THE DOUGLAS REPORT
CHILEAN MINING AND ITS POLITICAL REPRESENTATION IN 1871

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Abstract:

James Douglas (1837-1918), born in Canada, became a leading figure in the world copper mining industry and then mining in general. His first great success came in Arizona after he located the Atlanta property for the Phelps-Dodge Company. He went on to become president of the company. He founded a family prominent in Arizona mining and politics. Early in his career, 1871, Douglas traveled extensively Chile visiting the major copper mining districts. Home in Quebec, he wrote a series of papers and articles on Chilean mining. The paper draws attention to his observations as an impartial diagnosis of the Chilean mining industry before it went into decline in the 1880s.

Heading south aboard the S.S. Panama, James Douglas arrived off the coast of northern Chile at Caldera on February 18, 1871. At age 33, visiting Chile seemed a good bet for his future. His newly patented and novel *"wet process"* for leaching copper from its ore held promise for application at the Invernada mine on the mountain west of Tiltil -between Santiago and Valparaíso. Yet, this chance to demonstrate the process meant months from his home in Quebec where his wife and young children remained, plus loneliness, as he spoke no Spanish. The year before, Mr. Arthur Lewis, an English investor visited the Harvey Hill mine works in Megantic County,

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Quebec, to observe first-hand the Hunt & Douglas process.[1] Douglas and Sperry Hunt, a city of Quebec chemist and professor at Morrin College, developed the process to treat the ore at Douglas' father's Harvey Hill copper mine.[2] Impressed with what he saw, Mr. Lewis invited Douglas to try the process at a mine in Chile where Lewis had an interest - the Invernada. Once the tests at Invernada were under way, Douglas traveled north to learn about the applications of technology at Chile's other mining districts. Douglas' months in Chile would shape his thinking about the business of copper mining, and leave him with a positive understanding of Chile's copper industry. His several papers and articles on Chile are what we call the "*Douglas Reports*."

Arriving in Chile in February, Douglas stayed on until at least September, and we know by early November he had returned to North America.[3] Allowing for a month of return travel, this means he left by early October at the latest.

The details of his trip north after he finished at Invernada are not fully recorded, but it seems he stayed at the mine until at least May 15. So we assume his travel through the major copper districts took place from June until September. The core of this paper is an account of some of Douglas' most interesting statements about copper and mining in Chile, plus his views about the country's politics and the mining code.

This research into Douglas' writing about Chile is really a search for comparison of Chilean and North American copper mining over many decades of the nineteenth century.[4] As Michigan, and then Arizona and Montana, competed with Chile's copper districts, we seek contemporary comparison as to how they each produced copper and with what technology. Technology during this period is about metallurgy and recovering copper from falling grades of ore. This is especially important during the later part of Chile's peak years from the 1860s through the 1870s. We know of no Chileans who toured North American mines for this period, let alone documented the trip. Douglas is a case of a North American who visited Chile and then wrote about it.

Keeping in mind that the U.S. mining districts had marginalized their Chilean competitor by the 1890s, we ask, "*How was this was accomplished? What was the competitive edge of the three U.S. copper districts? In the new global copper market of the nineteenth century, why did Chile, with huge reserves of low-*

[1] H. H. Langton, draft manuscript of James Douglas: A Memoir, p. 41. Located in The Douglas Papers Special Collections, AZ 290, Library of the University of Arizona, Tucson. Hereafter DC-UA.

[2] They obtained their first patents for the Hunt & Douglas in 1869 in both Canada and the USA.

[3] Letter to his wife Naomi, dated January 20, 1871, in his 1871 Letterbook, documents his departure date. DC-UA.

[4] The work of Charles Tilly has long clarified our research. A new collections of essays on theories of social and economic history, Miguel Angel Centeno and Fernando López-Alves, editors, *The Other Mirror: Grand Theory Through the Lens of Latin America*, Princeton, New Jersey: Princeton University Press, 2001, looks at the ideas of Tilly, among others, in light of the experience of Latin America.

grade copper ore, fall behind? Why did Chile falter in the shift from vein and lode-based mining to bulk processing of ore? The search for answers to these questions is an extension of our previous published work on the topic.[5] James Douglas links the U.S. and Chile. His huge success as a leader in the U.S. industry, make his Chilean experience, and his ideas about it, especially relevant. In particular, James Douglas represents an attitude of constant innovation in technology. He personally, or with Sperry Hunt, held by 1918 at least 33 patents in the United States, Canada, Mexico and perhaps in Chile. Moreover, he became known for sharing technology under the belief that by such sharing all in the industry benefited. In a 1907 editorial in the Engineering and Mining Journal a public address by Douglass is the subject. It lauds the philosophy of no trade secrets, and repeats Douglas' point that such secrets are found out by detective work and brides in any case. Innovation should turn to patent law, rather than secrecy for protection. Douglass also points out that often the patent hides the true innovation. The editorial argues that whole mining industry will grow if Douglas' practices are followed.[6]

What makes James Douglas, born November 4, 1837, important for the history of late nineteenth century mining? The simple answer is that he possessed a lifelong inclination to write. While still in Quebec, and before his metallurgical career became defined, he was active in the Literary and Historical Society of Quebec. In 1862, at age 25, he read before the society's members his first paper, which dealt with Egyptian beliefs about the state.[7] He became president of the society in 1869. All his life he wrote about his experiences.

Since his life turned towards mining, he wrote about mining. The authors are trying to collect a full bibliography of Douglas' articles, but it is a challenge. Further complicating the task, many of his articles appeared as reprints, but with new titles. Until he *"made his fortune"* at age 40, his writings constituted a supplement to his income.[8] In his collected papers at the University of Arizona, there are clipping from at least 200 of his published articles. He published not just in mining journals, but also in Harper's Weekly, the Nation, and several Canadian periodicals. Additionally, he authored seven books.

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[5] William W. Culver and Cornel J. Reinhart, *Capitalist Dreams: Chile's Response to Nineteenth Century Copper Competition*, in Daniel H. Levine, ed., Constructing Culture and Power in Latin America, (Ann Arbor: University of Michigan Press, 1993) pp. 41-74) [revised article from Comparative Studies in Society and History: An International Quarterly, 31:4 (October, 1989), pp. 722-744].

[6] *The Policy of Secrecy in Engineering Record* (New York City) December 21, 1907.

[7] *The Belief of the Ancient Egyptians Regarding the Future State*, paper read at the Literary and Historical Society of Quebec, and published in Transactions, Vol. V, no. 1. (1862).

[8] This *«after forty success»* seems to have caught the attention of the public after his death. See Edward F. Smith, Making a Fortune After Forty, New York Herald (October 18, 1918). This is a candid and funny look at Douglas. *«That is what makes the case of James Douglas exceptional and worthy of note. For James Douglas was at forty a retired physician, an ex-professor, a preacher and a rolling stone. And at eighty-one he died a multi-millionaire. He had done what is commonly deemed impossible.»*

Douglas wrote at seven papers or articles on Chile after his return from South America. His last publication on Chile came out in 1881 before he went to Arizona to consult for New York's Phelps, Dodge & Company. In the years after Chile, he sometimes mentioned the country in copper articles, but compared to what we know about him in Quebec and the United States, we know little about his experiences in Chile. It is also noteworthy that his time in Chile is almost totally ignored in his biographies, and not mentioned once in the dozens of career biographies publishes after his death June 25, 1918.[9]

The Douglas Chile Bibliography

1871 The Silver Mines of Chile, *paper read at the Literary and Historical* Society of Quebec, Montreal, December 13. [Unpublished. This paper may be lost.]

1872 The Copper Mines of Chili, Quarterly Journal of Science, and Annals of Mining Metallurgy, Engineering, Industrial Arts, Manufacturing and Technology, 9 (April), pp. 159-182.

1872 *The Copper Mines of Chile I, II, III, IV, & V,* [Republished , with revisions and corrections of the author, from the London QJS article], Engineering and Mining Journal, XIII (May 21, 28, June 4, 18 and 25, pages 330-331, 340, 363, 387-388, & 406.

1872 *Reduction of Silver Ores in Chili*, Engineering and Mining Journal, XIV (July 2) page 4.

1872 *The Political Conditions of a South American Republic*, paper read at the Literary and Historical Society of Quebec, Montreal, December 11. [Unpublished. This paper may be lost.]

1878? [Chile?], Pennsylvania Monthly.

1879 *The Seat of the War in South America*, Rose-Belford's Canadian Monthly and National Review, vol. 3, no. 2 (August), pp. 113-129.

1881 Chile - Its Geography, People and Institutions, Journal of the American Geographical Society, pp. 59-92.

The Douglas Reports reveal a world where science and its technological applications are the handmaidens of *"progress,"* and Douglas believed himself to be a participant in the shift towards *"scientific mining and metallurgy."*[10]

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[9] The authors examined 151 obituaries and death notices published between June and October 1918, where not one word was written about Chile. Box 3, -In Memoriam James Douglas- University of Arizona Special Collections.

[10] The Seat of the War in South America, Rose-Belford's Canadian Monthly and National Review, 3:2 (August, 1879), p. 124.

His generation of Canadians shared a pride and confidence in their new Dominion, and he never gave up his Canadian citizenship. It was the time of Confederation, the Canadian Pacific Railway, and Sir John A. Macdonald,[1] when progress seemed inevitable for those who understood the principles of science. If for Douglas scientific metallurgy promised production from once marginal ores, railways became both the means and the measure of a country's overall prosperity. This is the "*progressive*" perspective James Douglas brought to the coastal mountains of Chile as he toured mines between Tiltil and the Aconcagua River Valley to the Quebrada Pan de Azúcar just north of Chañaral and the then border with Bolivia. He described what he determined to be Chile's three major copper districts: "*Tomaya*" (sic), "*Carrizal,*" and "*Chañaral.*"

His efforts at writing a comprehensive review of Chile's mines provide us with an interesting contemporary benchmark from which to assess the turbulence of the following two decades during which time Chilean copper output declined - plummeted if considered as a percentage of world production of copper - and North American output soared.

Douglas Reports: What He Wrote

These seven reports collectively document for 1871 a competitive well-managed and technologically up-to-date mining industry, especially as regards copper. Douglas' views are summed up in his own words, "*What I learned of mining and metallurgy [in Chile] and of the commercial aspects of the copper trade have been of inestimable value to me.*"[2] Back in Canada 18 months after leaving Chile, his assessment about how copper mining, worldwide, should proceed is clear. He saw expanded production based on the systematic, or business-like, processing of ever-lower grades of ore. We quote an extensive paragraph that sets out this view. This "business approach" to mining, as opposed to the speculative search for the one great bonanza lode, is a core lesson for Douglas. He first saw a copper industry operated as a business in Chile, not in North America.

"*If copper is to be mined profitably it must be found in large quantities. The ore must not necessarily be rich, but there must be plenty of it. As in the distribution of many another mineral, however, so in that of copper, there are to one large deposit hundreds of little ones, none large enough to nourish a mine, but large enough for the credulous to build false hopes upon, and to temp to the reckless expenditure of money above and below ground. Almost every State has its list of*

[1] Sir John A. Macdonald was the first Prime Minister of the Dominion of Canada, after having led the organization of the Canadian confederation. He served from 1867-1873, and again 1878-1891, leading the Conservative majority in Parliament.

[2] H. Langton, draft manuscript of James Douglas. Chapter I, page 41.

copper-mines worked and abandoned, but begging to be tried again. Yet, if amidst this multitude throughout the length and breadth of the land, there should be opened up six substantial lodes, this country [USA] would reverse her present position, and from being an importer become at once a large exporter. And that such must soon be her attitude is certain, for copper-deposits of great extent do exist within easily accessible limits. It does not require that a country be underlaid with copper to give it prominence in the copper-trade. More than one-half of the copper which enters the markets of the world comes from Chili, and yet, about one-half of this is mined from three lodes, the productive portions of which do not exceed two miles in length.

There, as here, exist hundreds of insignificant mines, yielding a few tons of ore annually, to every large one yielding thousands. The difference is that there the little lodes, if not altogether neglected, are worked by a miner or two, content if they make simple wages, while here each such veinlet is made the foundation on which to build a company. There, moreover, mining is a business - here it is a speculation."[13]

This understanding of how Chileans approached copper mining was spelled out in comparison of the operation of the mines at "*Tomaya*" [sic] with those at Ore Knob, Tennessee. Douglas argues that this business attitude lead to success at Tamaya, even though circumstances were more difficult then at Ore Knob.

"I have adduced this instance merely to show that the success of mining, where mining is pursued as a business, is not due altogether to exceptionally favorable local or social conditions, and to show that there are, in the United States, mines richer and more advantageously circumstanced than in the paradise of copper mines - Chili."[14]

Douglas seemed impressed by what he learned of Charles Lambert, who worked the major deposit north of La Serena - known for the Brillador mine - from 1847 onwards. Douglas saw in Lambert the lesson of scale reinforced. Lambert "...taught his neighbors that ore must be extracted by the ton instead of the pound, if mining is to be a profitable investment."[15] The older experience at Brillador, and the contemporary experience at Tamaya/Panucillo, Carizal, and Chañaral were for Douglas the Chilean copper industry.

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[13] *1873 Copper Mining in the Past, and Its Prospects in the Future*. Engineering and Mining Journal, XVI (August 26) pp. 131-132.

[14] *The Copper Mines of Chili*. Quarterly Journal of Science, and Annals of Mining Metallurgy, Engineering, Industrial Arts, Manufacturing and Technology, 9 (April, 1872), p. 182

[15] *James Douglas, Jr., Chile - Its Geography, People and Institutions, Journal of the American Geographical Society, 1881*, pp. 85.

The most complete statement about copper mining and smelting in Chile came in his 1872 article, The Copper Mines of Chile. Published first in the London Quarterly Journal of Science (April 1872) and then revised and corrected for the New York Engineering and Mining Journal (May and June 1872), Douglas gave the English-speaking mining community their first comprehensive look at Chile's copper production. Most likely, he wrote a draft of this while sailing back to North America, as he had the habit of using travel time at sea or by rail to write. He believed that the market power of the chili bar, so important to futures trading in London, required the mining world to look systematically at the basis of Chile's production, and its potential for the future.

"As the produce of the Chili mines now regulates the price of copper all over the world, and all speculation as to its future price must depend on the probable future yield of these mines, their condition is a subject of prime importance to all interested in the copper trade."[6]

For the first time outside Chile, a discriminating analysis distinguished the hundreds of mines up and down the Andes from the few important workings at the copper districts of the period. Outside of Chile, until then, confusion resulted from not distinguishing the two systems of copper mining - the modern industrial mines and the older artisan mines. This distinction became common in the 20th Century, and certainly, no one in 21st Century Chile would go to Andacollo to characterize the state of Chilean copper. This is where Douglas' reports are significant. Douglas recognized Chilean copper came predominantly from three well-worked lodes in the 1870s, and even in the 1860s.

"All the copper comes, with the exception of but a trifling quantity, from the coast range, and from within 30 miles of the sea, and nearly two-thirds of it from the three great mineral districts of Tomaya (sic), Carrizal, and Chañaral."[7]

Yet, many other small mines existed with one or two laborers, or owner/miners, working a vein or an outcrop. The small mines persisted with old technology. The old technology often caught the eye of the traveler. Typical of reports from Chile in the 1860s was the item in the American Journal of Mining in 1866. As Chile competed with the new U.S. mines, reports were welcome, if few and partial. One particular report on smelting leaves us with the view that coal is not used in Chile for smelting, only wood, and that the industry was very backward. It is brief and is attributed to Major Rickard.

"The ore is smelted by wood in small reverberatory furnaces. Sometimes the smelting furnaces are of a very rude description, 'being built of mud or clay -fire-

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[6] *The Copper Mines of Chili*, p. 159.
[7] *The Copper Mines of Chili*, p. 159.

bricks being only used where the flame come s in immediate contact with the sides, roof and chimney. The ores of a rich class, principally sulfides, being brought from a considerable distance to be smelted here, as it is the nearest point at which fuel can be obtained. From the few operations I saw carried on there,' says Major Rickard, 'I should say about one-half of the copper ought to have been lost in the smelting."

Douglas left a clear statement that the technology, the machines, the work plans, were all as modern in Chile as any mine he knew in North America or Europe, and moreover, their application followed a business plan to earn a profit by attention to keeping costs below the market price.

A few other the points made by Douglas regarding operations are worth mentioning. Some years after his stay in Chile, 1881 to be exact, Douglas presented a paper to the American Geographical Society, and later published it in their journal. Douglas, responding to an interest in the region provoked by the War of the Pacific, offered his views after a decade of reflection. At this time he was even more specific about the basis of Chilean production in the three major districts he identified ten years earlier.

"Now, the three great mining districts of Tomaya (sic), Carrrizal-alto and Chañaral -whose mines are owned and worked by associations of Chilian gentlemen, are connected each by its line of railroad with smelting works and with the coast, are supplied with the best machinery, and worked well and systematically and on a very extensive scale, yielding profit from an ore which would be despised in our Western country [reference to Michigan, Montana and Arizona], and under conditions of climate and situation though not of wages, as unfavorable as any that exist there."[18]

Douglas had mentioned wages back in 1872, perhaps unaware of the unsubstantiated charge made just a few years earlier in the United States House of Representatives that in Chile copper was worked by convict labor. The charge constituted the core reason for a discriminatory tariff against Chile ore, which undersold its North American competitors. In 1872 he wrote,

"The same high [wage] rates approximately rule throughout all the mining regions of Chili....so that it is evidently a mistake to suppose Chili owes her mining importance to cheapness of labor."[19]

In 1881 he does comment that expansion in copper had led to a drop in skill levels, but that the Chilean miner remained skilled, especially in single-hand drilling.

"Formerly miners belonged to a close guild, from which inexperience was carefully excluded....But with the extraordinary demand of late, extraordinary precautions have disappeared; but, nevertheless, in manual skill, especially in single-hand drilling, the Chilean miner proves a match for the most dexterous European."[20]

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[18] Chile - Its Geography, *p. 85.*
[19] *The Copper Mines of Chili*, p. 165.
[20] *Chile - Its Geography*, p. 86.

We end this overview of his expert opinion about Chilean mining with his comments on the silver strike north of Chile in 1870. *"Just then all Chile was excited by news of the recent discovery of a new silver region 40 leagues inland from the coast, and not far from, if not within, the neutral zone.... To the Bolivian mines of Caracoles there did not flock, therefore, Bolivian miners from famous Potosi, but Chileans from Chañarcillo. Chilean science also soon erected splendid silver-reducing works at Autofogasta [sic] on the Bolivian coast, and Chilean capital ran a railroad over the desert towards the mines....On the very confines, therefore, of Chilean territory, there sprung up two industries [the other being ["nitre"] worked by Chilean labor, developed by Chilean skill and sustained by Chilean capital."*[21]

Politics and Mining Code

The mention of tariff brings up the topic of the political system of Chile, and the ways Chile regulated and taxed mining. Chile after 1865 adjusted to closure of its U.S. Atlantic seaboard markets due to the 1865 United States tariff. For years afterwards, in the United States a copper free trade debate continued. As a service to readers, the American Journal of Mining regularly printed original letters as well as reprinted letters to the editor from various newspapers around the country. One such exchange, from the January 2, 1869 issue, carries an exchange of letters on *"both sides of the Copper Tariff question,"* all prompted by yet another bill in Congress to further increase duties on copper. The issue is protection of high cost "*American*" mines in the Keeweenaw Peninsula, versus the copper products industry seeking to export competitively priced goods. Also, the seaboard smelters (specially in Baltimore) need *"foreign"* ores, read Chilean ores, to mix with domestic ores (Ore Knob, Tennessee) in processing. Opponents of further duties see speculators as behind the legislative move.[22] The objective of the tariff was to build a strong protected industry, and then try to compete. The fear was Chilean would continue on an evolutionary path of lower costs even as lower grades of ore were exploited. Chilean did not seem as quick to find consensus over how to cope with external competition and to adapt it regulatory and tax systems. Still, Douglas believed Chile to be well-governed. In an editorial for the Engineering and Mining Journal in 1912, Douglas wrote on problems in Mexico caused by the colonial past. Then he turned to compare Mexico with Chile.

"Chile fortunately escaped because poor, and we see the results today in honest government and active industry, carried on in great measure by the Chileans themselves. When Chile was at the height of its copper production in the '70s (occupying in the world relatively the same position, as regards copper production,

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[21] *Chile - Its Geography*, p. 71

[22] *The Copper Tariff. American Mining Journal, VII* (January 2, 1869) p. 2.

as we [United States] do today), the big copper mines were owned and operated by Chileans, who used the profits for the development of the country instead of exporting them." [23]

In his 1881 article on Chile Douglas also showed a mixed admiration for Chile as possessing the basic stability which industry required if it were to advance. His views were formed during the 1871 election campaign, and the July 25 election itself. He perceived the executive and legislative departments of government as a compromise between the systems of Great Britain and the United States, while the *"internal administration of affairs all resemblance ceases, and we recognize a strict resemblance to Spanish methods."*[24] He notes that at the time of the 1871 election, of the 2,002,597 people in Chile, only 49,047 voted. *"The property qualifications excludes all below the artisan class, and thus diminishes accordingly the demand on the bribery fund of the opposition parties.."*[25] Douglas ends his political overview stating,

"At any rate, Chile owes half a century of good government to her oligarchical rulers. Disapprove as we and their liberal opponents may of some of their principle sand practices, they have made their country trusted and respectable abroad. They have shown the world that at least one South American republic is governed without fraud and without violence."[26]

One of the main inheritance of the Spanish methods was their mining code and its logic of how to use mining to generate revenue for the state. The code required constant operation in order for maintenance of the mine title, notwithstanding low prices. The code also contemplated mining following veins with defined walls, not masses of ore without walls. Douglas never focuses on the mining code as a topic in itself, but typically drop statements like, *"In this mine [Tamaya] another hardship of the Spanish mining code in force in Chili is illustrated...."*[27]

Carrizal Alto fell into decadence between the time of Douglas and the 1883 letter of Ovalle to Vicuña Mackenna mentioned earlier. Ovalle attributes the problems at Carrizal Alto to numerous vertical shafts which destroyed the mineral - at heart a code problem.[28] This was a development problem where the lode was *"high-graded"* and left unstable. Inspired by a prior letter Vicuña Mackenna wrote concerning the place of coal in copper mining and the harm caused by vertical shafts on the copper deposit at Carrizal Alto, Enrique Sewell

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[23] *«Some Reflections on Mexican Matters,»* editorial page, in Engineering and Mining Journal , 1912, by JD but not signed.
[24] *Chile - Its Geography*, p. 67.
[25] *Chile - Its Geography*, p. 68.
[26] *Chile - Its Geography*, p. 92.
[27] *The Copper Mines of Chili*, p. 165.
[28] *Letter from Ramón I. Ovalle to Vicuña Mackenna*, November 18, 1883, Achivo Nacional de Chile, Fondo Vicuña Mackenna.

asked Vicuña Mackenna to write a letter to El Mercurio about the need for mine code reform.[29]

"Could you also refer to my efforts, over the last eight years, in respect to the new legislation in Chile and English capital? As implemented in Spain and in Peru, a wise law brought millions to Spain. The actual commissions named by the Finance Ministry (Hacienda) have not brought any positive results. The only thing that can bring practical results of great importance for Chile, is to implement the same law in Chile that Spain implemented in 1871. It has brought great results. If the same law is not approved in Chile, all else is useless (es inutil), because the English will not accept any other law that the Spanish one, with which they already have experience. No matter how good the new Chilean law."

The Chilean code seemed strange to observers from competitor in New York, although they saw some benefit in the resulting stability of output. As early as 1866 Chile's code was a topic in the mining press.

"One of the principal sources whence copper is derived is Chili. The richest lodes and deposits have, it is said, been exhausted; but the supply of copper still comes, notwithstanding the war in which the Chilian Government is engaged. The copper yielding districts are of very great extent, and appear to be capable of supplying the markets of the world. The peculiar mining laws of Chili tend to keep up the supply, notwithstanding the slackness of demand. If a Chilian miner finds his sett becoming less productive, he has not only the inducement to continue his operations which a hope of increasing in richness holds out, but also the certainty that, if he abandon his mine, even for a short time, he loses his claim, and Government may re-let it."[30]

Chile's President Balmaceda created the country's National Mining Society in 1884 upon the recommendation of the Comisión de Minería, itself an executive creation in July 1883. The Sonami reports began to flow and early on they identified a solution to the crisis their mandate told them to resolve. It is worth considering their position on why Chilean mining, specifically the copper mining industry, was prostrate at the end of the 1870s.[31] At the core they endorsed the view that low world prices and falling ore grades combined as the principal causes.

They note this double trend, especially the prices, were worldwide. So then why were mines in Spain, Africa, Australia and the United States expanding and attracting new capital? Noteworthy, there was less capital going into extraction itself and more capital into ore processing on ever-larger scales.

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[29] Letter Enrique Sewell to Vicuña Mackenna August 21, 1883. Achivo Nacional de Chile, Fondo Vicuña Mackenna.

[30] [Editorial column], Chili Copper, American Journal of Mining, 1:10 (June 2, 1866), p. 52.

[31] «El Descenso del cobre en Chile.» Boletín de la Sociedad Nacional de Minería, Informe numero 4, Santiago de Chile, 1 de febrero de 1884, pp. 25-26.

Three causes stood out to these analysts as causing the mining industry into ever greater decline. These causes were all derived from legislation.

1. Export taxes.
2. Import taxes on materials used in extraction and elaboration of copper.
3. Insecurity of mining properties. In sum, all their problems stemmed a lack of capital. Without capital, they could not replace human and animal force with machines. The miner was at the whim of the foundry owner. Why does Chile lack capital, when it had mines as rich as other countries, good workers and political stability. The answer is legislation which left the mining industry insecure and without guarantees.

Sonami notes in their report number four that Spain in 1868 reformed its code from one like Chile's, and within a year the huge mines in Rio Tinto and Tharsis were in full production using British capital. In a letter published in the Boletín on April 15, 1884, Señor J. M. Goyenechea objected to the proposals for perpetual mining concessions upon payment of a fee, known as a *"patent fee."*[12] They note the patent system was passed by unanimity by the Directors of Sonami, and they show themselves quite familiar with the earlier Spanish abandonment of the old *"ley Española"* code.

Douglas Later Views in the mid-1880s on Copper and Chile

In 1885 Douglas wrote a letter to the London Times countering an August 26th 1885 article titled *"A Deluge of Copper."* In mid-October he send a copy to the Engineering and Mining Journal, as the Times had not yet printed his letter countering the *"bear"* article. Douglas argued that the price outlook is normal, as demand is up and Chile's production was down. He uses his Chile knowledge well, even if his direct 1871 experience was by then out-dated.

"Chili is exporting less than in her palmy days. Most of the great mines that have made her famous are decaying and approaching extinction. Of the three prominent districts of Tomayal [sic], Carrizal Alta, and Chañaral, the last only is today prosperous. But that she remains even her present production in the face of such a market is due to the favorable rate of exchange. Her miners and smelters really get now from 17 to 18 cents at par. They are enjoying the same advantages as we did in the old greenback days at the close of the war, when, gold standing at 250, copper sold at 55 cents. The power of resistance of Chili's mines will be tested only when she returns to specie payment.....But of the mines of Chili and of this

[12] Boletín, pp. 65-67.

country I can speak from personal knowledge.....If Chili returns to specie payments before prices revive, her production will certainly fall below its present level, low as that now is below her maximum."[53]

In 1904, at age 67 and still very active professionally, he gave a speech to the senior class at the Michigan College of Mines in Houghton near the great mines of the Keeweenaw Peninsula. He spoke of the need for the young mining engineers to learn to speak Spanish.

"Another branch of literary training that is a growing necessity is instruction in the Spanish language. The greatest undeveloped mineral resources of the world, so far as is known, lie in countries where Spanish is the official language. This includes the republic of Mexico and the whole of South America. To meet with the highest success there, it is absolutely necessary to speak the Spanish language. If it is not learned before going to those parts, it must be learned afterwards, and the mining engineer may count himself years ahead if he masters the tongue before leaving the United States."[54]

Six year later, in 1910, Douglas writes a mature review of the copper market. He considers the early and mid 19th century production. It is a thoughtful overview, and shows he is still very aware of Chile. He sees a great future for South America copper. He recalls the world he knew forty years earlier, when Chilean copper ore came mostly from the same mines he wrote of in 1872.

"This came almost exclusively from the districts of Tamaya, Carrizal-Alto and Chanaral, with small quantities of argentiferous copper from Copiapó. They mined only the richer ore, extracted from comparatively shallow depths. The cost of mining and smelting with dear coal in reverberatory furnaces of small size was high, and has remained so ever since. But Chile's coal mines, in the southern provinces, have of late undergone rapid development; petroleum discoveries on the west coast have been made, and above all, the contagion of our success in working low-grade porphyries will extend, and when it reaches there, low-grade ore will be developed in abundance sufficient to keep both company managers and metallurgists busy."[55]

Douglas' Credibility: His Life before and after Chile

What kind of reception did Douglas' written evaluation of Chilean mining find among his readers? Was it known of Douglas in Chile? Benjamín Vicuña Mackenna refers twice to Douglas' trip to Chile in his copper book.

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[53] Copper Production Outlook, Engineering and Mining Journal (October 17, 1885).
[54] Prof. Douglas Makes Some Suggestions, Mining Gazette, April 24, 1904.
[55] The Future of Copper, Engineering and Mining Journal, January 8, 1910, pp. 86-87.

There is no evidence Vicuña Mackenna saw any of Douglas' English language reports, but Vicuña Mackenna did know of the 1871 trip and at least one of the publications. Vicuña Mackenna's research technique for his Libro de Cobre involved requesting memoir-style letters from friends and acquaintances involved in mining. Ramón F. Ovalle, living in Catapilco in 1883, sent one such a letter to the Vicuña Mackenna regarding the copper mines in Carrizal and the early 1870s period.[36] In Libro de Cobre, while discussing the importance of the mines at Carrizal Alto, Vicuña Mackenna refers to the opinion of the *"distinguished English metallurgist Mr. James Douglas, born in Canada,"* that Carrizal Alto is one of the most promising copper properties in Chile. Vicuña Mackenna cites the letter from R. F. Ovalle dated November 18, 1883, as the source of this opinion.[37] What Vicuña Mackenna does not mention are Ovalle's efforts to get Vicuña Mackenna a copy of one of Douglas publications. We do not know which one, as the November 18th letter limits itself to *"hizo una publicación,"* but most likely the reference is to The Copper Mines of Chili published in the Quarterly Journal of Science. Ovalle knew of one copy in Chile, apparently in the hands of *"MacAuliff a Chañaral, quien debe tenerlo."*[38] [MacAuliff in Chañaral should have a copy.]

Further on Vicuña Mackenna attaches to his book's conclusions a budget for application of the Hunt-Douglas System to the 3% and 5% tailings at the Tamaya deposit dated 1871. While there is no explanation, Douglas must have developed the budget during his visit in 1871.[39] Vicuña Mackenna states the Hunt-Douglas budget came from a pamphlet published in Valparaíso, entitled, *"Método para beneficiar metales, ejes de cobre o de cobre I plata bajo el sistema de Hunt I Douglas."*[40] There is no mention of this study or budget in any of the extant Douglas papers.

The views of Douglas probably reflected those who spoke English in Chile. Certainly those people carried a memory of his visit for the short term. The superintendent of the mines at Invernada, Mr. Waring, obviously knew Douglas well, and probably carried on long conversations with Douglas. Douglas also corresponded with Juan Stewart Jackson, an agent for investors seeking to consolidate several mines at Caracoles in 1888. Douglas and Jackson corresponded until at least the late 1880s. Thus in Chile the impact of his writing seems marginal. In the states, the more Chile declined, the less interest

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[36] Letter from Ovalle to Vicuña Mackenna, November 18, 1883, Achivo Nacional de Chile, Fondo Vicuña Mackenna.
[37] B. Vicuña Mackenna, El Libro del Cobre i del Carbón de Piedra en Chile, Santiago, 1883, reprinted Santiago: Editorial del Pacífico, 1966, p. 276.
[38] Ovalle-Vicuña Mackenna letter.
[39] Vicuña Mackenna, El Libro, p. 467, 474-75.
[40] Vicuña Mackenna, El Libro, p. 467

in Chile. That is, until the so-called porphyry boom that led to the great mines at El Teniente, Potrerillos and Chiquicamata.

Conclusions

Chilean copper is but a small part of a larger story of the entrance of industrial capital into mining. Investments in North American industry in the 1870s and 1880s all hinged on the opinion of people in New York City and Boston. Douglas understood the problem of attracting new investment - Wall Street saw mining as more of a speculation than a business. In Chile he found that the serious mines ran as a business, in parallel with small outcroppings worked to support a few miners. These small mines were not inflated as bonanzas. Douglas returned from Chile understanding the need for business principles in mining - he saw them in practice in Chile. Soon after his return, he began traveling west helping scout new properties.

The mid-century years continue to fascinate our efforts to understand the ways in which twentieth century industrialization shaped that century's social conflicts. Comparisons over a long period of time allow us to perceive the habitual. Copper became a modern world commodity early in the 19th century, prior to any other base metal. The steam engine, iron, coal, and copper go back to Glamorgan County and the start of the "industrial revolution." The changes unfolding from those seemingly isolated advances in industry, soon touched Chile. The copper story lies intertwined with liberal economic policy debates from the English Corn Laws, protectionist efforts in Great Britain in 1845 and in the USA in 1860s, mine policy reform from Spain to Australia, to modern nationalization.

How should we understand copper mining in Chile and the 19th century Americas in general?[41] In response to this question, the authors believe economic history, actually industrial history, is a useful common thread. Our research on copper leads us to see the mineralized regions of Latin America, not as bit players or victims, but as full participants along with North America in the industrialization of production in the North Atlantic world. Our interest is in the way in which republican governing institutions shaped the fate of each country as each country participated in the "*global*" economy of the 19th century. What set the world on the course of national economic differentiation, now so pronounced? We seek to combine specific events over a long periods in a broad comparative context.[42]

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[41] Miguel Angel Centeno and Fernabdo López-Alves, editors. The Other Mirror: Grand Theory through the Lens of Latin America. Princeton: Princeton University Press, 2001.

[42] David Bushnell & Neill Macaulay. The Emergence of Latin America in the Nineteenth Century, Second Edition. New York: Oxford University Press, 1994. provide a useful overview the formation of political and economic institutions, and the preoccupation of the historical literature with liberalism.

The research reported in this paper places copper production in the context of world industrialization. James Douglas is a link between the mining record of Chile and that of Arizona. His life touches Quebec, New York, Arizona, Sonora and northern (Norte Chico) Chile. Specifically our interest is drawn to the production of base metals as one of the pillars of modern industrial society. The Andes Mountains from at least the latitude of Rancagua, Chile to at least Trujillo in northern Peru are central to any understanding of copper competition. Did Chile's political system act, or not act, and thus soured the country's export market position?

Interest in Chile's political process goes back to the early republic. Travelers' reports began to characterize Chile as the "England of South America." The characteristics of Chile's democracy included stability, routine rotation of power, and effective government. In comparison to other countries of the region, Chile stood out as the country most closely approaching the ideas of liberal democratic process. Yet, we know little how this process operated at the policy level. There is considerable literature on the politics of the 19th century and the opening towards the *"pueblo."* The history of governments is well known. What is unclear in the documentation is the process itself. How did political representation operate? What is the process by which major national issues became public policy concerns and eventually legislation and implemented policy?

Chile, a mining country, led the world's copper industry in output for a half century, with significant output in silver and gold. Nitrates involved Chile in war and the war in turn transformed the country's land configuration. Coal boosted the industrial development of the country's south. As a mining country, where mining nationalism drove 20th century politics, the collapse of the 19th century metal mining industry and its subsequent rebirth under foreign leadership cannot be anything other than one of the country's most important historical issues. We need to know more about how, and to what extent, this the late nineteenth century mining crisis become a policy issue?

This paper attempts to introduce the authors' efforts to look at political representation in the 1870s and 1880s, just before Chile's 1891 Civil War, and the parallel crisis of the countries copper industry. Our position is that Chilean copper was in crisis by the 1880s in the sense that output stagnated just as the industry's world production soared. The roots of this enormous world output expansion, a part of world industrialization, lie in the movement of finance capital into mining. The mining world in the last half of the nineteenth century convulsed with changes caused by its incorporation into industrial capitalism. New York, Boston and London financiers sought copper projects applying the new technologies allowing exploitation of ever-lower grades of ore. Chile was

not on the short-list of investment sites until after its 1886 code reform, when investment commitments had already been made elsewhere.

Perhaps we can see this issue better by comparing it to agriculture in the early 21st century. Until the last half of the 20th century agriculture, especially the production of vegetables, remained until that time more of a family-run small business enterprise.[43] Technology now seems to change everything. Advances in genetics, applications of computers in all aspects of farming -the new *"precision farming"*- now bring finance capital to farming. As margins drop, farms grow in size. Those farms unable to obtain large capital inputs seem increasingly stressed. This is precisely what happened in copper from the 1860s to 1910 or so. By the 1880s access to industrial capital became the threshold to the strength of any property that had the ore to justify a mine.

As Chilean territory possessed known copper ore deposits similar to others developed in the 1870s and 1880s elsewhere, why did Chile miss this stage of industrial evolution? In other words, what happened so that industrial capital was not invested in Chile to apply the new metallurgical techniques making lower grade properties profitable? The position of the authors is that Chile's unreformed mining code precluded large-scale mining. The 1886 reform came too late to revitalize the Chilean leadership and momentum of a decade or so earlier. Is this a case of political failure? Did Chile's democracy create the copper crisis due to its inability to effectively cope with a major national issue? James Douglas (1836-1918) of Quebec City helps us sort out the story, but he does not resolve it.

The key events of the nineteenth century are not specific moments but transitions. The shift in leadership from the prospector, to the miner, to the metallurgist, to the financier, each represents a stage of the industry. The early mines consisted of high grades of copper ore. As the easy mines consumed their high grades of ore, productivity pressure focused on the knowledge of reclaiming ore from complex minerals and in lower percentages. The shift to even lower grades required large plants and benefited from vertical organization, which in turn required new levels of finance. Public policies taxing the extractive industries along with codes regulating mineral extraction gave shape to mining and determined the results of competition at any one moment as much as the qualities of discovered ore.

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[43] See Richard Lewontin, *«Genes in the Food!»* New York Review of Books, XLVIII: 10 (June 21, 2001), pp. 81-84. Lewontin lays out the debate over contemporary production of food.

James Douglas
(November 4, 1837 - June 25, 1918)

Metallurgist, mining engineer, industrialist. Lifelong Canadian citizen. Born: Quebec [City], Lower Canada.

1850s Father investor in Harvey Hill copper mines of Quebec

1860 married Naomi, third daughter of Walter Douglas of Glasgow, Scotland

1860s with Sterry Hunt developed the Hunt & Douglas process for treating certain copper ores.

1868 First son James Stuart born ("Rawhide Jim" - died 1949) worked for Phelps Dodge as an assayer at the Copper Queen. Then became superintendent at various Phelps Dodge properties in Arizona and Sonora. Founded banks at Bisbee, Douglas and Jerome. He made his reputation in Jerome, where after 1910 he and others obtained control of the Little Daisy Mine (near William Clark's United Verde). In 1914 they struck a bonanza ore body, and for 25 years worked the deposit as United Verde Extension (UVX).

1869 Elected president of Literary and Historical Society of Quebec.

1870 Second son Walter born in Quebec (died 1946) and grew up in Pennsylvania and New York. In 1890 also entered mining career with a Phelps Dodge subsidiary in Prescott. In 1917 he succeeded his father as president of Phelps Dodge and stayed there until 1930.

1871 Nine month trip to Chile from January to November. Works on applying Hunt-Douglas Process at Invernada Mine near Tiltil, then visits major copper districts of Chile.

1875 came to Phoenixville, Pennsylvania to take charge of the copper-extraction plant of the Chemical Copper Company, applying the Hunt-Douglas Process.

1881 at request of Phelps, Dodge & Company of New York examined some copper claims in Bisbee, Arizona. His recommendation led to property acquisition of Detroit Copper Company at Morenci and the Atlanta Mine at Bisbee.

1885 Phelps Dodge struck a major body of ore deep underground at the Bisbee property. Phelps Dodge then bought nearby Copper Queen Company, and merged with the Atlanta to create the Copper Queen Consolidated Mining Company. Douglas then became a minority partner and later president of Phelps Dodge when it incorporated.

1894 Grandson Lewis William born (died 1974) to father "Rawhide Jim." College, WWI service, the Arizona Legislature, U.S. Congress, and then FDR budget director in 1933. Broke with Roosevelt over government

spending and balance budget and moved to Canada to serve as President of McGill University. 1940 left to head Mutual of New York Life Insurance. In 1947 Truman named him ambassador to England.

1899 to 1901 President of American Institute of Mining Engineers. The Institute now awards annually the James Douglas Gold Medal for distinguished achievement in non-ferrous metallurgy.

1906 awarded Gold Medal by the London Institution of Mining and Metallurgy

1915 John Fritz Medal for achievement in mining, metallurgy, education and industrial welfare.

1915 to 1918 (death) Chancellor of Queen's University, Kingston.
Lived at Spuyten Duyvil (Bronx County) on 50 acres outside New York City.
Died: New York City

Selected Bibliography of James Douglas, Jr.

1862 The Belief of the Ancient Egyptians Regarding the Future State, paper read at the Literary and Historical Society of Quebec, and published in Transactions, Vol. V, no. 1.

1864 The Gold Fields of Canada, paper read at the Literary and Historical Society of Quebec, and published in Transactions, Vol. "New Series", no. 2.

1865 On Two Mummies from Thebes in Upper Egypt, paper read at the Literary and Historical Society of Quebec, and published in Transactions, Vol. "New Series", no. 3.

1866 Sketch of the Literary and Historical Society: Opening Address by the Vice-President, paper read at the Literary and Historical Society of Quebec, and published in Transactions, Vol. "New Series", no. 4.

1867 The Harvey Hill Mine and the Whilply and Storer Process for Reducing Copper Ores, paper read at the Literary and Historical Society of Quebec, December 4. [Unpublished and possibly lost.]

1870 On Recent Spectroscopic Observations of the Sun and the Total Eclipse on the 7th August, 1869, paper read at the Literary and Historical Society of Quebec, and published in Transactions, Vol. "New Series", no. 7.

1871 The Silver Mines of Chile, paper read at the Literary and Historical Society of Quebec, Montreal, December 13. [Unpublished and possibly lost.]

1871 Notes on the Copper Deposits at Harvey Hill, paper read at the Literary and Historical Society of Quebec, and published in Transactions, Vol. "New Series", no. 8.

1872 The Copper Mines of Chili, Quarterly Journal of Science, and Annals of Mining Metallurgy, Engineering, Industrial Arts, Manufacturing and Technology, 9 (April), pp. 159-182.

1872 The Copper Mines of Chile I, II, III, IV, & V, ["Republished , with revisions and corrections of the author from the London QJS], Engineering and Mining Journal, XIII (May 21, 28, June 4, 18 and 25, pages 330-331, 340, 363, 387-388, 406.

1872 Reduction of Silver Ores in Chili, Engineering and Mining Journal, XIV (July 2) page 4.

1872 The Political Conditions of a South American Republic, paper read at the Literary and Historical Society of Quebec, Montreal, December 11. [unpublished and possibly lost].

1873 Canadian Pacific and Its Railway Rivals, Canadian Monthly and National Review, vol. 4, no. 6 (December), pp. 457-471.

1873 Copper Mining in the Past, and Its Prospects in the Future, Engineering and Mining Journal, XVI (August 26) page 131-132. [Reprinted from the Boston Advertiser]

1874 Present Condition of the Survey of the Canadian Pacific Railway, Canadian Monthly and National Review, vol. 6, no. 3 (September), pp. 229-248.

1875 The Present State of Literature in Canada and the Intellectual Progress of Its People During the last 50 Years, paper read at the Literary and Historical Society of Quebec, and published in Transactions, Vol. "New Series", no. 11.

1875 The Intellectual Progress of Canada During the Last Fifty Years, and the Present State of Its Literature, Canadian Monthly and National Review, vol. 7, no. 6 (June), pp. 465-476. [An address read before the Literary and Historical Society of Quebec, on the 3rd of March, 1875, while J. Douglas served as the Society's President.]

1876 The Centennial Exhibition, Canadian Monthly and National Review, vol. 9, no. 6 (June), pp. 535-543.

1876 The Philadelphia Exhibition: The Australian Colonies, Canadian Monthly and National Review, vol. 10, no. 3 (September), pp. 239-247.

1877 The Philadelphia Exhibition: The Display of Pottery, Canadian Monthly and National Review, vol. 11, no. 1 (January), pp. 69-76.

1878? [Chile?], Pennsylvania Monthly.

1879 The Seat of the War in South America, Rose-Belford's Canadian Monthly and National Review, vol. 3, no. 2 (August), pp. 113-129.

1880s Letters from the West, [various contributions], Engineering and Mining Journal, September, 1880 to July, 1881.

1881 Chile - Its Geography, People and Institutions, Journal of the American

Geographical Society, pp. 59-92.
1881 Letters from the West. - I - Rocky Mountain Railroads" Engineering and Mining Journal (December 3).
1881 "Letters from the West. - II - Rocky Mountain Railroads" Engineering and Mining Journal (December 10). pp. 387-88.
1881 "Letters from the West. - III - Rocky Mountain Railroads" Engineering and Mining Journal (December 17). p. 403.
1881 "Letters from the West. - IV - The Plattner Process in Nevada County Ca." Engineering and Mining Journal (December 24). p. 425.
1882 "Letters from the West. - V - Spencerville Copper-Works" Engineering and Mining Journal Engineering and Mining Journal (January 21).
1882 "Letters from the West. - VI - From Casa Grande to Globe" Engineering and Mining Journal (February 18).
1882 "Letters from the West. - VII - San Francisco" Engineering and Mining Journal (March 4). p. 121.
1882 "Letters from the West. - VIII - Butte, Montana" Engineering and Mining Journal (April 22). p. 208.
1882 "Letters from the West. - IX - Butte, Montana" Engineering and Mining Journal (April 29). p. 219.
1882 "Letters from the West. - X - Clifton, New Mexico - Its Copper Mines and Furnaces" Engineering and Mining Journal (September 2). p. 121.
1882 "Pyrites Deposits and the Use of Pyrites in the Manufacturer of Sulphuric Acid I" Engineering and Mining Journal August 5, 1882, p. 69.
1882 "Pyrites Deposits and the Use of Pyrites in the Manufacturer of Sulphuric Acid II" Engineering and Mining Journal August 19, 1882, p. 69.
1882 "On the Bessemerizing of Copper Ores and Mattes," Engineering and Mining Journal (October 7), p. 185.
1885 "Copper Production Outlook," Engineering and Mining Journal (October 17).
1887 "The Sonora Earthquake of May 3, 1887" by T. Sperry Hunt and James Douglas
1892 Biographical Sketch of Thomas Sterry Hunt, Transactions of the Institute of Mining Engineers.
1894 Canadian Independence, Imperial Federation and Annexation.
1898 The Copper Industry of Arizona, The Mineral Industry, Its Statistics, Technology and Trade in the United States and Other Countries to the End of 1897, New York: The Scientific Publishing Company, pp. 327-232.
1898 A Memoir of Thomas Sterry Hunt, M.D., LL.D. (Cabtab.), Philadelphia: MacCalla & Company.

1903-5 Education in Quebec in the 17th Century, paper read at the Literary and Historical Society of Quebec, and published in Transactions, Vol. "New Series", no. 25.

1904 Untechnical Addresses on Technical Subjects, New York: John Wiley & Sons.

1905 Old France in the New World, (Cleveland).

1909 The Influence of Railroads of the United States and Canada on the Mineral Industry.

1910 "The Future of Copper" Engineering and Mining Journal, (January 8), pp. 86-87.

1910 Journals and Reminiscences of James Douglas, M.D., New York. [Edited volume.]

1910 "Copper," Encyclopedia Britannica, 1902-03 10th edition unconfirmed, as it is an unsigned article.][44]

1912 "Some Reflections on Mexican Matters" on editorial page, Engineering and Mining Journal.

1913 New England and New France, (New York).

Chronological Bibliography about James Douglas and His Times

Canadian Who Was Who, Vol. I.

Obituary, New York Times

Obituary, [Montreal newspapers]

1871 [Editor], Notes from Chili, Engineering and Mining Journal, XII (November 7, 1871) p. 289.

1873 Hunt, T. Sperry, Remarks on the Hunt and Douglas Copper Process, Transactions of the American Institute of Mining Engineers, vol. 1 (May 1871-February 1873), pp. 258-260.

1879 Coxe, Eckley B., Presidential Address at Lake George October 1878, Transactions of the American Institute of Mining Engineers, vol. VII (May 1878-February 1879), pp. 103-104.

1879 Howe, H. M., A Direct Process of Copper Smelting, Transactions of the American Institute of Mining Engineers, vol. VII (May 1878-February 1879), pp. 442-454.

1916 Ledoux, Albert R., John Fritz Medal Awarded to Dr. James Douglas, Bulletin of American Institute of Mining Engineers, January, pp. iv-ix..

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[44] *Letter from Henry Howe to James Douglas*, dated February 14, 1900, «Dear Dr. Douglas, ENCYCLOPEDIA BRITANNICA. Yes, you are certainly to write on copper for the Encyclopedia Britannica. They want letters A-C as soon as possible, and I think they would like to get it by the first of April.»

1918 James Douglas Dead in Eighty-First Year, Wall Street Journal (June 25) [obituary].
1918 Dr. Douglas, Eminent Copper Expert, Dead, Evening Post (New York), (June 25) [obituary].
1918 Arizona Loses in Death of dr. Douglas, Tombstone Prospector (June 26) [obituary].
1918 Dr. Douglas Passes to the Great Beyond, Arizona Mining Journal (Phoenix), (July), pp. 5-9 [obituary]
1918 James Douglas
1918 James Douglas, Engineering and Mining Journal, (June 29) pp. 18-20 [obituary].
1918 Raymond, R. W., James Douglas, Bulletin of American Institute of Mining Engineers, (September) [obituary].
1927 Wurtele, Fred. C., [Librarian], Index of the Lectures, Papers and Historical Documents published by The Literary and Historical Society of Quebec, and also of The Names of their Authors, together with A List of Unpublished Papers Read before the Society 1829-1891, Quebec.
1930 Johnson, Allen and Dumas Malone, editors, James Douglas, Dictionary of American Biography, New York: Charles Scribner's Sons, vol. 5,
1940 Langton, H. H., James Douglas: A Memoir, Toronto: University of Toronto Press.
1947 Beltrán, Pedro, South American Minerals in the Future World Economy, Seventy-five Years of Progress in the Mineral Industry 1871-1946, New York: The American Institute of Mining and Metallurgical Engineers, pp. 623-633.
1947 Crane, Clinton H., Copper, Lead and Zinc Mining in the Future, Seventy-five Years of Progress in the Mineral Industry 1871-1946, New York: The American Institute of Mining and Metallurgical Engineers, pp. 596-602.
1947 Parsons, A. B., History of the Institute, Seventy-five Years of Progress in the Mineral Industry 1871-1946, New York: The American Institute of Mining and Metallurgical Engineers, pp. 403-492.
1948 Wallace, W. Stewart, General Editor, James Douglas, The Encyclopedia of Canada, Toronto: University Associates of Canada, vol. 2, pp. 230-231.
1948 Wallace, W. Stewart, General Editor, Literary and Historical Society of Quebec, The Encyclopedia of Canada, Toronto: University Associates of Canada, vol. 4, pp. 88-89.
1972 James Douglas, Encyclopedia Canadiana, Toronto: Grolier of Candada, vol. 3, pp. 230-231.
1972 Literary and Historical Society of Quebec, Encyclopedia Canadiana, Toronto: Grolier of Candada, vol. 6. p. 147.

1976 Flitton, Marilyn G., compiler, An Index to the Canadian Monthly and National Review and to Rose-Belford's Canadian Monthly and National Review 1872-1882, Toronto: The Bibliographical Society of Canada.

1979 Ball, Phyllis, Lewis W. Douglas, Papers, Including Materials on James Douglas (Grandfather) and James Stuart Douglas (Father): Inventory Boxes 1-514, Special Collections, University of Arizona Library. [Boxes 1-55 James Douglas]

1982 James Douglas, Dictionary of Canadian Biography, Toronto: University of Toronto Press, vol. XI, pp. 271-272. [About James father 1800-1886, with comments on James of Phelps Dodge.].

1986 Browder, Robert Paul, and Thomas G. Smith, Independent: A Biography of Lewis W. Douglas. New York: Alfred A. Knopf. [Biography of grandson of James Douglas, and son of James' eldest son, James S. ("Rawhide Jim") Douglas (1868-1949). Lewis lived 1894-1974.]

1996 Fell, James E., Jr., Douglas Family, in Charles Phillips and Alan Axelrod, Encyclopedia of the American West, vol. 2, New York: McMillan Reference, U.S.A..

2000 Negretto, Gabreil L. and José Antonio Aguilar-Rivera, Rethinking the Legacy of the Liberal State in Latin America: The cases of Argentina (1853-1916) and Mexico (1857-1910), Journal of Latin American Studies, vol. 32, pp. 361-397.

2000 Platt, Tristan, The Alchemy of Modernity. Alonso Barba's Copper Cauldrons and the Independence of Bolivia Metallurgy (1790-1890), Journal of Latin American Studies, vol. 32, pp. 1-54.