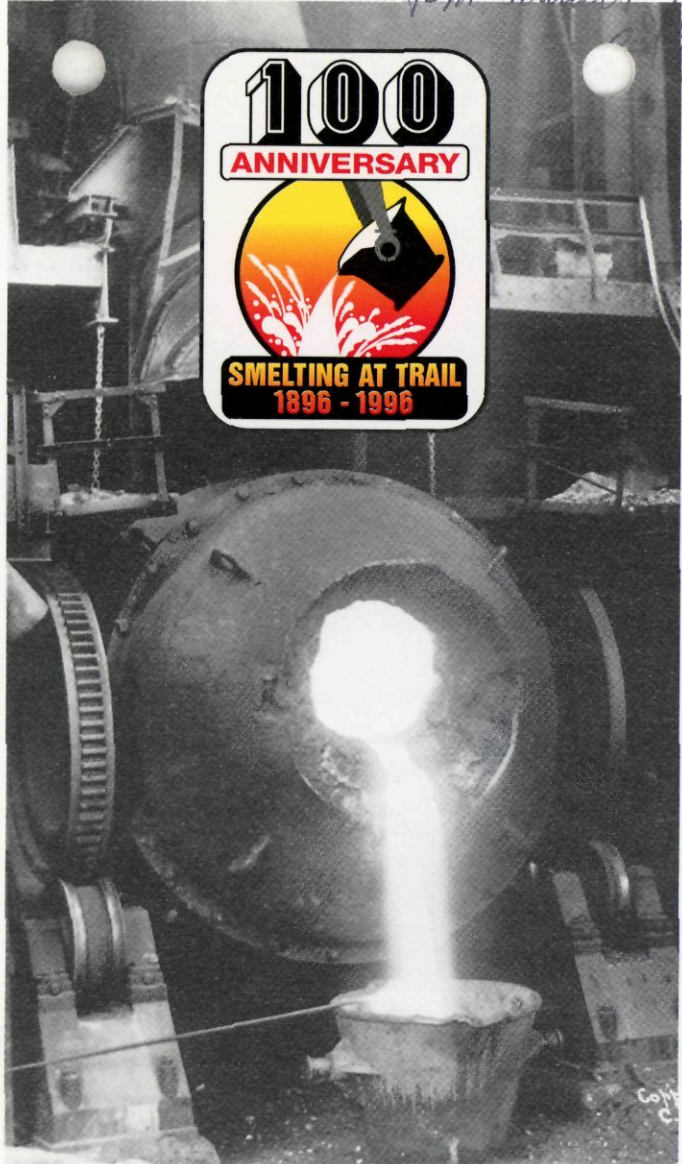
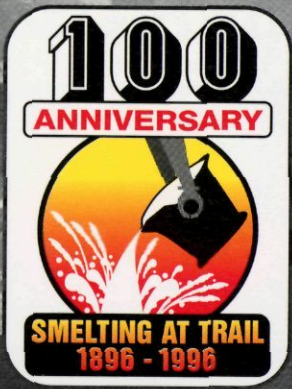


Tom Schwartz

8/97



100 YEARS OF THE SMELTING INDUSTRY AT TRAIL: 1896-1996

At Trail, in southern British Columbia, stands the world's largest zinc and lead smelting complex. For 100 years there has been a smelter here, evolving from crude to sophisticated modern technology and providing the Province with one of its main economic engines. How this came about is a colourful story...



Trail Smelter
888927



CANADA.

By the Honourable Richard William Scott, Secretary of State of Canada.

To all to whom these presents shall come, or whom the same may in any wise concern,

GREETING:

Whereas, in and by Chapter 15 of 11, Edward VII., and known as "The Companies Act, 1902," it is amongst other things, in effect enacted, that the Secretary of State may, by Letters Patent, under his Seal of office, grant a Charter to any number of persons, not less than five, who having complied with the requirements of the Act, apply therefor, constituting such persons, and others who thereafter become shareholders in the Company thereby created, a Body Corporate and Politic for any of the purposes or objects to which the Legislative Authority of the Parliament of Canada extends, except the construction and working of Railways or of Telegraph or Telephone lines, or the business of Banking and the issue of paper money, or the business of Insurance or the business of a Loan Company, upon the Applicants therefor establishing to the satisfaction of the Secretary of State due compliance with the several conditions and terms in and by the said Act set forth and thereby made conditions precedent to the granting of such Charter.

And Whereas, Henry Smith Osler, Barrister at Law, William Beardsley Raymond, Esq. Barrister at Law, Frank Ford, Barrister at Law, George Charles Loveys, Esq. William Wellington Livingstone, Esq. Barrister at Law, James Miller Swing, Esq. Barrister at Law, and Edouard Oler, Esq. Barrister at Law, of the City of Montreal in the Province of Quebec,

have made application for a charter under the said Act, constituting them and such others as may become shareholders in the Company thereby created, a Body Corporate and Politic, under the name of

Canadian Consolidated Mines (Limited)

for the purposes hereinafter mentioned, and have satisfactorily established the sufficiency of all proceedings required by the said Act to be taken, and the truth and sufficiency of all facts required to be established previous to granting of such Letters Patent, and have filed in the Department of the Secretary of State a duplicate of the Memorandum of Agreement executed by the said applicants in conformity with the provisions of the said Act.

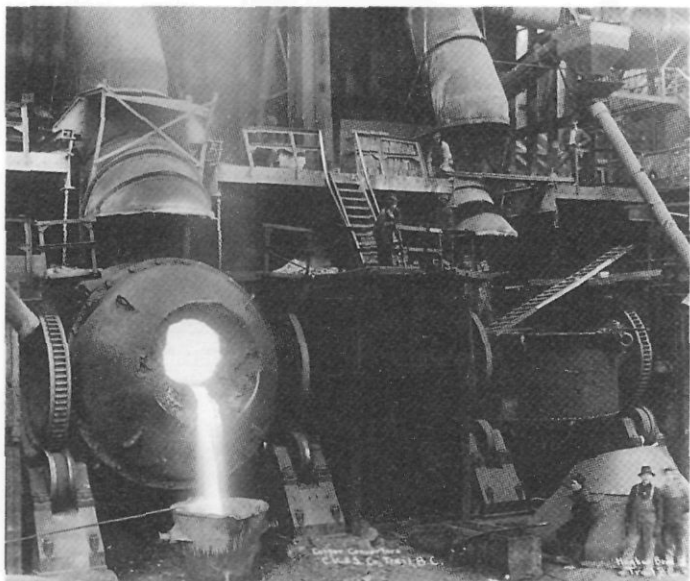
Now Know Ye, that I, the said Richard William Scott, Secretary of State of Canada, under the authority of the hereinbefore in part recited Act, do by these Letters Patent, constitute the said

Henry Smith Osler, William Beardsley Raymond, Frank Ford, George Charles Loveys, William Wellington Livingstone, James Miller Swing and Edouard Oler

and all others who may become shareholders in the said Company a Body Corporate and Politic, by the name of Canadian Consolidated Mines Limited

with all the rights and powers given by the said Act and for the following purposes and objects, namely

THE BEGINNING



Copper converter

On February 1, 1896 the first copper furnace was blown in at Fritz Heinze's B.C. Smelting and Refining Company at Trail Creek Landing, starting a chain of events that led to the formation of a "Great Canadian Enterprise," now known as Cominco, which has touched the lives of millions around the world. Originally built to smelt the copper and gold ores of the nearby Rossland mines, the Trail smelter soon diversified into other products and new metallurgical technologies.



the Trail smelter, 1896



the White Bear mine, Rossland, 1907



Rossland miners

Smelters were not new to B.C. At the turn of the century, there were 19; however, many failed because



Pilot Bay



Northport smelter



Marysville



Hall Mines smelter

of poor technology, lack of operating expertise and lack of strong financial backing. But, why did the Trail smelter succeed where so many others failed?

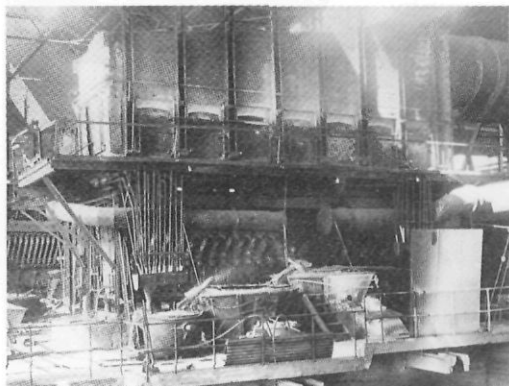


Fritz Heinze



Trail ore wagon

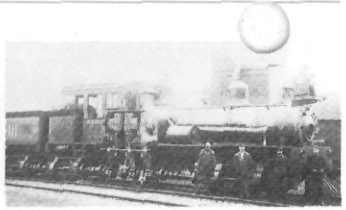
As a smelter, Fritz Heinze's plant was not a technological leader. The roasting was done by the heap method, where ore and wood were piled up and set alight to drive off the sulphur. The copper furnaces were also crude and resulted in an impure copper matte that had to be shipped to a U.S. smelter for refining. Yet, the Trail smelter's



early copper furnace

place in history was assured when it poured Canada's first gold bar in 1897.

The smelter itself would probably have gone the way of all the others once the Rossland mines were exhausted had it not been for Heinze's railway interests. He had secured the rights to build railway lines from Trail to Castlegar and on to Penticton - a vital link in the Canadian Pacific southern route.



*CPR train at the Trail smelter, 1900
- the first Shay engine in Canada*

THE CANADIAN PACIFIC RAILWAY

In 1897, the CPR sent in Walter H. Aldridge to negotiate for Heinze's B.C. assets, but what they really wanted were the railway rights he held, not the smelter.

The negotiations between Heinze and Aldridge stalled when Heinze wanted more than Aldridge thought the railway rights and smelter were worth. Characteristic of Heinze's flamboyant entrepreneurial style, he suggested they play a hand of poker to settle the difference - a matter of \$300,000! Aldridge being more conservative, suggested an alternative.



Walter H. Aldridge

In the middle of the night they took a horse and buggy up the mountain road to Rossland and dragged the manager of the Bank of Montreal, J. S. C. Fraser, out of bed to act as an arbitrator. Fraser borrowed a lawyer's

black robes to help him look the part, then Aldridge and Heinze negotiated back and forth through the night until they struck a deal. On March 1, 1898, the Trail plant was renamed the Canadian Smelting Works.



J.S.C. Fraser

Aldridge decided to broaden the smelter's base by adding lead furnaces to serve the growing number of lead mines in the area and to compete with other



tapping lead slag

smelters. He also signed a contract for the ore from the St. Eugene mine on Moyie Lake, thus securing a supply of feed.



St. Eugene mine



Selwyn G. Blaylock

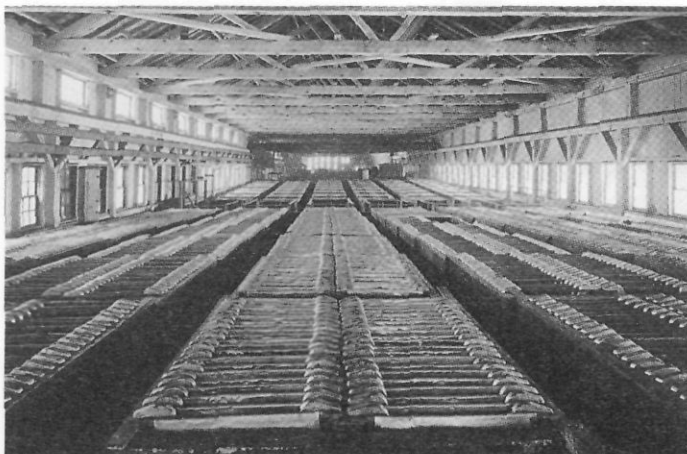
The next significant move made by Aldridge was to hire a new McGill graduate named Selwyn G. Blaylock, thereby ensuring a leadership succession that would be successful beyond Aldridge's greatest hopes.

TECHNOLOGICAL DEVELOPMENT

His next step was to look into building a lead refinery at Trail to treat Canadian lead in Canada, instead of shipping crude bullion to the U.S. for refining. Then, as now, the shipping distance from the market made it tough to be competitive with U.S.

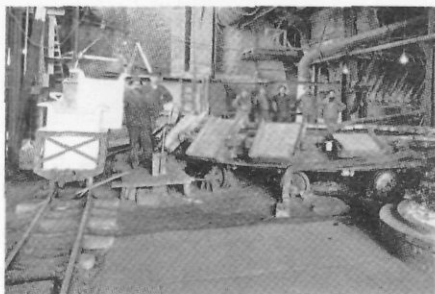


early lead refinery exterior



lead refining using the Betts process

refineries, but now superior technology comes into play. Aldridge opted for the new Betts electrolytic process. In 1902,



lead anode casting machine

he started up the world's first electrolytic lead refinery and that same process, with very little difference, is still used at Trail today. The Betts process produced an excellent quality of lead and is said to be solely responsible for establishing a Canadian lead industry.

Aldridge recognized the value in the smelter owning its mines. In 1905, he began working toward consolidating the Rossland mines and the St. Eugene mine with the smelter. Agreement was reached with the War Eagle, Centre Star and St. Eugene mine owners and the CPR gained a controlling interest in them for \$825,000.



War Eagle mine

The new company formed in 1906 was called The Consolidated Mining and Smelting Company of Canada Limited. Some people still call it CM&S. Cominco became the Company's official name in 1966.



old CM&S logos

The relationship between CM&S and Canadian Pacific was a good one. The railway got increasing amounts of business from the mines and smelter, plus a share in CM&S profits. Consolidated benefited from having a powerful financial backer. It is amazing to think this relationship survived almost 80 years on the same basis.



Sullivan mine portal

With CPR backing, Aldridge set out to expand smelter production and secure more sources of ore for his Trail Operations. In late 1910, CM&S took a lease on the

Sullivan mine at Kimberley with an option to buy. They probably did not realize at the time just how good a decision it would prove to be.

Aldridge resigned as Managing Director in 1910 and Pat Stewart became General Manager and Blaylock took the role of Assistant General Manager. At about this time, work began on a zinc extraction process at Trail, although the emphasis was more on simply getting rid of the zinc. That soon changed, however, and, along with it, the fortunes of CM&S.



electrolytic zinc refinery in the 1920s

Alab process was developed to make refined zinc by electrolysis, but at that time, Consolidated



pouring zinc slabs

was not too well off financially. However, WWI demands for brass increased the need for zinc. In 1916, a 50-ton per day plant started up, becoming one of the two first electrolytic zinc refineries in the world.

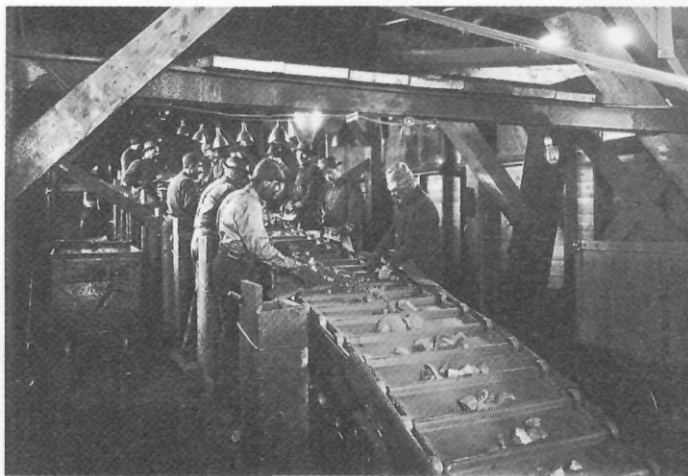


WWI tank



WWI soldiers in Rossland

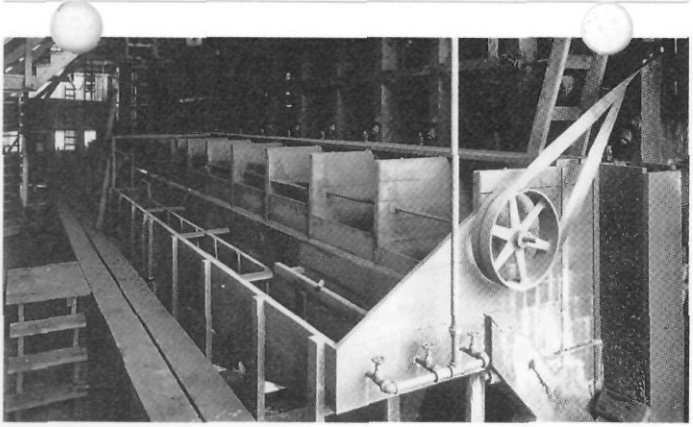
That first year's production totalled 11,000 tons – a remarkable scale-up from the laboratory process. This was at a time when no way had yet been devised to make separate lead and zinc concentrates at the mines. Zinc ore still had to be hand separated from lead ore.



hand sorting ore at Sullivan

Good technological development work, coupled with good business sense, again proved to be profitable for Consolidated. Increased demand for zinc and lead during the War drove the effort to find a way to make separate zinc and lead concentrates at the Sullivan mine. While CM&S could make refined zinc, the process was by no means efficient and much of the ore became waste. A differential flotation method, one that would make separate concentrates of zinc, lead and iron sulphide, was essential for the zinc plant to survive. It would also ensure the best use of the enormous Sullivan orebody.

In 1917, Blaylock recruited Ralph W. Diamond from the Anaconda Copper Co. A 300-ton-per-day test mill was built at Trail for him to do this research. By early 1918, a partial solution was reached, giving the zinc plant a new lease on life, and the test mill became an operating plant. Diamond's team continued to improve their process



early flotation cells

and the costs started coming down, but only just keeping pace with dropping metal prices.

Hundreds of chemical reagents were tried in an effort to find those that would selectively float the tiny particles of lead first, then zinc, leaving behind the



Concentration Dept.

iron. Finally, on August 13, 1920, Diamond was able to say, "Commercial separation by selective flotation of Sullivan ore into a lead concentrate, a zinc concentrate and an iron concentrate, was reality."

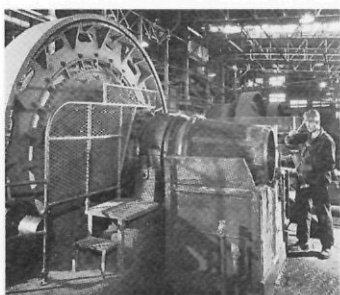


concentrator at Trail

On the basis of this work, a 2500-ton-per-day mill was built at Kimberley, and put into operation in mid 1923. This process made it possible to extract the maximum amount of valuable minerals from the Sullivan ore and ensured low-cost production and good profits for many decades to come.



Sullivan concentrator



Sullivan concentrator interior



flotation cells at Sullivan

Thus, a strong commitment to technological development proved its worth again and set the tone for the Company's operations to this day. Aldridge was proven right again; the smelter had to own its mines to get the best profit. It is doubtful the Trail Operations could have survived and prospered without the Sullivan mine and the development of differential flotation.

World War I also increased the demand for copper and led to the construction of Canada's first electrolytic copper refinery at Trail. While the process itself was not a new one, this 30-ton-per-day plant did signal the beginning of the



electrolytic copper refinery

copper refining industry in Canada. At that time, the Rossland mines were still producing their gold and copper ore, but before long the decline set in. By 1930, Consolidated was out of the copper business as the price had dropped and new copper mines were scarce.

THE HOME FRONT

Leadership once again emerged as the dominant factor in the Company's success and Blaylock and Diamond proved to be brilliant technical and business leaders in the decades between the World Wars. Then, Blaylock became President of CM&S at the outbreak of WWII and faced the greatest challenge of his career.



Blaylock, right, and Diamond



women join the work force

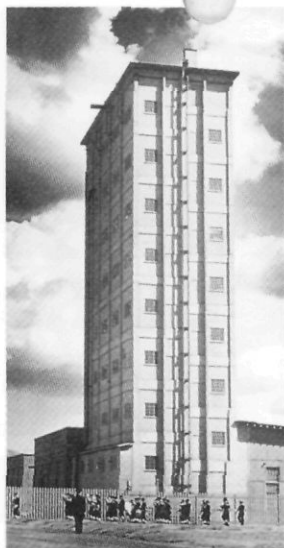


mill workers, Kimberley, 1943

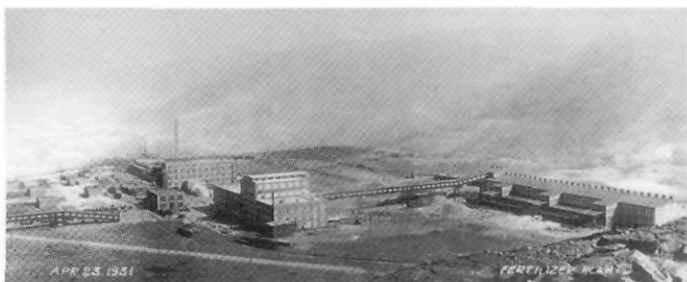
The Canadian government virtually conscripted all the company's lead, zinc and chemical production at low fixed prices for the war effort. Many of the best technical staff were assigned to government wartime work and many other employees went to

military service, making it more difficult to sustain production. Still, the government pressed for more and more lead and zinc production and Blaylock saw it as his patriotic duty to Canada and the British Empire to see that they got it. Production was constantly expanded with many women taking the place of the men.

To meet the extra power needed to sustain this increased production, CM&S had to build the Brilliant Dam and put it into operation in 1942. The fertilizer plants switched to making explosive grade ammonium nitrate and the Canadian and U.S. governments compelled CM&S to build a secret heavy water plant at Trail to supply early experiments in nuclear fission.



Trail's heavy water plant



Trail Fertilizer Operations, 1931



Brilliant Dam construction

By the end of WWII, CM&S was well poised to supply and prosper from post-war growth as soldiers returned home to start their families, now known as the "baby boom."

INNOVATION CONTINUES

At the Cominco Trail Operations of today, the tradition of innovation continues with new processes, new technologies and new products to meet society's needs... and it's all due to the efforts of those pioneering entrepreneurs, miners and smelterworkers who came West 100 years ago seeking their fortunes and stayed to build one of the largest smelting and refining complexes in the world and the City of Trail.

CONSOLIDATED MINING AND SMELTING CO., of Canada, Ltd., TRAIL, B. C.

**Smelters
And
Refiners**
Buyers of
**Gold, Silver,
Copper
and
Lead Ores**





MANUFACTURE AND TRADE: CAPACITY
200 TONS PER DAY; CONSOLIDATED MINING
AND SMELTING CO., TRAIL, B. C.

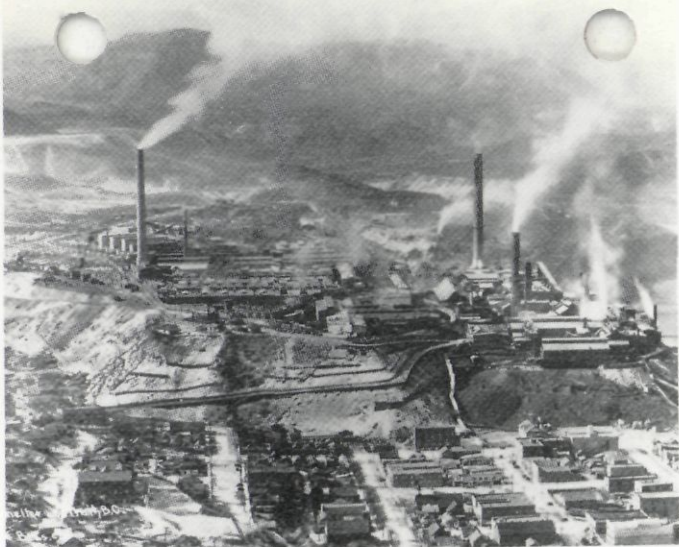
**Manufacturers of
Pig Lead**
[Trail Brand]
Which is produced by
electrolytic process,
and is the purest
produced anywhere,
also
Bluestone
[Copper Sulphate]
of the very purest quality

HEADWORKS CONSOLIDATED MINING AND SMELTING CO., PROPERTIES, ROSSLAND, B. C.

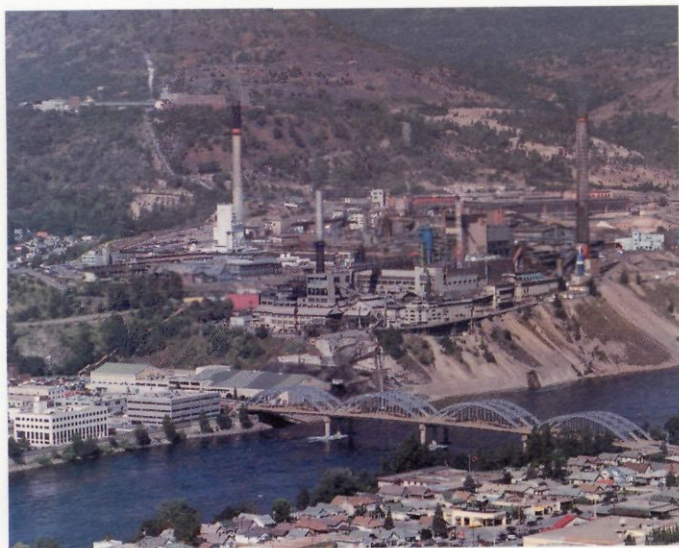


CONSOLIDATED MINING AND SMELTING CO. SMELTER, TRAIL, B. C.

Consolidated Mining and Smelting Co., of Canada, Ltd., Trail, B.C.



Trail smelter, 1929



Trail smelter, 1996



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