

HISTORY OF THE TACOMA SMELTER

ORGANIZATION

When the Northern Pacific Railroad began building westward from St. Paul, Minnesota in the early 1880's toward a salt water terminus in the Puget Sound, the promoters began to figure likely industries to be benefited. Among the proposals was one for a smelter in the growing town of Tacoma, Washington.

When the first bank was started there in 1880, the population of this town was 1,098 and by 1887 it had grown to an estimated 12,000. There was much prospecting in the State of Washington at that time and much of the ore found was basic and required smelting. The first proposal for such an industry appeared in an editorial in the Tacoma Daily Ledger of September 23, 1884. Some attempts were made to raise money locally, but the promoters failed to get the confidence of the people, who felt it was primarily a scheme to mulct them.

In 1887 when the Northern Pacific decided not to delay further, waiting the completion of the Stampede tunnel, and built a switch-back over the summit, thereby being able to reach their terminal at Tacoma July 3, 1887. This brought a great influx of people and according to W. P. Bonney's "History of Pierce County" 1,410 buildings including factories, warehouses, hotels and frame residences were built in the year 1888 at a cost of \$5,821,195.00 and the population jumped to 36,006.

The completion of the railroad also called the attention of Eastern money to the opportunities of the Northwest. Coupled with a desire to make tonnage for the new road, a representative of Eastern capital, Dennis Ryan, incorporated the Tacoma Milling and Smelting Company on January 11, 1887 with the following officers:

Pres.	-	Dennis Ryan
Treas.	-	Theodore Hosmer
Asst. Treas.	-	Wm. D. Tyler
Secy.	-	R. B. Galusha

From the Tacoma News dated August 18, 1887, the following is quoted:

C. C. Perkins and S. D. Ryan arrived from the East today to superintend the erection of the large smelting works to be built in this city by Dennis Ryan, St. Paul millionaire. Instead of a 200-ton daily capacity, there will be works of capacity of 400 tons backed by a company with a capital stock of \$200,000.

The smelter will be erected on 25 acres of land bordering on the waters of the Sound just below Mason's waterfront addition in the First ward. The land has been donated by General Sprague and others. The works, when completed, will employ about 500 men.

In 1887 W. R. Rust came to Tacoma to look over the possibility of erecting a lead smelter, but did not consider the conditions were right and returned to Aspen, Colorado where he was engaged in custom buying and selling of ores.

Apparently Mr. Ryan did not complete his company organization until he was certain the Northern Pacific would buy the Coeur d'Alene Railroad and Navigation Company, which occurred in September, 1888. He did, however, perfect a permanent organization as noted from the Tacoma News issue of June 21, 1888:

A meeting was held at The Tacoma last evening at which a permanent organization of the Tacoma Milling and Smelting Company was consummated. There were present Dennis Ryan, R. B. Galusha, W. D. Tyler and Isaac W. Anderson. Capital stock will be \$1,000,000 divided into 20,000 shares of \$50. Construction will begin in a short time under supervision of Col. C. C. Perkins.

Construction was begun almost immediately as shown in the following note in the Tacoma News of September 30, 1888:

The work of delivering the brick on the smelter site will begin this week. Capt. B. K. Hall has the contract for delivering it. Work will begin at once, and Capt. C.C. Perkins is now in the east to purchase machinery.

The hopes of these promoters did not seem to have materialized, although in Herbert Hunt's "History of Tacoma" we find... "a large number of new industries began operating in Tacoma in the summer and fall of 1889. Beginning with the smelter there are new mills and factories all along the shoreline to the head of the Bay". The following appeared in Tacoma News issue of May 2, 1889:

Eighty men are now on the Ryan smelter and the big chimney, which is 90 feet high, 14 feet square at the base and 10 feet square on the inside from bottom to top, is completed. It contains 400,000 brick. The company will start with two furnaces, each having a capacity of 140 tons of ore a day.

and again September 15, 1889:

The new Ryan smelter is now ready for business. Everything about the smelter is in fine condition and fires were lighted yesterday for the first time. Operations will begin inside of 30 days. Dennis Ryan of St. Paul, who is mainly interested in the plant, is expected to arrive in this city within 10 days.

These fires must have been for drying out because no further reference to actual operations appears.

Late in 1889 W. R. Rust returned and recognized that Tacoma was the natural focus to bring together the high lead ores from the Coeur d'Alenes, the necessary iron flux from the concentrates produced at the Great Treadwell Mine in Juneau, Alaska, and to smelt them with limerock delivered by scow from the San Juan Islands, and coke which was in abundant supply within 30 miles from Tacoma. The location had the added advantage of deep salt water frontage readily facilitating boat shipment of lead bars to the principal market in San Francisco, California. Accordingly he became affiliated with the Tacoma Milling and Smelting Company and for \$30,000 bought a controlling interest and became manager. On April 1, 1890 he reorganized this company under the name of the Tacoma Smelting and Refining Company. About this time he also became a stockholder in the Bunker Hill and Sullivan Mining Company and the Alaska Treadwell Company, making it more easily possible to get the necessary shipments from these properties.

The first ore receipt of the new smelter arrived June 18, 1890 and consisted of 132½ tons from the Gold Hunter Mining Company. The plant was ready to operate in September as recorded in Herbert Hunt's "History of Tacoma": "At 7 A.M. September 15, 1890 fire started in the cupel of the first stack. Roasting furnaces had been burning two weeks. Starting the stack was held up waiting arrival of limerock from the San Juan Islands." On September 27, 1890 the steamer "Queen" loaded the first lead bullion for shipment to San Francisco. It consisted of 23 tons of lead bars valued at \$9,971. At this time the plant employed 50 men and was reported to be producing 5 tons of lead bars per day.

Tacoma Smelting and Refining Company operated until December 6, 1898 at which time the president was George Browne and the secretary was W. R. Rust. On this date they leased the plant to the Tacoma Smelting Company, organized under the laws of the State of Washington and officered as follows:

Pres.	-	Chas. P. Masterson
V.P. & Treas.	-	W. R. Rust
Secy.	-	I. M. Heilig

This was a ten-year lease calling for a rental of \$5,000 per year. At this time the Tacoma Smelting Company paid the Tacoma Smelting and Refining Company \$59,354 for the inventory of the ore, flux, fuel, supplies and personal property. Subsequently Galusha, Parsons, and other minority stockholders of the Tacoma Smelting and Refining Company brought suit to void the lease claiming fraud. A Superior Court of Pierce County found for the defendants, but on January 8, 1902 the Supreme Court of the State of Washington reversed the decision. During the three years the Tacoma Smelting Company had been in control, a total of \$175,000 was spent on improvements and betterments, including building two roasters and bunkers \$40,000, briquetting machine and building \$7,000, two blast furnaces \$14,000, dust chamber \$10,000, electric power installation \$13,093, and a third roaster \$11,000. The return of the operation to the Tacoma Smelting and Refining Company involved an agreement as to the extent to which the physical plant had been benefited by these improvements, and in final negotiations the sum of \$141,640.28 was arrived at and

the operation returned to the Tacoma Smelting and Refining Company. It would seem this company could not arrange the payment due the Tacoma Smelting Company and on August 4, 1902 W. R. Rust, acting for the Tacoma Smelting Company, bid \$255,000 for the rights and interest of the Tacoma Smelting and Refining Company and got them. During the next 3 years the tonnage of ores received increased from 82,900 tons per annum to 149,191 tons per annum, and a copper smelting department was put into operation.

At this time the marketing of lead was very competitive and the principal producers were eager to secure adequate supplies to maintain their position. This led officials of the American Smelting and Refining Company to look favorably to the acquisition of the lead smelter operated by W. R. Rust, particularly because of a long term smelting contract he had for the output of lead concentrates from the Bunker Hill Mine in Idaho. Negotiations for the purchase of the Tacoma Smelting Company were entered into and on May 27, 1905 W. R. Rust, its general manager, submitted an inventory in accordance with the Baruch option (details not available at Tacoma) in the total amount of \$1,790,438.80. This inventory was accepted, but it is not clear just what bearing it had on the final purchase price of \$5,000,000 plus \$500,000 for additional improvements. It is generally understood the purchasers paid at least ten times the inventory value of the physical assets and this is borne out by the subsequent transfer of the assets of the Tacoma Refining Company to the Tacoma Smelting Company of Nevada at which time they were valued at \$499,000.

Five employees of the Tacoma Smelting Company of Washington subscribed for two shares each for which they paid \$100 per share in a new company - the Tacoma Smelting Company of Nevada - the articles of incorporation for which were filed November 4, 1908. The authorized number of shares in this company was 5,000 at the par value of \$100 per share. On December 7, 1908 this company got a corporation license from the State of Washington and at a stockholders meeting authorized a sale of the 4,990 remaining shares. On this same December 7, 1908 the Tacoma Smelting Company of Washington held a stockholders meeting and voted to change their corporate name to Tacoma Refining Company.

On December 28, 1908 the Tacoma Smelting Company of Nevada held a stockholders meeting and elected

Pres. - Roger Taylor  
V. P. - Frank Pittman  
Treas. - R. F. McElvenny  
Secy. - A. D. Elder

and designated W. R. Rust, agent, to accept service in any suit that might be filed. At this meeting F. W. Clark, representing the Tacoma Refining Company (now a subsidiary of the Tacoma Smelters Securities Company), appeared and offered to exchange all the property of that company for the 4,990 unsold shares of the Tacoma Smelting Company of Nevada. The offer was accepted. At that time the holders of stock in the Tacoma Refining Company, as shown at an executive committee meeting held December 12, 1908 at which time

L. B. Craig resigned as director and was succeeded by H. Y. Walker, were as follows:

American Smelters Securities	4,995
W. R. Rust	1
F. W. Clark	1
E. B. Braden	1
Edward Brush	1
H. Y. Walker	1
	<u>5,000</u>

A meeting was then called on December 28, 1908 of the stockholders of the Tacoma Refining Company and it was voted to pay all bills, to disincorporate and to distribute the assets.

On January 7, 1909 a Board of Directors of the Tacoma Smelting Company of Nevada by unanimous consent appointed W. R. Rust general manager, who then appointed F. W. Clark manager and H. Y. Walker assistant manager.

On January 25, 1909 the five original incorporators of the Tacoma Smelting Company of Nevada resigned and in their places as directors there were elected: W. R. Rust, F. W. Clark, H. Y. Walker, E. B. Braden, Edward Brush, and the following officers were selected:

W. R. Rust	- Pres. and Treas.
Edward Brush	- V. P.
L. B. Clark	- Secy.
W. E. Merris	- Asst. Secy.
F. W. Clark	- Auditor

and an executive committee consisting of

Edward Brush  
E. B. Braden  
W. R. Rust.

Although a wholly owned subsidiary of the American Smelters Securities Company, it operated under the name of Tacoma Smelting Company until August 5, 1918 at which time at a meeting of stockholders the resolution was adopted to deliver all assets to the A.S.S.Co. and to dissolve the Tacoma Smelting Company. H. Y. Walker was chairman of that meeting and L. C. Beyer secretary. The A.S.S.Co. was in turn a subsidiary of the American Smelting and Refining Company and at a stockholders meeting held January 15, 1923 all the assets of the A.S.S.Co. were sold to the A.S.&R.Co. and the A.S.S.Co. was dissolved January 31, 1923.

## ORE SUPPLY

The annual receipts through the year 1905 are as follows and their derivation by states is shown in Supplement A. No attempt has been made to carry these figures beyond the time of the purchase by the A.S.S.Co., but such figures if of interest can no doubt be taken from records in the New York Office.

<u>Year</u>	<u>Tons Ore</u>	<u>Ozs. Au</u>	<u>Ozs. Ag</u>	<u>Tons Pb</u>	<u>Tons Cu</u>
1890	4,402	1,851	193,187	765	
1891	18,459	8,749	550,953	3,381	
1892	17,267	12,134	513,386	2,337	
1893	19,042	16,135	501,226	3,908	
1894	14,229	11,910	405,106	3,274	21
1895	16,142	17,081	368,733	2,479	
1896	13,684	18,841	441,540	2,854	
1897	16,117	18,158	362,075	2,983	
1898	10,432	12,349	340,755	2,130	
1899	38,811	38,078	610,887	7,125	152
1900	53,942	45,363	907,829	8,890	248
1901	81,440	63,821	1,255,591	12,714	1,464
1902	82,900	121,145	2,178,547	14,058	1,043
1903	100,010	172,420	1,661,572	13,056	5,053
1904	125,618	214,816	1,693,700	12,566	8,585
1905	149,191	199,600	1,965,238	13,118	8,876

Following are some interesting notes on these receipts:

The first shipment received by the Tacoma Smelting and Refining Company was 132.5 tons of lead ore assaying 50% Pb and 42 ozs. Ag made by the Gold Hunter Mining Company on B/L's dated April 25 thru May 23, 1890. The first boat shipment was delivered by the SS "Walla Walla" July 10, 1890 and came from D. N. Gray followed by another delivery by the SS "City of Topeka" August 4th. The first shipment from the United States Public Sampling Works, Montana, arrived July 15, 1890 and their total for the balance of that year was 600 tons of ore averaging 17% Pb and 12 ozs. Ag. The first shipment from the Alaska Treadwell consisted of 377 tons assaying 1.89 ozs. Au received August 19, 1890.

Through September 1890, the month the furnaces first started, a total of 405 tons had been received from mine shippers for which 16 settlements were made, or an average of 25 tons per lot. In 1891 the first shipment of 100 tons was made from Mexico by Oscar J. Smith which assayed  $1\frac{1}{2}$  ozs. Au, 400 ozs. Ag, and these shipments continued through 1893.

In 1898 shipments from Bunker Hill and Sullivan totaled 3,421 tons, but these increased beginning in January 1899 and during the last quarter of that year averaged 2,330 tons per month. During the 8 years 1891 thru 1898, the average annual receipts were 16,222 tons containing 14,650 ozs. Au, 447,120 ozs. Ag and 3,000 tons Pb, giving an average assay of .9 oz. Au, 28 ozs. Ag and 18% Pb.

When the gold rush to the Klondike started in 1898, the trail out of Skagway was most difficult and many of the prospectors spread out in British Columbia and Southeast Alaska, seeking an easier way to the diggings. Most of these wanderers never reached the Yukon but did find showings of copper ore, some of which became mines and for the first time the Smelter began to record the copper contents of the receipts. In 1899 a total of 152 tons of copper were received at the Smelter, mostly in limy ore carrying 7 $\frac{1}{2}$ % copper from Marble Bay, British Columbia.

Shipments from all sources increased and by 1901 reached a total of 81,392 tons containing 63,821 ounces of Au, 1,255,591 ozs. Ag, 12,714 tons Pb and 1,464 tons Cu. In that year the first shipments from Beatson arrived in August and Bunker Hill and Sullivan were shipping an average of 2,000 tons per month of 50% Pb concentrates. From Montana 500 tons per month of 18 ozs. Ag ore was coming and Selby was diverting 300 tons per month of 60 oz. Ag ore from Tonopah with 2 $\frac{1}{2}$  ounces Au content.

With the starting of the copper blast furnace in 1902, shipments of copper matte began to come in from the Tye Smelter and the Canadian Smelting Works, which later became Trail Consolidated. This Canadian Smelting Works matte was high-grade gold and assayed 18 ozs. Au, 80 ozs. Ag, 30% Pb and 40% Cu. In this year the Republic District in Washington also began shipments of siliceous ores. In 1904 the shipments from Idaho were augmented by 16,512 tons of siliceous 5% Cu ore from J. H. Howard, The Snow Storm Mine, and matte shipments came from the smelters at Greenwood, B. C., North Port, Washington and Takilma, Oregon. No Beatson was received in 1902 or 1903, but shipments were resumed in 1904.

The receipts for the year 1905, when the Tacoma Smelting Company was taken over by American Smelters Securities Company, amounted to 149,191 tons containing 199,600 ozs. Au, 1,965,238 ozs. Ag, 13,118 tons Pb and 8,876 tons Cu. In 1905 the Consolidated Mining and Smelting Company took over several mines and the smelter at Trail, B.C. formerly operated by the Canadian Pacific Railroad subsidiary Canadian Smelting Works and the name of this shipper was changed at that time.

The principal source of lead concentrates was the Bunker Hill and Sullivan Company mine at Kellogg, Idaho and when they changed their milling practice and produced a different grade of concentrates than called for by the contract with the Tacoma plant, they started their own smelter and shipments from that source ceased in August, 1911. It was in 1911 that Kennecott began shipments of copper ores and concentrates running from 55% to 72% copper and in that year a total of 10,735 tons were received. These shipments increased an amount to a maximum of 89,343 tons in 1927. The property was exhausted and shipments ceased in 1938.

The first shipments of copper ores and concentrates from Britannia were received at the Tacoma Plant in September 1910 and Granby concentrates started coming in March 1911.

SUPPLEMENT A

	1890		1891		1892		1893		1894		LBS. COPPER
	TONS ORE	LBS. LEAD	TONS ORE	LBS. LEAD	TONS ORE	LBS. LEAD	TONS ORE	LBS. LEAD	TONS ORE	LBS. LEAD	
Alaska	596	2,385	168	11,364	61	253	197	48,781	203	32,811	
British Columbia			258	414	2,866	156,163	1,179	407,919	1,868	116,030	41,825
California	46		442	823	91	-	4	-	11	-	
Idaho	1,091	898,470	4,320	3,688,478	5,035	3,441,720	5,651	5,046,159	4,972	5,003,557	
Japan											
Montana	1,967	407,600	10,301	2,178,298	5,592	295,850	8,041	624,494	6,847	1,380,122	
Mexico			101	-	482	24,869	85	-			
Oregon			321	-	225	-	500	1,212	267	2,597	
Washington	702	222,404	2,548	882,096	2,915	755,965	3,385	1,687,572	61	12,467	
Total	4,402		18,459		17,267		19,042		14,229		
Total Pb		1,530,859		6,761,473		4,674,820		7,816,137		6,547,584	
Total Cu											41,825
Total Au		1,851		8,749		12,134		16,135		11,910	
Total Ag		193,187		550,953		513,386		501,226		405,106	

	1895		1896		1897		1898		1899		LBS. COPPER
	TONS ORE	LBS. LEAD	TONS ORE	LBS. LEAD	TONS ORE	LBS. LEAD	TONS ORE	LBS. LEAD	TONS ORE	LBS. LEAD	
Alaska	220	48,037	1,289	299,989	522	75,693	753	48,753	17,584	95,163	3,644
British Columbia	8,026	1,523,855	4,157	1,570,263	5,203	958,349	2,025	621,470	1,495	96,342	234,490
California			2		4	446	0.1		27		
Idaho	3,124	2,955,199	3,896	3,671,365	4,808	4,330,664	3,421	3,308,093	14,995	13,760,275	358
Japan											
Montana	2,081	72,910	1,500	49,012	1,512	159,525	865	115,093	1,726	122,489	24,991
Mexico	3	-									
Oregon	1,666	1,707	2,265	2,852	2,715	561	2,053	37,969	2,258	80,527	32,356
Washington	1,022	356,534	575	114,878	1,353	440,273	1,315	128,934	726	95,728	8,614
Total	16,142		13,684		16,117		10,432		38,811		
Total Pb		4,958,242		5,708,359		5,965,511		4,260,312		14,250,524	
Total Cu											304,453
Total Au		17,081		18,841		18,158		12,349		38,078	
Total Ag		368,733		441,540		362,075		340,755		610,887	



SUPPLEMENT A

	1900			1901			1902			Other Smelters
	TONS ORE	LBS. LEAD	LBS. COPPER	TONS ORE	LBS. LEAD	LBS. COPPER	TONS ORE	LBS. LEAD	LBS. COPPER	
Alaska	21,226	60,403	57,006	21,572	60,503	252,870	32,150	130,670	630,164	
British Columbia	2,791	3,763	404,500	21,999	3,480	2,638,274	11,928	6,178	1,165,281	
California	50	-	-	12	-	-	23	-	-	
Idaho	17,638	17,410,186	5,328	24,858	25,029,948	15,273	26,397	27,685,372	12,295	
Miscellaneous							621	118,130	5,959	
Montana	7,850	53,480	-	6,003	80,623	138	2,804	92,024	13,695	
Mexico	242	3,815	12,528	273	19,814	6,073	308	1,298	16,694	
Nevada				3,605	-	-	3,118	-	-	
Oregon	2,845	75,444	12,725	1,483	3,765	14,306	3,142	-	8,856	
Washington	1,292	173,755	4,524	1,367	173,749	86	2,145	82,800	33,519	
Straits Settlement	8	-	-	268	56,635	-	262	-	199,242	
<b>Total</b>	<b>53,942</b>			<b>81,440</b>			<b>82,898</b>			
Total Pb		17,780,846			25,428,517			28,116,472		
Total Cu			496,611			2,927,020			2,085,705	
Total Au		45,363			63,821			121,145		
Total Ag		907,829			1,255,591			2,178,547		

	1903			1904			1905		
	TONS ORE	LBS. LEAD	LBS. COPPER	TONS ORE	LBS. LEAD	LBS. COPPER	TONS ORE	LBS. LEAD	LBS. COPPER
Alaska	36,970	167,508	1,339,590	42,632	78,847	2,043,586	45,413	18,166	3,753,475
British Columbia	13,620	2,167	6,983,037	23,384	-	10,270,020	23,847	32,423	7,081,681
California	2,441	-	328,508	1,000	-	142,146	11,381	33,612	2,594,847
Idaho	25,770	25,692,104	7,685	47,000	24,631,027	1,676,670	51,185	25,924,305	1,435,140
Miscellaneous	561	7,473	11,628	557	21,169	26,718			
Montana	427	10,518	30,491	105	4,144	18,858	581	1,847	166,868
Mexico	928	5,347	203,954	2,036	223,302	359,840	614	148,350	12,504
Nevada							7,991	-	-
Oregon	3,981	7,777	1,279	4,051	4,581	277,738	3,050	4,781	996,329
Washington	14,215	178,084	73,532	2,208	145,976	136,692	3,811	67,335	1,711,516
Other Smelters	1,097	30,665	1,112,336	2,645	21,786	2,215,892			
Japan							1,318	4,847	
<b>Total</b>	<b>100,010</b>			<b>125,618</b>			<b>149,191</b>		
Total Pb		26,101,643			25,130,832			26,235,666	
Total Cu			10,092,040			17,168,160			17,752,360
Total Au		172,420			214,816			199,600	
Total Ag		1,661,572			1,693,700			1,965,238	

## METALLURGICAL AND PLANT DEVELOPMENT

The first proposal for a smelter in Tacoma, the editorial in the Tacoma Ledger September 23, 1884, suggested the opportunity for a copper, gold and silver smelter. The plan on which an effort to raise funds locally was based called for erection of a plant with a daily capacity of 200 tons. This plan did not meet with success and when Dennis Ryan brought C. C. Perkins to Tacoma in 1887 to superintend the construction of the plant, a contract was let to Frazer and Chalmers to build a lead plant of 400 tons per day capacity - duplicating the smelter at Omaha and the Grant Smelter at Denver, Colorado. The excellence of these plans is collaborated in the first annual report of the Washington State Geologist, G. A. Bethune, for the year 1890 published January 1, 1891:

### Tacoma Smelting Works

These extensive works are located at Swansea distant from the City four miles. In my experience, and I have visited all the leading ones, it is among the most complete and best managed establishments I have ever seen. (Speaking of W. R. Rust and Peter Daly) These gentlemen have made of an enterprise, that I must confess wavered in the balance at its birth, the well-founded and prosperous industry that it is today.

The plant comprises smelting structure 160 ft. 2 stories high with a Northern wing 40 x 40 ft. and a blacksmith shop 12 x 20 ft. Another large and substantial structure on a knoll contains 2 roasting furnaces 17 x 75 ft. in size. The main building has two 120-ton furnaces and engines and blowers in the wing. The second floor is given to bins and bedding floors.

The main stack is a substantial and symmetrical structure 80 ft. in height.

No operating or metallurgical figures are available for the first 10 years of operation, but from the inventory of ore stocks taken at irregular intervals it is probable that tons smelted correspond very closely to the tons purchased; in fact it is a local rumor that on several occasions the furnaces were kept going by running slag back through the furnace because of the fear that if the smoke ever stopped coming out of the stack the bank and other creditors might foreclose and stop the operation permanently.

As a matter of fact, the plant operations have been continuous from 1890 to the present time (1948) with the following exceptions:

1. In December 1913 a group of Austrians employed in the electrolytic tankhouse pulled a strike and were joined by a large percentage of the other employees. This was at a time when it was customary to resist such demands in every way possible. The men set up a picket line and the company employed a professional guard force, set up a commissary and boarding house within the plant to take care of a skeleton crew of key men and kept as many operations going as possible. Some men and supplies were brought in each day by boat from a downtown dock and the number of men availing them-

selves of this route slowly increased. The feeling at first was very bitter and shots were exchanged on several occasions. The strike lasted three months, to some extent prolonged by incidents arising from the activities of the professional guard force and at its conclusion, with no concessions to the men, the number of Austrians permitted to work in the plant was for many years limited to 25. At this time an A.F.L. Union was organized, but following the strike the membership dwindled and the charter was eventually given up.

2. In 1932 the receipts of ores and concentrates dropped to an average of about 10,000 tons per month and all ore stocks were cleaned up, so when there was a further drop to less than 4,000 tons in March 1933 the smelting furnace was shut down to accumulate stocks. The shutdown lasted through April and May. Conditions then seemed to improve and smelting was resumed in June. The receipts of the last six months of 1933 averaged 14,000 tons per month. The electrolytic refinery was scheduled to go down about June 1st but the change in conditions made this unnecessary.

A longshoremen's strike in May, June and July 1934 tied up all boats on the Pacific Coast, except those from Britannia, but an increase in rail shipments and ore from stockpiles permitted smelter operation on a curtailed basis. A similiar situation existed in the fall of 1946. A disastrous fire in tankhouse No. 2 in January 1930 put that unit out of commission for a period of six months.

3. With the enactment of the Wagner Labor Act the employees again formed a union which became C.I.O. with the United Mine Workers and on February 25, 1946 completely tied up the plant in connection with contract negotiations. This strike involved all the A.S. & R. Co. plants and lasted until June 19, 1946.

Although the original smelter was reported to have a capacity of 200 tons or 400 tons per day, no such tonnage was available the first 8 years of operation, nor was there very much variation in available tonnage as shown by the following comparison:

	<u>Average Purchases Per Month</u>				
	<u>1891</u>	<u>1895</u>	<u>1890 thru 1898</u>	<u>1899- 1900</u>	<u>1905</u>
Tons Ore	1,540	1,345	1,167	3,869	12,433
Ozs. Au	729	1,422	1,150	3,476	16,633
Ozs. Ag	45,913	30,728	38,357	63,280	163,770
Lbs. Pb	563,458	413,270	412,690	1,334,640	2,186,305
Lbs. Cu				33,378	1,479,363

These figures indicated that although the plant had two lead furnaces of over 200 tons capacity each, there was only an average of 40 tons of ore producing 7 tons of lead available, which even with the flux would barely keep one furnace in operation. The metallurgy seems to have been good considering the equipment--there being a lead loss averaged over the whole period of approximately 6.5% or 22.6 pounds per ton of ore smelted, with an abnormal gold gain of 8.5% and a slight silver loss of 0.87%. No accounting

was made for copper. A fragmentary record shows that in January 1898 two of the 3 lead furnaces were operated 31 days and smelted

Pounds			produced
Ore	Limerock	Coke	
7,258,500	899,950	1,370,000	13,891 bars of Bullion

This figures roughly 67 tons of solid charge per day, 100 charges, 16½% coke and a production of 11 tons of lead. There was a marked increase in receipts both from Bunker Hill and Sullivan (up from 500 tons per month to 2500 tons per month) and from Treadwell (up to 1700 tons per month) beginning in 1899, and in the shipment of copper ores from British Columbia. Notable of these British Columbian ores was the shipment of 7½% copper ore from Marble Bay, which also furnished replacement for barren limerock flux. The conditions seemed to be accurately stated in the "Annual Report of Washington Geological Survey 1901", which describes the smelter at Tacoma as follows:

"Presently 250 tons ore received per day placing total days work 400 tons which the new copper blast furnace to be ready in May 1902 will increase by half. The plant has three double-decked mechanical roasters 12' wide by 140' long, each with a capacity of 70 tons per day. They are a local modification of the Brown patent and reduce the sulphur content from 10% to 3%. The calcines are mixed with 2% Roach Harbor lime in a White Mineral Press, which makes them into briquettes 4 inches in diameter and 2 inches high which become dry and hard by exposure to roaster gases for a period of 4 days.

There is one small copper furnace 33 inches by 84 inches with a capacity of 100 tons per day and one lead blast furnace the same size. Also two other lead furnaces, one 36 inches x 120 inches, the other 36 inches x 160 inches having capacities from 130 to 140 tons per day each. The gases from these furnaces go through underground flues to two stacks 115 feet high. The matte from the lead furnaces runs 2% to 4% copper and 10% to 15% lead, and after crushing is roasted in two reverberatories 18 by 72 feet and run through the lead blast furnace again.

The new copper blast furnace will be made by Allis-Chalmers. The waterjacket will be 42 inches x 160 inches and have a capacity of 200 tons per day. The blast for these furnaces will be heated to 800°."

The report goes on to say the power for the plant is furnished by the Snoqualmie Falls Power Company, the 22,000V stepped down at the plant to 440V and used in 4 motors with an aggregate of 460 HP. A fifth motor of 75 HP will be added to operate the new copper furnace. The big steam plant is not operating but is being held as a standby and the small boiler is being used for the necessary steam. The report also states the plant has over 350 patterns and is operating a small foundry and machine shop - the shop being to handle all necessary repairs right at the plant.

The period 1899 to 1905 was one of great expansion. The increased copper content of ore receipts were first handled in one of the lead blast furnaces used to concentrate copper into a high copper matte. This was inadequate, particularly with the advent of shipments from the Bestson mine beginning the summer of 1901, and in 1902 a blast furnace designed for copper smelting was put into operation. It was intended to operate on the hot blast principle and B. H. Bennetts, who had experience in this type of operation in Australia, was employed January 1, 1902. The attempt to reduce fuel costs in this manner was not successful. Converting was done in acid-lined converters and the first blister, 276 tons, was shipped East to L. Vogelstein on October 4, 1902. The production was about 225 tons per month and it was all shipped to Vogelstein until March 1905, subsequent to which it went to the A.S.&R. Co. plant at Perth Amboy and the newly constructed refinery at the Tacoma plant.

As noted in the Washington State Geologist report of 1901, hydro-electric power became available during this period and with prospects for the sale of electrolytic copper in China and Japan a small electrolytic refinery was built which went into operation early in 1905.

This refinery was begun in 1904 and \$146,865.69 was spent prior to the sale of the plant to the AS&RCO. Subsequently an appropriation of \$179,522.97 was made for completion and enlargement. Other improvements started in 1903 to 1905 were building of the 325 ft. concrete stack, completed in November 1905, and the flues leading to it at a total cost of \$115,913.72, a second copper blast furnace \$20,000, a copper unloading and shipping dock \$15,000, and an additional blower for the new blast furnace \$7,500. Late in 1904 the 25,000 barrel fuel oil tank for the copper casting furnace was built at a cost of \$15,000 and a tilting furnace for casting anodes was purchased from Anaconda.

The lead plant was also expanded beginning in 1903 with the addition of another roaster, another briquetting machine, and \$45,000 was spent for a steel flue and a baghouse beginning in 1904. A foundry was built and it became a separate department in 1903.

The expansion program continued under the new ownership and in the fall of 1905 an appropriation of \$30,000 was made for a second baghouse and a \$55,000 appropriation for enlargement of the copper smelter. This latter appropriation included \$23,740.37 for new converters, \$7,918.15 for an additional blowing engine, and further provided for a 30-ton crane and runway and a new 150 KW generator and a 300 HP motor in the powerhouse. The plant now had two small docks, one for the copper plant and one for the lead plant. Boat unloading was done by hand shoveling in the hold into buckets, which were hoisted and dumped into bunkers on the dock. From there the ore and concentrates were transferred into narrow gauge cars which men pushed over the scales and to the bins and beds. In 1906 an attempt was made to use a locomotive crane for unloading boats, but it was not successful and the equipment was returned to the Browning Engineering Works.

The first shipment of ingots and ingotbars from the new copper refinery was made by boat in May 1905 and the first shipment of dore bars to Selby the same month. The dore production was approximately 45,000 ounces per month. The operating costs for this small tonnage were relatively high. As a consequence it was discontinued in September 1905 and the slimes were shipped to the Selby plant by the new owners. At first the Tacoma plant was very dissatisfied with this arrangement claiming too much loss in estimated contents of the slimes. This was finally settled by both parties agreeing on the method for handling and accounting for the moisture content. The records show that up to May 1905 the smelter transferred to the refinery 1,456 tons of blister copper and thereafter through March 1906 the transfer was at the rate of 725 tons per month. This was relatively high grade blister carrying from 18 to 20 ozs. Au and from 100 to 150 ozs. Ag per ton. Beginning in February 1906 some cathodes were shipped to Perth Amboy but with the depression of 1907 the tankhouse was shut down early in that year and for a few months blister was shipped to Baltimore and then back to the Perth Amboy refinery beginning in May 1907.

During the late 1900's there was a marked improvement in milling practice and more and more concentrating was done at the mines. This had the result of increasing the receipt of concentrates at the smelter and this fine-ground product gave more and more trouble metallurgically in the blast furnaces, both in the lead plant and the copper plant. So far as the lead plant was concerned, it was pretty well handled by the hand rabbled roasters, the Brown mechanical roaster, the briquetting machine and the Huntington and Heberlein sintering pots, (the first of which was added in 1905 at a cost of \$3200 and another in 1906 at a cost of \$3700) and ceased to be a problem with the end of the shipments of lead concentrates from the Bunker Hill and Sullivan mine, which resulted in closing down the lead plant in 1911.

The roasting of high-grade concentrates for the arsenic contained began in November 1907 and since these high-grade concentrates properly went to the copper blast furnace they further increased the percentage of fines on that charge. The black arsenic produced was shipped to Everett for refining until that plant was shut down and a refining furnace was started at Tacoma in 1913. The briquetting equipment available to the copper plant was limited and expense was so high that in February 1911 an appropriation of \$14,000 was made for the purchase of a Dwight Lloyd. Another machine of this same type was purchased in March 1912 and \$25,000 was spent for a nodulizing furnace in 1915. A good deal of experimental work was done on other processes which culminated in the utilization of a commercial type of building-brick making machine to make pallets of a mud mixture of concentrates and gypsum. These mud bricks were used extensively from 1914 to the end of the blast furnace smelting operation in 1930.

A general improvement in conditions made possible the reopening of the electrolytic refinery and in March 1911 an appropriation totalling \$45,000 was made to recondition the anode furnace and tank room and \$3,548.58 for a new anode casting machine. Besides the sintering machine referred to above, there was also appropriated \$24,172.55 for the construction of the first basic lined converter

in the copper smelter and early in 1912 a blister casting machine was installed at a cost of \$10,100. Activity continued in 1912 and in October and November it was decided to spend \$30,000 for another copper blast furnace and \$13,000 for an additional blowing engine and \$40,000 for a new steel connecting flue.

For the period 1913 to 1915 the plant was smelting an average of 260,000 tons of ore per annum and reported a copper loss of 7.75 pounds per ton of ore smelted, a gold loss of 0.3% and silver loss of approximately 1%. Nearly one-third of the receipts were in the form of concentrates unsuitable for direct charging to the blast furnaces and the various methods of agglomerating them were not entirely successful nor economically practical. In 1915 an average of two copper blast furnaces were operated, smelting 475 tons of ore per furnace day from a charge averaging 0.7 ozs. Au, 5.0 ozs. Ag, 19% Cu and producing 190 tons of copper from a 48.5% matte.

Beginning late in 1913 thru 1917 a very extensive construction program was followed which practically resulted in rebuilding the entire plant and called for the expenditure of approximately three and one-half million dollars. The ore receiving and sampling department was mechanized and served by standard gauge track, steam locomotives for handling cars and a locomotive crane for stockpiling were added. Forty-four 300 ton coarse ore bins were built and this storage space further augmented by the erection of an aerial tram in 1915. A third copper blast furnace 48" x 261" x 13' columns was built and 17' x 3½' settlers installed, also a reverberatory smelting furnace 23½' x 121' and six Herreshoff roasters to serve it. In the converter department the crane rail was raised and two big 13' converters and an additional crane installed. A complete arsenic plant and flues were put up and the power plant moved to a new location to house additional equipment. The No. 1 tankhouse was altered and extended and in 1915 a larger No. 2 house with 3,000 tons capacity was built and the copper casting furnaces were housed in a separate building. Beginning in 1916 the No. 3 tankhouse of 2,000 tons capacity was built. The nickel sulphate plant was housed in a separate building and a new slimes house constructed. The 572' brick stack went into operation 1917 and a Cottrell plant became part of the flue system. A clubhouse was built and turned over to the employees for their use in 1917. Some of the separate appropriations in this program were as follows:

	Dated	
New Plant Construction	7/13/14	\$646,690.05
Pugging Machine	9/30/14	19,976.28
Reverberatory Furnace	7/21/15	473,347.41
Converter Building	9/1/15	223,132.56
Aerial Tram	8/25/15	48,723.96
No. 3 Blast Furnace	4/4/17	160,802.20
Pierce Smith Converter	12/30/14	20,605.26
Cottrell Plant	12/31/16	178,398.94
New Brick Stack	12/6/16	245,291.03
		<u>\$2,016,967.69</u>
No. 1 Refinery alterations & extension	11/30/13	\$101,821.07
No. 2 Refinery	6/15/15	473,618.87
No. 3 Refinery	10/25/16	415,626.11
Nickel Sulphate Plant	4/4/17	48,513.65
Power Plant	8/25/15	125,000.00
		<u>\$1,164,579.70</u>

Arsenic Plant  
" "

11/30/13  
8/31/14

\$14,000.00  
17,791.74  
\$31,791.74

The threatened shortage of sulphur incident to World War I led to an appropriation of \$50,000 in 1915 to investigate the possibility of recovering SO<sub>2</sub> from converter gases and was followed by an appropriation in February 1917 of \$66,677.12 for the construction of a plant to produce 10 tons of SO<sub>2</sub> per day. Another appropriation of \$145,000 was made in December 1917 to increase the production of this plant another 20 tons. In 1919 an additional \$30,000 was spent in this department to put a tighter hood on one converter to increase the average SO<sub>2</sub> content of the gases and an economizer to recover waste heat from them and reduce the cost of heating the solution. The chemical basis of absorbing the converter gases in water and recovering it by heating was relatively simple, but many difficulties presented themselves from the mechanical application of the process. These difficulties were not far from being solved and there was a big and growing demand in the developing pulp industry in this region, but with the return of a more normal sulphur market and due to the amount of water handled by the operation and the large amount of steam required for heat, the cost of recovering SO<sub>2</sub> by this method was not competitive and the plant was shutdown in 1922. Again in 1929 and 1930 the sum of \$75,000 was spent in development of a process to recover the SO<sub>2</sub> by fractionating under pressure, but no feasible process was worked out.

Although in 1917 the total tonnage smelted reached 473,084 tons, not exceeded until 1926, the figures for 1920 are more representative of the 10-year period 1915 to 1925. These show total ore smelted of 310,835 tons containing 95,525 ozs. Au, 3,811,001 czs. Ag, 312,822 lbs. Pb and 137,502,000 lbs. Cu. The average assay of the charge was approximately .3 ozs. gold, 12.5 ozs. silver and 22 $\frac{1}{2}$ % copper. An average of one blast furnace was operated averaging 407 tons per day of ore running 28.5% Cu and producing 200 tons of high grade, 58.5%, matte. An average of one reverberatory furnace was operated, smelting 621 tons of an average 18% copper ore and producing 290 tons per day of lower grade, 37.8%, copper matte. There was a high gold gain of 2.13% reported for the year and abnormally high silver loss of 1.6% and a copper loss of 6.91 pounds per ton of ore smelted. Copper production in the refinery was 80,856 tons indicating that about 12,000 tons came in from other smelters as blister copper.

Originally the reverberatory smelting furnace was constructed to use oil for fuel but the demand for this type of fuel built up during World War I so increased the price that in March 1918 the sum of \$189,700 was appropriated for the construction of a pulverized coal plant and the furnace was equipped for that type of fuel. Although delivery lines were run to the fine copper casting furnaces, they were never equipped to burn this fuel and the capacity of the pulverizing plant was not enough to supply the second reverberatory smelting furnace and fuel oil was always used on the second furnace when the two were in operation. The grade and quantity of the coal



available in this section gradually deteriorated and with the increase in price due to advance in miners wages late in the 1930's pulverized coal became more expensive than oil and the coal plant was shutdown in June 1941.

In the spring of 1919 the concrete stack was razed. The new brick stack had been put into service in February 1918 and required only a minimum of repairs until 1930. Then a crack developed which required more extensive repairing up until October 1936 when it was found necessary to put iron bands around the top section. In March 1937 the top was so bad that 10 feet were removed, reducing the height to 562' and more bands were added. A few years later the number of these bands was increased and today they extend from the top to the bottom, and with regular painting on the outside of the top sections seems to be maintaining the stack in good condition.

The next big capital expenditure was in 1923 when \$326,744.73 went into the construction of a new ore unloading dock and sampling building. This included erection of two big unloading cranes traveling along the dock, digging from the hatches of the boats and discharging on belts running along the dock which carried the ore and concentrates to weigh and sampling hoppers and thence to the crushing plant or the storage bins.

In the spring of 1929 construction was begun on the second reverberatory smelting furnace primarily to furnish a standby in case of an accident to No. 1 furnace, but since concentrates now made up more than 50% of the receipts and these did not carry silica or lime enough to flux them necessitating the fine crushing of at least 50% of the ore received, the plans were changed and that Fall another \$181,930.53 was appropriated for additional roasters and crushing plant and \$33,456.23 for a 26' Godfrey roaster for arsenical concentrates. Use of the blast furnaces for smelting copper was discontinued in 1930 and the furnaces were later dismantled.

The tonnage in both the smelter and refinery reached a new high in 1930 when 486,385 tons were smelted and the refinery produced 104,429 tons of cathodes. (About 6,000 tons less than each of the preceding two years). In that year a total of 118,376 ozs. of Au, 5,897,712 ozs. Ag, 3,461 tons of Pb, and 87,222 tons of Cu were smelted with a reported gold gain of 2.63%, silver gain of 1.82% and a copper loss of 6.11 pounds per ton of ore smelted. This record was quickly followed in 1933 by the lowest tonnage since the plant was taken over by the AS&RCo in 1905. Only one reverberatory was operated for 9 months of the year, averaging 454 tons of ore smelted per day carrying an average of 1.0 ozs. Au, 30.0 ozs. Ag and 11.5% copper and producing 135 tons per day of 30.0% copper matte, which is over 50 tons of copper per day. For the full year only 116,109 tons of ore were smelted and 27,219 tons of cathodes were produced. The total content of the ores was 158,165 ozs. Au, 3,538,651 ozs. Ag, 2,570 tons Pb and 13,343 tons Cu. The gold gain for the year was 0.59%, the silver gain 0.87% and the copper loss was 4.5 pounds per ton of ore smelted.

In 1936 the third and fourth Godfrey furnaces and additional storage were added to the arsenic plant at a cost of \$66,105 and a reverberatory type anode furnace and traveling charging crane at a cost of \$123,771.73. Originally all charging of cold blister and tankhouse scrap to the tilting anode furnaces had been by hand. The new charging crane was also designed to charge into the existing tilting furnaces. In 1939 the sum of \$198,904.01 was appropriated for an addition to No. 2 tankhouse. In 1940 appropriations were made of \$80,000 for a new warehouse and spare electrical equipment storage and \$46,911.68 for a time office and first aid hospital. A new laboratory was built in 1929 at a cost of \$56,000 and was ready for occupancy in August 1930.

In 1940 an all-time high in plant operations was reached with 485,188 tons of ore smelted and 118,222 tons of cathodes produced. The ore smelted contained 618,916 ozs. gold, 7,799,998 ozs. silver, 8,827 tons of lead and 66,610 tons of copper. One reverberatory smelting furnace was operated full time and the second furnace two-thirds of the time. The average tonnage of ore smelted was now up to 957 tons per day, averaging 1.25 ozs. Au, 16 ozs. Ag and 13 $\frac{1}{2}$ % copper. The matte production was 400 tons of 34.5% copper per day. This meant that when two furnaces were in operation approximately 275 tons of copper per day was turned out in the form of blister copper. The gold gain for the year was 0.99%, the silver gain 3.5% and the copper loss only 1.36 pounds per ton of ore smelted. Over 50,000 tons of copper for the refinery came from blister shipped from other smelters. About the same tonnage and results were obtained in 1941, but since then due to conditions brought about by World War II the tonnages have been falling at an accelerating rate through 1946 when they were seriously affected by the 3 months shutdown due to the strike at all AS&RCo plants.

With the acquisition of 13.25 acres of the North End Mill Company's sawmill site, the property now comprises 71.25 acres, a large part of which is made ground from slag produced over all the years. The original beach line ran along on what is now the coarse ore bunkers and converter craneway and a part of No. 1 tankhouse. Slag has now been poured along the whole base of the plant to the existing harbor line and beginning in 1922 a breakwater was poured along the harbor line in front of the Tacoma City Park Board property, making a very good harbor for yacht and pleasure boats. This breakwater is now 2242 feet long. The three docks presently existing are built along the base of the slag fill and have a depth at their face of a minimum of 31 feet of water at low tide. The part of the plant built on this slag fill consists of the ore weighing, sampling and crushing equipment, all the ore storage except the coarse ore bins, the machine shops, carpenter shop, new warehouse, change house, part of the anode department and all of the No. 2 tankhouse and fine copper casting department.

In 1941 in preparation for World War II \$250,000 was put into additional equipment in power house including a 30,000 cu.ft. steam driven turbo blower for converter air and a steam-driven 3500 cu.ft. high pressure air compressor. Another major construction and modernization program is starting in 1948, including new ore handling facilities and modernization of the arsenic plant. The feasibility of a new sulfuric acid plant is also being studied.

WILLIAM ROSS RUST

William Ross Rust was born August 1, 1850 in Philadelphia, Pennsylvania. His father was L. C. Rust, a wholesale merchant in that city in the 1850's. The family moved to Bourbon, Illinois in 1854 where his grade and high school education were acquired. He later went to the University of Kentucky at Lexington. In 1861 the family moved to Arcola, Illinois - his father becoming involved in the grain business. In 1876 his father suffered financial reverses and lost all his fortune. In the same year, William Ross Rust went to Black Hawk, Colorado where he was attracted by gold strikes. He was employed as an engineer at stamp mills. In 1880 he started the Black Hawk Sampling Works which he sold out in 1883, moving to Denver and establishing the Denver Public Sampling Works, which was the first such in operation in Denver.

In 1887 he came to Tacoma to size up the situation in regard to the erection of a lead smelter, returning the same year to Aspen, Colorado and engaging in buying and selling ores. In late 1889 he came to Tacoma, reorganized the Tacoma Milling and Smelting Company and changed the name to the Tacoma Smelting and Refining Company. In 1905 he sold the Tacoma Smelting and Refining Company to the American Smelter Securities Company.

He purchased coal fields up near Wilkeson, Washington in 1906. In November 1907 he became president of the North Coast Commercial Company, a holding company which controlled the Northwest Fisheries Company, the Northwest Steamship Company and the North Coast Lighterage Company. At that time the Northwest Steamship Company owned eighty-two percent of the Alaska Steamship Company. He became a director of the Hanford Irrigation Company and also a director of the Selby Smelting and Lead Company, and organized a group which purchased the Chichagoff Mining Company.

William Ross Rust died on August 17, 1928. In 1884 he had married Miss Helen M. Smith of Denver, who died April 25, 1937. They had two sons - Howard L., who died in 1911, and Henry Arthur, who died May 13, 1936.

Mr. Rust was chairman of the Board of Directors of the Tacoma General Hospital in which he was very much interested and to which he contributed very heavily.

He was a member of Afifi Temple, AAONMS, of the Tacoma Lodge of BPOE and of the Tacoma Golf and Country Club.