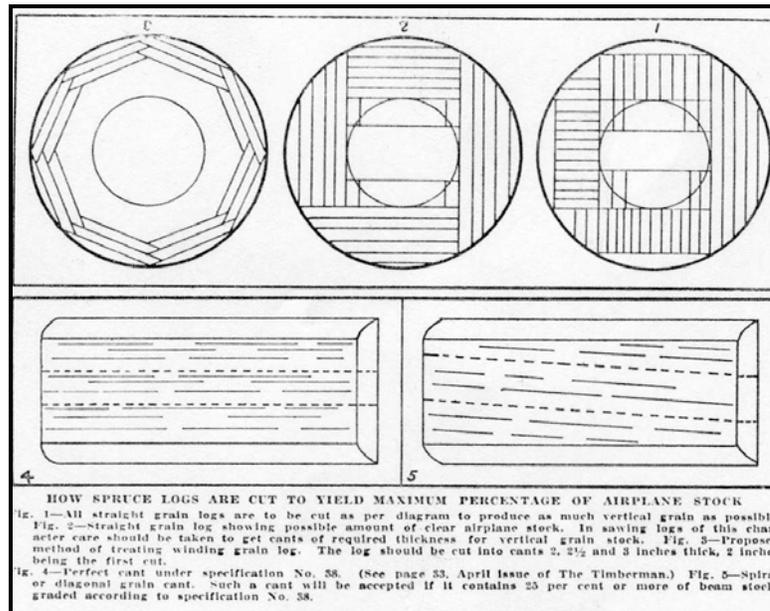


Figure 3-19. Diagram of log cutting patterns and straight grain (4) vs. cross grain (5). From *The Timberman*, May 1918, p. 26. (Note: numbers 1-3 are printed backwards)

In the spring of 1918, Disque contacted George E. Breece, President of the West Virginia Lumber Company, Charleston, West Virginia. Breece was an experienced hardwood manufacturer. Hardwood had to be cut for straight grain if it was to be useful for many applications. Breece volunteered as a “dollar a year” man and was named Supervisor of Production for the SPD. He applied methods used to cut hardwoods to cutting spruce. He first addressed the way the

¹⁸ Maj. Reuben Hitchcock to Maj. M.H. Ray, Jan. 4, 1919, 4. Correspondence File, Brice P. Disque Papers, University of Washington Special Collections, Seattle, WA.

¹⁹ Hitchcock to Ray, Jan.4, 1919, p.3.

commercial mills cut logs into cants. He advocated cutting logs with spiral grain in an octagonal pattern, turning the log after each cut (see figure 3-19-3). If the log had straight grain, he advocated a quarter-sawing pattern (see figure 3-19-1 and -2).²⁰ Breece's instructions for the spruce logs with spiral grain were as follows:

After the logs are delivered to the mills, care should be exercised in their sawing to the desired thickness for the manufacture of aircraft material. If the log is large and has a large amount of spiral grain, this log should always be cut into short lengths of 20 to 22 feet. You should take off a slab and a board until you get a good wide surface, not less than 2 feet. Then take off one thin cant 2 5/8 inches and continue to turn this log making the cants of about equal width and turning the log at least eight times and continue this until you saw this log up, being sure that the log is put on the carriage and blocked out in alignment with the saw so that equal cuts will be taken from end to end of the log running straight with the grain. Then by having these thin cants sawn full width they can be taken to the Cut-up Plant in Vancouver and on the table saws [sawn] with the grain that runs straight across the board, making straight grain material, such as we must have for the manufacture of airplanes.²¹

These written instructions were accompanied by diagrams and blueprints to show how to cut "all manner of spruce logs." If more help was needed, Breece offered to send "to the mill an expert sawyer to teach millmen how to saw this material."

So Breece's method for getting straight grain stock out of spiral grain trees was to have the commercial mills cut cross-grain slabs wide enough for the sawyers at the Cut-up Plant to cut narrow boards at a diagonal across the wide slab. "These cross-grain cants when run through the Cut-up Plant were turned on the head saw so that the grain was followed in sawing, thus producing straight grain wing beam stock."²² The results were very successful. "The new method of sawing logs had thoroughly demonstrated that practically the same amount of aircraft stock could be produced from sawn logs as that which could be produced from the rived ones."²³ Added benefits occurred in the late spring of 1918, revising the grading standards for aircraft stock, and diminishing the size necessary for wing-beams. Production moved up during the early summer, from 7.8 million board feet shipped in June, 1918, to 18.6 million board feet shipped in August, 1918.

The changes that Breece made in sawing spiral grain logs were followed by changes in techniques of re-sawing the cants from these logs. Material entering the Cut-up Plant was inspected and the grain direction on each piece marked with a grading crayon. Then the mark was used to align the material on the head saw, edger, or band re-saw "so the saw will cut parallel to it regardless of

²⁰ For Breece's background and program, see "Sawn Spruce Displaces Rived Aircraft Stock," *The Timberman*, (May, 1918), 26; see also Hitchcock to Ray, January 4, 1919, p. 4.

²¹ Breece's instructions were reprinted in several documents, this one from Disque, "Historical," 4.

²² Hitchcock to Ray, Jan. 4, 1919, p.5.

²³ Hitchcock to Ray, Jan. 4, 1919, p.5.

the angle which the cut makes with the edge of the cant.”²⁴ Further re-sawing could produce a board with both edge grain and flat grain parallel to the faces.

Lt. Col. J.D. Reardon was a senior officer in the SPD and later the Commanding Officer of the Lincoln County, Oregon, operations. In the congressional investigations of the SPD/SPC in 1919 he offered a useful summary of the operations at the Cut-up Plant for a general audience:

After being placed on the table [of the head saw], the cant is lined up [on the carriage] by means of moveable blocks or “dogs” to enable it to be sawn with the grain...and this is done under the direction of an expert in sawing, usually the head sawyer of the unit or the unit foreman, whichever is considered the better man of the two in practice....The cants went from the head saw to the table edger where they were sawn to the straight grain considered from the standpoint of the slash grain. From this table they were placed on the inspection table for the first inspection of the sawn lumber, which was made by a trained wood inspector, to eliminate lumber containing defects which would render it unsuitable for further manufacture into airplane sizes. All lumber that passed this inspection table was marked by the inspector for further manufacture...[the] most useable sizes being marked on the lumber in pencil....That lumber marked for further manufacture was sent to the re-saw machine and sawn into sizes indicated by the marks on the lumber...Lumber from the re-saw is then given an inspection to see if any new defects have been uncovered by this process. All lumber found to be clear was then sent to the loading shed on trucks, where it was sorted into sizes and stacked, or loaded upon cars, usually the latter. In loading, the lumber was again inspected and tallied. That is about what happened to a cant from the time it entered the front of the mill.²⁵

Reardon’s testimony emphasized the number of inspections needed to ensure consistent quality of the aircraft-grade lumber. Later in the testimony he reiterated that four separate inspections were built into the milling process at the Cut-up Plant, and that these inspections were preceded by inspections at the primary mills and followed by final grading inspections before the material was shipped to the aircraft plants.

The system of manufacturing aircraft spruce lumber was cumbersome, but once it was in place, it succeeded in producing material of sufficient quality, and quantity, to meet and exceed the demands that Allies made in the spring of 1917.

²⁴ Nathan A. Bowers, “Filling the Allies’ Rush Order for Airplane Spruce,” *Engineering News-Record*, (December 5, 1918), 1023.

²⁵ Lt. Col. J. D. Reardon, “Conference Relative to the Operations of the United States Spruce Production Corporation at Portland, Oregon,” March 31, 1919. Brice P. Disque Papers, University of Oregon Special Collections, Eugene, OR.

CHAPTER IV

RAILROADS AND THE SPRUCE PRODUCTION DIVISION

As we have seen, during the winter months of 1917-1918 the Spruce Production Division created an ambitious system for making aircraft lumber. Loggers in camps on the Oregon and Washington coast sent their logs and flitches to local mills, which in turn sent the timber to the Army's Cut-up Plant in Vancouver. In Vancouver the raw material was cut into lumber suitable for aircraft use. That in turn was sent to airplane makers in Europe and the U.S. The entire undertaking—from stump to airplane—depended on moving the products by rail. The final leg of the journey to European aircraft factories was done by ship, of course, but getting raw materials to the Cut-up Plant at Vancouver and getting finished lumber to shipping points on the east coast required nearly seamless operation by the U.S. rail network. Unfortunately, the rail network had not always been seamless. By the second decade of the 20th century, however, it was doing a reasonably good job at its primary mission, which was to get goods to a specific point at a specific time.

Like other utilities, railways operated with oversight by the federal and local governments. The most important agency involved was the Interstate Commerce Commission (ICC), created by the Interstate Commerce Act of 1887. This legislation gave the government broad powers to regulate interstate railroads. The ICC regulated the mechanical aspects of rolling stock and track, rates and services, and the railroads' route structure and corporate reach. During World War I, the federal government regulated railways through the U.S. Railroad Administration (USRA), created in March, 1918. Railroads providing transportation service to the public within a single state—but not beyond state boundaries—were regulated by state utilities agencies in Washington and Oregon. One peculiarity of the lumber industry was that many firms operated private logging railroads on private lands. These were in practical terms unregulated if they did not send traffic onto public interstate or intrastate railroads.¹

Most railroads in the West remained private enterprises, although there were some publically-owned short line railroads. Historians are quick to point out that the transcontinental railroads serving the western states were created by private capital plus enormous infusions of public capital in the form of land grants.² The railroads serving

¹ Most private logging railroads in the fir country were short (< 10 miles) and short-lived. Private railroads in the pine country east of the Cascades tended to be long (>40 miles) and many remained in service for decades. One interesting exception was the famous Kerry Line in northwestern Oregon which hauled hundreds of millions of board feet of fir over a 25-year period.

² See, for example, Dorothy O. Johansen and Charles M. Gates, *Empire on the Columbia* (New York, 1957) 370ff.

the Pacific Northwest grew and developed in a tumultuous fashion during the last decades of the 19th century and the first decades of the 20th century. Five major transcontinental systems solidified in Oregon and Washington by about 1910. These were as follows:

- Northern Pacific (1883), connecting east from Portland and Puget Sound;
- Union Pacific (1886), connecting east from Portland;
- Southern Pacific, (1887) connecting south from Portland;
- Great Northern, (1893) connecting east from Puget Sound and Portland;
- Chicago, Milwaukee, and St. Paul, (1909) connecting east from Puget Sound.

A sixth major railway serving Oregon and Washington was the Spokane, Portland, and Seattle (SP&S), which connected three major cities of the region. After its completion in 1908, the SP&S main line ran on the north bank of the Columbia River from Portland to Kennewick, Washington. This line was not a transcontinental, but it had transcontinental connections through its association with the Great Northern (GN) and the Northern Pacific (NP). The SP&S was the only railroad serving the SPD Cut-up Plant at Vancouver.

As private enterprises, the railroads competed to serve new areas by building branch lines or buying local lines already in service. Some major cities like Portland or Tacoma had service to the East by two or more railroads. In these instances, the railroads competed in freight rates and services. In general, though, by 1917 the five major transcontinental railroads serving Oregon and Washington had carved out their own territorial systems. Branch and subsidiary lines reached into the hinterlands, and the transcontinental main lines reached out to national markets to the east and south. This five-way division of the market was further complicated by the railroad owners' entrepreneurial zeal. After the first years of the 20th century, the five were really only two. E.H. Harriman, a New York financier, owned the Southern Pacific and the Union Pacific. James J. Hill, a Midwesterner, owned the Great Northern and the Northern Pacific. Only the Chicago, Milwaukee, and St. Paul remained outside the orbit of Hill and Harriman, and it was the least successful line. The sixth major line in the Northwest—the SP&S—was also part of Hill's empire. James J. Hill built this railroad to extend service to Oregon, and eventually California, and to cement his firm's dominant position in the Northwest market.

The SPD operating plan required different levels of railroads. Logging railroads would bring logs and flitches out of the woods and deliver them to mills or re-load points near the coast. Then local branch railroads and the main line Southern Pacific or Northern Pacific would bring the material to Portland or Vancouver to transfer onto the SP&S for delivery to the Cut-up Plant. The SP&S would haul the finished lumber out of the Cut-up Plant for transfer at Vancouver or Portland. Finally the major transcontinental railroads—the Northern Pacific, the Great Northern, or the Union Pacific—would get the finished lumber to Atlantic ports for shipment to Europe or to aircraft factories in the Midwest or on the East Coast.

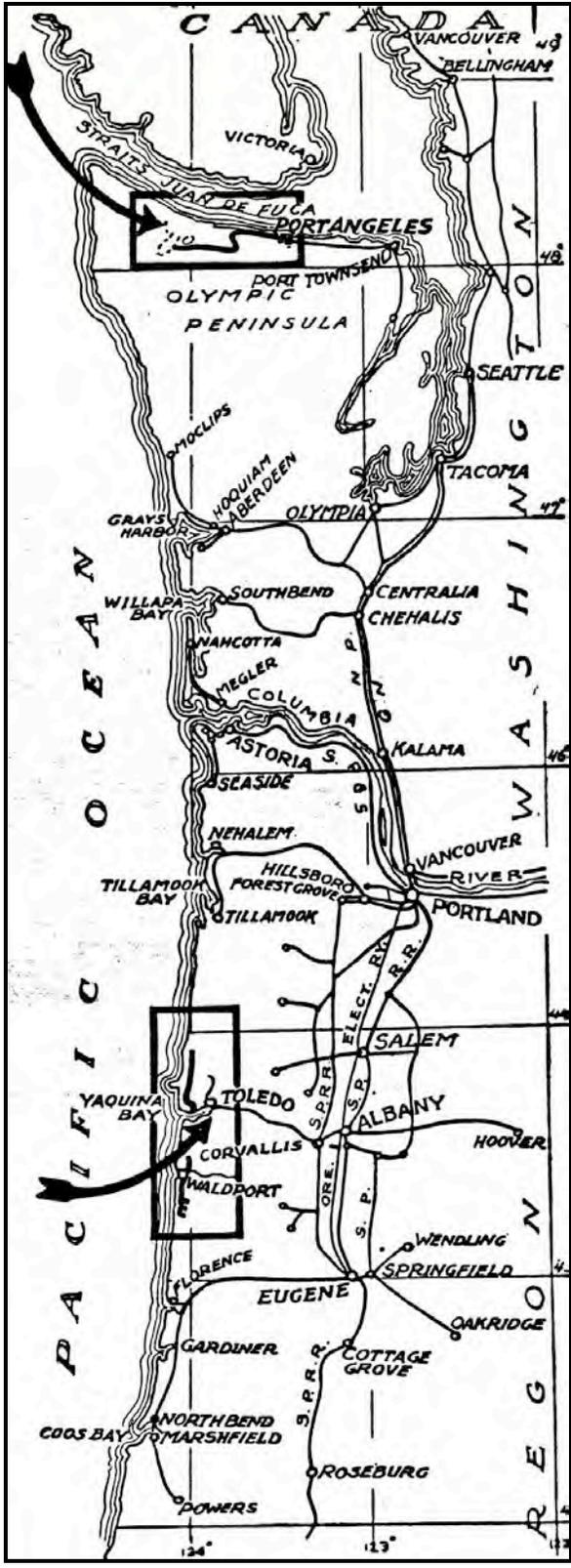


Figure 4-1 Map of the SPD railroad network showing some logging railroads, branch railroads, and portions of the Southern Pacific, Great Northern, and Northern Pacific. The SP&S is shown from Portland to Astoria, and the Chicago, Milwaukee, and St. Paul is shown (but not labeled) from Port Townsend to Port Angeles. Logging railroads in bold are major SPD projects on the Olympic Peninsula in Washington and the Lincoln County coast in Oregon.

Logging Railroads

Difficult terrain, heavy logs, and a wet climate made railroad logging the standard practice of the west coast timber industry by about 1890.³ The logging railroads were typically composed of a main haul road that would remain in service for several years and temporary spurs that would be used for no more than two years. The main haul roads were built with modest gradients <2% and with reasonable curves. Hardware included 65 to 80 pound rail. They could accommodate conventional rod locomotives and trains operating at speeds of up to 40 mph. The spurs were built with lighter rail—typically 45-pound—and gradients sometimes reached above 6%. The spurs were not ballasted and were best suited for use by geared locomotives that could develop their tractive effort at low speeds.⁴ Spurs accessed timber in a specific area. When that timber was cut, the rails and ties were taken up and a new spur built into new areas. In the 1930s, Nelson Courtlandt Brown, Professor of Forestry at Syracuse University, estimated that there were about 6,000 miles of logging railroads in operation in the Pacific Northwest, with about 2,000 miles of spur line replaced each year⁵. Loggers typically built new spurs during the relatively dry summer months for the next year's cutting.

During the summer of 1917, however, industry-wide strikes by the Industrial Workers of the World and other labor groups interrupted all work in the woods, including railroad building.

The I.W.W. in the year 1917 prevented the logging industry from constructing railroads during that summer, which is the only season of the year in which railroads can be built in that country due to the immense rainfall. In December 1917 it became quite apparent that the production of spruce logs would fall off very materially during the first part of 1918 due to the fact that the loggers were working out the stands of timber which they had opened up by their 1916 railroad construction and to the further fact that they were prevented from extending these railroads during the summer of 1917.⁶

The SPD's first strategy for getting spruce out of the woods during the spring of 1918 was to rive the huge logs into smaller flitches that could be loaded onto motor trucks and hauled to the mills. The second strategy was for the SPD to embark on a program of building logging railroads for the contract lumber companies to use. The SPD started construction of logging railroads in Washington and Oregon in the spring of 1918. These were numbered I through XIII. Most of these were relatively short logging lines reaching pure spruce stands or timber stands with a high percentage of spruce mixed with other softwoods. Railroads I and XII, however, were more ambitious main line logging railroads over 20 miles long that would tap new areas not served by other logging railroads.

³ See Ward Tonsfeldt, "Context Study for Railroad Logging in Oregon," 1993, on file, Oregon State Historic Preservation Office, Salem, OR.

⁴ Nelson Courtlandt Brown, *Logging Transportation*, (New York, 1936), 200.

⁵ Brown, *Logging Transportation*, 203.

⁶ Major Reuben Hitchcock to Major M.H. Ray, January 4, 1919, Correspondence File, Brice P. Disque Papers, University of Washington Library Special Collections, Seattle, WA.

Table 4-1 SPD Logging Railroads⁷

SPD Railroad Number	Name	Location	Miles Main Line	Miles spurs	Connects To	Average Stand Density	Steepest Grade	Rail Weight
I	Clallam County RR	Olympic Peninsula, WA	36	70	Chicago, Milwaukee, and St. Paul RR	26 mbf/acre	2%	80#, 67.5#
II	Merrill and Ring RR	Near Pysht, WA	4.69	2.19	To booming ground on Straits of Juan De Fuca	26 mbf/acre	3.2%	56#
III	Queniult County RR	Quinault Reservation, WA	5.32	0.254	N.P. Poulson branch	28 mbf/acre	1.43%	56#
IV	Elk River RR	Gray's Harbor, WA	2.14	0.82	To booming ground on Elk River	18 mbf/acre	6%	60#
V	North Nemah River RR	Willapa Bay, WA	7.73	0.21	To booming ground on Willapa Bay	18 mbf/acre	3%	45#
VI	South Nemah River RR	Willapa Bay, WA	2.28	1.6	To booming ground on Willapa Bay	22 mbf/acre	4%	45#
VII	Nasel River RR (narrow gauge)	Willapa Bay, WA	1.88	0.17	To booming ground on Willapa Bay	12 mbf/acre	n.a.	n.a.
VIII	Lewis and Clark River Narrow Gauge RR	Near Seaside, OR	2.5		SP&S Astoria branch	21 mbf/acre	n.a.	n.a.
IX	Lewis and Clark River RR	Near Seaside, OR	13	5.25	SP&S Astoria branch	21 mbf/acre	2.2%	50#, 60#
X	Toledo and Siletz RR	Near Toledo, OR	6.4	1.74	S.P. Yaquina branch	26 mbf/acre	3%	30#-75#
XI	Yaquina Northern RR	Yaquina Bay to Cape Foulweather, OR	10.83	2.09	S.P. Yaquina branch	34 mbf/acre	3.7%	50#, 67.5#
XII	Alsea Southern RR	Yaquina Bay to Waldport, OR	23.42	3.36	S.P. Yaquina branch	59 mbf/acre	3%	60#
XIII	Beaver Hill RR	Near Coos Bay, OR	1.54	0.04	S.P. Coos Bay branch	n.a.	7%	60#, 45#

Railroad I was the controversial route from a junction on the Seattle, Port Angeles, and Western Railway near Port Angeles to Lake Pleasant in Clallam County, Washington. It cost over \$12 million to build 36 miles, averaging over \$333,000/mile. Construction costs for ordinary civilian logging railroads varied, of course, but generally remained under \$20,000/mile.⁸ The SPD calculated their budget for railroad construction at \$3 per thousand board feet of timber accessed.⁹ By this formula, Railroad I should have accessed 36 million board feet of timber. By SPD estimates, it accessed 6.6 billion board feet of spruce, fir, hemlock, and cedar.¹⁰ A later estimate set the total volume

⁷ Sources: *History of the Spruce Production Division*, 1919, 42ff; SPD Engineering Office, Exhibits 6-12B, Jan. 15, 1919, ARC 5049512, General Records, Spruce Production Division Papers, NARA, Seattle.

⁸ Logging railroad construction costs varied so widely that calculations on a dollars-per-mile basis may not be meaningful. Brown (p. 220-221) estimated that building the average logging railroad should cost no more than \$2 for each thousand board feet of timber it accessed. Operating costs were another matter. See also James O'Hearne, "Construction of Logging Railroads," *The Timberman*, (November 1917). 49.

⁹ *History of the Spruce Production Division*, 39.

¹⁰ *History of the Spruce Production Division*, 43.

accessed at 10.1 billion board feet.¹¹ The enormous volume of timber tributary to Railroad I justified its cost to some extent, but it was this railroad and the other expenditures for two saw mills, a hotel, and timber on the Olympic Peninsula that prompted the Congress to conduct a formal investigation of the SPD in 1919.

Railroad I was designed to deliver one million board feet of logs to an SPD mill in Port Angeles each working day, so it was built to very high standards. The railroad and the mill were not completed before the Armistice, and were never used. Similarly, Railroad XII started at South Beach, Oregon, across Willapa Bay from the new SPD mill at Toledo. It was also not quite completed by the Armistice. The mill at Toledo was also a month short of completion in November, 1918. Railroad XIII was the Beaver Hill line in Coos County, Oregon. It was begun in September of 1918 and was operating by the time of the Armistice, but delivered only a few logs to the Smith-Powers mill in Coos Bay. The other SPD railroads were less ambitious than Railroads I or XII and generally proved their worth. Railroad VIII, the Lewis and Clark River Narrow Gauge, operated for a short time in the spring of 1918. It was removed in July, 1918, when its timber was all cut.



Figure 4-2 Spruce soldiers working on Railroad XII, the Alsea Southern (Photo, NARA College Park, MD).

¹¹ “United States Spruce Production Corporation Detailed Analysis of Properties Offered for Sale, September 2, 1919,” p. 12, Brice P. Disque Papers, University of Oregon Special Collections, Eugene, OR.

Building the railroads in the spring and early summer of 1918 required significant numbers of soldiers and huge amounts of material. The work began with location engineers choosing routes that would maintain reasonable standards of gradient and curvature. Only the Elk River RR and the Beaver Hill RR had extreme gradients, in excess of 5%. Construction was done through lumber companies or through contractors on some railroads, including the Siems, Carey--H.S. Kerbaugh Company on Railroad I and the Warren Spruce Company on other railroads. Many soldiers worked for Siems, Carey-H.S. Kerbaugh and for Warren Spruce. The total force of soldier-workers required to build the railroads in the spring of 1918 exceeded 10,000 men.¹² Siems-Carey-H.S. Kerbaugh employed 5000 to 6000 men on Railroad I during the summer of 1918. Construction work was done by horse teams and by steam shovels when possible, but the lack of equipment and the availability of inexpensive labor meant that much earth moving was done “by pick and shovel and sledge hammer.”¹³ The railroads I and XII had sophisticated requirements. The Alsea Southern needed a ferry and a terminal to get material and rolling stock from the mill at Toledo to South Beach. It also required a bridge across Alsea Bay. The route of the line down the coast was difficult to supply because there was no road for motor trucks. Timbers and other items were launched into the bay at Toledo as rafts and then towed down the coast and sent through the surf to crews on the beach. In Washington, Railroad I needed two tunnels through hard rock and numerous bridges and trestles across streams.



Figure 4-3 Map prepared by SPD Engineering Section showing Spruce Railroad I and Spruce Railroad II. Railroad I was a very ambitious project accessing somewhere between 6.6 and 10 billion board feet of timber (Diagram from SPC decimal files, NARA, Seattle).

Fir ties for the railroads were readily available from mills operating along the coasts of both states. Hardware items for the track, such as spikes, splice plates, switch gear, rail braces, and the rail itself were re-used from spur to spur, and were always available on the second-hand market. The variety of rail weights on the thirteen railroads suggests that the SPD used whatever came to hand (see Table 4-1, p. 78). By 1918,

¹² *History of the Spruce Production Division*, 41.

¹³ *History of the Spruce Production Division*, 42.

narrow-gauge railroads were rare. They had been popular in the 1880s, and narrow-gauge equipment was available at bargain prices. The inconvenience of off-loading and re-loading logs or lumber from narrow gauge to standard gauge cars discouraged most lumber companies from building narrow-gauge systems. Professor Brown estimated in 1930 that 98% of logging railroad mileage was standard-gauge.¹⁴

Two of the SPD railroads were narrow gauge. One, Railroad VIII, was very short-lived and appears to have been replaced with a conventional railroad in July, 1918. The other, Railroad VII, the Nasel River RR (now “Naselle”), was built to haul logs from the woods to booming grounds on Willapa Bay. Since this line did not send cars to another railroad, the narrow-gauge equipment was not much of a disadvantage. On the Long Beach Peninsula, across Willapa Bay from the Nasel River and Railroad VII, an elderly narrow-gauge railroad ran between Megler, on the Columbia River, and Nahcotta, a port on Willapa Bay. This was the Ilwaco Railway & Navigation Co. line, operating from 1888 to about 1930. It was completely landlocked, connecting to no other railroad. Equipment from this line could have been leased to the SPD or Warren Spruce for service on The Nasel River line.

Not only did the SPD have to build the railroads, they also had to equip them. The preferred locomotives for logging work were the geared engines of the Shay, Heisler, and Climax designs. These locomotives could operate at low speeds with full tractive effort as they negotiated the steep grades and tight curves of the logging railroads. A conventional Mikado rod locomotive operating on level track could move 3630 tons; the same locomotive on a 5% grade could move only 160 tons.¹⁵ Geared locomotives were much more effective at slow speeds on steep grade and curves. The trade-off was that the geared locomotives were slow and poorly suited for hauling trains of loaded log cars back to the mill. Most large logging operations west of the Cascade Mountains had rod locomotives for the main line hauls and geared locomotives for logging. Logging locomotives represented a substantial investment for the lumber companies. Writing in 1930, Brown found that a new 90-ton Heisler cost \$23,200, a 50-ton Heisler cost \$15,000, and a used 40-ton Climax cost \$10,000.¹⁶ To date, no synthetic list of SPD locomotives, their type and manufacturing information, has been gathered. Available photos show that SPD #1 was a Heisler locomotive.

¹⁴ Brown, *Logging Transportation*, 201. This may be a rather casual estimate. A few logging railroads in Oregon and California, like the Sumpter Valley Railway in NE Oregon, used narrow-gauge equipment through the 1950s.

¹⁵ Brown, *Logging Transportation*, 217.

¹⁶ Brown, *Logging Transportation*, 219.



Figure 4-4 SPD taking delivery of a Heisler geared locomotive for logging work: (NARA College Park, MD).

Locomotives bought by the SPD were lettered to the United States Army Signal Corps, the Spruce Production Division, Seims, Carey--H.S. Kerbaugh, and Warren Spruce Co. Photos and the chronology of construction on Railroads I and XII confirm that the logging locomotives were used as construction locomotives before any logging began. As such, they could haul crew cars, supply and equipment cars, and perform other useful tasks. Logs were carried on flat cars, skeleton log cars, and disconnects. The disconnects were sets of railroad trucks that were attached to each end of a log, typically over 40' long. They were not permitted on ICC-regulated common carriers. The SPD purchased disconnects as well as conventional skeleton log cars and flatcars in addition to boxcars and other rolling stock. At the end of the war, all of the railroad equipment including rail, hardware, locomotives, and rolling stock was sold, but we have conflicting evidence about the terms of the sale and disposal. Some, but not all, of it was brought to the Cut-up Plant for sale.

General Order #34, dated November 22, 1918, eleven days after the Armistice, specified that the SPC would stop all logging and milling of aircraft lumber. Logs already cut were to be hauled to the mills and the SPC would honor their contract for buying these logs if the contract mills so desired. Railroad construction was to stop on the SPD railroads except for Railroads I and XII. Construction would continue on these lines. For the other railroads, "all rails, ties, etc. will be taken up and all equipment of each operation will be concentrated at the terminal, painted and greased to prevent

deterioration, carefully inventoried, and reported to this office.”¹⁷ Equipment from the smaller SPD railroads, then, was pulled up and assembled at the terminal of each railroad. Disque appointed Major Reuben Hitchcock to head up a Sales Board to oversee the sale of property. He also appointed Major W.A. Welch to head up a Catalogue Board to “inventory, catalog, and concentrate all the property of the Corporation, except logs and lumber.”¹⁸

The catalog was to be organized by “units of operations” and to detail all of the assets with appropriate maps showing timber holdings. The catalog would be prepared “at the earliest practicable date” and 500 copies were to be printed. The catalog appeared in September, 1919, ten months after General Order #34. It listed the two major properties only—the mills, timber lands, and railroads at Toledo and the railroad, mills, timber, and hotel at Port Angeles. The 60-page catalog provided details of installations, timber accessed by the railroads, accessory equipment, hydropower potential, and other information potentially useful to bidders. It also detailed the railroad materials and supplies left unused on Railroads I and XII. Bidding instructions were clear, and the catalogue included “Bid Sheets” to be filled out and submitted to the Corporation. The catalog was distributed by mail, and the auction advertised in “all principal cities in the United States, Canada, Europe, and South America.” We do not know what (if any) bids the Corporation received in 1919, but none of them was acceptable. The Lincoln County properties finally sold in December, 1920; the Clallam County properties sold in 1922.

Photographs and documents make it clear that some rolling stock and other items from the small logging railroads made their way to the Cut-up Plant, where they were offered for sale before the summer of 1919. The sale continued until the fall of 1924. However, the volume of material used on the logging railroads is not consistent with the material shown for sale at the Cut-up Plant. The logging railroads other than I and XII had about 75 miles of track, which was manufactured in 20-foot lengths. This would amount to nearly 40,000 pieces of rail. Some rail was sold at the Cut-up Plant, but not in this quantity. Similarly, locomotives, log cars, yarders, and other equipment was sold at the Cut-up Plant, but some of it must have been sold on site at the terminals of each logging railroad. The cost of transportation made this a much better practice than assembling all of it in Vancouver. In the case of a land-locked railroad like Railroad II in Pysht, Washington, the cost of transporting material back to Vancouver was significant, and Merrill and Ring, who had logging operations and a mill at Pysht, would be likely to buy it on site.

¹⁷ “General Order #34” Item 10, November 22, 1918, ARC 4913140, General Orders, Spruce Production Division Papers, NARA, Seattle.

¹⁸ “General Order #34” item 14.



Figure 4-5 Locomotives for sale at the Cut-up Plant, 1919. Locomotive #7 is lettered to the Spruce Production Division (Photo NPS, Ft. Vancouver NHS, FOVA 1645 vertical files).



Figure 4-6 Machinery for sale at the Cut-up Plant, presumably in the large lumber shed (Photo NPS, Ft. Vancouver NHS, FOVA 1645 vertical files).

The sales of the two major properties were well-documented, and the buyers known. The purchasers were not large established lumber companies, but were small groups of investors assembled to buy the properties for speculative purposes. The two groups were based in Portland, and included several of the same individuals. By 1925, the original groups had sold both properties to other investors, neither of whom prospered (see chapter 6). The sale of the small items, including railroad rolling stock, logging equipment, and industrial supplies began before the summer of 1919 and continued through 1924, when all items had been sold and the last buildings were scheduled for demolition. The SPC maintained a sales office on site, which arranged the individual transactions. Buyers were not recorded, but we can assume that the most desirable items sold first and such items as office supplies and salvaged building materials sold slowly.

The Portland salvage firm of Zimmerman-Wells-Brown and Co. (“The House of Machinery Values”) apparently purchased much of the logging machinery and railroad equipment at the Cut-up Plant before the summer of 1919. They advertised in the August, 1919, issue of *The Timberman*, that they had purchased equipment from the U.S. Spruce Production Corporation for re-sale, and were offering Snohomish railroad logging disconnected trucks, Washington Iron Works yarders, locomotives, connected logging trucks, skidder cars, and an American Crane and Ditcher at “very attractive prices.” Much of the equipment was new; the Shay-type locomotives had been “shipped from the factory in May, 1919.” The two-page advertisement reported that “these machines have been moving very rapidly, but we still have a few available.”¹⁹ After their purchase of the SPD equipment, then, Zimmerman-Wells-Brown retailed it out to whatever buyers came forward. This state-of-the-art equipment at bargain prices would have enabled logging companies around the West to modernize their operations.

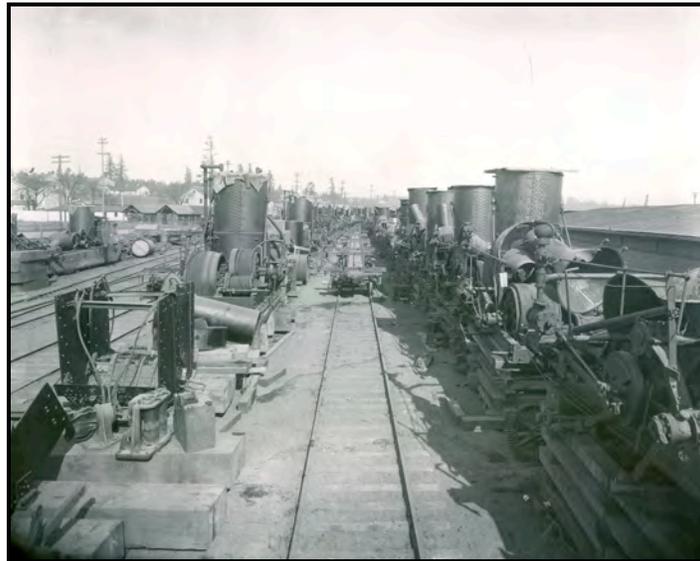


Figure 4-7 Yarders for sale, 1919 (Photo NPS, Ft. Vancouver NHS, FOVA 1645 vertical files).

¹⁹ “Equipment Purchased by Us [sic] from U.S. Spruce Production Corporation and Offered at Very Attractive Prices,” (advertisement) *The Timberman* (August, 1919), 48H-48I.



Figure 4-8 Rail and splice plates assembled for sale at the Cut-up Plant, 1919. Total rail from the logging railroads other than Railroads I and XII would have been approximately 40,000 pieces of rail. Total number of splice plates would have been the same. The photo shows a substantially smaller amount of material (Photo NARA, College Park, MD).



Figure 4-9 Shay type logging locomotives lined up for sale at the Cut-up Plant in 1919. These are lettered to Seims, Carey—H.S. Kerbaugh, the contractor on Railroad I, Clallam County, WA. These were used after the Armistice for final construction and preparing the property for sale. Locomotives lettered to U.S. Army Signal Corps and Spruce Production Division were also sold at Vancouver. These were used on Railroad XII, where they were also active after the Armistice. Locomotives from other operations, especially the Warren Spruce Co. do not appear in photos at the Cut-up Plant (Photo NARA, College Park, MD).

Branch Lines from the Mills to Vancouver

Once the logging railroads had delivered the logs to the mills, they could be cut into cants for shipment to the Cut-up Plant. For the spruce flitches from riving operations, the material simply needed to be transferred to flat cars or gondola cars and sent to Vancouver. Branch railroads served the isolated coastal mills. Many had begun as independent railroads, like the Corvallis and Eastern connecting Yaquina Bay to the Willamette Valley, or the Seattle, Port Angeles, and Western connecting Olympic Peninsula towns with ferry service at Port Townsend. These independent lines were bought by larger railroads during the consolidation period after the nationwide recession of 1893. Other branch lines had been built by the transcontinentals as feeder lines to increase their service area. The Southern Pacific, for example, built the line to Coos Bay, but bought the Pacific Railroad and Navigation Co. line to Tillamook Bay. The Northern Pacific built the lines to Gray's Harbor and to Willapa Bay on the Washington coast. Some branch railroads went through several owners before settling down to a tranquil corporate life. The railroad connecting Astoria with Portland began as the Astoria and South Coast Railway, then became the Astoria and Columbia River Railway, and finally became a branch of the Spokane, Portland, and Seattle (see Appendix E).

When a small independent railroad or a branch of a major railroad was built into a new area of western Oregon or Washington, saw mills were up and running within a few years. Commercial-scale mills could operate on waterways or railroads, but they required either ships or trains to get the lumber to market. Since the mills depended on the branch railroads we can assume that they had reasonably good relations with them. The branch lines were also dependent on the mills for their cargo, and would have kept up their side of the bargain. Other mills delivering material to Vancouver were located on main transcontinental railroads. The Bridal Veil Lumber Company's mill at Bridal Veil, Oregon, or the Booth Kelly Lumber Company's mill at Eugene, Oregon, would have had to compete with other shippers for rail cars. As a government agency, the SPD had priority over civilian shipping, but had to compete with other government agencies for the same limited railroad facilities.

Table 4-2 below outlines the transportation picture for the mills employing SPD soldier/workers in May of 1918. We know that all of these mills delivered cants and flitches to Vancouver since each soldier was required to produce 100 board feet of Grade-A airplane spruce per day. Other mills without soldier/workers may have sent cants or flitches to the Cut-up Plant as well. The column on the left shows the SPD production district that included the mills. We do not know the exact boundaries of these production districts. The interior counties—Whatcom, Skagit, Snohomish, King, Kitsap, Pierce, and Cowlitz—are included in the Clallam district for convenience since it is the northernmost district.

Table 4-2 Mills Participating with SPD , May 2, 1918

SPD Production District	County in Washington	Rail Service	Towns	Mills Participating in May, 1918
Clallam	Clallam	Seattle, Port Angeles, and Western RR (Chicago)	Joyce Pysht Sequim	Puget Sound Mills Merrill & Ring LC Snow Ck. LC
	Whatcom	Northern Pacific RR or Great Northern RR	Van Zandt	Nooksack LC
	Skagit	Northern Pacific RR or Great Northern RR	Clear Lake Alger Hamilton	Clear Lake LC Bloedel-Donovan LC Lyman Timber
	Snohomish	Northern Pacific RR or Great Northern RR	Sultan Arlington Darrington	Sultan R&T Florence LC Sound Timber Co.
	King	Northern Pacific RR or Great Northern RR	Stillwater Woodinville Snoqualmie Eagle Gorge Seattle	Cherry Valley LC Campbell LC Snoqualmie Falls LC Page LC Schwager-Nettleston
	Kitsap	Northern Pacific RR or Great Northern RR	Bremerton	Stimson LC
	Pierce	Northern Pacific RR or Great Northern RR	Fairfax Orting	Eisworth-Bishop LC St. Paul and Tacoma
	Cowlitz	Northern Pacific RR or Great Northern RR	Kelso	Eufaula LC
Aberdeen	Grays Harbor	Northern Pacific RR	Aberdeen Hoquiam Carlisle Aloha Bay City Elma Moxchuck Monsano Cosmopolis Brady Grays River	Coats-Fordney LC Grays Harbor LC Wilson Bros. LC A.J. West LC Western LC Polson LC Bale LC Copalis LC Aloha LC Climax LC Saginaw LC Chehalis LC Wynooche LC Grays Harbor LC Shafer Bros. Columbia LC North Bank LC
Raymond	Pacific	Northern Pacific RR or Chicago, Milwaukee, and St. Paul RR	Raymond Firdale Nasel	Willapa LC Cass Shingle South Bend M&T Siler Mills Quinault LC Sunset LC Moffitt Logging Co
	Lewis	Northern Pacific RR	Lindberg	West Fork LC
	Skamania	Spokane, Portland, and Seattle RR	Carson Yacolt	Wind River LC Clarke County TC

SPD Production District	County in Oregon	Rail Service	Towns	Mills Participating in May, 1918
Lewis and Clark	Clatsop	Astoria and Columbia River RR (SP&S)	Blind Slough Seaside Seaside Astoria Scappoose	Larkin-Green LC Hammond LC Prouty L&B H.E. Noble LC Oregon Pacific LC Astoria Box Co. Nehalem Timber Beaver LC
	Tillamook	Southern Pacific RR, Tillamook Bay Branch		
	Multnomah	Union Pacific RR	Bridal Veil	Bridal Veil LC
Yaquina	Lincoln	Corvallis and Eastern RR (SP)		
	Lane	Southern Pacific RR	Eugene	Booth-Kelly LC
Coos Bay	Coos	Southern Pacific RR, Coos Bay Branch	North Bend	North Bend LC Buehner LC
	Curry		Powers	Smith Powers LC

By 1916 each of the branch lines that the SPD would rely upon to get timber to the Cut-up Plant was owned by a major railroad. Whether the parent line was a Harriman railroad or a Hill railroad, both systems were competently managed and could deal with the needs of shippers throughout their extensive empires. Twenty-five years previously, in the early 1890s, the railroad picture in the Northwest was much less clear. The lines that served the coastal areas of Washington and Oregon were far fewer, and many of them were struggling to stay in business. Independent short-line railroads did not always have the resources to operate efficiently and to coordinate with the transcontinental lines.

The Spokane, Portland, and Seattle's Portland Hub, with Service to Vancouver Barracks

James J. Hill's goal for the Spokane, Portland, and Seattle Railway was to create a new line that would open Oregon to his railroads. As a latecomer to Portland, the SP&S needed to get its trains into the city by a new route from the north. The Southern Pacific came in from the south, and the Union Pacific came in by way of Sullivan's Gulch from the east. The Hill-owned Northern Pacific served Portland from its line west to Goble, where it operated a rail-car ferry across the Columbia to Kalama, to connect with its main line north. The ferry, installed in 1883, created a bottleneck in the line and was not considered compatible with modern railroading. The location of the SP&S on the Washington side of the Columbia meant that the new line would need to come in from the north and find a place in Portland for its yards as well as its terminals. The Harriman lines—the Southern Pacific and the Union Pacific—had their passenger station located in a central area of Portland. This Harriman-controlled passenger station would not let the Hill lines use the facility until 1921, although the U.S. Railroad Authority required both

systems to share the terminal during the war.²⁰ The Harriman lines' freight yards, however, were on the east side of the Willamette in less central area of the city. Hill's strategy was to put the SP&S railroad yards in downtown Portland immediately adjacent to the Union Station. To this end, his agents purchased undeveloped land west of the Union Station. The Hill railroads built their rail yards and their passenger station there. They also developed warehouses with street and rail access which they leased or sold to shippers. This gave the new railroad good visibility and a convenient location for its clients.

The Hill forces made initial surveys and began acquiring property and right-of-way for the new railroad along the Columbia in the spring and summer of 1905. The terminal and yard properties in Portland were especially important, and Hill wanted to acquire an adequate land base for the new line. All of this had to be done with some secrecy, since the Harriman forces were on the lookout for any activity in the Hill camp. Finally, in August of 1905 Hill's agents in Seattle incorporated the Portland and Seattle Railway, an early name for the SP&S. News of Hill's plans became public. Hill made a publicity visit to Portland to drum up enthusiasm for the new railroad. The *Portland Oregonian* responded as expected with cautious endorsement.²¹ Harriman's people were not happy, and a period of legal wrangling began which lasted for nearly a year. There were several near-confrontations over right-of-way on the north bank of the Columbia River, but the situation stabilized.

To reach Portland from the north bank of the Columbia, the SP&S had to build a bridge across the river to get trains into Oregon. This expensive task was somewhat mitigated by the company's purchase of a bridge pier built and then abandoned by a previous railroad. Once across the Columbia, the new railroad would need to cross the St. Johns Peninsula, which was a ridge running between the Columbia and the Willamette Rivers. Maintaining a reasonable grade across this ridge required a large cut 40' wide and up to 40' deep. Material excavated from the cut had to be brought across the Willamette to provide 450,000 cubic yards of fill for the land purchased for the SP&S Portland yards.²² Congress approved an act in December authorizing the interstate railroad bridge across the Columbia. The Port of Portland had authority over bridges across the Willamette. Unfortunately, an oppositional OR&N pilot (Harriman owned the OR&N) sat on the Port of Portland committee in charge of bridge permits. He delayed the permit as long as he could, but the new line was completed in February, 1908. Access for the SP&S, then, consisted of the bridge over the Columbia, the cut through St. Johns Peninsula, and the bridge across the Willamette leading to the SP&S yards in downtown Portland (See Figure 4-14, p. 92). These three engineering projects were expensive, but the Northern Pacific and Great Northern would use them as well as the SP&S. All three Hill railroads now had excellent access to Portland. The Northern Pacific had good

²⁰ John Gaertner, *North Bank Road: The Spokane, Portland, and Seattle Railway*, (Pullman, WA, 1990) 40.

²¹ "The North Bank Road a Down-Hill Grade to Sea Level in Portland," *Portland Oregonian* (Oct.,5, 1905) 8

²² Gaertner, *North Bank Road*, 8

access for the first time since 1888 and its train ferry crossing the Columbia from Goble to Kalama was now no longer needed.

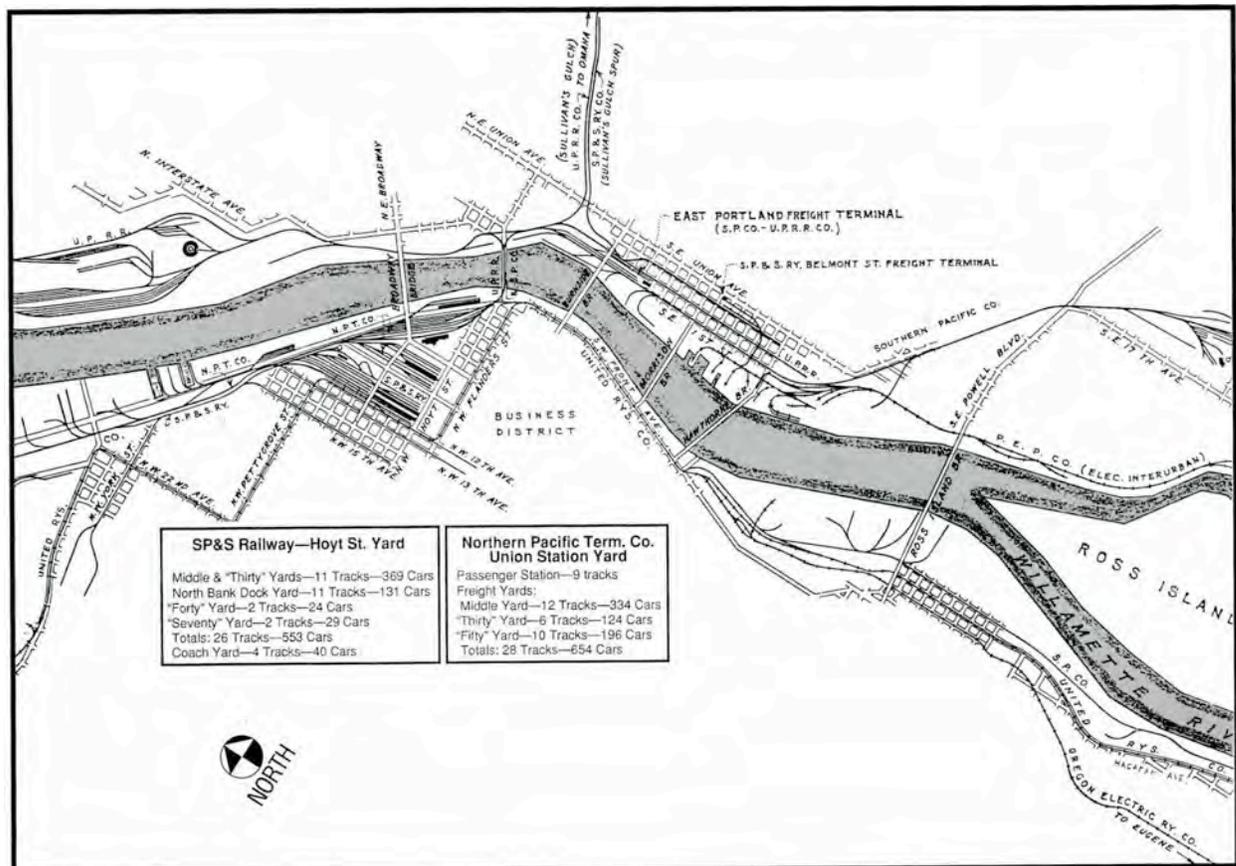


Figure 4-10 Map of the terminals and yards in Portland, n.d.. The SP&S occupies yards north of Hoyt St. in downtown Portland. The Southern Pacific and Union Pacific operate yards east of the Willamette and the East Portland Freight Terminal. The SP&S also operates the Belmont St. Freight Terminal east of the Willamette. The extensive UP Brooklyn Yards are shown on the upper right (Map from Gaertner, *North Bank Road*, 34).

The distribution of facilities in Portland after 1905 was complex with three major stakeholders—the UP, the SP, and the new SP&S—competing for location. The Harriman railroads' freight yards were located on the east side of the Willamette. Union Pacific trains entering Portland came into town through Sullivan's Gulch from the east. Passenger trains went to the Union Station across the Steel Bridge, and freight trains went north to the Brooklyn Yards. There incoming trains could be broken up and new trains made up. Southern Pacific trains entered Portland from the south and went to yards on the east side of the Willamette. If a freight car was to be transferred from the UP or the SP to the SP&S, it would need to be taken across the Willamette on the Steel Bridge (marked "UPRR and SP Co." on figure 4-10) and sent to the SP&S yards.

By 1910, the situation in Portland was considerably more complex as the Hill interests bought three additional Oregon branch lines to add to the SP&S. These were the Astoria and Columbia River Railway in 1907, the Oregon Electric Railway in 1910, and

the United Railways also in 1910.²³ All three converged in Portland and needed access to the central SP&S yards.

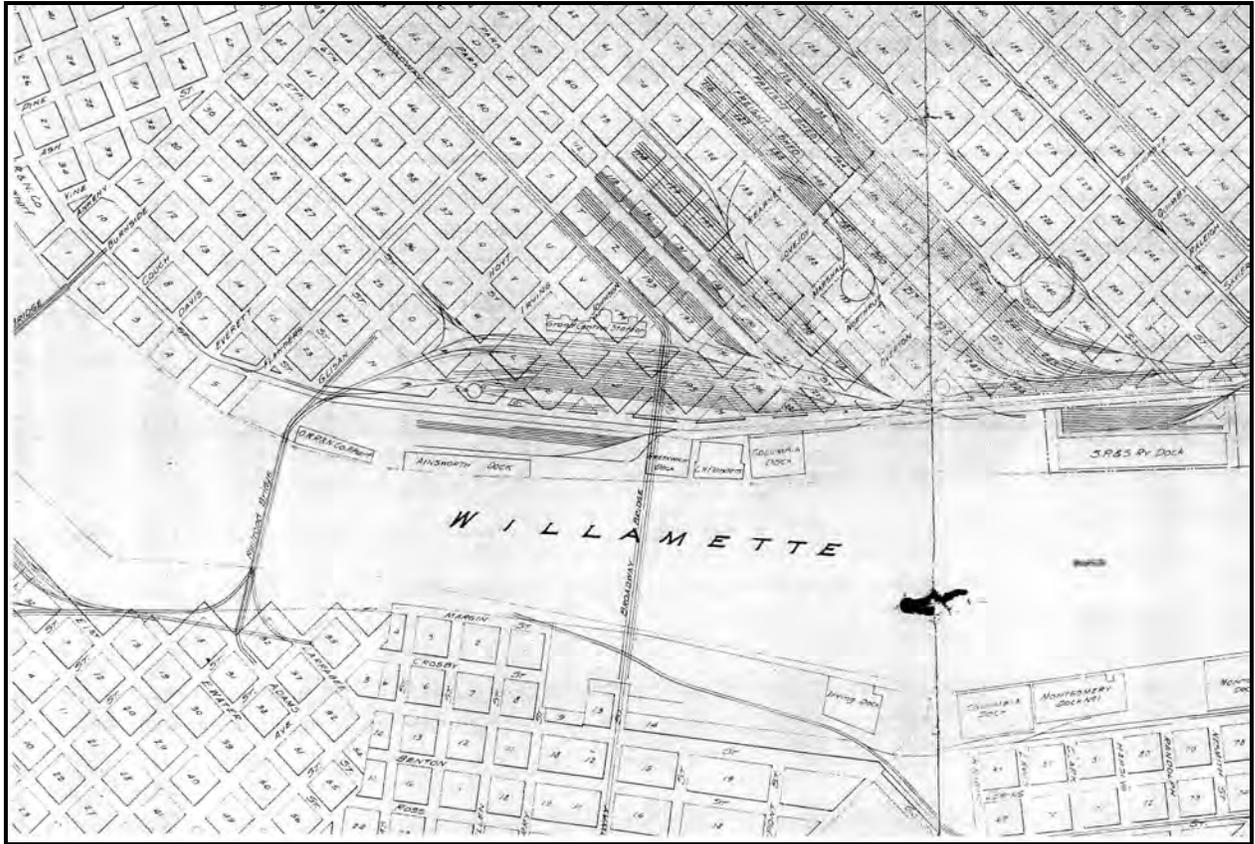


Figure 4-11 Map of the SP&S yards and terminal in Portland, 1916. The Union Station is marked “Grand Central Station” in the center of the map at the west end of the Broadway Bridge. (“Right of Way and Track Map, SP&S Terminals Divisions, Portland Terminals, June 16, 1916, NARA College Park)

Figure 4-11 is a portion of a map prepared by the SP&S showing terminals and yards in Portland in 1916. The UP and SP freight yards on the east side of the Willamette are not shown on this map. The Harriman lines’ passenger trains crossed the Willamette on the Steel Bridge (marked “Railroad Bridge”) on route to the Union Station. This facility is shown in the center of the map with the station building (marked “Grand Central Station”) and spurs running horizontal (north-south). Before 1921, except during the war years, all SP&S passengers used the Hoyt Street facility.²⁴ The SP&S trains came into Portland from the north (right side of this map) and curved to the west (top of this map) to the yards. These were called the “Hoyt Street” yards because Hoyt Street provided a southwest boundary. The yards covered 40 city blocks, consisting of perhaps 50 long sidings interspersed with warehouses. In addition, the SP&S had a dock on the Willamette with numerous sidings and access for loading cargo to or from ocean-going

²³ Gaertner, *North Bank Road*, 10.

²⁴ Gaertner, *North Bank Road*, 40.

ships or riverboats. The Hill interests owned the Great Northern Steamship Company for a brief period from 1914 to 1916. Simply in terms of convenience and “presence,” the Hill railroads were very well-situated in Portland. For service yards, maintenance shops, and a roundhouse, the SP&S used the Vancouver yards of the Northern Pacific.

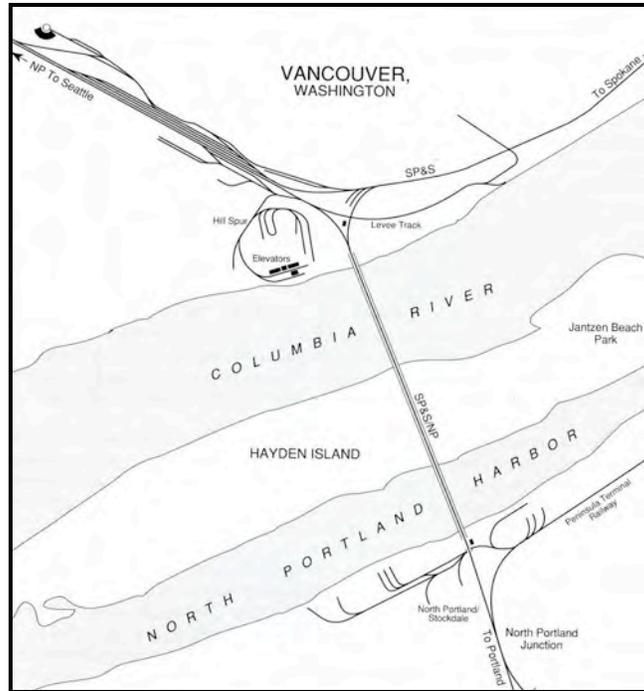


Figure 4-12 Map showing location of the Vancouver yards, Hill spur, and the SP&S bridge. (Map from Gaertner, *North Bank Road*, 58)

Figure 4-12 shows the yards in context with the SP&S bridge over the Columbia, the North Portland stockyards, and the Hill spur. This was built during World War I to reach shipyards in Vancouver. Later, grain elevators were built there to store grain delivered by rail or by barge.²⁵

In 1917, with the advent of World War I, the SP&S was placed on a war footing, as were other railroads. President Wilson created the United States Railroad Administration (USRA) by proclamation on December 26, 1917. The Railway Administration Act of March 21, 1918, solidified the new agency’s status. The USRA managed railroad routes and schedules during the war. The agency also mandated standard designs for locomotives and boxcars produced for service during the war. The USRA regulations were not removed until 1920. To judge from railroad activity in the lumber industry, the USRA provided oversight of railroad operations at the national level, but left the railroads’ managers in place. For example, the SP&S General Manager became the “SP&S Federal Manager” and received direction from the USRA. The war traffic through Portland was significant, and the SP&S saw increases in freight and troop movement.

²⁵ Gaertner, *North Bank Road*, 38.

With America's entry into World War I, SP&S traffic and revenues picked up dramatically. Vancouver, Washington, became the site of several shipyards and also a mill that manufactured spruce structural parts for the aircraft industry [sic]. The company built the Hill spur in 1918 to reach one of the shipyards... This spur would become the site of considerable industrial development in the coming years. With all the war activity the five-track yard at Vancouver became crowded. Tracks 6-11 were added in 1918 to help ease the congestion.²⁶

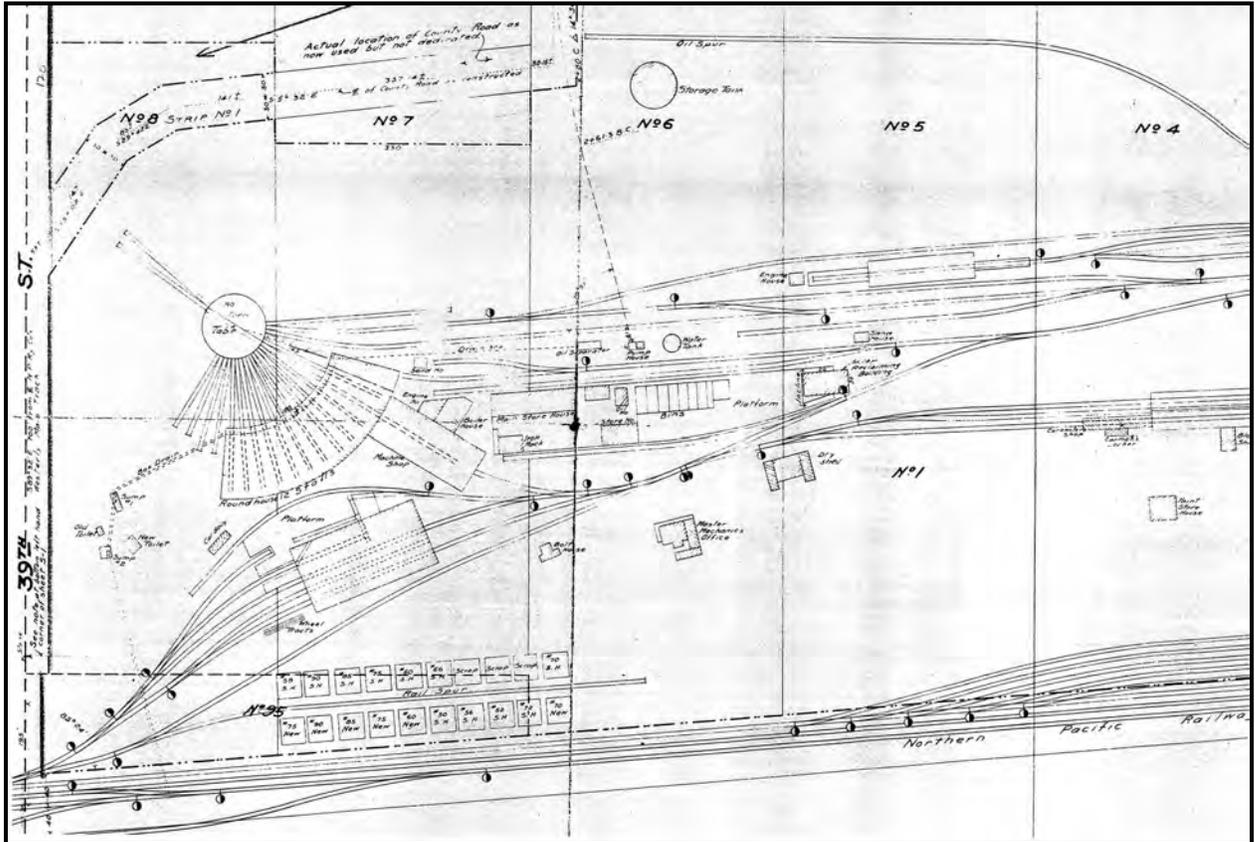


Figure 4-13, SP&S 1916 map of a portion of the Vancouver yards, showing shops, sheds, and the Northern Pacific roundhouse (Map from NARA, College Park, MD).

When the Vancouver Cut-up Mill was up and running after February, 1918, all incoming timber had to be delivered to the mill by the SP&S, and all outgoing lumber started on its way to ports on the east coast or aircraft factories in the U.S. by the SP&S. The freight yards in Portland, and to some extent the Vancouver yards, routed all incoming timber onto the SP&S for delivery to the mill. Table 4-2 (p. 88) shows that the branch lines in Washington delivered to the Northern Pacific and the Great Northern. There could have been some timber originating on the Chicago, Milwaukee, and St. Paul as well, but this railroad used the Northern Pacific for routing freight south. Cars loaded with timber coming from the NP or the GN would have been delivered to the Vancouver yards for routing to the Cut-up Plant. Timber from Oregon would have come to Portland

²⁶ Gaertner, *North Bank Road*, 38.

on the Southern Pacific or the SP&S itself. The SP cars would arrive in the SP yards on the east side of the Willamette then be shuttled across the river to transfer to the SP&S for delivery to the Cut-up Plant. There was at least one mill—the Bridal Veil Lumber Company—delivering timber to Portland on the Union Pacific. These cars would have come into Portland on the UP line down Sullivan’s Gulch, then gone to the Brooklyn Yards, and finally shuttled across the Willamette to the SP&S yards. One of the new branch railroads that the SP&S added by 1910 was also delivering large quantities of spruce and other timber to the Cut-up Mill. This was the Astoria and Columbia River Railway, which brought timber from the lower Columbia, the Warren Spruce operations, and the Hammond mill in Astoria. This timber came into the Portland yards. Two other SP&S branches—the Oregon Electric and the United Railways—could also have delivered timber to the SP&S Portland yards.²⁷

Cars loaded with cants and flitches from all these sources would be made up into trains by the SP&S and sent to the Cut-up Plant. By the summer of 1918, the volume of incoming cars was more than 100 per day. Disque noted at one point that the average daily shipment of “government lumber” in Oregon and Washington to the Cut-up Plant was 107 cars.²⁸ Another estimate of inbound timber to the Cut-up Plant in July 1918 set the daily volume at 900,000 board feet.²⁹ The U.S. Railroad Administration’s official tally of cars “loading for local shipment within the district...[but not] shipments from the Northwest to the East or Middle West” for October, 1918, was 2,652.³⁰

The Rail Facilities at the Cut-up Plant

Vancouver Barracks, as one of the West’s oldest Army posts, was built without rail access. After 1883, there was Northern Pacific service to Vancouver by way of a branch line from the Kalama-to-Tacoma main line. When the SP&S built its north bank line through Vancouver in 1907, direct rail service to the base became available. As a result, the Army built a spur onto the southern part of the post to provide a shipping point for goods delivered by the SP&S. Maps of the original spur show a single curving track leaving the SP&S mainline via a trestle to bring it down to the level of the field and a modest set of buildings including sheds for coal and wood.

²⁷ The United Railways line was an obscure branch in the western Willamette Valley that connected to Portland. After the great Tillamook Burn of 1933, much of the fire-damaged timber was sent via the Gales Creek and Wilson River Railroad by the United Railways to mills or booming grounds in Portland, earning substantial revenue for the SP&S (see Gaertner, *North Bank Road*, 49 and Walter Grande, *The Spokane, Portland, and Seattle, The Northwest’s Own Railway*, (Portland, 1997), 102-117)

²⁸ “Historical” Brice P. Disque Collection, University of Oregon Special Collections, Eugene, OR.

²⁹ Traffic Section, Spruce Production Division, Portland to H.M. Adams, Chief, Inland Traffic Service, Washington DC, July 27, 1918. ARC 5049512, General Records, Spruce Production Division papers, NARA, Seattle, WA.

³⁰ “October Shipments,” *The Timberman*, (October, 1918), 35.

The original siding was inadequate for the volume of traffic that would be coming into the Cut-up Plant, so additional development of spurs and sidings was proposed in the original authorization:

5. A siding to be led off the North side of existing siding about one hundred (100) feet South of the South end of Building 110 and to extend to the north side of the Construction area above described. A siding to be led off the South side of existing siding about three hundred (300) feet South of South end of Building 110, and to extend to the south side of Construction area above described.³¹

The Army presumably built the enlarged spurs and sidings because the project was a part of the construction of the Cut-up Plant. However, SP&S “Authorization for Expenditures” accounts listed an undated project, number AFE 2632, to “Lay siding and track, Government spruce cut-up mill.”³² This project may refer to the improvement made in December, 1917, or some subsequent improvements in the spur and sidings at the Cut-up Plant.

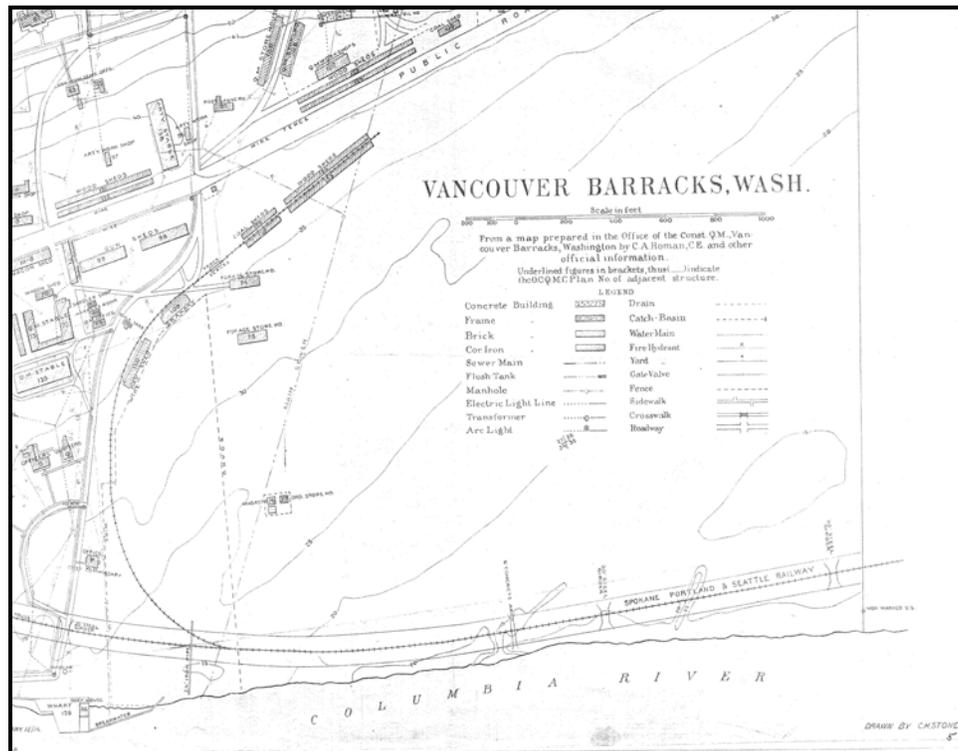


Figure 4-14 Rail spur onto Vancouver Barracks after 1908 but before January 1917. Facilities include sidings, coal bunkers, warehouses, and sheds for wood as well as a water tank (Homan Map from Ft. Vancouver NHS archives).

³¹ Commanding Officer, 4th Engineers to Headquarters, Post of Vancouver Barracks, Washington, December 13, 1917. ARC 5049398 Correspondence, Vancouver Barracks, Spruce Production Division Papers, NARA, Seattle.

³² Records from SP&S Engineering Section, Great Northern Papers, Minnesota History Center, St. Paul, Minnesota.

Maps of the Cut-up Plant in operation after February of 1918 show a complex set of sidings off three spurs serving the post. Spur "A" is the spur built north of the original spur as described in the December 13, 1917, authorization.

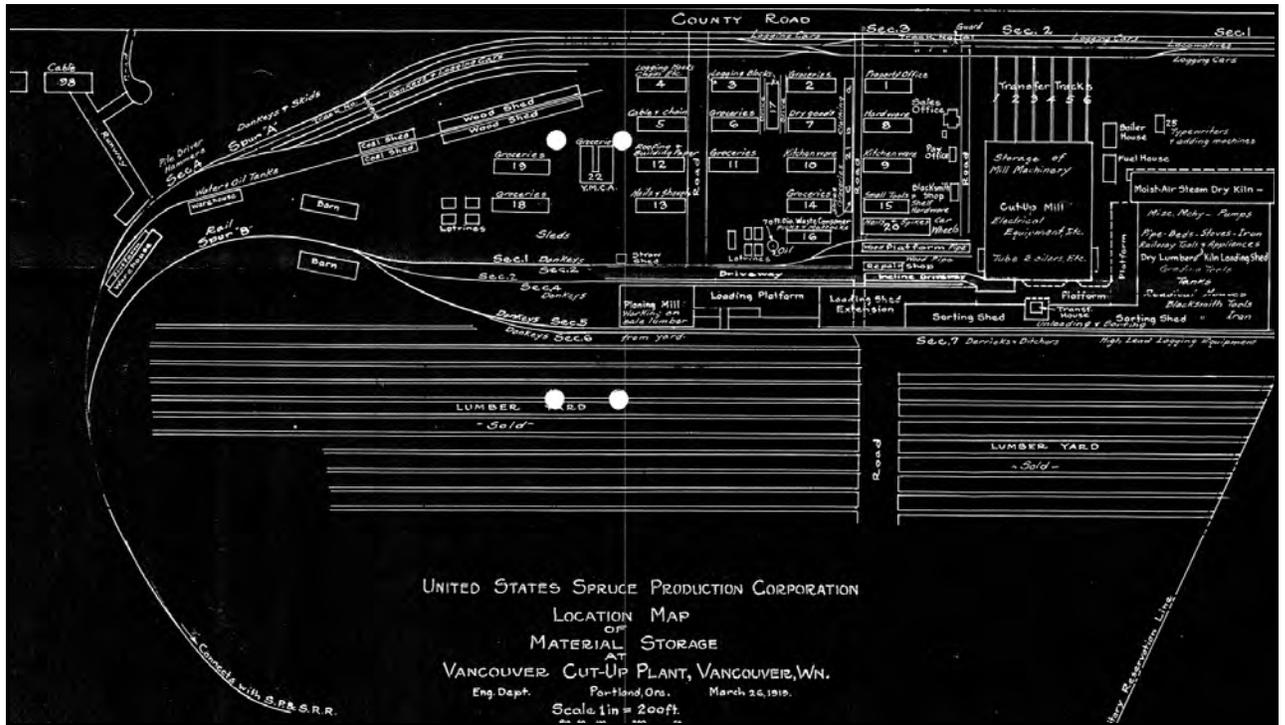


Figure 4-15. Map of the Cut-up Plant, March 26, 1919. This shows the spur and siding development at its fullest (Map from NARA College Park, MD).

Spur "A" extended east as far as the eastern boundary of the post and served the front of the main mill building. Incoming loads of timber would come in on spur "A," which was equipped with sidings to store empty cars or cars waiting to unload. This spur and siding complex also included the track for the locomotive crane that unloaded the cants for the six mill head saws. The original spur, immediately south of spur "A," remained unaltered, serving the Army's coal sheds and wood shed.

Spur "B," built south of the original spur, brought in empty cars to load lumber from the loading platform, storage sheds, and planning mill. Cars loaded with lumber were then sent back to Portland or Vancouver to connect with east-bound trains. At the peak of operations in the fall of 1918, the rail facility at the Cut-up Plant was impressive:

Track connections are with the Spokane, Portland, and Seattle RR. [W]ithin Vancouver, Washington, Yard Limits there being a total of 6700 lineal feet track along platforms and loading sheds which could be used for unloading or shipping facilities. There is also 20,000 lineal feet track used for storage purposes within the plant yards, also yard storage space to accommodate storage trackage.³³

³³ C.B. Williams to Col. Stearns, Dec. 1, 1919, ARC 601796, Correspondence, Vancouver Barracks, Spruce Production Corporation Papers, NARA Seattle

With a daily volume of 100 cars, the Cut-up Plant would have been a very busy place with cars moving in, unloading, and with some empty cars being retained for delivery of lumber. Many of the incoming cars would have been flat cars or gondolas, however, and these were not suitable for delivering finished lumber during the warm months.³⁴ So empty boxcars would have to come in to be filled with lumber and empty flatcars and gondolas would have to be removed from the Plant and sent back to the contract mills for another load of cants.

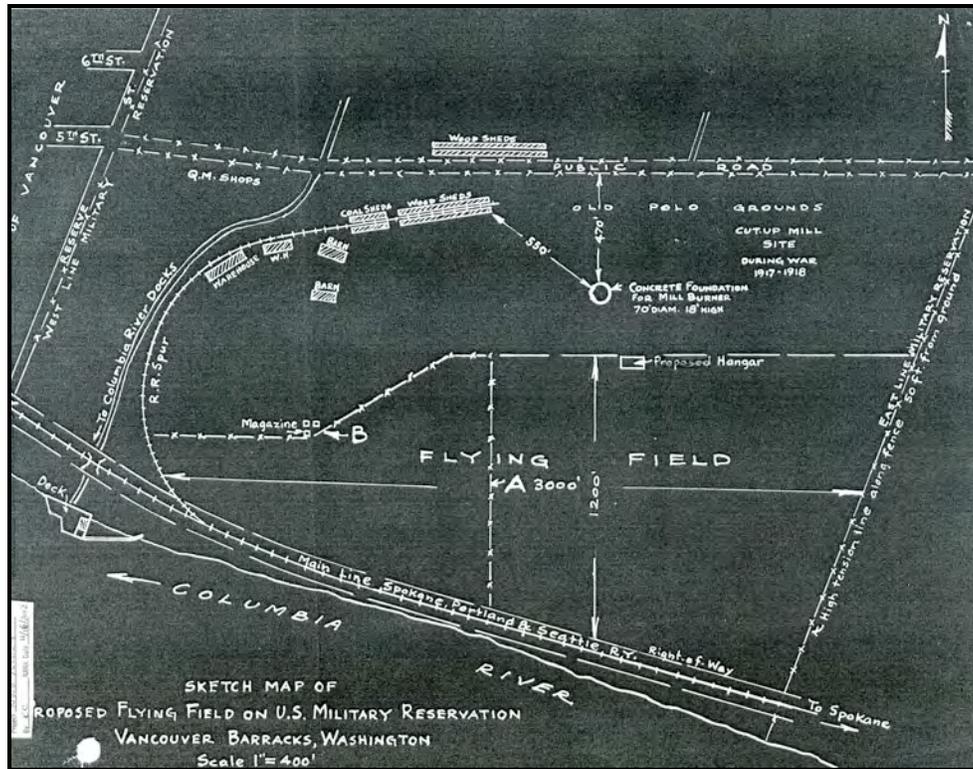


Figure 4-16 Map of Cut-up Plant area after 1925, when the main mill building had been demolished. Note that the configuration of spurs has returned to the pre-war status with a single spur serving Vancouver Barracks coal and wood storage sheds (Map from NARA, Seattle).

At the end of the war the spur and siding complex built to serve the Cut-up Plant was dismantled after the main mill building was demolished in the winter of 1925. The rail facility on the south side of Vancouver Barracks returned to its pre-war configuration.

Traffic

Railroad and industrial organizations in the first half of the 20th century used the term “traffic” to refer to the movement of rail cars and trains. As we have seen, the railroad situation in the Northwest in 1917 was complicated. In other parts of the country

³⁴ *History of the Spruce Production Division*, 61.

it was equally complicated, and in the major rail centers like Chicago, St. Louis, or Philadelphia it was bewildering. Disque and his advisors no doubt recognized that traffic management was critical to the success of the SPD. They appointed a traffic manager in the fall of 1917, but the position was not clear in the chain of command (see p. 29ff).³⁵ When the Cut-up Plant and the spruce railroads came into production, the traffic manager, Captain George Powell, had increased responsibilities. In July, 1918, we find Powell responding to complaints to the U.S. Railroad Administration's Chief of the Inland Traffic Service in Washington, DC:

If your request was occasioned by the recent report of the Car Service Commission that there were 226 cars of cants on hand in the Vancouver terminals for shipment to the mill to be manufactured into aircraft, and which could not be loaded on account of congestion at the mill, please let me say that a personal check of the Vancouver terminals was made by the writer, and it was found that there was not more than the usual run of business on hand...³⁶

With a volume of 100 inbound cars each day, minor congestion at the Cut-up Plant could easily result in significant congestion at the Vancouver yards, which would in turn cause problems with NP traffic headed for Puget Sound. Since all U.S. railroads were operating under USRA orders during the war, problems at the Vancouver terminal would be reported to Washington DC.

There was still no position for a traffic manager in the chain of command as it was revised in the summer of 1918, but Disque added a new position on October 14, 1918. This was the "Manager of Railway Operations," who reported directly to Disque in Portland. The person in this new position had responsibility for the 13 spruce railroads, as well as railroad operations at the Cut-up Plant. The traffic manager at the mill, along with other railroad-related positions, reported to the Manager of Railway Operations.³⁷ This position may not have been filled in the three weeks remaining before the Armistice. In addition to traffic concerns, the new Manager of Railway Operation would have to deal with rates and shipping procedures.

Before the war, freight rates were set by railroads and adjudicated by the Interstate Commerce Commission (ICC) with the goal of standardizing rates for goods and equitable rates for different parts of the U.S. In March of 1917, for example, we find Idaho mills lodging a complaint with the ICC about lumber rates on the Northern Pacific, and the West Coast Lumbermen forming a Rate Committee to negotiate with the "western carriers" under the auspices of the ICC.³⁸ With the advent of the war, rates came under the purview of the U.S. Railroad Administration. The procedure for setting rates changed:

³⁵ *History of the Spruce Production Division*, 60.

³⁶ Captain George Powell to H.M. Abrams, July 27, 1918, ARC 5080983 General Correspondence, Spruce Production Corporation, NARA Seattle.

³⁷ "General Order No. 1, Changes No. 6," October 14, 1918, ARC 4913140, General Orders, Spruce Production Division papers, NARA Seattle.

³⁸ "Rate Reduction Asked;" "Rate Committee Formed," *The Timberman*, (April, 1917), 49.

A new structure of “uniform” freight rates for lumber shipments originating on the Pacific Coast is being worked out by J.B. Baird, traffic manager of the Northern Pacific at St. Paul, at the request of Edward Chambers, Director of Traffic for the Railroad Administration.³⁹

The U.S. Railroad Administration was set to expire 21 months after the Armistice. After that date, rate negotiations would again be conducted through the ICC rules. Rates set by the railroads at the behest of the U.S. Railroad Administration applied to all civilian shipments and to all government agencies including the SPD. Shipping spruce to the East Coast ports cost \$23/ thousand board feet in September, 1917.⁴⁰ Disque noted that as of February 1, 1918, all eastern shipments of fir airplane stock would be billed at \$65/thousand board feet.⁴¹ Shipment to Europe averaged \$195/thousand board feet.⁴²

The SPD created shipping instructions for cants to the Cut-up Plant and for finished lumber to airplane factories and East Coast ports. When the carloads of cants left the coastal mills for the Cut-up Plant, the chain of paperwork for the milling-in-transit system began. “Carloads of sawn or rived cants consigned to the Cut-up Plant” were to have a Commercial Bill of Lading billed to Vancouver, with the number of pieces in each carload and the composition of the load specified on the waybill.⁴³ Cants awaiting shipment for more than three days needed to be “stickered” with lumber to separate the cants, and the load needed to be covered with “cull boards” for protection from the elements. The covering boards were not to be nailed to the cants.⁴⁴ Lumber shipments in open cars were difficult because of damage from staining by moisture intrusion, or checking from exposure to the sun. Boxcars to protect the lumber were not always available, so the SPD developed shipping procedures for aircraft stock in open cars. The lumber was to be “stickered” with boards to ensure even air flow through the stack. The stacked lumber was to be “completely covered on ends, side, and top” with nominal 1-inch shiplap covers, secured (but not nailed) to the stack.⁴⁵

The Traffic Manager had three principal problems with car movements. The first was the chronic shortage of available rail cars. The second problem occurred when a railroad or the U.S. Railroad Administration declared an “embargo.” This stopped all shipment beyond a certain geographical point, and usually meant that the lines and yards were clogged with trains and cars in that area. The third problem was scheduling when a carload was due to arrive at its destination. The average travel time to each destination could be estimated, but “diversions” could delay delivery for weeks.

³⁹ “New Lumber Rates Planned,” *The Timberman*, (November, 1918), 35.

⁴⁰ “Spruce Manufacturers meet in Centralia,” *The Timberman*, (September, 1917), 48b.

⁴¹ “SPD Bulletin No. 21,” ARC 5049398, General Records, Spruce Production Division Papers, NARA. Seattle.

⁴² “Spruce Manufacturers meet in Centralia,” *The Timberman*, (September, 1917), 48b.

⁴³ “SPD General Orders, Transportation, 199,” ARC 4913140, General Orders, Spruce Production Division Papers, NARA, Seattle.

⁴⁴ “Tentative Specifications for Spruce Cants for Aircraft Material, SPD Bulletin #10” ARC 5049398, General Records, Spruce Production Division Papers, NARA. Seattle.

⁴⁵ “Bulletin No. 37, To All Spruce Mills,” April 4, 1918,” ARC 5049398, General Records, Spruce Production Division Papers, NARA. Seattle.

Car shortages were not confined to war-time railroad operations. They occurred whenever a railroad was not able to supply empty cars to load for shipment. In the lumber industry, mills that were unable to obtain empty cars were unable to sell their output and were caught in serious financial straits. The U.S. Railroad Administration recognized that car availability would be a major issue during the extra stress of the war, and created a Car Commission to regulate car movements. The car crisis for the SPD began during the winter of 1917-1918. It began on the Tillamook Branch of the Southern Pacific, and “spread rapidly over the remaining lines of that company.”⁴⁶ The SPD traffic officer, Captain George Powell, appealed to the Car Commission but was unable to get adequate support, so “arrangements were made” (presumably by Powell) to get the Union Pacific to deliver five empty cars each day to the Southern Pacific in Portland for SPD use. This agreement worked for a while but eventually fell apart. The SPD worked with the railroads and the Car Commission to formulate a plan to get cars for aircraft lumber and U.S. Fleet Emergency Corporation lumber, but without cars to ship the commercial lumber cut from the lower-grade spruce and fir, the mills had to shut down for lack of revenue.

By December of 1917, the car shortage on the SP spread to the Northern Pacific. The SPD worked out a complicated plan in January with the SP and the NP to furnish adequate cars for government lumber, and enough cars to keep the mills’ commercial sales running. The SPD publicized this plan in the February issue of *The Timberman* magazine, pledging the Army’s help for spruce-producing mills unable to get enough cars. Unfortunately, the new plan did not please the Northern Pacific or the Car Commission and was suspended on February 5, 1918.⁴⁷ In March more of the contract mills closed because they could not ship lumber to market. Spruce production declined. “Extensive telegraphic communication between The West Coast Lumbermen’s Association and Director General McAdoo [Car Commission], and between General Disque and the War Department kept the wires warm.”⁴⁸ Finally, in April, issues of car assignments were resolved in favor of the SPD and the shortage ended for the rest of the war. Disque noted that by mid-April, 1918, “the car situation is still above normal, and all mills are disposing of their accumulated side-cut. Average daily shipments, April 8th to 25th inclusive, amounted to 801 cars of all classes for mills in Oregon and Washington.”⁴⁹

One of the problems that exacerbated the car shortage was the time it took to deliver a car to its destination and unload it. When the SPD started shipping lumber, “the transit time to the East had been from forty-five to ninety days.”⁵⁰ This meant that an individual car might not be available for a load back to the west coast for up to 100 days. The lumber industry was not concerned about this transit time because one of their business practices was to sell carloads of lumber “in transit.” When the mills had lumber to sell, they often sent it by rail, without a buyer, to some junction point in the east. When

⁴⁶ *History of the Spruce Production Division*, 62.

⁴⁷ *History of the Spruce Production Division*, 63.

⁴⁸ *History of the Spruce Production Division*, 63.

⁴⁹ “Historical” n.d., 3, Brice P. Disque Papers, University of Oregon Special Collections, Eugene, OR.

⁵⁰ *History of the Spruce Production Division*, 62.

the car left the mill, salesmen offered the carload to buyers along the way by telephone, telegraph, or mail. Since their communications easily outdistanced the loaded car, it was usually sold somewhere on route, and would be “diverted” from the train at an appropriate siding. The train stopped to drop the car, then had to wait to get back into the traffic pattern and continue until another car was diverted, and then stop somewhere else. The car might sit idle on a siding for a week or two. If it sat for more than a few days, it was charged “demurrage” or a parking fee by the railroad. The lumber companies became very adept at working this system to their advantage. In peace time, when there were enough boxcars for everyone, this practice was convenient for everyone. When the pool of available cars dried up, transit time had to be reduced. Also, as a newcomer to the lumber business, the SPD was apparently not very clever at avoiding demurrage.

Owing to the fact that under the present tariffs reconsigning charges are assessed against all cars of aircraft [lumber] originally billed to Chicago, concentrated at certain junctions for the purpose of reconsigning to ultimate consignee and destination, a new plan of handling has been adopted. All charges other than the regular freight rates incidental to the movement of aircraft [lumber] will then be eliminated except when it is necessary to divert cars on instructions from the Order Section of this Division.⁵¹

In fairness to the lumber industry it is worth noting that not all manufacturers practiced selling in transit, and that many in the industry felt that it was an abusive practice.

There is no practice which has such a demoralizing effect on the lumber and shingle industry as the abuse of re-consignment privileges. In season and out of season, *The Timberman* has inveighed against this re-consignment and diversion idea. It is basically wrong in theory. It encourages speculation. The practice is manifestly unfair to the shipper who has a definite order for material and is unable to ship because the equipment has been commandeered by a competitor without orders but who takes the gambler’s chance of selling in transit and deprives the legitimate shipper of the equipment.⁵²

In November, 1917, the Southern Pacific responded to the growing problems of car shortage and shipping delays by refusing to accept diversions. “Effective November 20, 1917, the Southern Pacific Company will not permit diversion or re-consignment of carload shipments of lumber or shingles on any points on its lines.”⁵³

The solution for the problem of diverting cars and delaying trains was relatively simple. The SPD partnered with the Fir Production Board, its sister agency with the U.S. Emergency Fleet Corporation. The Fir Production Board was based in Seattle and was charged with acquiring fir ship-building lumber for east coast shipyards. Disque and his counterpart from Seattle met with the railroad representatives from the Chicago, Milwaukee, and St. Paul, the Harriman Railroads (UP and SP) and the Hill lines (NP, GN, SP&S). They agreed to make up special trains of government lumber from Vancouver and Seattle for delivery to defense plants, shipyards, or ports on the east coast. The trains could not be diverted since there were no speculative carloads. Transit time to

⁵¹ “Historical” n.d., p.3 Brice P. Disque Papers, University of Oregon Special Collections, Eugene, OR.

⁵² “Abolish the In-Transit Feature,” *The Timberman*, (September, 1917), 1.

⁵³ “S.P. Embargo on Diversion Cars,” *The Timberman*, (November 1917), 31.

Chicago was cut to eight days. Time to Buffalo and Galveston averaged eleven days, and time to New England averaged eighteen days. This was a significant improvement over the previous average of forty-five to ninety days.⁵⁴

Embargoes occurred when a railroad, or the U.S. Railroad Administration, simply stopped accepting shipments of a specified product or service to a specified area. In December, 1917, and January, 1918, the Railroad Administration embargoed shipments of lumber to all points east of St. Louis and Chicago. The railroads serving the east coast refused to accept lumber for delivery east of Chicago, and by the end of January, “the situation was so aggravated that even government lumber was interfered with.” Again in March an embargo was issued suspending all shipment east of the Illinois state line. Finally, an embargo in September, 1918, stopped all commercial lumber shipments for October. The SPD was able to ship aircraft spruce during the embargoes, but the contract mills and the Cut-up Plant were unable to sell their “side cut” or the commercial lumber made from spruce or fir that did not meet aircraft standards.⁵⁵

The railroad system for the SPD was complicated, and needed constant attention, but the final result was that it worked and enabled the agency to do what it was supposed to do. Total traffic from the SPD amounted to 7,908 cars of aircraft lumber shipped from August 1917 to November, 1918. Cars loaded with cants shipped to the Cut-up Plant totaled 12,730. The cants and flitches were made up of 2,931 cars of rived spruce; 3,937 cars of sawn spruce; 5,171 cars of fir; 481 cars of rived cedar; 268 cars of sawn cedar; 4 cars of hemlock; and one car of larch. This volume was of course a very small part of the total railroad traffic during the War. The joint Fir Production Board/Spruce Production Division “solid trains” began running in February, 1918. By Armistice Day, 390 of these special trains had reached the east coast. This traffic was distributed among the transcontinental railroads as follows:

- 43 special trains by Chicago, Milwaukee, and St. Paul Railway
- 44 special trains by Great Northern Railway
- 149 special trains by Northern Pacific Railway
- 145 special trains by the Union Pacific Railway.⁵⁶

⁵⁴ *History of the Spruce Production Division*, 60.

⁵⁵ *History of the Spruce Production Division*, 65.

⁵⁶ *History of the Spruce Production Division*, 65.

CHAPTER V

THE SPRUCE PRODUCTION CORPORATION AND THE BEGINNINGS OF MILITARY AVIATION AT VANCOUVER BARRACKS, 1917-1925

Pearson Field Overview

Pearson Field, the U.S. Army aviation field at Vancouver Barracks, had a complex past involving several military and civilian agencies. In general, aviation at Vancouver Barracks developed slowly and unofficially before World War I. It was conducted by civilians with the support and cooperation of the Army. Aviation stagnated during the World War I years, then grew quickly in the 1919-1925 period.¹ Military aviation persisted at the Barracks until World War II, after which it ended abruptly.

The massive presence of the Army Signal Corps, Aviation Section, Spruce Production Division, at Vancouver Barracks from 1917 through 1918, was the largest concentration of Army aviation forces during the war. And, as we have seen, their efforts were critical to the Allies' air war in Europe. But the men of the Spruce Production Division (SPD) had nothing to do with the manufacture or operation of aircraft—they simply made aircraft-grade lumber. Since the Allies' military airplanes were manufactured in other parts of the U.S. or in Europe, there was no aircraft construction or flight associated with the Spruce Production Division at Vancouver Barracks. In fact, much of the old Vancouver Barracks polo field, which had been used intermittently by aviators before the war, was appropriated by the SPD for lumber manufacturing.

In 1923 Army aviation at Vancouver Barracks got its official start when the Army Air Service assigned the 321st Observation Squadron to Vancouver Barracks. The 321st was an Army Reserve unit. It trained Reserve officers, held summer camps for Reserve organizations from other parts of Oregon and Washington, and conducted training flights. The 321st remained at Vancouver until 1941.

When the 321st arrived in 1923, there was a modest aviation facility consisting of runways, a hangar, and a shed. An Army aviator attached to the Spruce Production Corporation was keeping two airplanes there and flying out of Vancouver for training purposes. The hangar for the two aircraft was built by the Spruce Production Corporation

¹ See William Alley. *Images of Aviation: Pearson Field* (Chicago, 2006); [Jon Walker], *History of Pearson Airpark: 1905-1927*, Unpub. mss on file, Ft. Vancouver National Historic Reserve, n.d.; Jon Walker, *A Century Airborne: Air Trails of Pearson Airpark* (Vancouver, 1994); Von Hardesty, *Historical Overview of Pearson Airfield* (Seattle, 1992); Donna L. Sinclair, *Riptide on the Columbia: A Military Community Between the Wars, Vancouver, Washington and the Vancouver National Historic Reserve, 1920-1942*. (Vancouver, 2005).

on land leased from the Army. By 1925, the nascent air field—variously named the Vancouver Barracks Aerodrome, Weeks Field, and the Vancouver Flying Field—was officially established by the Army in its present location as Pearson Field. The field was named after Lt. Alexander Pearson, Jr., a promising Army pilot who had been killed in a crash in 1924.

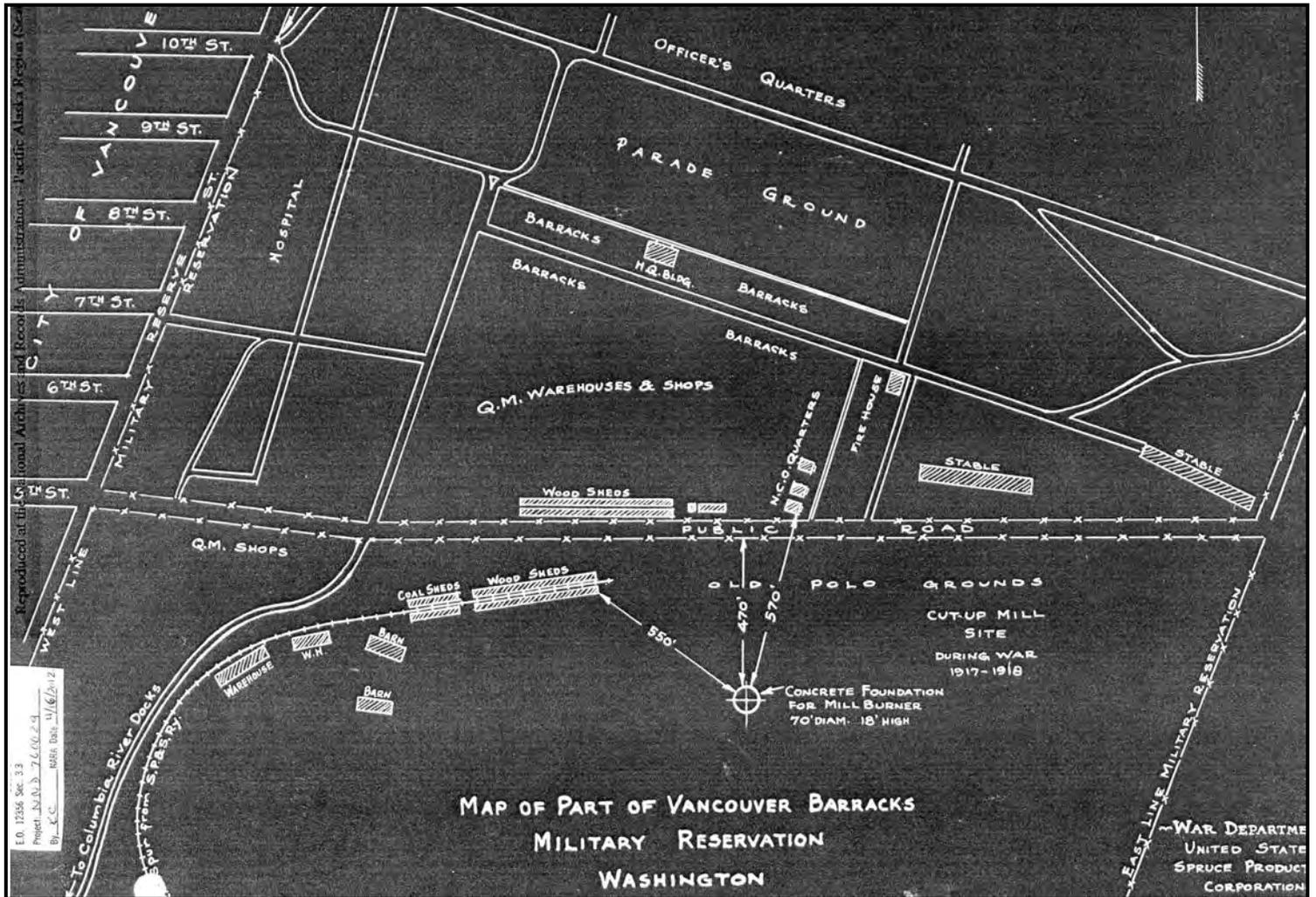


Figure 5-1 Map of the south east corner of Vancouver Barracks, prepared by the Spruce Production Corporation before building their hangar in the fall of 1921. The “Old Polo Grounds” was the site of aviation before 1917. During WW I, the spruce mill occupied much of the polo field from 5th St. (“Public Road”) on the north to a point near the southern border of this map (see figure 5-3). The concrete burner base, shown as the datum on this map, was near the geographic center of the sprawling spruce mill. The Spruce Production Corporation hangar and shed were located about 50 m south of the burner base and slightly to the east (see figure 5-5). The military part of Pearson Field was established about 450 m to the northeast of the burner base and near the eastern boundary of the military reservation. In 1925, the military part consisted of a new steel hangar, two office buildings moved from the SPC area, and the SPC 1921 hangar (see figure 5-8). The civilian part of Pearson Field was established further to the east, on 70 acres of private land leased from The Spokane, Portland, and Seattle Railway. Blueprint from RG 18, Entry SE 7574, ARC 5080983, General Correspondence, Spruce Production Corporation Papers, NARA, Seattle.

The Army created Pearson Field in 1925 by assembling a new hangar, and then moving two office buildings and the Spruce Production Corporation hangar to their present locations near the eastern border of the military reservation. Civilian aviators were excluded from Pearson, except in emergencies. In response, and with the blessings of Lt. Oakley Kelly, commanding officer of the 321st, the Vancouver Chamber of Commerce leased 70 acres of contiguous land from the Spokane, Portland, and Seattle Railway.² This land was developed as a civilian field, continuous with the military field, for use by private and commercial aviators in Vancouver and Portland. The two sides shared runways. In 1928, the City of Vancouver took over the civilian side of Pearson from the Chamber of Commerce. Air Mail and some limited passenger flights from Pearson date from this period. Private aviation was the dominant use, however.

During the 1920s and 1930s the fortunes of civilian and military activity at Pearson waxed and waned. The high point of regional and even international attention occurred in 1937 when Soviet pilot Valery Chkalov flew non-stop from Moscow to Vancouver across the North Pole in 62 hours.

In 1941, with the U.S. entry into World War II, the 321st Observation Squadron was activated for war service and left Pearson. During the war there was what historian Von Hardesty calls “some military flying in and out” of Pearson, but little sustained activity.³ In 1940 and 1941, the Army had built the larger and more convenient Portland Army Air Base across the Columbia River near Portland. The Portland location prospered during the war with military training, patrol, and transport flights. At the end of the war, Pearson was declared surplus and in 1949, title to Pearson transferred from the Army to the City of Vancouver. The City re-named the field Pearson Airpark.⁴

Aviation Culture at Vancouver Barracks Before 1918

During the years between 1905 and 1917, Vancouver Barracks was a central place in the Portland area for aviation enthusiasts to gather, try out their aircraft, and in some cases set up camp. These early aviators were civilians, and most of them were amateurs. The few who were employed as aviators were typically hired to perform stunt and exhibition flights. Perhaps the most striking aspect of these early years is the degree of cooperation between the military establishment at Vancouver Barracks and civilian aviators. Historians Jon Walker and Donna L. Sinclair make a convincing case that amateurs, commercial “daredevils,” and military men shared an enthusiasm and dedication to the emerging “science of flight.” Walker characterizes the men who gathered at the Vancouver Barracks polo field as “...a mixture of professional pilots, backyard tinkers, auto mechanics, and hangers-on.”⁵

² Hardesty, *Historical Overview*, 22.

³ Hardesty, *Historical Overview*, 32.

⁴ Hardesty, *Historical Overview*, 32.

⁵ Walker, *History*, 19.

In 1905 dirigible pilot Lincoln Beachey forged the original link between aviation and Vancouver Barracks by landing the first airship at Vancouver and delivering a message from the Lewis and Clark Exposition in Portland to the base commander, General Constant Williams.⁶ Beachey's message to General Williams had no particular content, but it did draw public attention to the Lewis and Clark Exposition. The dirigible flight also gained additional publicity by demonstrating that the Columbia River, which did not have a bridge at this time, could be crossed by airship. As the account in the *Portland Oregonian* made clear, the flight was not all smooth sailing.⁷ In his attempt to return to Portland, Beachey encountered headwinds that forced him to return to Vancouver twice before he was blown north to land at a farm near Orchards, Washington, about five miles east of Vancouver. His airship, the *City of Portland*, had to be disassembled and brought back—somewhat ignominiously—in a farm wagon.

Lincoln Beachey was 18 when he flew in 1905, and the *Oregonian* regarded him as a “daring aviator.” Ten years later, while flying a monoplane at the Panama-Pacific Exhibition in San Francisco, Beachey was killed. The wings of his ship “crumpled like a collapsed umbrella” at 3000 feet and he plunged to his death in front of several thousand spectators.⁸

Beachey's dirigible flight to Vancouver Barracks originated at the Aeronautic Concourse on the Lewis and Clark Exposition grounds.⁹ Because of the ship's ability to take off and land vertically, it did not require a runway. Heavier-than-air ships needed more space, and their use was incompatible with urban areas. As the only military base near Portland, and as the location of a spacious polo field maintained for the cavalry, the Barracks was a logical choice on two counts.

The best location for the other end of the Portland-to-Vancouver flights was less obvious. The field in Portland most favored by early aviators was the Portland Fair and Livestock Association's Country Club grounds, on East 62nd Street near the Oregon Railway and Navigation tracks. When flights were planned, tents were erected as temporary hangars. There was plenty of room for spectators, and the O.R. & N. ran special trains from Union Station for the events.¹⁰ Later, Portland had municipal airports at Sellwood and on Swan Island. Sellwood was converted to a golf course in the early 1920s, and the Swan Island municipal airport was not operating until 1927.

An event held at the Country Club grounds in 1910 illustrates the complex social network of early aviation. The spring of 1910 was a very early point in aviation development in the U.S. Only seven years after the Wright Brothers' first flight, aircraft were still a great novelty. The air meet on March 4 would bring together three Curtiss aircraft. Two were furnished by the Curtiss Flying Team and operated by pilot Charles

⁶ For general accounts of the early years of flight at Vancouver Barracks, see Alley, 2006; [Walker], n.d., Walker 1994; Hardesty, 1992; and Donna L. Sinclair, *The Waking of a Military Town: Vancouver, Washington, and the Vancouver National Historic Reserve, 1898-1920* (Vancouver, 2005).

⁷ “Takes Message by Airship” *Portland Oregonian*, Sept. 20, 1905, 1.

⁸ “Lincoln Beachey Falls to Death” *Portland Oregonian*, March 15, 1915, 1,3.

⁹ Carl Abbott, *The Great Exposition: Portland and the Lewis and Clark Exposition* (Portland, 2004) 45.

¹⁰ “Sky Craft Arrives” *Portland Oregonian*, March 2, 1910, p. 20.

Hamilton. One was provided by Portland businessman and Good Roads activist E. Henry Wemme. Wemme was not a flier, but he was bringing his airplane to the meet to publicize the Good Roads movement and the Columbia Gorge and Mt. Hood Loop Highways. Spectators needed to purchase tickets. The meet consisted of several flights and demonstrations, including a race between an airplane and a Buick automobile for a \$100 prize. The Portland Aeronautical Club offered a prize of \$500 if Hamilton could break the current airplane distance record of 35 miles.¹¹

Oregon's Governor Benson attended the meet, but the most notable spectator was General Marian P. Maus, Commandant of the Department of the Columbia at Vancouver Barracks. Maus requested that the pilot

"...conduct a series of maneuvers at the Country Club grounds as he would if he were in a battle. One of the feats to be attempted in this connection will be the dropping of a bag of sand in full flight from a height of 500 feet. The aim will be to see if the aviator can drop the bag within a five-foot circle."¹²

Maus was then quoted in the *Oregonian's* coverage of the meet on the following day:

"If this [the bombing] can be accomplished all navies and fortresses in the world will become so much scrap iron and will form inviting objects for demolition and slaughter."¹³

Maus' interest in the meet illustrates the fascination early aviation held for the military and also shows that Maus himself—and by extension the Army—did not have planes or pilots available at this time. The Army had ordered its first airplane in 1908 from the Wright Brothers. The plane was delivered in 1909. In 1910, when the air meet was taking place in Portland, the Wright Brothers were still training the Army's first pilots. As late as 1914, the Army Signal Corps, Aeronautical Division, had only 28 flying officers and one airfield, which was at College Park, Maryland.¹⁴

In the early years of the decade, Silas Christofferson became the pilot most closely identified with Vancouver Barracks. Christofferson was a civilian, in his early 20s, and enthusiastic about motorboat and automobile racing as well as flying. Before 1912 he had made 200 flights at the Vancouver Barracks polo field. In the spring of 1912 Christofferson reached a record altitude of 10,000 feet and also crossed the Columbia to land at the Country Club field in Portland. The *Oregonian* recorded this flight as the first crossing of the Columbia by a heavier-than-air ship.¹⁵ Christofferson found his passion for flying at an early age, making his own airplane for his first flights. In the spring of 1912, he was flying regularly from the polo field, keeping his plane there, probably camping there, and establishing a list of "firsts" including taking the first women aloft. The crowning achievement of this busy season was his flight from the roof of the Multnomah Hotel in Portland to the polo field in June 11. He and his assistants dismantled his plane and re-assembled it on a 175' inclined wooden runway built on the

¹¹ "Weather Will Not prevent Flights" *Portland Oregonian*, March 3, 1910. p. 7.

¹² "Sky Craft Arrives" p.20

¹³ "Weather Will Not Prevent Flights" p. 7

¹⁴ G.W. Mixter and H.H. Emmonds, *US Army Aircraft Production Facts* (Washington DC, 1919) 5.

¹⁵ "Flight from Roof Beset By Danger" *Portland Oregonian*, June 10, 1912, p.16.

hotel roof. Christofferson gunned his Curtiss biplane down the runway, skipped over the parapet, and launched the plane on a successful flight back to the polo field.¹⁶

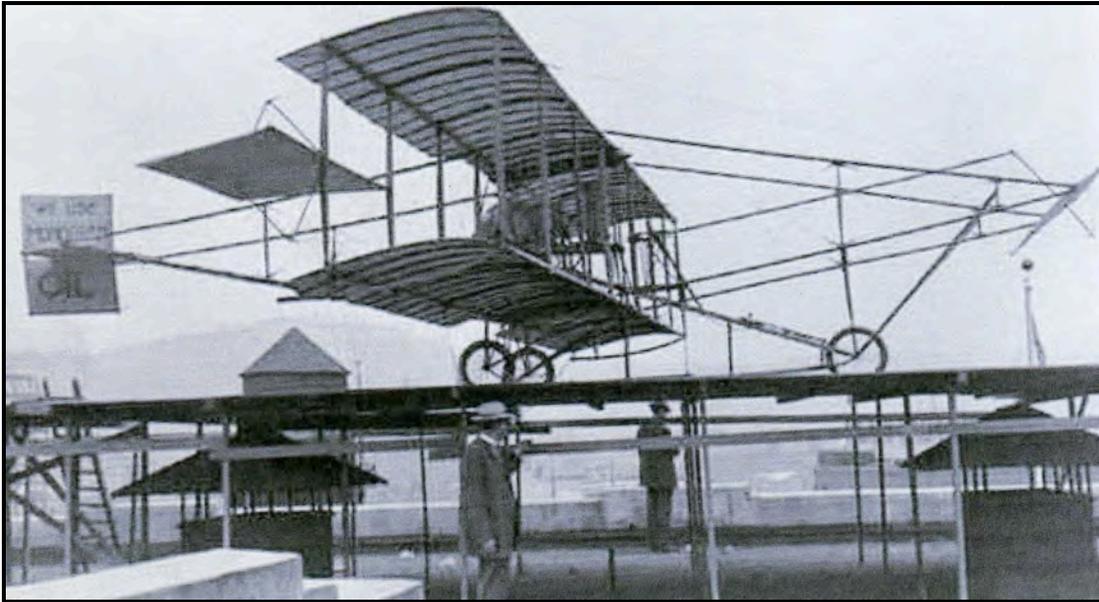


Figure 5-2 Silas Christofferson's Curtiss biplane on the roof of the Multnomah Hotel, downtown Portland, June 11, 1912. The plane is sitting on a 175' wooden runway built for the flight (Photo: NPS Ft. Vancouver NHS archive).

During the summer of 1912, the Army held a “military sports” festival at Vancouver Barracks with precision drills, cavalry maneuvers, bridge building, bayonet fencing and other activities. Christofferson and his Curtiss flew during the show to demonstrate military flying techniques.¹⁷ Since there were no Army pilots or planes, and he was on hand, the Army organizers used what was available, disregarding Christofferson's civilian status. Christofferson continued flying in Oregon and California. He married Emma Biesner, a girl from Portland, and was able to support himself by teaching flying, performing at shows, and taking people aloft. On November 1, 1916 his plane lost power and plunged to the ground, killing the young aviator.¹⁸

Other notable pioneer aviators flying at Vancouver Barracks before 1917 were Charles Walsh, Walker Edwards, Alys McKay (the first woman to land at the polo field), and Louis Barin. In August of 1917, after the U.S. had officially entered the war, what may have been the last series of civilian flights on the polo field took place. The O.K. Jeffrey Company in Portland set out to manufacture airplanes, and they were testing their first craft. The biplane was brought across the Columbia by barge and towed to the polo field. The *Oregonian* went on to comment: “There is a field of about 100 acres in the

¹⁶ Many accounts of this famous stunt are available. See Sinclair, *Waking of a Military Town*, 70, for a balanced treatment.

¹⁷ “Military Sports at Vancouver Draw Thousands of Spectators” *Portland Oregonian*, July 7, 1912 p.4.

¹⁸ “Portland Airman Killed in Flight” *Portland Oregonian*, Nov.1, 1916 p.5.

lower part of the military reservation suitable for aeroplane testing and it has been used for such purposes by a number of aviators.”¹⁹

Aviation at Vancouver Barracks During the War Years

After the U.S. entered World War I in April of 1917, the atmosphere at Vancouver Barracks changed. The informal community of aviation enthusiasts dwindled as young men joined the military, and the Army itself had more to do. Newspaper accounts in 1917 and 1918 emphasize recruiting activity, arrival of new personnel, and the creation of the Spruce Production Division after December 1917. The Barracks inducted troops and prepared them for France. The Barracks also embarked on a building program to accommodate and serve additional soldiers.²⁰

In December of 1917, the SPD began construction of the spruce mill complex. The site chosen was the polo grounds, still an open field of 100 acres with ample room for the huge mill that had been proposed. A force of 5,000 soldiers began work on the mill on December 14. According to the official history, it was ready to operate by February 7, 1918.²¹ At the time that the mill ceased manufacturing lumber in December of 1918, it was still under construction and relentlessly expanding into the polo grounds.

In practical terms, then, aviation at Vancouver Barracks ceased during the war for two reasons. First, the Army during wartime was a different organization than the Army during peacetime. The tolerant and cooperative attitude toward civilian aviation we have seen demonstrated during the years from 1910-1916 was inappropriate once the Barracks was placed on a wartime regimen. Second, the polo grounds which had served as the center of aviation activities was in use for other purposes.

¹⁹ "Portland Plane Tested" *Portland Oregonian*, August 19, 1917, 9.

²⁰ Ward Tonsfeldt and Katherine C. Atwood, *Historic Structures Report for Vancouver Barracks, West Barracks, Vancouver National Historic Reserve* (Seattle, 2002) 90-91.

²¹ *History of the Spruce Production Division*, 46.

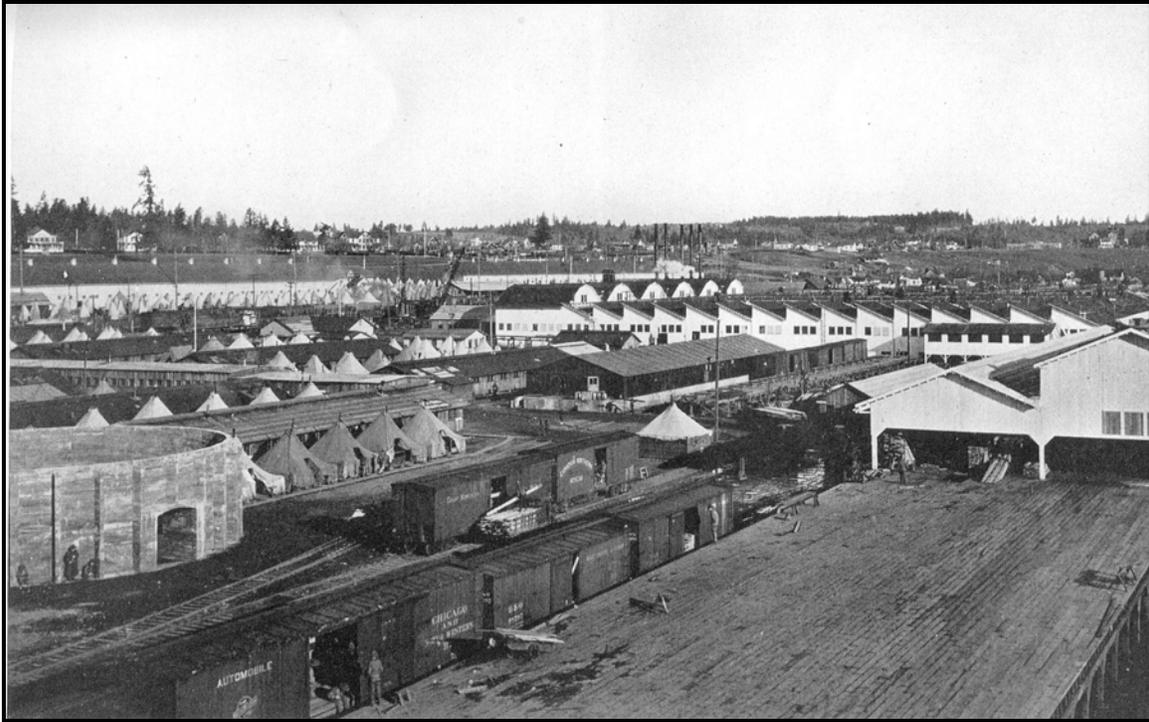


Figure 5-3 Spruce Production Mill occupies the polo grounds in 1918. The photo faces northeast from the loading area to the main mill buildings, with the concrete burner base on the left. The numerous white squad tents to the north housed soldiers assigned to the mill. Boxcars in foreground are being loaded with lumber for shipment to aircraft plants (Photo: NARA, College Park, MD).

The Spruce Production Corporation Takes Over, November 1918-September 1919

In early November, 1918—virtually on the eve of the Armistice—the Spruce Production Corporation took over the activities of the Spruce Production Division.²² The Spruce Production Corporation (SPC) was a hybrid civilian-military organization charged with producing aircraft-grade lumber using the material, personnel, and other resources of the Spruce Production Division. The Army Appropriations Act of July 9, 1918, (Sess. 2, ch. 143, 40 Stat. 845) had authorized the Director of the Aircraft Production Board to create “...one or more corporations for the purchase, production, manufacture and sale of aircraft, aircraft equipment, or materials therefor [*sic*], and to build, own, and operate railroads in connection therewith.” The Act also provided that within one year of the signing of a treaty of peace, all such corporations should be dissolved and the assets liquidated.²³ The Aircraft Production Board was to own and vote the stock of the Corporation, and to purchase any bonds or notes issued by the Corporation. All assets of the Spruce Production Division were to be assigned to the Corporation. Officers or enlisted men in the Army could be detailed to duty with the Corporation.

²² *History of the Spruce Production Division*, 84.

²³ http://fraser.stlouisfed.org/docs/publications/usbudget/pages/61321_1945-1949.pdf

The Board of Trustees formed to guide the Corporation was made up of Col. (now General) Disque, Col. Stearns, four well-known lumbermen, and a representative from the Loyal Legion of Loggers and Lumbermen. General Disque would serve as President of the Corporation. As the Corporation was constituted in November of 1918, there were 43 major administrative positions. Five of these were held by civilians, and the balance by Army officers.

During its heyday of production in 1918, the Vancouver mill employed some 5,000 soldiers. The labor force diminished as the mill cut the last lumber. Spruce soldiers from the scattered logging camps were brought to Vancouver Barracks, and mustered out of the Army.²⁴ As soldiers were demobilized, civilian workers had to be hired to finish business at the Vancouver mill. In January, 1919, the SPC announced that it would fill 300 positions with civilian workers, preferably with former Spruce Division soldiers.²⁵ In general, the logging equipment and supplies were sold into the industry, but the timber land, the railroads, and the mills lingered on the market. The eventual sale of these major assets involved contracts that paid the Corporation—and by extension, the government—on the basis of timber cut on the lands, transported on the railroads, and manufactured into lumber. The Corporation remained in business until 1946 in an office in Portland, administering the contracts, inspecting the properties, and collecting the payments.

Through the early 1920s, the Corporation included a small group of military officers as well as a civilian staff. The Vancouver mill site was the headquarters of the Corporation during the disposal of materials and supplies. Gradually, the warehouses, sheds, dry kilns, planning sheds, and barracks at the Vancouver mill were razed. In December of 1924, a contract was let for demolishing and salvaging materials from the main mill building. A salvage company from Portland took the main mill down in the first months of 1925.

As the spruce mill was receding into the past, a new facility was emerging at the Corporation property, phoenix-like, from the wreckage. This was the modest beginning of the second Vancouver Barracks aviation center, which was to become Pearson Field after 1925. It is unlikely that any aviation activity took place at the Barracks until the sale of logging equipment and lumber was nearing completion. The former polo field was occupied by goods for sale, including locomotives, railroad cars, miles of rail, yarders, railroad ties, spools of cable, and other items. As the inventory diminished, buildings could be torn down and the grounds opened up.

The Flying Field at Vancouver Barracks, September, 1919-September, 1921

As the Corporation was selling off the assets of the SPD and demolishing the physical plant of the Vancouver mill, the possibility of a new flying field at Vancouver

²⁴ "Soldiers Think of Home" *Portland Oregonian*, November 23, 1918 p. 12.

²⁵ "300 Jobs Help Situation" *Portland Oregonian*, Jan. 17, 1919, p.14.

Barracks came under discussion from several quarters. Aircraft design and manufacture had taken remarkable strides during the war. Planes like Silas Christofferson's Curtiss were completely eclipsed in power, speed, range, ceiling, practicality, and reliability by the new aircraft. In the post-war years, Army training planes from the war were available for other uses. The two common types were the De Haviland DH-4 and the Curtiss JN-4. As early as 1918, the USDA Forest Service saw the wisdom of augmenting their forest fire lookouts with aerial patrols during the worst parts of the fire season. H.S. Graves, Chief Forester, endorsed air patrols in 1918, and they were instituted on the West Coast during August and September of the following year.²⁶

During the fire season of 1919, detachments of men and aircraft from the 91st Observation Squadron at Crissy Field in San Francisco were sent to Roseburg, Eugene, and Salem, Oregon, for temporary fire patrol duty. By 1919, radio communication had been established on national forests in Oregon, Washington, and California, as well as other forested states.²⁷ This radio service was extended to aircraft during the patrols.²⁸ At the instigation of Oregon's Senator McNary, Congress allocated \$60,000 in May of 1920 for the Forest Service to cooperate with the War Department in arranging patrol flights. The 91st was called out for duty at Roseburg, Eugene, and Salem (but not Vancouver) during the fire seasons of 1920, 1921, and 1922.²⁹

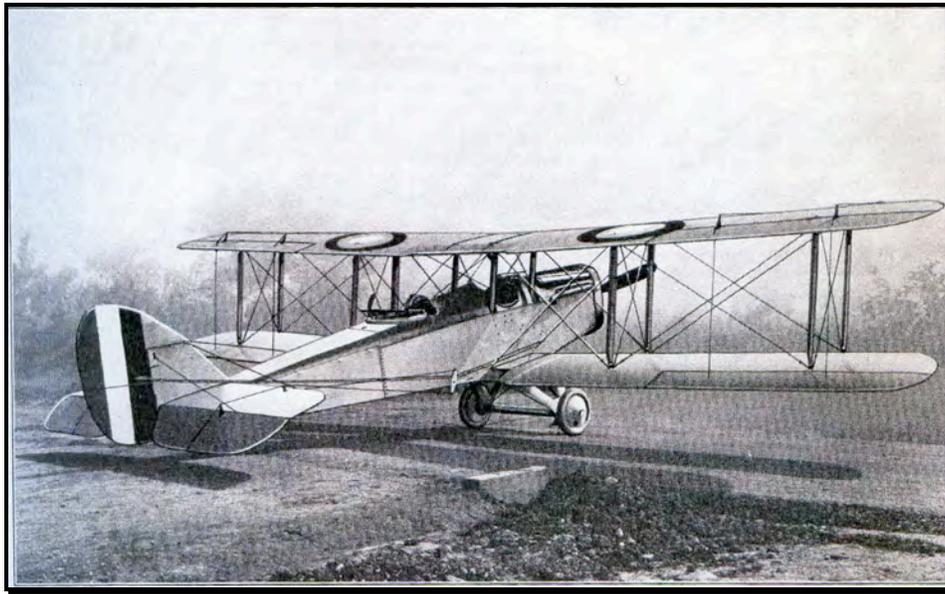


Figure 5-4 DeHaviland DH-4, popular training aircraft from WWI widely available after the war for peacetime military uses. Manufactured in the U.S. (Photo: NARA, College Park, MD).

²⁶ D.S. Edgerton, *Airplane Forest Fire Patrol History* unpublished manuscript, RG 95, Entry 61 Fire Control Records, 1909-1941 General Correspondence, NARA, College Park, MD.

²⁷ "Wireless Telephones to be Used for Communication with Airplanes" *The Forest Patrolman*, 1 (no. 6, 1920) 2.

²⁸ In the summer of 1920, the Forest Service had voice radio (radiotelephone) while the Army aircraft had code radio communication (radiotelegraph). The Western Forestry and Conservation newsletter noted that this situation was "being addressed." "Wireless Telephones" 2.

²⁹ "Resumption of Forestry Patrol" *Air Service News Letter*, 6 (no. 24, 1922) 3.

The War Department conducted patrols in other states, including California and presumably, Washington, but as late as the fall of 1922, no forest patrols were conducted from Vancouver Barracks.³⁰ Major Jacob E. Fickel, who was an Air Service officer attached to the Spruce Production Corporation, apparently took the lead in coordinating what aviation there was at Vancouver Barracks during this time. Fickel wrote to the Chief of the Air Service on December 21, 1921 that "...members of the Forest Patrol en route from Eugene, Oregon, to Camp Lewis, Washington, have frequently landed at the field. No record has been kept of these landings."³¹

Major Fickel's correspondence during 1921 shows that there was some aviation activity taking place at the Barracks, although it was not officially part of the Army Air Service operations. In July, H.A. Halvorsen, an Air Service officer from Crissy Field, asked Fickel how aircraft could be "kept in flying condition" at Vancouver, and whether aircraft were available for Reserve Officers' training and for use by the Flight Surgeon.³² Captain W.E. Farr, an inactive (i.e., Reserve) officer of the Air Service in Portland, wrote to Captain Lowell H. Smith at the Municipal Aviation Field in Eugene a week later saying that the field at Vancouver Barracks was adequate for a DH-4 to land, and that they were working on improvements to the field as quickly as possible. Farr also asked Smith to consider using the field at Vancouver Barracks "in place of the [Portland] Municipal Field at Sellwood." Farr was ready to "furnish transportation" for moving materials "from Sellwood to Vancouver at any time you desire."³³

On September 22, the Ninth Corps command in San Francisco wrote to the Commanding General of Vancouver Barracks to ask for his cooperation "to secure an airplane landing field in the vicinity of Portland, Oregon." The field would be used for "government planes on cross country flights, for the future operations of the aerial forest patrol and for use in connection with instruction of Reserve Officers."³⁴ The letter goes on to say that there were "no suitable landing fields in the vicinity of Portland" and that the Portland municipal field (Sellwood) is "about to be turned into golf links." The Ninth Corps correspondent reassured the General that the field could normally be used for other activities (perhaps polo) as long as "everyone on the field [is] required to get off when an airplane circles before landing."³⁵

By the fall of 1921, then, the Air Service command was interested in establishing a field at the Barracks, on the old polo grounds, for four purposes:

³⁰ By the fall of 1922, Forest Patrol flights were "considerably curtailed" and all 91st Squadron plans were based in Eugene. "Resumption of Forestry Patrol" 2.

³¹ J.E. Fickel to Chief of the Air Service, Dec. 21, 1921, RG 18, Entry 179, Bureau of Aircraft Production, Vancouver Barracks, NARA, College Park, MD.

³² Spruce Production Corporation to Halvorsen, July 21, 1921, RG 18, Entry 179, Bureau of Aircraft Production, Vancouver Barracks, NARA, College Park, MD.

³³ William E. Farr to Lowell H. Smith, July 25, 1921, RG 18, Entry 179, Bureau of Aircraft Production, Vancouver Barracks, NARA, College Park, MD.

³⁴ L.S. Chappellear to Commanding General, Vancouver Barracks, September 22, 1921. RG 18, Entry 179, Bureau of Aircraft Production, Vancouver Barracks, NARA, College Park, MD.

³⁵ L.S. Chappellear to Commanding General, Vancouver Barracks, September 22, 1921. RG 18, Entry 179, Bureau of Aircraft Production, Vancouver Barracks, NARA, College Park, MD.

- To serve Army planes on cross-country flights
- To serve Army planes en route from Camp Lewis to Forest Patrol duty in Roseburg, Eugene, or Salem
- To train Air Service reserve officers in the Portland area
- To replace the Sellwood municipal air field with a government facility.

The Spruce Production Corporation was leasing the polo field at this time, however. They were using some of the field, but no longer occupying all of it. More to the point, the person most closely involved in spearheading aviation at the Barracks was Major Jacob E. Fickel, an Air Service officer and pilot who was assigned to duty with the Spruce Production Corporation.

Fickel served with the SPC for a brief period from the spring of 1921 through the summer of 1922, but his correspondence reveals a young officer who was energetic and perhaps a little pushy.³⁶ As a certified Army pilot, Fickel was expected to fly a minimum number of hours each month to keep up his skills. Also, as a result of the provisions of the Hay Bill of 1914, active pilots received flight pay for their time in the air.³⁷ Fickel went on to become a Major General in the Army Air Corps, ending his long career as Assistant Chief of the Air Corps in Washington DC during World War II.

At some point in 1921, perhaps in response to the letter from the Ninth Corps, The Spruce Production Corporation built a hangar and a shed on the polo field. In December of 1923, Col. Van Way, President of the Spruce Production Corporation, explained the history of the hangar to the Vancouver Barracks Quartermaster:

1) This is to inform in reply to your letter of the 11th instant in respect to the air drome or hangar erected on that portion of the Vancouver Barracks Reservation now occupied by the U.S. Spruce Production Corporation that the building in question was erected in 1921 at the request of the Chief of Air Service by the U.S. Spruce Production Corporation from materials resulting from the wrecking and salvaging of the Corporation's mill buildings then in progress.

2) It was originally intended as a less substantial structure to house two planes being sent an Air Service officer on duty with the Corporation [Major Fickel] to enable him to continue his flying practice and to also carry on certain work in connection with the Air Service Reserve Corps officers in this vicinity. While construction was underway, the field was visited by the Air officer of the 9th Corps area, who requested that the building be made somewhat larger in order to accommodate three more planes which were to be placed on Forest Patrol during the coming summer. This increase in size necessitated a much more substantial building; however, as previously stated, it was accomplished by the labor of the salvaging crew and from the material of little value resulting from the wrecking then in progress and at very small additional expense to the Corporation's operations.³⁸

³⁶ <http://www.af.mil/information/bios/bio.asp?bioID=10144>

³⁷ Herbert A. Johnson, *Wingless Eagles: U.S. Army Aviation Through World War I*, (Chappel Hill, 2001), 24-26.

³⁸ Charles Van Way to The Quartermaster, U.S.A., Vancouver Barracks, Dec. 20, 1923. ARC 5090983, RG 18, entry SE 7574, NARA Seattle.

The location of the hangar and accompanying shed built by the Spruce Production Corporation in 1921 is shown on the following blueprint and aerial photograph, Figures 5-5 and 5-6. The new field was apparently welcomed by pilots flying from Camp Lewis to Forest Patrol duty in Salem, Eugene, or Roseburg in the fall of 1921. They informally named the new field “Webb Field” after a pilot who had been killed on Forest Patrol in 1919. General Patrick, Chief of the Air Service, did not approve of this name because the field was “only a landing field and not an organized airdrome.”³⁹ The default choice for the name of the new field was “Vancouver Barracks Airfield,” which was descriptive if not especially imaginative.

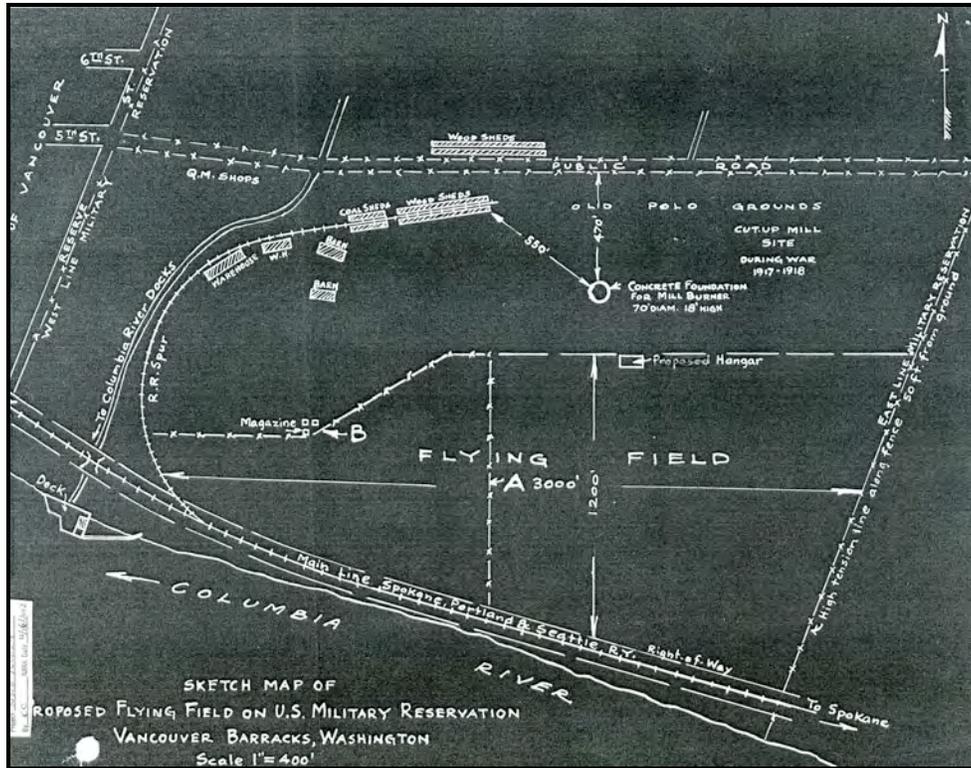


Figure 5-5 This is the same blueprint as Figure 5-1 with the location of the hangar added. Blueprint prepared by Spruce Production Corporation in 1921. Blueprint from RG 18, Entry SE 7574, General Correspondence, Spruce Production Corporation, NARA, Seattle.

³⁹ Mason H. Patrick to the Adjutant General, Oct. 13, 1921. RG 18, Entry 179, Bureau of Aircraft Production, Vancouver Barracks, NARA, College Park, MD.

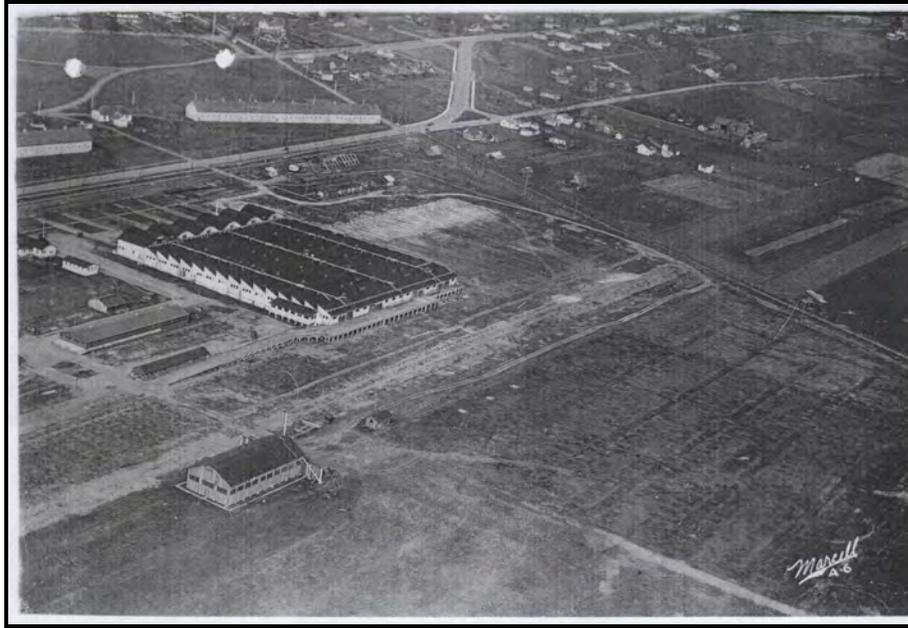


Figure 5-6 Undated aerial photo by “Marcell” of SPC hangar and shed, left foreground. The hangar was built in the fall of 1921. The main mill in left center was demolished in January and February, 1925: (Photo: NARA, Seattle).

By January of 1922, Major Fickel had his two DH-4s, but neither was running. One plane’s engine had water left in it which froze, splitting the water pump. The other plane’s oil pump seized up during flight. Fickel wrote to Major S.W. Fitzgerald at Rockwell Field, San Diego. Fitzgerald was apparently a friend, and Fickel asked that a new engine be sent to Vancouver, as well as a replacement oil pump. Fickel went on to characterize the situation at Vancouver that winter:

We have a very good flying field here at Vancouver Barracks, very smooth and long enough for any type of ship. At present it is good for only two-way landings, but after some more buildings of the Cut-Up Plant are demolished it can be converted into a four-way field. There is only one drawback to the field and that is a line of high-tension wires along one end that might get a stranger into difficulties. There is no danger if a person knows they are there. In spite of the far-famed wet weather of Oregon, there have been enough sunny days for me to get in all my flying days this winter.⁴⁰

Fitzgerald responded warmly that he was pleased to hear from Fickel and was prepared to send the engine and the oil pump, but that he needed some authorization:

I have never been informed as to just what your functions are, whether you are working directly under the Chief of Air Service, or under the supervision of the Air Officer, and therefore I am at a loss to know who supplies you.⁴¹

⁴⁰ J. Fickel to S.W. Fitzgerald, Jan. 23, 1922, RG 18, Entry 179, Bureau of Aircraft Production, Vancouver Barracks, NARA, College Park, MD.

⁴¹ S.W. Fitzgerald to J. Fickel, Jan. 30, 1922. RG 18, Entry 179, Bureau of Aircraft Production, Vancouver Barracks, NARA, College Park, MD.

Fickel's official "functions" with the Spruce Production Corporation almost certainly did not include flying, but that did not discourage him. He then sent requisitions to the Air Officer, Ninth Corps Area, San Francisco, on February 4, 1921 and apparently got his spare engine and parts. In June, Fickel was scheduled to fly his DH-4 to Mt. Rainer National Park to perform a "difficult mountain road reconnaissance" for the Park Service. Later in June, he was transferred to a new duty station.

In the following year, the 321st Observation Squadron, 96th Division, arrived at Vancouver Barracks and brought a new champion for the Air Service. This was Lt. Oakley Kelly. In the spring of 1924, there were five aircraft at Vancouver, and Kelly was asking for two more and an additional hanger to shelter them.⁴² This second hangar is referred to as the "steel hangar" in correspondence and was a standard military hangar, measuring 66' x 140.' It came from Mather Field, Sacramento, California, and may have been a new prefabricated building, or a surplus building previously erected there. It was still "being completed" in April of 1925, but it arrived at Vancouver without doors, which had to be back ordered.

In the winter of 1925, then, Pearson Field as it is now configured was beginning to take shape. The new steel hangar would be erected at a location on the polo field east of the recently-vacated main mill site. It remained at this location until it burned in 1976. On February 27, 1925, General Joseph Kuhn, Commanding Officer of Vancouver Barracks, asked that the Spruce Production Corporation office building and garage be transferred to the War Department for future use by the Air Service, 96th Division.⁴³ Kuhn included the annotated photo below, which was taken while the main mill building was still standing, in January of 1925. The office building was 25' x 50' and the garage was 20' x 40'. These buildings were to be moved to a location east of the main mill site

⁴² Oakley Kelly to Air Officer Ninth Corps Area, San Francisco, March 23, 1924. RG 18, Entry 179, Bureau of Aircraft Production, Vancouver Barracks, NARA, College Park, MD.

⁴³ J. Kuhn to Ninth Corps Area Command, San Francisco, Feb. 27, 1925. RG 18, Entry 179, Bureau of Aircraft Production, Vancouver Barracks, NARA, College Park, MD.

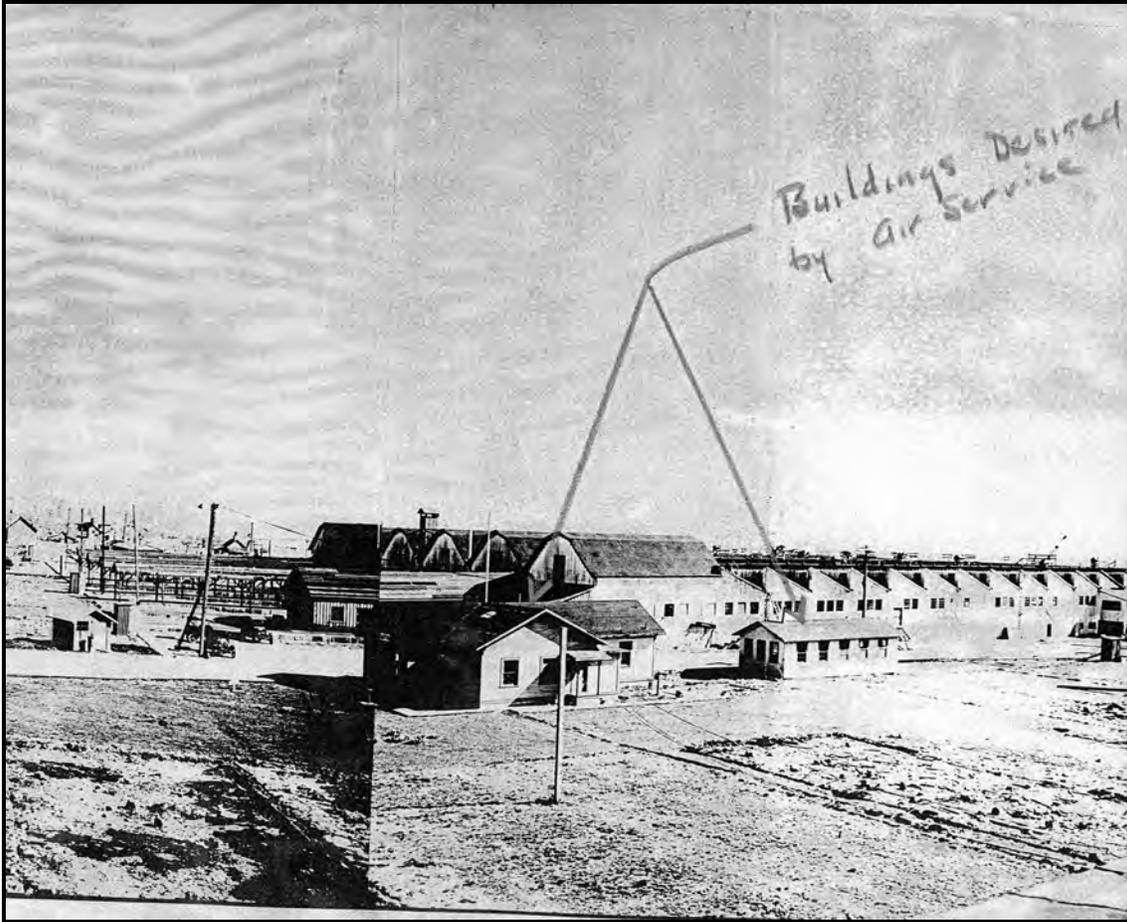


Figure 5-7 Photo taken before January, 1925, showing the Spruce Production Corporation office building and garage. Photo from RG 18, Entry 179, Bureau of Aircraft Production, Vancouver Barracks, NARA, College Park, MD.

near the new steel hangar. The original 1921 hangar built by the Spruce Production Corporation and the shed that accompanied it were to be moved to the same area, thus forming the nucleus of the new airfield.

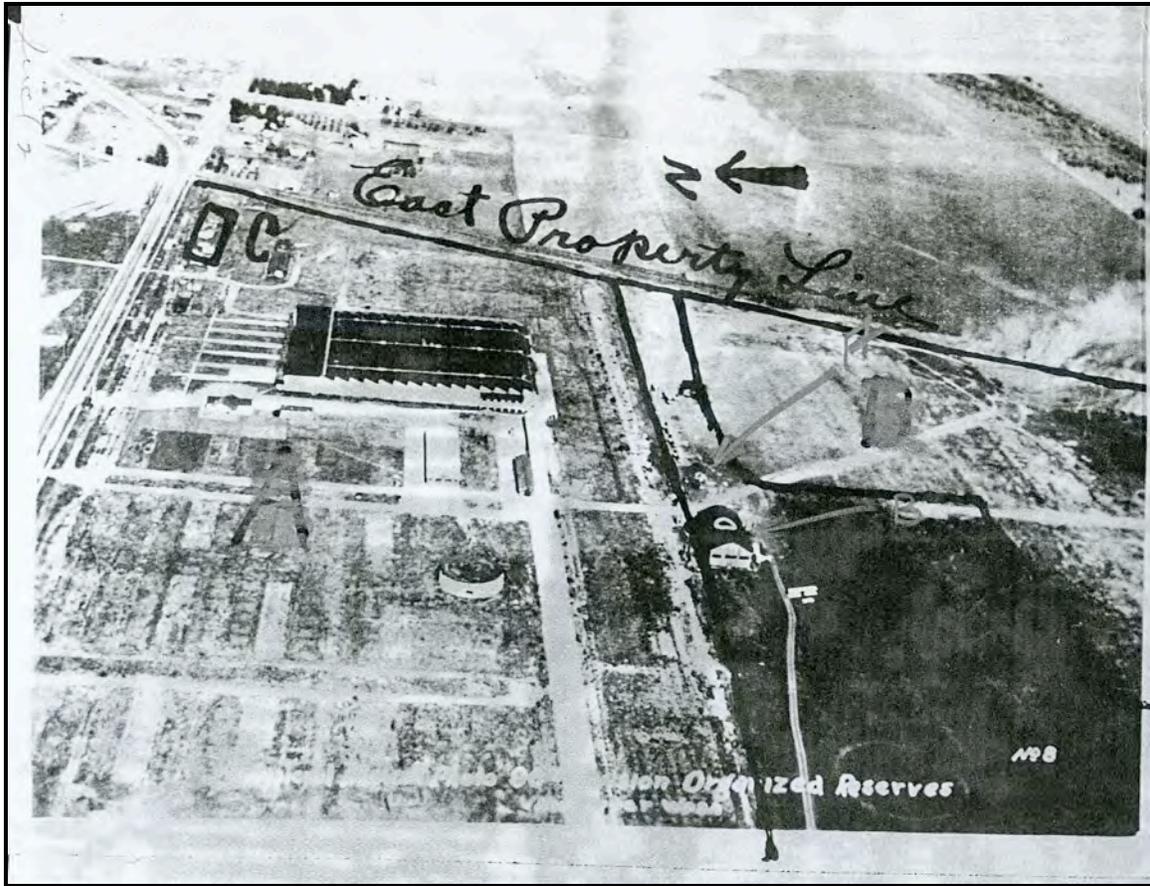


Figure 5-8 Aerial photo of the old polo grounds taken by "Marcell" and annotated by Air Service personnel at Vancouver Barracks. The main mill is still standing, so the photo dates before February, 1925. "A" is the 1921 shed, and "B" is the 1921 hangar, with DH-4 nearby. "C" is possibly the steel hangar under construction, or perhaps the area where the steel hangar will be erected. The SPC office building and the garage are visible immediately west of the main mill building. The burner base is near the center of the photo. The SPC office building and garage, and the 1921 hangar will be moved near the steel hangar to create Pearson Field (Photo: NARA, College Park, MD).

On May 7, 1925, the new airfield was dedicated as "Pearson Field" in honor of Lt. Alexander Pearson Jr. Pearson was a celebrated Army aviator originally from Portland. He was killed in September of 1924. Lt. Pearson was not stationed at Vancouver Barracks or what became Pearson Field. Pearson Field was de-commissioned by the Army Air Corps at the end of World War II, but it remains in service as a municipal airfield.

CHAPTER VI

SIGNIFICANCE OF THE SPRUCE PRODUCTION DIVISION

At the end of the 1919 official *History of the Spruce Production Division* the anonymous authors included a final chapter simply called “The Accomplishment.” In this discussion, they considered the work of the Division and its outcomes. They reviewed the two basic tasks that Colonel Disque had set at the formation of the SPD in October, 1917: solving the production problem and solving the labor problem. The authors focused on the production side—the undeniable achievement of increasing aircraft lumber production from about 1.5 million board feet per month in October, 1917, to about 23 million board feet per month in October, 1918. They regarded this accomplishment as something that would speak for itself and for the men of the Division.

No such number of pages would be required to recite the achievement itself. That takes but a single sentence. General Disque and his Division in one single year increased the production of airplane lumber from perhaps 1,500,000 feet a month to 23,000,000 feet a month; an increase of at least seventeen hundred percent. Comment can add little to that stark fact.¹

In 1963, nearly fifty years after the SPD was disbanded, historian Harold Hyman published *Soldiers and Spruce: Origins of the Loyal Legion of Loggers and Lumbermen*. Hyman interpreted the history of the SPD by concentrating on the second of Disque’s tasks. This was the plan to remedy labor problems in the lumber industry by creating the Loyal Legion of Loggers and Lumbermen and stationing troops in the mills and logging camps. Hyman’s assessment of the Loyal Legion was circumspect:

In sum, the SPD-Legion combination had been an outstanding production success and a woodland organization of some epic characteristics. Further, it had issued into the timberlands a form of collective organization that was new to the industry and to the region. There can be no disagreement that out of this interaction the conditions of lumber workman improved substantially. Achievement of agreement on the eight-hour day alone was a large victory... The Legion and the SPD had stabilized the labor force, set output quotas, enforced quality standards, fixed prices, and allocated marketing areas. World War I was a kind of vast school for American entrepreneurs, in which the Northwestern lumbermen participated... Yet there is a basic error though not

¹ *History of the Spruce Production Division*, 117.

guilt in the Legion's story. Whatever the achievements of his unique organization, there is a failure in Disque's erroneous conviction that the League's way was the wave of a desirable future. ... That [the League] worked for the exceptional circumstances of the war convinced Disque that these ideas would endure in peacetime.²

In other words, Hyman concluded that the SPD had helped solve problems in the Northwest lumber industry, but that the solution was *ad hoc* and could not be applied to other labor conflicts.

Now, nearly one hundred years after the events, we are likely to see the importance of the SPD in a different light than either the official *History's* celebratory view or Hyman's socio-political approach. In our present post-industrial period, producing 30 million board feet of lumber a month is not necessarily desirable—especially at the expense of old-growth forests. Production at that level was obviously not sustainable. Professor Hyman's socio-political approach to the history of the SPD shows the importance of this theme, but is a little oblique in that it ignores the central purpose of the organization. All of Disque's maneuvering with labor issues and the Loyal Legion was a means to the end of producing adequate amounts of aircraft lumber. That simple material goal underlay the Army's venture into civilian labor relations.

There are, however, several other issues implicit in the history of the SPD that resonate with contemporary readers. Central to these is the question of how the U.S. coped with the emergence of military aviation, which was a new and daunting technology in 1917. Or, more precisely, we might frame the question as how the U.S. coped with an explosive rate of change in this new and little-understood technology. At the beginning of the war in Europe, airplanes were novelties, useful for observing the enemy. By the end of the war, control of the air was essential for control of ground warfare.

There is good evidence that the appearance of aircraft in the war, and the continuing development of new aircraft on the Western Front, caught the U.S. off guard and unprepared. This was an unanticipated development that upset and probably embarrassed the military, much as Sputnik would do in later years. Worse, military aviation was a moving target in World War I, with whole generations of airplanes developed between 1914 and 1918. American Expeditionary Forces commander General John Pershing had some bad experiences with American aircraft in his Mexican campaign in 1916. He was not an early advocate of military aviation. Some other senior Army officers were more favorable and were able to persuade Pershing to create the Air Service for the AEF.³ But it seems fair to say that the potential that military aviation offered was not always apparent to the Army's senior officers during World War I.⁴

² Hyman, *Soldiers and Spruce*, 335-336.

³ Herbert A. Johnson, *Wingless Eagles*, 186.

⁴ See Herbert A. Johnson, *Wingless Eagles*, for an extensive discussion of the troubled relations between military aviation and the U.S. Army in World War I.

Early in the war both the Allies and the Axis had a limited number of aircraft—perhaps no more than 200-300 each.⁵ These were light, poorly armed reconnaissance planes spotting targets for artillery. In 1916 both sides developed more sophisticated and versatile airplanes, and by the time of the U.S. entry in 1917, airplanes were taking an important part in the conflict. The number of combat aircraft active at the end of the war is difficult to pin down, but one reasonable estimate is that Germany and Austria had about 3,000 and the Allies had about 8,300.⁶ This counts combat aircraft—pursuit planes, bombers, and reconnaissance aircraft—not training planes. By 1918, European military aircraft design and technology had progressed through a complex evolution. Planes in use in 1914 were obsolete by 1916, and many of the second generation planes were obsolete by 1918.

Throughout the war, and even during such prolonged offenses as the Somme, technological developments were critical factors that altered the effectiveness of pursuit aviation, and hence Allied or German superiority in the air.⁷

Bringing the U.S. into the air power race required coordinating the scientific establishment, the nascent field of aeronautical engineering, the means for manufacturing and distributing materials, plus huge reserves of manpower and capital. This simply could not be done in the 19 months of U.S. participation. Nevertheless, the U.S. made some important strides in aircraft production and made a real contribution to the Allies' eventual control of the skies over France. Aircraft lumber was important, but it was a small part of this larger picture. By the end of the war, the U.S. was contributing aircraft lumber, and it also contributed state-of-the-art engines for airplanes, modern aircraft designs, ample supplies of fabric and lacquer, well-trained pilots, and a much clearer idea of the role that aircraft could play in a war.⁸

Air Power and the War

British historian John H. Morrow separates the history of aircraft in the war into several phases. In 1914-1915, the few military aircraft available were capable of reconnaissance and spotting artillery targets but little else. They did not have machine guns or bomb sights. These were the Allies' Royal Aircraft Factory BE-2, the Morane-Saulteir series, Bleriot, Vickers FB, and the early Airco series, and the AEG observation planes in Germany. Then in 1916, "true aerial warfare" became possible as both the Allies and the Axis worked to design and manufacture aircraft capable of combat with

⁵ John H. Morrow, "The War in the Air," *The Oxford History of the First World War*, ed. Hew Strachan (Oxford, 1998) 267.

⁶ G. W. Mixter and H.H. Emmons, *U.S. Army Aircraft Production Facts*, (Washington DC, USPOG, 1919), 57.

⁷ Johnson, *Wingless Eagles*, 2001, 145.

⁸ Hyman, *Soldiers and Spruce*, 1963, 22.

other aircraft, supporting ground troops, and bombing military or civilian targets.⁹ “Aerial warfare in 1916 was as much a technological and industrial as a military affair.”¹⁰ Both sides emphasized new military aircraft technology and production. One critical development was the synchronizer gear (or cam) that allowed a machine gun to fire through a propeller without hitting it. Both sides had operating synchronizers by 1916. Among the new engines developed by the Allies in 1916 was the Hispano-Suiza V-8 aircraft engine, which was very successful. The British Vickers aircraft machine gun was also a product of this period.

The 1916-1917 aircraft included the Fokker series and the early Albatros and Faltz aircraft for Germany, the French Nieuport series, the early French SPAD pursuit planes, and the British Sopwith Pup. The final generation of World War I aircraft in use by the summer of 1918 included the French SPAD XIII, the British Sopwith Camel, the British SE5A, the German Albatros DV, the French Breuget bomber, and the Italian Caproni CA-3 bomber. By 1918, this final generation of aircraft “played a significant role in the outcome of the war” as both sides fought for air supremacy over the battlefield and French and Italian bombers supported troops on the ground.¹¹

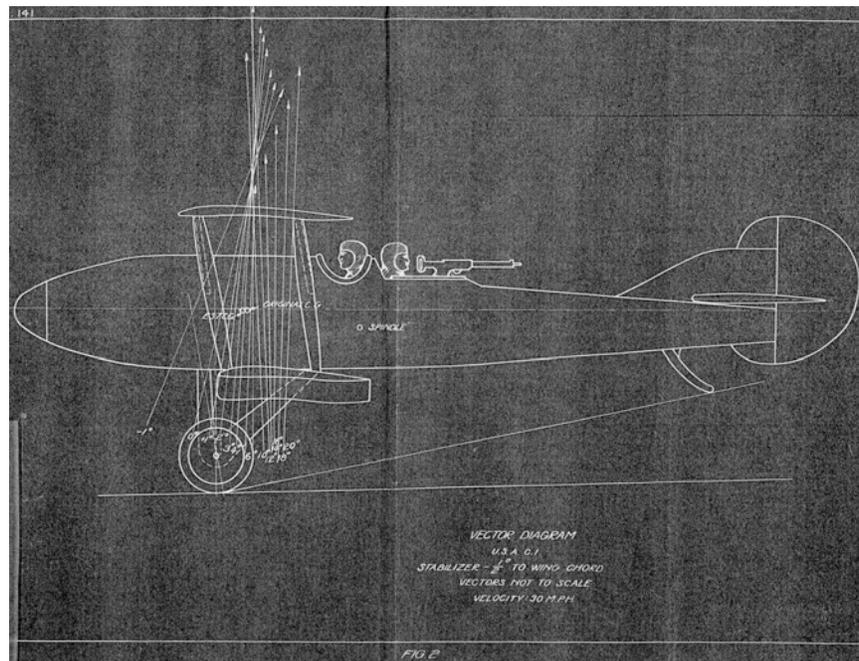


Figure 6-1 Aeronautical engineering was in its infancy during WW I and the basic physics of flight was not well understood. This vector diagram shows lift at take-off (blueprint from NARA College Park, MD).

⁹ Morrow’s comments relate to air power on the Western Front, in support of ground troops. At the same time, naval aircraft were being developed along separate lines, but did not see as much service in the war. American Naval aviator William Mitchell was an international pioneer in naval aircraft.

¹⁰ Morrow, “The War in the Air,” 270.

¹¹ Morrow, “The War in the Air,” 274. Strategic bombing and bombing of civilian targets was limited to a few zeppelin raids on England, according to Morrow.

In April, 1917, when the U.S. entered the war, the Axis and the Allies were hoping that revitalized air power would be the answer to the dismal stalemate in the ground war. For the Allies the industrial capacity of France and Britain—and later the U.S.—proved to be a significant advantage. In the spring and early summer of 1917 the Royal Flying Corps suffered huge losses of aircraft and personnel, the infamous “Bloody April.” The European Allies recovered from these losses by their ability to train and replace pilots and to secure new and better machines. “In 1917 attrition and shortages [of aircraft] forced increased aircraft production, accompanied by heightened political strife in Britain and France.”¹²

The aircraft situation in Europe was tense. Air superiority on the Western Front changed several times between 1915 and 1917. The U.S. had huge industrial capacity, but American aircraft manufacturers were small and had no experience with design or construction of state-of-the-art military aircraft. Americans also lacked the ability to produce aircraft in large numbers with assembly-line techniques. The European Allies and their new American friends made some important agreements about aircraft at the outset. Americans would not attempt to build combat aircraft because the infrastructure was not available and the design parameters were changing too fast for the Americans to catch up.¹³ Americans would supply training planes and observation aircraft. The American-designed Liberty aircraft engine was a successful power plant for these planes, but was not adequate for combat because of its weight-to-horsepower ratio. America could shine, however, at providing strategic materials for European aircraft production.

The major American contribution to aircraft procurement was harvesting raw materials in the United States, particularly spruce and other wood...The Signal Corps [also] planted and harvested castor oil beans to lubricate Allied engine crankshafts. More accurate navigational instruments were designed and put into production, and more durable and less flammable airplane fabric was developed.¹⁴

The U.S. was to supply 5,000 observation or training planes and 8,500 Liberty aircraft engines to France by June, 1918. In return, the French would supply the AEF with some SPAD pursuit planes. The U.S.-made De Havilland DH-4 training airplanes, the U.S. Liberty aircraft engines, and mountains of raw materials were solid though modest American contributions to the Allies’ goal of air supremacy.

The Europeans’ frenzied quest for superior aircraft in 1916-1917 provides the context for the American entry into the war. The French, British, and Germans had all designed better aircraft by 1917, with the SPAD, the Albatros, and others becoming available at the front. The Allies’ high rate of casualties of pilots and aircraft in “Bloody April,” 1917, however, showed the British and French that competitive technology was not enough. They also needed to be able to manufacture enough aircraft and train enough pilots to overwhelm the Germans. This was why the American-made De Havilland training planes and Liberty engines were important. It also explains why the British and

¹² Morrow, “The War in the Air,” 272.

¹³ Johnson, *Wingless Eagles*, 190.

¹⁴ Johnson, *Wingless Eagles*, 188.

French insisted on getting the Americans to commit to producing 100,000,000 board feet of spruce lumber.

Waldemar Kaempffert (1877-1956) was a scientifically-trained writer who interpreted science and engineering topics for two generations of American readers. Writing in the fall of 1917, before the Spruce Production Division began its work, Kaempffert explained the Allies' needs for aircraft and raw materials. He noted that Congress had recently appropriated \$720 million for the air war. Yet, "no strategist...cherished the illusion that \$720,000,000 will buy command of the air."¹⁵ Britain was spending \$600,000,000 on aircraft manufacturing in 1916 alone. He calculated that the U.S. would be fortunate to meet its commitment to deliver 5,000 training planes to France in the spring of 1918. Production would have to reach 4,000 planes each month in 1919. In April of 1917 Britain lost 318 airmen. Each new pilot wrecked 1.5 planes on average during training. Kaempffert advised his readers that the "aviation army" projected by the Allies would require 10,000 new pilots and perhaps 30,000 additional planes.

One Hundred Million Board Feet

Discussions of aircraft lumber production in 1917 and 1918 refer to 100 million board feet as the amount needed to meet the Allies' goal of lasting air supremacy. We know that Europeans were buying Sitka spruce lumber for aircraft through conventional channels as early as 1916. Ralph Burnside, President of the Willapa Lumber Company in Raymond, Washington, wrote of the "abnormal demand" for spruce from Europe during the second half of 1916, but did not quantify the amount ordered.¹⁶ This demand in 1916-1917 coincided with the frantic production of new aircraft in Britain and France to replace the obsolete first-generation planes and the planes lost in combat during the spring. The order for 100 million board feet, or 10 million per month, was set by the "United States Government and the Allies" soon after the U.S. entered the war in April, 1917.

During the summer of 1917, before the SPD was formed in November, the Allies sent an embassy of British, French, and Italian representatives of the military and aircraft manufacturers to the Northwest to discuss their need for spruce. The number that emerged from meetings with Oregon and Washington lumbermen was 117 million board feet for the coming year.¹⁷ In October, 1917, *The Timberman* reported the threshold figure as 100 million board feet or 10 million each month. In October, 1917, Waldemar Kaempffert reported that 75 million board feet needed to be on hand with more in the

¹⁵ Waldemar Kaempffert, "The Wings of Victory," *The America Review of Reviews*, October, 1917, 386.

¹⁶ Ralph Burnside, "Spruce," *The Timberman*, (January, 1917) 35.

¹⁷ "Pacific Coast Spruce Placed at Disposal on United States and Her Allies," *The Timberman*, (August, 1917), 40.

supply chain.¹⁸ In January, 1918, Henry Suzzallo, President of the University of Washington and member of the Washington Defense Council, wrote a long letter on the spruce situation to Felix Frankfurter, Assistant Secretary of War. In it, he interpreted the Allies' need as 100 to 110 million feet of aircraft spruce delivered at the rate of 10 million feet each month.¹⁹ In April, 1918, the Aircraft Production Bureau abruptly increased the monthly goal to 30 million board feet.²⁰

The SPD managed to meet the 10 million feet per month goal. Total SPD production of aircraft lumber for twelve months from November 1, 1917, through November 1, 1918, was 139,081,592 board feet, averaging 11.66 million per month on an annualized basis.²¹ This number includes aircraft-grade spruce and fir, and presumably cedar as well, shipped from all SPD sources. Unaudited figures from the Cut-up Plant show 75,906,444 board feet of "Aero" grade spruce, fir, and cedar shipped from the start of operations in February, 1918, through November 1, 1918.²² Neither figure necessarily includes lumber originating from private non-affiliated mills like the Monarch Lumber Company that shipped 25 million board feet of aircraft fir directly to the Italian government. In October, 1918, production at the Vancouver plant reached 20 million board feet per month, but never met the goal of 30 million.

The numbers are impressive, but difficult to understand. The amount of lumber in World War I aircraft averaged around 500 board feet per plane. Manufacturing data for the American-built Curtiss JN-4 and the De Havilland DH-4 shows that building 1000 JN-4s required 449,250 board feet and building the same number of DH-4s required 553,050 board feet.²³ These measurements are for the finished wooden parts of the aircraft. Each part was made from a larger board, so there was inevitably some waste of lumber during manufacturing. However, the dimensions of each part were known, so the piece of lumber used could be selected to approximate the finished size. Mass production allowed for economy of scale and efficient use of materials. On the other hand, some of the aircraft lumber would be lost in transit or damaged. We might even allow for shiploads of spruce torpedoed as they crossed the Atlantic. If we assume that half the lumber was lost through waste, damage, or the fortunes of war, we would still have a requirement of about 1000 board feet per finished airplane.²⁴ Producing 10 million board

¹⁸ "Organize a Spruce Regiment," *The Timberman*, (October, 1917), 1; Kaempffert, "Wings of Victory," 386.

¹⁹ Suzzallo to Frankfurter, January 3, 1918, Correspondence Files, Brice P. Disque Collection, University of Washington Special Collections, Seattle, WN.

²⁰ *History of the Spruce Production Division*, 7; See also Nathan A. Bowers, "Filling the Allies' Rush Order for Airplane Spruce," *Engineering News-Record* (December 5, 1918), 1028.

²¹ "Spruce Production Division Bureau of Aircraft Production, Aircraft Lumber Production and Shipment Charts, November 1, 1917- November 1, 1918" NARA College Park.

²² "Production report of Vancouver Cut-up Plant, Beginning of Operations until November 1, 1918" ARC 5049398 Vancouver Records, NARA Seattle.

²³ "DH-4 Summary, Bill of Spruce Lumber for One Thousand Aeroplanes," n.d., RG 165, entry 8 Spruce Production Division, NARA College Park; "Spruce Rough Lumber Requirements for 1000 JN-4-D Airplanes," n.d. RG 165, entry 8 Spruce Production Division, NARA College Park.

²⁴ Waldemar Kaempffert (1917) also estimated that 1000 board feet would be required for each airplane, although he began his calculations with an erroneous estimate of 200 board feet of finished material per airplane.

feet of lumber each month would make enough lumber for 10,000 airplanes each month. The annual goal of 100 million board feet would be enough lumber for 100,000 airplanes in a year.

Early estimates of the number of aircraft needed for the war vary. Henry Suzzallo wrote that “as near as I can get to the situation, the program calls for 22,000 airplanes for the U.S. Army and 5,000 to 6,000 for the U.S. Navy by October 1, 1918.”²⁵ Writing in October, 1917, Waldemar Kaempffert estimated 30,000 planes for the Allies. At a presentation in Portland on August 13, 1917, General George O. Squier, commander of the Signal Corps Air Service, was deliberately evasive. “I am not here to make public our plans or to indulge in prophetic figures.”²⁶ Later in his speech he mentioned the number of 22,000 airplanes for the U.S. Army.

In the summer of 1918, J.D. Ryan, head of the Bureau of Aircraft Production, visited the Northwest. His chief of staff, Kenneth Ross, also made a visit earlier in the summer. Both men were senior managers at Anaconda Copper Mines in Montana who were volunteering for war service under the “dollar-a-year” program. Ryan announced increased production goals for aircraft lumber and referred to the agreement made in the spring of 1917 that concentrated production of combat aircraft in Europe. “All of the light, fast-flying planes will be built across the Atlantic. Styles are changing too rapidly to permit plans to be brought across the ocean, the planes built, and sent back to France.”²⁷ Planes made in the U.S. would continue to be the JN-4 and the DH-4 trainers. Ryan also alluded to new bombers to be built in the U.S. that would carry 4,000 pounds of bombs, numerous machine guns, and have a range of 1,500 miles. This anticipated increase in aircraft production would require the new lumber production goal of 30 million board feet each month. Ross announced the ambitious plans for new SPD mills and railroads on the Olympic Peninsula in a presentation made in June, 1918. He alluded to the goal of air supremacy on the Western Front, but he was unwilling to commit to a number of aircraft needed:

It is as important that we produce airplane stock as that we produce wheat. Perhaps it is more important. The war will never end until the United States and her Allies have in the air more airplanes than Germany can possibly produce. Germany will produce all the aircraft she can. Germany has in the past produced more aircraft than all of the Allies. Until the tide is turned decisively, the war will continue.²⁸

It seems reasonable that the military hierarchy in the U.S., Britain, and France had a concrete goal for aircraft production, but they were understandably wary of making that goal public. Since the number of aircraft potentially required was uncertain, the amount of lumber was also uncertain. No one knew where aircraft technology might go, and a decisive change in technology could render all existing aircraft obsolete. This would require a whole new generation of planes, as it had in 1916 and again in 1918. Replacing

²⁵ Suzzallo to Frankfurter, 3 January, 1918.

²⁶ “Pacific Coast Spruce Placed at Disposal of United States and Her Allies,” *The Timberman*, (August, 1917), 41.

²⁷ “J.D. Ryan Visits Spruce District of the Northwest,” *The Timberman*, (August, 1918), 48G.

²⁸ “Great Spruce Mill to Rise on the Olympic Peninsula,” *The Timberman*, (June, 1918), 34.

the air fleet with new planes in 1916 apparently strained the British and French supply lines to the breaking point. Even if the same airplanes remained in production, the average life of the wooden and fabric airframe of a pursuit plane was only 80 hours of flight time.²⁹ The life expectancy of a combat pilot was 93 hours. The goal of 100 million board feet was most likely set by the Allies as a convenient number for the Americans to aspire to. That volume of spruce lumber would provide a margin of safety for whatever might occur in the air power race.

Finding the actual number of aircraft produced is much easier than finding the number anticipated. As Suzzallo, Squiers, and others anticipated, American factories built 22,150 airplanes for the Army, mostly Curtis JN-4 and De Havilland DH-4 trainers. They were disposed as follows:

U.S. Army	16, 952
Britain	258
Italy	59
France	4,881 ³⁰

Some planes were no doubt built for the Navy, but they do not enter into these calculations. The U.S. was committed to deliver 5,000 training and observation planes to France in exchange for an undetermined number of SPAD pursuit planes, but the actual delivery apparently fell short by 119 planes.

We might return now to the point made in the *History of the Spruce Production Division* that the SPD was significant because it produced a large amount of aircraft lumber. If we put the lumber production into the context of rapidly-evolving aircraft technology in Europe, we can say that the lumber was a strategic material that ensured the Allies' ability to respond to whatever new aircraft the Axis developed. If the Germans had come up with a game-changing new airplane in 1918—as they nearly did with the monocoque Albatros pursuit planes—the British and French would have enough material on hand to replace their fleet and build new aircraft to respond to the German threat.

The Supremacy of Spruce

In meeting the challenges of technological change in European aircraft, the SPD was not simply a passive source of raw material. Early references to aircraft manufacturing emphasized spruce—especially Sitka spruce—but the SPD supplied other woods including Douglas fir and Port Orford cedar to meet their quotas. Sitka spruce made up a large part of this mix, but no more than 57%. Spruce Production Division shipments of aircraft stock for November 1, 1917 to November 1, 1918 were as follows:

²⁹ “Laminated Airplane Beams,” *The Timberman*, (August, 1918), 48G.

³⁰ Mixter and Emmons, *U.S. Army Aircraft Production Facts*, 57.

Total shipments	139,081,592 board feet
Sitka Spruce	79,554,415 board feet or 57%
Douglas fir	59,527,177 board feet or 43% ³¹

We must assume that these final numbers published by the Bureau of Aircraft Production are authoritative, but they do not break out the cedar from the other woods, or tell us where the lumber came from. The Cut-up Plant was producing aircraft lumber, but some other mills were also shipping product directly to clients in Europe and aircraft plants in the U.S. Data from the SPD Cut-up Plant tells a slightly different story:

Total lumber produced, Feb., 1918-Nov. 1, 1918,	118,040,254
Sitka spruce	56,002,955 or 47.5%
Douglas fir	57,909,005 or 49%
Port Orford cedar	4,128,304 or 3.5% ³²

The difference of 21 million board feet represents aircraft lumber produced before the Cut-up Plant began operations in February, 1918, and whatever amount was cut and shipped by other mills. By either set of calculations, the SPD may have been a little cavalier with the European governments' specific request for spruce.

The use of wood in aircraft goes back to the beginnings of heavier-than-air flight in Europe and America. Otto Lilienthal, Octave Chanute, and other glider enthusiasts in the 1890s used wooden and fabric construction, as did the Wright Brothers and Louis Bleriot in their early powered flights. "Wood had been the material used in the first successful planes, and its continuation as the prime airplane material was only natural."³³ There was some interest in other materials—like steel tubing—but wood had good weight-to-strength characteristics, was inexpensive, and easily worked.³⁴ The question during the war, then, was not so much finding the right material as finding the right wood. Spruce was a well known wood in Europe and America, and was known as light and strong, with good flexion—the ability to bend and return to its original shape. Sitka spruce was a desirable species of spruce, but European species of spruce must have been used initially.

Wood was used in aircraft by convention, but there was also some science available to engineers and aircraft builders. The USDA Forest Service had created the Forest Products Laboratory at the University of Wisconsin in 1909. The new lab provided reliable information about the characteristics of different woods and performed numerous

³¹ "Spruce Production Division Bureau of Aircraft Production, Portland Oregon, Aircraft Lumber Production and Shipment Charts," NARA College Park.

³² "Production report of Vancouver Cut-up Plant, Beginning of Operations until November 1, 1918" ARC 5080993, Aircraft Production Progress Reports, Spruce Production Corporation papers, NARA Seattle.

³³ R.L. Hankinson, "Wood in Airplane Construction," *The Timberman*, (January, 1928), 38.

³⁴ Richard P. Hallion, "Wooden Aircraft and the Great War," *Journal of Forest History*, (October, 1978), 200

tests on various woods at the request of the Bureau of Aircraft Production.³⁵ The Massachusetts Institute of Technology was apparently conducting tests on various woods at the same time. Data on the specific gravity and strength-to-weight ratio showed spruce at 23 pounds/cubic foot, and yellow pine the closest competitor at 34.3 pounds/cubic foot. Spruce showed a tensile strength of 9000 pounds/cubic foot. Comparing steel with spruce showed that spruce was 2.9 times as strong for the same amount of weight.³⁶

Tests conducted by the Forest Products Laboratory compared western softwoods, including spruce, Ponderosa pine, sugar pine, and Douglas fir. Spruce was found to be the lightest at 27 pounds/cubic foot, with Douglas fir the heaviest at 34 pounds/cubic foot. Douglas fir was found to be the strongest in a complex set of measurements.³⁷ The Forest Products Laboratory offered the following woods as the best for airplane construction:

Sitka spruce
Douglas fir
Western white pine
White ash
Port Orford cedar
Yellow poplar
Norway pine
Noble fir
White fir³⁸

Douglas fir, yellow poplar, and Port Orford cedar were acceptable only when they were kiln-dried. Not all of these woods were available in the grades and lengths required for aircraft. Poplar, white ash, and Norway pine were apparently difficult to procure, so Sitka spruce, Douglas fir, and Port Orford cedar had an advantage in that they were available as old-growth trees with clear lumber, good length, and few defects. The extensive stands of western white pine (*Pinus monticola*) in Idaho offered another potential source of aircraft lumber since pine was light and available in clear grades and good lengths. The Aircraft Production Board approved western white pine in the summer of 1918, but there are no records that it was used by the SPD.³⁹ Sitka spruce was difficult to log and mill, as we have seen, so the SPD substituted other suitable woods. Had the SPD been required to cut only spruce, they would not have met their quotas.

How necessary was American aircraft lumber for European aircraft builders? The British and French were the largest consumers of aircraft spruce. The Italian Caproni

³⁵ Shirley Allen, "History of the War Cooperation Between the Bureau of Aircraft Production and the Forest Products Laboratory," n.d., MS in RG 18, Air Service 1917-1926, Box 1, p. 1086 NARA College Park.

³⁶ Alexander Klemin and T.H. Huff, "Materials in Airplane Construction," *Aviation and Aeronautical Engineering*, (April 15, 1917), 261.

³⁷ "Properties of Various Woods For Use in Airplane Design," *The Timberman*, (January, 1918), 45.

³⁸ Allen, "History of the War Cooperation Between the Bureau of Aircraft Production and the Forest Products Laboratory," 1086.

³⁹ "Pine for Airplanes," *The Timberman*, (June, 1918), 34.

was made from Douglas fir. After the British embargoes of 1917, we can assume that the Germans got along without supplies of any lumber from America. Prior to the embargo, West Coast softwoods were shipped to Europe from the U.S. and possibly from British Columbia. Some of these shipments may have gone to Axis countries when the U.S. was a neutral nation. In the winter of 1918, B.C. aircraft spruce production was reportedly just getting started with logging in the Queen Charlotte Islands and milling in Prince Rupert. Before 1918 there was little spruce production in B.C.⁴⁰ European sources of softwoods and hardwoods were available to the Germans, and apparently met their needs.

As early as 1917, the German designers were moving away from the conventional frame and fabric construction to a new technology that did not require spruce or other clear softwood lumber. This was the development of monocoque fuselages made from wood veneer.

This machine [the Albatros]...proves of particular interest as a specimen of modern German airplane construction, because it tends to show that some, and not the least well-known, enemy airplane designers are displaying a growing sympathy toward the use of veneer in body construction.⁴¹

“Monocoque” construction meant that the rigid surface of the fuselage provided the strength, much like the hull of a ship, and that internal bracing was not required. The advantages of monocoque construction were that it was stronger than frame and fabric, less vulnerable to damage, and much more streamlined. The frame and fabric fuselages required external wires, struts, and braces which interrupted the air stream and slowed the aircraft down. Monocoque fuselages on the German Albatros and Faltz airplanes were streamlined and clear of obstructions. Building a monocoque fuselage required building a temporary framework and then bending sheets of veneer around it. The veneer was glued to other sheets to build up several layers, and then the framework was removed. This method of construction was widely used after the war and competed with all-metal airplane fabrication.

By the final months of the war, both sides were working with laminated wing beams.⁴² These were the 20' long longitudinal beams in the wings. The requirement of perfectly clear, straight grained lumber for wing beams was a major problem in aircraft lumber production. In general, laminated wood fabrications are stronger than single boards. Laminated beams could be made from shorter and thinner pieces of lumber, eliminating the requirement for clear boards 20 feet long.

The production of aircraft lumber by the SPD is probably best seen as the procurement of a strategic material during a time of national emergency. In this context it is analogous to the production of ballistic missiles or plutonium during the Cold War. These materials were valuable as military commodities, available for use, but also valuable for the security that they provided. There was also some propaganda value. The

⁴⁰ “Northern British Columbia Spruce Situation,” *The Timberman*, (January, 1918) 27; “British Columbia Spruce” *The Timberman* (February, 1918), 38.

⁴¹ “The Model C.V. Albatros Biplane,” *Aviation and Aeronautical Engineering*, (April, 1918), 293.

⁴² “Laminated Airplane Beams” *The Timberman*, (August, 1918), 48G

U.S. made no secret of its spruce program. The press was kept up-to-date with SPD developments, posters were circulated, and professional photographers documented all kinds of activities. Ten million feet of aircraft lumber each month may not have made much impression on the Germans, who were perfecting their monocoque fuselages and laminated wings, but it would have reassured the Allies, who were committed to wood and fabric aircraft.

Solving the Labor Problem

What Colonel Disque called the “labor problem” in the mills and camps of the Pacific Northwest assumed its fullest form in the late spring of 1917. The U.S. had entered the war in April. Enlistment in the Army and work in the war-related jobs—like shipbuilding—were taking men from the lumber industry by offering better pay and working conditions. Men who remained in the industry were older, cynical, and inured to a lifetime of conflict with management. Turnover in the labor force was estimated at 600% to 1000% on an annual basis.⁴³ Workers responded to adversity by moving to another camp, and employers responded to the chronic labor shortage by luring workers away from competitors. Living conditions in many camps were dismal. Radical groups like the Industrial Workers of the World had organized some loggers and millworkers, and openly advocated general strikes and “striking on the job.” The American Federation of Labor had created a less radical alternative in the American Federation of Timber Workers, which—as an affiliate of the American Federation of Labor—had the provisional blessing of the federal government.

For ordinary citizens in the lumber towns and in Portland or Seattle, the activities and attitudes of the radical labor groups were often upsetting and annoying. They sometimes responded with vigilante activities and quasi-legal attempts to suppress the activists. The infamous Everett Massacre occurred in Everett, Washington, in November, 1916. A quasi-official group of vigilantes met IWW men in a gunfight that left perhaps 15 men on both sides dead. During the spring of 1917, there was widespread concern about sabotage in the lumber industry, and some reports of specific incidents. The industry-wide strike in July showed that disgruntled loggers could stop or at least impede lumber production at will.

Colonel Disque offered two strategies for dealing with the labor situation by the fall of 1917. The first was to create the Loyal Legion of Loggers and Lumbermen. This government-sponsored patriotic organization included workers and managers. The two sides would come together committed to common goals for working conditions in the industry, including the highly controversial eight-hour working day. The LLLL acted like a union, negotiating wages, hours, and benefits. Workers joined because the SPD made membership appealing to the workers, including some who were affiliated with the Industrial Workers of the World and other radical labor groups. Mill owners joined the LLLL because membership was required if they were to get soldier/workers.

⁴³ *History of the Spruce Production Division*, 16.

Disque's second strategy was stationing troops in the mills and camps to ensure order and a sufficient work force to get the product out. The two strategies were connected in that mill owners asking for Army troops in their camps or mills needed to join the LLLL and publicly commit to the LLLL goals of better working conditions and the eight-hour working day. The two-pronged approach worked. The loggers did not strike or disrupt production for the rest of the war, and for their part the lumbermen cleaned up conditions, and went on the eight-hour day.

The official position of the Army, as reported in the *History of the Spruce Production Division*, was that the SPD solved the labor problem by appealing to the workers' and mill owners' patriotism and channeled that through the LLLL. The official position of the Industrial Workers of the World—and other radical unions, presumably—was that placing the SPD troops in the camps amounted to martial law.

Colonel Disque put soldiers to work in the camps, ostensibly to aid in spruce production, but as soldiers were placed in camps where not a stick of spruce was produced, it is evident that the real object was to break the [July 1917] strike.⁴⁴

We might argue that the July strike was over by December when the soldiers went into the camps, and that spruce was only 57% of SPD production, and that the SPD troops were not there to enforce martial law, which had not been declared. The solid achievements of the SPD were establishing a level of peace within the industry that lasted through the war, and winning concessions from lumbermen on the eight-hour day and camp conditions. The eight-hour day and sanitary camp conditions survived the SPD, but industrial peace did not. On November 11, 1919, the Centralia Massacre occurred in Western Washington, again pitting armed Wobblies against armed local vigilantes.

The most visible single achievement was the eight-hour day. This was important for the loggers and mill workers. There had been numerous attempts to institute an eight-hour day before the war through negotiation and mediation, but neither side was willing to concede on this issue. During the strike of July, 1917, the labor groups made this the foremost of their demands. The lumbermen wouldn't budge, but Washington's Governor Ernest Lister declared the eight-hour day by *fiat* over the objections of the lumbermen within the state in August, 1917. This was not a successful strategy. Disque made the eight-hour day stick, but he did it by forcing the mill owners to abide by LLLL goals if they wanted to have soldiers in their mills and camps, and to have government contracts.

As soon as the lumbermen capitulated in the winter of 1917-1918 and went on the eight-hour day March 1, 1918, both the IWW and the American Federation of Labor claimed that the victory was their doing.

Colonel Disque and the lumber barons finally began to realize that they were up against a method of fighting in which they were hopelessly outclassed [i.e. the IWW work slowdowns]. Every method successful before in breaking strikes had been tried and failed. There remained only one thing to do—to concede the eight-hour day. March...1918, after official

⁴⁴ James Rowan, *The I.W.W. in the Lumber Industry*, (Seattle, n.d.) 47.

announcement by Col. Disque and the lumber barons, the eight-hour day was recognized by the lumber industry of the Northwest.⁴⁵

Disque had enlisted Samuel Gompers, President of the American Federation of Labor, as an ally in bringing the International Union of Timber Workers into the LLLL. Disque sent a telegram to Gompers on February 28, announcing that the lumbermen had conceded the eight-hour day in a meeting with the SPD. Gompers later wrote to W.D. Clark, Secretary of the Coeur d'Alene Timber Workers:

You have undoubtedly observed that quite recently the basic eight hour day has been established in the lumber and timber industry of the great northwest, providing for time and one-half for overtime beyond eight hours. That was the achievement of the American Federation of Labor and no little credit is due to the International Union of Timber Workers.⁴⁶

Unfortunately for Gompers, this letter was widely reproduced, and Disque was justifiably livid when he read it. Disque wrote to Gompers:

I certainly am very much surprised to find this statement over your signature, and, feeling as I do that I have a complete knowledge of this situation, I wish to state unqualifiedly that the International Union of Timber Workers, or the American Federation of Labor, could never have brought about the basic eight hour day in this industry during the period of the war.⁴⁷

All sides claimed credit for establishing the eight-hour day, and that serves as good testimony to its importance.

Sabotage and Vigilante Violence

Another aspect of the “labor problem” that Disque faced in the fall of 1917 was the level of hostility prevailing between radical labor groups and citizens who organized themselves into vigilante bands. The IWW and other groups were a problem, but the ordinary citizens of many communities across the U.S. were themselves a problem, as they became violent and persecuted the labor groups. The IWW was often the lightning rod for this violence. Wobblies were colorful and outspoken with a nation-wide reputation for organizing, agitating, and offending the establishment. Wobblies were also committed to writing and publishing pamphlets and books that disseminated their often inflammatory ideas. Their writing may have upset people as much as their actions. They had been organizing workers in the mining, farming, and lumber industries as early as 1905. After April, 1917, these industries became part of the “war effort,” and the level of

⁴⁵ Rowan, *The IWW and the Lumber Industry*, 47-48.

⁴⁶ Gompers to Clark, May 21, 1918, Correspondence File, Brice P. Disque Collection, University of Washington Special Collections, Seattle, WN.

⁴⁷ Disque to Gompers, June 10, 1918, Correspondence File, Brice P. Disque Collection, University of Washington Special Collections, Seattle, WN.

tension increased. Wobblies condemned the war and the American military, and made their views very public.

During the first three decades of the 20th century the IWW was the victim of vigilante violence and extra-legal suppression throughout much of the West. The situation in the copper mines in Montana and Arizona was especially acute, with IWW members or sympathizers persecuted by vigilantes and by the local law-enforcement agencies. There were arrests, beatings, and expulsions from many communities.

Angry citizens throughout the nation banded together to administer justice as they conceived it without waiting for the more orderly process of the law. Local governments and the federal government acting under existing statutes or under new laws passed for the occasion prosecuted dissenters considered dangerous for national security.⁴⁸

The Pacific Northwest had been a focus of IWW activity before the war. Wobblies had organized in the lumber industry throughout the region and in the migrant farm-workers' camps in central Washington, the Willamette Valley, and in the Hood River and Rogue River valleys of Oregon.

The Pacific Northwest had experienced ten years of I.W. W. agitation, of annoying wildcat strikes, red-flag parades, free-speech fights, jailhouse hunger strikes, and endless soapbox oratory.⁴⁹

Seattle, Spokane, and Portland were key cities for the IWW, with a solid, visible presence in each. During the Everett Massacre, on November 6, 1916, armed citizens of Everett met a ship bringing armed IWW members from Seattle. Both sides opened fire as the ship was landing. Estimates vary, but as many as 15 men on both sides were killed. After the beginning of the war in April, 1917, the Wobblies advocated striking and disrupting industries seen as essential for the war—again, lumber, mining, and farming. This stance convinced many that the IWW was contributing to the cause of the Axis powers, either deliberately or as an inadvertent consequence of their actions. After the lumber industry strike during the summer of 1917, the IWW could not have looked much worse to most citizens of the Northwest.

Despite the history of anti-labor violence in the Northwest, and the heightened feelings of nationalism during the war, the year between the formation of the SPD in November, 1917, and the Armistice in November, 1918, was a brief period of calm in the lumber industry. The Everett Massacre preceded this period by a year, and a second incident—the Centralia Massacre on November 11, 1919—followed it by a year. The intervening months in which the SPD was active in the mills and camps, though, were largely peaceful. There were isolated incidents of vigilante activity in Hood River, Oregon; Aberdeen, Washington; Centralia, Washington; and Seattle. “But [during the SPD period in the Pacific Northwest] law and order, of a sort, soon pre-empted these individual and vigilante acts of suppression.”⁵⁰ However unpleasant, none of these “acts

⁴⁸ See Robert L. Tyler, *Rebels in the Woods: The IWW and the Pacific Northwest*, (Eugene, 1967), 116ff.

⁴⁹ Tyler, *Rebels in the Woods*, 127.

⁵⁰ Tyler, *Rebels in the Woods*, 1967, 129.

of suppression” in the Northwest approached the level occurring in other parts of the U.S. during the war such as the violence in the Arizona copper mining communities and mass arrests and prosecution of IWW members in Chicago in September, 1917. The SPD brokered a fragile peace during its tenure in the Northwest woods.

The connection between radical labor activity and national security during the war was widely acknowledged but difficult to document then or now. The IWW made no secret of its contempt for the war, or its willingness to strike and agitate in industries important to the war. The IWW writers and spokespersons maintained that their targets were capitalism and militarism and not the Allies’ effort. The Germans, for their part, probably sabotaged U.S. munitions plants, as evidenced by the Black Tom Pier explosion in July, 1916, and the burning of the Kingsland, New York, ammunition factory in January, 1917. After the general strike in the summer of 1917, the IWW directed its members to return to work in the camps and mills, but to “carry the strike to the job.” The IWW described this tactic as follows:

These men advocated that the strike should be transferred to the job while the union was still intact and the fighting spirit of the men unsubdued; or in other words, that the strikers should go back and work no more than eight hours a day, or if at times they found it necessary to stay on the job ten hours, they should work slow so that no more than eight hours work would be done in ten hours. They advocated poor work for poor pay, poor food, and poor conditions.⁵¹

Stated in these terms, striking on the job seems rather innocuous. However, thanks to IWW notoriety, “carrying the strike to the job” conjured up visions of bomb-throwing European anarchists sabotaging American industry.

Disque himself was convinced that the IWW practiced industrial sabotage to further their war against capitalism, and to impede the war effort, but he did not accuse them of acting under the influence of German agents. In November, 1917, we find him charging the IWW with systematic anti-capitalist activity:

...there has been for several months a determined and increasing determination on the part of the representatives of the I.W.W. to slow down production by means which are unquestionably illegal. To some extent this...is inspired by a desire to injure the Government and its war preparations, but I believe this to be merely incidental and that the general purpose is merely to destroy industry for the sake of destruction. I have in my files voluminous records from operators and secret service agents detailing accounts of violence and sabotage daily committed, which result in serious delays to practically all of the industries now concerned in producing aircraft material....Such acts as burning bridges, setting fire to forests, placing emery powder in the oil wells of machines, breaking castings, falling trees across railroad tracks, threatening loyal employees, etc., are of almost daily occurrence.⁵²

Disque’s mentor on labor issues, Carleton Parker, was similarly convinced of IWW sabotage in the summer of 1917 and its cost to the Allies:

⁵¹ Rowan, *The IWW in the Lumber Industry* 42.

⁵² Disque to Chief Signal Officer, November 27, 1917, Correspondence File, Brice P. Disque Papers, University of Washington Special Collections, Seattle, WN.

Employing sabotage against the employers, the Wobblies in effect were serving the Kaiser. Intimidating workers who might otherwise willingly cut wood,...the Wobblies could wreck production even if the formal strike ended.⁵³

Parker advocated stationing troops in the mills and camps and suspending civil rights—classic strategies of martial law. Parker conceded, however, that “even the application of martial law in the West would not halt the retrograde effects of IWW activity.”⁵⁴

During the winter of 1917-1918 Disque’s notebook records IWW meetings that he attended in Portland and personal contacts he made with IWW members Joe Willis, Pat Rooney, and a third unnamed person. In January, Disque noted a “conciliatory movement” within the Portland IWW group, and singled out a member named Ellis as spokesman for the new attitude.⁵⁵

Actual sabotage performed by the IWW is difficult to document. If it existed it was carried out in secret, and the organization preferred not to identify itself as the agent of mysterious fires, breakdowns, or other calamities. During the industry-wide strike in July, feelings ran high and several incidents were reported:

The I.W.W.’s have been guilty of committing many overt acts. Dynamite has been found on the railroad tracks; telephone wires have been cut; threats to poison wells have been made; men have been intimidated, and forest fires have been set, and the end is not yet.⁵⁶

J.J. Donovan, Vice President of Bloedel Donovan Lumber mills in Bellingham, Washington, corresponded frequently with Disque. In January, 1918, Donovan reported that nine trackmen suspected to be IWW members “threw down their tools and quit, refusing to work more than eight hours” on a Bloedel-Donovan logging railroad.

[A Loyal Legion man,] Mike Brassar, an Austrian 28 years old, came to the foreman in the evening and warned him to look out as the I.W.W.’s had threatened damage to the company property. He took some precautions and the only thing that happened was that they managed to let the water all out of our 30,000 gallon tank and there was some delay from this in starting up in the morning. ...I may say that one of the best things about the Loyal Legion is that the men will report those who are threatening damage.⁵⁷

In another incident during the winter of 1917-1918, railroad cars were sabotaged.

It has been definitely learned by this office that a number of east bound freight cars, on the O.W.R.N.R.R. all containing Government orders have had sand placed in the journal boxes for the purpose of delaying them. No cars from the Cut-up Mill were amongst them.⁵⁸

⁵³ Hyman, *Soldiers and Spruce*, 69.

⁵⁴ Hyman, *Soldiers and Spruce*, 69.

⁵⁵ Brice P. Disque, Notebook entries, December 31, 1917; January 10, 1918; January 11, 1918. Brice P. Disque Papers, University of Oregon Special Collections, Eugene, OR.

⁵⁶ “IWW Activities in the Inland Empire,” *The Timberman*, (July, 1917), 43.

⁵⁷ J.J. Donovan to Col. Disque, January 30, 1918, Correspondence file, Brice P. Disque Papers, University of Oregon Special Collections, Eugene, OR.

⁵⁸ Intelligence Officer to C.O. Signal Cantonment, Vancouver WN, February 18, 1918, ARC 601796, Correspondence, Vancouver Barracks, Spruce Production Division Papers, NARA Seattle.

One of the most spectacular incidents attributed to IWW sabotage during the war was the arson of the Martin Brothers grain elevator in Klamath Falls, Oregon. Tons of wheat had been stored there. Wheat was an important commodity for the war, and the authorities suspected IWW sabotage. The Klamath County Sheriff's posse rounded up local Wobblies, but the County Prosecutor could lodge no charges against the men.⁵⁹

Congress responded to threats of sabotage with the Espionage Act of 1917 and the Sedition Act of 1918. Both of these were probably aimed at the IWW and other radical organizations. Immigration laws passed or amended at this time made immigrants vulnerable to deportation if they were associated with seditious groups. The IWW position on sabotage and sedition was predictable: they denied all knowledge or participation. "The I.W.W. has never advocated crime, violence, or any methods of terrorism, either lawful or unlawful."⁶⁰ Historian Cloice R. Howd, writing in 1924, agreed with charges of sabotage against individual Wobblies, if not the IWW itself:

That the I.W.W. as an organization advocated or practiced sabotage during this period [i.e., WWI] has not been proven, but there seems to be an abundance of evidence that individual members of the organization did resort to such practices as driving spikes into logs to break the saws, putting emery dust in machinery, wasting material through careless work and similar methods.⁶¹

However much they may have been tempted by evidence of IWW sabotage and misbehavior, Disque and the SPD did not resort to real martial law when they moved troops into the logging camps and mills in December, 1917. The Army practiced some commendable self-restraint in a potentially explosive situation. The SPD soldier/workers, as we have seen, were there to work and not to stand guard over the workers. They were issued arms, but the guns stayed locked up in camp. The civil rights of the loggers and mill workers were not compromised, and ordinary law and due process prevailed. The only parties whose civil rights were curtailed were the SPD soldiers themselves, who were subject to military discipline and military law. Stationing soldiers in the mills and camps to cut lumber was a strange expedient, which Disque himself called "unprecedented." It was also a successful expedient in that it restrained the tendency to violence that both radical loggers and the otherwise solid citizens in the Northwest had shown.

Dissolution

Armistice Day, 1918, marked not only the end of the war but the end of an era in the West Coast lumber industry. The time of "airplane spruce" was over. The product

⁵⁹ Tyler, *Rebels in the Woods*, 133

⁶⁰ Rowan, *The IWW and the Lumber Industry*, 25.

⁶¹ Cloice R. Howd, *Industrial Relations in the West Coast Lumber Industry*, (Washington DC, 1924), 76.

which had been so important for the past three years had lost its market. Brice P. Disque had been promoted to Brigadier General, and now served as President of the Spruce Production Corporation, which had largely replaced the Spruce Production Division. The Corporation's charter called for its assets to be liquidated at the end of the war, and Disque proceeded accordingly. Wearing his military hat instead of his corporate one, he issued what must have been the last of his long series of General Orders on November 22, 1918. General Order #34 called all records of the Division and the Corporation to be boxed up in quadruplicate and placed in storage. Logging and construction were to stop, contract mills were to send cants to Vancouver, and the Vancouver mill would cut the remaining timber into commercial lumber but not aircraft stock. General Order #34 also appointed officers to the Sales Board which would oversee the sale of SPD properties and a Catalogue Board which would prepare a sales catalog.⁶²

Ever attentive to his men, Disque wrote a farewell note "To the Soldiers of the Spruce Production Division." He thanked them for their dedication and service. He also included a rather strange warning that peace would be "a period of readjustment," and during this time "problems will confront us in many instances as vital to our welfare as a nation as those we have met and solved during this war."⁶³ For Disque himself this warning proved prophetic as he and his senior officers faced a Congressional investigation during the summer of 1919. Disque and the SPD were absolved of any wrongdoing, but the process was humiliating, and he left his war service disillusioned with the Army and the government.⁶⁴

Small assets of the SPD were sold at the Cut-up Plant after they were gathered from the coastal logging camps and railroads. The rolling stock included locomotives, disconnected logging cars, and other railroad equipment. Rail and hardware was stacked at Vancouver. Donkey engines and their sleds, wire rope, construction equipment, and such oddities as pile driver hammers made their way to the sale. Logging blocks, chain, wire rope, end hooks for lifting logs, tongs, and chokers were available. Less exotic items such as groceries, first aid-supplies, hardware, small tools, shovels, kitchenware, nails, spikes, picks, and mattocks were jumbled in with office furniture, pipes and tubes, beds and stoves, and electrical supplies. Finally it all sold, and in the winter of 1925, the Cut-up Plant, heroically built in 45 days, came down.

The eleven logging railroads that the SPD built were expected to have short lives. After the timber they accessed was cut out, the rail and hardware would be pulled and used to build the next logging railroad. Disque ordered the rails, ties, and hardware of each logging railroad to be removed, and the materials "concentrated at the terminals, painted and greased to prevent deterioration, carefully inventoried and reported to this office."⁶⁵ Railroads X and XI reached parts of Lincoln County north of the mill at

⁶² "General Order #34." November 22, 1918. ARC 4913140 General Orders, Spruce Production Division papers, NARA Seattle.

⁶³ "To the Soldiers of the Spruce Production Division," Brice P. Disque Papers, University of Oregon Special Collections, Eugene, OR.

⁶⁴ Hyman, *Soldiers and Spruce*, 336.

⁶⁵ "General Orders #34," November 22, 1918, ARC 4913140 General Orders, Spruce Production Division papers, NARA, Seattle.

Toledo. These lines were apparently not scrapped as ordered, and saw some use after the war.⁶⁶

The larger properties were more difficult to sell. These were the mill at Toledo, the mill at Port Angeles, the mill at Lake Pleasant, Railroad I on the Olympic Peninsula, Railroad XII on the Oregon coast, and the Blodgett Tract, near Waldport, Oregon. The Blodgett Tract was a 12,750-acre tract of timber south of the isolated community of Waldport. There was no access to the tract by rail, and the sketchy coastal roads could not be used to transport logs. The tract had a good stand of Sitka spruce and the SPD had identified it as a valuable property. The owner, John W. Blodgett, was a Michigan lumberman who owned timber in Oregon and California. Blodgett bought the tract from C.A. Smith in May, 1917. Smith was a devious timber operator who was at the time under more-or-less continuous indictment by the federal government for land fraud.⁶⁷ Smith had accumulated numerous large timber properties in Wisconsin, Michigan, Oregon, Washington, and California by illegal means. He was stripped of some properties by the federal courts, and was bankrupted by his bondholders. Among the bondholders was John Blodgett, who apparently accepted the tract in exchange for Smith's bonds. Blodgett's agent in Portland, P.S. Brumby, warned him that Smith's title to the tract was not good. Blodgett believed that taking possession of the tract and logging was his best opportunity to recover his money. Then, suddenly, the Army was clamoring to buy the tract in the winter of 1917. Blodgett was unwilling to sell, probably because he had no clear title. The SPD eventually bought the tract over Blodgett's objections for \$600,000.

The SPD built Railroad XII to reach the tract from Toledo, and were just getting logging started at the time of the Armistice. The SPD listed the tract for sale with the other Lincoln County assets. There were no buyers, perhaps because the cloudy title was common knowledge in the lumber business. In May of 1920, newly appointed Secretary of Agriculture Edwin T. Meredith wrote Secretary of War N.D. Baker suggesting that the Blodgett Tract be transferred to the Siuslaw National Forest. Meredith offered to initiate appropriate legislation in Congress to make the transfer possible.⁶⁸ The Army and the Spruce Production Corporation demurred, saying that the mill and railroad would be impossible to sell without the timber.⁶⁹

Seven months later, in December of 1920, a buyer for the Lincoln County properties came forward. This was the Pacific Spruce Corporation, a group of Western and Mid-western investors headed by Fentress Hill of San Francisco. They purchased the

⁶⁶ Lloyd Palmer, *Steam Towards the Sunset: the Railroads of Lincoln County*, (Lincoln City, OR, 1982), 79ff.

⁶⁷See S.A.D. Puter, *Looters of the Public Domain*, (Portland, 1908), 9; U.S. Bureau of Corporations, *The Lumber Industry, vol. II* (Washington, DC 1914), 576; Ward Tonsfeldt, "Summary History of the Blodgett Tract," on file, Siuslaw NF, Corvallis, OR, 1988, 13ff.

⁶⁸ Secretary of Agriculture [E.T. Meredith] to Secretary of War [N.D. Baker] May 10, 1920, RG 165, entry 8, NARA College Park. This letter, apparently a draft, does not identify the sender or the recipient by name, just by title. The correspondence began on May 3, 1920. Meredith took office February 2, 1920, so the chain of correspondence could have begun with his predecessor, David F. Huston.

⁶⁹ Maj. Gen. George W. Burr to Secretary of War, April 12, 1920, RG 165, entry 8, NARA College Park.

railroad and mill outright, but bought the Blodgett Tract for a down payment of \$50,000 in cash and an agreement to pay for the timber as they cut it.⁷⁰ So, ownership of the tract remained with the U.S. Spruce Production Corporation. Controlling interest in Pacific Spruce Corporation passed into the hands of C.D. Johnson, a lumberman from the South. Johnson got the Toledo mill running, and repaired Railway XII to the Blodgett Tract and Railway X to the north of Toledo. Pacific Spruce struggled through the 1920s, losing its logging company, its ships, and its railroads. The company was re-organized in bankruptcy during the Depression. The Blodgett Tract was largely cut out by 1927, and what remained burned in a major fire in 1934. The Siuslaw National Forest bought the tract as the Yachats Purchase Unit with Weeks Act funds in 1941.⁷¹ During World War II conscientious objectors were sent to Camp Angell on the Blodgett Tract to re-plant the logged and burned-over land.

One of the most anomalous aspects of the Blodgett Tract's convoluted history is that the terms of the contract with Pacific Spruce and its successor firm, the C.D. Johnson Lumber Company, required the U.S. Spruce Production Corporation to remain in business, and to maintain an office in Portland until 1947. The Corporation had a president, a secretary, a clerk, and a chauffeur to drive a government vehicle. The only business of the Corporation was to administer the contract on the Blodgett Tract and to periodically visit the property in Lincoln County. The C.D. Johnson Lumber Company saw its fortunes rise during World War II. The Johnson family sold to Georgia-Pacific Lumber Company in 1952. Georgia-Pacific continues to operate a large pulp mill on the SPD mill site, nearly 100 years after its construction in 1918.

The Spruce Production Corporation property in Clallam County, Washington, had a similar history. During the Congressional investigation in 1919, it was the SPD properties in Clallam County that caused the most stir. Congressmen James Frear (Wisc.), Clarence Lea (Calif.), and Walter Magee (N.Y.) had difficulty understanding why the SPD needed a \$12 million dollar railroad, two sawmills, and a hotel in Port Angeles. Again, there were no buyers in 1920. The Bloedel-Donovan Lumber Company was interested but offered too little. Then, in January, 1921, a huge cyclonic storm struck the Olympic Peninsula, bringing down millions of trees. The timber accessible by the railroad was damaged, and the logs the SPC had left on the ground were buried in debris. "The wind-thrown spruce and hemlock decayed before it could be reached. The fir was salvaged at 80% of its value."⁷²

In 1922, a new firm, Lyon, Hill and Company, bought the properties in Clallam County, which consisted of the two mills, the railroad, and the hotel. The SPC owned no timber land. Lyon, Hill and Company was a group of investors led by Fentress Hill, the man who had organized Pacific Spruce Corporation to buy the Lincoln County, Oregon, properties. Lyon, Hill was based in Portland, as was Pacific Spruce, and many of the same investors were involved in both firms. Also involved were Calvin Fentress and Lucius Baker, principals of Baker, Fentress—a private investment firm in Chicago with

⁷⁰ Palmer, *Steam Toward the Sunset*, 59; Tonsfeldt, *Summary History*, 81.

⁷¹ Tonsfeldt 1988 105ff.

⁷² Donald H Clark, *Eighteen Men and a Horse*. (Seattle, 1949), 117.

extensive holdings in the Western lumber industry.⁷³ In 1925 Lyons, Hill separated the railroad from the mill properties, and in 1929 they sold the railroad to the Sol Duc Investment Company. The railroad ran through the 1920s, suffered through the 1930s, revived during World War II, and expired in 1951.

Today, features of Railroad I remain including the grades, heavy cuts and fills, two tunnels, and several archaeological sites. The right-of-way runs through the Olympic National Park and the Olympic National Forest, and is managed by both agencies as a National Register property. The mill at Port Angeles is gone, as is the hotel.

The Spruce Production Division in the 21st Century

Now, nearly 100 years after the events, contemporary audiences are likely to see the history of the World War I period as simultaneously ancient and modern. The obscure European politics that began the conflict and propelled it through four years of grim combat probably strike most Americans as quaint and decidedly foreign. The soldiers of the American Expeditionary Force or the Spruce Production Division, however, are more familiar. They inhabit the past, but their lives offer some uncanny reflections of our own times and concerns. In terms of material culture, politics, business, and social issues, people of the World War I period are much more familiar than people of the last decades of the 19th century. Their lives reflect the emerging importance of internal-combustion transportation technologies, electronic communication technologies, and the role of vital natural resources.

The story of the Spruce Production Division is rooted in material culture. The political and social problems that the SPD had to deal with are important in the story, but the core elements are aircraft design and production, lumber making, transportation systems, and other early 20th century industrial technologies. The interplay of these concrete, material themes makes the history of the SPD unusual among World War I programs, and gives it its distinctly modern flavor.

⁷³ Ward Tonsfeldt, “National Register of Historic Places Nomination, SPD Railroad I” on file, Olympic National Park, Port Angeles, WA.

APPENDICES

Appendix A	Published Sources Cited
Appendix B	Relevant Holdings, NARA, College Park, MD
Appendix C	Relevant Holdings, NARA, Seattle, WA
Appendix D	Selected Bibliography of Secondary Sources
Appendix E	Notes on the Railroads Supplying Timber to the SPD
Appendix F	Authorization to Built the Cut-up Plant
Appendix G	Glossary

APPENDIX A: PUBLISHED SOURCES CITED

“Airplane Fir Situation.” *The Timberman*. November, 1917: 36.

“Abolish the In-Transit Feature.” *The Timberman*. September, 1917: 1.

Alley, William. *Pearson Field: Pioneering Aviation in Portland and Vancouver*. Charleston, SC: Arcadia, 2006.

Armstrong, W.B., “Food Conservation in the Logging Camp,” *The Timberman*. November, 1917: 61.

Barry, John M. *The Great Influenza, the Epic Story of the Greatest Plague in History*. New York: Penguin: 2004.

Bowers, Nathan A. “Filling the Allies’ Rush Order for Airplane Spruce.” *Engineering News-Record*. December 5, 2918: 1023.

Bradley, Becky Hunter. *The Works: Industrial Architectures of the United States*. New York: Oxford University Press, 1999.

Brown, Jerold S. *Where Eagles Land: Planning and Development of U.S. Army Airfields 1910-1941*. New York: Greenwood Press, 1990.

Brown, Nelson C. *Logging: Principles and Methods of Harvesting Timber in the U.S. and Canada*. New York: John Wiley and Sons. 1934.

_____. *Logging Transportation*. New York: John Wiley and Sons, 1936.

Burnside, Ralph. “Spruce.” *The Timberman*. January, 1917: 35.

Clark, Donald H. *Eighteen Men and a Horse*. Seattle, 1949.

Clark, Irving C. “Logging Railroad Construction.” *The Timberman*. August, 1925: 50-55.

Clark, Robert E. S., “National Register of Historic Places, Inventory-Nomination, Ft. Vancouver.” Olympia, WN: Washington SHPO, 1972.

Compton, Wilson. "Production of Airplane Spruce." *American Review of Reviews*. June, 1919.

Joseph R. Conlin. "Old Boy, Did You Get Enough of Pie?" *Journal of Forest History*, October, 1979.

Cornwall, G. M. 1917. "Your Country and Mine." *The Timberman*. July 1917: 1.

Donovan, Sally & Bruce Howard. *Historic Paint Analysis for the Interior and Exterior Window Sash and Trim: Pearson Historic Airplane Hangar*. Hood River, OR: Donovan & Associates, 2009.

Dubovsky, Melvin and Joseph A. McCartin. *We Shall be All: A History of the Industrial Workers of the World*. Urbana: Illinois University Press, 1967.

"Douglas Fir Export Take Contract for Twenty-Five Million Feet Airplane Fir Stock." *The Timberman*. August, 1917: 47.

Dunn, W.H. "The Location of Logging Railroads." *The Timberman*. November, 1917: 50.

"Equipment Purchased by Us from U.S. Spruce Production Corporation and Offered at Very Attractive Prices." (advertisement) *The Timberman*. August 1919: 48H-48I.

Erigerio, Patricia C. "Spruce Production Division". *Fort Vancouver Cultural Landscape Report*. Seattle, Washington: Pacific Northwest Region, National Park Service, United States Department of Interior, 1992.

_____. *Historic Overview and Evaluation of Significant Resources of Fort Vancouver, Vancouver Barracks, Providence Academy, and Kaiser Shipyards*. Seattle: NPS, Pacific Northwest Region, 1992.

Evans, Gail F. and G.W. Williams. *Over Here, Over Here: the Army's Spruce Production Division and the War to End All Wars*. Eugene, OR: Willamette National Forest, 1984.

Ficken, Robert E. *Lumber and Politics: The Career of Mark E. Reed*. Seattle: University of Washington Press, 1979.

_____. "The Wobbly Horrors: Pacific Northwest Lumbermen and the Industrial Workers of the World, 1917-1918." *Labor History* 24, 3, 1984.

_____. *This Forested Land: A History of Lumbering in Western Washington*. Durham: Forest History Society, 1987.

Finucane, S. *A History of the Blodgett Tract*. Corvallis, OR: Siuslaw National Forest, 1980.

“Forest Fire Losses for 1918,” *The Timberman*. November, 1918: 64.

French, William F. “Turning Spruce Forests into Airplanes.” *Illustrated World*. January, 1919.

Gaertner, John. *North Bank Road: The Spokane, Portland, and Seattle Railway*. Pullman, WA; Washington State University Press, 1990.

Goldrich, Steven. “American Military Culture from Colony to Empire,” *Daedalus*. Summer, 2011: 58-74.

Grande, Walter. *The Northwest's Own Railway: The Spokane, Portland, and Seattle Railway and its Subsidiaries* (2 vol.). Portland: Grande Press, 1992, 1997.

“Great Spruce Mill to Rise on the Olympic Peninsula.” *The Timberman*. June, 1918: 34.

Greeley, W. B. *Some Public and Economic Aspects of the Lumber Industry*. Washington, DC: USGPO, 1917.

Hallion, Richard P. “Wooden Aircraft and the Great War.” *Journal of Forest History*. October, 1978: 200-205.

Hankinson, R.L. “Wood in Airplane Construction.” *The Timberman*. February, 1928: 27.

Hardesty, Von. “Historical Overview of Pearson Airfield.” Seattle: NPS Pacific Northwest Region, 1992.

History of the Spruce Production Division, United States Army and United States Spruce Production Corporation. Portland: Press of Kilham Stationery & Printing Co, 1919.

Howd, Cloice R. *Industrial Relations in the West Coast Lumber Industry*. Miscellaneous Series, Bulletin No. 349. Washington, DC: Bureau of Labor Statistics, US Department of Labor, 1924.

“How Soldiers Were Quartered and Fed in the Spruce Production Camps,” *Engineering News-Record*. January 9, 1919: 105.

Hussey, John. *History of Ft. Vancouver and its Physical Structure*. Olympia: Washington State Historical Society, 1957.

_____. *Historic Structures Report, Ft. Vancouver National Historic Site, Historical data, Vol. I*. Denver: USDI National Park Service, 1972.

Hyman, Harold M. *Soldiers and Spruce: Origins of the Loyal Legion of Loggers and Lumbermen*. Los Angeles: Institute of Industrial Relations, University of California, 1963.

“J.D. Ryan Visits Spruce District of the Northwest.” *The Timberman*. August, 1918: 48G.

Jensen, Vernon. *Lumber and Labor*. New York: Farr and Reinhart, 1945.

Johansen, Dorothy O., and Charles M. Gates. *Empire on the Columbia*. New York: Harper, 1957.

Johnson, Herbert S. *Wingless Eagles: U.S. Army Aviation Through World War I*. Chapel Hill: University of North Carolina Press, 2001.

Jones, Roy. “Clark County Aviation.” *Clark County History Annual*. Vancouver, WA, Clark County Historical Society, 1968.

Kaempffert, Waldemar. “The Wings of Victory.” *American Review of Reviews*. October, 1917: 35-43.

Klemin, Alexander, and T.H. Huff. “Materials in Airplane Construction.” *Aviation and Aeronautical Engineering*. April 15, 1917: 261-237.

“Laminated Airplane Beams.” *The Timberman*. August, 1918: 48G.

Marsh, F. *Twenty Years a Soldier of Fortune*. Portland: Binfords and Mort, 1976.

Maurer, M. *Aviation in the U.S. Army 1919-1939*. Washington DC: U.S. Air Force, 1987.

_____. *The U.S. Air Service in World War I*. Washington DC: U.S. Air Force, 1989.

Merritt, Jane. n.d. “Pearson Airpark and its Relation to Ft. Vancouver NHS.” On file, NPS Pacific Northwest Region.

Mittelman, Edward B. "The Loyal Legion of Loggers and Lumberman — An Experiment in Industrial Relations," *Journal of Political Economy*. 31, 1923: 313-341.

Mixer, G. W. and H.H. Emmonds. *U.S. Army Aircraft Production Facts*. Washington DC: USGPO, 1919.

"New Lumber Rates Planned." *The Timberman*. November 1918: 35.

Newby, Arthur C. "[Letter] From a Private in the Spruce Production Division." *Six Twenty-Six* 2, 9, 1918: 4-5.

"Northern British Columbia Spruce Situation." *The Timberman*. January, 1918: 27.

O'Hearne, James. "Construction of Logging Railroads," *The Timberman*. November, 1917: 49.

"October Shipments." *The Timberman*. October, 1918: 35.

"Organize a Spruce Regiment." *The Timberman*. October 1917: 1.

"Pacific Coast Spruce." *The Timberman*. February 1917: 35.

"Pacific Coast Spruce Placed at Disposal of United States and her Allies." *The Timberman*. August, 1917: 386-387.

Palmer, Lloyd. 1982. *Steam Toward the Sunset*. Newport, OR: Lincoln County Historical Society.

"Pine for Airplanes." *The Timberman*. June, 1918: 34.

"Properties of Various Woods in Airplane Design." *The Timberman*. January, 1918: 45.

Prouty, Andrew Mason. *More Deadly than War: Pacific Coast Logging, 1827-1981*. New York: Garland, 1985.

Puter, S.A.D. *Looters of the Public Domain*. Portland: Portland Printing House, 1908.

Rajala, Richard A. "A Dandy Bunch of Wobblies: Pacific Northwest Loggers and the Industrial Workers of the World, 1900-1930." *Labor History* 37, 2, 1996: 205-234.

_____. "Bill and the Boss: Labor Protest, Technological Change, and the Transformation of the West Coast Logging Camp, 1890-1930." *Journal of Forest History*, October, 1989.

Randal, Warren, Robert F. Kenniston and Dale M. Bever. *Manual of Oregon Trees and Shrubs*. Corvallis: Oregon State University Press.

"Rate Reduction Asked." *The Timberman*. April, 1917: 49.

"Rate Committee Formed." *The Timberman*. April, 1917: 49.

"Resumption of the Forestry Patrol." *Air Service News Letter*. 6, no. 24, 1922: 3.

Ross, Kenneth. "Report on Cook House Management." *The Timberman*. November, 1917: 61.

Rowan, James. *The I.W.W. in the Lumber Industry*. Seattle: Industrial Workers of the World Press, 1919.

"S.P. Embargo on Diversion Cars." *The Timberman*. November, 1917: 31.

"Sanitary Requirements for Camps," *The Timberman*. July, 1919: 68.

"Sawn Spruce Displaced Rived Aircraft Stock." *The Timberman*. May, 1918: 26.

Sawyer, Mott. 1918. "S.P.D. Railroad No. 1." *Spruce*. November, 1918: 12-16.

Schwantes, Carlos A. 1989. *The Pacific Northwest: An Interpretive History*. Omaha: University of Nebraska.

_____. 1994. *Radical Heritage: Labor, Socialism, and Reform in Washington and British Columbia*. Moscow: University of Idaho Press.

Sinclair, Donna L. *Part II, The Waking of a Military Town: Vancouver, Washington and the Vancouver National Historic Reserve, 1898-1920 with Suggestions for Further Research*. USDI: National Park Service, 2005.

_____. *Part III, Riptide on the Columbia: A Military Community Between the Wars, Vancouver, Washington and the Vancouver National Historic Reserve, 1898-1920 with Suggestions for Further Research*. USDI: National Park Service, 2005.

"Spruce Manufacturers Meet in Centralia." *The Timberman*. September, 1917: 48E.

“Spruce Production Investigation Underway,” *The Timberman*, August, 1918: 44.

Strachan, Hew. *The Oxford Illustrated History of the First World War*. New York: Oxford University Press, 2000.

“The Model C.V. Albatros Biplane.” *Aviation and Aeronautical Engineering*. April, 1918: 293.

“The Production of Spruce.” *The Timberman*. December, 1917: 1.

“The YMCA in the Spruce Woods.” *The Timberman*. July, 1918: 36.

Thorne, J. Frederick. “Organized Airplane Spruce Production.” *Aviation and Aeronautical Engineering*. 4, 1, 1918: 289-293.

Tonsfeldt, Ward. *Summary History of the Blodgett Tract*. Corvallis, OR: Siuslaw National Forest, 1986.

_____. “National Register of Historic Places Multiple Property Documentation Form, The Blodgett Tract, Lincoln County, OR.” Salem, OR: Oregon SHPO, 1987.

_____. *Context Statement for Railroad Logging in Oregon*. Salem, Oregon SHPO, 1993.

_____. “National Register of Historic Places Nomination, U.S. Army Spruce Production Division Railroad #1, Clallam County, WA.” Olympia, WA: Washington SHPO, 2005.

_____. *Celebrating the Siuslaw: A Century of Growth*. Seattle: Northwest Interpretive Center, 2009.

Tonsfeldt, Ward and Katherine Atwood. *Historic Structures Report for Vancouver Barracks, West Barracks, Vancouver National Historic Reserve*. Seattle: National Park Service, Columbia Cascades Support Office, 2002.

Tyler, Robert L. *Rebels in the Woods: The IWW in the Pacific Northwest*. Eugene, OR: University of Oregon Press.

U.S. Bureau of Corporations. *The Lumber Industry* (3 vols.). Washington DC: USGPO, 1914.

Van Arsdol, Ted. *Vancouver on the Columbia: An Illustrated History*. Vancouver, WA; Windsor, 1986.

_____. *Northwest Bastion: the U.S. Army Barracks at Vancouver, 1849-1916*. Vancouver, WA: Heritage Trust of Clark County, 1991.

_____. "World War I Brought Boom Times." *Clark County History* 17, 1976: 53-87

"Vancouver Spruce Plant Progressing." *The Timberman*. January, 1918: 45.

Van Dorn, Harold A. *Government Owned Corporations*. New York: Alfred A. Knopf, 1926.

Vinsedge, R. W. "Report of the Accident Prevention Commission," *The Timberman*. November, 1917: 64D.

Walker, Jon. *A Century Airborne: Air Trails of Pearson Airpark*. Vancouver, WA: Pearson Airpark Historical Society, 1994.

Welch, W.A. "Soldiers Build Logging Railroads in Spruce Forests." *Railway Age*. January, 1919: 805-807.

Williams, Gerald W. "And What Did You Do in the Great War Grandpa?" "I Cut Spruce for the Army." Washington DC: USDA Forest Service, 1994.

_____. "The Spruce Production Division." *Forest History Today*. Spring, 1999: 2-10.

_____. *The U.S. Forest Service in the Pacific Northwest*. Corvallis, OR: Oregon State University Press, 2009.

Periodicals

Official Periodicals

Loyal Legion of Loggers and Lumbermen Monthly Bulletin

Spruce Siems-Carey-H.S. Kerbaugh Engineering

Straight Grain Spruce Production Division periodical

Periodicals chronicling the SPD

Aeronautical Engineering

American Forestry

Aviation Age

Six Twenty-Six (Forest Service Region Six periodical)

The Timberman

The American Lumberman

Periodicals dealing with relevant historical topics

American Aviation Historical Society Journal

Forest History Today

Journal of Forest History

Journal of Forest and Conservation History

Oregon Historical Quarterly

Pacific Northwest Quarterly

The Northwest's Own Railway SP&S Historical Society

Timberbeast Railroad logging history

Newspapers

Lincoln County leader

Newport Journal

Olympic Tribune

Oregon Journal

Oregonian

Seattle Times

Vancouver Columbian

Vancouver Independent

Waldport Tribune

APPENDIX B: RELEVANT HOLDINGS, NATIONAL ARCHIVES AND RECORDS ADMINISTRATION, COLLEGE PARK, MD

National Archives and Records Administration, College Park, MD, is a branch of the National Archives dedicated to 20th century materials. The materials that antedate the 20th century are housed in the Washington DC National Archives in the Federal Triangle in central Washington. The lines of demarcation between the two depositories are murky, varying with specific records groups. The 1917-1947 records of the Spruce Production Division (SPD) and its successor agency, the Spruce Production Corporation (SPC) are all rooted in the 20th century, so we would expect to find them at College Park. Other topics of interest to our project, such as Vancouver Barracks, are logically found in both locations.

In addition to the chronological split between the 20th century and preceding centuries, there is also a geographical division among NARA records collections. Materials of interest to specific regions of the U.S. are housed in regional archives, including the one at Seattle. The Spruce Production Division and the Spruce Production Corporation were seen as being importantly mostly to the Pacific Northwest, so most of these records are housed at NARA Seattle. However, there are numerous relevant records remaining at College Park, and many important references to the Spruce Production Division in record collections permanently housed there. For example, records identified with the operations of the SPD were sent to Seattle, but records of the Aircraft Production Board, the parent agency of the SPD, remain at College Park. Records of the relations (often strained) between the Spruce Production Corporation and the USDA Forest Service remain at College Park.

The core of the National Archives collection is text documents. However, there are also archives of photos, moving pictures, maps, plans, and various graphic materials. Those relating to the SPD and SPC are housed in College Park, but in collections separate from the main text and document collection. Access to these materials is quite easy.

Materials entering the National Archives are catalogued in a variety of ways which can be a little baffling at times. In general, text materials are organized by Record Group and entry number. Record Group (RG) 18, for example, is the records of the Army Air Forces—that is, the military air service that was a branch of the Army Signal Corps and later Army Air Corps before the formation of the Air Force. Naval air activities do not fit into this record group. Records within these holdings like correspondence files or general orders files are organized by a 10-point military decimal system. All correspondence about Signal Corps Air Service buildings, for example, would be found in the 600s in a relevant entry.

The public's interest in on-line access has nudged NARA toward a new cataloging system. From a user's perspective this new system seems very promising. It is called Archival Research Catalog (ARC) and materials may be located on-line and called by an

ARC number. The Seattle Branch of NARA and the photographic, maps and plans, and graphics collections at College Park use the ARC number to access materials. The text collection at College Park still uses the Record Group and entry number system, which is only available through the print inventories or finding guides in the archivists' room in the text collection. This system creates something of a bottleneck, since each researcher must work with an archivist and with a finding guide to identify relevant materials and request them.

Inventories of Holdings in Record Group 18

Johnson, Mazie H. *Preliminary Inventory of the Textual Records of the Army Air Forces*, Washington DC, NARA, 1965

Johnson, Mazie H. and Sarah Powell. *Supplement to Preliminary Inventory no. 53, Textual Records of the Army Air Forces*, Washington DC, NARA, 1967.

Guide to the National Archives of the United States. "Records of the Army Air Forces," 1977

Records of the United States Army Air Forces, RG 18-SPC, Photography Collected by the Spruce Production Corporation 1918-1920, Box List.

These finding guides list the hundreds of entries in RG 18 by the source of the records, the nature of the records, and some of the contents. General files like correspondence or general orders are organized by the military decimal system. Other entries may have their own index, which is noted in the finding guides.

General Photographic and Historical Holdings

Record Group 18 Army Air Forces ARC 512884 Photographs Collected by the Spruce Production Corporation, 1918-1920

This is the basic collection of photography from SPD camps, mills, and construction projects. Contains photographs by several commercial photographers engaged by the SPD plus photos taken by Signal Corps photographers.

Record Group 18 Army Air Forces Air Service, 1917-1928 Box 1
Allen, Shirley *History of the War Cooperation Between the Bureau of Aircraft Production and the USDA Forest Products Laboratory* MS only

This manuscript contains valuable information about spruce and other woods evaluated for aircraft construction by the Forest Service Wood Products Laboratory in Madison, WI.

Bulletin of the Airplane Engineering Department, U.S. Army

This periodical was distributed within the military and (presumably) within the aircraft manufacturing community, or perhaps to military contractors. Contains technical information about standards aircraft lumber must meet.

Specific Entries, Record Group 18 Records of the Army Air Forces

Record Group 18 Army Air Forces Entry 8 Textual Records from the War Department. Office of the Chief of Staff. (08/15/1903 - 09/18/1947)

Records of War Department administration, some relating to the SPD and SPC. Organized by the military decimal system.

Record Group 18 Army Air Forces Entry 9 Aircraft Production Department Purchase Orders, 1917-1921

General procurement documents for military aircraft construction and material including lumber.

Record Group 18 Army Air Forces Entry 28 Correspondence, Orders, and other Records of Aircraft Production Detachments, 1918-1919

Aircraft production detachments here are not the spruce squadrons stationed in logging camps and mills, but other military groups involved with the SPD. Spruce squadrons and SPD medical records are archived in NARA Seattle.

Record Group 18 Army Air Forces Entry 36 Records of the Bureau of Aircraft Production, 1917-1921

This is an extensive entry containing the collected records of the Bureau of Aircraft Production, parent agency of the SPD. Records are arranged by military decimal numbers.

Record Group 18 Army Air Forces Entry 48 General Records by Decimal Number

This is another voluminous entry with records of aircraft production and materials for the war effort.

Record Group 18 Army Air Forces Entry 107 History and Development of Aircraft Production, WWI

Chronology of the Bureau of Aircraft Production

Record Group 18 Army Air Forces Entry 110 Correspondence, Reports, Studies and Other Records Relating to the Bureau of Aircraft Production and Military Aeronautics, 1917-1921 (by Decimal Number)

Military decimal files include construction data for aircraft. The total amount of lumber per 1000 aircraft is calculated for the De Haviland DH-4 and other aircraft used by the Allies.

Record Group 18 Army Air Forces Entry 111 Bureau of Aircraft Production History

More historical information about the Bureau of Aircraft Production, parent of the SPD

Record Group 18 Army Air Forces Entry 116 Test Reports for Aircraft Materials

Technical information on aircraft materials, including spruce, Port Orford cedar, and Douglas fir. Also contains data on fabric, dope, and cable used to strengthen wooden airframes.

Record Group 18 Army Air Forces Entry 168 Army Air Force Central Decimal Files, 1917-1938

File materials organized by the military decimal system

Record Group 18 Army Air Forces Entry 179 Spruce Production Board, Vancouver Barracks, 1917-1921

This organization was made up of lumbermen who advised the SPD and the SPC at Vancouver Barracks during the war.

Record Group 18 Army Air Forces Entry 292 Landing Fields Boxes 1211-1215, 2317-2319 Pearson Field, WWII

This entry includes records from Pearson Field during WW II, after it was well established as a military field.

Record Group 18 Army Air Forces Entry 315B History and Description of Property, Spruce Production Corporation 1932

Information about the timberlands in Lincoln County, OR and Clallam County, WA owned by the SPC and provisionally sold to lumber companies. Includes the mill site at Toledo, OR and the mill site at Port Angeles, WA.

Specific Entry, Record Group 92, Records of the Office of the Quartermaster General, General Construction Division

Construction of World War I Forts, and other Facilities, compiled 1909 - 1936

ARC 522924 / Entry 92-CD.

Photographs and other Graphic Materials from the War Department. Office of the Quartermaster General. Construction Division. (06/15/1930 - 12/16/1941)
Still Picture Records Section, Special Media Archives Services Division,
Series from Record Group 92: Records of the Office of the Quartermaster General, 1774 - 1985

Includes photographs of Pearson Field during the 1930s, after our period.

Specific Entries, RG 95 Records of the USDA Forest Service

Record Group 95 USDA Forest Service Division of Fire Control, General
Correspondence Box 1124
Edgerton, D.F. *Airplane Forest Fire Patrol History* MS only

Forest Patrolman

These two publications chronicle the early (1919-1922) forest fire patrols flown from Camp Lewis, WA; Salem, OR; Eugene, OR; and Roseburg, OR as well as other states.

Record Group 95 USDA Forest Service Entry 61 Fire Control Records, 1909-1941

Records of the forest fire patrols flown by the Army for the Forest Service.

Inventory of Holdings in RG 134, Interstate Commerce Commission, Railroads

Pfeiffer, David. *Records Relating to North American Railroads, Reference Information Paper 91*, Washington DC, NARA, 2001.

Finding guide for all federal government records relating to railroads including records of the Interstate Commerce Commission

Specific Entries, RG 134 Records of the Interstate Commerce Commission, Railroads

Record Group 134 Interstate Commerce Commission, Railroads
Appendix B: Interstate Commerce Commission, Bureau of Valuation--Valuation Docket Index (Railroads) 1914-1928 Valuation Docket 896, Spokane, Portland, and Seattle Railway

Entry 111.83 Engineering Field Notes of the ICC Surveys 1914-1928

Notes from the survey of all ICC railroads, and the survey conducted during 1916 for the Spokane, Portland, and Seattle. The purpose of this survey and inventory was to provide data for levying taxes.

ARC 1566726 Spokane, Portland, and Seattle Railway Maps and Charts in Special Media Archives

Maps of the main line, stations, yards, and other features described in the 1916 survey of properties.

Specific Entries, RG 165 Records of the War Department General and Specific Staffs

Record Group 165 War Department General and Special Staffs Entry 8 Spruce Production Division (by Decimal Number)

This entry chronicles Command and staff operations of the SPD prior to the formation of the SPC in 1918. Includes acrimonious correspondence between the Forest Service and the Army about possible Forest Service sales of spruce.

Record Group 165 War Department General and Special Staffs Entry 106 Plant Files (Vancouver Barracks)

This entry contains much information about the construction and operation of the flying field at Vancouver Barracks, 1919-1926

APPENDIX C: RELEVANT HOLDINGS, NATIONAL ARCHIVES AND RECORDS ADMINISTRATION, SEATTLE, WA

Federal records from Record Group 18 (military aviation) relating most directly to the Spruce Production Division (SPD) of U.S. Army Signal Corps and the Spruce Production Corporation (SPC) have been transferred to the Seattle branch of the National Archives and Records Administration (NARA). In recent years, NARA has been changing its organizational system from the old decimal system to a new system called Archival Research Catalog or simply "ARC." The new system is not completely congruent with the older system, rendering many of the older finding guides obsolete. Record Group 18, Army Air Force, is the basic catalog number.

SPRUCE RECORDS IN SEATTLE BY ARC GROUP

Record	ARC IDs	Dates	Agency	Boxes
Audit reports	5091019	1920-1945	SPC	1
Aircraft production progress reports	5080993	1918-1919	SPC	1
Cablegrams	5080986	1918-1919	SPC	2
Circulars	5-80989	1918	SPC	1
Contracts	5058551	1917-1943	SPC	5
Corporate documents	5080991	1918-1946	SPC	1
Field notes	5059050	1917-1923	SPC	5
Financial Records	5049782	1918-1946	SPC	11
Financial reports	5050304	1920-1946	SPC	7
General correspondence	5080983	1918-1946	SPC	15
Index to cablegrams	5080984	1918	SPC	1
Index to General Correspondence	5080980	1918-1946	SPC	1
Journal Vouchers	5052316	1918-1946	SPC	14
Corporate meeting minutes	5080988	1918-1946	SPC	3
Monthly statements of costs	5081020	1918	SPC	1
Payroll lists	5049770	1918-1925	SPC	8
Sales Orders	5091018	1918-1946	SPC	1
Reports	5060601	1918-1934	SPC	1

Record	ARC IDs	Dates	Agency	Boxes
Roster of military personnel	5080995	1918	SPC	2
Sales Orders (2)	5057508	1922-1946	SPC	2
Stock certificates	5056769	1918-1946	SPC	1
Clatsop Records	5049388	1918	SPD	4
Coos Bay Records	5049389	1918	SPD	2
Puget Sound Records	5049390	1918	SPD	6
Lake Pleasant Records	5049491	1918	SPD	4
Correspondence, Vancouver Barracks	601796	1917-1919	SPD	21
Vancouver Records	5049398	1917-1919	SPD	6
Siletz, Yaquina Records	5049475	1917-1919	SPD	2
History SPD	5048576	1917-1918	SPD	1
Surgeon's Records	5049346	1917-1919	SPD	25
Officers' school records	5049511	1918-1919	SPD	1
General Records, SPD	5049512	1917-1919	SPD	6
Rosters of Military Personnel	5049344	1918	SPD	1
Records of Causal Detachments	4913136	1918-1919	SPD squadrons	37
General Orders, Causal Detachments	4913140	1918-1919	SPD squadrons	7
Provisional Regiment Records	5013065	1918-1919	SPD squadrons and units	20
Squadron Correspondence	622392	1917-1919	SPD squadrons	256

These holdings fall into four general categories:

- The Spruce Production Division general staff and operations (1917-1919),

- the Spruce Production Corporation operations (1918-1846),
- reports and correspondence from the separate SDP districts (1918-1919),
- reports and correspondence from the detached squadrons of the SPD in the mills and camps in Oregon and Washington (1917-1919).

The overwhelming bulk of this material is the records of administering the individual squadrons in the mills and camps. This constitutes 320 of the 483 boxes of material, or 66% of the total.

For our purposes, the materials from the Spruce Production Corporation, the Spruce Production Division general staff and operations, and the Vancouver District (including the cut-up mill) are the most relevant. Other districts are less relevant, and the bulk of these files consist of correspondence with SPD headquarters in Portland or Vancouver, which is copied in the Vancouver Barracks correspondence files. The records of the detached squadrons consist largely of personnel and material concerns.

Spruce Production Corporation

Over its long life (1918-1946), the Spruce Production Corporation was a somewhat anomalous agency. It was a public corporation—roughly half government and half private. It was created to manufacture aircraft lumber in 1918. After the war ended in November of that year, the SPC was charged with selling off the assets of the SPD including the logging and milling equipment, the 12 spruce railroads, the mills at Toledo, Port Angeles, Lake Pleasant, and Vancouver, the Blodgett Tract, timber lands on the Olympic Peninsula, and other scattered properties, including a hotel in Port Angeles.

Some of these items sold at auction, but the Blodgett Tract, the timber on the Olympic Peninsula, railroads 1 (Olympic Peninsula) and 12 (Toledo to Waldport), and the mill at Toledo, languished for several years until they sold on contracts that allowed the buyers to pay for the timber as they cut it and manufactured it into lumber. The Corporation managed these contracts for the government. Hence, the SPC operated out of an office in Portland through the 1920s, 1930s, and into the WWII years.

Records of the SPC in the National Archives, Seattle, include the following broad categories:

- finances, including financial reports, audit reports, journal records, sales, statements of costs, payroll, and contract administration
- communications, including cablegrams, circulars, and general correspondence
- corporate records including corporate documents, stock certificates, minutes of corporate board meetings.

The most useful of these is the general correspondence file, which includes letters, telegrams, and other communication outside the agency. Fortunately, this collection of 15 boxes of material is organized by the War Department Decimal System, which is as follows:

000	General
100	Finance
200	Personnel
300	Administration
400	Supplies and Equipment
500	Transportation
600	Buildings
700	Medicine, hygiene, sanitation
800	Rivers and harbors

In addition to this broad organization, the correspondence file has a very useful subject index provided by the SPC.

Spruce Production Division

The SPD had a much shorter life than the SPC, but it was considerably more active. If we skip over the voluminous material generated by the detached squadrons and the Puget Sound, Coos Bay, Siletz-Toledo-Alsea, and Clatsop districts, we have records from SPD headquarters in Portland, operations at Vancouver Barracks, and the cut-up mill itself. There are also some records which are general to the SPD like the Division Surgeon's reports, the Officers' Candidate School reports, personnel records, and the history of the agency that Disque had his communications staff prepared.

The Portland headquarters and Col. Disque created extensive operating orders and policy statements. These were published and distributed within the agency.

General Orders—policy statements covering military life, operations of the SPD, work rules, uniforms, and pay. Intended for all members of the agency. Indexed

Special Orders—details of operations, personnel decisions, uniforms. Not indexed

Weekly Bulletins—details of logging and milling operations. Intended for all members of the agency. Indexed

Mimeographs—announcements and notices. Indexed

Memoranda—personnel matters, distribution is unclear

Division memos—quartermaster issues, transfers, leave, etc. Not indexed

In addition there were publications intended for outside audiences like the History of the Spruce Production Division, *LLLL Bulletin*, *Straight Grain*, the weekly *War Summary*, patriotic posters, and other materials. Holdings of the Seattle NARA includes all the General Orders, and examples of the other publications. The Spruce Production Division had an aggressive publicity policy, and to that end employed commercial photographers

to record many activities. Those photos are scattered through the materials, but are not well represented in the NARA Seattle holdings. They can be found at NARA College Park and at the Brice P. Disque Collections at the University of Oregon Library and the University of Washington Library. The Oregon State University Library has an excellent set of the commercial and Army photographs, as well as amateur photographs of SPD activities.

Vancouver Barracks and the Vancouver Mill

Documents relating to the Vancouver mill consist of communications about authorizing the mill, building the mill, and equipping it for manufacturing aircraft-quality lumber of Sitka spruce, Douglas fir, and incense cedar. During the 10 months that the mill operated it generated an enormous amount of paper work documenting production, personnel, sales and shipment, and accounting. Much of this is available in the General Records, SPD, file 5049512, and Correspondence, Vancouver Barracks, file 601796. Oversize maps and diagrams of the mill and the surrounding area are also available in these groups.

Vancouver Barracks was also the center of the SPD operations, although Col. Disque and his staff worked out of the Yeon Building in Portland. Disque set up offices in the Yeon building in 1917, and probably remained there because it was close to the nerve center of the lumber industry in Oregon.

The military departments needed to operate a force of perhaps 25,000 troops stationed throughout western Oregon and Washington were housed at Vancouver Barracks, however. These included executive officers, accounting and payroll personnel, medical personnel, transport staff, logistics, quartermaster, induction services and training, officers' candidate training, and other categories of military management. In addition, civilian specialists in logging, lumber manufacture and distribution, and milling technology entered the mix of people involved in this great industrial adventure.

Sometimes the lines blurred. For example, the Division Surgeon had the task of seeing to the health, welfare, and safety of the troops. These were scattered in small groups (squadrons) in remote locations in Oregon and Washington. They were involved in dangerous occupations with a high rate of injury. A spruce soldier injured in Clatsop County, Oregon, would need immediate treatment at the site of the accident, then perhaps transport of the hospital at Vancouver for additional treatment. Soldiers were susceptible to various illnesses, and some brought existing health problems with them into Army service.

Maintaining the troops' health and treating injuries was part of what any Army doctor would expect by way of job description. The SPD also required the medical staff to inspect far-flung logging camps for sanitary conditions, oversee the troops' diets, lecture them on social diseases and hygiene, and send those with hernias, "mental deficiency," or chronic back problems to other less strenuous duties.

In addition to all this, the medical staff had to deal with the great Spanish Influenza epidemic in the winter of 1918. This world-wide pandemic was one of the most significant disasters ever recorded, killing perhaps 100 million people world wide. It was especially pernicious for troops, living in close proximity to each other, and—since the disease victimized younger people—at the most vulnerable age. The base hospital at Vancouver had to be expanded with temporary buildings to accommodate the sick, and the medical staff was stretched to the breaking point.

All of this is recorded in ARC file 5049346, the Division Surgeon's Records. The materials consist of 25 boxes of correspondence, reports, kitchen and latrine inspection reports, sick call lists, hospital admissions, and other health-related documents.

APPENDIX D: SELECTED BIBLIOGRAPHY OF SECONDARY SOURCES

This bibliography presents selected published or “secondary” materials. These are generally written or graphic items created after the events they describe and distributed for a wide readership. The other category of material includes unpublished or primary materials which are created at the time by the participants and usually not distributed to the public.

The distinction is murky and sometimes arbitrary. As an agency of the U.S. government, the SPD was well-documented during its two-year life and those records, now in various archives, are the most important primary materials. In addition to these internal documents, the SPD generated a substantial amount of publicity including photographs, periodicals, and news releases intended for public consumption.

For purposes of this study, we will try to consider materials prepared by the SPD as primary and materials prepared about the SPD by others as secondary. Unsigned news articles in 1917 and 1918 probably reflect the “party line” of official SPD news releases (primary). Other, signed, articles probably reflect the position of the writer and the publication and may deviate from the official position (secondary). The famous photos of SPD activities by A.M. Prentiss, Kinsey, and the Signal Corps are primary. Periodicals published by the SPD—*Straight Grain*, *Spruce*, and *The Loyal Legion of Loggers and Lumbermen Monthly Bulletin* are primary, while other periodicals like *The Timberman* and *The American Lumberman* contain materials derived from news releases (primary) and also materials generated by savvy industry insiders like *The Timberman* editor George Cornwall (secondary). Soon after the agency was disbanded in 1918, two anonymous members of the SPD command prepared a 100-page history of the SPD which was printed privately in Portland. So, this 1919 SPD history could be seen as either primary or secondary.

Reports and documents on the SPD prepared by historians and cultural resource managers are secondary, even though they are not commercial publications, and their distribution may be small. Reports on archaeological investigations of SPD sites or features contain original, sensitive information and may have a restricted circulation. These are probably best seen as primary. In the end, all materials are shuffled together to contribute to our understanding of the agency.

General History, Pacific Northwest, World War I

Publications grouped under this rubric have been selected from among numerous choices. DeWeerd, Ford, and Strachan cover WW I itself and the U.S. role, but there are any number of other books available. The two environmental histories—Dietrich and Langston—focus on the decline of scenic woodlands in Oregon and Washington but also see forest history within a broad social and economic perspective that goes beyond scenery. Gerald Williams is retired as official historian of the USDA Forest Service. His expertise includes the agency itself, the SPD, and the Pacific Northwest. The two accounts of the Spokane, Portland, and Seattle Railway provide critical information about this road. The region-wide organization and efficiency of this railroad made the complicated milling-in-transit scheme of the SPD possible.

DeWeerd, Harvey A. 1968. *President Wilson Fights His War: World War I and the American Intervention*. New York: Macmillan.

Dietrich, William. 1992. *The Final Forest: The Battle for the Last Great Trees of the Pacific Northwest*. New York: Simon and Schuster.

Ford, Nancy Gentile. 2008. *The Great War and America: Civil-military Relations During World War I*. Westport, Connecticut: Praeger Security International.

Gaertner, John. 1990. *North Bank Road: The Spokane, Portland, and Seattle Railway*. Pullman, WA: Washington State University Press.

Grande, Walter. 1992, 1997. *The Northwest's Own Railway: The Spokane, Portland, and Seattle Railway and its Subsidiaries* (2 vol.). Portland: Grande Press.

Langston, Nancy. 1995. *Forest Dreams, Forest Nightmares; the Paradox of Old Growth In the Inland West*. Seattle: University of Washington Press.

Schwantes, Carlos A. 1989. *The Pacific Northwest: An Interpretive History*. Omaha: University of Nebraska.

Strachan, Hew. 2000. *The Oxford Illustrated History of the First World War*. New York: Oxford University Press.

Williams, Gerald. 2009. *The U.S. Forest Service in the Pacific Northwest*. Corvallis, OR: Oregon State University Press.

Local History—Olympic Peninsula and Clallam County, WA; Vancouver and Clark County, WA; Portland, OR; Toledo and Lincoln County, OR

This category includes local histories of the cities and counties most affected by the SPD. In Clallam County, Washington, and Lincoln County, Oregon, SPD infrastructure had a profound effect on later 20th century economy. The influence of the SPD at Vancouver Barracks was less profound, but the Army and the command at Vancouver Barracks incorporated lessons from the SPD into the administration of the Civilian Conservation Corps in the 1930s. In Oregon, the SPD was involved in the contested ownership of timberland wrested from the public domain in Lincoln and Coos counties. Problems with land fraud in these counties antedated the SPD and persisted long after the end of the agency. Stephen A. D. Puter—“king of the Oregon land fraud ring”—wrote his confessional book “in the dank recesses of a prison cell” to show how the Blodgett Tract and other Oregon spruce lands were assembled.

Becham, S.D., K.A. Toepel, and Rick Minor. 1984. *Cultural Resource Overview of the Siuslaw National Forest*. Corvallis, OR: Siuslaw National Forest.

Finucane, S. 1980. *A History of the Blodgett Tract*. Corvallis, OR: Siuslaw National Forest.

Hays, M.H. 1976. *The Land That Kept its Promise: A History of South Lincoln County*. Newport, OR: Lincoln County Historical Society.

Landerholm, Carl. 1960. *Vancouver Area Chronology, 1784-1958*. Vancouver, WA.

Morgan, A.W. 1959. *Fifty years in Siletz Timber*. McMinnville, OR: News Register Printing.

Morgan, Murray. 1955. *The Last Wilderness*. Now York: Viking.

MacColl, Kimbark. 1976. *The Shaping of a City: Business and Politics in Portland, Oregon 1885-1915*. Portland: Georgian Press.

O'Callaghan, J. 1979. *Disposition of Public Lands in Oregon*. New York: Arno.

Palmer, Lloyd. 1982. *Steam Toward the Sunset*. Newport, OR: Lincoln County Historical Society.

Puter, S.A.D. 1908. *Looters of the Public Domain*. Portland: Portland Printing House.

Rooney, J.R. 1997. *Frontier Legacy: A History of the Olympic National Forest, 1897-1960*. Seattle: Northwest Interpretive Center.

[Russell, Jervis] 1971. *A History of Clallam County*. Port Angeles, WA: Clallam County Historical Society.

Tonsfeldt, Ward. 1987. "National Register of Historic Places Multiple Property Documentation Form, The Blodgett Tract, Lincoln County, OR." Salem, OR: Oregon SHPO.

_____. 2005. "National Register of Historic Places Nomination, U.S. Army Spruce Production Division Railroad #1, Clallam County, WA." Olympia, WA: Washington SHPO.

_____. 2009. *Celebrating the Siuslaw: A Century of Growth*. Seattle: Northwest Interpretive Center.

Van Arsdol, Ted. 1986. *Vancouver on the Columbia: An Illustrated History*. Vancouver, WA; Windsor.

_____. 1991. *Northwest Bastion: the U.S. Army Barracks at Vancouver, 1849-1916*. Vancouver, WA: Heritage Trust of Clark County.

_____. 1976. "World War I Brought Boom Times." *Clark County History* 17: 53-87.

History of the Lumber Industry in the Pacific Northwest

During the first and second decades of the 20th century the Pacific Northwest became the locus of much of the lumber industry in the U.S. Yields from the Great Lakes States, the southern pine lands, and Middle Atlantic States were declining and new mills in Oregon, Washington, and northern California began production. Portland and Seattle were centers of the industry. *The*

Timberman, a trade journal published in Portland and edited by George Cornwall, served the industry with technical articles, local columns, and what is probably best seen as industry gossip. The result was a lively mix that still reads well. Influential lumbermen in Washington and Oregon served on the advisory board of the SPD. Others, like Mark Reed, served in political and agency positions. After the war, the SPD—re-named the Spruce Production Corporation—continued to administer its timber lands and other resources through the 1930s.

Abbey's Register of the Western Lumber Industry, 1922-1942, Portland.

Anonymous. 1905-1906. *American Lumbermen, Series 1-3*. Chicago: American Lumbermen Press.

Carlson, Linda. 2003. *Company Towns of the Pacific Northwest*. Seattle: University of Washington Press.

Cornwall, G. M. 1917. "Your Country and Mine." *The Timberman*. July 1917: 6.

_____. 1924. *Timberman Directory of the Lumber Industry*. Portland: Timberman Press.

_____. 1926. "The Lumber Industry and Port Development." *The Timberman* October, 1926: 42-43.

Ficken, Robert E. 1979. *Lumber and Politics: The Career of Mark E. Reed*. Seattle: University of Washington Press.

_____. 1979. "Weyerhaeuser and the Pacific Northwest Timber Industry." *Pacific Northwest Quarterly* 70: 146-154.

_____. 1987. *This Forested Land: A History of Lumbering in Western Washington*. Durham: Forest History Society.

Greeley, W. B. 1917. *Some Public and Economic Aspects of the Lumber Industry*. Washington, DC: Government Printing Office.

Johnson, Arthur Bolling. 1924. *Pacific Spruce Corporation and Subsidiaries*. Chicago: Lumber World Review.

U.S. Bureau of Corporations. 1914. The Lumber Industry (3 vols.). Washington DC: U.S. Government Printing Office.

Forestry, Logging, and Logging Railroad Technology

In the 1880s and 1890s west-coast logging and lumber manufacturing mechanized with three critical inventions—logging railroads, John Dolbeer’s steam-powered log skidders, and steam or electric powered band saws in the mills. The industry that emerged after the turn of the century was much more sophisticated and capital-intensive than earlier. Scientific forestry and the land grant colleges produced well-trained foresters and logging engineers. Agencies like the USDA Forest Service (1905) emphasized improved forest management and regulated logging practices. For the SPD, the critical technology was railroad logging. In two years the SPD built and operated a dozen railroads in the spruce timber.

Anonymous. 1918. "Coast's Wire Rope Controlled by Army". *Los Angeles Times*. 21 February 21: 13.

Brown, Nelson C. 1934. *Logging: Principles and Methods of Harvesting Timber in the U.S. and Canada*. New York: John Wiley and Sons.

Bryant, R.C. 1913. *Logging*. New York: John Wiley.

Camp, Walter Mason. 1904. *Notes on Track*. Chicago.

Clark, Irving C. 1925. "Logging Railroad Construction." *The Timberman*. August, 1925: 50-15.

Crosby, Lloyd. 1928. "Selective Logging and Railroad Location." *The Timberman* . November, 1928: 70.

Dunn, W.H. 1917. "The Location of Logging Railroads." *The Timberman*. November, 1917: 50.

Keller, C.W. 1954. "Railroad Born of First World War Fades Out." *Seattle Sunday Times*, December 5: 10.

Searles, W.H. 1942. *Field Engineering: A Handbook of the Theory and Practice of Railroad Location, Surveying, and Construction*. New York: Wiley.

Tonsfeldt, Ward. 1993. *Context Statement for Railroad Logging in Oregon*. Salem, Oregon SHPO.

Wacherman, A.E. 1949. *Harvesting Timber Crops*. New York: McGraw-Hill.

History of the Spruce Production Division

Historical accounts of the SPD began with the volume prepared by former members of the agency in 1919. Although they did not sign their work, SPD staff members E. H. McCollister, and R.S. Gill were the probable authors. Recent historical work has been done by Gail Evans, Gerold Williams, Patricia Erigero, and Ward Tonsfeldt.

Crosman, Kathleen. 2011. "The Army in the Woods: Spruce Production Division Records at the National Archives." *Oregon Historical Quarterly* 112, 1: 100–106.

Erigero, Patricia C. 1992. "Spruce Production Division." *Fort Vancouver Cultural Landscape Report*. Seattle, Washington: Pacific Northwest Region, National Park Service, United States Department of Interior.

Evans, Gail F. and G.W. Williams. 1984. *Over Here, Over Here: the Army's Spruce Production Division and the War to End All Wars*. Eugene, OR: Willamette National Forest.

Finucane, S. 1980. *A History of the Blodgett Tract*. Corvallis, OR: Siuslaw National Forest.

Hyman, Harold M. 1963. *Soldiers and Spruce: Origins of the Loyal Legion of Loggers and Lumbermen*. Los Angeles: Institute of Industrial Relations, University of California.

[McCollister, E.H. and R.S. Gill]. 1919. *History of the Spruce Production Division, United States Army and United States Spruce Production Corporation*. Portland: Press of Kilham Stationery & Printing Co.

Prentiss, A.M. 1918. *Spruce Helped Win the War: a portrayal of the personnel, railroad construction, timber cutting, etc. necessary to the production of airplane spruce*. Portland: A.M. Prentice.

Tonsfeldt, Ward. 1986. *Summary History of the Blodgett Tract*. Corvallis, OR: Siuslaw National Forest.

Williams, Gerald W. 1984. "And What Did You Do in the Great War Grandpa?" "I Cut Spruce for the Army." Washington DC: USDA Forest Service.

_____. 1999. "The Spruce Production Division." *Forest History Today*. Spring, 1999: 2-10.

Spruce Production Division Activity

Sources in this category include accounts of the SPD written during period of activity (or shortly afterwards) in publications outside the agency.

Anonymous. 1918. "General Disque Employed". *The Christian Science Monitor*: March 22: 2.

_____. 1918. "Spruce and the airplane." *The San Francisco Chronicle*. 11 April 11: 18.

_____. 1918. "The Race for Airplane Spruce and Ship Timbers." *American Forestry*. September: 523-527.

_____. 1919. "Turn in Tide is for Disque." *Los Angeles Times*. September 7: 16.

Compton, Wilson. 1919. "Production of Airplane Spruce." *American Review of Reviews*. June: 629-633.

French, William F. 1919. "Turning Spruce Forests into Airplanes." *Illustrated World*, January 1919: 196-201.

Hallaver, F.D. 1920. "Proper Care of Airplane Wood." *The Timberman*. June 19: 97-101.

Hankinson, R.L. 1928. "Wood in Airplane Construction." *The Timberman*. February, 1928: 38-43.

Sawyer, Mott. 1918. "S.P.D. Railroad No. 1." *Spruce*. November 1918 12-16.

Thorne, J. Frederick. 1918, "Organized Airplane Spruce Production." *Aviation and Aeronautical Engineering*. 4, 1: 289-293.

Welch, W.A. "Soldiers Build Logging Railroads in Spruce Forests." *Railway Age*. January, 1919: 805-807.

First Person Narratives of SPD Soldiers

This category is represented by only two publications, but they are very revealing. Marsh's lively account of his life includes a year's service building the mill at Toledo. He was a miner from Colorado who enlisted in the Army expecting to go to the trenches in France, but wound up on the Oregon coast living in a tent in the winter.

Marsh, F. 1976. *Twenty Years a Soldier of Fortune*. Portland: Binford and Mort.

Newby, Arthur C. 1918. "[Letter] From a Private in the Spruce Production Division." *Six Twenty-Six* 2, 9: 4-5.

Labor and Politics—IWW and the LLLL

Academic historians have approached the SPD within the broad context of the labor struggles of the early 20th century. Some American labor organizations radicalized during the decades surrounding the turn of the century. The Western Federation of Miners and the Industrial Workers of the World organized the maritime trades, construction laborers, loggers, mill workers, miners, and farm laborers in the West and the Midwest. A general strike in July

of 1917 stopped lumber production for the summer. General Pershing, in command of the U.S. forces, worried that if labor unrest could cripple lumber production, then steel, coal, food and other war materials were also vulnerable. As a result, the SPD created the Loyal Legion of Loggers and Lumbermen (LLLL), a government-sponsored surrogate union that negotiated with mill owners for the 8-hour day, better living conditions in camp, medical support, and other benefits. The LLLL continued after the war through the 1930s. Labor historians see the SPD and the LLLL as either a vindication for the radicals, or as an example of the government co-opting legitimate labor positions.

Brody, David. 1989. *Workers in Industrial America*. New York: Oxford University Press.

Dubovsky, Melvin. 1994. *The State and Labor in Modern America*. Chapel Hill : University of North Carolina.

Dubovsky, Melvin and Joseph A. McCartin. 2000 (1967). *We Shall be All: A History of the Industrial Workers of the World*. Urbana: Illinois University Press.

Ficken, Robert C. 1984. "The Wobbly Horrors: Pacific Northwest Lumbermen and the Industrial Workers of the World, 1917-1918." *Labor History* 24, 3: 325-341.

Howd, Cloice R. 1924. *Industrial Relations in the West Coast Lumber Industry*. Miscellaneous Series, Bulletin No. 349. Washington, DC: Bureau of Labor Statistics, US Department of Labor.

Jensen, Vernon. 1945. *Lumber and Labor*. New York: Farr and Reinhart

McCartin, Joseph A. 1997. *Labor's Great War: The Struggle for Industrial Democracy and the Origins of Modern American Labor Relations*. Chapel Hill: University of North Carolina.

McClelland, John. 1987. *Wobbly War: the Centralia Story*. Tacoma: Washington State Historical Society.

Mellinger, Phil. 1996. "How the I.W.W. Lost its Western Heartland: Western Labor History Revisited." *Western Historical Quarterly* 27, 3: 303-324.

Mittelman, Edward B. 1923. "The Loyal Legion of Loggers and Lumberman — An Experiment in Industrial Relations," *Journal of Political Economy*, 31: 313-341.

Montgomery, David. 1989. *The Fall of the House of Labor*. New York: Cambridge University Press

Nichols, Claude W. Jr., *Brotherhood in the Woods: The Loyal Legion of Loggers and Lumbermen: A Twenty Year Attempt at "Industrial Cooperation"*. PhD dissertation. Eugene, OR: University of Oregon, 1959.

"Oregon at War! On the Home Front, Controlling Oregon's Economy for the War Effort". Salem, Oregon: Oregon State Archives, Office of the Oregon Secretary of State.

<http://arcweb.sos.state.or.us/exhibits/war/ww1/economy.html>. Retrieved 14 November 2010.

Rajala, Richard. 1996. "A Dandy Bunch of Wobblies: Pacific Northwest Loggers and the Industrial Workers of the World, 1900-1930." *Labor History* 37, 2:205-234.

Robbins, William G. (2002). "An Economic Turnaround". *Oregon History Project*. Portland, Oregon: Oregon Historical Society. <http://www.ohs.org/the-oregon-history-project/narratives/this-land-oregon/rural-urban-interface/an-economic-turnaround.cfm>

Schwantes, Carlos A. 1994. *Radical Heritage: Labor, Socialism, and Reform in Washington and British Columbia*. Moscow: University of Idaho Press.

Tyler, Robert L. *Rebels in the Woods: The IWW in the Pacific Northwest*. Eugene, OR: University of Oregon Books.

——— "The United States Government as Union Organizer: The Loyal Legion of Loggers and Lumbermen." *Mississippi Valley Historical Review*, vol. 47 (Dec. 1960), pp. 434-451.

Van Dorn, Harold A. 1926. *Government Owned Corporations*. New York: Alfred A. Knopf.

Vancouver Barracks and Ft. Vancouver NHS

Vancouver Barracks was chosen as the location of the huge SPD re-manufacturing plant. This site is a central place in Pacific Northwest history, with Euro-American activities extending from the Hudson's Bay Company to

the present, nearly 200 years. The SPD was relevant for only two years, but it is a distinct part of Vancouver's past.

Baron, Kristin L. 1998. *Vancouver Barracks Physical History Reports*. Vancouver, WA: Fort Vancouver NHS.

_____. 1998. "Vancouver Barracks Research Bibliography: Fort Vancouver National Historic Site." San Francisco: NPS Presidio Project Office.

Clark, Robert E. S. 1972. National Register of Historic Places, Inventory-Nomination, Ft. Vancouver." Olympia, WA: Washington SHPO.

Emmons, Ann and Janene Caywood. n.d. *National Register Nomination for the Vancouver National Historic Reserve*. Missoula, MT; Historical Research Associates, Inc.

Erigeron, Patricia C. 1992. *Historic Overview and Evaluation of Significant Resources of Fort Vancouver, Vancouver Barracks, Providence Academy, and Kaiser Shipyards*. Seattle: NPS, Pacific Northwest Region.

Erigeron, Patricia and Terri Taylor. 1992. Fort Vancouver National Historic Site Cultural Landscape reports, Volumes I and II. Seattle: NPS, Pacific Northwest Region.

Hidden, Robert A., and Anita Cheira. 1974. "National Register of Historic Places Nomination, Officers' Row, Ft. Vancouver Barracks." Olympia, WA: Washington SHPO.

Hightower, Barbara. 1986. "National Register of Historic Places Inventory-Nomination, Ft. Vancouver." Olympia, WA: Washington SHPO.

Hussey, John. 1957. *History of Ft. Vancouver and its Physical Structure*. Olympia: Washington State Historical Society.

_____. 1972, *Historic Structures Report, Ft. Vancouver National Historic Site, Historical data, Vol. I*. Denver: USDI National Park Service.

Sinclair, Donna L. 2005. *Part II, The Waking of a Military Town: Vancouver, Washington and the Vancouver National Historic Reserve, 1898-1920 with Suggestions for Further Research*. USDI: National Park Service.

_____. 2005. *Part III, Riptide on the Columbia: A Military Community Between the Wars, Vancouver, Washington and the Vancouver*

National Historic Reserve, 1898-1920 with Suggestions for Further Research.
USDI: National Park Service.

Thomas, Bryn. 1992. *An Archaeological Overview of Ft. Vancouver, Vancouver Barracks, House of Providence, and the World War II Shipyard, Clark County, Washington.* Seattle: NPS Pacific Northwest Region.

Tonsfeldt, Ward and Katherine Atwood. 2002. *Historic Structures Report for Vancouver Barracks, West Barracks, Vancouver National Historic Reserve.* Seattle: National Park Service, Columbia Cascades Support Office.

Aviation and Pearson Field

Another aspect of Vancouver's past is Pearson Field, which was an early Army Signal Corps location. Although the SPD did not manufacture or operate aircraft itself, the connection with military aircraft and the new science of aeronautics was a part of the agency's background.

Alley, William. 2006. *Pearson Field: Pioneering Aviation in Portland and Vancouver.* Charleston, SC: Arcadia

Donovan, Sally & Bruce Howard. 2009. *Historic Paint Analysis for the Interior and Exterior Window Sash and Trim: Pearson Historic Airplane Hangar.* Hood River, OR: Donovan & Associates.

Hardesty, Von. 1992. "Historical Overview of Pearson Airfield." Seattle: NPS Pacific Northwest Region.

Jones, Roy. 1968. "Clark County Aviation." *Clark County History Annual.* Vancouver, WA, Clark County Historical Society.

Maurer, M. 1987. *Aviation in the U.S. Army 1919-1939.* Washington DC: U.S. Air Force.

Merritt, Jane. n.d. "Pearson Airpark and its Relation to Ft. Vancouver NHS." On file, NPS Pacific Northwest Region.

Thorne, J. Frederick. 1918, "Organized Airplane Spruce Production." *Aviation and Aeronautical Engineering.* 4, 1: 289-293.

Toothman, Stephanie. 1990. "Statement Regarding the Nomination of Pearson Airpark to the National Register of Historic Places." Seattle: NPS Pacific Northwest Region.

Walker, Jon. 1994. *A Century Airborne: Air Trails of Pearson Airpark*. Vancouver, WA: Pearson Airpark Historical Society.

Master List—Selected Published Sources

Abbey's Register of the Western Lumber Industry, 1922-1942, Portland.

Alley, William. 2006. *Pearson Field: Pioneering Aviation in Portland and Vancouver*. Charleston, SC: Arcadia.

Anonymous. 1905-1906. *American Lumbermen, Series 1-3*. Chicago: American Lumbermen Press.

_____. 1918. "General Disque Employed". *The Christian Science Monitor* (Christian Science Publishing Society): March 22: 2.

_____. 1918. "Spruce and the airplane." *The San Francisco Chronicle*. 11 April 11: 18.

_____. 1918. "Coast's Wire Rope Controlled by Army". *Los Angeles Times*. 21 February 21: 13.

_____. 1918. "The Race for Airplane Spruce and Ship Timbers." *American Forestry*. September: 523-527.

_____. 1919. "Turn in Tide is for Disque". *Los Angeles Times*. September 7: 16.

Baron, Kristin L. 1998. *Vancouver Barracks Physical History Reports*. Vancouver, WA: Fort Vancouver NHS.

_____. 1998. "Vancouver Barracks Research Bibliography: Fort Vancouver National Historic Site." San Francisco: NPS Presidio Project Office.

Becham, S.D., K.A. Toepel, and Rick Minor. 1984. *Cultural Resource Overview of the Siuslaw National Forest*. Corvallis, OR: Siuslaw National Forest.

Brody, David. 1989. *Workers in Industrial America*. New York: Oxford University Press.

Brown, Jerold S. 1990. *Where Eagles Land: Planning and Development of U.S. Army Airfields 1910-1941*. New York: Greenwood Press.

Brown, Nelson C. 1934. *Logging: Principles and Methods of Harvesting Timber in the U.S. and Canada*. New York: John Wiley and Sons.

- Bryant, R.C. 1913. *Logging*. New York: John Wiley.
- Camp, Walter Mason. 1904. *Notes on Track*. Chicago.
- Carlson, Linda. 2003. *Company Towns of the Pacific Northwest*. Seattle: University of Washington Press.
- Clark, Irving C. 1925. "Logging Railroad Construction." *The Timberman*. August, 1925: 50-15.
- Clark, Robert E. S. 1972. National Register of Historic Places, Inventory-Nomination, Ft. Vancouver." Olympia, WN: Washington SHPO.
- Compton, Wilson. 1919. "Production of Airplane Spruce." *American Review of Reviews*. June: 629-633.
- Cornwall, G. M. 1926. "The Lumber Industry and Port Development." *The Timberman* October, 1926: 42-43.
- _____. 1917. "Your Country and Mine." *The Timberman*. July 1917: 6.
- _____. 1924. *Timberman Directory of the Lumber Industry*. Portland: Timberman Press.
- Crosby, Lloyd. 1928. "Selective Logging and Railroad Location." *The Timberman* . November, 1928: 70.
- Crosman, Kathleen. 2011. "The Army in the Woods: Spruce Production Division Records at the National Archives." *Oregon Historical Quarterly* 112, 1: 100–106.
- DeWeerd, Harvey A. 1968. *President Wilson Fights His War: World War I and the American Intervention*. New York: Macmillian.
- Dietrich, William. 1992. *The Final Forest: The Battle for the Last Great Trees of the Pacific Northwest*. New York: Simon and Schuster.
- Donovan, Sally & Bruce Howard. 2009. *Historic Paint Analysis for the Interior and Exterior Window Sash and Trim: Pearson Historic Airplane Hangar*. Hood River, OR: Donovan & Associates.
- Dubovsky, Melvin. 1994. *The State and Labor in Modern America* . Chapel Hill : University of North Carolina.

Dubovsky, Melvin and Joseph A. McCartin. 2000 (1967). *We Shall be All: A History of the Industrial Workers of the World*. Urbana: Illinois University Press.

Dunn, W.H. 1917. "The Location of Logging Railroads." *The Timberman*. November, 1917: 50.

Emmons, Ann and Janene Caywood. n.d. *National Register Nomination for the Vancouver National Historic Reserve*. Missoula, MT; Historical Research Associates, Inc.

Erigero, Patricia C. 1992. "Spruce Production Division". *Fort Vancouver Cultural Landscape Report*. Seattle, Washington: Pacific Northwest Region, National Park Service, United States Department of Interior.

_____. 1992. *Historic Overview and Evaluation of Significant Resources of Fort Vancouver, Vancouver Barracks, Providence Academy, and Kaiser Shipyards*. Seattle: NPS, Pacific Northwest Region.

Erigero, Patricia and Terri Taylor. 1992. Fort Vancouver National Historic Site Cultural Landscape reports, Volumes I and II. Seattle: NPS, Pacific Northwest Region.

Evans, Gail F. and G.W. Williams. 1984. *Over Here, Over Here: the Army's Spruce Production Division and the War to End All Wars*. Eugene, OR: Willamette National Forest.

Ficken, Robert E. 1979. *Lumber and Politics: The Career of Mark E. Reed*. Seattle: University of Washington Press.

_____. 1984. "The Wobbly Horrors: Pacific Northwest Lumbermen and the Industrial Workers of the World, 1917-1918." *Labor History* 24, 3: 325-341.

_____. 1979. "Weyerhaeuser and the Pacific Northwest Timber Industry." *Pacific Northwest Quarterly* 70: 146-154.

_____. 1987. *This Forested Land: A History of Lumbering in Western Washington*. Durham: Forest History Society.

Finucane, S. 1980. *A History of the Blodgett Tract*. Corvallis, OR: Siuslaw National Forest.

- Ford, Nancy Gentile. 2008. *The Great War and America: Civil-military Relations During World War I*. Westport, Connecticut: Praeger Security International.
- French, William F. 1919. "Turning Spruce Forests into Airplanes." *Illustrated World*, January 1919: 196-201.
- Gaertner, John. 1990. *North Bank Road: The Spokane, Portland, and Seattle Railway*. Pullman, WA; Washington State University Press.
- Grande, Walter. 1992,1997. *The Northwest's Own Railway: The Spokane, Portland, and Seattle Railway and its Subsidiaries* (2 vol.). Portland: Grande Press.
- Greeley, W. B. 1917. *Some Public and Economic Aspects of the Lumber Industry*. Washington, DC: Government Printing Office.
- Hardesty, Von. 1992. "Historical Overview of Pearson Airfield." Seattle: NPS Pacific Northwest Region.
- Hays, M.H. 1976. *The Land That Kept its Promise: A History of South Lincoln County*. Newport, OR: Lincoln County Historical Society.
- Hankinson, R.L. 1928. "Wood in Airplane Construction." *The Timberman*. February, 1928: 38-43.
- Hallaver, F.D. 1920. "Proper Care of Airplane Wood." *The Timberman*. June 19: 97-101.
- Howd, Cloice R. 1924. *Industrial Relations in the West Coast Lumber Industry*. Miscellaneous Series, Bulletin No. 349. Washington, DC: Bureau of Labor Statistics, US Department of Labor.
- Hidden, Robert A., and Anita Cheira. 1974. "National Register of Historic Places Nomination, Officers' Row, Ft. Vancouver Barracks." Olympia, WA: Washington SHPO.
- Hightower, Barbara. 1986. "National Register of Historic Places Inventory-Nomination, Ft. Vancouver." Olympia, WA: Washington SHPO.
- Hussey, John. 1957. *History of Ft. Vancouver and its Physical Structure*. Olympia: Washington State Historical Society.
- _____. 1972, *Historic Structures Report, Ft. Vancouver National Historic Site, Historical data, Vol. I*. Denver: USDI National Park Service.

- Hyman, Harold M. 1963. *Soldiers and Spruce: Origins of the Loyal Legion of Loggers and Lumbermen*. Los Angeles: Institute of Industrial Relations, University of California.
- Jensen, Vernon. 1945. *Lumber and Labor*. New York: Farr and Reinhart.
- Johnson, Arthur Bolling. 1924. *Pacific Spruce Corporation and Subsidiaries*. Chicago: Lumber World Review.
- Jones, Roy. 1968. "Clark County Aviation." *Clark County History Annual*. Vancouver, WA, Clark County Historical Society.
- Keller, C.W. 1954. "Railroad Born of First World War Fades Out." *Seattle Sunday Times*, December 5: 10.
- Kennedy, David M. 1980. *Over Here: The First World War and American Society*. New York: Oxford University Press.
- Lichtenstein, Nelson. 2003. *The State of the Union: A Century of American Labor*. Princeton: Princeton University Press.
- Landerholm, Carl. 1960. *Vancouver Area Chronology, 1784-1958*. Vancouver, WA.
- Langston, Nancy. 1995. *Forest Dreams, Forest Nightmares; the Paradox of Old Growth In the Inland West*. Seattle: University of Washington Press.
- Marsh, F. 1976. *Twenty Years a Soldier of Fortune*. Portland: Binford and Mort.
- Maurer, M. 1987. *Aviation in the U.S. Army 1919-1939*. Washington DC: U.S. Air Force.
- McCartin, Joseph A. 1997. *Labor's Great War: The Struggle for Industrial Democracy and the Origins of Modern American Labor Relations*. Chapel Hill: University of North Carolina.
- McClelland, John. 1987. *Wobbly War: the Centralia Story*. Tacoma: Washington State Historical Society.
- [McCollister, E.H. and R.S. Gill]. 1919. *History of the Spruce Production Division, United States Army and United States Spruce Production Corporation*. Portland: Press of Kilham Stationery & Printing Co.

Merritt, Jane. n.d. "Pearson Airpark and its Relation to Ft. Vancouver NHS." On file, NPS Pacific Northwest Region.

Morgan, A.W. 1959. *Fifty years in Siletz Timber*. McMinnville, OR: News Register Printing.

Morgan, Murray. 1955. *The Last Wilderness*. New York: Viking.

MacColl, Kimbark. 1976. *The Shaping of a City: Business and Politics in Portland, Oregon 1885-1915*. Portland: Georgian Press.

Mellinger, Phil. 1996. "How the I.W.W. Lost its Western Heartland: Western Labor History Revisited." *Western Historical Quarterly* 27, 3: 303-324.

Montgomery, David. 1989. *The Fall of the House of Labor*. New York: Cambridge University Press.

Mittelman, Edward B. 1923. "The Loyal Legion of Loggers and Lumberman — An Experiment in Industrial Relations," *Journal of Political Economy*, 31: 313-341.

Nichols, Claude W. Jr., *Brotherhood in the Woods: The Loyal Legion of Loggers and Lumbermen: A Twenty Year Attempt at "Industrial Cooperation"*. PhD dissertation. Eugene, OR: University of Oregon, 1959.

Newby, Arthur C. 1918. "[Letter] From a Private in the Spruce Production Division." *Six Twenty-Six* 2, 9: 4-5.

Ogburn, Milton. 1970. *Wings of World War I*. New York: Exhibition Press.

O'Callaghan, J. 1979. *Disposition of Public Lands in Oregon*. New York: Arno.

"Oregon at War! On the Home Front, Controlling Oregon's Economy for the War Effort". Salem, Oregon: Oregon State Archives, Office of the Oregon Secretary of State.
<http://arcweb.sos.state.or.us/exhibits/war/ww1/economy.html>. Retrieved 14 November 2010.

Palmer, Lloyd. 1982. *Steam Toward the Sunset*. Newport, OR: Lincoln County Historical Society.

Prentiss, A.M. 1918. *Spruce Helped Win the War: a portrayal of the personnel, railroad construction, timber cutting, etc. necessary to the production of airplane spruce*. Portland: A.M. Prentice.

Puter, S.A.D. 1908. *Looters of the Public Domain*. Portland: Portland Printing House.

Rajala, Richard. 1996. "A Dandy Bunch of Wobblies: Pacific Northwest Loggers and the Industrial Workers of the World, 1900-1930." *Labor History* 37, 2:205-234.

Robbins, William G. (2002). "An Economic Turnaround". *Oregon History Project*. Portland, Oregon: Oregon Historical Society. <http://www.ohs.org/the-oregon-history-project/narratives/this-land-oregon/rural-urban-interface/an-economic-turnaround.cfm>

Rooney, J.R. 1997. *Frontier Legacy: A History of the Olympic National Forest, 1897-1960*. Seattle: Northwest Interpretive Center.

[Russell, Jervis] 1971. *A History of Clallam County*. Port Angeles, WA: Clallam County Historical Society

Sawyer, Mott. 1918. "S.P.D. Railroad No. 1." *Spruce*. November 1918 12-16.

Schwantes, Carlos A. 1989. *The Pacific Northwest: An Interpretive History*. Omaha: University of Nebraska.

_____. 1994. *Radical Heritage: Labor, Socialism, and Reform in Washington and British Columbia*. Moscow: University of Idaho Press.

Searles, W.H. 1942. *Field Engineering: A Handbook of the Theory and Practice of Railroad Location, Surveying, and Construction*. New York: Wiley.

Sinclair, Donna L. 2005. *Part II, The Waking of a Military Town: Vancouver, Washington and the Vancouver National Historic Reserve, 1898-1920 with Suggestions for Further Research*. USDI: National Park Service.

_____. 2005. *Part III, Riptide on the Columbia: A Military Community Between the Wars, Vancouver, Washington and the Vancouver National Historic Reserve, 1898-1920 with Suggestions for Further Research*. USDI: National Park Service.

Stegman, Arthur E. 1919. *United States Spruce Production Corporation, Analysis of Properties Offered for Sale*.

Strachan, Hew. 2000. *The Oxford Illustrated History of the First World War*. New York: Oxford University Press.

Thomas, Bryn. 1992. *An Archaeological Overview of Ft. Vancouver, Vancouver Barracks, House of Providence, and the World War II Shipyard, Clark County, Washington*. Seattle: NPS Pacific Northwest Region.

Thorne, J. Frederick. 1918, "Organized Airplane Spruce Production." *Aviation and Aeronautical Engineering*. 4, 1: 289-293.

Toothman, Stephanie. 1990. "Statement Regarding the Nomination of Pearson Airpark to the National Register of Historic Places." Seattle: NPS Pacific Northwest Region.

Tonsfeldt, Ward. 1986. *Summary History of the Blodgett Tract*. Corvallis, OR: Siuslaw National Forest.

_____. 1987. "National Register of Historic Places Multiple Property Documentation Form, The Blodgett Tract, Lincoln County, OR." Salem, OR: Oregon SHPO.

_____. 1993. *Context Statement for Railroad Logging in Oregon*. Salem, Oregon SHPO.

_____. 2005. "National Register of Historic Places Nomination, U.S. Army Spruce Production Division Railroad #1, Clallam County, WA." Olympia, WA: Washington SHPO.

_____. 2009. *Celebrating the Siuslaw: A Century of Growth*. Seattle: Northwest Interpretive Center.

Tonsfeldt, Ward and Katherine Atwood. 2002. *Historic Structures Report for Vancouver Barracks, West Barracks, Vancouver National Historic Reserve*. Seattle: National Park Service, Columbia Cascades Support Office.

Tyler, Robert L. *Rebels in the Woods: The IWW in the Pacific Northwest*. Eugene, OR: University of Oregon Books.

_____. "The United States Government as Union Organizer: The Loyal Legion of Loggers and Lumbermen." *Mississippi Valley Historical Review*, vol. 47 (Dec. 1960), pp. 434-451.

U.S. Bureau of Corporations. 1914. *The Lumber Industry* (3 vols.). Washington DC: U.S. Government Printing Office.

Van Arsdol, Ted. 1986. *Vancouver on the Columbia: An Illustrated History*. Vancouver, WA; Windsor.

_____. 1991. *Northwest Bastion: the U.S. Army Barracks at Vancouver, 1849-1916*. Vancouver, WA: Heritage Trust of Clark County.

_____. 1976. "World War I Brought Boom Times." *Clark County History* 17: 53-87.

Van Dorn, Harold A. 1926. *Government Owned Corporations*. New York: Alfred A. Knopf.

Wacherman, A.E. 1949. *Harvesting Timber Crops*. New York: McGraw-Hill.

Walker, Jon. 1994. *A Century Airborne: Air Trails of Pearson Airpark*. Vancouver, WA: Pearson Airpark Historical Society

Welch, W.A. "Soldiers Build Logging Railroads in Spruce Forests." *Railway Age*. January, 1919: 805-807.

Wells, Gail. 2006. "Union Activity". *Oregon History Project*. Portland, Oregon: Oregon Historical Society. <http://www.ohs.org/the-oregon-history-project/narratives/the-oregon-coast/unions-and-hard-times-between-wars/union-activity.cfm>.

Williams, Gerald W. 1984. "And What Did You Do in the Great War Grandpa?" "I Cut Spruce for the Army." Washington DC: USDA Forest Service.

_____. 1999. "The Spruce Production Division." *Forest History Today*. Spring, 1999: 2-10.

_____. 2009. *The U.S. Forest Service in the Pacific Northwest*. Corvallis, OR: Oregon State University Press.

Periodicals

SPD official periodicals

Loyal Legion of Loggers and Lumbermen Monthly Bulletin

Spruce Siems-Carey-H.S. Kerbaugh Engineering

Straight Grain Spruce Production Division periodical

Periodicals chronicling the SPD

Aeronautical Engineering

American Forestry

Aviation Age

Railway Age

Six Twenty-Six Forest Service Region Six periodical

The Timberman

The American Lumberman

Periodicals dealing with relevant historical topics

American Aviation Historical Society Journal

Forest History Today

Journal of Forest History

Journal of Forest and Conservation History

Oregon Historical Quarterly

Pacific Northwest Quarterly

The Northwest's Own Railway SP&S Historical Society

Timberbeast Railroad logging history

Newspapers

Lincoln County leader

Newport Journal

Olympic Tribune

Oregon Journal

Oregonian

Seattle Times

Vancouver Columbian

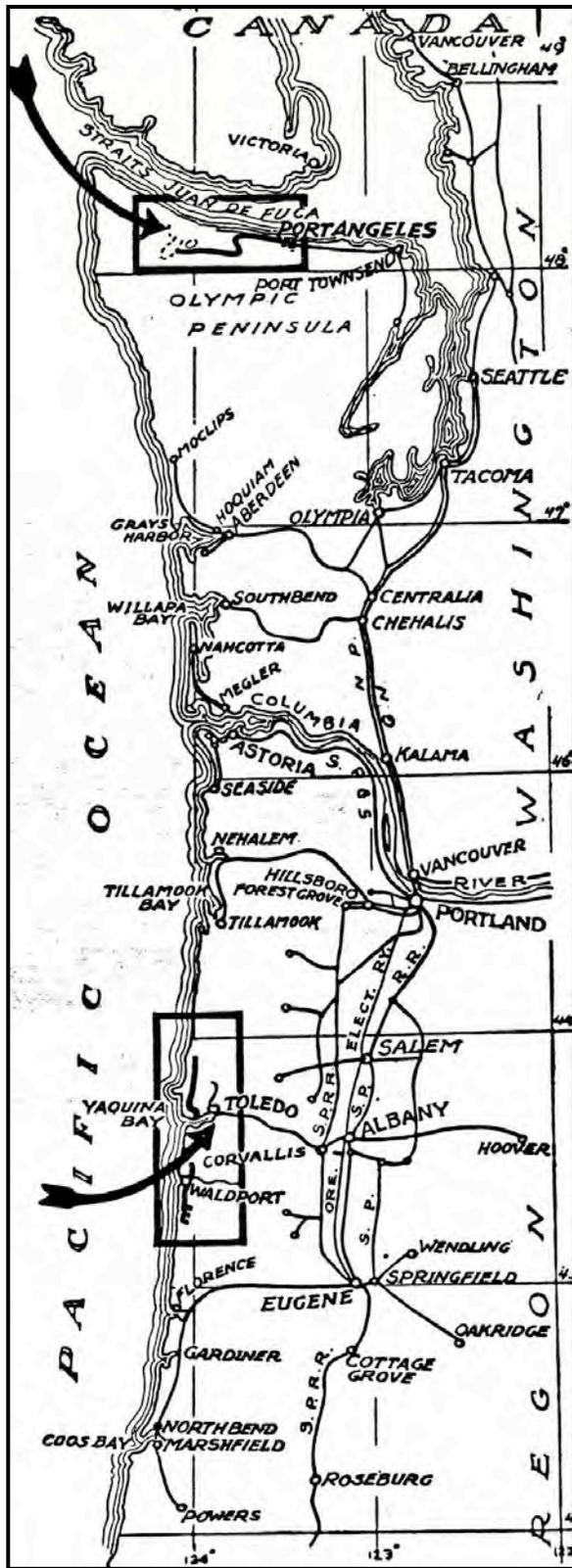
Vancouver Independent

Waldport Tribune

APPENDIX E: NOTES ON THE BRANCH LINES AND OTHER RAILROADS SUPPLYING TIMBER TO THE SPRUCE PRODUCTION MILL AT VANCOUVER

A series of short-line railroads connected the contract mills to the main-line railroads which delivered timber to the Spruce Production Division Cut-up Plant in Vancouver. These railroads typically had a checkered past. They were often poorly funded projects that struggled for years. Most eventually came under the ownership of a major railroad. Other short-line railroads were built by a major line to reach into potentially lucrative areas. Although they were operating reasonably smoothly by 1917, there were some problems. The rail-car shortage that crippled the Northwest in the winter of 1917-1918 started on the Tillamook, Oregon, branch of the Southern Pacific.

The following section offers brief discussions of railroads in western Oregon and Washington that were important to the Spruce Production Division. These can be located on the SPD map of railroads. The discussion generally follows north to south from Port Angeles, Washington, to Coos Bay, Oregon.



SPD map of western Oregon and Washington showing the short-line railroads and their connections to the main line railroads

Seattle, Port Angeles, and Western Railway, Branch of the Chicago, Milwaukee, and St. Paul.

This railroad extended from Discovery Junction west to Twin Rivers on the Olympic Peninsula—a distance of about 71 miles (see Figures 5-1 and 5-3). The railroad began in 1911 as the Port Ludlow, Port Angeles, and Lake Crescent Railway. After several changes in ownership, it was incorporated as the Seattle, Port Angeles, and Western Railway (SPA&W) in 1915. The Chicago, Milwaukee, and St. Paul Railway was the major stockholder. On December 31, 1918, the Chicago, Milwaukee, and St. Paul bought the railroad outright.¹

Discovery Junction, the beginning point of this railroad was a three-way junction between the Seattle, Port Angeles and Western, the branch line to Port Townsend, and a third line, the Port Townsend Southern. The Port Townsend Southern served the southeast portion of the Olympic Peninsula. At Port Townsend there was a rail-car ferry running to the Chicago, Milwaukee, and St. Paul Railway terminal in Seattle. Spruce Railroad I branched off the SPA&W at Disque Junction, about six miles west of Port Angeles. The SPD was to have used the SPA&W for service from its mill at Port Angeles to Seattle. At the end of the war, the SPA&W had the opportunity to buy SPD Railroad I and extend their reach across the Olympic Mountains to the coastal plateau. They declined, however. The ferry was an obvious bottleneck to rail service on the Olympic Peninsula. Major mills like Pope and Talbot or Merrill and Ring preferred to bring their lumber to market by steamship rather than railroad.

Northern Pacific and Great Northern mainline and branches in Whatcom, Skagit, Snohomish, King, Kitsap, Pierce, and Cowlitz counties

The Northern Pacific Railway was one of the original land-grant railroads and the first transcontinental to reach Portland from the east, which it accomplished in 1883 by using the tracks of the Oregon, Railway and Navigation (OR&N) into Portland. This railroad ran on the south bank of the Columbia River from Wallula, Washington, to Portland (See Figure 5-1). The operating agreement between the NP and the OR&N was facilitated by the fact that both railroads were in bankruptcy at the time. In the same year as it reached Portland, the NP built tracks west of Portland to Goble, on the Columbia River. There it ferried trains across the Columbia River to Kalama, Washington, where it was building a new line north through western Washington. This line reached Tacoma and served Puget Sound. Finally, in 1888, the NP completed a direct route from the east to Puget Sound over the Cascades through Stampede Pass and the

¹ U.S. Interstate Commerce Commission Railroad Valuation, Washington 1, n.d. Accessed by internet, Sept. 24, 2012, <http://milwaukeeeraoarchives.com/Construction/SeattlePortAngeles&WesternRy.pdf>

Stampede Tunnel. At that time, it abandoned its agreement with the OR&N and stopped service down the Columbia to Portland. The route from Kalama through western Washington became a branch feeding traffic south to Portland and north to Tacoma. This was a well-established railroad with uninterrupted service after the mid-1880s.²

Northern Pacific Grays Harbor Branch and Union Pacific--Chicago, Milwaukee, and St. Paul Grays Harbor Branch

The Northern Pacific built a branch from Centralia, Washington, to Ocosta on Grays Harbor in 1892 (See figure 5-1). The NP was unable or unwilling to extend the line farther to the towns of Hoquiam and Aberdeen, which were the dominant communities on Grays Harbor. Aberdeen built its own municipal line to connect with the NP branch in 1895. By 1898 the line was extended to Hoquiam. In 1909, the Union Pacific in combination with the Chicago, Milwaukee, and St. Paul built a second line to serve Grays Harbor. This railroad ran on the south side of the Chehalis River. Lumber and shingle mills in the area provided adequate freight for both railroads.

Northern Pacific Raymond Branch and the Puget Sound and Willapa Harbor Railway

The Northern Pacific built their branch from Chehalis on their main line west to Raymond on Willapa Bay in 1893 (See Figure 5-1). It served as a carrier for forest products from the Willapa Bay mills, and also from mills along the line between Chehalis and Raymond. In 1913, the Pacific and Eastern Railway was formed to extend track eastward from Raymond along a logging railroad to connect with the main lines. The Chicago, Milwaukee, and St. Paul bought the Pacific and Eastern and re-named it the Puget Sound and Willapa Harbor Railway, extending east to Chehalis, Centralia, and Maytown, a major junction point. This provided additional service from Willapa Bay and competed with the Northern Pacific branch line.³

Spokane, Portland, and Seattle Railway, north bank, Columbia River

The Spokane, Portland, & Seattle Railway was a regional carrier associated with the Northern Pacific and the Great Northern, James J. Hill's

² Johansen and Gates, *Empire on the Columbia*, 376ff.

³ Steve Rogers, "Lewis County to Willapa Bay by Rail," *The Sou'wester: The Journal of the Pacific County Historical Society*, (Summer and Fall 2006) 34-41.

transcontinental lines. The SP&S was in service on the north bank of the Columbia River by 1908, running between Portland and Kennewick, Washington (See Figure 5-1). It later reached Spokane, where SP&S trains connected with the Great Northern and Northern Pacific. Using tracks of the North Pacific, it connected from Portland to Seattle. Major branches of the SP&S included the line to Astoria (1908), the Oregon Trunk (a GN branch completed to Bend, Oregon, in 1911), the Oregon Electric through the Willamette Valley to Salem and Eugene (1910), and United Railways west of Portland (1910). The Oregon Trunk eventually connected through the California in 1931, and United Railways eventually connected west to a point near Tillamook Bay through the Gales Creek and Western Railway in 1920.⁴

Hill built the SP&S on the north bank of the Columbia River to gain access to the Oregon market. Building a railroad in Washington to reach markets in Oregon seems counter-intuitive, but the route on the north bank of the Columbia Gorge was the best way to get through the Cascade mountains which dominate the geography of both states. In the first decade of the 20th century, the Hill railroads (NP and GN) were most important in Washington and the Harriman railroads (SP and UP) were most important in Oregon. Building a railroad down the north bank of the Columbia would get trains to Vancouver, but Hill needed to build a bridge across the Columbia to reach Portland, and then a bridge across the Willamette. He also needed to dig a massive cut across the St. Johns peninsula to reach yard areas in Portland. The basic railroad—exclusive of branches Hill purchased—cost over \$60,000,000 to build⁵ Although the route from Portland to Kennewick was redundant with the Union Pacific on the south side of the river, the SP&S was financially successful and became an important part of the Hill railroad empire. The SP&S was the only railroad serving the Cut-up Plant at Vancouver Barracks

Astoria and Columbia River RR, branch of SP&S

This railroad ran west on the south bank of the Columbia River to Astoria and then ran south as far as Seaside (See Figure 5-1). The line had great potential as it accessed the port of Astoria, the lower Columbia River forests, and provided excursion trips to the northern Oregon beaches at Gearhart and Seaside. Unfortunately, the railroad had to compete with river traffic for logs and lumber. After false starts dating back to the 1880s, Montana financier A.B. Hammond formed the Astoria and Columbia River Railway in 1895 and began construction. Hammond was active in Oregon, owning railroads, the mills of the Hammond Lumber Company, and organizing the Columbia River Packers Association.

⁴ See Walter R. Grande, *The Northwest's Own Railway: the Spokane, Portland, and Seattle Railway and its Subsidiaries* Vol. II, (Portland, 1997).

⁵ John T. Gaertner, *North Bank Road: The Spokane, Portland, and Seattle Railway*, (Pullman, 1990), 23.

Hammond finished the railroad in 1898 and operated it successfully until 1907 when he sold it for \$4.7 million to James J. Hill. Hill operated it as the Astoria and Columbia River Railway until 1911, when he deeded it over to the SP&S.⁶

Tillamook Bay Branch, Southern Pacific Railway

In 1905, the Southern Pacific incorporated the Pacific Railway and Navigation Company to start a rail line from Hillsboro, Oregon, to Tillamook Bay (See Figure 5-1). Hillsboro was a junction with the SP west side branch. The line was completed in 1911. The 95-mile line followed the Salmonberry River west to Nehalem Bay then ran south along the coast to Garibaldi and Tillamook. Major shippers on the line were the Hammond Lumber Company mill at Garibaldi and other Tillamook County mills. There was also some resort traffic to Rockaway Beach and other vacation spots. Hill and his associates reportedly considered building a rival line to Tillamook, but abandoned the idea. Later, in 1917, the Gales Creek and Wilson River Railroad was built west from Wilkesboro, on the United Railways line. This 13-mile line did not reach Tillamook Bay but came close enough to convince the Hill interests to buy it as an extension of United Railways. In the aftermath of the Tillamook Burn in 1933, the Gales Creek and Wilson River RR hauled millions of board feet of fire-damaged timber out of the woods and contributed to the United Railway finances.

The Southern Pacific operated the Pacific Railway and Navigation line until 1990 when it became a municipal railway owned by the Port of Tillamook.⁷

Oregon-Washington Railway and Navigation Company. Subsidiary of the Union Pacific Railway

This is the main line east from Portland on the south bank of the Columbia River (See Figure 5-1). The company dates back to the Oregon Steam Navigation Company, founded in Portland in 1862. This firm was a shipping company operating vessels in the coastwise trade and up the Columbia River. It owned a portage railway at the Cascades, which it developed into a railroad extending over 1000 miles east from Portland through southeast Washington and into Idaho. As the railroad business came to dominate the company it changed its name the Oregon Railway and Navigation Company (OR&N) and then in 1896 changed the name to the Oregon *Railroad* and Navigation Company (also OR&N). The route up the Columbia Gorge was the most practical route across the Cascade Mountains, and possession of that route made the Oregon Railway and Navigation

⁶ Grande, *The Northwest's Own Railway*. 40-47.

⁷ Don Hofsommer, *The Southern Pacific 1901-1985* (College Station, TX, 1986) 41-43. See also Ed Austin and Tom Dill, *The Southern Pacific In Oregon* (Portland, 1987).

Company a very desirable property. The OR&N leased passage rights on the Columbia to the Northern Pacific to create the first transcontinental connection with Portland in 1883. Later, it combined with the Union Pacific's Oregon Short Line to create a second transcontinental route. The UP was the major shareholder after 1898. The UP bought the line in 1910 and changed its name to the Oregon-Washington Railway and Navigation Company until 1936, when the old name was dropped and the line was absorbed into the UP system.⁸

Corvallis and Eastern Railway, branch of Southern Pacific

The Corvallis and Eastern was one of the many names of a railroad completed west from Corvallis to Toledo, on Yaquina Bay, in 1884 (See Figure 5-1). The railroad continued to build east from Corvallis to Albany, then further east with track complete to Idanha in the Cascades, about 140 miles. It was projected to cross the Cascades and run east to join the Union Pacific in Ontario, Oregon. Like many small railroads, finances did not match its ambition. The railroad was operated by Col. T. Edgerton Hogg, a remarkable character who personally handled the financing in Europe and the US, and who supervised construction and operation of the railroad and a line of steamships. Unfortunately, it fell victim to the recession of 1893 and was bankrupted. A.B. Hammond bought the railroad at a sheriff's sale 1894 for \$100,000. Hammond immediately sold the steamships and some railroad equipment for \$200,000. He then operated the railroad until he sold it to the Southern Pacific in 1907 for \$750,000 several years later. Hammond was a very astute railroad entrepreneur and was able to capitalize on the railroad's best opportunities for traffic. Service from the Willamette Valley to the coast focused on excursion trade, especially during the summer months. The part of the line that ran east into the Cascades hauled lumber out of the mills in Lebanon, Sweet Home, Mill City, Detroit, and Idanha.

When the SPD decided to build the big mill at Toledo and the 20-mile railroad down the coast to Waldport in 1918, it looked as though the SP had made a timely purchase. At the end of the war, the Southern Pacific had an opportunity to buy SPD Railroad XII and bring regular service to Waldport. It did not, however, and the South Beach to Waldport line dwindled as the timber was cut out. The mill in Toledo had a checkered career until the years after World War II when it became a pulp mill. None the less, Hogg's railroad remains in service both west and east of Corvallis, still hauling freight back and forth to the pulp mill at Toledo and the lumber mills in the Santiam Valley.⁹

⁸ Johansen and Gates, *Empire on the Columbia*, 370ff.

⁹ See Lloyd Palmer, *Steam Towards the Sunset* (Lincoln City, OR, 1982).

Southern Pacific main line, Willamette Valley

The first railroad from Portland south through the Willamette Valley was the Oregon and California Railway, which was incorporated in 1869 from two rival lines. Among the principals was Ben Holliday, the colorful frontier transportation entrepreneur. The O&C experienced more vicissitudes of finance and personalities than most of the early railroads, and the Southern Pacific assumed management of the line before it reached the Oregon border and connected through the SP to San Francisco in 1887. The route followed the Willamette Valley to Eugene, then crossed the Umpqua Valley at Roseburg, then crossed the Rogue River Valley at Grants Pass, and crossed the Siskiyou Mountains at Ashland on the California border. This portion of the SP made a substantial contribution to corporate earnings.

As the first railroad to built 20 miles south of Portland, the O&C qualified for the huge land grant offered by the Oregon and California Railroad act of 1866, totaling 3,700,000 acres. Land fraud associated with this grant was extreme even by Oregon standards, and the federal government eventually rescinded the grant, creating the federal O&C lands agency administered by the Department of the Interior.¹⁰

Southern Pacific Railway, Coos Bay Branch

In 1906 the Southern Pacific bought the 28-mile Coos Bay, Roseburg, and Eastern Railroad and Navigation Company railroad in Coos Bay. The line provided transport to the port of Coos Bay for other points in the area but was not connected to any other railroad. The SP then began building west from Drain, on the main line south of Roseburg, towards Coos Bay. In 1910, with the railroad from Drain not yet complete, the SP unaccountably abandoned the line and removed the rails. The next year, the SP incorporated a new line, the Willamette Pacific Railway, and began construction towards Coos Bay from Eugene. The line followed the Siuslaw River west to Florence, then followed the coast south across the mouth of the Umpqua River eventually reaching Coos Bay in 1916 (See Figure 5-1). Traffic was generated by the mills in the Siuslaw Valley. The railroad founded the town of Reedsport, which became a center of lumber manufacturing for the lower Umpqua country. Near Reedsport, the railroad served Gardiner, one of the oldest mill towns on the Oregon Coast. On Coos Bay numerous mills had the option to send their lumber to market by rail or by ship. Another source of revenue for the line was the resort communities on the lakes south of Florence. Passenger service to this area blossomed during the summer.

¹⁰ See Dan Hofsommer, *The Southern Pacific, 1901-1985*, 1986, and Ed Austin and Tom Dill, *The Southern Pacific in Oregon*, 1987.

One important mill in Coos Bay was the Smith-Powers Lumber Company. C.A. Smith was an early convert to the Loyal Legion of Loggers and Lumbermen and produced Sitka spruce, Douglas fir, and Port Orford cedar for the Spruce Production Division. The Smith-Powers Lumber Company had built a railroad from their mill at Powers north to Coos Bay.¹¹

¹¹ Dan Hofsommer, *The Southern Pacific 1901-1985*, 56.

APPENDIX F: AUTHORIZATION TO BUILD THE CUT-UP PLANT AT VANCOUVER BARRACKS (Memorandum, December 13, 1917, RG 165, Spruce Production Division Decimal File, NARA, College Park, MD)

DECLASSIFIED
E.O. 12958 Sec. 3.3
Project: NJ 02 D 760029
By: K.C. NARA Date: 4/16/2012
13 X

Reproduced at the National Archives and Records Administration - Pacific Alaska Region (Seattle)

Cut-up Plant

HEADQUARTERS,
POST OF VANCOUVER BARRACKS, WASHINGTON.

December 13, 1917.

1. Under authority contained in War Department Telegram of December 11th, 1917, the Signal Corps Spruce Production Division is authorized to utilize the following described areas of the military reservation at Vancouver Barracks for the erection of a cut-up plant and for storage of material.

CONSTRUCTION AND STORAGE.

2. Beginning at intersection of fence South of public road with temporary fence East of cantonment stables; thence bounded by the public road to a point thirty (30) feet from the reservation line measured normal to said reservation line; thence parallel to said reservation line in a Southwesterly direction to a point eight hundred (800) feet from the South boundary of the public road, measured normally to said road; thence Westerly and parallel to South boundary of public road to a point in prolongation of fence above referred to; thence Northerly along line of said fence, and fence prolonged, to point of starting.

STORAGE ONLY.

3. Beginning at Southwest corner of above area extending Northwardly along West boundary of above area to South fence of cantonment stable area; thence Westerly along said fence line to a point fifty (50) feet West of line of West end of cantonment stables prolonged; thence Southerly to a point eight hundred (800) feet from South boundary of public road measured normal to said road; thence Easterly and in prolongation of Southerly boundary of Construction area above described to starting point; provided that a passage-way through the area from the cantonment stable gate be kept open.

PARTIAL STORAGE AREA.

4. The area between the wood sheds and public road to be used when necessary as a storage area for incoming timber, provided that free access to the wood sheds be not interfered with.

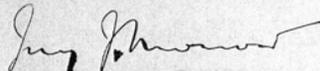
SIDING.

5. A siding to be led off the North side of existing siding about one hundred (100) feet South of South end of building 110 and to extend to the North side of the Construction area above described. A siding to be led off the South side of existing siding about three hundred (300) feet South of South end of building 110, and to extend to the South side of Construction area above described.

P

GENERAL.

6. All the foregoing is shown on blue print attached. It is understood that the post water system will be called upon for drinking water and fire protection only and that a separate source of supply for all other purposes will be arranged; also that arrangements will be made for supply of electric current without expense to the Post Quartermaster. All changes in roads, crossings, fences, sewer and water lines, etc., involved in the construction, to be made at the expense of the Spruce Production Division, Signal Corps, or agencies employed by them. It is further understood that no construction is hereby authorized that has not been authorized by the War Department in telegraphic authority above cited, and that any additional construction will require additional authority of the War Department.


Colonel, 4th Engineers.

APPENDIX G: GLOSSARY OF LOGGING AND LUMBER TERMS USED BY THE SPRUCE PRODUCTION DIVISION

These terms were in general use by the lumber industry on the Pacific Coast during the first decades of the 20th century. As the specialized language of a trade, loggers' and millworkers' language was constantly changing as new technologies and products came into the industry. It was also a regional dialect. Lumber workers in the Great Lakes States, the Central Atlantic States, New England, and the South used differed expressions.

Various glossaries of logging terms are available on the internet. One of the most interesting was compiled by Soper-Wheeler, a West Coast lumber company in continuous operation through most of the 20th century (<http://www.soperwheeler.com/about-us/education/logging-terminology>). Language used in Spruce Production Division materials is limited by time (early 20th century) and by location (West Coast). Two good published sources for the Pacific Coast in the early decades of the 20th century are the following: Nelson Courtlandt Brown, *Logging: the Principles and Methods of Harvesting Timber in the United States and Canada* (New York: John Wiley, 1934) and Paul Hosmer, *Now We're Logging* (Portland: Binfield and Mort, 1930).

Board foot A board foot is a measure of timber or lumber equal in volume to a board 12 inches long, 12 inches wide and 1 inch thick.

Boom, booming ground A boom is an arrangement of floating logs, usually chained together. A booming ground is a location on a river, bay, or lake where logs are dumped into the water and stored or prepared for towing.

Bridge In logging railroad construction, a bridge is a structure that includes one or more spans between piers, as opposed to a **trestle**, which is made up of evenly-spaced supports or bents.

Buck, bucking, bucker Once a tree has been felled, it is bucked into logs of even lengths, often 16 feet, 20 feet, or 40 feet. Bucking is strenuous but relatively simple work, as opposed to felling, which requires considerable skill.

Cable Steel cable was critical for industrial-scale logging, and sufficient supplies were not available to loggers at the outset of World War I. Manufacturing cable and supplying it to west coast loggers became an important program for the SPD.

Cant A cant is a large timber that has been cut in a mill. Cants are typically cut into smaller boards, either on a **gang saw** or a **re-saw**.

Cantonment A cantonment is a military building used for barracks, offices, or storage. The term implies a temporary building, or even a pre-fabricated building erected quickly to accommodate Army activities. In World War I, cantonments were typically made of lumber with composition roofs and siding.

Carriage In a mill, the carriage is a steel frame mounted on a 40-foot track. The carriage holds the log securely and advances it through the saw. “Shotgun carriages” are powered by a steam or hydraulic piston. “Setworks” on the carriage determine how thick the board will be.

Caulks, caulked boots These are boots with spikes on the soles to give loggers secure footing in the wet forest soil and on springboards.

Choker, chokerman, choker setter A choker is a steel cable or chain noose that tightens around logs to pull them in to a **landing**. A choker-setter or chokerman is a logger charged with looping the choker around the logs.

Circle saw, circular saw A circular saw blade is a round blade with inserted teeth. These are generally favored for re-saws, but the SPD Cut-up Plant used circle saws for their primary saws.

Clear This term describes lumber without any knots, checks, or other defects. In general, clear lumber is difficult to cut and expensive.

Climax A Climax locomotive was a popular geared locomotive designed and manufactured by the Climax Manufacturing Company of Corry, PA.

Cost-plus Cost-plus business arrangements are made on the basis of the actual cost the contractor incurs plus an agreed-upon profit. The advantage is that a contractor can perform unfamiliar work without fear of losing money. The disadvantage is that the more money the contractor spends on “costs,” the more he will make on profits.

Cull A cull log is one with too much defect to be worth removing from the woods.

Cut-off saw, trim saw This is a small circular saw that cuts across a board to trim it to length.

Cut-up mill This kind of mill or “plant” cuts large pieces of lumber (cants or flitches) into smaller boards, or finished wooden products like boxes, millwork, or sash and door material.

Deck, cold deck, hot deck A deck is a stack of logs which are in storage (cold deck) or are being sorted or loaded out (hot deck) onto rail cars or motor trucks.

Donkey engine A donkey engine or **yarder** is large winch used to pull logs along the ground (ground lead) or through the air (**high lead**). During the SPD’s period of activity, donkey engines were steam-powered and mounted on huge log sleds or on rail cars.

Dry kiln A dry kiln is a masonry chamber in which green lumber is dried by steam. Most dry kilns are built as several chambers, also called a kiln battery.

Dry room or drying room Loggers west of the Cascade Mountains in Oregon and Washington worked in a rainy climate. A “dry room” attached to their bunkhouse was a heated room that allowed them to dry their clothes overnight.

Edger An edger is a machine in a saw mill that cuts boards longitudinally to remove defect to standardize their size.

Embargo Railroad embargoes were orders issued by railroads to disrupt service to a specific area or disrupt shipments of specific products.

Felling, faller Felling refers to cutting a tree down. The term is usually pronounced “falling” by loggers, and a logger who specializes in this is said to be a “faller.” Since trees needed to be cut down without hanging up on other trees or being damaged by falling on rocks, skilled fellers could command high wages, usually paid on the basis of the amount of timber they brought down. This was known as working “on the scale.”

Fitch In spruce production, a fitch was a large piece of wood split from a log by **riving**. The fitch was re-sawn into smaller boards

Fuel house Mills burned wood waste including sawdust, bark, and trimmings to generate steam and electricity. The wood waste was stored in the fuel house to keep it relatively dry and available for the boilers.

Gauge, standard gauge, narrow gauge The gauge of a railroad is the distance between rails. Standard gauge is 56 ½ inches and narrow gauge is 36 inches. Narrow gauge was popular for a while in the 1870s and 1880s, but was largely supplanted by standard gauge by the early 1900s. Some logging companies used narrow gauge equipment for hauling logs because it was available at bargain prices on the second-hand market.

Geared locomotive Geared locomotives including **Shay**, **Climax**, and **Heisler** were popular with loggers because they developed tractive effort at low speeds and were well-suited to steep gradients, tight curves, and hastily-constructed railroads. They were very slow, however, and were not suited to pulling large trains at higher speeds. Most large logging companies employed geared locomotives for logging, and **rod locomotives** for hauling logs to the mill.

Grade, gradient This term refers to the incline of a railroad, and is expressed as a percentage figure, so that a 2% grade would climb or descend 2 feet/hundred feet. “Grade” also refers to the earthwork that supports the railroad track, consisting of ballast, ties, and rails.

Grain The grain of a piece of lumber is the pattern of annual rings in the tree as shown in the lumber. A typical board has a longitudinal grain as it is cut parallel to the long axis of the log. Old-growth softwood trees have a fine grain since the annual growth is limited by their size and the prevailing shady forest conditions. Clear lumber of most species can be sawn from logs so that the grain lines are vertical and parallel if the logs are quarter-sawn in the head rig. Logs that are not quarter sawn will show a significant amount of flat grain, which is less attractive and does not command as high a price. “Straight grain” means that the vertical grain runs parallel to the edges of the board. “Cross grain” or “diagonal grain” means that the grain runs at a diagonal to the edges of the board. “Spiral grain” means that the tree twisted as it grew, producing diagonal grain lumber. Aircraft lumber required straight grain, which was available on only a small percentage of the trees. Spruce Production Division personnel developed methods of sawing diagonal grain lumber to produce straight grain aircraft material.

Head rig, head saw The head rig is the first saw in a mill. It is used in conjunction with the **carriage** to cut the logs into smaller pieces, either boards or cants. By 1918, most mills had electric **band-saw** head rigs, which were mechanically superior to **circular saw** head rigs. The huge band saws were expensive and much more complicated than the circular saws, however.

Heisler A Heisler locomotive was a popular geared locomotive designed and manufactured by the Sterns Manufacturing Company and later by the Heisler Locomotive Company of Erie, PA.

High-lead This is a method of cable logging in which a cable is extended into the woods from a **donkey engine** and used to pull logs back to a **landing** where they could be decked and loaded onto rail cars. In high-lead logging one end of the log, or the entire log, is elevated off the ground so that it can be pulled to the landing without interference from trees, logs, stumps, rocks, snags, or other obstacles.

Landing A landing or log landing is an area where logs are sorted, stored, or transferred to another means of transportation.

Live roll In a saw mill, live rolls are rollers that are powered by electric motors to move lumber along as it is sorted, graded, or re-sawn to different dimensions.

Log, logger, logging A log is a section of a tree cut to a specific length for manufacture into lumber. In West Coast parlance, a “logger” is someone who works with timber in the woods. East of the Mississippi, loggers are called “lumberjacks.” “Logging” is a general term for working with timber in the woods.

Lumberman This term refers to a capitalist or manager in the lumber business, as opposed to loggers or millworkers, who perform manual labor. Some managerial or professional positions in logging— such as logging superintendant or logging engineer—or in the mills— such as an electrical or mechanical engineer—would fall somewhere in between. For

example, Col. Disque created the Loyal Legion of Loggers and **Lumbermen** to bring capital and labor together under a common organization.

Main line, branch line, spur line Railroads were typically divided into these three levels of dendritic organization. For logging railroads, the main line ran from the mill into the woods, perhaps as far as the camp. Branch lines radiated out into the woods from the main line. These were used by rod locomotives. Spurs ran deeper into the woods and were used by geared locomotives. Standards of construction varied between the main lines, which were built to operate for several years with large trains at speeds of 40 miles per hour, and spur lines which were built for slow-moving geared locomotives and would be used for one or two seasons. Large interstate railroads were also divided into these three levels, although all their tracks were more-or-less permanent.

Milling-in-transit This is a process of manufacturing in which one step is conducted at one location, and subsequent steps are conducted at other locations. Milling-in-transit requires excellent transportation facilities.

Mill-wright A mill-wright is a master mechanic at a mill. Duties include maintaining all the mill machinery as well as fabricating machinery and setting it to work in the mill.

Planer A planer is a mill machine that puts a smooth surface on a board, using rotating blades.

Power house, boiler house Each mill has a power house where wood waste is burned to produce steam in the boilers. The steam is used to drive turbines to produce electricity or to power a reciprocating steam engine. The electricity or mechanical power drives all the machinery in the mill. Traditionally, power houses were built of masonry to reeducate the danger of fire. The power house at the Vancouver Cut-up Plant was apparently made of lumber.

Rail Steel rail for railroads was made in various sizes, as measured by the weight per yard of rail. Light rail for logging spurs was typically 40-pound rail, while main line rail on intercontinental railroads could be as large as 120-pound. Industrial archaeologists measure rail in the field by profiling the end of the rail and comparing the dimensions to standards for different weights. Mining and construction rail could be as light as 10-pound, but this was used with carts pushed by workers, or by draft animals instead of locomotives. Rail was spiked to ties to create track, and could be removed from the ties to be re-used. Rail typically came in 20-foot sections which were bolted together with splice plates. Used or salvaged rail and other **track hardware** was readily available in the machinery sales yards in Portland or Seattle.

Remanufacturing This is the process of sawing lumber into other more specialized products, such as box material, moulding, or millwork. Turning common spruce cants or flitches into specialized aircraft lumber was a remanufacturing process.

Re-saw A re-saw is a band saw or circular saw that cuts lumber longitudinally into smaller pieces.

Rive, riven Riving means splitting a piece of wood for a special use. Shakes, for example, are riven from shake bolts by hand or with a hydraulic splitting machine. Riving spruce logs meant splitting them with wedges and jacks in the woods so that the resulting piece would have straight grain which could be used in aircraft.

Rod locomotive A rod locomotive is a conventional locomotive in which the driving wheels are powered by piston rods directly from the steam cylinders and by connecting rods from other wheels. The alternative is a **geared locomotive**, in which the steam pistons power a steam engine which powers the driving wheels through gears or shafts and bevel gears.

Shay A Shay locomotive was a popular geared locomotive designed and manufactured by Lima Locomotive Works in Lima, Ohio, and later by Willamette Iron and Steel in Portland, Oregon.

Shook Shook, or box shook, is lumber pre-cut for box manufacturing. It was typically sold as pre-cut boards for the end used to assemble into boxes, also coffin shook for making simple wooden coffins.

Side cut This term applies to lumber that does not meet grading standards for a specific material. Much of the Sitka spruce logged for aircraft could not be used for aircraft, and became a less valuable product that had to be sold for whatever price the mills could get.

Spar tree A spar tree is left standing in the forest after the limbs and top are removed. The spar tree is braced by cables radiating out in all directions, then fitted with pulleys (called “blocks”) to hold the **high-lead** lines from the **donkey engine** or **yarder**.

Stumpage This term refers to timber purchased standing or “on the stump” for logging. Lumbermen were usually more interested in buying stumpage than buying land to log, since owning the land required paying taxes, protecting it from fire, and waiting for the next crop of timber to grow after logging. This growth time, or “timber cycle,” is usually calculated at 40 years in the coastal forest. The SPD purchased stumpage on the Olympic Peninsula and other locations on the coasts of Oregon and Washington, but were required to purchase the land outright on the Blodgett Tract in southern Lincoln County, Oregon.

Timber, lumber, wood These terms are used consistently in the West Coast lumber industry to refer to different products. They are not used interchangeably. “Timber” refers to standing trees, felled trees, or logs. “Lumber” is the product of the mill, usually measured in standard dimensions as rough lumber (e.g. 2 x 4). After planing, the dimensions are reduced, although the designations remain the same as those of the rough lumber, so a planed (or “nominal”) 2 x 4 is smaller than the original rough 2 x 4 before it went into the planer. “Wood” is simply fiber, as in “pulp wood,” “fire wood,” or “wood log.” People unfamiliar with the industry refer to lumber as “wood,” which immediately marks them as outsiders

Tongs, hooks, hooksetter These are devices used to attach a cable to a log so that it can be raised for loading onto a rail car. The hooksetter attached the tongs or end hooks to the log by hand and then signaled for the winch operator (“donkey puncher”) to tighten the cable, lifting the log. Because the hook or tongs could slip, hooksetting was an especially dangerous position in the logging operation.

Track hardware Collectively, this refers to the steel hardware that attaches rails together and attaches rail to the ties to create track. Items of track hardware are diagnostic artifacts for industrial archaeologists, providing information about the chronology of the railroad, its dimensions, and probable use. Common items include splice plates, splice-plate bolts, spikes, tie plates, rail braces, switch frogs, and others.

Traffic During the first half of the 20th century, this term referred to the movement of railroad trains. This was complicated by the precise schedules necessary to ensure clear tracks, and the movement of goods across the country.

Trestle A railroad trestle, as opposed to a **bridge** is an elevated structure crossing a declivity or waterbody with more-or-less continuous support under it. The common type of trestle is made from vertical bents set on uniform 10-foot to 20-foot centers. The bents can be wooden piles driven into the ground, wooden timbers set on sills, steel girders, or masonry. Another kind of trestle used horizontal logs to support the track. These trestles were short lived and used mostly on logging spurs.

Veneer Veneer is a thin sheet of lumber, typically no more than 1/8” thick, made by turning a log on a veneer lathe, or ripping it very thin. Veneer can be used to manufacture sheets of plywood, or formed into curved shapes, like aircraft fuselages or boat hulls.

Yard, yarding, yarder To “yard” is to bring logs through the forest to a **landing**. **Yarding** can be done by gravity, by animal power, by cable, or by any combination of methods. When logs are moved by water, as opposed to being moved on the land, the process is called “driving” or “booming,” however. A **yarder** is a large winch, steam-powered during the first decades of the 20th century, mounted on a sled of logs, or a rail car.