

**THE PERUVIAN EXPROPRIATION
OF THE TARAPACA NITRATE INDUSTRY, 1875-1879.**

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ABSTRACT

This thesis provides the first comprehensive account of the Peruvian expropriation of the Tarapacá nitrate industry from its origins in 1870-1875 to its conclusion in 1879. The data on sellers of nitrate plants, holders of production contracts, and quotations of the nitrate bonds furnished in payment for the plants included in this work had been missing from prior, sketchy accounts of the expropriation. The sharp and protracted domestic debate in Perú over the scheme, both prior to and during the operation, presented here in detail, has never been noted or analyzed before. The parallel history of the Antofagasta Company, a Chilean-British nitrate company competing with Tarapacá at the time, is described here based on the previously unavailable correspondence of the local manager in Antofagasta.

The main contribution of this thesis is its reinterpretation of the origins of the expropriation, as well as its impact on the Antofagasta Company in particular and Chilean interests in general. The ostensible justification of the Peruvian Government for launching the operation was to curtail nitrate exports in order to allow larger guano sales at higher prices, a goal viewed as both commendable and feasible by virtually all authors dealing with the issue. This account shows that it was demonstrably impossible for Perú to control the world supply of sodium nitrate at the time because it had ceased to be the sole exporter of the product after the Antofagasta Company started operating in 1872. It is also documented here for the first time that the local opposition repeatedly cautioned that any attempt at restricting Tarapacá nitrate exports would only end up increasing the share of the market held by the rival Antofagasta Company. The conclusion of this work is that the Peruvian Government had a second, thinly veiled, agenda in proposing the purchase of the Tarapacá nitrate industry, namely to secure a new overseas loan to pursue railroad construction, imperiled by the 1876 default of the country on its foreign debt. It also demonstrates that the Antofagasta Company, as well as other emerging Chilean nitrate regions, viewed the operation as extremely favourable for them. The latter conclusion refutes the notion that the expropriation was a nationalistic measure negatively affecting Chilean interests.

RÉSUMÉ

La présente thèse est la première relation complète de l'expropriation de l'industrie des nitrates de Tarapacá par le Gouvernement du Pérou, depuis ses débuts en 1870-1875 jusqu'à la fin en 1879. Les données sur les installations, les titulaires des contrats de production et les cours des obligations données en paiement des installations n'ont jamais été remarqués ou analysés auparavant. L'histoire parallèle de la compagnie Antofagasta, société de nitrates anglo-chilienne qui était à l'époque en concurrence avec Tarapacá, est fondée sur la correspondance, non disponible jusqu'à maintenant, du directeur local à Antofagasta.

La réinterprétation des origines de l'expropriation, ainsi que les incidences qu'elle a eues sur la compagnie Antofagasta en particulier, et sur les intérêts chiliens en général constituent l'apport principal de la présente thèse. Le Gouvernement péruvien a lancé l'opération dans le but ostensible de diminuer les exportations de nitrates afin d'accroître les ventes de guano, et ce, à des prix plus élevés. Cet objectif a été jugé louable et réalisable par tous ceux qui ont traité de la question. La présente thèse montre que le Pérou à l'époque était absolument incapable de contrôler l'offre mondiale de nitrate de soude car il avait cessé d'être le seul exportateur de ce produit après que la compagnie Antofagasta eut commencé à l'exploiter en 1872. La présente thèse prouve aussi pour la première fois, documents à l'appui, que l'opposition locale n'avait cessé de signaler que toute tentative de limiter les exportations de nitrates de Tarapacá n'aboutirait qu'à une augmentation de la part du marché détenue par la compagnie Antofagasta. La présente thèse conclut que le Gouvernement péruvien, en proposant d'acheter l'industrie des nitrates de Tarapacá, avait un deuxième objectif à peine déguisé. Il s'agissait d'obtenir un nouveau prêt de l'étranger pour continuer la construction de la voie ferrée qui était compromise par le non-remboursement de la dette extérieure du pays en 1876. La thèse prouve aussi que la compagnie Antofagasta, ainsi que d'autres régions du Chili récemment ouvertes à l'exploitation des nitrates, estimaient que l'opération leur était extrêmement favorable. Cette dernière conclusion va à l'encontre de la notion que l'expropriation était une mesure d'intérêt national ayant des incidences négatives sur les intérêts chiliens.

Para Pepa y Pipo

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INTRODUCTION

On May 28, 1875, the Peruvian Government approved a law authorizing the Executive Branch to purchase privately-owned nitrate plants located in Tarapacá, then part of southern Perú, for a total of some £4 million. The explicit goal of the operation was to acquire all existing nitrate works in the region, placing them under the control of the Peruvian State. Although the owners of the some 165 Tarapacá nitrate plants were not legally compelled to sell their properties to the government, the scheme was known from the outset as the Peruvian expropriation. The main purpose of this work is to examine why the operation was launched, how it was implemented, and what some of its major consequences were.

The Peruvian expropriation lasted some four years. Actual plant acquisitions in Tarapacá started in 1876. The outbreak of the War of the Pacific (1879-1883), in which Chile fought against Perú and Bolivia, put an abrupt end to the operation, through the Chilean occupation of Tarapacá in November, 1879. Chile also annexed the neighbouring region of Antofagasta, part of Bolivian territory at the time, where a Chilean nitrate enterprise, the Antofagasta Company, was actively competing with the State-owned Tarapacá industry throughout the period. The War of the Pacific broke out when Bolivia, in violation of a boundary treaty, imposed an export duty on the Antofagasta Company in 1878. Perú became involved in the conflict because it was linked to Bolivia by a previous military alliance. An additional goal of this work is to document how Peruvians viewed the Antofagasta Company prior to the War of the Pacific, and how the Chilean enterprise reacted to the Peruvian expropriation.

The lack of a comprehensive study of the episode, unique in nineteenth-century Latin America, ostensibly committed to the principles of economic *laissez-faire*, hampers the understanding of several related subjects. The history of the Peruvian Guano Age (1842-1879) is incomplete without due knowledge of a major

operation which spelled the beginning of the end for the period. The relationship between Tarapacá and Antofagasta prior to 1879 is directly relevant to the origins of the War of the Pacific.

Chilean history would also benefit from a proper understanding of the expropriation. The Peruvian Government bought the nitrate plants with temporary bonds, known as the *certificados salitreros*, pledging to pay them in full when a projected foreign loan was contracted. The loan fell through, and Chile inherited, along with Tarapacá, a large number of unpaid bondholders without plants. The considerable historiography on the post-1879 evolution of the Peruvian *certificados*, accepted by Chile in payment for the matching plants to reprivatize the industry, has been crippled by the absence of information regarding the 1876-1879 history of the securities. The identity of the original recipients of the *certificados*, as well as the transactions effected with the controversial bonds prior to 1879, have been the subject of much speculation, but no actual research. After the War of the Pacific, about half of the outstanding *certificados* were exchanged for nitrate plants, the other half was paid in cash, with a heavy discount, eight years later, in 1887. The names of the 1887 bondholders have also remained unknown. Data on these developments is crucial for the study of Chilean nitrate policy in the aftermath of the war.

The available accounts of the Peruvian expropriation are merely concise articles or chapters of books dealing with larger issues related more to the history of Chile than to Perú. The most informed summaries have been based almost exclusively on the records of the British firm of Antony Gibbs and Sons, which played a leading role in the operation. However, the expropriation was, without a doubt, a purely Peruvian decision, taken in the face of widespread overseas opposition. The total neglect of Peruvian primary sources in writing about a Peruvian experience has led to a skewed view of the event. The origins, goals, and implementation of the operation have been discussed only superficially, if at all, while the position of the Gibbs firm has been thoroughly documented.

The dearth of data derived from Peruvian sources has also affected the discussion of the world market of nitrogenous fertilizers in that period, particularly the relationship between guano and nitrate. During the three years preceding the expropriation, Peruvians engaged in an extensive public debate over the eventual impact of growing nitrate exports on guano sales. Guano was considered the "national" fertilizer since most government

income came from that source. Tarapacá nitrate, barely taxed and under private control, came to be viewed as an inimical product which had to be curtailed in order to expand overseas sales of guano. The failure of the attempt at imposing a State monopoly on nitrate exports in 1873-1874, known as the *estanco*, aimed at increasing nitrate prices relative to those of guano, led to the expropriation. A high nitrate export duty, proposed along with the expropriation in 1875, was also intended to make nitrate more expensive than guano. The ostensible justification for the expropriation was in fact to restrict nitrate exports in order to make more room for guano in the world market. The protracted debate of this issue in Perú has never been studied. As a result, virtually all authors dealing with the expropriation gave little thought to what the Peruvian critics of the operation pointed out repeatedly: any attempt to curtail Tarapacá exports would be offset by larger nitrate sales from the rival Antofagasta Company. Similarly, an eventual increase in nitrate prices would only stimulate the Chilean enterprise to export more, dragging prices down in the process. The chimeric Peruvian monopoly on nitrogen, a loudly proclaimed theoretical premise for the expropriation, was applauded by most of the historiography as blindly as the contemporary supporters of the operation. A second, or hidden, agenda concealed behind the manifest goal of protecting guano was never considered. Thus, the fact that the expropriation law authorized an additional £3 million loan for public works, and that some Peruvian congressmen came to vote for the expropriation as a means of financing railroads, has received no attention.

Only part of the historiography has taken exception to the notion that the operation was intended as a "nationalization" of Tarapacá, showing that the major production contracts, or agreements to manage nominally State-owned nitrate plants, were awarded to European producers, and the monopoly of nitrate sales was granted to the Gibbs firm. Peruvian primary sources make clear that the "nationalization" rhetoric was kept to a minimum during the discussion of the expropriation, doubtlessly because it was too transparently misleading for informed contemporaries to accept it at face value. Some contemporary supporters of the expropriation, followed by part of the historiography, suggested that the operation was intended to end Chilean influence in Tarapacá, particularly Valparaíso financing. However, some Chileans were granted profitable production contracts; Chilean owners of fledging Tarapacá nitrate plants were happy to trade them for bonds; Chilean workers dismissed from Tarapacá migrated to Antofagasta; the Antofagasta Company showed spectacular profits

as its share of the world market grew in 1877-1878; and the emerging Chilean nitrate regions of Taltal and Aguas Blancas sprang to life as a result of the higher prices temporarily induced by the expropriation.

The pre-1879 history of the Antofagasta Company, partly owned by the ubiquitous Gibbs, has been outlined, rather than studied, using the British firm's records or an incomplete summary of the enterprise's manuscript correspondence. This work attempts to correct these flaws by drawing mainly from Peruvian sources to describe the expropriation, while examining the parallel evolution of the Antofagasta Company based on the complete correspondence between the local manager and the Valparaíso headquarters, only recently available in the *Archivo Nacional* in Santiago. The Gibbs records have been quoted sparingly to illustrate specific issues, particularly relating to nitrate overseas sales.

This work has been organized in two volumes; the first volume includes the account of the operation, while the second one provides the pertinent statistical information, too extensive to insert in the narrative. The account of the expropriation follows a strict chronological order, documenting first Peruvian developments, followed by concurrent Antofagasta events. Chapter 1 provides an outline of the origins of the nitrate industry up to 1869, placing particular emphasis on the growth of a world market of nitrogenous fertilizers, as well as on early technological developments in Tarapacá. Chapter 2 opens with a brief description of the contracting of the 1870 Peruvian loan, and the adoption of a new guano management system, based on the outright sale of a large volume of the fertilizer to a single foreign contractor. It also includes a review of the inflow of foreign funds into Perú, triggering a boom of new nitrate plants in Tarapacá, mainly joint-stock companies, hastily organized both in Lima and Valparaíso.

Chapter 3, besides outlining the massive 1872 Peruvian loan and the ensuing fever of railroad construction, examines the origins and the failure of the estanco. The last section describes the birth of the Antofagasta Company, including its relationship with shifting Bolivian Administrations. Chapter 4 summarizes the debate on the expropriation law, when virtually all the flaws subsequently dictating the ultimate collapse of the scheme were sharply exposed. Chapter 5 deals with the first stage of the expropriation under President Pardo, including the Peruvian default on the foreign debt; the arbitrary pricing of nitrate plants, the first production contracts and the Gibbs agreement on nitrate sales, providing for the service of the *certificados*; the

initial deliveries of nitrate bonds; and the jubilant reaction of the Antofagasta Company to the operation, correctly foreseeing higher prices, larger sales, and increased profits.

Chapter 6 covers the transition to the Prado Administration; the high quotations of the nitrate bonds in a market drained of reliable currency; the first corruption charges over plant purchases; and the emergence of the revolutionary Shanks process, which helped raise the value of unsold plants, forcing the reassessment of some enterprises. The section on Antofagasta shows that the early hopes of the company about increased profits materialized, inducing the working of new deposits to take advantage of higher prices

Chapter 7 deals with the critical year 1878. At that point, the expropriation came unravelled: Gibbs refused to continue financing nitrate sales, and servicing the nitrate bonds, due to exorbitant production contracts, and the Prado Administration had to resort to the precarious domestic banking system to supersede the British firm, through a new contract. The holders of *certificados* saw the service of the securities severely threatened. The discovery of clandestine issues of nitrate bonds to finance railroads added to the uproar over the new agreement, leading to the first formal proposal in the Peruvian Senate to repeal the expropriation law. The growing Antofagasta threat was increasingly acknowledged in Perú. The Antofagasta section describes the reaction of the company to the explosive Bolivian duty on nitrate, as well as the protracted diplomatic negotiations following the measure, which allowed continued exports, generating the higher earnings ever reported. The records of the manager of the Antofagasta Company show that the current Bolivian Prefect, General Manuel O. Jofré, forced the hiring of his son as the company's lawyer in exchange for supplying confidential reports from La Paz after his appointment as Minister of Defense.

Chapter 8 portrays the final phase of the expropriation; the failure of the domestic corporation replacing Gibbs to service the *certificados*; the steep decline in the quotation of the nitrate bonds; the views on the securities advanced in the Peruvian debate on war finance; and the Congressional repeal of the expropriation bill in February, 1879, followed by a Presidential veto and an unfinished discussion on what to do about current production contracts and outstanding *certificados*. The Antofagasta section describes the tense situation preceding the landing of Chilean troops in February, 1879. Chapter 9 summarizes the aftermath of the war in

Tarapacá, up to the final payment of the nitrate bonds in 1887, including a complete list of the recipients, and provides a critical review of the historiography on the Peruvian expropriation.

It should be noted that the "historiography" of the operation reviewed in detail in Chapter 9 amounts to little more than scattered opinions, as opposed to serious studies on the issue. These views, normally uninformed and tainted by the passionate debate on the origins of the War of the Pacific, evolved over time from an adamant rejection to a vindication of the goals, if not the implementation, of the expropriation. Early Chilean opinions on the scheme were scathing, moving the country to return the Tarapacá nitrate plants to private hands almost immediately after the war; early Peruvian opinions, while critical of the way in which the operation had been carried out, presented it as a "nationalistic" measure, exonerating President Manuel Pardo, and laying the blame at the door of President Prado. It was also intimated that, in allegedly bartering Chilean interests, the expropriation would have induced Chile to contemplate the annexation of Tarapacá. Towards the turn of the century, British predominance in the nitrate region spawned the development of an articulate Chilean group demanding State intervention to expand domestic investments in Tarapacá. This movement led to a revisionist view on the expropriation in Chile, regretting the haste with which the Peruvian Government monopoly had been undone after the war. Towards 1940-1950, in line with the increasing influence of socialist ideas, both Peruvian and Chilean authors viewed the operation as a visionary scheme, anticipating twentieth-century thinking.

The most noticeable flaw of all attempts made to evaluate the Peruvian expropriation was the neglect of the current world market for nitrogenous fertilizers, namely the actual relationship between nitrate and guano. A closer look at such issue would have shown exactly how illusory the stated goals of the operation were. The supporters of the expropriation in Perú claimed that it was possible to increase nitrate prices to a given level by restricting Tarapacá nitrate exports by a precise amount. President Manuel Pardo, and his advisors, had a key role in spreading these equivocal views in the country. As the contemporary opposition pointed out, the pertinent historical data on nitrate exports and prices was exceptionally erratic, strongly suggesting that fluctuations in supply alone did not determine nitrate prices. Furthermore, an alleged correlation between guano and nitrate was taken as an established fact, pretending that a specific increase in nitrate prices would inevitably

push consumers to switch to guano, driving both prices and sales of the latter to a higher, predictable, level. Only the superficial character of the historiography on the issue can explain that such an utterly implausible project, reminiscent not of socialism but of the contrived theories of mercantilism, widely adopted in the old Viceroyalty of Perú, could be allowed to stand for so long as a laudable undertaking, marred solely by inadequate management. The same absence of study explains the fact that a measure which so obviously favoured the Antofagasta Company, as well as other Chilean nitrate-related interests, could be viewed as an inducement to wage war on Perú.

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CHAPTER 1

THE NITRATE INDUSTRY TO 1869

1. *The Geographical Setting*

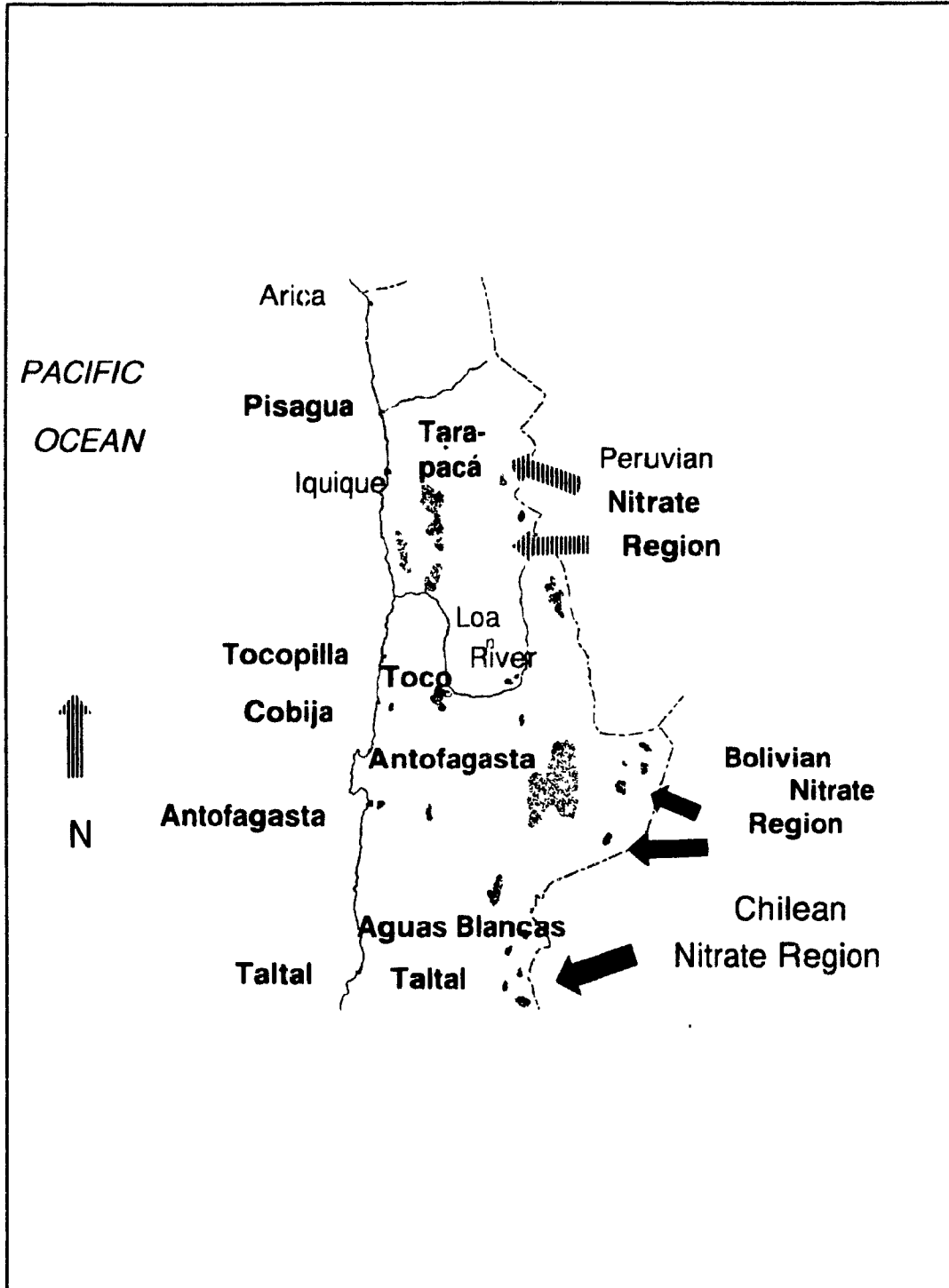
The current Chilean nitrate region lies between 19 and 26 degrees south latitude, and comprises the provinces of Tarapacá and Antofagasta. The combined area of both provinces is substantial—some 185,000 Kms², or slightly less than the entire surface of the United Kingdom.¹ The nitrate region proper, a fraction of the total area of both provinces, or some 30,000 Kms², is roughly equal in size to that of Belgium.²

The nitrate region can be divided into five distinct sections. The first section, Tarapacá, stretches from the Camarones ravine in the north to the Loa River in the south. This was the first nitrate area to be developed, and it was part of Peruvian territory until Chile occupied it in November, 1879. Two of the remaining sections, El Toco and Antofagasta proper, were under Bolivian rule until 1879, although since Bolivia

¹The size of both provinces changed in line with administrative rearrangements. Figures quoted reflect pre-1973 measurements. In 1883, the combined area of both provinces was placed at 101,695 square kilometres. Chile, Oficina Central de Estadística, *Sinopsis Estadística y Geográfica de Chile en 1883* (Santiago de Chile: Imprenta Cervantes, 1884) p. 9

²The "nitrate region proper" denotes here the surface covered by actual nitrate deposits. The 30,000 kms² estimate was made in the 1920s. Chile, Ministerio de Hacienda, Sección Salitre, *Antecedentes sobre la industria salitrera* (Santiago de Chile: Imprenta Universo, 1925) p. 7 (Quoted hereafter as Chile, *Antecedentes*). The government study estimated the nitrate deposits actually surveyed in 5,800 Kms², the exploited nitrate grounds in 550 kms²; and the unexplored nitrate deposits in 25,000 kms². The report made clear that current knowledge of the reserves was insufficient, the last survey having been made in 1908 (p. 10).

Map 1. Nitrate Region, 1870-1879



Based on Bermúdez, *Salitre*, p. 17.

lacked resources to develop nitrate enterprises in the region, Peruvians took hold of El Toco, and Chileans developed Antofagasta before the entire region was absorbed by Chile in 1879. The other two sections, Taltal and Aguas Blancas, were always part of Chilean territory and were developed from the start by Chilean capital. Each section was served by different ports (see Map 1).

In Tarapacá, the nitrate area can be divided into three distinct topographical zones: the coastal area, the central plain, and the Andes mountains. Economically, the most significant feature of the region is that the Tarapacá nitrate deposits, although found in the coastal area, are sharply separated from the ocean by a mountainous range -- the *Cordillera de la Costa* -- with an average width of some forty to eighty kilometres and an average height of 800 to 1,500 meters. Thus the nitrate beds lie behind the coastal range -- mainly in the soft eastern slopes -- making the transport of nitrate to the ports a critical problem for the industry.³ The exceptional dryness of the region explains the fact that extensive deposits of sodium nitrate are found there to the exclusion of all other countries in the world.⁴ Because of the solubility of the compound, it can only accumulate in thoroughly rainless districts.

³Geographical descriptions of the area are found in: Guillermo E. Billinghurst, *Estudio sobre la Geografía de Tarapacá (Páginas de un libro)* (Santiago de Chile: Imprenta de "El Progreso", 1886); Enrique Espinoza, *Geografía Descriptiva de la República de Chile* (Santiago de Chile: Imprenta, Litografía y Encuadernación Barcelona, 1903). In English see: J.R. Partington and L.H. Parker, *The Nitrogen Industry* 1st edition 1922 (New York: D. Van Nostrand Co., 1923) (Quoted hereafter as Partington, *Nitrogen*), (for the Antofagasta region) J. Valerie Fifer, *Bolivia: Land, Locution and Politics since 1825* (Cambridge, Eng.: Cambridge University Press, 1972); W.R. McConnell, "The nitrate industry of Chile", *Journal of Geography* 16 (1918) 211-214, and Marie McLaughlin, "The nitrate regions of Chile, Study guide for" *Journal of Geography* 31 (1932) 237-244.

⁴Sodium nitrate deposits are found in Argentina, Bolivia, Perú, Colombia, Venezuela, Spain, Hungary, Algeria, and Egypt; however, all of them were found unprofitable to mine. The largest deposits outside Chile are found in the Western United States, particularly in Amargosa Valley, California, but it was estimated in 1922 that they could be made to yield merely some 1,980 short tons of sodium nitrate. G.R. Mansfield and Leona Boardman, *Nitrate Deposits of the United States* (Geological Survey Bulletin 838) (Washington, D.C.: U.S. Government Printing Office, 1932) pp. 1-3, 8-9.

Sodium nitrate occurs predominantly in a deposit made up of five successive layers whose total width vary widely from as little as 1.5 meters to up to 12 meters⁵ The *caliche*, or nitrate-bearing ore, is found after removing the two first layers. Nitrate mining never required underground work similar to that of other mining industries. The deposits were simply blast open, and chunks of ore were further broken down and selected for transport to the refining plant. The *caliche* is composed of rough gravel cemented by sodium nitrate and other salts. Since the amount of nitrate in the *caliche* fluctuated from as much as 95 per cent to as little as 15 per cent, the relative richness of *caliche* was a basic source of cost advantages for the different operators. All the layers rest upon volcanic rocks making up the geological foundations of the coastal range.⁶

2. The World Market

Throughout its history, nitrate had two distinct applications: as a fertilizer and as a crucial ingredient in the manufacture of explosives. Other non-agricultural uses of nitrate developed in line with the expansion of chemical knowledge. However, in the nineteenth and twentieth century, agricultural consumption of nitrate was by far the most important. One official estimate placed the share of nitrate used in agriculture, prior to 1914, at some 75 to 80 percent⁷

Although the use of fertilizers in agriculture is certainly much older than the consumption of gunpowder, an international trade in explosives' components developed much earlier than a world market for manures. The material originally known as "saltpetre", used in the manufacture of the earliest form of gunpowder (i.e., "black powder"), was not Chilean nitrate in its native form, i.e., sodium nitrate, NaNO_3 , but

⁵ [Eric] Semper and Dr [sic] Michei, *La industria del salitre en Chile* (Translated and enlarged by Javier Gandarillas and Orlando Ghigliotto Salas) (Santiago de Chile: Imprenta Barcelona, 1908), pp. 8, 12, 19 (Quoted hereafter as Semper, *Industria*).

⁶ Enrique Kaempffer, *La Industria del Salitre y del Yodo, 1907-1914* (Santiago de Chile: Imprenta Cervantes, 1914) pp. 130-131 (Quoted hereafter as Kaempffer, *Industria*)

⁷ Great Britain, Ministry of Munitions and War, Inventions Department, Nitrogen Products Committee, *Final Report* (London: H.M. Stationary Office, 1929) p. 10 (Quoted hereafter as Nitrogen Committee, *Report*).

potassium nitrate, KNO_3 .⁸ The fundamental difference between both types of compounds, for the purpose of explosives manufacture, lies in their degree of deliquescence, i.e., the rate at which they become damp. Sodium nitrate takes up moisture from the air far more easily than potassium nitrate, and the only way to use the former in gunpowder manufacture was to convert it into the latter. Additional refining involved higher costs, making of potassium nitrate the preferred compound unless scarcity forced upon the producer the use of the lesser material.⁹ Another important development took place in the alkali industry of mid-nineteenth century: potassium nitrate was superseded by sodium nitrate in the production of sulphuric acid, one of the most widely used chemical compounds, drastically lowering its cost of production.¹⁰

Although the origins of fertilizer consumption are linked to the dawn of sedentary agriculture, an international market for sodium nitrate as a fertilizer did not develop until the second half of the nineteenth century. This applied to all types of fertilizers, including potash and phosphate compounds.¹¹ The three basic factors explaining this late blooming were the archaic nature of chemical knowledge concerning plant growth, the absence of a scientific approach towards farming in general, coupled with stagnant, or nonexistent, domestic

⁸For the early terms used, such as "saltpetre" and *nitrum*, see A. R. Hall, "A Note on Military Pyrotechnics" in Charles Singer *et al.*, *A History of Technology* 5 vols. (Great Britain: Oxford at the Clarendon Press, 1956-1958) 2: 374-381 (Quoted hereafter as Hall, "Pyrotechnics", and Singer, *Technology*, respectively). Arthur P. Van Gelder and Hugo Schlatter, *History of the Explosives Industry in America* (New York: Columbia University Press, 1927) p. 6 (Quoted hereafter as Van Gelder, *Explosives*)

⁹However, sodium nitrate can be used as such to manufacture a coarse type of "black powder" suitable for blasting in mining. See below p. 17.

¹⁰J.R. Partington, *The Alkali Industry* 1st edition 1918 (New York: D. Van Nostrand, 1919) p. 262; Archibald Clow and Nan L. Clow, *The Chemical Revolution: A Contribution to Social Technology* (London: The Batchworth Press, 1952), p. 147. In the index to Clow's work, Chilean nitrate was erroneously referred to as "calcium nitrate"

¹¹*Cf.* B.H. Slicher van Bath, *The Agrarian History of Western Europe, A.D. 500-1850* (London, Eng.: Edward Arnold, 1963) p. 10 (Quoted hereafter as Slicher van Bath, *History*); David B. Grigg, *The Agricultural Systems of the World. An Evolutionary Approach* (London and New York: Cambridge University Press, 1979) pp. 1, 52 (Quoted hereafter as Grigg, *Agricultural*); and James Hendrick, "The Growth of International Trade in Manures and Foods" *Transactions of The Highland and Agricultural Society of Scotland* 5th series 29 (1917) 1-36 (Quoted hereafter as Hendrick, "Trade")

and foreign trade. Up to the nineteenth century, fertilizing was done entirely by natural organic means, either by using animal manures, or "green manuring", i.e., leguminous crops. Most manure was wasted on common land¹²

In the field of agricultural chemistry, up to the eighteenth century early alchemy focused on a search for the elusive "principle of vegetation". Alchemists assumed that plants were made up of a single substance which had to be discovered in order to unlock the secret of fertilizers.¹³ Crucial advances in chemical research, including the pneumatic trough, which made possible the collection of the previously unknown gases, the discovery of oxygen and nitrogen, and the identification of the earth's atmosphere, led to a reformulation of the venerable problem of plant growth based on verifiable experimental work.¹⁴ The eminent German chemist Justus von Liebig (1803-1873) was generally considered the father of agricultural chemistry, on the strength of a classical work, first published in 1840.¹⁵ However, Liebig held fast to the notion that plants drew nitrogen, as well as carbon, directly from the atmosphere in the form of ammonia. This major flaw ruled out the importance of soil nitrogen for plant growth, and thus of all nitrogenous fertilizers, including sodium nitrate.¹⁶

¹²Grigg, *Agricultural*, p. 162, Hendrick, "Trade", p. 1-2, Slicher van Bath, *History*, p. 10-11.

¹³Samuel L. Tisdale, *Soil Fertility and Fertilizers* (New York: McMillan, 1956), p. 13 (Quoted hereafter as Tisdale, *Fertilizers*); Aaron J. Ihde, *The Development of Modern Chemistry* (New York: Harper and Row, 1964) p. 421 (Quoted hereafter as Ihde, *Chemistry*)

¹⁴Ihde, *Chemistry*, pp. 32-34, 38, Margaret W. Rossiter, *The Emergence of Agricultural Science: Justus Liebig and the Americans, 1840-1880* (New Haven and London, Eng.: Yale University Press, 1975) pp. 11, 13 (Quoted hereafter as Rossiter, *Liebig*)

¹⁵Justus von Liebig, *Organic Chemistry in Its Application to Agriculture and Physiology* (London: Playfair, 1840). The discussion of Liebig's role in the evolution of nitrate consumption as a fertilizer included in Bermúdez is severely flawed. Oscar Bermúdez, *Historia del Salitre desde sus orígenes hasta la guerra del Pacífico* (Santiago de Chile: Ediciones de la Universidad de Chile, 1963) pp. 156-157 (Quoted hereafter as Bermúdez, *Salitre*)

¹⁶Liebig gradually dismissed soil nitrogen in successive editions of his book on the subject, taking a definitive stance against it in the 1843 edition. Rossiter, *Liebig*, pp. 27-28, 41-42. Cf. also, F.R. Moulton(ed.) (continued...)

More important (and accurate) for nitrate consumption, was the work of Theodore de Saussure and Jean-Baptiste Boussingault (1802-1887), proving the vital impact of soil nitrogen on plant growth¹⁷ The exceptional research of the British scientist John Bennet Lawes (1814-1900) at the agricultural experimental station in Rothamstead, England, established unequivocally the importance of soil nitrogen for non leguminous plants, by careful measurements The comparative chemical composition and advantages of different types of fertilizers, including nitrate, were properly quantified¹⁸

However, in the long term, the development of a truly scientific agricultural chemistry was a mixed blessing for nitrate. Besides showing the qualities of sodium nitrate as a fertilizer, chemical research also disclosed a vast range of alternative sources of nitrogen. Nitrogen was detected, *inter alia*, in the earth's atmosphere (by far the richest source),¹⁹ and, more importantly, in coal. An estimate made in the mid-1880s noted that the nitrogen contained in the current production of coal was some 100 times that of the output of sodium nitrate used in agriculture²⁰ Although "fixing" atmospheric nitrogen economically was not a real threat for nitrate until the First World War, the production of sulphate of ammonia, a by-product recovered from

¹⁶(...continued)

Liebig and after Liebig (Washington, D.C.: American Association for the Advancement of Science, 1942)

¹⁷Richard P. Aulic, "Boussingault and the Nitrogen Cycle" *Proceedings of the American Philosophical Society*, 114(1970) 453-479; Tisdale, *Fertilizers*, pp. 14-15; Ihde, *Chemistry*, p. 422

¹⁸Sir John E. Russell, "Rothamstead and Its Experimental Station" *Agricultural History* 16(1942) 161-183, Tisdale, *Fertilizers*, p. 16 Lawes published regular reports on his findings in the *The Journal of the Royal Agricultural Society*.

¹⁹Air hovering over a single square mile of land contains some 20 million tons of nitrogen Nitrogen Committee, *Report*, p.5.

²⁰George Lunge, *Coal-tar and Ammonia. Being the second and enlarged Edition of A treatise on the Distillation of Coal-tar and Ammoniacal Liquour* (London. Gurney and Jackson, 1887) p. 540 (Quoted hereafter as Lunge, *Coal-tar*).

matters of organic origin, including coal, was undertaken simultaneously with the development of nitrate.²¹ This meant that nitrate would eventually face a formidable competition from the manufacturers of pig iron with raw coal, metallurgical coke, illuminating gas, and power gas.²² Ammonium salts were first applied as fertilizers as early as 1840, and the Rothamstead experiments determined that sulphate of ammonia was the most suitable of them for agricultural use.²³ The compound also appeared in the list of traded manures in the Southern United States *circa* 1848.²⁴ However, during most of the nineteenth century, sulphate of ammonia was used sparingly in agriculture, mainly because a cost-efficient recovery process depended on the replacement of currently inadequate coke ovens.²⁵ Sulphate of ammonia was also blocked by the price of other nitrogenous fertilizers, including guano and nitrate, a barrier which in fact placed an implicit ceiling on price increases on the latter: higher prices on competing manures implied opening the door to artificial substitutes such as sulphate of ammonia.²⁶

In clarifying the process of plant growth, including soil requirements, chemical research actually defined three separate fertilizer markets: nitrogenous, phosphatic, and potash-based manures. These three different types of fertilizers did not compete among themselves. Soil science helped determine which crops and what land

²¹Lunge, *Coal-tar*, pp.540-541.

²²Partington, *Nitrogen*, p.85.

²³Hendrick, "Trade", pp. 5, 10.

²⁴W.T. Jordan, "The Peruvian Guano Gospel in the Old South" *Agricultural History* 24 (1950) pp. 211-221 (Quoted hereafter as Jordan, "Guano").

²⁵Watson Smith, "The Earliest records of methods for the coking of coal in coke ovens for metallurgical purposes with recovery of the tar and ammonia" *Journal of the Society of the Chemical Industry* 3 (1884) 601-605; Lunge, *Coal-tar*, p.539.

²⁶George W. Stocking and Myron W. Watkins, *Cartels in Action. Case Studies in International Business Diplomacy* (New York: The Twentieth Century Fund, 1946) pp. 148-149.

required specific types of fertilizers. Coupled with the development of a global trade and transport network, chemistry opened the way for the rise of the Tarapacá nitrate industry in the mid-nineteenth century as a supplier of a major nitrogenous manure.

3. *The Tarapacá Nitrate Industry to 1869*

From the colonial period and up to 1869, the Tarapacá nitrate industry went through three distinct stages. Each stage was marked by the use of a different nitrate-processing technology. All phases introduced an improved and larger vat, the core of all nitrate-refining plants, coupled with a more efficient heating system. However, the essential chemical principle on which all refining methods were based was identical. Basically, sodium nitrate could be extracted from the *caliche* ore because, at high temperatures (i.e., at about the boiling point of water), sodium nitrate is much more soluble than common salt (sodium chloride) -- and certainly more soluble than the rest of the solid substances making up the *caliche*.²⁷ Thus, by heating the *caliche* mixed with water and mother liquor (i.e, the residual liquid left over from prior operations) an effective separation of sodium nitrate from the less soluble substances in the ore could be brought about. When the solution made up of sodium nitrate, water, and mother liquor was run off from the dissolving tank, cooled, and allowed to crystallize, it deposited, as crystal, almost pure sodium nitrate, with little or no common salt. Sodium nitrate was in effect "washed out of" the *caliche* ore, then "crystallized out of" the resulting solution. The "washing out" could also be effected with cold or tepid water, although it took longer to obtain a concentrated solution, heat was saved at the expense of time.²⁸

²⁷The clearest explanations of this basic principle are found in: B. Donald, "History of the Chilean Nitrate Industry" *Annals of Science* (1936) 1: 29-47; 2: 193-216 (Quoted hereafter as Donald, "Nitrate"); I.B. Hobsbawm and J.L. Grigioni, "Production of Nitrate in Chile -- Past, Present and Future" *Journal of the Society of Chemical Industry* 36 (1917) p. 53 (Quoted hereafter as Hobsbawm, "Nitrate").

²⁸E.I. Hobsbawm, "Observaciones sobre la técnica salitrera" *Caliche*, no. 9 (December, 1919) 335-346, and no. 10 (January 1920) 335-336 (Quoted hereafter as Hobsbawm, "Observaciones")

During the first phase of the Tarapacá nitrate industry, spanning the whole of the colonial period up to 1810, nitrate was extracted from the *caliche* ore by means of a rudimentary "Indian pan" method. Crushed *caliche* mixed with water was placed in the same copper pans used in silver mines, and heated by using local wood. It took considerable time and fuel to dissolve the mixture. The resulting solution, already saturated by nitrate, was transferred to a second container where residual matter (basically *borra*, a slimy liquid residue, and common salt) was allowed to settle down. After the settling of impurities, the solution was transferred to a third container where sodium nitrate crystallized while cooling. Transfers of the solution were made manually, by means of large wooden spoons.²⁹ The resulting product was used to produce a coarse "black powder", unsuitable for military applications but adequate for blasting ore in mining operations.³⁰ No estimates of nitrate output for the colonial period exist. The product was only applied and traded locally for mining operations.

The second phase of the Tarapacá nitrate industry was dominated by the *paradas* system, introduced in the region *circa* 1810.³¹ In that date, Thadeus Haenke (1761-1817), a German scientist residing in Bolivia, allegedly supplied a viable method to convert sodium nitrate into potassium nitrate.³² The formula presumably taught by Haenke consisted in adding a solution prepared from burnt cactus which contained some 80 per cent

²⁹Bermúdez, *Salitre*, p. 415.

³⁰William Bollaert, *Antiquarian; Ethnological and other Researches in New Granada, Equador, Peru and Chile, with observations on the Pre-incarial, and other Monuments of Peruvian Nations* (London: Trubner and Co., 1860) pp. 238-239 (Quoted hereafter as Bollaert, *Antiquarian*); Kaempffer, *Industria*, p. 134.

³¹For a discussion on the possible origin of the term, see: Bermúdez, *Salitre*, pp. 415-416.

³²Kaempffer, *Industria*, pp. 171-172; Donald, "Nitrate", 38-39 ; Hosbawm, "Nitrate", pp. 52-63; Bermúdez, *Salitre*, p. 57. There is no agreement about the veritable role of Haenke in introducing the first relatively efficient method of processing *caliche*. All the authors quoted in this note, with the exception of Bermúdez, credited Haenke with the "invention" of the *paradas* system. So did Roberto Hernández, *El Salitre. Resumen histórico desde su descubrimiento y explotación* (Valparaíso: Fisher Hermanos, 1930) pp. 12-15 (Quoted hereafter as Hernández, *Salitre*), and Chile, *Antecedentes*, p. 8.

potash to sodium nitrate.³³ That would have provided a final product suitable (in conjunction with sulphur and charcoal) for military needs. The *paradas* system improved upon the "Indian pan" method of the colonial era by substituting a pair of cone-shaped vessels made of wrought iron (or *fondos*) for the archaic copper pan, and by placing the *fondos* on top of a furnace. Two vats were heated by one furnace, using two lateral chimneys and placing each tank between the furnace and one of the chimneys.³⁴

The introduction of the conversion formula in Tarapacá gave rise to a first nitrate boom, albeit of very limited proportions. The boom lasted from 1810 to about 1820, coinciding with the Wars of Independence in the area.³⁵ Some 7 or 8 nitrate-producing operations were open between 1810 and 1812 in Tarapacá; production came to a halt around 1820, when the Viceroyalty of Peru was no longer able to command sea routes.³⁶ Operations were resumed some ten years later, and during the first two decades of renewed *paradas*' operations in Tarapacá, nitrate exports grew from 850 tons in 1830 to some 24,000 tons in 1850; the number of ships engaged in the nitrate trade increased twenty-fold from 4 in 1830 to over 80 in 1850 (see Table 1.1). The *paradas* system proved adequate for these modest levels of output.

³³Bollaert, *Antiquarian*, p. 267.

³⁴Francisco Puelma, "Apuntes Geológicos y Geográficos sobre Tarapacá en el Perú, acompañados de una ligera noticia sobre la explotación del Nitrato de Sodio" *Anales de la Universidad de Chile* 12(1855) 670-671 (Quoted hereafter as Puelma, "Apuntes"); Kaempffer, *Industria*, p. 172.

³⁵F. Crouzet, *L'économie britannique et le blocus continental* 2 vols. (Paris: Presses Universitaires de France, 1958) 2: 184-185. For Perú during this troubled period see: Heraclio Bonilla, *Un siglo a la deriva. Estudios sobre el Perú, Bolivia y la guerra* (Lima: Instituto de Estudios Peruanos, 1982) (Quoted hereafter as Bonilla, *Un siglo*).

³⁶Kaempffer, *Industria*, p. 173; Semper, *Industria*, p. 134.

Table 1.1

*Tarapacá Nitrate Exports, Ships,
and Prices, 1830 1863*

Year	(1) Tarapacá Exports (Sp.Q.)	(2) Tarapacá Exports (M.Tons)*	(3) No.Ships Exports Tarapacá	(4) Price (Sh.d./ cwt/UK)
1830	18,700	850	4	
1831	40,385	1,836	12	
1832	52,500	2,386	15	
1833	92,700	4,214	26	
1834	147,800	6,718	36	
1835	140,399	6,382	39	
1836	158,534	7,206	45	
1837	155,369	7,062	38	
1838	120,610	5,482	39	
1839	140,567	6,389	36	
1840	227,362	10,335	4	
1841	278,488	12,659	52	
1842	359,918	16,360	65	
1843	369,317	16,787	67	
1844	380,191	17,281	74	
1845	376,239	17,102	70	
1846	391,149	17,780	66	
1847	383,197	17,418	60	
1848	485,189	22,054	75	
1849	430,102	19,550	69	
1850	511,845	23,266	81	
1851	699,406	31,791	89	14.3
1852	562,989	25,590	95	15.9
1853	860,244	39,102	124	18.3
1854	720,465	32,748	161	18
1855	923,800	41,991	121	18
1856	817,600	37,164	98	18.6
1857	1,196,830	54,401	123	18
1858	1,210,240	55,011	124	15
1859	1,321,240	60,056	141	15.3
1860	1,376,248	62,557	120	12.6
1861	1,358,691	61,759	118	13.9
1862	1,829,017	83,137	147	12.9
1863	1,540,963	70,044	147	14.6
1864	1,695,587	77,072	168	15.3
1865	1,441,459	65,521	211	13

*Computed by the author.

Source: (1)-(3) *El Veintiuno de Mayo* (Iquique),
14-May-1884.

(4) Hernández, *Salitre*, p.69.

In this period, nitrate production and sales were financed largely out of Valparaíso, Chile's main port. Valparaíso enjoyed both a geographical edge due to a superior location for vessels taking the Cape Horn route to the West coast of South America,³⁷ and an economic advantage derived from the early political stability of Chile.³⁸ Valparaíso, rather than Arica or Callao, became the key buying and selling centre for nitrate. The port was also the financial hub from which capital was sought to establish or expand nitrate ventures, regardless of the fact that the nitrate deposits developed at the time were located in Peruvian and Bolivian territory.

Nitrate was marketed through a growing chain of merchant firms established in Valparaíso.³⁹ Perhaps the most important merchant firm for the history of Chilean nitrate was the Valparaíso branch of the British house of Antony Gibbs and Sons, established in 1825. The founder of the firm, Antony Gibbs (1756-1815) had died at the time, and the expansion of the House of Gibbs into independent Spanish America was presided over first by William Gibbs, and subsequently by Henry Hucks Gibbs (1819-1907), later first Baron of Aldenham. The firm first imported nitrate into England in 1835 --three parcels worth £4 000-- and repeated the operation in 1838-1839.⁴⁰ Gibbs had chosen Lima, Perú, as the site for its first South American branch in 1822, and at

³⁷The old Panama trail involved transporting goods by land since no canal existed at the time. Malaria was a crucial disadvantage for the Panama route. Walter LaFeber, *The Panama Canal. The Crisis in Historical Perspective* (New York: Oxford University Press, 1979) pp. 13-15.

³⁸For a recent review of the literature on the period, see: Simon Collier, "Historiography of the Portalian period (1831-1891) in Chile" *Hispanic American Historical Review* 57 (1977) 660-690.

³⁹Marthe Barbance, *Vie commerciale de la route du Cap Horn au XIXe siècle. L'armement A.-D. Bordes et fils* (Paris: S.E.V.P.E.N., 1969) p. 63 (Quoted hereafter as Barbance, *Bordes*).

⁴⁰John Arthur Gibbs, *The History of Antony and Dorothea Gibbs and of other Contemporary Relatives, including the History of the Origins and Early Years of the House of Antony Gibbs and Sons* (London: The Saint Catherine Press, 1922) p. 387, note 4 (Quoted hereafter as Gibbs, *Gibbs*). Cf also Wilfred Maude, *Antony Gibbs and Sons Limited. Merchants and Bankers, 1808-1958* (London: The Millbrook Press, 1958) (Quoted hereafter as Maude, *Gibbs*).

least for the first fifty years of the nitrate trade the Peruvian operations, chiefly guano, took precedence over all other regional line of business of the British firm.⁴¹

The third period of the Tarapacá nitrate industry was marked by the advent of steam. The Crimean War (1853-1857) spurred an increased demand for explosives, and in response to dwindling supplies of potassium nitrate from India, German chemists invented a "conversion nitrate", using sodium nitrate in conjunction with potassium chloride.⁴² In the United States, the Dupont company, responding to the same incentive, also devised a method to substitute economically sodium nitrate for the traditional Indian potassium nitrate.⁴³ The efforts to meet the enlarged world market for sodium nitrate stretched the resources of the archaic *paradas* system to its physical limits, highlighting flaws which were less apparent at lower levels of output. Prices for all inputs required to manufacture sodium nitrate, particularly fuel, were driven to speculative levels in the early 1850s.⁴⁴ Imports of coal to supersede a shrinking supply of local wood had a major impact on the industry since it was estimated that the freight charges for coal from the coast to the plants doubled the price of sodium nitrate at point of export.⁴⁵

⁴¹Cf. W.M. Mathew, *The House of Gibbs and the Peruvian Guano Monopoly* (London: Royal Historical Society, 1981) (Quoted hereafter as Mathew, *Gibbs*).

⁴²Alberto Herrmann, *La producción en Chile de los metales i minerales más importantes, de las sales naturales, del azufre i del guano desde la Conquista hasta fines del año 1902* (Santiago: Imprenta, Litografía y Encuadernación Barcelona, 1903), p. 69; José Gassiot Llorens, *La lucha por los nitratos* (Barcelona: Seix y Barral, 1949).

⁴³Alfred D. Chandler, Jr., and Stephen Salsbury, *Pierre S. Du Pont and the Making of the Modern Corporation* (New York: Harper and Row, 1971) p. 6; Van Gelder, *Explosives*, p. 118; Bessie G. DuPont, *E.I. du Pont de Nemours and Company. A History, 1802-1902* (Boston: Houghton Mifflin, The Riverside Press, 1920), p. 80.

⁴⁴Manuel Antonio Prieto, "Explotación y beneficio del salitre y yodo" *Anales de la Universidad de Chile* 73(1888) p.342 (Quoted hereafter as Prieto, "Explotación"); Bermúdez, *Salitre*, p. 151.

⁴⁵Prieto, "Explotación", pp. 341-342.

In order to expand operations efficiently, Pedro Gamboni (1825-1895), a Chilean entrepreneur, developed the first viable alternative to the old *paradas* system⁴⁶. The novel method gave rise to new *oficinas de máquina*, or "mechanized plants", gradually transforming the nitrate industry⁴⁷. The Gamboni breakthrough, known as *vapor directo*, or "direct steam", was based on the heating of the ore on a tank considerably larger than the old *fondos*. The *fondos* of the *paradas* system had a capacity of about 1.2 metric tons each, while the new Gamboni vat--20 feet long, 6 feet wide and 6 feet deep-- could hold some 22 metric tons of ore, capacity being thus increased twenty five times. The new dissolving vat was named *cachucho*, a term lasting for the entire life of the industry. In order to heat economically the new, enormous tank, an impossible task with the archaic "direct-fire" furnace, Gamboni adapted steam-generating Cornish boilers. Approximately at the same time, steam crushers were introduced to replace manual crushing. Steam pumps were adopted to transfer the mother liquor from the lower-level crystallizing tanks to the dissolving vats of the upper level⁴⁸.

Of course, the most important advantage of the new refining system was the dramatic increase in capacity of the dissolving tank. An *oficina de máquina* endowed with two of the novel *cachuchos* was able to process over 66,000 tons of ore per annum against the meagre 2,600 tons of the two *fondos* of the *paradas* system, or 25 times more ore. Indeed, final nitrate output from the *oficinas de máquina* (i.e., after discounting losses in processing) could reach over 20,000 tons per annum as opposed to less than 800 tons for the *paradas*. Furthermore, since the increased efficiency of the heating method adopted allowed four batch operations per

⁴⁶Kaempffer, *Industria*, p. 183; Bermúdez, *Salitre*, pp. 139-141. Information regarding Gamboni is scarce, not only is there no biography of Gamboni, but his name does not figure in a single biographical dictionary (Hernández, *Salitre*, p. 55).

⁴⁷The best description of the Gamboni plant was supplied by Prieto ("Explotación", pp. 342-344), all subsequent authors dealing with the subject borrowed heavily from this account.

⁴⁸No precise date was given for these ancillary innovations. Prieto, "Explotación", pp. 342-343

day, as opposed to three under the *paradas*, total nitrate output of the new steam system was 26 times larger than that of the *paradas*.⁴⁹

Very little is known about the characteristics of the first *máquinas* erected in Tarapacá. Indeed only nine *máquinas* were built in the nitrate region in the seventeen years following Gamboni's invention (see Table 2.1), and only two patents were registered in Chile during the same period, both without precise explanations.⁵⁰ Of course, the very fact that, up to 1870, only seven *máquinas* could meet current demand might by itself explain the limited number of new plants established during the period.

⁴⁹Estimates made by the author, on the basis of data supplied by Prieto, "Explotación", and Santiago [James] Humberstone, "Historia de la técnica salitrera en Chile" in: R. Urzúa (editor), *La Semana del Salitre* (Santiago: Editorial Universitaria, 1926) (Quoted hereafter as Humberstone, "Historia"). James Humberstone was the inventor of the Shanks process which totally transformed the nitrate industry *circa* 1875-1876. See below pp. 222-224.

⁵⁰The list of early patents was published in *Caliche* 1 (April 1919) no. 1, p.25.

Table 2.1

*First Steam Plants,
Tarapacá, 1853-1863*

Year	Plant	Owner	District
1853	n.a.(1)	n.a.	Sal de Obispo
1854(?)	Sebastopol	F. Gamboni	n.a.
1855(?)	San Pedro(2)	n.a.	Cocina
1856	La Nueva Noria(3)	G. Smith	La Noria
1857	Hanza	F. Corssen	Cocina
n.a.	Salar	F. Freuraut	La Noria
n.a.	China	D. Figueroa	La Noria
n.a.	Victoria(4)	Soruco & Co.	Sal de Obispo
1863(?)	Carolina	G. Smith	Sal de Obispo
(1)Gamboni's prototype. (2)Third steam plant established by Gamboni (3)Later renamed "Limeña" (4)Valparaíso financing.			

Source: Billingham, *Capitales*, p. 14;
Bermúdez, *Salitre*, p. 168.

The new system created a division between weak and strong plants, between high-cost producers and low-cost producers, which grew sharper with the subsequent evolution of the nitrate industry. However, during the first seventeen years following the introduction of steam in the nitrate region the new *máquinas* remained merely a latent threat to the *paradas*; both systems appeared to have coexisted without friction during this period.⁵¹

Possibly the most important event at the end of the first phase of the steam age in the nitrate region was the establishment of the first joint-stock company in the industry, the *Compañía de Salitres de Tarapacá*, on November 8, 1865. George Smith, who constructed the two most important nitrate plants of the period (see Table 2.1), retired in 1865.⁵² Gibbs had financed the construction of "Carolina", and in 1865 the British firm took over Smith's plants, establishing a joint-stock company on that basis. The *Compañía de Salitres de*

⁵¹There are no figures available regarding output or exports per plant in Tarapacá up to 1879.

⁵²For Smith see Bollaert, *Antiquarian*, pp. 267-268.

Tarapacá was organized with a capital of 450,000 Peruvian *soles* (roughly equal in value to current U.S. dollars), divided in 12 shares of 37,500 *soles* each. Smith was given three shares, valued at 112,500 *soles* while "Guillermo Gibbs y Cía", the name of the Lima branch of Antony Gibbs and Co., and Melbourne Clarke, held the rest of the shares.⁵³ The new company had a lasting impact in the evolution of the nitrate industry, representing a new phase for the Gibbs House. However, it was increasingly evident at the time that the more the nitrate industry developed, the greater the interest of the governments with a hold on the region. This was particularly true of the Peruvian Government whose finances became dramatically dependent at the time on the future of guano, a competitor of sodium nitrate in the world market.

4. Peruvian Guano and Finances

Guano became the foundation of Perú's public finance since 1840. The fertilizer is actually bird dung from a gull-like species, the *guanay*, accumulating in a string of islands on the Peruvian coast. The Spaniards during the three centuries of colonial rule abandoned the fertilizing practices of the Incas, based on guano, and unwittingly built up massive reserves of *guanay* dung.⁵⁴ In discovering the value of guano in European markets, around 1840, the Peruvian Government chose to exploit the product by means of consignment agreements. Basically, the consignment system consisted in granting specific merchants the exclusive right to sell guano to one or more overseas markets. The Peruvian Government, as the legal owner of the product, shared in the eventual profits or losses of every sale. The contractors financed all intermediate costs, and received a commission on gross sales proceeds. The Peruvian Government adopted the hazardous policy of requiring the

⁵³Hernández, *Salitre*, p. 167; Bermúdez, *Salitre*, pp. 150-159, 169, 172.

⁵⁴Emilio Romero, *Historia Económica del Perú* (Buenos Aires; Editorial Sudamericana, 1949), pp. 30, 40, 358 (Quoted hereafter as Romero, *Historia*); Emilio Romero, *Perú: Una nueva geografía* 2 vols. (Lima: Librería Studium, n.d. 1978) 1:37, 38, 44, 48-53, 73-74, 76-79, 80-82 (Quoted hereafter as Romero, *Geografía*). An extensive bibliography on the subject is included at the end of the second volume of this comprehensive study Cf also R.C. Murphy, *Bird Islands of Peru* (New York: G.P. Putnam's Sons, 1925).

guano contractors to supply interest-bearing cash advances in anticipation of future (an uncertain) sales.⁵⁵ In addition, after 1841 a fixed percentage of guano income was slated to pay the country's foreign debt. Thus, the claims of an articulate and influential group of British bondholders competed with the demands of guano contractors, most of whom were originally Peruvian nationals.⁵⁶ In 1849, the conflict was temporarily settled by granting the control of guano sales to the British firm of Antony Gibbs and Sons.⁵⁷ However, in 1862, the *nacionales* succeeded in wresting the control of guano from the British firm, but did not develop their own marketing network, relying on foreign agents for overseas sales, this made the "nationalization" scheme somewhat illusory.⁵⁸

The *nacionales*, headed by Manuel Pardo (1834-1878), were increasingly blamed for the mismanagement of guano;⁵⁹ the group was charged with taking advantage of the financial problems of the Peruvian State, lending funds to the government at usurious rates, more noticeably during a brief war with Spain

⁵⁵Emilio Dancuart and J.M. Rodríguez, *Anales de la Hacienda Pública del Perú* 19 vols. (Lima. Librería e imprenta Gil, 1902-1926) 3:104 (Quoted hereafter as Dancuart, *Anales*), José M Rodríguez Montoya, "Historia de los contratos del guano y sus efectos en las finanzas del Perú" *Economista Peruano*, 6(1921) 85-129 (Quoted hereafter as Rodríguez, "Historia"); Romero, *Historia*, p. 361; Jorge Basadre, *Historia de la República del Perú* 17 vols. (Lima: Editorial Universitaria, 1963-1969) 3:147-165 (Quoted hereafter as Basadre, *Historia*), J.V. Levin, *The Export Economies* (Cambridge, Mass.: Harvard University Press, 1960) p. 52 (Quoted hereafter as Levin, *Export*); Heraclio Bonilla, *Guano y Burguesía en el Perú* (Lima: Instituto de Estudios Peruanos, 1974) p. 32 (Quoted hereafter as Bonilla, *Guano*), W.M. Mathew, "Foreign Contractors and the Peruvian Government at the Outset of the Guano Trade" *Hispanic American Historical Review* 52 (1972) 598-620; and, more recently, Mathew, *Gibbs*, pp. 25-30

⁵⁶W.M. Mathew, "The First Anglo-Peruvian Debt and Its Settlement, 1822-49" *Journal of Latin American Studies* 2 (1970) 81-98.

⁵⁷Text of the contract in Dancuart, *Anales*, 4: 34-38.

⁵⁸Charles McQueen, *Peruvian Public Finance* (Washington, D.C.: Government Printing Office, 1926) p. 6 (Quoted hereafter as McQueen, *Peruvian Finance*); Levin, *Export*, pp. 67-68

⁵⁹Evaristo San Cristóbal, *Manuel Pardo y Lavalle su vida y su obra* (Lima: Imprenta Gil, 1945) pp. 71-72 (Quoted hereafter as San Cristóbal, *Pardo*).

in 1865.⁶⁰ More importantly, in driving up guano prices, the system vexed overseas consumers, stimulating the search for viable substitutes.⁶¹

Nothing like an investment strategy for guano income was devised during the first ten years of the guano trade, but in 1850 President Ramón Castilla pushed through the Peruvian Congress a law known as the *Consolidación*, or consolidation, ostensibly aimed at paying up all outstanding local claims against the government, including unspecified damages inflicted during the protracted War of Independence. The unseemly scramble for payments spawned by the Consolidation Law tarnished the image of the country in the eyes of foreign investors. A subsequent military coup by José Rufino Echenique in 1851, sponsoring the demands of disaffected creditors excluded by Castilla, managed to transform the consolidation payments, originally paid in domestic bonds, into foreign bonds sold in London. A sweeping budget reform effected in 1854, including the abolition of slavery, further increased the government's debt through compensatory payments to slave-owners, while virtually eliminating all internal taxation; it made the Peruvian Government entirely dependent on guano income. In staging a successful return to power in 1855, Castilla recognized additional claims of his supporters. The combined operations of the two struggling factions managed to saddle Perú with a foreign debt of £2.6 million and an internal debt of 7 million *pesos* by 1855.⁶²

⁶⁰According to Bonilla, the company lent 1 million *soles* to the Peruvian Government, crippled by emergency war spending, at exorbitant rates. Bonilla, *Guano*, pp. 41-43.

⁶¹The case against the system was made at the time, *inter alia*, by the Peruvian politician Luis Benjamín Cisneros, "Ensayo sobre varias cuestiones económicas del Perú" (1866) in: Luis Benjamín Cisneros, *Obras Completas*, 3 vols. (Lima: Librería e Imprenta Gil, 1939) 3. 106-139 (Quoted hereafter as Cisneros, *Obras*); and more recently, Levin, *Export*, pp.71, 73, note 138. Mathews took exception with Levin's views, particularly with respect to Gibbs' role prior to 1862, he noted that the charges against Gibbs came from Peruvian groups who had a vested interest in discrediting the British firm in order to regain control of the guano trade (*Gibbs*, pp. 338-339 *et passim*)

⁶²McQueen, *Peruvian Finance*, p. 86. For the "consolidations" see: Dancuart, *Anales*, 5: 27-28, 44-45; 6: 65; 7. 106, Romero, *Historia*, p. 337; Henry E. Dobyns and Paul L. Doughty, *Peru. A Cultural History* (New York: Oxford University Press, 1976) p. 160 (Quoted hereafter as Dobyns, *Perú*); and Pedro Dávalos y Lisson, *La Primera Centuria* 4 vols. (Lima: Librería e Imprenta Gil, 1919-1926) 4:71-72 (Quoted hereafter as Dávalos, *Centuria*)

The combined impact of the internal strife over contracts, and the periodic clashes with British bondholders, sowed havoc in overseas markets. The initial honeymoon of the 1840s, when guano was hailed as an almost miraculous manure,⁶³ gave way to a growing concern regarding the Peruvian Government's handling of the fertilizer. In Great Britain, the problem of guano was compounded by a conflict between local bondholders and farmers; it was feared that the interests of the former were met at the expense of higher guano prices paid by the latter.⁶⁴ The farmers' anxiety about the monopolistic practices of guano contractors was echoed by important British politicians, the Royal Agricultural Society offered a reward for an acceptable substitute for guano in 1852; and, in the same year, irate British farmers unsuccessfully demanded that the British Government simply take over the Lobos Islands off the Peruvian coast.⁶⁵

In the United States, as guano prices climbed steadily from \$45 a ton in the 1840s to \$70 a ton in the 1860s, pressure from the Southern farmers translated into strongly worded statements by President Millard Fillmore at the end of 1850; in an Act of Congress in 1856 the United States offered to annex any unclaimed guano island, and subsequently some 60 to 70 guano islands came under temporary ownership of the country, and dozens of substitute fertilizers sprang up in the United States in the 1840s and 1850s, giving rise to a "mixed fertilizer" industry which grew to over 300 plants by the mid-1870s, shrinking imports of Peruvian guano into

⁶³For the impact of guano in the United States, see: W.T. Jordan, "The Peruvian Guano Gospel in the Old South" *Agricultural History* 24 (1950) pp. 211-221 (Quoted hereafter as Jordan, "Guano"), R.H. Taylor, "The Sale and Application of Commercial Fertilizers in the South Atlantic States to 1900" *Agricultural History* 21 (1947) pp. 46-52 (Quoted hereafter as Taylor, "Fertilizers"); for Great Britain, see Mathews, *Gibbs*, p. 47

⁶⁴Levin, *Exports*, p.76.

⁶⁵Mathew, *Gibbs*, p. 159; Jordan, "Guano", p.212; Leland H. Jenks, *The Migration of British Capital to 1875* (London: Thomas Nelson and Sons Ltd., 1963) pp. 328-329 (Quoted hereafter as Jenks, *Migration*)

the country.⁶⁶ The French Government resorted to differential duties on Peruvian guano as a means of pressuring Perú into lowering guano prices.⁶⁷

As shown in Table 3.1, in spite of the unrest in foreign markets, guano exports grew steadily in the 1840s, somewhat irregularly in the 1850s, and spectacularly in the 1860s.⁶⁸ By 1869, guano exports had reached an unprecedented level of over 580,000 tons, yielding an estimated total gross income of some £7.6 million. The product covered over 70 percent of total government expenses, almost 50 percent of the expenditures were slated to pay military salaries and equipment.⁶⁹ The increase in guano revenue in the 1860s should have vastly improved the economic position of the country but it had the opposite effect. The guano consignees were always creditors of the government, and at the end of 1861 Perú had an internal floating debt of some 13 million pesos⁷⁰, most of which represented debts to contractors.⁷¹

⁶⁶Lewis C. Gray, *History of Agriculture in the Southern United States to 1860* 2 vols. (Washington, D.C.: The Carnegie Institution of Washington, 1933) 2: 806; United States, *Congressional Globe*, 2-Dec-1850, 23: 2; United States, *Senate Executive Document No. 59* (31st Congress, 1st Session), p. 7; Levin, *Export*, p. 75; Jordan, "Guano", p. 213; Taylor, "Southern", pp. 50-51; the estimate on the total number of "mixed fertilizers" factories in the United States was supplied by Deputy D.J.M. González in: Perú, *DE 1875*, 14-Mar-1875, p. 239.

⁶⁷Dancuart, *Anales*, 6: 150.

⁶⁸Figures for guano exports should be taken with caution, since the parcelling out of markets between a variable number of contractors muddled the pertinent statistics.

⁶⁹Figures for the 1859 budget provided by McQueen, *Peruvian Finance*, p. 37.

⁷⁰Government budgets were computed in silver *soles* only since 1869, after a monetary reform. McQueen, *Peruvian Finance*, p. 36, Table.

⁷¹McQueen, *Peruvian Finance*, p. 38.

Table 3.1

*Guano Exports, Prices,
and Income, 1843-1869*

Year	(1) Guano Exports (a)	(2) Price Guano (b)	(3) Total Income (c)
1843	1,589	10.6	16,843
1844	16,475	10.10	166,398
1845	14,101	10.10	142,420
1846	22,410	10.10	226,341
1847	57,762	10.10	583,396
1848	61,055	9.9	604,445
1849	73,567	9.5	698,887
1850	95,083	9.5	903,289
1851	199,732	9.5	1,897,454
1852	86,293	9.5	819,784
1853	106,312	10.5	1,116,276
1854	221,747	11.1	2,461,392
1855	255,535	11.5	2,938,653
1856	177,016	12.2	2,159,595
1857	264,230	13.5	3,567,105
1858	302,207	12.18	3,680,881
1859	49,064	12.1	593,674
1860	122,459	12.5	1,530,738
1861	161,566	12.5	2,019,575
1862	345,992	12.18	4,214,183
1863	390,823	n.a.	n.a.
1864	381,622	n.a.	n.a.
1865	383,673	n.a.	n.a.
1866	436,778	n.a.	n.a.
1867	448,581	12.00	5,382,972
1868	540,426	12.00	6,485,112
1869	585,189	13.00	7,607,457

(a) Long tons.
 (b) British pounds per long ton,
 FOB, UK.
 (c) Computed by the author (1*2).

Source: Greenhill, "Peruvian", p. 111;
 Rodríguez, "Historia", p. 110;
 exports 1843-1861, only UK (Mathew,
 Gibbs, p. 252).

The reaction to this paradoxical situation, marked by expanded guano sales and shrinking fiscal revenue, was exceptionally drastic. On one hand, it led to a total rejection of the consignment system, including the controversial *nacionales*, creating a sharp rift in the Peruvian elite; on the other, after the repeal of old arrangement failed to yield tangible results, it directed the attention of the Peruvian Government towards Tarapacá nitrate, viewed as a dangerous competitor of guano in the world market.

CHAPTER 2

THE 1870s BOOM

1. The Piérola Reform

In 1869, the new José Balta Administration (1868-1872), with Nicolás de Piérola as Minister of Finance, embarked on a vast reform scheme, spelling the end of the consignment system, and introducing an ambitious program of railroad construction supported by overseas loans.¹ Piérola's radical new approach drew upon the widespread aversion towards the scandal-ridden consignment system in the country. The preceding Finance Minister, Francisco García Calderón, had publicly announced, before resigning, that the government had run out of funds. The bloated State bureaucracy, including the volatile Armed Forces, had gone unpaid for four months. Piérola's vast borrowing scheme, holding out the promise of immediate fiscal relief, enjoyed instant popularity.²

The central tenet of the Piérola reform was the need to turn guano into railroads, i.e., a non-renewable resource into a permanent asset. The scheme postulated the consolidation of all guano operations on a single hand in order to obtain the large, concentrated income required for the projected railroad network. Railroads were presented as a catalyst for the general economic development of Perú, and were expected to pay for

¹The standard Balta biography is: Geraldo Arosemena Garland, *El coronel José Balta* (Lima: Imprenta del Ministerio de Guerra, 1945). For Piérola: Alberto Ulloa Sotomayor, *Don Nicolás de Piérola una época en la historia del Perú* (Lima: Imprenta Santa María, 1949) (Quoted hereafter as Ulloa, *Piérola*), and José Dulanto Pinillos, *Don Nicolás de Piérola* (Lima: Imprenta Santa María, 1949) (Quoted hereafter as Dulanto, *Piérola*)

²Basadre, *Historia*, 6: 131, 135-136.

themselves. In a deeply fragmented country, both geographically and socially, a railroad network was viewed as a tool for national integration and centralized political control over widely scattered Indian communities, representing perhaps 67 percent of the total population.³

On January 26, 1869, the Peruvian Congress granted Piérola what amounted to an unlimited authorization to reorganize the guano management system, raise a foreign loan, and launch a railroad-construction program.⁴ On July 5, 1869, two Peruvian envoys signed a contract for the sale of two million tons of guano with the French firm of Dreyfus Frères et Compagnie.⁵ Dreyfus formed a syndicate to carry out the contract, and agreed both to service the foreign debt of the country and repay the controversial outstanding loans of the previous consignees; in addition, the French firm advanced 2.4 million *soles* (roughly, £480,000) to the government in the first month of contract, and 700,000 *soles* per month for a period of 20 months thereafter. Two modern assessments of the Dreyfus contract viewed it as favourable to Perú, and superior to the prior consignment system.⁶

³Deputy L.B. Cisneros in: Perú, *DE1875*, 23-Jun-1875, pp. 15-18. The figure for the percentage of Indian population (in 1826) was supplied by Dobyns (*Perú*, pp. 153-154). *Mestizos*, or half-breeds made up close to 20 percent of the total.

⁴Basadre, *Historia*, 6: 131.

⁵Text of the contract in Dancuart, *Anales*, 8: 115; the best discussion of the preliminary negotiations, as well as the Dreyfus firm, is found in John Peter Olinger, "Dreyfus Frères, Guano and Peruvian Finance, 1869-1880. A Chapter in Economic Imperialism" (Unpublished Ph.D. dissertation, State University of New York at Binghamton, 1973) pp. 64-66 (Quoted hereafter as Olinger, "Dreyfus"). César Antonio Ugarte, *Bosquejo de la Historia Económica del Perú* (Lima: Imprenta, 1926) p. 135 (Quoted hereafter as Ugarte, *Bosquejo*); San Cristóval, *Pardo*, p. 74; Basadre, *Historia*, 6: 133, 150.

⁶Levin, *Export*, pp. 98-99; Olinger, "Dreyfus", pp. 70-73.

The *nacionales* reacted by challenging the contract in the Peruvian Supreme Court⁷, and by refusing financing to Dreyfus from their powerful *Banco del Perú*, forcing him to make his first payments in gold. Dreyfus had to establish his own Peruvian Bank, the *Banco Nacional*, to operate in the country.⁸ The Dreyfus contract created a political cleavage in Perú, as deep as the old Castilla-Echenique struggle. On the one hand, Piérola, allied with Dreyfus, who also financed the newspaper *La Patria*, an organ of the pierolista faction, was bitterly opposed by the evicted national consignees, led by Manuel Pardo, voicing its opposition through a Lima newspaper, appropriately called *El Nacional*. Just as the earlier political divisions were triggered by the consolidation loans, the Piérola-Pardo rivalry revolved around the control of guano.

2. The 1870 Loan

The London financial market reacted positively to the Dreyfus contract: the quotation of Peruvian Government bonds rose from 50 to 98 after the signing of the agreement.⁹ In addition, all major financial markets were gripped by a tidal wave of speculation *circa* 1870-1871. The boom was nurtured by the floating of a massive indemnity in France related to the Franco-Prussian War, coupled with monumental railroad-building projects in the United States, heavily dependent on large issues of bonds and securities, having a strong

⁷Cisneros, "El Negociado Dreyfus" in: Cisneros, *Obras*, 3:191-358. Cisneros was Dreyfus' lawyer in the Supreme Court trial. San Cristóval, *Pardo*, pp. 75, 77.

⁸Carlos Camprubí Alcázar, *Historia de los Bancos en el Perú, 1860-1879* (Lima: Editorial Lumen, S.A., 1957) p. 109 (Quoted hereafter as Camprubí, *Bancos*); Olinger, "Dreyfus", p. 80

⁹Watt Stewart, *Henry Meiggs. Yankee Pizarro* (Durham, N.C.: Duke University Press, 1964) p. 269 (Quoted hereafter as Watt, *Stewart*)

impact on Great Britain.¹⁰ Government loans floated in London climbed steadily from £11.4 million in 1867 to £35 in 1870, exceeding £40 million in 1871, and reaching a peak of £43.3 million in 1872.¹¹

The European lending euphoria made the £12-million 1870 Peruvian loan a resounding success, although the country's outstanding foreign debt more than doubled.¹² The fact that the Peruvian issue was the second largest government loan floated in London at the time, slightly behind a Russian loan, provides some measure of the size of the borrowing.¹³ The 1870 Peruvian loan contract stipulated that the respective service would be made out of the surplus of guano sales proceeds, after providing for the service of two previous outstanding loans; it was guaranteed by all State properties, including the guano deposits and the State railroads.¹⁴

In his annual address to Congress, President Balta publicly "thanked heaven" for the economic boom triggered by the 1870 loan in Perú; he hailed the current "abundance of capital" and the "quest for new ventures" as a positive development.¹⁵ Indeed, from 1870 to 1872, 6 new Banks, 23 consignment houses, 4 import firms,

¹⁰Clément Juglar, *Des Crises Commerciales et de leur retour périodique en France, en Angleterre et aux Etats-Unis* 5th French edition 1938 (New York: Burt Franklin, 1969) pp. 284, 390, 391-392 (Quoted hereafter as Juglar, *Crises*); Leonard P. Ayres, *Turning Points in Business Cycles* 1st ed. 1940 (New York: A.M. Kelley, 1969) p. 25 (Quoted hereafter as Ayres, *Cycles*); for German speculation see: *The Economist* (London), 5-May-1877, pp. 505-506; for the United States, see also: Irwin Unger, *The Greenback Era. A Social and Political History of American Finance, 1865-1879* (Princeton: Princeton University Press, 1964).

¹¹Leland H. Jenks, *The Migration of British Capital to 1875* (London: Thomas Nelson and Sons Ltd., 1963) pp. 425 (Quoted hereafter as Jenks, *Migration*).

¹²The current foreign debt of Perú stood at £10,290,000 in 1869; the 1870 loan increased it to slightly over £22 million. McQueen, *Peruvian Finance*, pp. 85-86; William Clarke, *Perú and its Creditors* (London: Ranken and Co., 1877) p. 8 (Quoted hereafter as Clarke, *Perú*).

¹³Jenks, *British Capital*, p. 423.

¹⁴Clarke, *Perú*, pp. 8-9.

¹⁵President José Balta, "Mensaje", 28-Jul-1870, in: Perú, *Mensajes de los Presidentes del Perú* (Recopilación y notas de Pedro Ugarteche y Evaristo San Cristóval) 4 vols. (Lima: Librería e Imprenta Gil, 1945) 2:5 (Quoted hereafter as Perú, *Mensajes*).

81 investment companies, and over 2,000 miscellaneous commercial enterprises were established in Perú.¹⁶ Increased domestic bank lending financed an abrupt expansion of the Peruvian sugar industry.¹⁷ The same local Banks supported the first boom of plant construction in the Tarapacá nitrate region.

3. *The Tarapacá Boom*

The influx of funds from the 1870 Peruvian loan into Tarapacá fed upon a pre-existing expansionary movement in the nitrate industry. The Tarapacá nitrate region experienced a devastating earthquake on August 13, 1868, inducing a fall in output coupled with a steep increase in prices in 1869 (Table 1.2).¹⁸ Stimulated by the worldwide boom of the early 1870s, the high nitrate prices triggered by the 1868 earthquake persisted for four years, holding at between 15 sh 3 d per English quintal in 1870 to 16 sh 3 d in 1871, the highest level in some ten years. Nitrate became an attractive investment.

The 1870s Tarapacá boom can be considered as the dawn of a veritable nitrate industry. Prior to 1870 nitrate production was confined to a few mechanized operations surrounded by an array of lesser *paradas*. New, steam-driven technology was available since the Gamboni invention in the late 1850s¹⁹, and all of the plants established after 1870 incorporated the latest designs, or at least attempted to do so. Since the capital requirements for erecting a nitrate *máquina* were substantially superior to those needed to set up a *parada*, it was inevitable that capital for the Tarapacá plants was raised through joint-stock companies, although in fact

¹⁶Dancuart, *Anales*, 9:20; Camprubí, *Bancos*, pp. viii, 1.

¹⁷Bonilla, *Un siglo*, p.39, Table 7; Ernesto Yopez, *Perú 1820-1920, un siglo de desarrollo capitalista* (Lima. Instituto de Estudios Peruanos, 1972) pp. 111-112; Enrique Amayo-Zevallos, "British Policy in the War of the Pacific: Chile vs. Perú and Bolivia, 1879-1884. A Chapter of Free Trade Expansion in the Pax Britannica Period" (Unpublished Ph.D. dissertation, University of Pittsburgh, 1985) pp. 119-126 (Quoted hereafter as Amayo-Zevallos, "British Policy"); Pablo Macera, *Las plantaciones azucareras en el Perú, 1821-1875* (Lima: n.p., 1974).

¹⁸A mention of the earthquake was made by Deputy Luna, Perú, *DE1875*, 22-Mar-1875, Appendix, p.XXII.

¹⁹See above p. 22.

most of the *máquinas* remained as non-incorporated operations.²⁰ The new nitrate joint-stock companies were formed both in Valparaíso, already the most important financial centre in the West Coast of South America, and Lima, awash with new Banks.²¹

²⁰See below pp. 83-83.

²¹O'Brien stated that the new Peruvian nitrate companies in the early 1870s "resulted directly from the effects of the guano trade"; the elite would have used "their political power" to "syphon off revenues from the state-controlled guano trade" (*Nitrate*, p. 14). However, there was no guano revenue to "syphon off" at the time (see below pp. 65-67), and the resources used in Tarapacá clearly came from the 1870 and 1872 loans. In fact, in describing these loans O'Brien stated that the service of the enlarged foreign debt "completely absorbed" guano revenue (p. 20).

Table 1.2

*Tarapacá Nitrate Exports, Prices,
and Percentage Changes,
1860-1872*

Year	(1) Tarapacá Exports (Sp.Q.)	(2) Tarapacá Exports (M.Tons)*	(3) Tarapacá Exports (L.Tons)*	(4) Price (Sh.d./ cwt/UK)	% Change Exp- orts*	% Change Pri- ce*
1860	1,376,248	62,557	58,564	12.6		
1861	1,358,691	61,759	57,817	13.9	-1.3%	9.4%
1862	1,829,017	83,137	77,831	12.9	25.7%	-7.8%
1863	1,540,963	70,044	65,573	14.6	-18.7%	11.6%
1864	1,695,587	77,072	72,153	15.3	9.1%	4.6%
1865	1,441,459	65,521	61,339	13	-17.6%	-17.7%
1866	2,157,685	98,077	91,816	10.1	33.2%	-28.6%
1867	2,358,327	107,197	100,354	10.9	8.5%	7.2%
1868	1,906,503	86,659	81,128	12.8	-23.7%	14.8%
1869	2,507,052	113,957	106,683	15.7	24.0%	18.5%
1870	2,943,413	133,792	125,252	15.3	14.8%	-2.6%
1871	3,605,906	163,905	153,443	16.3	18.4%	6.1%
1872	4,220,764	191,853	179,607	15.10	14.6%	-7.9%

*Computed by the author.

Source: (1) *El Veintiuno de Mayo*
(Iquique), 14-May-1884.
(4) 1860-63 - Hernández, *Salitre*, p.69.
1864-69 - E.Malinowki, 16-Sep-1874,
Gibbs, Ms. 11,132.
1870-72 - Sen. Claro, *Chile, SO1880*,
pp. 281-7.

The impact of the boom on Tarapacá was immediately visible in the massive inflow of workers seeking employment in the region, increasing fivefold the population of Iquique, the main nitrate port, by 1876 (Table 2.2). Social conflicts erupted in late 1870, prompting a call for an increased police force to control the new immigrants.²² The complaints about the "foreign labourers" continued into 1871, with an alarming proliferation

²²*El Comercio* (Lima), 7-Jan-1871. The report was dated December, 1870.

of armed clashes and assaults.²³ A substantial number of the new workers came from neighbouring Chile: in May, 1871, the number of Chilean workers entering Tarapacá was placed at 3,320 a month, or some 120 per day. Chilean landowners complained that the Tarapacá exodus came on the heels of successive waves of emigration triggered both by the construction of the Peruvian railroad network, and a boom in silver mines located in the Bolivian region of Caracoles, close to Antofagasta.²⁴ However, the demand for labour was so strong that certain plants had to close down for lack of personnel, while salaries soared.²⁵

Table 2.2

Tarapacá Population, 1862-1876

District	1862	%(1)	1876	%(1)
Camiña	2,073	10.79%	1,297	3.39%
Chiapa	1,237	6.44%	1,126	2.95%
Iquique	3,614	18.80%	15,575	40.75%
Mamiña	870	4.53%	1,043	2.73%
Pica	4,025	20.94%	8,236	21.55%
Pisagua	2,867	14.92%	5,937	15.53%
Sibaya	2,272	11.82%	1,079	2.82%
Tarapacá	2,262	11.77%	3,932	10.29%
Total	19,220		38,225	

(1) Computed by the author.

Source: Paz Soldán, *Diccionario*, p.740.

²³*El Comercio* (Lima), 8-Feb-1871, and 13-May-1871.

²⁴*El Comercio* (Lima), 27-Jun-1871. For Caracoles, see below p. 56.

²⁵*El Comercio* (Lima), 19-Dec-1871.

4. The Peruvian Nitrate Companies

Six nitrate companies were organized in Lima between 1870 and 1872, with a combined nominal capital of some 3.6 million *soles* (Table 3.2), a sum approximately equal to the Valparaíso nitrate companies (Table 4.2). All the Peruvian companies were linked to one Lima Bank, and featured inter-locking directories. Most of the capital of the Lima enterprises was concentrated on two large ventures, Barreñechea and Esperanza, accounting for some 62 percent of all current investment on Peruvian nitrate joint-stock companies. Both companies were high-risk ventures. The Barreñechea Company adopted experimental processing technology, and the Esperanza plant was projected in an undeveloped area in the extreme South of Tarapacá, requiring heavy investments in infrastructure.

Table 3.2

*Peruvian Nitrate Companies,
Lima, 1870-1872
(Soles and Sp. Quintals)*

(1) Nitrate Company	(2) Nominal Capital (soles)	(3) Date Established	(4) No. Pla- nts	(5) Capacity (Sp. Q. p. annum)*
1 Barreñechea	1,000,000	Nov-1870	1	360,000
2 Esperanza	1,260,000	14-Sep-1870	1	360,000
3 Alianza	320,000	16-Sep-1871	1	450,000
4 La Peña	440,000	Post-Sep-1871	1	450,000
5 Providencia	300,000	Post-Sep-1871	1	240,000
6 Rimac	300,000	Post-Sep-1871	2	780,000
6 Total	3,620,000		7	2,640,000

*1875 official assessment.

Source: (1)-(3) Billinghamst, *Capitales*, pp.33-35.

(4)-(5) Derived from Attachment 1.2.

The Barrechea Company was organized in November, 1870,²⁶ by the Peruvian businessmen José Antonio Barrechea. The company purchased the vast "Unión" and "Argentina" deposits (see Map 2), with the stated purpose of processing nitrate in a radically new fashion. The Barrechea plant was designed to use cold water to dissolve nitrate ore, shipping the liquid solution, as opposed to the finished product, to the port of Iquique through its own pipeline for final processing. The innovative process held out the promise of substantial savings both in coal and in freight charges to the point of export; it was also believed that the distilled water generated during the evaporation phase could be marketed in Iquique.²⁷ The Barrechea process was publicly endorsed by an impressive, if heterogeneous, group of institutions and personalities, including the local Municipality, the Prosecutor of the Supreme Court of Perú, and the prominent Italian scientist Antonio Raimondi, advisor to the Peruvian Government on guano-related issues.²⁸ Individual shares were deliberately priced low "so that the enterprise would not remain the property of a few, but would be within the reach of small investors, and the largest possible number of residents of the rich province of Tarapacá".²⁹ J.A. Barrechea organized and managed the *Banco Garantizador*, a new Bank controlled by an influential group of investors, including Henry Meiggs, his associate Charles Watson, John Dawson, manager of the Bank of London, Mexico and South America (BOLSA), and Julián de Zañabardi, the founder of the

²⁶Billingham provided this date, although, according to *El Comercio*, the company was officially registered on February 17, 1871. Guillermo E. Billingham, *Los capitales salitreros de Tarapacá* (Santiago de Chile: Imprenta de "El Progreso", 1889) pp 33-35 (Quoted hereafter as Billingham, *Capitales*), *El Comercio* (Lima), 9-Mar-1871

²⁷The most thorough description of the Barrechea process was made by Prieto ("Explotación", pp.370-371), although he noted that he did not have enough data at the time (1887) to assess its economic feasibility.

²⁸*El Comercio* (Lima), 9-Mar-1871

²⁹*El Comercio* (Lima), 9-Mar-1871

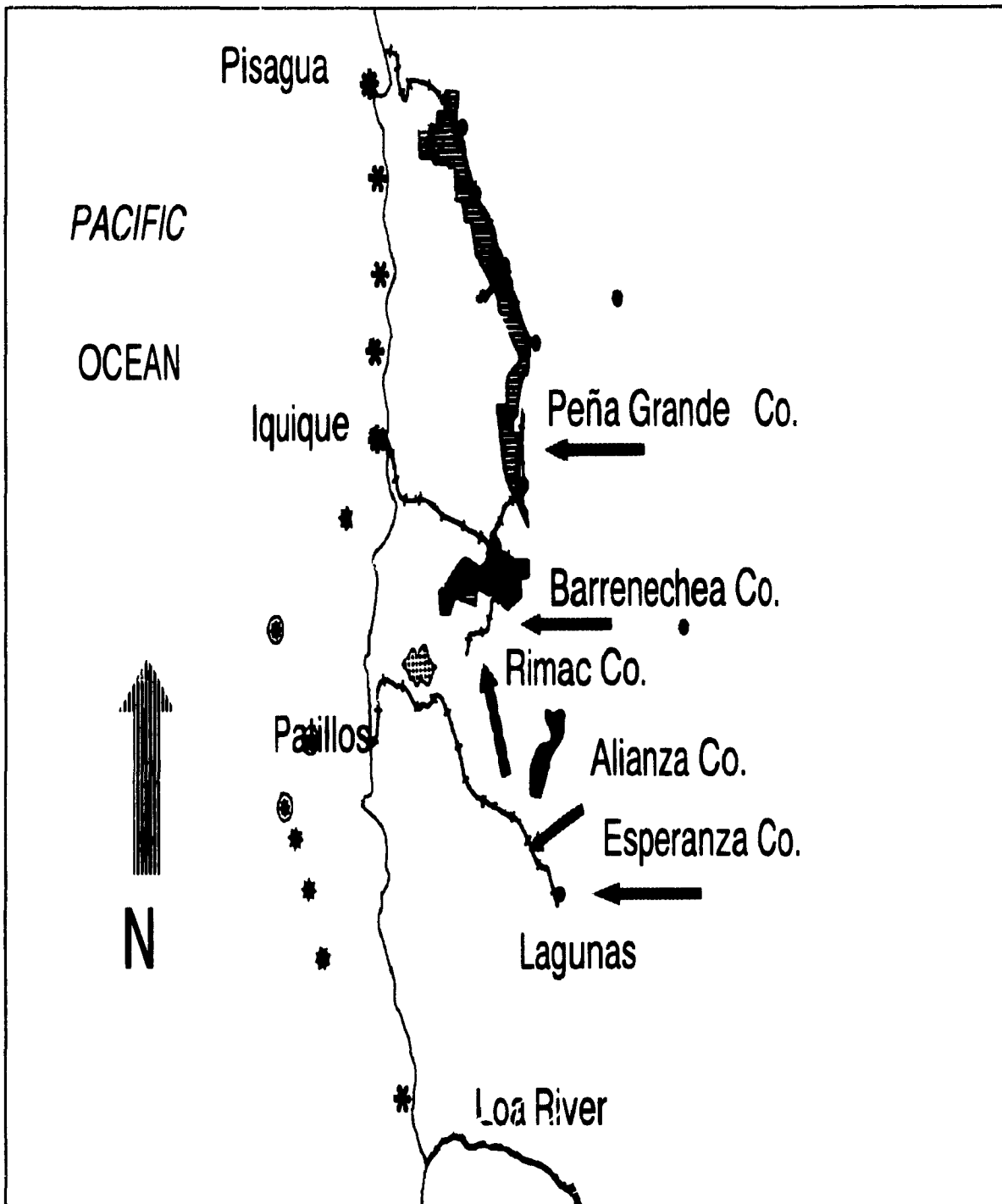
Esperanza Company.³⁰ In addition, J.A. Barrenechea was member of the Board of Directors of a life-insurance company, *La Paternal*, also part of the wave of new enterprises established in the 1870s boom.³¹ Manuel S. Chávez, a key figure behind the Barrenechea Company, was a member of the Board of the Directors of the *Banco del Perú*, as well as the founder and manager of the Peña Grande Nitrate Company.³²

³⁰*El Comercio* (Lima), 10-Oct-1872.

³¹*El Comercio* (Lima), 30-Mar-1874.

³²Chávez figured as the representative of the *Banco del Perú* in negotiations with the government (James Henry to Comber, Lima, 31-Aug-1875. Private. Gibbs Ms. 11,132); he was identified as the manager of Peña Grande in *El Comercio* (Lima), 25-Aug-1877. He also received some 30 percent of the bonds issued for the Barrenechea company in 1876-1878. Chile, *Diario Oficial*, 3-Jul-1882, pp. 1065, 1068, 1070, 1071

**Map 2. Peruvian Nitrate Companies,
Tarapacá, 1870-1879**



Based on Espinoza, *Geografía*, Map 5, and Bermúdez, *Salitre(2)*, p. 45.

The Esperanza Company, whose deposits were referred to as "Lagunas", was organized by the Peruvian businessman Julián de Zaracondegui; another Peruvian, Ascencio Almonte, contributed the large deposits he owned in the extreme South of Tarapacá.³³ The Esperanza Company was supported by a 1-million-soles loan from the *Banco de Lima*,³⁴ of which Zaracondegui was one of two general managers.³⁵

Although Esperanza did not attempt to establish an unusual refining process such as the one adopted by the Barrechea Company, it was indeed breaking new ground. The Lagunas deposits (see Map 2) measured 548 Peruvian *estacas*, or some 15,344 square kilometres,³⁶ an area large enough to accommodate a major city, and were located in the new and vast nitrate district normally referred to as *Del Sur*³⁷; however, the section was bereft of all infrastructure, particularly water and transportation to port of export. Consequently, the most important task of Esperanza was the construction of a 62-mile railroad line linking the Lagunas deposits to the port of Patillos. In fact, the Patillos railroad, valued at 600,000 soles, represented fully 60 percent of the value assigned to the Esperanza company.³⁸

³³These details came to light as a result of Zaracondegui's bankruptcy in 1874. "Estado del salitre y quiebra de Zaracondegui", *El Comercio* (Lima), 11-Jun-1874.

³⁴The stockholders contributed the remaining 260,000 soles. Bermúdez, *Salitre*, pp.261-262, 264.

³⁵*El Comercio* (Lima), 3-Jan-1873. The *Banco de Lima* received 91 percent of the bonds issued for the Esperanza Company in 1876. Chile, *Diario Oficial*, 3-Jul-1882, p. 1068. For the statutes of the company, see Perú, "Informe especial", p.XLVI.

³⁶One Peruvian *estaca* was equal to 27,950 square meters, or almost 28 square kilometres.

³⁷This was the name used by the Chilean authorities after 1879. Cf. Francisco Valdés Vergara, *Memoria sobre la Administración de Tarapacá presentada al Supremo Gobierno* (Santiago de Chile: Imprenta de la República, 1884) Anexo 2 (Quoted hereafter as Valdés Vergara, *Memoria*), and Chile, *JPT* 1882, 25-Oct-1882.

³⁸According to the official assessment of 990,000 soles, made in 1875, although the report stated that over 1.5 million soles had been invested. Perú, "Informe Especial", pp.XLVI-XLVII, Valdés Vergara, *Memoria*, pp. 129-130, 140. For the Patillos railroad: Alejandro Bertrand, *Memoria acerca de la condición actual de la*

(continued)

The construction of the Patillos railroad was critical for the success of another Lima nitrate company, Alianza, located in the same undeveloped extreme South, with deposits of 340 Peruvian *estacas*, or some 9,520 square kilometres, only slightly inferior to those of Esperanza.³⁹ The Alianza company was established by the Peruvians Zuloaga, Novoa, and Julián de Zaracondegui, the organizer of Esperanza.⁴⁰ A key figure in the Alianza Company, J. Fernández Puente, was also a Director of the Barrechea Company and the *Banco de Lima*.⁴¹ The Alianza plant was never assembled, and, if so, it would have been affected by the decision of the contractor of the Patillos railroad to deliberately distance the line as much as possible from the rival enterprise.⁴²

The Peña Grande Company, the third largest venture established in Lima in the period, was controlled by Manuel G. Chávez, linked to both the *Banco del Perú*, and the Barrechea Company.⁴³ The Peña Grande

³⁸(...continued)

propiedad salitrera en Chile y Exposición relativa al mejor aprovechamiento de los salitrales del Estado presentada al señor Ministro de Hacienda por el Delegado Fiscal de Salitreras. Septiembre de 1892 (Santiago de Chile: Imprenta Nacional, 1892) pp. CV-CVIII (Quoted hereafter as Bertrand, *Memoria*).

³⁹Perú, "Informe especial", Table 2.

⁴⁰Billinghurst, *Capitales*, p.34; Bermúdez, *Salitre*, pp. 134-136, 264.

⁴¹Fernández Puente was named as a Director of the *Banco de Lima* in *El Comercio* (Lima), 1-Apr-1874, and as a Director of Barrechea in *El Comercio* (Lima), 19-Nov-1877. He received 92 percent of the bonds issued for Alianza in 1876 (Chile, *Diario Oficial*, 3-Jul-1882, p. 1068). See Volume 2, Table 1, for the evolution of the plant.

⁴²Perú, "Informe especial", p. XLVI.

⁴³For Chávez, see above, note 32; Chávez received all of the bonds issued for Peña Grande in 1876. Chile, *Diario Oficial*, 3-Jul-1882, p. 1068. See Volume 2, Table 1, for the evolution of the plant.

plant was acknowledged as a large and solid concern both before and after 1879, but there is no record of output up to 1875, and it was shut down after that date.⁴⁴

The Rimac Company, perhaps the only relatively successful Peruvian company, owned two plants, Carmen Bajo and Perla, and it was controlled by Manuel Moscoso Melgar, manager of the *Banco de la Providencia*.⁴⁵ The information concerning the Rimac Company is spotty, although it reportedly succeeded in building a substantial plant; a French import-export firm, Prevost and Company, ended up owning the enterprise in 1876, perhaps reflecting growing indebtedness to suppliers.⁴⁶

A fourth Peruvian Bank, the *Banco Nacional*, established on August 31, 1872, opened a subsidiary in Iquique at the end of that year,⁴⁷ and also provided financing for nitrate ventures. As stated before, the *Banco Nacional* was organized by Auguste Dreyfus, the guano contractor, in his struggle against the prior Peruvian consignees, who controlled the *Banco del Perú*.⁴⁸ Although Dreyfus reportedly made an offer to purchase

⁴⁴Perú, "Informe especial", p.LII, and Table 2; Chile, *JPT 1882*, 12-Jul-1882; Chile, *JT 1883-1884*, Vols 1-2; Valdés Vergara, *Memoria*, p.141. The Peña Grande plant must have been solid, indeed, since it was reported in good condition as late as October, 1883, i.e., after being closed down for eight years

⁴⁵Moscoso Melgar was manager of the Providencia Bank at least since 1871 (*El Comercio* (Lima), 11-Sep-1871); in 1874, Moscoso Melgar was mentioned as the official representative of the Rimac Company (*El Comercio* (Lima), 29-Apr-1874). He was subsequently granted a production contract to run Carmen Bajo under government ownership. Perú, Delegación de los Bancos Asociados, *Anexos a la Memoria Anual de 1877* (Lima Imprenta de "La Opinión Nacional", 1878) p. 17 (Quoted hereafter as Bancos Asociados, *Anexos*) The bonds issued for the two plants of the Rimac Company provided no indication of ownership since most of them were bought in public auction by Alfred Bohl, head of the Gibbs Lima subsidiary, in 1878 (*El Comercio* (Lima), 1-Oct-1878)

⁴⁶Chile, *Diario Oficial*, 3-Jul-1882, p. 1068, 1070, 1071. See Volume 2, Table 1, for the evolution of the plant

⁴⁷Billinghurst, *Capitales*, p.35.

⁴⁸See above p. 34.

Esperanza around 1872,⁴⁹ the *Banco Nacional* concentrated in supporting a wide variety of Peruvian-owned nitrate enterprises, half of which were old *paradas*⁵⁰

The most important features of the Peruvian nitrate joint stock-companies established in the early 1870s were their links to specific Banks, namely the *Banco de Lima*, the *Banco del Perú*, and the *Banco de la Providencia*, as well as the visible presence of inter-locking directorates Julián de Zaraqondegui and Manuel G. Chávez were involved in more than one company, furnishing a link with two major Lima Banks; Manuel Moscoso Melgar provided a contact with an additional Bank. Both Barrenechea and Zaraqondegui were involved in multiple enterprises, clearly overextending their resources. Coupled with a willingness to embrace untried refining procedures, as well as to erect plants on undeveloped areas, the Peruvian nitrate companies were heavily dependent on high nitrate prices and extremely vulnerable to an economic downturn.

5. The Chilean Nitrate Companies

The ten Chilean nitrate companies listed in Valparaíso in 1873 as working in Tarapacá (Table 4.2) were less dependent on incipient or speculative banking capital, reflecting a more stable financial market. There were also no inter-locking directories, and a wider distribution of shares. Most of the Chilean companies were opened to, and even controlled by, foreign shareholders, underscoring the role of Valparaíso as a regional financial hub. Three Valparaíso companies had a commanding participation of a Peruvian national who had sought financing in Chile, and one was organized by an Italian.⁵¹ In fact, only five of the ten Valparaíso nitrate companies existing in 1873 to work in Tarapacá were originally controlled by Chileans. An additional Valparaíso nitrate

⁴⁹*El Comercio* (Lima), 11-Jun-1874.

⁵⁰This became clear when the *Banco Nacional* received some 1 million soles in bonds for 13 plants in 1876-1878, of which the two most important were Nueva Soledad and Tarapacá; the last of these was owned by Juan Vernal y Castro, a traditional Peruvian *paradas*' owner. See below p. 157, Table 2.5.

⁵¹One unlisted company was formed in 1872 by a group of Peruvian businessmen who came to Valparaíso to raise capital, but the project fell through. Letter of Francisco de P. Marquezado, Iquique, 2-Jun-1878. The Chairman of the failed company was the Peruvian Mariano E. Zarratea. *El Comercio* (Lima), 11-Jun-1878.

company, the *Compañía de Salitres y Ferrocarril de Antofagasta*, incorporated on October 9, 1872 to work Bolivian deposits, also featured a mixed Chilean-British ownership.⁵² In addition, Chile, as the rest of the world, felt the impact of the 1870 boom, coming at the heels of the discovery of the Bolivian silver deposits of Caracoles (March 25, 1870), just north of the Chilean border, in Antofagasta, giving rise to new Valparaíso joint-stock companies.⁵³ This also helped raising capital for Tarapacá ventures.

Table 4.2

*Chilean Nitrate Companies,
Valparaíso, 1873
(Chilean pesos)*

No.	Name	No. Shares	Total Capital	Nominal Value p.share	Paid per share	%Paid per share	% total capital (1)
1	Sacramento	500	500,000	1,000	960	96%	12.66%
2	Solferino	450	450,000	1,000	750	75%	11.39%
3	América	400	400,000	1,000	1,000	100%	10.13%
4	Chucumata	400	400,000	1,000	100	10%	10.13%
5	N. Carolina	400	400,000	1,000	1,000	100%	10.13%
6	Pisagua	400	400,000	1,000	1,000	100%	10.13%
7	San Carlos	350	350,000	1,000	750	75%	8.86%
8	Negreiros	300	300,000	1,000	600	60%	7.59%
9	Valparaíso	500	300,000	600	360	60%	7.59%
10	California	80	200,000	2,500	2,500	100%	5.06%
Total(1)		3,780	3,700,000				

(1) Computed by the author.

Source: *La Patria* (Valparaíso) 21-Jul-1873.

⁵²See below pp. 56-57.

⁵³Isaac Arce, *Narraciones Históricas de Antofagasta* (Antofagasta: n.p., 1930) p.243-244, 249, 257 (Quoted hereafter as Arce, *Antofagasta*); W.F. Sater, "Chile and the World Depression of the 1870s" *Journal of Latin American Studies* 11(May, 1979) 67-99 (Quoted hereafter as Sater, "Depression").

In Sacramento, the largest Chilean company established in Tarapacá, the Peruvians José María and Mariano Loayza, partners of the firm Loayza y Pascal, held 236 shares of a total of 500 upon the launching of the venture on December 16, 1872.⁵⁴ The main stockholder of San Carlos, established in Valparaíso on October 7, 1872, was a Peruvian, Eugenio Marquezado, holding 35 out of 350 shares.⁵⁵ Negreiros, established in September 14, 1872, was organized by granting José María Vernal, a Peruvian owner of *paradas*, 150 shares out of a total of 300.⁵⁶ Solferino, the second largest Valparaíso nitrate company, incorporated on March 28, 1872, fell on a slightly different category, since 170 shares of a total of 450 were held by Félix Massardo, an Italian national.⁵⁷

Nueva Carolina, established in Valparaíso on August 28, 1872, may or may not have been controlled by Chileans, since the nationality of its major shareholder, Fernando López, is unclear.⁵⁸ Chucumata, established in Valparaíso on October 1, 1872, had mainly Chilean stockholders, but its checkered evolution

⁵⁴List of original stockholders in Luis Ortega, "Change and crisis in Chile's economy and society, 1865-1879" (Unpublished Ph.D. dissertation, University College, London, 1979) p. 512 (Quoted hereafter as Ortega, "Change").

⁵⁵List of original stockholders in Ortega, "Change", p.503. However, O'Brien found that the enterprise had been organized by a Chilean banker, Francisco Subercaseaux, who made his brother-in-law, Melchor Concha y Toro, a Director of the company. None of this was apparent in the documents quoted by Ortega. Thomas F. O'Brien, *The Nitrate Industry and Chile's Crucial Transition: 1870-1891* (New York: New York University Press, 1982) pp. 10-11 (Quoted hereafter as O'Brien, *Nitrate*) The plant was operated by the German firm of Folsch and Martin after 1878, although the actual ownership remains unclear. See Volume 2, Table 1, for the evolution of the plant.

⁵⁶List of original stockholders in Ortega, "Change", p.505.

⁵⁷List of original stockholders in Ortega, "Change", p.506.

⁵⁸López held 200 shares of a total of 400 (Ortega, "Change", p.511). Fernando López figured as one of the founders of a failed Tarapacá Nitrate Bank on January 22, 1873, and perhaps as an associate of the Peruvian Loayza on a manifesto signed by nitrate bondholders on July 26, 1878. *El Comercio* (Lima), 22-Jan-1873, and 26-Jul-1878.

clouded its ownership history.⁵⁹ Pisagua, the first of the new Valparaíso nitrate companies, established on October 20, 1871, was originally controlled by the Chilean Vicente Gutiérrez.⁶⁰ The Valparaíso nitrate company was organized on October 30, 1872 by the Chilean Rafael Olcay, who held 125 shares out of 500; the company owned the plants Valparaíso and Concepción, also known as Palacio Industrial.⁶¹ Similarly, the America Company, owner of two plants, Dolores and Santa Catalina, and one deposit, Paccha, established on October 20, 1872, remained under Chilean control up to 1879.⁶² Two additional companies formed in Valparaíso during the same period, Peruana and Chilena, did not go beyond the stage of mere projects.⁶³

6. *The European Nitrate Companies*

In addition to the new Chilean and Peruvian companies, some important changes took place in the European firms operating in Tarapacá. The British firm of Gibbs reinforced its position, and four new powerful companies, Hans Gildemeister and Company, Clark and Eck, J.D. Campbell and Co., and Folsch and Martin, were established in the early 1870s.

⁵⁹The main stockholder, Enrique Cood, held 45 of a total of 400 shares (Ortega, "Change", p.504). However, the bonds issued for the plant were delivered to the Peruvian banker Francisco García Calderón in 1877, and the plant was repossessed in 1883 by the Peruvian Rosa Vernal de Hillinger. Chiie, *Diario Oficial*, July 3, 1882, p.1069.

⁶⁰Vicente Gutiérrez held 200 out of 400 shares (Ortega, "Change", p. 507-8).

⁶¹Ortega, "Change", p. 514.

⁶²The original shares were widely distributed, no single stockholder having more than 50 shares out of a total of 400 (Ortega, "Change", p. 509).

⁶³Peruana was established to purchase the plant from the same name from the Peruvian Virginia Boyza, but never did. Billingham, *Capitales*, pp. 15, 38. The purpose of Chilena, organized in mid-1871, is unknown (O'Brien, *Nitrate*, p.25).

Gibbs reorganized the *Compañía de Salitres de Tarapacá*, or Tarapacá Nitrate Company, established in 1865,⁶⁴ making a public offering of 1,500 shares of £1,000 each, including the two plants of the company, Carolina and La Noria (later renamed Limeña), as well as all related facilities.⁶⁵ More important, however, was the revamping of the new Limeña plant, resulting perhaps on a three-fold increase in capacity between 1872 and 1873.⁶⁶

Hans Gildemeister (born in Bremen, Germany, in 1823) had been involved in Tarapacá since the 1860s, but as a supplier and financier, or *habilitador*, of nitrate producers; between 1870 and 1872, he bought three plants, "Hanza" (also known as "San Antonio Gildemeister"), "Argentina", and "San Pedro", followed by the purchase of "San Juan" in 1873.⁶⁷ Although "Argentina" was originally the strongest plant of the Gildemeister group, the subsequent acquisition of "San Juan" around 1874⁶⁸, bolstered the position of the German entrepreneur in Tarapacá. Gildemeister installed a novel refining process in "San Juan", eliminating the vats or *cachuchos* altogether, and using instead solid metallic carts on rails submitted to high pressure.⁶⁹ Although the

⁶⁴See above pp. 24-25.

⁶⁵Manuscript prospect in Gibbs Ms. 11,132.

⁶⁶Mariano Felipe Paz Soldán, *Diccionario Geográfico Estadístico del Perú* (Lima: Imprenta del Estado, 1877) p. 615 (Quoted hereafter as Paz Soldán, *Diccionario*) reports an output of 299,166 Spanish quintals in 1872, and 1,035,125 in 1873. The 1875 Assessment Commission placed Limeña's capacity at 900,000 Spanish quintals (Perú, "Informe especial", p. XXXIX), while Billingham's *Capitales*, p.28) furnished a detailed listing of Limeña's output for 1876-1884 giving a maximum figure of some 518,000 quintals (in 1878). O'Brien (*Nitrate*, p.16) estimated the capacity of Limeña in 800,000 quintals. The range of figures might reflect the difference between estimated potential capacity and actual output. However, since Paz Soldán's figures reportedly reflected actual output, as did the ones provided by Billingham, it is likely that Limeña could indeed produce up to 1 million quintals per year, but it declined gradually after 1875, possibly due to its limited deposits.

⁶⁷Bermúdez, *Salitre*, pp.266-267.

⁶⁸The exact date of the "San Juan" purchase remains uncertain. Bermúdez, *Salitre*, pp. 266-268.

⁶⁹Prieto, "Explotación", p.347; Humberstone, "Historia", pp. 210-211.

novel process had some disadvantages,⁷⁰ San Juan's capacity was placed at some 360,000 Spanish quintals per annum, and it was singled out as one of the best plants in the region in 1875.⁷¹

Clark, Eck and Company established the plant "Esmeralda" in 1873, with an estimated capacity of 300,000 Spanish quintals per annum;⁷² although one author claimed that the new firm relied on Peruvian Banks for financing, there is strong evidence that it was heavily indebted to Gibbs.⁷³ However, "Esmeralda" was a solid operation, favourably evaluated in 1875.⁷⁴

The founding of J.D. Campbell and Company was an important event for the future evolution of the Tarapacá nitrate industry. The venture was build around two different plants, "San Antonio" and "Agua Santa". "San Antonio" was financed by the Valparaíso branch of the British firm Hainsworth and Co., and one of its members John Syers Jones took over the plant as a result of a foreclosure.⁷⁵ The date of this transaction remains uncertain, but Jones figured as owner of "San Antonio" as early as March, 1871.⁷⁶ The San Antonio Nitrate and Iodine Company was established in 1873 to operate "San Antonio" with the participation of the

⁷⁰Prieto noted that it increased the complexity of the equipment and the number of parts, raising costs of maintenance and repairs to a point which might have offset the savings generated by its use ("Explotación", p.347).

⁷¹Perú, "Informe especial", p.XLV.

⁷²The actual output for 1873 was 190,000 Spanish quintals (Paz Soldán, *Diccionario*, p.343), while in 1875 annual capacity was estimated at 300,000 quintals (Dancuart, *Anales*, 12: 72).

⁷³O'Brien (*Nitrate*, p.17) mentioned unnamed Peruvian banks; however, all of the bonds issued for "Esmeralda" were handed over to Alfred Bohl, manager of William Gibbs and Co, in 1877 (Chile, *Diario Oficial*, 3-Jul-1882, p. 1067, 1069). The firm was reorganized after 1879 under the name Eck, Trevor and Company (Chile, *JPT 1883-1884*, Vol. 1, no folio).

⁷⁴Perú, "Informe especial", p. IL.

⁷⁵Bermúdez, *Salitre*, p. 272; O'Brien, *Nitrate*, p.16.

⁷⁶*El Comercio* (Lima), 5-Mar-1871.

British entrepreneurs John D. Campbell and J. Outram⁷⁷ J.D. Campbell had managed to obtain support from the Balta government to construct a railroad joining the Peruvian port of Arica with the Bolivian city of La Paz, granting one third of the stock to the State; the project fell through. He was also an unsuccessful candidate to build the Tarapacá nitrate railroad.⁷⁸ Around 1874, J.D. Campbell bought separately a *parada* owned by the Peruvian family of Osorio to establish "Agua Santa".⁷⁹ Both plants developed into formidable ventures, leading the industry through the establishment of a new refining process.⁸⁰

The German firm of Folsch and Martin was organized by Hermann Conrad Folsch, and Federico [Friedrich] Martin in 1872. Folsch was born in Hamburg in 1845, and worked for the entrepreneur Georg Hillinger in Iquique at least since 1870.⁸¹ The company was financed by the Hamburg firm of Vorwerk and Company,⁸² a concern tightly connected with the powerful house of Krupp.⁸³ Folsch and Martin acquired the

⁷⁷Bermúdez, *Salitre*, p. 272.

⁷⁸*El Comercio* (Lima), 13-Oct-1871; *La Epoca* (Valparaíso), 15-Oct-1884. Campbell dealt with both the Peruvian and the Bolivian Governments; he was known to have been involved in advancing merchandise and cash to the latter in connection with a controversial foreign loan to Bolivia in 1866. Casto Rojas, *Historia Financiera de Bolivia* (La Paz: Talleres Gráficos "Marinoni", 1916) p. 292 (Quoted hereafter as Rojas, *Historia*). In 1873, Diego Hainsworth and George A. Wilhelmy, partners of Hainsworth and Co. retired, leaving the Tacna branch in the hands of J.D. Campbell (*La Patria* (Valparaíso), 1-Jul-1873). The J.D. Campbell firm was liquidated in 1878, changing its name to J. Outram and Company (*El Comercio* (Lima), 15-Oct-1878, and Bohl to Read, Lima, 18-Sep-1878, Gibbs Ms. 11,132).

⁷⁹Bermúdez, *Salitre*, p. 272-273.

⁸⁰See below pp. 222-224.

⁸¹Blancpain, Jean-Pierre, *Les Allamands au Chili (1816-1945)* (Cologne: Böhlauverlag Kölnwien, 1974) pp. 809-810, note 88 (Quoted hereafter as Blancpain, *Allamands*). The first name of Martin was mentioned in *El Mercurio* (Santiago), 11-May-1921, p.15.

⁸²O'Brien, *Nitrate*, p. 16-17.

⁸³Blancpain, *Allamands*, p. 809, note 87. Vorwerk furnished rolling stock and military equipment, and it is quite possible that his interest in nitrate was due to the importance of the product in the field of explosives.

plant "Paposo" in 1872; although reported in mediocre condition in 1875, "Paposo"'s capacity was placed at a respectable 240,000 Spanish quintals per annum.⁸⁴

7. Overview of the Tarapacá Boom

Except for the vestigial *paradas* which remained unchanged, no nitrate-producing concern in Tarapacá remained untouched by the massive transformation of the region between 1870 and 1874. However, the extent of the change in Tarapacá remains uncertain. With the exception of O'Brien, all authors quoted in this work relied on the figures provided by the Peruvian Guillermo Billinghurst in 1887, claiming that 74 new *máquinas* with a total capacity of almost 17 million Spanish quintals had been established in Tarapacá in 1870-1878.⁸⁵ Considering that the highest annual exports of nitrate up to 1872 had reached merely 4.2 million Spanish quintals (see Table 1.2), the 1870s expansion of Tarapacá would have entailed, according to Billinghurst, an excess capacity of over six times the highest known rate of consumption. However, Billinghurst's figures included indiscriminately unassembled, flawed, and solid operations; a revised estimate (see Attachment 1.2) suggests that the real expansion in capacity was close to some 13 million quintals, or somewhat less than four times the highest annual export figure, over an eight year period, 1870-1878, the larger enlargement coming in 1872-1874, with 19 new good plants adding 6.4 million quintals to the total capacity of the industry.⁸⁶ Still, an industry suddenly able to export some 13 million Spanish quintals to markets which had previously purchased only 4

⁸⁴Perú, "Informe especial", p.L. Folsch and Martin's position was subsequently reinforced by the purchase of the *parada* "Virginia" around 1882, and the subsequent establishment of a powerful *máquina* (*La Industria* (Iquique), 13-Oct-1882).

⁸⁵Billinghurst, *Capitales*, pp.15-17 Cf., more recently, Oscar Bermúdez, *Historia del Salitre desde la Guerra del Pacífico hasta la Revolución de 1891* (Santiago de Chile Ediciones Pampa Desnuda, 1984) pp. 61-66 (Quoted hereafter as Bermúdez, *Salitre* (2)). This was a posthumous edition, published without the formal approval of the author.

⁸⁶See Attachment 1.2 below for a complete listing, and Volume 2, Table 1

million was clearly edging towards an over-production crisis. The crisis indeed took place, but it was further complicated by the adoption of a new Peruvian policy towards the expanded Tarapacá nitrate industry.

8 Origins of the Antofagasta Company

The fact that the Antofagasta Company, the most important Chilean nitrate venture of the period, was located in Bolivian territory marked the evolution of the enterprise from the outset. Bolivia was mired in political chaos since Independence. Typically, Bolivian military *caudillos* resorted to forced loans on individuals and cities, confiscatory taxation, and systematic expropriation of property.⁸⁷ The two major consequences of these arbitrary policies were to hamper both the development of local entrepreneurs and a mobile industrial working class.⁸⁸ Both social classes were needed to effectively occupy the vast and empty territories claimed by Bolivia outside the Andes Highlands, home to the vast majority of the Bolivian population, namely in the Pacific littoral to the West and towards the Amazonian region to the East. In addition, the practice of farming out the collection of duties at customs to foreign contractors in exchange for cash advances and loans weakened the hold of the government on its own income and frontiers.⁸⁹ Bolivian isolation was as much, if not more, socio-political than purely geographical in nature.

In addition, the chronic Bolivian turmoil translated into persistently offensive behaviour towards foreign representatives, leading to protracted periods of diplomatic seclusion, including severed relations with Great

⁸⁷All Bolivian historians quoted here agree on this issue. Cf. Rojas, *Historia*, p. 324.

⁸⁸Luis Peñaloza, *Historia Económica de Bolivia* 2 vols. (La Paz: Author's Edition, 1953), 2:129 (Quoted hereafter as Peñaloza, *Historia*)

⁸⁹The practice also covered "internal customs" at La Paz and Oruro. Enrique Finot, *Nueva Historia de Bolivia. Ensayo de Interpretación Sociológica*. 3d Edition (Gisbert y Cia., S.A.: La Paz, 1964) p. 229 (Quoted hereafter as Finot, *Historia*); Rojas, *Historia*, p. 160, 389.

Britain, France and Perú in the 1860s.⁹⁰ The closing of European financial markets to Bolivia, an upshot of diplomatic isolation, explains the fact that the first foreign loan of the country, known as the Concha y Toro loan, was actually raised in Chile in 1868.⁹¹ Chilean investors also established the first Banks in the country in the late 1860s.⁹² Bolivian mine-owners sought and obtained financing in Chile for the largest local silver corporation, the Huanchaca Company, in the early 1870s.⁹³ The rich silver deposits of Caracoles, located in the Pacific littoral area, were discovered by Chileans (March 24, 1870), and developed through some 32 joint-stock companies organized in Valparaíso.⁹⁴

The discovery of nitrate deposits in Antofagasta by Chileans in 1858, 1860 and 1861, and the subsequent establishment of two successive companies to exploit them in Valparaíso in 1867 and 1869, were part of an established pattern of Bolivian forced withdrawal and Chilean activity in the area.⁹⁵ Given the history of abusive taxation in Bolivia, no serious investment in Antofagasta nitrate was made without a formal

⁹⁰Roberto Querejazu Calvo, *Guano, Salitre, Sangre. Historia de la Guerra del Pacífico* (Editorial Los Amigos del Pueblo: La Paz, Cochabamba, 1979) p. 38 (Quoted hereafter as Querejazu, *Guano*)

⁹¹*El Veintiuno de Mayo* (Iquique), 26-Apr-1884; Rojas, *Historia*, p.281.

⁹²Peñaloza, *Historia*, 1:378; Rojas, *Historia*, p. 319.

⁹³Antonio Mitre, "The Economic and Social Structure of Silver Mining in XIX Century Bolivia" (Unpublished Ph.D. dissertation, Columbia University, 1977) pp. 120, 123, 129, 131, 133-134 (Quoted hereafter as Mitre, "Silver"); Peñaloza, *Historia*, 2: 179-181.

⁹⁴Arce, *Antofagasta*, pp. 95-99, 127; Bermúdez, *Salitre*, p. 210; Querejazu, *Guano*, p. 75 List of Caracoles companies in: *La Patria* (Valparaíso), 9-Mar-1874. Significantly, both the fraction of the deposits granted by law to Bolivians in Caracoles, and the stock owned by some of them, were transferred to foreigners. Peñaloza, *Historia*, 1: 347-351; 2: 129, 168; Rojas, *Historia*, p. 348-349.

⁹⁵Samuel Ossa Bourne, "Don José Santos Ossa" *Revista Chilena de Historia y Geografía* 67(1931) 43-90; 68(1931) 112-141; 69(1931) 186-215; 72(1932) 176-228 (Quoted hereafter as Ossa, "Ossa"); Bermúdez, *Salitre*, p. 185.

concession from the Bolivian Government, issued in 1869.⁹⁶ Upon the granting of a second, modified concession in 1872, the *Compañía de Salitres y Ferrocarril de Antofagasta* (CSA) was established in Valparaíso with a nominal capital of 2.5 million *pesos*⁹⁷, and mixed Chilean-British ownership. William Gibbs & Co. held some 18 percent of the shares, while Chilean stockholders controlled the remaining 82 percent.⁹⁸

Furthermore, to the north of the Antofagasta deposits, and close to the Peruvian border, nitrate was discovered at El Toco in 1870, and the Bolivian Government granted the right to exploit the deposits to several entrepreneurs.⁹⁹ The establishment of new nitrate enterprises in Bolivian territory in the early 1870s spelled the end of the Peruvian monopoly on sodium nitrate, a fact whose significance would become clear in the near future.

⁹⁶Ossa, "Ossa", 76: 201; Bermúdez, *Salitre*, pp. 201-204.

⁹⁷Approximately equivalent to current U.S. dollars.

⁹⁸*2a Memoria de la Compañía de Salitres y Ferrocarril de Antofagasta* (Valparaíso: Imprenta de La Patria, 1873) (Quoted hereafter as CSA, *Memoria*, followed by year).

⁹⁹The list of owners and properties in El Toco was included in: Carlos Aldunate Solar, *Leyes, Decretos i Documentos relativos a Salitreras* (Santiago de Chile: Imprenta Cervantes, 1907) Bolivian Section, pp. 53-186 (Quoted hereafter as Aldunate, *Leyes*).

ATTACHMENT 1.2

*Capacity of New Tarapacá Nitrate Plants,
Billinghurst's and Revised Estimates,
1870-1878
(Spanish Quintals per Annum)*

No.	1870-2 Plant	(A) Billing. Capacity (Sp.Q.)	% Total Cap. (A)	(B) 1876 Capacity (Sp.Q.)	% Total Sta- Cap. tus (B) (8)
1	N.Noria (1)	200,000	6.25%	900,000	18.30% Gd.Wk.
2	Solferino	280,000	8.75%	650,000	13.22% Gd.Wk.
3	S.Pedro	250,000	7.81%	250,000	5.08% Gd.Wk.
4	Argentina	300,000	9.38%	250,000	5.08% Gd.Wk.
5	Peruana	200,000	6.25%	240,000	4.88% Gd.Wk.
6	S. Carlos	120,000	3.75%	210,000	4.27% Gd.Wk.
7	S.Ant.(C)(7)	200,000	6.25%	700,000	14.24% Gd.Wk.
8	Porvenir	200,000	6.25%	200,000	4.07% Gd.Fd.
8	Good Plants	1,750,000	54.69%	3,400,000	69.15%
1	Victoria	220,000	6.88%	240,000	4.88% Md.Fd.
2	China	100,000	3.13%	100,000	2.03% Md.Fd.
3	Sta. Rita	110,000	3.44%	120,000	2.44% Bd.Rb.
4	Hansa (S.A.)	100,000	3.13%	250,000	5.08% Bd.Fd.
5	Rosario(P)	60,000	1.88%	240,000	4.88% Bd.Fd.
6	Germania(2)	120,000	3.75%	210,000	4.27% Bd.Fd.
7	Palacio I.(3)	120,000	3.75%	120,000	2.44% Bd.Fd.
8	Sacramento L	200,000	6.25%	117,000	2.38% Bd.Fd.
9	Carolina	300,000	9.38%	0	0.00% Bd.Fd.
10	Sta. Isabel	120,000	3.75%	120,000	2.44% Bd.Dst.
10	Bad Plants	1,450,000	45.31%	1,517,000	30.85%
18	70-72 Plants	3,200,000		4,917,000	100.00%

(Continued next page)

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1872-4 No.Plant	(A) Billing. Capacity (Sp.Q.)	% Total Cap. (A)	(B) 1876 Capacity (Sp.Q.)	% Total Cap. (B)	Sta- tus
1 Limeña(1)	600,000	6.88%	900,000	9.10%	Gd.Wk.
2 Palma	300,000	3.44%	300,000	3.03%	Gd.Wk.
3 Esmeralda	300,000	3.44%	300,000	3.03%	Gd.Wk.
4 S.Lorenzo UC	300,000	3.44%	300,000	3.03%	Gd.Wk.
5 Bearnes	140,000	1.61%	140,000	1.41%	Gd.Wk.
6 Calacala	120,000	1.38%	120,000	1.21%	Gd.Wk.
7 Perla	360,000	4.13%	480,000	4.85%	Gd.Fd.
8 Nva.Soledad	460,000	5.28%	460,000	4.65%	Gd.Fd.
9 Peña Grande	450,000	5.16%	450,000	4.55%	Gd.Fd.
10 Sta.Catalina	400,000	4.59%	400,000	4.04%	Gd.Fd.
11 S. Vicente	300,000	3.44%	390,000	3.94%	Gd.Fd.
12 Carmen Alto	150,000	1.72%	360,000	3.64%	Gd.Fd.
13 Carmen Bajo	180,000	2.07%	360,000	3.64%	Gd.Fd.
14 S. Agustín	200,000	2.29%	300,000	3.03%	Gd.Fd.
15 Providencia	240,000	2.75%	240,000	2.43%	Gd.Fd.
16 Matillana	240,000	2.75%	240,000	2.43%	Gd.Fd.
17 Trinidad	210,000	2.41%	210,000	2.12%	Gd.Fd.
18 Paposo(máq.)	240,000	2.75%	240,000	2.43%	Md.Wk.
19 Peña Chica	210,000	2.41%	210,000	2.12%	Md.Wk.
19 Good Plants	5,400,000	61.96%	6,400,000	64.68%	
1 Nva.Carolina	220,000	2.52%	300,000	3.03%	Md.Fd.
2 S.José Noria	180,000	2.07%	180,000	1.82%	Md.Fd.
3 Sta.Laura(B)	100,000	1.15%	210,000	2.12%	Bd.Fd.
4 S.Andrés	180,000	2.07%	195,000	1.97%	Bd.Fd.
5 Alianza	300,000	3.44%	450,000	4.55%	Bd.Un.
6 Valparaíso	450,000	5.16%	450,000	4.55%	Bd.Un.
7 Candelaria	450,000	5.16%	450,000	4.55%	Bd.Un.
8 Lagunas(4)	360,000	4.13%	360,000	3.64%	Bd.Un.
9 Resurrección	300,000	3.44%	300,000	3.03%	Bd.Un.
10 Negreiros	300,000	3.44%	300,000	3.03%	Bd.Un.
11 Sta.Laura(W)	300,000	3.44%	300,000	3.03%	Bd.Un.
12 P.Almonte(5)	80,000	0.92%		0.00%	Bd.Un.
13 El Morro(6)	50,000	0.57%		0.00%	Bd.Ul.
14 Tarapaque.(6)	45,000	0.52%		0.00%	Bd.Ul.
14 Bad Plants	3,315,000	38.04%	3,495,000	35.32%	
33 72-4 Plants	8,715,000		9,895,000	100.00%	

(Continued next page)

(Continued from previous page)

No. Plant	1874-8	(A) Billing. Capacity (Sp.Q.)	% Total Cap. (A)	(B) 1876 Capacity (Q.)	% Total Cap. (B)	Sta- tus
1	Agua Santa	500,000	10.03%	500,000	9.67%	Gd.Wk.
2	Angela	200,000	4.01%	500,000	9.67%	Gd.Wk.
3	S. Pablo	300,000	6.02%	300,000	5.80%	Gd.Wk.
4	S.Fco.(Bra.)	300,000	6.02%	300,000	5.80%	Gd.Wk.
5	S.Juan(G.)	360,000	7.22%	250,000	4.83%	Gd.Wk.
6	Santiago(C)	200,000	4.01%	200,000	3.87%	Gd.Wk.
7	California	360,000	7.22%	360,000	6.96%	Gd.Fd.
8	Sta. Ana	300,000	6.02%	300,000	5.80%	Gd.Fd.
9	Dolores(C)	210,000	4.21%	210,000	4.06%	Gd.Fd.
10	Católica	210,000	4.21%	210,000	4.06%	Gd.Fd.
11	Sta. Adela	210,000	4.21%	210,000	4.06%	Gd.Fd.
12	S.Antonio(P)	200,000	4.01%	200,000	3.87%	Gd.Fd.
13	Chinquiquir.	200,000	4.01%	200,000	3.87%	Gd.Fd.
14	Salar Noria	110,000	2.21%	110,000	2.13%	Md.Wk.
14	Good Plants	3,660,000	73.45%	3,850,000	74.42%	

(Continued next page)

(Continued from previous page)

1874-8 No.Plant	(A) Billinc. Capacity (Sp.Q.)	% Total Cap. (A)	(B) 1876 Capacity (Sp.Q.)	% Total Cap. (B)	Sta- tus
1 Buen Retiro	45,000	0.90%	45,000	0.87%	Md.Rb.
2 S.José(Y)	48,000	0.96%	48,000	0.93%	Md.Fd.
3 Barrenechea	360,000	7.22%	360,000	6.96%	Bd.Fd.
4 Concepción(1)	120,000	2.41%	120,000	2.32%	Bd.Fd.
5 Angeles	300,000	6.02%	300,000	5.80%	Bd.Un.
6 Magdalena	200,000	4.01%	200,000	3.87%	Bd.Un.
7 Carmelitana	150,000	3.01%	150,000	2.90%	Bd.Un.
8 S.Juan de S.	100,000	2.01%	100,000	1.93%	Bd.Un.
8 Bad Plants	1,323,000	26.55%	1,323,000	25.58%	
22 74-8 Plants	4,983,000		5,173,000	100.00%	
73 Total Plants	16,898,000		19,985,000		

(1)La Nueva Noria later became Limeña.

(2)Germania was known as Tarapacá.

(3)Palacio Industrial and Concepción.
are the same plant.

(4)Lagunas was also known as Esperanza.

(5)Pozo Almonte was a mere deposit of
Nueva Soledad circa 1876.

(6)El Morro and Tarapaqueña disappeared
circa 1876, and were not listed or
assessed by the Peruvian Government.

(7)1876 capacity assumed.

(8)For codes see Volume 2, pp. 69-70.

Source: Billinghamst, *Capitales*, pp.15-17, and
Table 1, Volume 2.

CHAPTER 3

THE ESTANCO

1. The Peruvian Railroads

The two first parts of Piérola's reform scheme, the Dreyfus contract and the 1870 loan, were followed by the launching of the projected program of railroad construction. The bulk of the Peruvian railroad network was State-owned, but most of the construction was entrusted to Henry Meiggs (1811-1878), a United States entrepreneur with a shady record on real estate speculation in San Francisco in the late 1840s, rehabilitated by successfully completing a major railroad in Chile in 1863.¹

The railroad contracts awarded to Meiggs in Perú were truly monumental in scope. In total, the United States entrepreneur managed to obtain four contracts from the Peruvian Government valued at 108.8 million *soles*, or slightly over £21 million,² for the construction of over 1,000 kilometres of railroad lines. He also bought two additional contracts from other contractors.³ On the whole, in 1870-1875, a total of 1,941 kilometres of State railroad were projected in Perú, of which 1,267, or 65 percent, were actually constructed, at a total cost

¹Stewart, *Meiggs*, p. 144; Ramón Rivera Jofré, *Reseña Histórica del Ferrocarril entre Santiago y Valparaíso* (Santiago: Imprenta Nacional, 1863) p. 142 *et passim*

²I am computing the *sol* at a rate of 5 to the British pound, although the Peruvian exchange fell drastically *circa* 1875. See below pp. 210-212.

³Figures computed by the author. San Cristóval, *Pardo*, pp. 130-131, Stewart, *Meiggs*, pp. 85, 99

of £27.7 million; some 800 kilometres of private lines were also planned, and slightly over 670 kilometres, or 84 percent, were built.⁴

It is worth noting that the railroad fever was not confined to Perú. In fact, up to 1830, the bulk of the world's railroad network was built in Europe and North America, with approximately 100,000 miles each, Latin America's share of the total railroad mileage opened worldwide was merely 6,300 miles, or less than 5 percent of the world total.⁵ Speculation in railroad bonds and stock in Europe and North America, particularly the United States, played a paramount role in all the world depressions after 1836.⁶ However, in spite of the fact that Peruvian railroad mileage was negligible compared to the world total, it still required substantial additional borrowing, pushing the country to tap again European financial markets.

2. The 1872 Peruvian Loan

Since the amount contracted for railroad construction reached almost £28 million, exceeding the total foreign debt of Perú, i.e., £22 million, in July, 1871, the Peruvian Congress approved a second loan for £23 million.⁷ This decision made Perú the largest single debtor in Latin America, and the 1872 Peruvian loan the largest government bond issue floated in London in that year.⁸

⁴Figures provided by Paz Soldán, *Diccionario*, p. 760. No cost figures for the private railroads was supplied.

⁵E.J. Hobsbawm, *The Age of Capital, 1848-1874* (New York): Mentor Books, 1979) p. 55 (Quoted hereafter as Hobsbawm, *Capital*)

⁶Juglar, *Crises*, pp. 345, 355, 367, 378, 378, 384-385, 390-393. Juglar noted that, unlike Banks and industries, railroad construction could not be easily stopped when a depression broke out (p. 378). This turned out to be a critical element in the subsequent Peruvian collapse

⁷McQueen, *Peruvian Finance*, p. 87; Clarke, *Perú*, p. 10.

⁸From figures supplied by Jenks, *Migration*, p. 423. As a result of the 1870 and 1872, Perú ended up owing £32.6 million; in Latin America, Mexico and Brazil were a distant second, with £23.6 million and £23.06 million, respectively. Fred Rippy, *British Investments in Latin America, 1822-1949. A Case Study in the Operation of Private Enterprise in Retarded Regions* (Minneapolis: University of Minnesota Press, 1959) p. 25, Table 3 (Quoted hereafter as Rippy, *British Investments*).

However, unlike the previous loan, the subscription for the new Peruvian loan, which opened in January, 1872 at a number of major European cities, failed to attract investors; sales of the 1872 bonds were painfully stretched over several years.⁹ Dreyfus Brothers, the financial agent for the loan, was forced to retain some 70 percent of the issue. Of the total proceeds of the 1872 loan, almost 45 percent was applied to the purchase and conversion of a 1865 loan, some 12 percent to reimburse Dreyfus for advances on guano, leaving less than 38 for actual railroad construction¹⁰

One way of coping with the failure of the 1872 loan would have been to suspend or reduce the railroad-construction program. However, as it happened throughout the world, railroad building, once started, seemed to develop a life of its own. The construction of the diverse Peruvian lines conjured up a host of local contractors with enough political clout to prevent cancellation; furthermore, since their earnings were a percentage of total expenses, they had no interest in keeping costs down, and as a rule chose the most expensive routes.¹¹ Landowners receiving a sizable compensation for segments of their properties used for railroad lines, also had a stake in the operation.¹² The government chose to pay construction expenses with State bonds quoted below par in the already depressed Lima market, and the contractors inflated cost estimates in order to cover eventual losses due to a subsequent downward shift in bond prices. Thus, a new domestic debt in

⁹McQueen, *Peruvian Finance*, p.87.

¹⁰Clarke, *Perú*, p.19, 20; percentages computed by the author.

¹¹Dávalos, *Centuria*, 4: 255. Amayo-Zevallos, "British Policy", p.321 E. J. Hobsbawm admitted feeling "a grudging admiration even to the most obvious crooks among the railroad builders", and praised the "grandeur of the concept" of the Peruvian Central Railroad, inspired by "the romantic if rascally imagination" of Henry Meiggs (*Capital*, p.55). However, it is worth noting that a good part of the "grandeur" of the Peruvian railroads had more to do with inflating costs than with lyrical fantasies.

¹²Stewart, *Meiggs*, p.86.

railroad bonds emerged in Perú, and Meiggs was granted almost total control of the successive issues; the failure of the 1872 loan, forced the government to flood the local market with these new securities.¹³

The hope that the new railroads would pay for themselves proved illusory, since the location of the lines was hastily studied, placing unrealistic expectations on future traffic and revenues.¹⁴ Regional interests fuelled what one Peruvian Congressman termed a "legitimate emulation, peculiar to the human heart"; "each and every one of the [Peruvian] Deputies wanted to have a railroad", and some of them threatened Indian uprisings if their lines were discontinued.¹⁵ The ongoing railroad network, and its attendant bond issues, was further encumbered by a crisis on guano sales, upon which the entire scheme had been built.

3. The Guano Crisis

In 1869, the year of the highest volume of guano exports (see Table 1.2), the exceptional guano of the legendary Chincha Islands, consistently exhibiting a 35 to 37 percent nitrogen content, was exhausted. Guano extraction was transferred to the adjoining southern islands of Guanape, Maccabi, and Lobos, where the richest layers showed a mere 15 to 16 percent nitrogen content.¹⁶ In the following year, 1870, guano exports fell dramatically (Table 1.3), threatening to drag along the whole of the railroad-building program, as well as the service of the foreign debt. Piérola attempted to counteract the concomitant decline of government income by

¹³Basadre, *Historia*, 6: 172-174.

¹⁴One British observer stated that Perú had been busy constructing railroads "to the Milky Way". A.J. Duffield, *The Prospects of Peru: The End of the Guano Age and a Description thereof with some account of the Guano Deposits and 'Nitrate' Plains* (London: Newman and Co., 1881) pp. pp. 115-116. (Quoted hereafter as Duffield, *Peru*). One Peruvian Congressman described the second most expensive line, the Callao-Oroya line, as going "nowhere, because a railroad to Oroya is a railroad to nowhere" (Deputy Chacalatana, Perú, *DE1872*, 2: 505-506). See also: Stewart, *Meiggs*, pp. 103-107, 230-231, 295.

¹⁵Deputy L.B. Cisneros, Perú, *DE1875*, 23-Jun-1875, pp. 15-18.

¹⁶Barbance, *Bordes*, pp. 188, 190.

raising guano prices twice to £12 10sh per ton and then to £13,¹⁷ but guano exports fell too drastically for the new prices to have a significant effect. It is worth noting that the post-1869 fall in guano exports merely restored the level of sales of 1862-1865 (see Table 3.1), which had allowed the country to virtually suppress all domestic taxation. The shrinking of guano exports of the 1870s was viewed as a catastrophe only because Peru had embarked on the ambitious railroad-construction adventure, linked to the service of two massive foreign loans.

Table 1.3

Guano Exports and Prices, 1864-1874

Year	(1) Guano Exports (a)	(2) Price Guano (b)	(3) Total Income (c)
1864	381,622	n.a.	
1865	383,673	n.a.	
1866	436,778	n.a.	
1867	448,581	12.00	5,382,972
1868	540,426	12.00	6,485,112
1869	585,189	13.00	7,607,457
1870	482,299	14.00	6,752,186
1871	416,848	12.00	5,002,176
1872	436,388	12.00	5,236,656
1873	390,771	12.15	4,747,868
1874	355,600	13.00	4,622,800

(a) Long tons.

(b) British pounds per long ton,
FOB, UK.

(c) Computed by the author (1*2).

Source: Greenhill, "Peruvian",
p. 111; Rodríguez, "Historia",
p. 110.

¹⁷Basadre, *Historia*, 6: 149.

Coupled to the poor sales of the 1872 Peruvian bonds in Europe, the decline of guano exports triggered an economic crisis in Perú, readily acknowledged by the new President elect, Manuel Pardo, in his first address to Congress in July, 1872. As the head of the excluded *nacionales*, Pardo laid the blame for the crisis at the door of the Piérola faction. He stated that the current economic situation of Perú could be "summarized" in two figures: the 1872 loan was expected to yield merely 48 million *soles*, while the contracted railroads were expected to cost some 80 million *soles*.¹⁸ Incoming President Pardo was handed an irreversible legacy. The two foreign loans could not be undone, nor could the Dreyfus contract, particularly since the new guano syndicate held 2 million tons of guano, furthermore, the French firm had become a major government lender, both through advances on guano sales, and through the forced retention of a substantial portion of the bonds of the 1872 loan. Meiggs' construction contracts, and the corresponding domestic railroad bonds, were equally unassailable.

The 1872 Peruvian crisis was soon compounded by a world depression, starting by the closure of the New York Stock Exchange in September, 1873.¹⁹ The slump spread to Europe; Great Britain was affected both by developments in continental Europe, and by the failure of questionable railroad ventures in the United States.²⁰ The London financial market was further wrecked by a chain of important defaults, including loans to Egypt, Turkey and the United States.²¹ The ensuing recession was violent, lingering for some three years,

¹⁸President Manuel Pardo, "Mensaje", 23-Jul-1872 in: Perú, *Mensajes*, 2: 24-25, 49. However, it is worth noting that both the Piérola loans and the railroads garnered almost unanimous support in the Peruvian Congress.

¹⁹*The Economist* (London), 27-Sep-1873, p. 1174; 4-Oct-1873, p. 1201. Samuel Rezneck, *Business Depressions and Financial Panics* (New York: Greenwood Publishing Co., 1968) p.129 (Quoted hereafter as *Rezneck, Depressions*).

²⁰Juglar, *Crises*, pp. 285, 287.

²¹*The Economist* (London), 5-May-1879, pp. 505-506.

up to 1876.²² Of course, the dire predicament of European financial markets ruled out all hope of further foreign financing for Perú

Domestic bank lending had been abruptly discontinued in Perú since 1872. As the world depression worsened in the following year, dwindling export revenues triggered a flight of gold and silver, leaving the country in payment for imports. Interest rates swelled up to 15 percent per annum, domestic prices shot up, and a wave of bankruptcies of major import-export firms swept Perú in 1873-1874. The inevitable run on the Peruvian banks forced President Pardo to intervene, on December 18, 1873, by accepting domestic Bank bills as legal tender for payments to the State (typically, taxes).²³ However, Pardo demanded in turn that the Banks guarantee their issues of bills by purchasing State bonds.²⁴ This opened yet another source of government debt, both dangerous and vital, since public employees, including the Army, had not been paid, and military expenses had to be drastically reduced, generating unrest in the volatile Armed Forces.²⁵ Given the desperate situation of the Peruvian exchequer, the Pardo Administration turned its attention to the Tarapacá nitrate industry, both as an alternative source of revenue, and as an alleged competitor of guano in the world market.

4. Origins of the Estanco

Up to 1872 increased nitrate exports coincided with four consecutive years of high prices. However, after 1873, in line with the current world depression, nitrate prices plummeted from 15sh 10d per English quintal in 1872 to 11sh 9d and 12sh 7d in 1873 and 1874, while exports continued to grow from 4.2 million Spanish quintals in 1872 to a record high of 6.2 million in 1873, almost holding at an equally impressive 5.5 million in

²²Juglar, *Crisis*, pp. 285, 287.

²³Camprubí, *Bancos*, pp. 169-171; San Cristóval, *Pardo*, p. 70.

²⁴Francisco García Calderón, *Memorias del Cautiverio* (Lima. Librería Internacional del Perú, 1949) p.256. García Calderón, a former Finance Minister, was a prominent contemporary Peruvian banker.

²⁵Camprubí, *Bancos*, pp. 169-171; President Manuel Pardo, "Mensaje", 28-Jul-1874 in: Perú, *Mensajes*, 2 52-53.

1874 (Table 2.3). The immediate reaction in Perú to massive exports of Tarapacá nitrate at low prices was one of alarm, since it was feared that guano sales, already in decline, would be further affected. On August 27, 1872, the Peruvian Government organized a Commission to study nitrate and guano output and prices, particularly what type of competition, if any, existed between the two products.²⁶

²⁶*El Peruano* (Lima), 7-Sep-1872.

Table 2.3

*Tarapacá Nitrate Exports and Prices,
1860-1874
(Sp. Quintals, M. and L. Tons,
Shillings and pence, FOB, UK, per cwt.)*

Year	(1) Tarapacá Exports (Sp.Q.)	(2) Tarapacá Exports (M.Tons)*	(3) Tarapacá Exports (L.Tons)*	(4) Price (Sh.d./ cwt/UK)	% Change Exports*	% Change Pri- ce*
1860	1,376,248	62,557	58,564	12.6		
1861	1,358,691	61,759	57,317	13.9	-1.3%	9.4%
1862	1,829,017	83,137	77,831	12.9	25.7%	-7.8%
1863	1,540,963	70,044	65,573	14.6	-18.7%	11.6%
1864	1,695,587	77,072	72,153	15.3	9.1%	4.6%
1865	1,441,459	65,521	61,339	13	-17.6%	-17.7%
1866	2,157,685	98,077	91,816	10.1	33.2%	-28.6%
1867	2,358,327	107,197	100,354	10.9	8.5%	7.2%
1868	1,906,503	86,659	81,128	12.8	-23.7%	14.8%
1869	2,507,052	113,957	106,683	15.7	24.0%	18.5%
1870	2,943,413	133,792	125,252	15.3	14.8%	-2.6%
1871	3,605,906	163,905	153,443	16.3	18.4%	6.1%
1872	4,220,764	191,853	179,607	15.10	14.6%	-7.9%
1873	6,263,767	284,717	266,543	11.9	32.6%	-26.9%
1874	5,583,260	253,785	237,586	12.7	-12.2%	6.3%

*Computed by the author.

Source: (1) *El Veintiuno de Mayo* (Iquique), 14-May-1884.
 (4) 1860-63 - Hernández, *Salitre*, p.69.
 1864-69 - E. Malinowski, 16-Sep-1874,
 Gibbs, Ms. 11,132.
 1870-74 - Sen. Claro, *Chile, 501880*,
 pp. 281-7.

In his first address to Congress, President Pardo concentrated on the urgent need to reduce a growing budget deficit placed at 8.5 million *soles* (£1.7 million), noting that guano income was no longer available to the government since it was entirely absorbed by the service of the foreign debt. Thus, he underlined that there was no choice but to "create resources independent of guano revenue". Pardo dismissed an income tax as impracticable (in line with nineteenth-century thinking), and singled out an increase in customs duties coupled with a nitrate export tax as the only two possible sources of revenue available at the time. However, he went

on to disclose a broader approach with respect to the Tarapacá nitrate industry. After noting that nitrate exports had grown continuously for the last 22 years, and emphasizing "the worldwide monopoly held by Perú in the production of Tarapacá nitrate", he inquired

Is it not worth paying more attention to the fact that the increase of nitrate consumption and prices is due largely to its use in agriculture as a fertilizer, explaining without a doubt the shrinking of guano consumption, whose price as a fertilizer is today relatively higher than the price of nitrate?²⁷

This statement was important. Indeed, Pardo appeared as the first Peruvian President to officially endorse what might be termed a local doctrine on guano and nitrate. The prior Balta Administration had focused mainly on restricting government grants of nitrate deposits.²⁸ A negligible, 4-cents export duty imposed at the time was aimed mainly at generating additional revenue.²⁹ However, subsequently, during the discussion of the expropriation law, it was stated that President Pardo had not been the author of the notion of the guano-nitrate competition, pointing out that as early as October 21, 1871, a special commission had requested the Balta Government to provide precise information on the issue, "in order to find a solution to the threat posed by such competition".³⁰ In addition, the distinguished Italian scientific advisor to the Peruvian Government, Antonio Raimondi, in a massive three-volume study had emphasized the need for government intervention in the Tarapacá nitrate industry, although he focused on obtaining more revenue from nitrate.

It is well known [he wrote] that guano has served for many years as the main source of government revenue; but since saltpetre, or sodium nitrate, is gradually replacing guano in agriculture, it was the government's duty to find

²⁷President Manuel Pardo, "Mensaje", September 21, 1872, in: Perú, *Mensajes* 2:18, 21, 24-28.

²⁸The Balta Administration forbade further grants of such deposits on November, 1868; the deposits granted were estimated at some 60,000 hectares by 1871. Guillermo Billingham, *Legislación sobre Salitre y Borax en Tarapacá* (Santiago de Chile. Imprenta Nacional, 1903), p. 26, 30, 38 (Quoted hereafter as Billingham, *Legislación*)

²⁹Text of the decree in Dancuart, *Anales* 8: 160-161

³⁰It is worth noting that at that time, i.e., some three years later, the Deputy admitted that "we are still in the dark", without "reliable data" on the guano-nitrate competition. Deputy Estevez, Perú, *DE1875*, 16-Mar-1875, pp. 259, 262

in due time the way of obtaining from nitrate the income supplied by guano.³¹

Raimondi's position on the matter might have evolved during the period since two years later, in a report issued in 1875, he flatly stated that if nitrate prices increased to 16 shillings per English quintal would not find overseas buyers, and guano would be then "preferred to any other fertilizer"³² In 1873, Raimondi also recommended treating the new rock-hard guano with sulphuric acid in order to compete with nitrate, but warned that "the government should never be an industrialist, being entirely proven that any industrial task ends up costing [the government] more than to a private individual or company"³³

As formulated by President Pardo and Antonio Raimondi, the Peruvian doctrine on guano and nitrate was made to appear as relatively straightforward, but it ended up serving as the foundation for far-reaching legislation. The central premise of such doctrine contended that the fall of guano consumption was directly related to an increase in nitrate sales. Actual exports figures showing that years of low guano sales did not coincide with an upsurge of nitrate consumption were brushed aside as incidental. The possibility that sales of one or both products might not be price-driven was never examined. The elasticity of demand for both products was never properly discussed.³⁴ No attempt was made to establish some coefficient of cross-elasticity for the

³¹Antonio Raimondi, *El Perú*, 3 vols. (Lima: Imprenta del Estado, 1874-1891) 3:524.

³²Quoted by Deputy Cornejo, Perú, *DO1878*, 2: 639.

³³Antonio Raimondi, *Manipulación del Guano* (Lima: Imprenta de "El Nacional", 1873) p. 27. This passage was important, since the advocates of purchasing the nitrate industry (and, curiously enough, the opponents of the expropriation) abstained from quoting it, restricting their references to Raimondi's views on the alleged competition between guano and nitrate.

³⁴The elasticity of demand is the ratio of change in quantity demanded to associated change in price. A product with low elasticity, or highly inelastic, requires a very large change in price to have any significant impact on quantity demanded, conversely, a negligible change in price of a product with a high elasticity of demand has a substantial impact on quantity demanded.

two products.³⁵ The notion that the decrease in guano sales could be connected to the mismanagement of the fertilizer, coupled with a perceptible decline in quality, was either summarily dismissed or ignored. The supporters of the doctrine claimed that only an increase in nitrate prices could induce an expansion in guano consumption, allowing the Peruvian Government to raise the price of guano, thus providing additional State revenue. The doctrine was also based on the belief on a Peruvian "monopoly" of nitrate, excluding or slighting the importance of both adjacent Bolivian deposits, particularly those currently worked by the Antofagasta Company, and artificial substitutes such as sulphate of ammonia. However, the sponsors of the doctrine of the guano-nitrate competition differed on the means to bring about the desired increase in nitrate prices. The more restrained school, mainly President Manuel Pardo (at least up to early 1875)³⁶ and Antonio Raimondi, believed that nitrate prices should be raised through increased taxation; in contrast, a radical faction, surfacing in 1872-1873, pressed for direct government intervention in the Tarapacá nitrate industry, first by means of a State control on nitrate sales, later through an outright government purchase of all nitrate plants. Ultimately, most of the moderate wing, including Pardo, ended up yielding to the more ambitious projects of the sponsors of direct State intervention. Nevertheless, it is worth noting that the nitrate export duty proposed by the moderates was not intended merely to supply additional government revenue, but primarily to make nitrate more expensive than guano. In this sense, all Peruvian groups striving for some form of State intervention in Tarapacá had a basic premise in common: the protection of guano through increased nitrate prices. These groups expressed a joint belief that higher nitrate prices would not be met by expanded exports from Antofagasta, driving down prices in the process, because Perú had a "monopoly" on sodium nitrate. It is also worth noting that, in terms of actual exports and prices, the alleged guano "crisis" was far from being as catastrophic as the supporters of the new doctrine made it to be. As Table 1.3 shows, Perú had lost some 2 to 3 million *soles* in income in 1874,

³⁵A coefficient of cross-elasticity is the ratio of percentage change in price of one product to a percentage change in another product; if both products are complementary, the result will be a positive number; if both products are competitive (as the supporters of the doctrine claimed for guano and nitrate), the result would be a negative number.

³⁶See below p. 146 for the change of heart of the Pardo Administration on the matter.

but relative to the peak years of 1868-1869. As Pardo had admitted in his inaugural speech, the real problem was not so much the decline of guano income, but the excessive commitments on railroads. In concentrating on the guano "crisis", attention was drawn to the problem of shrinking income, rather than to bloated spending.

Taking a moderate position, but in line with the aim of raising nitrate prices relative to those of guano, in his first Presidential Address to Congress, President Pardo proposed a nitrate export duty, hoping that "this measure will trigger a further increase in the price of nitrate which will fall more on the consumer than on the producer."³⁷ The export duty proposed by Pardo amounted to 40 percent of the difference between the cost of a quintal of nitrate and the sales price in Iquique.³⁸

The idea of taxing nitrate was fully justified, although it proved difficult to enact. Since 1828, Tarapaca nitrate had been taxed temporarily for only five brief periods,³⁹ and many Peruvians viewed an unregulated Tarapacá nitrate industry as unduly favouring Chile. According to one contemporary author, President Pardo stated privately that "through the nitrate industry, a strong flow of capital was channelled towards Chile, and his idea and purpose was to bring to Lima those capital resources".⁴⁰ Prior to Pardo's proposal, two nitrate tax projects had been tabled in 1870 and in early 1872, indicating a growing dissatisfaction with the sheltered status of Tarapacá.⁴¹ Pardo's proposal was thus the third nitrate tax bill in two years. However, the Peruvian Congress went much further than President Pardo's proposal.

³⁷President Pardo, "Mensaje", September 21, 1872 in Perú, *Mensajes* 2: 17-31.

³⁸Deputy Juan Luna, Perú, *DE*1875, 22-Mar-1875, Appendix, p.XXII.

³⁹Bermúdez, *Salitre*, pp. 312-313.

⁴⁰Guillermo Billinghurst in: Perú, *DO*1878, 29-Jan-1879, 2: 635-636. See below, Chapter 9, for a full discussion of Pardo's nitrate policy.

⁴¹Deputy M.M. Galvez in: Perú, *DE*1876, 6-Jul-1876, p. 49.

5 The *Estanco*

Following the Pardo proposal for a nitrate duty, on September 25, 1872, Senator Félix Manzanares submitted a bill establishing an *estanco*, or State monopoly, of nitrate sales. The monopoly would make the Peruvian Government the sole buyer and seller of nitrate, thus directly regulating both the volume of exports and prices.⁴² An alternative proposal stipulating a 60-cents export duty on nitrate was also tabled.⁴³ After a brief discussion in the Peruvian Congress, on January 18, 1873, the *estanco* on nitrate was signed into law.⁴⁴ In spite of official acceptance, the *estanco* was never actually enacted, and a subsequent law, dated April 23, 1873, postponed indefinitely the implementation of the scheme.⁴⁵

However, the debate on the issue made clear that a substantial majority of Peruvian congressmen endorsed the notion that it was imperative to curtail current nitrate exports in order to "protect" guano. It also brought into sharp focus the leverage of a wide range of special interests currently dominating the Tarapacá nitrate industry, namely the owners of new plants and the Lima Banks supporting them. These special interests were able to exact such concessions in terms of authorized output and prices that it is safe to state that even if the *estanco* had been enacted the current level of nitrate exports, which had prompted the measure in the first place, would not have been significantly reduced, if at all.

The consensus on the emerging doctrine on the guano-nitrate competition was quite broad. The report issued by the Senate's Finance Commission on the *estanco* bill stated that the Italian scientist Antonio Raimondi had "proven" that nitrate competed with guano in the world market, and that it was imperative to induce an

⁴²Senator Félix Manzanares, Perú, *SO*1872, 21-Oct-1872.

⁴³Billinghurst, *Legislación*, p. 48.

⁴⁴Text of the *estanco* law in Bertrand, *Memoria*, Appendix "Peruvian Documents", pp. 13-15.

⁴⁵Billinghurst, *Legislación*, p.57.

increase in nitrate prices "to prevent the fall in the price, or the decrease in consumption, of guano"⁴⁶ The subsequent majority report of the Chamber of Deputies' Finance Commission embraced the notion that competition from nitrate was seriously affecting guano sales, threatening the "fiscal collapse" of Peru Nitrate, it was noted, was also heavily used to produce mixed fertilizers,⁴⁷ making it all the more dangerous as a competitor of guano. However the Chamber's endorsement of the doctrine of the guano-nitrate competition was more qualified than that of the Senate. Although the Chamber's report remarked that the growth in nitrate consumption "coincided" with the "brisk decrease" in guano sales, it also acknowledged that the quality of the latter had fallen due to the exhaustion of the valuable Chincha deposits. Furthermore, the report admitted that the available data on sales and prices of both products did not support "an arithmetical conclusion" (i.e., a strict statistical correlation) concerning the alleged guano-nitrate competition. However, it went on to state that, if both products were allowed to compete freely on the world market, it was also impossible "to determine where such dangerous path would lead".⁴⁸ Only the minority report of the Finance Commission of the Chamber of Deputies, signed by a single Deputy, took exception to the prevalent doctrine, denying that there was any factual evidence of an ongoing guano-nitrate competition, and noting that actual export figures proved nothing of the sort. The dissenting report argued that the advocates of the *estanco* were making a selective use of statistics, highlighting only those years where the decline of guano consumption matched an increase in nitrate sales. The

⁴⁶"Informe de la Comisión Principal de Hacienda del Senado", signed by Senators Emilio Althaus, Manuel Alvarez Calderón, and Juan Araoz, October 21, 1872. *El Comercio* (Lima), 21-Oct-1872

⁴⁷Although mixed fertilizers were manufactured with naturally-occurring substances such as sodium nitrate they were normally referred to in Perú at the time as "*abonos artificiales*", or "artificial manures." Throughout this work, I have applied the term "artificial" to veritable chemical substitutes such as by-product sulphate of ammonia.

⁴⁸"Informe de la Comisión Principal de Hacienda de la Cámara de Diputados", signed by Deputies José Boza, A.R. Chalcataña, and Federico Luna, December 21, 1872. *El Comercio* (Lima), 21-Dec-1872; Billinghamst, *Legislación*, pp. 50-55.

drop in guano sales, the minority report argued, was due to factors other than an expanded use of nitrate, mainly to the current competition between local consignees and Dreyfus in the world market.⁴⁹

The *estanco* debate also included the first official pronouncements regarding the Antofagasta Company, the rival Chilean-British corporation which could offset cuts in nitrate exports in Tarapacá by increasing its own sales. The Senate's Finance Commission, although acknowledging the existence of the Antofagasta nitrate works, argued rather vaguely that Bolivia had "weakened" its "natural monopoly" by "leaving the product in private hands"⁵⁰ The majority report of the Chamber's Finance Commission chose not to deal with the Antofagasta issue. However, the minority report of the same Commission stressed the fact that there was a rival nitrate company emerging in Bolivia [i.e., Antofagasta], suggesting that Perú was no longer able to dictate nitrate prices, even through a State monopoly on Tarapacá exports.⁵¹ Thus, a central question posed by government intervention in Tarapacá, the extent of Antofagasta competition, and by implication the degree of Peruvian control of the nitrogenous fertilizers' market, had been raised, although only a single dissenting report properly outlined its critical importance.

The explicit purpose of imposing State control on nitrate sales was to curtail exports of the product, thus driving up its price, higher nitrate prices would presumably allow the Peruvian Government to increase guano prices without affecting the sales of the latter. The *estanco* was an archaic Spanish institution widely applied, and universally detested, in colonial times. The sponsors of the legislation paid heed to the negative feelings

⁴⁹"Informe de minoría de la Comisión Principal de Hacienda", Deputy Juan Luna, December 18, 1872. *El Comercio* (Lima), 21-Dec-1872.

⁵⁰"Informe de la Comisión Principal de Hacienda del Senado", signed by Senators Emilio Althaus, Manuel Alvarez Calderón, and Juan Araos, October 21, 1872. *El Comercio* (Lima), 21-Oct-1872.

⁵¹"Informe de minoría de la Comisión Principal de Hacienda", Deputy Juan Luna, December 18, 1872. *El Comercio* (Lima), 21-Dec-1872.

conjured up by the very mention of the term by claiming that the nitrate *estanco* bore no relation to the colonial practice because it would not affect an article of domestic consumption⁵²

However, in spite of these assurances, the problems confronted in establishing a State monopoly on nitrate sales proved unsurmountable. First, the *estanco* compelled the Peruvian Government to purchase outright all nitrate output from the producers at a stipulated price. If the official price was too high, it would stimulate producers to flood the market with nitrate, increase the amount paid by the government to the producers, and force the State to store a growing (and expensive) volume of output in order to prevent a collapse in overseas prices. If the price offered was too low, it would cut into the producers' profits, and compel higher-cost producers to shut down their plants. Since most of the less efficient producers were Peruvian owners of archaic *paradas*, low official prices were certain to fuel domestic political opposition. Influential Peruvian owners of heavily-mortgaged new plants were also at risk, as were the local Banks who supported them.

Senator Manzanares, the official sponsor of the *estanco*, proposed paying nitrate in cash at the current market price. Although cash payments favoured producers, an unpredictable "current market price" did not. Yielding to pressure from Tarapacá, the Senate's Finance Commission fixed the price offered by the State at 2.40 *soles*, underlining that it was high enough to guarantee a "stable income" to nitrate producers⁵³. It was also one of the highest nitrate prices ever recorded⁵⁴. Since the price was also attractive enough to stimulate overproduction, Manzanares proposed banning private exports, and offering a reward for information on "clandestine exports".⁵⁵

⁵²"Informe de la Comisión Principal de Hacienda del Senado", signed by Senators Emilio Althaus, Manuel Alvarez Calderón, and Juan Araos, October 21, 1872. *El Comercio* (Lima), 21-Oct-1872.

⁵³"Informe de la Comisión Principal de Hacienda del Senado", signed by Senators Emilio Althaus, Manuel Alvarez Calderón, and Juan Araos, October 21, 1872. *El Comercio* (Lima), 21-Oct-1872.

⁵⁴An article in *El Comercio* (Lima) (4-Dec-1872) stated that current prices in Valparaiso stood at 2.42 *soles* per quintal, "the highest possible price".

⁵⁵Senator Félix Manzanares, Perú, *SO* 1872, 21-Oct-1872.

How much nitrate output should be authorized under government-regulated exports? The discussion in the Peruvian Congress did not do as much as broach the critical question of exactly by how much nitrate exports should be cut to induce a significant increase in nitrate prices, although that was the very goal of the operation. The sponsors of the *estanco* were confronted with a similar problem as that posed by establishing an official buying price. Allowing too much nitrate output would compel the State to make large cash payments, and bear the cost of holding substantial unsold stocks in order to cut down overseas sales. Fixing a drastically reduced authorized output would force most nitrate plants to shut down, or would thin down individual shares; in both cases, profits would be eroded, hurting producers and lenders. Ultimately, a supplementary decree to the *estanco* law fixed the total amount of nitrate to be purchased by the State at 4.5 million Spanish quintals, or some 205,000 tons, per annum, a figure somewhat higher than the 1872 level of exports (see Table 2.3). In addition, the decree ended up authorizing private exports, not banning them as originally proposed, upon payment of a 15-cents export duty during the first six months of the *estanco*, and 25 cents thereafter.⁵⁶ Thus, the whole purpose of the scheme, i.e., to restrict nitrate exports, had actually been defeated in the *estanco* legislation itself since the level of output accepted was actually larger than that of 1872, and it was certain that private producers would further increase total exports.

At 2.40 *soles* per quintal, the total disbursement required to purchase the 4.5 million quintals authorized amounted to 10.8 million *soles*, or some £2.2 million, taking into account the turnover of nitrate sold and paid, one estimate placed net charges for the government at £1 million.⁵⁷ Since the Peruvian Government, heavily involved in railroad construction, and facing the failure of the 1872 loan, had no resources to finance nitrate purchases, it had to seek out private entrepreneurs to do the actual buying and selling of the product (thus, substantially eroding the desired "State control" of nitrate exports). Two Peruvian groups, one dominated by Lima Banks, the other by Tarapacá producers, struggled for the privilege of managing the *estanco*; the Banks won out, establishing a managing company on July 13, 1873, controlled by the *Banco del Perú*, the *Banco de*

⁵⁶Text of the decree, dated July 12, 1873, in Bertrand, *Memoria*, Appendix "Peruvian Documents", pp. 15-18.

⁵⁷J.M. Rodríguez in Dancuart: *Anales*. 11:66, note.

la Providencia, and the *Banco Nacional*.⁵⁸ Signalling the growing influence of the Lima Banks, upon the failure of the *estanco* the new corporation was entrusted with collecting a 15-cents nitrate duty, earning a 3-cents commission per quintal, thus unnecessarily duplicating a State function, since the 15-cents duty was kept as a meagre substitute for the aborted *estanco*, the questionable arrangement operated up to July, 1875, prompting some scathing attacks in the Peruvian Congress, demanding that the corporation returned the commissions perceived.⁵⁹

In attempting to stem a growing nitrate output during a period of spectacular expansion in Tarapacá, the *estanco* called for a quota system. The amount of nitrate officially accepted by the government, albeit substantial, could simply not accommodate all plants currently established, much less those being constructed or planned. Senator Manzanares proposed that only the producers who actually exported nitrate during 1872 would be eligible to sell to the State, thus excluding outright all unassembled or projected *maquinas*, such as Barrenechea and Esperanza, owned by powerful domestic groups linked to Lima Banks. The subsequent report of the Senate's Finance Commission, clearly acknowledging political pressure, chose to make room for all entrepreneurs who had made "substantial investments" in Tarapacá, besides those who had actually produced in 1872; output quotas would be fixed, not on the basis of actual exports for 1872, but according to estimated capacity as established by the government "prudently and equitably." This idea was ultimately written into the *estanco* law, thus leaving the assignment of output quotas entirely open to domestic political influence. Competition for a share of the market had been replaced by competition for government-fixed quotas. The subsequent regulatory decree actually established a commission of five nitrate producers designated by the *Prefecto*, or political authority, of Tarapacá, which would submit an estimate of the productive capacity of each nitrate plant, fixing the percentages of the total yearly output allowed for each establishment.⁶⁰ Thus, the new

⁵⁸*El Comercio* (Lima), 22-Jan-1873, and 27-Apr-1874; Camprubí, *Bancos*, 109-110.

⁵⁹Perú, *DE 1875*, 15-Jul-1875, pp. 174-175, 184-187, 196-197.

⁶⁰Bertrand, *Memoria*, Appendix "Peruvian Documents", Article 6, p. 16.

arrangement constituted in fact a forced cartel within which five selected producers were empowered to decide which plants would produce and how much each plant would be allowed to sell every year. Of course, this also meant deciding how much income individual producers would have to forgo for the benefit of the scheme in terms of sales and profits. It is not surprising that Tarapacá producers sabotaged the proposed commission, refusing both to join it, and to supply the required figures on productive capacity⁶¹

The only supporters of the *estanco*, according to Finance Minister Elguera, were the small Tarapacá nitrate producers, (who obviously preferred a guaranteed high price to open competition); he added that the large producers opposed it "because they had constructed vast establishments in Tarapacá, hoping for a substantial output".⁶² Thus, the failure of the *estanco* scheme made clear that any attempt at curtailing Tarapacá nitrate exports would have to muster the support of a powerful coalition of Peruvian and foreign owners of new nitrate plants, including its influential backers, the Lima Banks; the lesser *paradas* no longer counted.

6. *The Crisis in Tarapacá*

The news that the Peruvian Government was formally attempting to intervene in the nitrate industry was followed by a violent downward shift in nitrate prices, falling from 15 sh 10 d in 1872 to 11 sh 9 d in 1873 and to 12 sh 7 d in 1874 (see Table 2.3). The impact of declining nitrate prices on Tarapacá was notoriously disruptive. Already in January, 1873, trade in Iquique was reported to be at a virtual standstill.⁶³ A mutiny in

⁶¹Billinghurst, *Legislación*, p.61.

⁶²Elguera, "Memoria 1874" 10:125. Minister of Finance Juan Ignacio Elguera, "Memoria de Hacienda de 1874 (July 28, 1874)" in: Dancuart, *Anales* 10:125 (Quoted hereafter as Elguera, "Memoria 18").

⁶³*El Comercio* (Lima), 22-Jan-1873.

Tarapacá, in early August, 1873, further complicated the situation.⁶⁴ At the end of September, 1873, all reports on economic conditions in Tarapacá underlined a virtual suspension of nitrate sales.⁶⁵

The reaction to the *estanco* in Valparaíso, Chile, was uniformly critical, adding an international dimension to the crisis; the Chilean press reported regularly on the disastrous situation of Tarapaca, particularly the price increases in articles of daily consumption, like foodstuffs, the massive exodus of workers, and the growing stoppage of plants. The number of workers leaving Iquique was placed at more than one thousand in 1873.⁶⁶

The 1873-1874 nitrate crisis had a drastic impact on all the Tarapacá enterprises, including the emergent Chilean and Peruvian joint-stock companies. However, it is worth noting that the period 1873-1879 saw a variety of crises, of which the commotions of 1873-1874 were merely the preamble. An accurate assessment of the effects of the *estanco* period requires previously unavailable data for the 1875-1879 period in order to measure the long-term changes in ownership of nitrate plants. In addition, the turmoil of 1873-1874 had a different impact on Chilean and Peruvian Tarapacá enterprises. About half of the Valparaíso nitrate joint-companies not only survived, but some were further "Chileanized", while all but one of the Lima companies were virtually bankrupt, and unable to produce. However, it is worth noting that, as Table 3.3 shows, over 144 out of 165 Tarapacá nitrate enterprises, including 49 out of 70 *máquinas*, representing some 63 percent of total estimated capacity, were not organized as joint-stock companies. It would be misleading to evaluate the impact of the 1873-1874 crisis focusing exclusively on joint-stock ventures.⁶⁷

⁶⁴The brief uprising was led by General Vivanco, an old Peruvian *caudillo*, colonel Gregorio Albarracín was in charge of the movement in Tarapacá. *El Comercio* (Lima), 18-Aug-1873.

⁶⁵*La Patria* (Valparaíso), 1-Nov-1873, quoted from *La Patria* (Lima), 27-Sep-1873.

⁶⁶*La Patria* (Valparaíso), 1-Sep-1873.

⁶⁷This was partly the case of O'Brien (*Nitrate*, pp. 10-25) with respect to non-incorporated Peruvian ventures, although he aptly covered Chilean individual entrepreneurs (*Ibid.* p. 14).

Table 3.3

*Joint-Stock Companies, and
Non-Joint-Stock Ventures,
Tarapacá, 1876*

Type	No.	Capacity (Sp.Q.)	% Value	Value (Soles)	% Cap.
Joint-Stock	21	6,904,000	36.79	7,825,942.20	32.72
Non Joint-St. (1)	49	11,648,000	52.46	11,158,325.98	55.19
Non Joint-St. (2)	95	2,551,400	10.75	2,286,625.36	12.09
Total	165	21,103,400	100	21,270,893.54	100
(1) Máquinas					
(2) Paradas					

Source: Derived from Table 1, Volume 2.

The record of the eight Valparaíso nitrate companies which passed the stage of mere projects was mixed. In most of them, the controlling interest held by the main original stockholders, whether Chilean or foreign, was decisively altered by their financial difficulties. The need to resort to borrowing, exacerbated by the *estanco* crisis, altered the ownership or the control of most of the Valparaíso companies, strengthening the position of lenders.

Of the successful Chilean operations, Sacramento was probably the best, since it did not discontinue operations, although the Peruvian Loayza's original commanding position evaporated to the benefit of Chilean financiers.⁶⁸ The Italian Félix Massardo continued operating Solferino, although the plant was heavily mortgaged to the Bank of London.⁶⁹ In spite of being termed "unexceptional", the Santa Catalina plant, owned by the América Company, did not interrupt operations, albeit it was subsequently operated by a foreign

⁶⁸Chile, *SSA 1881*, February, 1880, and 24-Dec-1881. *El Veintiuno de Mayo* (Iquique), 13-Jan-1884. See Volume 2, Table 1, for the evolution of the plant.

⁶⁹The Bank of London received fully 89 percent of the bonds issued for the plant in 1878. Chile, *Diario Oficial*, 3-Jul-1882, p.1063; Chile, *JPT 1882*, 12-Oct-1882. See Volume 2, Table 1, for the evolution of the plant.

contractor; the *parada* Dolores, also owned by the same company, had no record of output.⁷⁰ San Carlos was reported as "well managed" in 1875, but it was indebted to the Bank of London, and handed over to the German firm of Folsch and Martin in 1878, which ended up owning the plant after 1880.⁷¹ The case of the Pisagua company was more complex; the company acquired the plant "Porvenir", and the *parada* "Santiago" from the firm Lafuente and Nephew, paying dividends in 1872, but collapsed in 1874.⁷² Some of the stock of the Pisagua Company was auctioned out in Santiago prior to its downfall.⁷³ However, the Porvenir plant did not halt production at least since 1878, although it was operated by the British firm of Brooking, James and Company, continuing operations after 1879, the ownership of the plant fell in the hands of the Chilean firm of A. Edwards at some time between 1874 and 1878, but *circa* 1881 a British firm repossessed the enterprise.⁷⁴

Nueva Carolina appeared to have been a totally failed venture since there is no record of actual production, and it was uniformly reported in bad condition during the mid-1870s and after 1879.⁷⁵ Some of the stock of the company was auctioned in 1874 at discounts as high as 70 percent.⁷⁶ Although the Chilean

⁷⁰The German entrepreneur Otto Harnecker operated Santa Catalina under a production contract with the Peruvian Government since 1877 (see Table 3, Volume 2). The characterization of Santa Catalina was made in 1875. Perú, "Informe especial", p. LI. See Volume 2, Table 1, for the evolution of the plant.

⁷¹The 1875 assessment of the plant was made in Perú, "Informe especial", p. LI. See Volume 2, Table 1, for the evolution of the plant.

⁷²*El Comercio* (Lima), 20-Mar-1871, reports the establishment of the plant by Lafuente O'Brien (*Nitrato*, 14, 22) furnished the data on the 1872 dividends and the 1874 bankruptcy proceedings.

⁷³*La Patria* (Valparaíso), 11-Mar-1874.

⁷⁴J.O. Délano, linked to A. Edwards, received all of the bonds issued for Porvenir in 1878 (Chile, *Diario Oficial*, 3-Jul-1882, p. 1063. The repossession by Edward Brooking and Henry B. James was recorded in (Chile, *ANI*, Vol. 59, expediente 271. 20-Apr-1880; 13-Jul-1881. See Volume 2, Table 1, for the evolution of the plant.

⁷⁵See Volume 2, Table 1, for the evolution of the plant.

⁷⁶*La Patria* (Valparaíso), 11-Mar-1874.

partners ended up controlling the company, Negreiros' history was marred by litigation among the stockholders, and it appeared not to have worked as a mechanized operation.⁷⁷ The California plant was never assembled, and the associated plant, Concepción, was severely flawed, a supplier, Serdio Brothers, ended up controlling the company.⁷⁸ The Valparaíso plant remained unassembled.⁷⁹ The Chucumata company was organized to buy up the plant "Salar del Carmen", but failed to do so.⁸⁰

Thus, on the whole, of the twelve nitrate companies established in Valparaíso in the early 1870s, three never went beyond the stage of mere projects, four were actually organized but there is no record of actual operations, one paid dividends, produced for some two years, collapsed, and was transferred to a different Chilean owner, and four remained active both prior and immediately after 1879, albeit with some changes in ownership. Of course, the most important of the Valparaíso nitrate companies of the early 1870s, the Antofagasta Company, was clearly, if not spectacularly successful, both under the original British-Chilean ownership, and after a subsequent 'chileanization' process in late 1878.⁸¹ Although the overall performance of the Valparaíso nitrate companies of the early 1870s was not altogether satisfactory, it was not an unmitigated disaster, as one recent account of the period claimed.⁸² This account was based on short-term data for the

⁷⁷The Chilean stockholders received 95 percent of the bonds issued for the plant in 1877, while the Peruvian José María Vernal held merely 5 percent (Chile, *Diario Oficial*, 3-Jul-1882, pp. 1069-70). The legal controversy was reported in Peru, "Informe especial", p. LIV.

⁷⁸Serdio Brothers was merely a minority stockholder in 1872, but received over 90 percent of the bonds issued for Valparaíso in 1878, while the Bank of London held some 4 percent (Chile, *Diario Oficial*, 3-Jul-1882, pp. 1063, 1065, 1070, 1071). See Volume 2, Table 1, for the evolution of the plant.

⁷⁹See Volume 2, Table 1, for the evolution of the plant.

⁸⁰O'Brien found that Pisagua actually paid dividends in 1872, and collapsed in 1874 (*Nitrate*, p. 14), but he did not explain how this was done since the company failed to acquire "Porvenir".

⁸¹The shares of the Antofagasta Company were quoted in Valparaíso alongside the rest of the nitrate companies (Cf. *La Patria* (Valparaíso), 21-Jul-1873).

⁸²O'Brien, *Nitrate*, pp. 10-25.

1872-1874 period, failing to note that the four surviving Valparaíso companies managed to weather all 1874-1879 crises without falling under foreign control⁴¹ Furthermore, excluding the three aborted projects, i.e., Chucumata, Chilena and Peruana, and including the Antofagasta Company, five successful ventures out of a total of ten could be considered acceptable, particularly in the light of the formidable disruptions brought about by a world depression and increasing government intervention in Tarapacá⁴²

Of the non-incorporated Chilean nitrate ventures, 'Salar de la Noria', owned by Daniel Oliva, continued working until 1881, while 'China', with the same owner, collapsed around 1876⁴³ 'Victoria', belonging to Soruco & Co., a Valparaíso firm, was reported closed down in 1876, as did 'Santa Laura de Barra', owned by Barra y Riesco, they never reopened⁴⁴ Not enough information is available to determine if these ventures were discontinued due to the rigours of the 1873-1874 period, or their machinery or deposits simply reached the end of their useful life

The joint-stock companies organized in Lima during the same period were decisively shattered, although the crisis might have simply exacerbated internal management flaws. As of January, 1874, the total nominal capital of all joint-stock companies listed in Lima amounted to some 78 million soles of which some 42 million soles had been paid up.⁴⁵ Only three nitrate companies were quoted at the time, Barrenechea, La Peña and Rimac, with a total nominal capital of some 2.1 million soles of which some 1.6 million soles had been paid up (see Table 5.3). Thus the Peruvian Tarapaca companies quoted in Lima in early 1874 represented less than 4

⁴¹This was particularly true of the troubled Pisagua company, since O'Brien ended his account of the venture in the 1874 bankruptcy without being aware that the Chilean J. O. Délano received the bonds issued for the company in 1878 (*Nitrate*, p. 22). In general, O'Brien's analysis was somewhat limited by his lack of knowledge of the identity of the bond recipients, which throws light on the ultimate fate of many plants

⁴²For the 1873-1875 period see below pp. 91-93

⁴³See Table 1, Volume 2.

⁴⁴See Table 1, Volume 2.

⁴⁵*El Comercio* (Lima), 10-Jan-1874. Totals and percentages computed by the author.

percent of total nominal capital, and less than 3 percent of total paid-up capital, of all the joint-stock companies listed at the time in Peru

Three additional Peruvian nitrate companies established in the 1870s boom, *Ahanza*, *Esperanza*, and *Providencia*, were not listed at the time, their combined assets were subsequently valued at some 15 million *soles*, slightly less than 1 million of which corresponded to the estimated price of *Esperanza*. *Ahanza* and *Esperanza* were unequivocally tailed ventures: the first company never actually built a plant, and the second, unable to produce nitrate, was crippled by a stunted railway line. Only *Providencia* was later reported as having constructed a viable plant, although it is not known if it ever produced any nitrate.⁶⁸

In early 1874, the Peruvian nitrate joint-stock companies were harshly criticized in the Lima press for having "exaggerated" the prospects of their enterprises, distributed free stock to its directors, operated with insufficient capital, and appointed "respectable citizens" as purely perfunctory inspectors; it was also charged that the companies had priced its shares low enough so as to bring them within reach of the ignorant classes.⁶⁹ This last charge might have applied to the *Barrenechea* Company whose stock was modestly priced at 500 *soles* (some £100 at an exchange of some 48 s, but possibly some 170 at the current, falling exchange), but it was much less true of both *La Peña* and *Rimac*, whose prices per share were considerably higher at 10,000 and 20,000 *soles* respectively (see Table 4.3)

⁶⁸See Table 1, Volume 2.

⁶⁹*El Comercio* (Lima), 10-Jan-1874

Table 4.3

*Peruvian Nitrate Joint Stock Companies
Listed in Lima, 1874
(Soles)*

Company	Nominal Capital	No. Stock	Price p. Stock	% P-up	Paid-up Capital*	Disc-ount
Barrenechea	1,300,000	2,600	500	90%	1,170,000	60%
La Peña	410,000	41	10,000	75%	307,500	n.o.***
Rímac**	640,000	32	20,000	50%	320,000	n.a.
Total*	2,350,000	2,673			1,797,500	

*Computed by the author.

**Capital increased to 800,000 on 27-May 1874.

***No offers.

Source: *El Comercio* (Lima), 27-Apr-1874, 13 May-1874, and 27-May-1874.

The organizer of the troubled Barrenechea Company, José Antonio Barrenechea, came under attack because of his association with the *Banco Garantizador*, a Bank actually organized and managed by Barrenechea since 1872.⁸⁰ The *Banco Garantizador* was originally established with a capital of 1 million soles, increased by 1874 to 2 million, of which only 400,000 were paid-up.⁹¹ The "competence" of José Antonio Barrenechea in managing both a Bank and a nitrate enterprise was questioned.⁹² Subsequently Barrenechea resigned as a

⁸⁰Other stockholders were Henry Meiggs and his associate Charles Watson; John Dawson, manager of the Bank of London, Mexico and South America (BOLSA); Julián de Zarándegui, one of the owners of the Esperanza Company, Senator Emilio Althaus, and nitrate entrepreneur Guillermo Scheel *El Comercio* (Lima), 10-Oct-1872

⁹¹*El Comercio* (Lima), 10-Jan-1874

⁹²*El Comercio* (Lima), 24-Mar-1874, Untitled article signed by "A stockholder".

manager of the *Banco Garantizador*;⁸³ however, he remained as a member of the Board of Directors of the life-insurance company *La Paternal*⁸⁴

The criticisms levelled at Barrenechea in 1874 drew attention to the dangers of interlocking directorates, particularly those involving the banking system, but Julián de Zarándegui's case was more spectacular since he officially filed for bankruptcy around June, 1874, leaving a wave of unpaid creditors, and conjuring up the spectre of a sequel of kindred failures. Besides being the organizer of the Esperanza Nitrate Company, Zarándegui was also a stockholder of the *banco Garantizador*⁸⁵ and one of two General Managers of the *Banco de Lima*, a more important undertaking with 5 million soles of nominal capital.⁸⁶

Zarándegui's bankruptcy it was stated, 'carried [with him] many widows and poor people' including his partner in the Esperanza Company, Ascencio Almonte, who had withdrawn funds from the Bank of London, Mexico and South America (BOISA) to provide working capital to his associate. Zarándegui was charged with accepting these funds, in spite of knowing that he was already bankrupt. The climate prevailing during the early 1870s boom coupled with the estanco legislation were suggested as two of the leading causes of Zarándegui's failure. During the early 1870s most of the [nitrate] industrialists embarked upon the establishment of expensive machinery, without having capital of their own, and using as collateral their two or three *paradas*. 'In that fever nothing was respected'. The *estanco* had exacerbated the situation of the incipient nitrate companies, sowing havoc in Tarapacá.

The only firms currently [i.e., June, 1874] working regularly and making a profit are the Tarapaca Nitrate Company [Gibbs] and Guldemeister, because they [operate] with their own capital, and had the good sense of purchasing rich deposits.

⁸³*El Comercio* (Lima), 29-Apr-1874

⁸⁴He was listed as such in *El Comercio* (Lima), 30-Mar-1874.

⁸⁵*El Comercio* (Lima), 29-Apr-1874

⁸⁶*El Comercio* (Lima), 3-Jan-1873

It was claimed that Esperanza had good deposits that the existing facilities were already capable of producing some nitrate, and that merely 14 miles of railroad line were needed to complete the Patillos railway. However, Zaraqondegui's financial downfall made the future of Esperanza uncertain, and it was regretted that he had refused an offer of 300,000 *soles* for the company made by Dreyfus some two years before.⁹⁷ At the end of 1874, Zaraqondegui delivered part of his stock in Esperanza, as well as some stock of the Providencia Nitrate Company, to one of his creditors.⁹⁸ The fact that Zaraqondegui also owned stock of the Providencia Company showed how closely linked the Peruvian nitrate ventures were at the time. Of course, it was hardly surprising that all of bonds subsequently issued for the purchase of Esperanza were delivered to the *Banco de Lima*.⁹⁹

The Rimac venture was the only Peruvian nitrate joint stock company operating at the time. In May, 1874, the company actually increased its capital from 540,000 to 800,000 *soles*, issuing new stock valued at 1,000 *soles* per share, the development followed the announcement of the completion of both its plants, Carmen Bajo and Perla.¹⁰⁰ However, the generalized failure of Peruvian joint stock companies did not mean that Peruvians had been totally eliminated from Tarapaca. Unlike the Chilean case, the non-incorporated Peruvian *maquinas* performed somewhat better than the Lima joint stock companies.¹⁰¹ In fact one Peruvian firm, Loayza y Pascal, managed to purchase a group of *paradas* operations known as Angela from a British owner, install a *máquina*, and work the plant successfully well into the post-1879 period.¹⁰² The most solid of all the Peruvian

⁹⁷"Estado del salitre y quebra de Zaraqondegui", *El Comercio* (Lima), 11-Jun-1874

⁹⁸*El Comercio* (Lima), 18 Dec-1874

⁹⁹See below Table 2.5, Chapter 5

¹⁰⁰*El Comercio* (Lima), 27 May 1874

¹⁰¹This was yet another gap in O'Brien's analysis of the period, he concentrated exclusively on Peruvian joint-stock companies, leaving out the rest of the Peruvian ventures (*Nitrate*, pp. 10-24)

¹⁰²The purchase and revamping happened after 1876. See Table 1, Volume 2

ventures, "San Lorenzo de Ugarte y Cevallos", owned by the firm of the same name, managed to produce both prior and after 1879, remaining under the same owner¹⁰³ However, the Peruvian plants in good condition in 1876 numbered only six (excluding Angela—a post 1876 acquisition)—representing less than 13 percent of the total assessed value of Peruvian owned enterprises, and all of them were transferred to non-Peruvians prior or after 1879¹⁰⁴ Loayza y Pascal and Ugarte y Cevallos were the only Peruvian owners of nitrate plants able to keep on producing between 1873 and 1879, and to continue operations after the War of the Pacific.

The European firms operating in Tarapaca did not go unscathed. Gibbs—perhaps the most efficient nitrate producer, showed losses close to 400,000 soles in 1873-1874, and considered selling off its Tarapaca properties, lesser European producers, such as Clark, Eck—pressed by creditors—halted operations in 1874, as did the German firm of Folsch and Martin¹⁰⁵ On the whole, the 1873-1874 crisis placed the less efficient producers on the verge of bankruptcy, although it did not necessarily increase the leverage of the European firms, in May, 1873, the only available estimate on Tarapaca production per nationality indicated that 8 active European *oficinas* had accounted for almost 25 percent of total nitrate production in 1872, an impressive figure, but not a sign of overwhelming supremacy¹⁰⁶

7 The Impact of the Estanco

Both during and after the *estanco*, different reasons were given for the abrupt drop in nitrate prices of 1873-1874, laying perhaps too much of the blame on the failed scheme, while overlooking the world economic recession in general, and the Peruvian financial crisis in particular. The records of the contemporary Bordes

¹⁰³See Table 1, Volume 2

¹⁰⁴See Table 1, Volume 2

¹⁰⁵O'Brien, *Nitrate* pp. 10-24

¹⁰⁶O'Brien, *Nitrate*, pp. 19 (Table 2), 23. It is worth noting that O'Brien considered that this 25 percent was tantamount to a demise of the Chilean presence in Tarapaca prior to 1879, while failing to examine the non-incorporated Peruvian ventures.

shipping firm ascribed the plummeting nitrate prices largely to the fact that the rumours of a State sales monopoly had attracted a large number of speculators (or *laineurs d'occasion* as the text reads) 'who only purchased the article in view of the [impending government] monopoly and greatly contributed to the desorganization of the market.'¹⁰⁷ A Chilean Government Commission pointed out in 1880 that the nitrate producers never really believed in the success of the *estanco* but were certain that a high export tax would be ultimately established: this belief would have led the owners of Tarapaca plants to overproduce, triggering a crisis in the nitrate industry.¹⁰⁸ A contemporary author singled out the attempt at imposing an *estanco* as a major contributing factor for the failure of some ten Chilean joint stock companies formed at the time to produce nitrate in Tarapaca. He noted that the value of their shares fell when the *estanco* was announced, credit to the producers was discontinued, and Chilean investors became permanently skeptical of nitrate ventures.¹⁰⁹

However, as Table 2.3 shows, although nitrate prices did start to fall in 1873, the year of the *estanco* project, the declining trend continued unabated through 1874, i.e. long after the collapse of the Peruvian Government's scheme. This seems to indicate that more lasting forces were at work, inducing a long run decline in nitrate prices. The overcapacity produced by the unprecedented wave of new nitrate plants since 1870 was nothing short of spectacular, and it would have certainly created a dramatic turmoil in the nitrate industry, with or without government intervention. Of course, the world depression which broke out in 1873, also affecting Valparaiso, a major purchasing market for nitrate, beset by rising interest rates and credit restrictions,¹¹⁰ was a major factor underlying the critical situation of Tarapacá.

¹⁰⁷ Barbance, *Bordes*, p. 196. Translation by the author.

¹⁰⁸ Chile, "Informe de la Comisión Consultiva de Salitres", June 8, 1880 in Chile, Ministerio de Hacienda, *Memoria del Ministerio de Hacienda presentada al Congreso Nacional por el Ministro de Hacienda en 1880* (Santiago de Chile: Imprenta Nacional, 1880) Appendix, pp. 4-5 (Quoted hereafter as Chile, *Memoria Hacienda* (followed by year)).

¹⁰⁹ () Brica, *Nitrato*, p. 24.

¹¹⁰ See *La Patria* (Valparaiso), 4 Feb. 1874.

Possibly one of the only unequivocal consequences of the *estanco* was the strengthening of the resolve of the growing number of Peruvians endorsing the doctrine of a guano-nitrate competition to do something drastic about the Tarapacá nitrate industry. This attitude was perhaps reinforced by the fact that nothing could be done to solve fiscal insolvency on far more fundamental areas such as guano and railroads; in a sense, the call for government intervention on Tarapacá nitrate became something of an evasion in the face of an irrepressible domestic crisis. A mounting chorus in Peru pointed out that falling prices made nitrate far more attractive than the overpriced guano to foreign consumers, further displacing guano from the world market.

8. *The Antofagasta Company, 1873-1874*

In contrast with the heterogeneous Tarapacá nitrate industry, the Antofagasta Company was an isolated operation in the Bolivian Pacific littoral. The Chilean-British enterprise had been established on the basis of a specific concession of the Bolivian Government granted in 1872.¹¹¹ However, since the area had been subject to conflicting claims by both Bolivia and Chile since the 1860s, regulated by a formal Treaty in 1866,¹¹² the CSA developed in a rarified diplomatic climate. The legal regime of the company, particularly taxation, was linked from the outset to strained international relationships. In December, 1872, a Bolivian-Chilean agreement known as the Lindsay-Corral Protocol established condominium rights over the littoral, and gave Chile the right to share government revenues from part of the area, including nitrate.¹¹³ An aborted military coup in the Antofagasta region, led by the Bolivian General Quintin Quevedo in August, 1872, who used Valparaiso as a

¹¹¹See above p. 56

¹¹²Text of the 1866 Chilean-Bolivian Treaty in Aldunate, *Leyes, Chilean Documents*, pp. 1-2

¹¹³Robert N. Burr, *By Reason or by Force: Chile and the Balancing of Power in South America* (Berkeley University of California Press, 1965) p. 123 (Quoted hereafter as Burr, *By Reason*)

springboard, gave rise to suspicions of Chilean involvement in Bolivia and Peru¹¹⁴ Perhaps the Quevedo incident contributed to the signing of a secret Treaty of Defensive Alliance by Bolivia and Peru on February 6, 1873, both countries agreed to take joint action in case one of the parties was threatened with loss of territory, or with any condition restrictive of sovereignty or independence¹¹⁵ The episode illustrates both the diplomatic tension in the area and the recurrent threat of Bolivian military coups staged from the Pacific littoral. The isolation of the Antofagasta region with respect to the changing governments of the Bolivian highlands (Cobija, the main Antofagasta port lay at some 30 days march from Potosí, the closest mining centre in the highlands)¹¹⁶ made it an ideal starting point for a prospective coup. The adjoining silver deposits of Caracoles were an additional incentive for disaffected Bolivians since they could help finance rebellions against the government.

In spite of explicit provisions of the 1866 Treaty excluding all additional taxation, the local municipal authorities, rather than those of La Paz, seemed to follow an autonomous and erratic policy in the littoral. An official announcement stating that customs duties for the Antofagasta region would be raised starting on June 1, 1873, created havoc, inducing all local enterprises to order large purchases prior to the stated date, however, in May, 1873, the decision was "postponed" for another three months, leading to the belief that the Bolivian authorities had "deliberately triggered this movement in order to increase customs income for this month"¹¹⁷

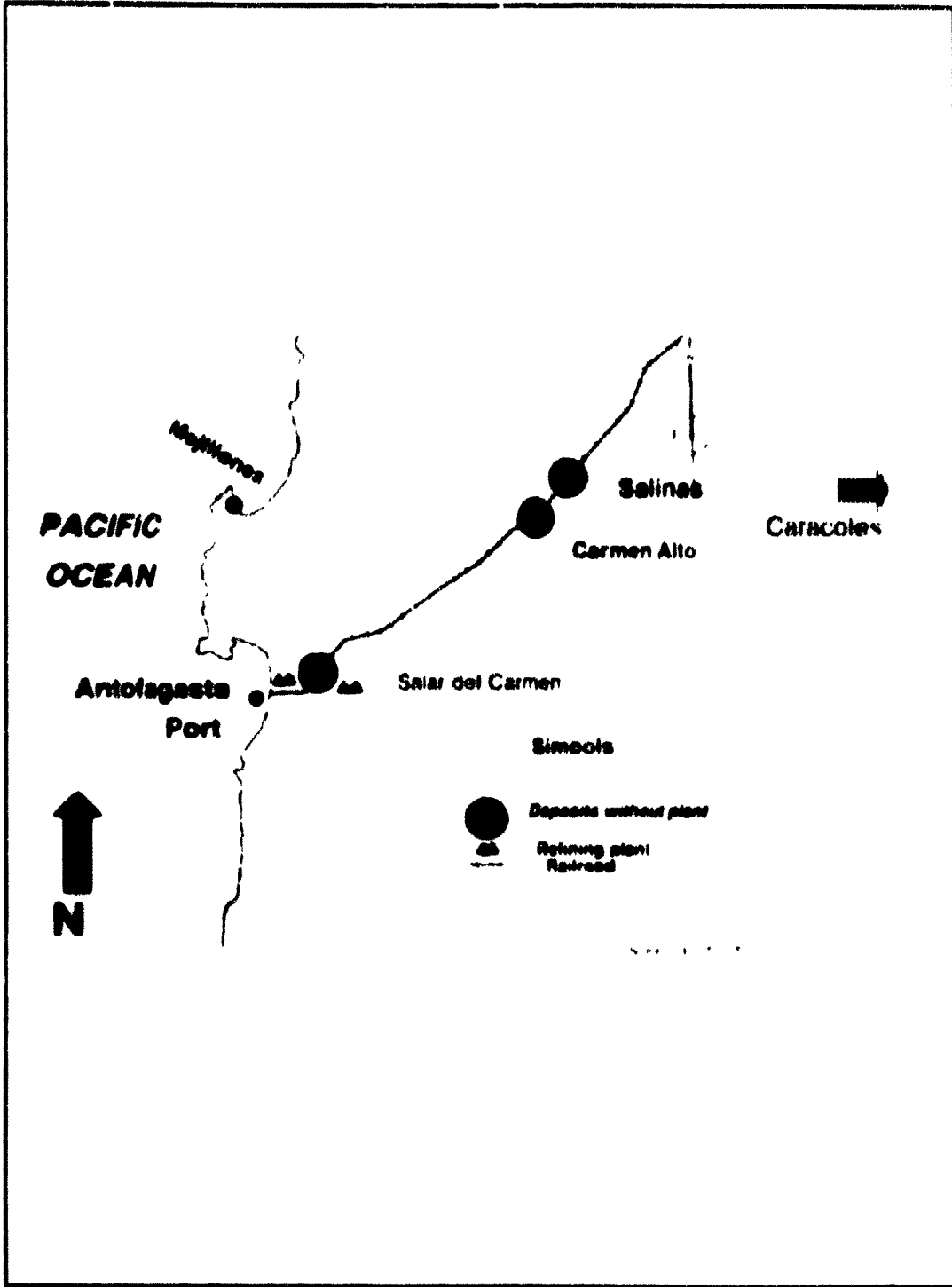
¹¹⁴Arce, *Antofagasta*, pp. 141, 143-144. However, George Hicks, manager of the Antofagasta Company, saw the crushing of a subsequent Quevedo coup in 1875 as "advantageous for everybody", noting that these periodic Bolivian uprisings were looked upon as "a Bolivian farce" even by local workers (Hicks to Soublette, Antofagasta, 15-Jan-1875 and 26-Jan-1875 CSA AG Vol. 6, fs. 045-048, 055, 058). The opposite view, charging Chilean complicity with Quevedo, was espoused most recently by the Bolivian historian Querejazu (*Guano*, pp. 113-114). Hicks wrote in Spanish to Valparaiso, the translation into English was made by the author.

¹¹⁵Burr, *By Reason*, p. 124. In a Bolivian account, the current Minister of Foreign Affairs of Argentina, when invited to join the Treaty, was quoted as remarking that the pact "looked more like an offensive than a defensive one" (Querejazu, *Guano*, p. 63).

¹¹⁶Querejazu, *Guano*, p. 8.

¹¹⁷Hicks to Soublette, Antofagasta, 16-May-1873, CSA AG Vol. 4, fs. 253.

Map 3. Sites used by the Antofagasta Company, 1872-9



Based on Bernádez, *Salitre* (2), p. 134.

In addition, another local authority demanded the CSA to pay a newly invented import duty on galvanized iron needed for the construction of the company's railroad line. Only the intervention of former Prefect Ruperto Fernandez succeeded in suspending the measure.¹¹⁸ However, the situation in Antofagasta remained tense, and the company sought to reach a clear understanding with the Bolivian Government with respect to taxation.

Through a Bolivian lawyer, Belisario Pero, the CSA signed a modified agreement on November 27, 1873, known as the Pero Transaction.¹¹⁹ Basically, the accord granted the Antofagasta Company an additional tract of recently discovered deposits, referred to as Salinas (see Map 3), as well as the right to exploit and export nitrate by the port of Antofagasta free of all export duties, and of any other municipal or fiscal taxes for fifteen years, starting in January, 1874. The CSA was also awarded the right of construct a railroad from the port of Antofagasta to the Salinas deposits, but exclusively for the transport of nitrate and articles required to produce nitrate, i.e., excluding other types of commercial cargo, as well as passengers. The Bolivian Government had granted a concession to the entrepreneur Henry Meiggs to build a railroad between the adjacent port of Mejillones and the Caracoles silver district (see Map 3), and the Pero Transaction explicitly forbade the CSA to affect or encumber the operation of such line. The CSA was interested in extending the Antofagasta railroad to Mejillones, and the conflict with Meiggs over the issue opened yet another source for conflicts in the area. Indeed, in February, 1872, the Bolivian Government, actually issued a decree ordering the CSA to suspend the construction of its railroad, a measure inspired, according to the current Prefect, by the Mejillones lobby. It took the full support of two successive Prefects, Ruperto Fernandez and Aniceto Arce, as well as public meetings and statements from the Caracoles miners for more than a year, to nullify the decree in June, 1873.¹²⁰ Thus, the Pero Transaction, although denying the Caracoles extension, furnished the CSA

¹¹⁸Hicks to Soublette, Antofagasta, 6-Jun-1873, and 15-Jun-1873, CSA AG, Vol. 4, fs. 286, 328-329.

¹¹⁹Text of the agreement in Bertrand, *Memoria*, Bolivian Documents, pp. 57-61.

¹²⁰Hicks to Soublette, Antofagasta, 11-Dec-1872, 27-Dec-1872, 4-Feb-1873, 7-Feb-1873, 11-Feb-1874, 14-Feb-1873, 15-Apr-1873, 22-Jul-1873, CSA AG, Vol. 4, fs. 61-62, 81, 128, 131, 134, 137, 205, 336.

with a measure of relief, Hicks viewed it with "great pleasure"¹²¹ The construction of the line itself was finished in the second half of 1873, albeit the first locomotive, which arrived in October, 1873, was endowed with a vastly underpowered engine, and could only be used for internal transport within the deposits¹²² The first trial run took place on December 3, 1873, although for some time the railroad was actually hauled by mules due to the inadequacy of the first locomotive¹²³

Just prior to the signing of the Pero Transaction, in early November, 1873, the Bolivian Government approved two tax laws, raising taxes on both minerals and joint-stock companies, in violation to the 1866 Treaty Furthermore, the provisions authorized the auctioning out of the collection of the new taxes to the highest bidder.¹²⁴ The new Bolivian taxes triggered an uproar in Chile, including a strong petition of Caracoles miners to the Chilean Government to intervene due to the violation of the 1866 Treaty, they also wanted the proscription of the corrupt system of farming out taxes¹²⁵ Negotiations between Bolivia and Chile over the issue took place in early 1874,¹²⁶ leading to a new Bolivian-Chilean Treaty on August 6, 1874, ending the previous condominium area, and fixing the boundaries between both countries at the 24th parallel Article 4 of the 1874 Treaty was particularly important for the Antofagasta Company

¹²¹Hicks to Soublotte, Antofagasta, 18-Dec-1873 CSA.AG Vol.5, fs 057-058.

¹²²Hicks to Soublotte, Antofagasta, 28-Oct-1873, 25-Nov-1873, and 3-Dec-1873 (SA.AG Vol 4, fs 457; Vol 5, fs. 028, 041-042.

¹²³Hicks to Soublotte, Antofagasta, 16-Dec-1873 CSA AG Vol 5, fs 051, 053-054

¹²⁴*La Patria* (Valparaiso), 19-Dec-1873, 10-Jan-1874, and 11-Mar-1874

¹²⁵Text of the request in Chile, *DO* 1873, 18-Dec-1873

¹²⁶Cf *La Patria* (Valparaiso), 10-Jan-1874, and 11-Mar-1874.

Export duties imposed on minerals produced in the area mentioned by the preceding clauses [up to the 23d parallel] shall not exceed the amounts currently charged, and Chilean citizens, industries, and capital will not be subject to further contributions of any kind. The stipulations included in this clause will last for twenty five years.¹²⁷

Thus, Chile had effectively traded its prior condominium rights established by the 1866 Treaty for stable taxation for Chileans working in the Pacific littoral during 25 years. For the Antofagasta Company, the 1874 Treaty was a triumph, partly because it incorporated its legal regime on a formal international instrument (although that was also true of the 1866 Treaty), and partly because it implicitly prolonged the fifteen year tax exemption granted through the Pero Transaction to twenty five years. However, the incident over taxation in the Bolivian littoral had led to angry attacks on Chile in both Bolivia and Peru. One Bolivian newspaper had stated that "if Chile insists on insulting us, we will honour her with a visit up to the borders of the Maule [a main Chilean river],"¹²⁸ while in Lima *El Nacional* and *La Opinion Nacional* spoke of Chilean speculators, and a "scandalous attack on Bolivian sovereignty."¹²⁹ In addition, in February 1874, yet another Bolivian revolt in Caracoles, led by Colonel Miguel Santa Cruz, seeking the establishment of a Federal Republic in the area, and exacting some 20,000 pesos from mine owners, led to further charges in Peru that "Chilean gold had financed the revolt."¹³⁰

The local Bolivian authorities, chronically unpaid, constituted an important source of friction for the Antofagasta Company. The fact that the development of the new Salinas deposits and the construction of the

¹²⁷This was a critical clause because its violation by the Bolivian Government triggered the War of the Pacific in 1879. See below pp. 295-296. The text of the 1874 Treaty is found in Aldunate, *Leyes, Bolivian Document* pp. 47-48.

¹²⁸*El Vapor de Puno*, quoted by *La Patria* (Valparaiso), 7-May-1874.

¹²⁹Quoted by *La Patria* (Valparaiso), 2-Feb-1874, and 7-May-1874.

¹³⁰In fact, the manager of the CSA overtly organized the resistance against Santa Cruz in Antofagasta, noting that "the presence here of a Chilean warship took away their courage." E.G. Foster to Soublette, Antofagasta, 15-Feb-1874, Hicks to Soublette, Antofagasta, 17-Feb-1874, and 19-Feb-1874. CSA-AG Vol 5, fs. 141, 143, 148. The Peruvian charges were published in *El Nacional* (Lima), as quoted by *La Patria* (Valparaiso), 21-Feb-1874.

CSA's railroad required a variety of permits from littoral authorities, who often saw the company as their only source of revenue, led to periodic confrontations. The main local Bolivian authorities comprised a Prefect for the entire littoral, appointed by the government and resident in Cobija, a Subprefect in Antofagasta, subject to the former, and the local Municipality of Antofagasta, whose leadership was chosen by popular election. Lesser authorities such as the Port's Captain and the Manager of Customs tended to form shifting alliances with or against some of the higher officials. From 1871 through February, 1873, the Bolivian Prefect of the littoral was Ruperto Fernandez. On February 16, 1873, Aniceto Arce replaced Fernandez, but turned over the post almost immediately. On July 22, 1873, to Emilio Fernandez Costas, who remained until the end of 1876. The first Prefect, Ruperto Fernandez, was appointed lawyer of the Antofagasta Company, and returned as such in May, 1873, being reappointed as Prefect in 1876.¹³¹ Of course, the fact that a former Prefect rushed to join the CSA as a lawyer upon the completion of his term in office was not precisely a healthy practice, nor was the fact that Aniceto Arce, a leading figure in the Huanchaca Company and the *Banco Nacional de Bolivia* (both Chilean dominated enterprises at the time) was sent, albeit briefly, to oversee a company closely associated with one of his own ventures.¹³² There was also a Subprefect (*Subprefecto*), stationed in Antofagasta, who normally proved far more hostile to the CSA than his immediate superior in Cobija.¹³³

Clearly, the Prefects of the littoral were figures of far more political weight, although not necessarily more trustworthy, than the lesser Subprefects of Antofagasta. Ruperto Fernandez was offered the position of Bolivian Ambassador in Lima in 1876,¹³⁴ and was a close personal friend of at least one Bolivian President,

¹³¹Hicks to Soublette, Antofagasta, 14-Feb-1873, 16-Feb-1873, 23-May-1873, 27-May-1873 (CSA AG, Vol 4, fs 137, 336, 264, 271-172, Vol 9, fs 077-078)

¹³²Agustín Edwards was at the time both the President of the CSA and of the *Banco Nacional de Bolivia La Patria* (Valparaiso), 27-Feb-1874

¹³³I found no name for this Subprefect in the correspondence consulted

¹³⁴Fernández rejected the offer in order to block the appointment of Narciso La Riva, viewed as hostile to the CSA, as Prefect of the littoral. Hicks to Soublette, Antofagasta, 2-Nov-1876 (CSA AG, Vol 9, fs 046)

Hilarión Daza (1876-1879), as well as one of his Ministers, Jorge Oblitas.¹³⁵ Amiceto Arce was a prominent Bolivian businessman, and Emilio Fernandez Costas who succeeded him was a distant relative of President Tomás Frías.¹³⁶ The most important Prefect of the littoral was General Manuel Othon Jofre who completed his term in Cobija in 1878 to join the government as Minister of Defense, leaving his son as the company's lawyer.¹³⁷ The Bolivian authorities in the littoral were sharply divided due to an almost permanent (and quite justifiable) mistrust of the Subprefects of Antofagasta as well as other members of the local Bolivian community, towards politically powerful Prefects stationed in Cobija, almost all of them strongly suspected by other Bolivians of being too friendly with, if not actually at the pay of, the Antofagasta Company. A very clear indication of this internal friction was the stiff resistance of the local Bolivian authorities to the appointment of Ruperto Fernandez as lawyer of the CSA, almost immediately upon completion of his tenure as Prefect.¹³⁸

The competition from neighbouring Tarapaca figured prominently in the correspondence of the local manager of the CSA. Clearly, the manager of the Antofagasta Company viewed government intervention in the Peruvian nitrate region as extremely favourable for the interests of the CSA. In March, 1873, Hicks feared that nitrate prices would decline because "the Estanco has been struck down in Peru".¹³⁹ In July, 1873, he greeted the news of a possible enactment of the same bill "I welcome the good news regarding an eventual establishment of the estanco in Perú, since we have a such a large amount of nitrate in stock, and we hope that

¹³⁵Hicks to Soubllette, Antofagasta, Confidential, 3-Nov-1876. CSA.AG. Vol.9, fs.047.

¹³⁶One of his cousins was also Frías' nephew Hicks to Soubllette, Antofagasta, 24-Jan-1874. CSA.AG. Vol.5, fs. 104

¹³⁷See below pp 297-298.

¹³⁸Hicks to Soubllette, Antofagasta, 23-May-1873, and 27-May-1873. CSA.AG. Vol.4, fs. 263-264, 271-272.

¹³⁹Hicks to Soubllette, Antofagasta, Antofagasta, 10-Mar-1873. CSA.AG Vol. 4, fs. 160.

this scheme will bring about a remarkable increase in the value of our stock"¹⁴⁰ In October, 1873, after a survey of the new Salinas deposits, estimated at some 37 million Spanish quintals, or about 17 million tons, at a cost of production ranging from 1.35 to 1.75 Chilean pesos per quintal. Hicks noted that it would be profitable to mine them if prices held at 2 pesos per quintal. He added that future nitrate prices relied heavily on the policy of the Peruvian Government in Tarapaca:

[Nitrate] prices will be subordinate to a great extent on the duties imposed by the Peruvian Government, and if these are approved, it seems impossible to me that the [Tarapacá] producers can deliver nitrate at less than \$2 [pesos per quintal] thus, since we are sure of being free of such duties, the business [of exploiting Salinas] is sure to be good.¹⁴¹

In November, 1873, along with expressing satisfaction at actual price increases in Europe, Hicks stated that he believed that they would go up even more "in view of the disorder in Tarapaca."¹⁴² Throughout 1874, virtually all fluctuations in nitrate prices were linked by Hicks to some event in Tarapaca, consistently welcoming all reported attempts of the Peruvian Government to implement the estanco or impose a substantial export duty on Tarapacá nitrate because they would lead to higher prices.¹⁴³

The manager of the CSA was interested in sizing up precisely the Tarapacá competition. At the end of 1873, Adamson, head of the CSA plant in Antofagasta, visited Tarapacá to study the new *máquinas*, "particularly the vats adopted in the Barrechea plant", but his trip yielded very little information, except "for some building aspects which could have given us problems"¹⁴⁴ Hicks himself traveled to Tarapacá in early

¹⁴⁰Hicks to Soubllette, Antofagasta, 22-Jul-1873. CSA.AG Vol 4, fs. 335.

¹⁴¹Hicks to Soubllette, Antofagasta, 23-Oct-1873. CSA.AG. Vol.4, fs.484-485.

¹⁴²Hicks to Soubllette, Antofagasta, 11-Nov-1873. CSA.AG Vol. 5, fs. 005.

¹⁴³Hicks to Soubllette, Antofagasta, 20-Jan-1874, 3-Jul-1874, 17-Dec-1874 and 5-Jan-1875. CSA.AG. Vol.5, fs. 095, 281, 448, vol 6, fs. 010, 030.

¹⁴⁴Hicks to Soubllette, Antofagasta, 20-Nov-1873, 9-Dec-1873, 1-Jan-1874, and 20-Jan-1874. CSA.AG Vol.5, fs. 025, 048, 077, 094.

1874 to sell some mules, but reported that the trip had been "entirely useless" "I found all kinds of businesses in that district in such a state of depression that it was impossible to make any type of sale, much less the sale of animals [whose owners] cannot finance their upkeep' The review of Tarapaca plants gave Hicks "great satisfaction" He only found one plant "somewhat interesting", but it was using an identical system to that adopted by the CSA in Antofagasta, and after a careful study of the vats, I remain fully convinced of the perfection of our plans" With respect to the quality of the Tarapacá deposits, he was also confident that those in Salinas were superior, having seen nothing better in the Peruvian region¹⁴⁵

Hicks was right in being concerned with developments in the Peruvian nitrate region, due to the obvious weight of Tarapaca nitrate exports Table 5.3 shows the relative share of the nitrate market held by Tarapacá and Antofagasta in 1872-1874

Table 5.3
*Nitrate Exports,
Tarapacá and Antofagasta,
1872-1874
(Spanish Quintals)*

Year	(1) Tarapacá Exports (S.Q.)	% Tara- pacá*	(2) Antofagasta Output (Sp.Q)	% Anto- fag.*	Total Exports (S.Q.)**
1872	4,220,764	97.20%	121,558.00	2.80%	4,342,322.00
1873	6,263,767	97.13%	185,028.00	2.87%	6,448,795.00
1874	5,583,260	96.02%	231,283.00	3.98%	5,814,543.00

*Computed by the author.

**Sum of Tarapacá exports and Antofagasta output.

Source: (1) *El Veintiuno de Mayo* (Iquique), 14-May-1884.
(2) CSA, *Memorias*, 1873-1879.

¹⁴⁵Hicks to Soublette, Antofagasta, 15-May-1874. CSA.AG. Vol.5, fs. 234-235.

Taking into account the fact that Annual Reports of the CSA listed yearly output, as opposed to exports, of the company, it is clear that even if all Antofagasta production were exported, the relative share of the world market held by Tarapacá would remain overwhelmingly superior, and that any significant development in the Peruvian region was likely to affect world prices. However, it is worth noting that the Antofagasta Company was gradually increasing its share, moving up from some 2.8 to almost 4 percent in two years.

Table 6.3

*The Antofagasta Company,
Exports, Costs, Prices and Net Profits,
1872-4
(Spanish Quintals and Chilean Pesos)*

	(1)	(2)	(3)	(4)	(5)
Year	Exports	Cost p.Sp.Q.	Total Cost*	Prices Valpso	Net Profits
1872	121,558.00	1.68	204,217.44	n.a.	n.a.
1873	185,028.00	1.31	241,461.54	2.01	102,050.73
1874	231,283.00	1.49	344,611.67	1.69	118,638.61

Computed by the author: (1)(2).

Source: (1), (2), (5) - CSA, *Memorias*, 1873-6.
(4) - *La Patria* (Valparaíso),
July 1873-August 1874.

The performance of the CSA during 1872-1874 was more than satisfactory. Table 6.3 indicates that in spite of a slight increase in costs of production per quintal of nitrate between 1873 and 1874, and a decline in nitrate prices in the second half of 1874, the Antofagasta Company managed to show growing net profits in 1873-1874, proving that the enterprise could weather comfortably a period of low prices.

Table 7.3

*The Antofagasta Company,
Costs of Production,
1871-1874
(Chilean pesos per Spanish Quintal)*

Sem- est.	Year	Cost p.S.Q.	Cost Annual*
	1871		1.69
	1872		1.68
1st	1873	1.24	
2nd	1873	1.37	1.305
1st	1874	1.51	
2nd	1874	1.47	1.490

*Computed by the author,
except 1871 and 1871,
computed by Hicks.

Source: Hicks to Soubllette,
13-May-1873, Vol.4,
fs. 371; 28-Feb-1876,
Vol.7, fs. 275-277.
CSA.AG.

As Table 7.3 shows, the Antofagasta Company managed steadily to reduce its costs of production in some four years, from 1.69 pesos per quintal in 1871 to 1.49 pesos at the end of 1874; since costs of production could vary considerably due to extraneous factors such as the rise in coal prices, it is worth noting that in one semester (i.e. the first semester of 1873), the CSA demonstrated that it could reduce its costs as low as 1.24, a capability which was certainly needed to survive in a period marked by abrupt policy changes in Perú. Clearly, the Antofagasta Company was poised to take advantage of any increase in prices brought about by taxes or regulations imposed by the Peruvian Government in Tarapacá, although as its performance in 1872-1874 seems to show, the CSA did not really need any major blunder in Perú to succeed.

CHAPTER 4

THE EXPROPRIATION DEBATE

1. The Guano Crisis, 1874-1875

As the Peruvian economic crisis sharpened in 1874-1875, Army unrest grew, factional struggle between the Pardo and Pierola factions sharpened, and the Lima press became increasingly virulent. Pierola chose to settle in Valparaíso, Chile, using the port as a springboard to stage a forcible return. In August, 1874, a first attempt at assassinating President Pardo took place.¹ In November and December, 1874, nine assorted mutinies were recorded in Peru, fuelled mainly by dissatisfaction with cuts in military expenditures.² Pierola organized a rebellion in October, 1874, purchasing a ship to land in Southern Peru, counting on a simultaneous uprising in Tarapacá. President Pardo was forced to take direct command of military operations to quell the revolt in December, 1874.³ The domestic debate on the fiscal crisis triggered by declining guano income, as well as on a new nitrate policy, took place in an increasingly unsteady political climate.

In Great Britain the declining quality of Peruvian guano, ascertained by improved chemical tests, led to a formal protest from the Royal Agricultural Society (RAS), demanding that guano prices be regulated in

¹San Cristóval, *Pardo*, p. 150. For earlier violence in Perú, see: Faustino Silva, *La Revolución de los Gutiérrez en julio de 1872* (Lima: Imprenta C. Ruiz, 1927).

²San Cristóval, *Pardo*, pp. 174-175.

³*El Comercio* (Lima), 14-Dec-1874; San Cristóval, *Pardo*, pp. 161-163.

line with a "standard analysis".⁴ The 1874 annual report of the JRAS's chemist contrasted the uniformity of the nitrate samples submitted for analysis with the uneven and lumpy condition of Peruvian guano. It censured the Pardo Administration's decision to fix higher guano prices "a great mistake", noting that in spite of "the increasing competition of nitrate of soda and compound artificial manures", the fertilizer could "hold [its] ground" if prices were lowered.⁵

The British pressure to decrease guano prices came at a difficult juncture for Peru. Pardo's relationship with Dreyfus, a close Piccola ally, was uneasy at best. Acknowledging that the French syndicate held a considerable stock of guano, and that the advances furnished to Peruvian Government coupled with substantial holdings of the 1872 bonds made the firm's position unassailable, Pardo reached an agreement with Dreyfus shortly after taking office, on October 3, 1872. The accord included an additional advance of 2.4 million soles, or some 1,480,000 for the upcoming year, in equal monthly instalments.⁶ However, Pardo, starved for railroad funds, made an attempt to obtain an authorization from the Peruvian Congress to deflect part of the funds of the 1872 loan for public works rather than for servicing the foreign debt, in violation of both the spirit and the letter of the original contract. The public confrontation with Dreyfus over the issue was embarrassing, stretching for more than a year, and had a detrimental effect on the quotation of outstanding Peruvian bonds in Europe.⁷ The conflict culminated with a new agreement between Dreyfus and the Peruvian Government, dated April 15, 1874. Through the new arrangement Peru recovered the right to ship its own guano as of July, 1875, but

⁴"Annual Report of the Consulting Chemist for 1873" by Augustus Voelker, F.R.S., December, 1873. *The Journal of the Royal Agricultural Society of England* 35, 1874, p. 282. (Quoted hereafter as *JRAS*, followed by volume and date). Augustus Voelker, "Report on the Composition of Thirteen Samples of Peruvian Guano, sent by the Secretary of the Admiralty to the Royal Agricultural Society of England." *JRAS* 35, 1874, p. 545, Earl Cathcart to Lord Derby, June, 1874, in *JRAS* 35, 1874, pp. 545-546.

⁵"Annual Report of the Consulting Chemist for 1874" by Augustus Voelker, F.R.S. *JRAS* 36, 1875, pp. 348-351.

⁶Olinger, "Dreyfus", p. 142-143.

⁷Basadre, *Historia*, 7, 13-22, Olinger, "Dreyfus", p. 144-145.

Dreyfus was bound to service the country's foreign debt only up to the same date, i.e., merely three more instalments. Dreyfus would pay the subsequent January, 1876 coupons only if the Peruvian Government was unable to find another financial agent. The Pardo Administration also came to terms with the fact that the current guano price of £13 had to be lowered, and fixed it at £12 10 sh. Accepting British complaints, Dreyfus was allowed to treat inferior guano with sulphuric acid and to price it according to its assessed content. The new price of £12 17 sh applied only to the best guano.⁸ The French syndicate also kept the substantial unsold stock remaining of the 2 million tons of guano originally purchased, amounting to some 850 000 tons at the date of the new agreement,⁹ this would seriously encumber the search for new contractors since they could legitimately fear competition from Dreyfus' unrealized stocks, particularly if guano sales for 1874-1875 were slow.

Overseas reaction to the new Dreyfus contract, quite critical of previous guano agreements, particularly due to advances made 'in anticipation of sales by contractors,'¹⁰ was marked by growing skepticism. The predicament of the Peruvian Government after the April, 1874 agreement was described in pessimistic terms by *The Economist* after more than a year of unsuccessfully searching for a new guano contractor:

Anyone who wants to take up a new contract with Peru has to face the fact that the Peruvian Government not only gave exclusive rights to Dreyfus, but also sold him a very large stock. Hence, the difficulty of making a new contract. Whoever buys wholesale from the Peruvian Government, giving them the funds for paying the maturing coupons, must be out of his money for many months before he can cover himself by retail sales, and this difficulty is created by the Peruvian Government.¹¹

Indeed, it is hard to underestimate the importance of the 1874 Dreyfus contract, the current French consul in Peru wrote that "the ship that departs with this contract carries the life or death of the present

⁸Delanto, *Pirola*, p. 196; Olinger, "Dreyfus", pp. 148-149.

⁹Olinger, "Dreyfus", p. 149.

¹⁰*The Economist* (London), 24-Apr-1874, pp. 483-484. Emphasis on the original.

¹¹*The Economist*: (London), 25-Dec-1875, p. 1512.

government.¹² By allowing a large stock of guano to remain in the hands of Dreyfus, and seeking new contractors, the Pardo Administration was effectively losing control of the supply of the fertilizer, thus unwittingly reintroducing competition in the guano trade. Starting in July 1875, the French syndicate would no longer be bound to respect the official price, and the new contractors would have to align their prices with those offered by Dreyfus. Furthermore, a new contractor could not be sure of controlling a fixed share of specific markets, since the French syndicate was free to sell guano in any country. Of course, the service of the Peruvian foreign debt for which the proceeds of guano sales had been expressly reserved, was at risk, and if no alternative financial agent could be found, the Peruvian Government was only three coupons away from a major default.

Domestically, the Pardo Administration could no longer count with any part of guano revenue, all of which was slated to pay foreign bondholders and cover the balance of the advances of the French syndicate; the latter debt swelled as declining guano sales left an increasing deficit. The unstoppable construction of State railroad lines was severely imperiled. In March, 1874 Meiggs established a new corporation, the *Compañía de Obras Públicas y Fomento del Perú*, issuing stocks and bonds in order to open a new source of financing. The participation of Francisco García Calderón, a key stockholder of the Providencia Bank, as Vice-President of the new company, signalled the growing involvement of the influential domestic banking sector in railroad construction.¹³ In a statement issued in August, 1874 Finance Minister Figueroa, indicated that nine railroads had been contracted to date at a total cost of some 125 million soles, or £27 million, an exorbitant amount, almost equal to the entire current Peruvian foreign debt. Figueroa made clear that halting railroad construction was politically impossible and economically disastrous. Politically, he admitted that "very powerful interests" were tied to the railroads, and that every congressman was fighting for a railway in his district. Economically, Figueroa predicted that the estimated loss of some 1 million soles a month in income from railway construction would trigger a "commercial and industrial crisis", affecting both railroad contractors and the domestic banking

¹²Quoted by Olinger, "Dreyfus", p. 150.

¹³*El Comercio* (Lima), 30-Apr 1874, *Camprubi, Bancos*, p. 214.

system. He warned that the abrupt dismissal of 20,000 workers currently employed in railroad construction was certain to unleash a social crisis. Minister Elguera also pointed out that the entire railroad venture was financed out of the 700,000 soles (£140,000) furnished by the Dreyfus firm.¹⁴

The last remark of the Elguera statement was extremely significant because it was an open admission that the total cost of the railroad network could not be financed only out of the Dreyfus allowance. Thus, the Peruvian Government was compelled to borrow more not only to pay for railroad works but to defray ordinary budget expenditures, particularly the wages of a restive army. With guano revenue entirely absorbed by the service of the foreign debt, monthly allowances applied exclusively to railroad construction, Peru was gradually flooded with domestic instruments of debt including inconvertible bank bills, bonds of the internal debt forcibly accepted by the banks, depreciating railroad bonds, and more recently, bonds from the novel public works corporation established by Meiggs. The time when workers and merchants started refusing payment in valueless paper was as imminent as the default on the foreign debt immediately following the July, 1875 instalment. The mounting pyramid of paper generated by the Peruvian Government would certainly collapse at some point, and the country, drained of gold and silver, and deprived of reliable currency to support even daily domestic transactions, could plunge into financial chaos.

Being close to losing control of guano, the main source of government income, and unable to arrest railroad construction, the main government expenditure, it is perhaps not surprising that both the Executive and the Legislative Branches of Peru developed something of an obsession with State intervention on the Tarapaca nitrate industry circa 1874. In 1874 and 1875 government statements and congressional reports, echoed by the vocal Lima press, were suddenly replete with references to the nitrate threat to guano. Of course, it was an evasion of the real issues before the country but then at that point in its troubled history the Peruvian Government had run out of options. By 1874, Peru had reached, quite literally, the end of the line.

¹⁴*El Comercio (Lima)*, 19-Aug-1874.

2 Guano and Nitrate, 1874-1875

In July 1874, President Pardo and his Finance Minister issued their respective annual reports to the Peruvian Congress. Both included important references to the Tarapaca nitrate industry. Pardo, along with blaming the failure of the *estanco* on "public opinion", cautioned that the collapse of the scheme had been followed by growing nitrate exports which had pushed down nitrate prices, the very development it was intended to prevent.¹⁵ Minister Elguera further elaborated on the nitrate theme by pointing out that, currently, in the aftermath of the aborted *estanco*, all sectors involved in Tarapaca were in a dire predicament. Nitrate producers were being ruined by low prices, and the Peruvian Government, due to this under-priced competition, was forced to cut down the official price of guano. He estimated that reducing guano prices by £1 a ton entailed a loss of £400,000 in government income, furthermore, he stated that a fall of £4 per ton in nitrate prices deprived Peru of some £800,000. Of course, the latter statement was quite bold since no correlation had been determined between guano and nitrate prices from actual historical data. It was also the first time that any Peruvian Minister or congressman had dared to supply precise quantitative estimates on alleged "losses" for Peru due to falling nitrate prices.¹⁶ Elguera went on to make the sharpest outline to date of the novel Peruvian doctrine on guano and nitrate:

Peru produces ammonia under two forms: guano and nitrate. She has brought the sales of the former under monopolistic control, becoming its sole seller, while abandoning the sales of the latter to the laws of the free market, allowing nitrate to be produced freely and without limits. There lies the reason why all the monopolistic efforts to increase the price of ammonia in the form of guano result in favouring the sales of its competitor in the form of nitrate, increasing the output of the latter, and as such an increase must result in the lowering of its price, this decrease in the price of ammonia in the form of nitrate makes the price of the same fertilizer in the form of guano relatively more expensive, and because the price of the latter does not vary, due to the monopoly which keeps it fixed, it is clear that the impact of the competition must translate into a decrease of guano sales.

¹⁵President Manuel Pardo, "Mensaje", 28-Jul-1874 in Peru, *Mensajes*, 2, 41-54.

¹⁶The losses referred to by Elguera could not be related to diminished taxation since the current export duty was based on volume of exports rather than price.

Elguera's statement chose to exclude obvious and major factors currently affecting the guano trade, to concentrate exclusively on an alleged nitrate competition. The recent decision to lower guano prices had been ostensibly linked to the uneven quality of the new, lumpy guano from the Guanape Islands. The fact that the "monopolistic" control of guano would only last until July, 1875, date of the expiration of the Dreyfus contract, leaving substantial stocks in foreign hands, meant that rival guano contractors would compete among themselves, rather than against nitrate. Besides the imminent fragmentation of guano stocks, the emergence of the Antofagasta Company in neighbouring Antofagasta ran counter to Elguera's view of a Peruvian "monopoly" on ammonia. Further cutting guano prices, the logical response to a perceived competitive threat, was ruled out only due to an uncontrollable railroad-building program, yet another crucial development unrelated to nitrate. Underlining the new main theme of the Pardo Administration, the Finance Minister closed his remarks by predicting that the competition between guano and nitrate would "gradually drive [guano] off the market"¹⁷.

Subsequent government initiatives gradually built up a climate favourable to State intervention in Tarapacá. President Pardo established a Consulting Board to make recommendations on the subject of the nitrate industry. Alfred Bohl, head of William Gibbs & Co., the Lima subsidiary of the London firm, José Cantuarias, later manager of the *Banco Garantizador*,¹⁸ and E. Malinowski, were designated as members of the new Board. The Consulting Board was charged with examining four proposals on the nitrate industry submitted to the Peruvian Chamber of Deputies, all of them contrary to the Pardo Administration's increasingly aggressive nitrate policy. The first proposal merely requested the establishment of a commission to study the nitrate question; the second one asked for the suppression of all duties on nitrate, the third suggested a small,

¹⁷Minister Elguera, "Memoria 1874", 10: 123.

¹⁸*El Comercio* (Lima), 29-Apr-1879.

5-cents-per-quintal export duty, and the fourth one recommended striking down all taxes on nitrate for two years, and after that period levying a 5-cents duty on nitrate exports.¹⁹

In September, 1874 the Consulting Board tabled two conflicting reports. The first one, signed by E. Malinowski, supported the idea that there was indeed an ongoing guano-nitrate competition, and requested the government to intervene in order to thwart what it viewed as the devastating impact of cheap nitrate on guano and the Peruvian economy at large.²⁰ The second report, signed by Bohl and Cantuarias, took issue with Malinowski's views, warning that government intervention in Tarapaca was likely to worsen rather than ~~enhance~~, the prospects of Peru.²¹

The Malinowski report offered no new empirical evidence on the alleged guano-nitrate competition, other than emphatically reiterating Elguera's prior statement that such struggle was damaging both products, hurting "the most vital interests of the Republic", and profiting only the consumer." According to Malinowski, current guano prices of £12 10 sh per long ton could be maintained only if nitrate prices remain at over 15 sh shillings per [English] quintal in English markets." He offered no supporting data for these figures, assuming rather than proving that a precise correlation could be established between guano and nitrate sales and prices.

However, unlike Finance Minister Elguera, Malinowski admitted that the decline in guano consumption also sprang from the exhaustion of the valuable Chincha guano, and its replacement by inferior Guanape Islands' guano. Furthermore, he noted that since the Dreyfus firm had been authorized to treat lumpy guano with sulphuric acid, two tons of the raw fertilizer would be used up, on the average, to sell one ton of refined guano, ~~and~~ pointedly that "it is difficult to know what influence this [procedure] could have on the volume of annual sales." This latter statement sharply qualified the alleged nitrate threat since it conceded that the guano trade,

¹⁹The authors of the proposals were Deputies Duarte, Lana, Oviedo, and Prado. As reflected by the subsequent debate, three of them were hostile to all forms of government intervention of Tarapaca. Deputy Prado did not speak out on the issue. Their proposals were summarized in Gibbs Ms. 11,132, 16-Sep-1874.

²⁰"Proposiciones relativas a la industria salitrera. Informe del señor E. Malinowski a la Junta Consultiva" Lima, September 16, 1874. Gibbs Ms. 11, 132.

²¹José Cantuarias and Alfred Bohl to the Minister of Finance of Peru, Lima, 1874. "Respuesta al informe del señor Malinowski de fecha 16 de septiembre de 1874" Gibbs Ms. 11,172.

by itself and independently of outside competition, was currently affected by a decline in quality of the product, as well as by the unpredictable impact of a new type of processing

Malinowski supported Elguera's contention that the country enjoyed an unchallenged "monopoly" on nitrogen, noting that Peru had come to regulate nitrogen prices in European markets, and other sources of production have to follow these prices." He dismissed the potential threat of new deposits of nitrogenous substances, or chemical advances by pointing out that it might take time for this danger to materialize, and that "while this does not happen Peru should take all possible advantage of the favourable situation in which Nature has placed her". On a similar vein Malinowski viewed competition from the emergent Antofagasta Company as a "simple eventuality which, for the time being, has no serious justification". He reported that the Peruvian Government had sent a "competent and trustworthy person"²² to visit and study "for more than a year" the ongoing nitrate works in El Toco and Antofagasta, concluding that the Bolivian deposits were too far away from the coast to compete successfully with Tarapaca "in conditions of equal taxation". Thus Malinowski recommended a nitrate duty of "at least" 60 cents per Spanish quintal, but granting the Peruvian Government the authority to reduce or eliminate it if "threatened with a significant competition", giving advance notice to avoid causing "undue turmoil in the market".

In sharp contrast to Malinowski's analysis, the Bohl-Cantuarias report focused on proving the crucial point that Perú could no longer dictate nitrogen prices in the world market. In the first place, the dissenting report noted, there were "enormous amounts" of alternative fertilizers which did not need to draw ammonia either from guano or nitrate, and it was more likely that "these manures, rather than guano, would benefit if Perú attempted to keep ammonia at a price which agriculture was unable to withstand". Furthermore, Bohl and Cantuarias remarked that it was misleading to dismiss potential competition from Antofagasta based on an unfavourable "distance to the coast" of the Bolivian deposits, transport problems could be easily solved by means of a railroad, currently operational, and "it should be at least assumed that a railroad would not be constructed if [the Antofagasta deposits] could not produce more than 500,000 quintals [some 23,000 tons] yearly". The

²²This surely referred to a report issued by a Dr. Hegsgaard subsequently quoted by the Peruvian press. See below pp. 114-115.

exemption of all import and export duties granted to the Antofagasta Company by the Bolivian Government conferred "considerable advantages" to the rival enterprise, proving that "Perú is not the only one that can compete with guano"

Bohl and Cantuarias concluded that it "would be more prudent to allow both nitrate and guano to follow its natural course, than to attempt to oppose it by means of artificial prices, when experience indicates that Perú cannot dictate an unchangeable arbitrary price to agriculture" They closed their report doubting that the profits derived from guano sales at £12 10 sh per long ton, singled out as desirable by Malinowski, a "theoretical and hypothetical price to say the least", would be sufficient to compensate for "such considerable sacrifice as the one demanded from one of the richest Peruvian provinces"

The Lima press started taking position on the guano nitrate issue around the second half of 1874. *La Opinión Nacional*, controlled by the main Lima Banks, took the lead in demanding government intervention in Tarapacá to halt the decline in guano sales. In September, 1874, *La Opinión Nacional* published letters of one Dr. Hegsgaard, commissioned by the Peruvian Government to survey the Bolivian nitrate deposits, addressed to the Italian scientist Antonio Ramondi. Dr. Hegsgaard noted that the Bolivian deposits were indeed more extensive than those of Tarapacá, and just as rich, but estimated that their costs of production at 2.30 soles per quintal, as opposed to 2.11 soles for the Peruvian nitrate region, gave Peru a distinct comparative advantage. It remains unclear what deposits Hegsgaard examined, and it is most likely that he went no further than El Toco region since there is no record of him ever visiting the Antofagasta Company, let alone examining its books and operations to calculate costs of production.²³ No mention was made of the published Annual Reports of the CSA which included lower costs of production.²⁴ *El Comercio* questioned Dr. Hegsgaard estimates, placing costs of production in Antofagasta at 1.60 soles taking into account the new railroad, thus making them lower

²³I found no reference to such visit in the correspondence of the manager of the Antofagasta Company.

²⁴See below p. 188, Table 8.5.

than those ascribed to Tarapacá.²⁵ The newspaper strongly opposed the idea of "ruining an entire province, along with the capital invested there, to help develop the Bolivian [nitrate industry]", proposed a "moderate duty" on nitrate, and advocated cutting guano prices to increase overseas sales.²⁶

Following the release of the reports of the Consulting Board, in early October, 1874, Finance Minister Elguera continued impressing upon Congress the importance of finding a way of to increase nitrate prices in order to prevent a fatal competition with guano.²⁷ Unlike his July address to Congress, in October, 1874, Elguera presented nitrate as an immediate, rather than a long-term, threat to guano.²⁸ According to him, it had been "clearly demonstrated" that "without a heavy duty on nitrate, or any other measure conducive to the same result, our fertilizer cannot escape a depreciation of £2 per ton" The reference to an alternative scheme to drive up nitrate prices, other than an export duty, appeared to indicate a tacit acceptance of an expropriation bill recently submitted to Congress,²⁹ since no other plan had been advanced. Equally interesting was the mention of guano as "our fertilizer", suggesting that Tarapacá nitrate had come to be viewed in government circles almost as a foreign product. However, the most significant information supplied by Elguera at the time was an estimate on the desirable level of guano sales to be achieved after nitrate prices increased. He stated that it "appeared" that it was possible to sell 500,000 [long] tons of guano, yielding a net annual government income of £3,160,000, "which is sufficient to meet our needs". A cursory review of the available data on guano exports (Tables 14 and

²⁵The relevant accounts of the Antofagasta Company show that *El Comercio* was closer to the truth than Dr. Hegsgaard. See below p. 188, Table 8.5.

²⁶*El Comercio* (Lima), "El impuesto sobre el salitre" (Editorial), 3-Oct-1874; "El Huano y el Salitre" (Editorial), 8-Oct-1874; "El Huano y el Salitre" (Editorial), 9-Oct-1874; 13-Oct-1874, and 15-Oct-1874. I am quoting Dr. Hegsgaard report from the version provided by *El Comercio* since the pertinent issues of *La Opinión Nacional* were not available.

²⁷"Informe de Juan Ignacio Elguera, Ministro de Hacienda, a la Cámara de Diputados", October 5, 1874. Perú, *DO1874*, 5-Oct-1874, 2: 314-315.

²⁸See above pp. 108-109.

²⁹See below pp. 119.

3.4) showed that in some thirty years of overseas sales of the fertilizer, the 500,000-ton mark had never been reached, current sales standing at about 350,000 tons yearly. Elguera's target for guano sales, with or without nitrate competition, was thus unrealistic, particularly in view of current problems with a lesser guano and an ongoing world recession. Of course, it was highly improbable that Perú could derive a net income of over £3 million from guano sales, given the prevailing uncertainty about prices, which would further sharpen when Dreyfus was free to sell guano at will. Nothing was said about guano income slated to service the foreign debt. Basically, Elguera's statement showed that Peru had no reasonably defined goals for future guano sales as it was about to attempt to restrict the output of an alleged competitor.

Furthermore, the Peruvian Chamber of Deputies implicitly showed that Elguera's estimates on the volume of guano sales required to solve the current deficit fell short of the mark. In a report on guano issued by the Main Finance Commission of the Chamber of Deputies on January 8, 1875, it was estimated that in order to generate the desired level of net income from guano sales, Perú would have to sell an unprecedented 670,000 tons of the fertilizer.³⁰ This was fully 170,000 tons more than Elguera's target, and of course an unattainable goal. In fact, 670,000 tons was a higher figure than the *combined* yearly exports of both guano and nitrate since 1843 (Tables 1.4 and 3.4). Thus, unless a truly dramatic expansion of the market for both products occurred, the figure furnished by the congressional report implied that nothing less than a complete elimination of nitrate was needed to achieve the desired level of guano sales.

³⁰"Informe de la Comisión Principal de Hacienda sobre los proyectos para la venta del guano presentados a la Honorable Cámara de Diputados", January 8, 1874. Perú, *DO1874* 2: 306-312, 14-Jan-1874.

Table 1.4

*Guano and Tarapacá Nitrate,
Exports and Prices,
1843-1867
(Long Tons, £ per Long Ton)*

Year	(1) Guano Exports	(2) Nitrate Exports	(3) Price Guano	(4) Price Nitr.	Total Exports (a)	% Guano (a)	% Nitrate (a)
1843	1,589	15,316	10.6	n.a.	16,905	9.40%	90.60%
1844	16,475	15,716	10.10	n.a.	32,191	51.18%	48.82%
1845	14,101	16,178	10.10	n.a.	30,279	46.57%	53.43%
1846	22,410	16,010	10.10	n.a.	38,420	58.33%	41.67%
1847	57,762	16,645	10.10	n.a.	74,407	77.63%	22.37%
1848	61,055	16,306	9.9	n.a.	77,361	78.92%	21.08%
1849	73,567	20,646	9.5	n.a.	94,213	78.09%	21.91%
1850	95,083	18,302	9.5	n.a.	113,385	83.86%	16.14%
1851	199,732	21,781	9.5	15.51	221,513	90.17%	9.83%
1852	86,293	29,762	9.5	17.25	116,055	74.36%	25.64%
1853	106,312	23,957	10.5	19.85	130,269	81.61%	18.39%
1854	221,747	36,606	11.1	19.53	258,353	85.83%	14.17%
1855	255,535	30,658	11.5	19.53	286,193	89.29%	10.71%
1856	177,016	39,311	12.2	20.18	216,327	81.83%	18.17%
1857	264,230	34,791	13.5	19.53	299,021	88.36%	11.64%
1858	302,207	50,929	12.18	16.27	353,136	85.58%	14.42%
1859	49,064	51,500	12.1	16.60	100,564	48.79%	51.21%
1860	122,459	56,223	12.5	13.67	178,682	68.53%	31.47%
1861	161,566	58,564	12.5	15.08	220,130	73.40%	26.60%
1862	345,992	72,723	12.18	13.99	418,715	82.63%	17.37%
1863	390,823	68,692	n.a.	15.84	459,515	85.05%	14.95%
1864	381,622	85,000	n.a.	16.60	466,622	81.78%	18.22%
1865	383,673	109,000	n.a.	14.10	492,673	77.88%	22.12%
1866	436,778	97,670	n.a.	10.97	534,448	81.73%	18.27%
1867	448,581	113,852	12.00	11.82	562,433	79.76%	20.24%

(a) Computed by the author. Conversions noted in Table 3.4.

Source: (1)-(3) Greenhill, "Peruvian", p.111; Rodríguez, "Historia", p.110; exports 1843-61, only imports into the UK (Mathew, Gibbs, p.252).
 (2) El Veintiuno de Mayo (Iquique), 14-May-1884.
 (3) The Economist (London), 13-Mar-1880; Greenhill, "Peruvian", p.110.
 (4) Greenhill, "Peruvian", p.110; 1843-69, Hernández, Salitre, p.69.

The recommendations of the Finance Commission were not very helpful, amounting essentially to a return to the discredited system of fragmented consignment arrangements upon the expiration of the current Dreyfus contract. The report did not mention nitrate competition. However, during the ensuing debate on the floor of the Chamber, one Deputy stressed that the solution to the guano crisis was linked to an upcoming congressional report on nitrate, dismissed a possible threat from Antofagasta, terming its deposits "small" and poor in nitrogen content, concluding that it was impossible to decide on a new guano management system without settling the nitrate question.³¹

In Great Britain, the RAS followed the Peruvian debate on a high nitrate duty with increasing alarm, asking support from the British Foreign Office in December, 1874 and January, 1875, to "remonstrate strongly against any such restriction", pointing out that the unsatisfactory condition of the guano trade was due exclusively to the lack of confidence in a product of uneven quality. These problems could be solved if guano was priced according to the recommended standard chemical analysis. The RAS concluded that there was ample room for both fertilizers in the world market, and that the most advantageous policy for Peru was to expand the trade of both products by means of free competition, rather than attempting to force consumers to purchase guano instead of nitrate, this latter scheme would hurt both Peru and British agriculture.³²

At the end of 1874, President Pardo held several meetings with a commission of Tarapacá producers, headed by Hans Gildemeister and Guillermo Billinghurst. The commission argued that the estanco had ruined them, and that the nitrate industry could ill-afford higher taxes, while Pardo reportedly stated that "I am not governing to benefit you, or to further the fortunes of Chile, but for the prosperity of Perú."³³ President Pardo was somewhat more precise in his annual address to Congress, delivered in February, 1875, he chose to pressure

³¹Deputy Mendoza, Peru, DO1874, 21 Jan-1875, 2: 379-381

³²"Report of the Council", General Meeting, December 10, 1874. *JRAS* 36, 1875, p. ix; Chairman of the RAS to Lord Derby, Secretary of State for Foreign Affairs, January, 1875. As quoted by Deputy Juan Luna in: Peru, DE1875, 22-Mar-1875, Appendix, pp. XXXI-XXXII. This letter was not published in the corresponding issue of the *JRAS*.

³³Hernández, *Salitre*, p. 82, quoting the Peruvian historian Pedro Dávalos y Lisson.

the Legislative Branch on the nitrate issue by underscoring the need to find a "solution" for "the outstanding issues related to the management of guano and nitrate, as well as the relationship between both substances, and the [bearing] that both of them have on the economic and fiscal development of the Nation"³⁴ One month later, the Peruvian Congress engaged in precisely such discussion

3. *The Preliminary Expropriation Bill*

The first bill formally proposing the expropriation of all Tarapaca nitrate plants was tabled by Deputy José Moscoso Melgar, on September 9, 1874, i.e., some six months prior to the actual congressional debate on the issue³⁵ Since this particular proposal was never discussed in the floor of the Peruvian Congress, it actually served as an elaborate preliminary draft for the novel idea of purchasing the Tarapaca nitrate plants, allowing objections to surface, and leading to a more mature expropriation bill submitted in early 1875³⁶ Moscoso proposed a "true" expropriation, i.e., a veritable forced sale of all Tarapaca nitrate plants "in actual production or ready to produce" The last clause made unassembled plants eligible for purchase by the State implicitly addressing an issue emerging during the discussion of the *estanco* The failure of the *estanco* had shown that nothing could be done in Tarapacá without the support of the Peruvian owners of new nitrate *máquinas*, including the Lima Banks backing them, the Moscoso bill, in consenting to buy these plants, even if they had never actually produced nitrate, tacitly offered a generous bail out, particularly for flagging ventures such as Barrenechea and Esperanza The mere purchase of nitrate output, even at a guaranteed high price and with pre-assigned quotas, as stipulated in the *estanco* law, was hardly enough to rescue these failed ventures In contrast, an outright purchase of all nitrate plants "ready to produce" was certain to turn foes of the *estanco* into supporters of the expropriation. Equally attractive for the influential Peruvian owners and financiers of flawed

³⁴Perú, *DE 1875*, 3-Feb-1875.

³⁵Deputy [José] Moscoso Melgar, Perú, *DO 1874*, 19-Sep-1874, 1: 128-130.

³⁶See below pp 126-129

nitrate plants was the clause of the Moscoso bill stating that the prices paid for individual enterprises would be established by means of a "fair assessment". This method held out the promise that property valuation would be entrusted to a pliable commission, responsive to the influence of the powerful Lima Banks.

A critical problem raised by the government purchase of all Tarapacá nitrate plants was how to pay for them. The Peruvian Government was on the verge of bankruptcy, and overseas financial markets had been closed to Peru since the disastrous 1872 loan. The Moscoso bill introduced the idea of issuing "special bonds" to pay for the nitrate plants, carrying a 6 percent interest per annum, and a 4 percent amortization charge. By itself, these "special bonds" would have been viewed by prospective sellers of nitrate plants as yet another discredited government security. However, Moscoso proposed that the Peruvian Government make an agreement with a contractor or company which would manage the operation and service the "special bonds" with the proceeds of nitrate sales. The contract would last until all outstanding nitrate bonds had been fully paid. All nitrate properties would remain as State property upon the expiration of the agreement. Both prices and exports of nitrate would be fixed by the State.

Thus, the Moscoso bill offered to pay the nitrate plants with funds generated by nitrate sales, apparently finding a way around the current dearth of financial resources. However, the suggested method of payment did not guarantee the service of the nitrate bonds in the case that sales proceeds proved insufficient to cover costs, including the contractors' commission. Furthermore, it introduced a potential area of conflict between a government attempting to restrict nitrate sales and increase nitrate prices to benefit guano and a contractor striving to maximize profits from nitrate sales regardless of its impact on guano. The holders of the "special" nitrate bonds, equally disinclined to expand guano sales at the expense of nitrate, would be natural allies of the contractor since their coupons would be serviced from the same source. If the contractor chose to find subcontractors to operate the nitrate plants, an unexamined issue in the Moscoso project, the nitrate producers, seeking to maximize profits on that account, would constitute yet another group vitally concerned with increasing rather than limiting nitrate sales.

Moscoso skirted these fundamental issues by drawing an extremely optimistic scenario of the financial aspects of the proposed expropriation. He noted that the Peruvian Government would not have to "disburse any

capital" to carry out the operation, placing the "assessed" Tarapaca plants at 5.3 million *soles*. "Unassessed" plants could increase the total value of the nitrate industry to 10, and even 20 million *soles*. No reference to the source of the quoted "assessment" was supplied. In Moscoso's view, the contracting firm would have to pay some 2 million *soles* per annum to service the respective bonds. He estimated that sales of 5 million Spanish quintals (some 273,000 tons) per annum at a price of 2.40 *soles* per quintal would yield a gross income of 12 million *soles* (£ 2.4 million), assuming an average cost of production of 1.60 *soles* per quintal; total costs of production would amount to 8 million *soles*, setting aside 2 million *soles* for bond service. Moscoso estimated that the Peruvian Government could safely count on a "surplus" of at least 1 million *soles* as a result of the operation. Furthermore, he viewed the estimated costs of production of 1.60 *soles* per quintal as "too high" because they included interests on capital invested which, according to him, would be "suppressed" [in some unexplained way] under government ownership, adding that income could also be higher if nitrate prices went up as expected. Moscoso thus remarked that the estimated "surplus" for the government could be as high as 2 to 3 million *soles*.

By far the most significant information furnished by Moscoso was that the nitrate plants would be paid out of the proceeds of nitrate sales. However, according to his estimates, the entire financing of the operation was based on annual nitrate sales of 5 million Spanish quintals or some 273,000 tons, at 2.40 *soles* per quintal (Iquique, f.a.s.). Thus, although the ostensible motive for the expropriation was to substantially restrict nitrate sales based on the assumption that consumers would switch to guano, Moscoso was actually proposing to maintain the highest recorded level of nitrate exports (i.e., 279,632 tons in 1873; see Tables 1.4 and 3.4) in order to pay for the plants. If nitrate sales were trimmed without a proportional increase in prices, the service of the bonds issued for the plants would be immediately at risk, along with the expected "surplus" for the government. The contracting firm's income might also be threatened if it was forced to pay 2.40 *soles* per quintal in Iquique, the highest recorded price for nitrate according to Moscoso, and overseas prices did not suffice to cover the generous Tarapaca prices plus intermediate costs. No mention was made of the critical issue of an eventual competition from the Antofagasta Company for which higher nitrate prices, if achieved, would certainly constitute an incentive to expand exports. The threat of lesser, but growing, chemical competitors such as sulphate of ammonia (see Table 2.4) was also neglected.

Table 2.4

*Exports of Guano, Nitrate,
and Sulphate of Ammonia,
1862-1874
(Long Tons)*

Year	(1) Guano Exports (Tons)	(2) Nitrate Exports (Tons)	(3) S.Amm. Output (Tons)	(4) Total Market (Tons)	(5) %	(6) %	(7) %
					Guano	Nitr.	S.Amm.
1862	345,992	72,723		418,715	82.6%	17.4%	
1863	390,823	68,692		459,515	85.1%	14.9%	
1864	381,622	85,000		466,622	81.8%	18.2%	
1865	383,673	109,000		492,673	77.9%	22.1%	
1866	436,778	97,670		534,448	81.7%	18.3%	
1867	448,581	113,852		562,433	79.8%	20.2%	
1868	540,426	85,111		625,537	86.4%	13.6%	
1869	585,189	111,921		697,110	83.9%	16.1%	
1870	482,299	122,688	40,000	644,987	74.8%	19.0%	6.2%
1871	416,848	160,978	41,000	618,826	67.4%	26.0%	6.6%
1872	436,388	197,355	42,000	675,743	64.6%	29.2%	6.2%
1873	390,771	279,632	43,000	713,403	54.8%	39.2%	6.0%
1874	355,600	200,892	45,000	601,492	59.1%	33.4%	7.5%

Source: (1)-(2)- Dep. Oviedo, 15-Mar-1875; Dep. Duarte, 17-Mar-1875. Perú, *DE*1875, pp.244-5, 281.
(3)- Output, UK. Aikman, *Manures*, p.358.
(4)-(7)- Computed by the author.

Moscoso's expropriation bill was strongly opposed in the Chamber of Deputies. Two Deputies objected to the very submission of such a project to the Finance Commission, currently studying the nitrate question, on the grounds that it violated the guarantee on private property stipulated in Article 26 of the current Peruvian Constitution; however, the Chamber of Deputies ultimately accepted that the Moscoso bill passed to the Finance Commission, along with a second proposal prescribing a higher nitrate export duty³⁷

In November, 1874, yet another expropriation project surfaced in the Peruvian press, drafted by Carlos Pividal. Pividal proposed paying the Tarapacá nitrate plants, not with "special bonds", but with actual cash drawn

³⁷Perú, *DO*1874, 19-Sep-1874, p. 130.

from yet another foreign loan.³⁸ He did not explain how to contract the required loan, a critical gap in the face of the failure of the 1872 Peruvian loan, and the current world recession. However, the fact that a foreign loan was considered as an alternative to Moscoso's unsecured "special bonds" surely betrayed the anxiety of prospective sellers of nitrate plants with respect to the type of payment offered. Some four months later the expropriation debate began in earnest.

4. The Three Nitrate Bills

On March 15, 1875, the Auxiliary Finance Commission of the Peruvian Chamber of Deputies completed its much-awaited study of the nitrate industry, submitting three separate bills for discussion on the floor. The majority of the Commission supported a bill drafted by Deputies Moreno y Maiz and Estevez stipulating a 60-cents export duty on nitrate.³⁹ A first minority bill, signed by Deputies Luciano Benjamin Cisneros and Francisco Garcia León, proposed a modest, 15-cents export duty on nitrate, postponing any drastic measures concerning Tarapaca until the overall problem was better studied.⁴⁰ A second minority bill, submitted by Deputy Francisco Flores Chinarro, called for the purchase of all Tarapaca nitrate plants by the Peruvian Government, the Moscoso idea of expropriating plants was dropped, replacing it by a voluntary sale.⁴¹ The introduction of the three nitrate bills outlined all the major themes subsequently discussed on the floor of the Chamber of Deputies.

The introduction to the 60-cents bill opened with a strong warning on the ongoing guano-nitrate competition in the world market, adding nothing new to the doctrine on the subject developed since 1873.

³⁸*El Comercio* (Lima), 11-Nov-1874.

³⁹The text of the bill was published in Perú, *DE 1875*, 15-Mar-1875; the introduction was included in Billinghamst, *Legislación*, pp. 68-69.

⁴⁰Both the bill and its introduction were included in Billinghamst, *Legislación*, p. 67.

⁴¹The text of the bill was published in Perú, *DE 1875*, 31-Mar-1875, p. 323, the introduction, in Billinghamst, *Legislación*, pp. 70-73.

However, the Moreno-Estévez proposal advanced yet another new estimate of the volume and prices of guano sales required to solve the Peruvian fiscal crisis. Elguera had placed this figure at 500,000 tons per annum at current prices (£12 10sh per ton), while a subsequent report of the Chamber of Deputies upgraded the estimate to an exorbitant level of 670,000 tons, also at prevailing prices.⁴² The Moreno-Estévez proposal not only sided more with the Chamber's higher estimate, placing the desired volume of guano sales at 600,000 tons, but also added that it was necessary to sell guano at the inordinate price of £15 a ton, a price never achieved in the entire history of the fertilizer (Tables 1.4 and 3.4). It appeared that, as time went by, it was deemed necessary to sell more guano at higher prices, placing by implication higher expectations on the desired restriction of nitrate sales.

⁴²See above p. 116.

Table 3.4

*Guano and Tarapacá Nitrate,
Exports and Prices,
(1868-1874)
(Long Tons, £ per Long Ton)*

Year	(1) Guano Exports (a)	(2) Nitrate Exports (a)(b)	(3) Price Guano (c)	(4) Price Nitr. (c)	Total Exports (d)	% Guano (d)	% Nitrate (d)
1868	540,426	85,111	12.00	13.89	625,537	86.39%	13.61%
1869	585,189	111,921	13.00	17.03	697,110	83.95%	16.05%
1870	482,299	122,688	14.00	16.05	604,987	79.72%	20.28%
1871	416,848	160,978	12.00	17.00	577,826	72.14%	27.86%
1872	436,388	197,355	12.00	15.05	633,743	68.86%	31.14%
1873	390,771	279,632	12.15	14.15	670,403	58.29%	41.71%
1874	355,600	200,892	13.00	13.00	556,492	63.90%	36.10%

(a) Long tons.

(b) Original in Sp. Quintals, converted by the author into long tons dividing by 23.5; Tarapacá, exclusive of Antofagasta.

(c) British pounds per long ton, FOB, UK.

(d) Computed by the author.

Source: (1)-(3) Greenhill, "Peruvian", p.111; Rodríguez, "Historia", p.110; exports 1843-61, only imports into the UK (Mathew, Gibbs, p.252).
 (2) *El Veintiuno de Mayo* (Iquique), 14-May-1884.
 (3) *The Economist* (London), 13-Mar-1880; Greenhill, "Peruvian", p.110.
 (4) Greenhill, "Peruvian", p.110; 1843-69, Hernández, *Salitre*, p.69. Original data given in shillings and pence per Spanish quintal, and converted by the author in British pounds per long ton.

Anticipating objections from nitrate producers, who had publicly opposed any increase in taxation, Moreno and Estévez noted that if nitrate prices reached £19 per ton in Europe (i.e., an unrealistic level only achieved in the mid-1850s, see Tables 1.4 and 3.4), Tarapacá could safely expect profits of £4 per ton, an amount "adequate to satisfy the most ambitious aspirations of the industrialists, however exaggerated" Of course, these optimistic estimates of future profits, if at all valid, could not apply to high-cost producers,

particularly the Peruvian owners of *paradas*, on the verge of being expelled from the market by the more efficient new *máquinas*, nor to owners and financiers of partially assembled operations, such as Barrenechea and Esperanza. This was the central political problem posed by the otherwise sensible idea of imposing a high export duty on nitrate. The majority of the Chamber's Finance Commission supporting the Moreno-Estévez bill had not fully assimilated the lessons of the aborted *estanco*, which had shown that no measure negatively affecting the Peruvian owners of new *máquinas* was likely to be implemented, furthermore, in ignoring the interests of the owners of small *paradas*, favoured in the *estanco* law, the 60-cents proposal was likely to spawn an even broader opposition in Tarapacá. However, it is worth noting that, strictly for the purpose of raising much-needed revenue, and stripped of illusions of influencing the nitrogen world market and driving guano sales to an impossible level, the 60-cents nitrate export duty was an eminently defensible proposition. Only the political price of such tax, the sacrifice of most Peruvian owners of nitrate plants, was clearly too high.

The introduction of the Cisneros-García bill took exception to the unhesitant characterization of an alleged guano-nitrate competition put forth by the sponsors of the 60 cents proposal. It noted that the actual figures on sales and prices for both products did not allow a clear-cut interpretation, particularly when the potential threat from the Antofagasta Company was taken into account. The bill proposed a 15-cents nitrate export duty as a temporary measure, while the Executive Branch collected "detailed data" on the competition between guano and nitrate, viewed as merely possible as opposed to definitively established.

The introduction to the Chinarro expropriation bill proclaimed its support for the ideas on the destructive impact of the competition between guano and nitrate stressed by Estévez and Moreno, but flatly rejected a 60-cents nitrate duty. Chinarro argued that a high export duty would generate "animosity and resentment". Nitrate prices could be increased "easier and more adequately" by a wholesale government purchase of all Tarapacá nitrate plants. In that case, the State would have "a monopoly of the product, and by properly restricting output, it would be able to dictate its price to the consumers. With a higher price and a curtailed production, guano consumption will surely increase, and yield larger profits". Chinarro explained that the idea of an expropriation *sensu stricto*, as stipulated earlier on the Moscoso Mielgar bill, was deemed "unacceptable" since it was certain to lead to protracted litigation, estimating that the State might not be able

to take possession of the nitrate plants for as long as ten years. This crucial shift meant that the nitrate remarks on the unconstitutional Finance Commission, issued against the Moscoso bill, had been taken into account. Furthermore, the new appropriation bill adopted the idea of paying for the nitrate plants with a new foreign loan previously advanced by Carlos Pividal,⁴³ although it was not explained how this loan could be raised in financial markets overtly hostile to further Peruvian borrowing, this method of payment was intended to quell fears of prospective sellers in the face of an unsecured issue of "special bonds" suggested in the Moscoso bill.

However, the proposal of an additional foreign loan to pay for the nitrate plants was not the only novelty included in the introduction to the Chinarro bill. By far the most important idea developed by Chinarro was that the government purchase of the Tarapacá nitrate plants would be beneficial and "imperative" for Perú on purely financial grounds, irrespective of its eventual impact on the world market for nitrogenous fertilizers. No one had advanced this notion before. All prior views on government intervention in Tarapacá, either through higher taxes, a State monopoly on nitrate sales, or a purchase of the industry, were predicated exclusively on the basis of protecting guano. Up to that moment, the entire nitrate debate had been in effect a discussion on the existence and the scope of guano-nitrate competition. Through the review of the Chamber's Finance Commission, lasting from mid-1874 to January, 1875, a new idea had emerged, and Chinarro spelled it out in full. Chinarro stated that even assuming that the alleged competition between guano and nitrate "did not exist" (*no fuera cierta*), a government purchase of the Tarapacá nitrate plants would be "not only convenient, but also imperative for the State". He noted that overseas lenders mistrusted Peruvian bond issues out of fear that the guano deposits of the country would not last for the twenty five years stipulated as the life of the current outstanding foreign debt. Nitrate, Chinarro remarked, could replace guano as a "collateral" for further overseas borrowing. He estimated optimistically that the nitrate industry under government ownership could produce a yearly fiscal income of 12 to 15 million *soles*, sufficient to "ensure the service of our debt for all the time required to fully amortize it". With this exceptional income in mind, Chinarro proposed "expanding" the loan

⁴³See above pp. 122-123.

projected to provide the means for an additional £3 million slated specifically for railroad construction "and to partially cover the [budget] deficit." He saw "no problem" in doing so because, according to him, income from authorized annual sales of 4 million quintals (181,818 tons) would cover both the nitrate and the railroad loans "leaving a surplus applicable to meet the needs of the public services".

Thus, the nitrate industry was suddenly regarded as a "collateral" for State overseas borrowing. The impact of the new projected loan on the depressed Peruvian economy was described enthusiastically by Chinarro.

This operation [i.e., the new foreign loan] would end the commercial crisis which carries such deplorable consequences on the general development of the country, since the proceeds of the loan contracted would circulate, the Banks would make good their portfolios, and commerce in general would come out of the dreadful situation in which it finds itself today. In order to appreciate [this impact], it is enough to consider that both the Banks and the commercial sector have invested substantial capital resources on nitrate ventures, which they are now unable to recover. Furthermore, the continuation of railroad works would powerfully contribute to improve the [economic] outlook by means of the circulation of larger capital [resources].

The emphasis of the supporters of the expropriation had clearly shifted from the defense of guano's share in the world market to the "end of the commercial depression" in the country, including an explicit bail out of the troubled banking system, coupled with fresh funds for railroad construction. Rather than considering the foreign loan proposed to buy up the Tarapacá nitrate industry as a purely ancillary measure, ultimately aimed at consolidating a Peruvian world monopoly of nitrogen, the projected bond issue was presented as an end in itself, in a fashion reminiscent of the corrupt "consolidations" of Castilla and Echenique in the 1850s. The political importance of such change in outlook was immense. Endowed with a new foreign loan with a double purpose, the expropriation bill could be expected to muster support from the powerful financial circles currently involved in banking and railroad construction. After all, the vague promise of increasing government income by the circuitous and dubious route of shrinking nitrate exports fell quite short of the pressing needs derived from the massive railroad network. Furthermore, the desired level of guano sales, some 600,000 tons, was clearly unrealistic. In contrast, a new foreign loan using nitrate as a "collateral" held out the promise of immediate financial relief, albeit it was yet to be determined how it could be raised.

The text of the Chinarro bill authorized the Peruvian Government to buy all Tarapaca nitrate plants and to contract a loan "for the amount necessary to carry out [the provisions] of this law", along with £3 million for "railroad works" and for "the general needs of the State". The phrasing of the pertinent article allowed for potentially unlimited government borrowing since no specific limit was placed on the amount slated to buy nitrate plants. The loan would be guaranteed by "the plants acquired, and the rest of the [nitrate] deposits owned by the State". The addition of a railroad loan implied that there would be two types of bondholders: the nitrate bondholders, presumably the sellers of nitrate plants, and the railroad bondholders, both laying claim to the same collateral. Exactly how attractive this new mortgage would be viewed by potential lenders was an open question. The usefulness of the mortgage placed on Peruvian guano and railroads to float the 1870 and 1872 loans was about to be tested upon the default of Perú in January, 1876. Furthermore, the text of the contract of both loans had included a "general" mortgage on "all" State properties,⁴⁴ and the unpaid bondholders could be expected to claim rights over the nitrate industry as State property.

The Chinarro expropriation bill, in keeping with the concept of a voluntary sale, allowed producers unwilling to part with their plants to continue freely exporting nitrate, but subject to a new export duty "which should not exceed the difference between the price paid for nitrate by the government [to State-controlled plants], and that fixed by [decree] for the sale of the product". The proceeds of the export duty would also be applied to service the authorized loans. Thus, the bill implicitly established two sectors in Tarapacá. A government-owned sector managed, according to the proposal, by contractors would coexist with a privately-controlled sector. A potential source of friction could arise if free exports, albeit taxed, threatened to drive the total volume of overseas nitrate sales beyond the level deemed acceptable by the government. The ensuing discussion in the floor of the Chamber of Deputies altered some of the provisions of the original Chinarro bill

⁴⁴See above p. 35.

5. *The Antojagasta Issue*

The understanding of the congressional debate on the three nitrate bills is somewhat hampered by the absence of biographical data on most Peruvian Deputies and Senators, particularly their links to specific economic groups. However, it is significant that two of the leading spokesmen for and against the expropriation were clearly associated with major sectors of the Peruvian economy. José Moscoso Melgar, the first Deputy to submit an expropriation project was the brother of Manuel Moscoso Melgar, Chairman of the Providencia Bank, an institution which backed nitrate plants and was subsequently charged with managing the entire operation; Manuel Moscoso Melgar also controlled the Rimac Nitrate Company.⁴⁵ Since the critics of the expropriation were quick to point out that the scheme involved a questionable bail out for troubled Peruvian plants, and the local banking system, Deputy Moscoso Melgar's credibility might have suffered on account of his brother's position. On the other hand, the position of Deputy Mariano Aparicio Oviedo, one of the leading critics of government intervention in Tarapacá, was compromised by the fact that he acted also as a lawyer for nitrate producers. In a heated exchange, a supporter of the expropriation told Oviedo that he should "forget about his clients", and "think about the veritable interests of the country".⁴⁶ On the whole, as the Tarapacá producers and their political supporters had opted, perhaps unwisely, for an inflexible rejection of any type of taxation, the sponsors of the 60-cents tax and of the expropriation could easily single them out as special interests who refused to pay their fair share of the country's expenses in the face of a dramatic fiscal crisis.

The three bills submitted to the Peruvian Chamber of Deputies reflected two radically different perspectives on the world market for nitrogenous fertilizers. Both the 60-cents proposal and the expropriation bill were based on the assumption that there was an ongoing competition between nitrate and guano in the world market; both projects were explicitly aimed at artificially restricting nitrate exports to allow for larger guano overseas sales. On the other hand, the opponents to both measures either denied the existence of such competition or argued that there was insufficient data to draw definitive conclusions.

⁴⁵See above pp. 45-46

⁴⁶Deputy Adán Melgar, Perú, *DE1875*, 16-Apr-1875, p.456.

However, it is worth noting that the actual existence of some form of competition between guano and nitrate was a secondary matter. By far the most disturbing question raised by early discussions on the subject was if it was still true that Perú was the only country producing sodium nitrate. Doubts on that account had to be put to rest before anything else was decided. Indeed, even if it could be proven that increased nitrate exports were responsible for the decline in guano sales, Perú would be unable to restrain nitrate production in the face of a foreign nitrate concern, namely the Antofagasta Company, freely exporting the same product. Any restriction in nitrate output enacted by the government in Tarapacá could be offset by increased exports from Antofagasta, a Bolivian region outside Peruvian control. In fact, a rise in nitrate prices induced by a restriction of Tarapacá exports would constitute an incentive for the Antofagasta Company to expand production, effectively nullifying any Peruvian decision to that effect.

It should be noted that it was fairly easy to verify exactly the extent of the Antofagasta threat. The annual reports of the company were published and distributed in Valparaíso. In fact, one Peruvian Deputy quoted, albeit erroneously, the latest annual report of the CSA in the floor of the Chamber.⁴⁷ The recent construction of the Antofagasta railroad was a major public event in the area. Alfred Bohl, the manager of the Lima subsidiary of the Gibbs firm, co-owner of the CSA, openly warned the Peruvian Minister of Finance about the Antofagasta railroad in his response to the Malinowski report.⁴⁸ Of course, the two refining plants of the Antofagasta Company were in full view. George Hicks, the resident manager of the Antofagasta Company, frequently received visitors, some of them connected to Meiggs and the Peruvian Government.⁴⁹ Hicks himself visited Tarapacá to study the new designs of the Peruvian nitrate plants, and workers from the Peruvian nitrate region flocked to Antofagasta to find jobs since early 1876.⁵⁰ Given the central importance of the issue, and

⁴⁷See below p. 134.

⁴⁸See above p. 113.

⁴⁹See below pp. 167-168.

⁵⁰See below p. 194.

considering that data on the Antofagasta Company was easily available at the time, the pertinent discussion both prior to and during the debate in the Peruvian Congress was surprisingly uninformed and superficial

In the Chamber of Deputies, the clearest and more accurate references to the Antofagasta Company came from the critics of both the 60-cents tax and the expropriation. Deputy Mariano Aparicio Oviedo pointed out that, besides the Antofagasta Company, there were eight new nitrate companies poised to start production in the El Toco district. Oviedo's major point was that a "defective" Peruvian legislation aimed at increasing Tarapacá nitrate prices, either through higher taxes or restricting the supply of a government-owned industry, would only "stimulate the development of a [rival nitrate] industry which will rise over the ruins of our own".⁵¹ He stressed the fact that an expanding Antofagasta Company would preclude the Peruvian Government from raising nitrate prices "at will", as soon as the CSA started increasing its exports to take advantage of higher prices, Perú would be compelled to "lower the price [of Tarapacá nitrate] to withstand the competition", and the country would end up incurring "substantial losses"

Is it possible ..that we impose on Perú the obligation of servicing twenty, or perhaps forty, million soles [in bonds] solely to generate losses, and to have to face later a powerful competitor which will ultimately swallow up our valuable nitrate industry?⁵²

This was arguably the most lucid question formulated during the congressional debate on nitrate. Oviedo also drew attention to the fact that nitrate workers and producers evicted from Tarapacá would migrate to the adjacent Bolivian nitrate works, further damaging Perú and reinforcing the competition. His only inaccurate prediction was that Bolivia would never levy taxes on nitrate because it would be tantamount to "commit suicide by destroying her [own] industries"⁵³ Other critics pointed out that the tax-exempt status of Antofagasta nitrate gave the company a critical cost advantage over its counterparts in Tarapacá, noting that the region's imports were also duty-free. "the Tarapacá workers have to spend ten [units] to dress and feed

⁵¹Deputy Oviedo, Perú, *DE1875*, 15-Mar-1875, p.243.

⁵²Deputy Oviedo, Perú, *DE1875*, 23-Mar-1875, pp. 315, 318.

⁵³Deputy Oviedo, Perú, *DE1875*, 15-Mar-1875, p.243.

themselves in line with the Peruvian tariff, while in Bolivia they will spend only five [units] for both purposes".⁵⁴ Some of the supporters of State intervention viewed a government-controlled nitrate industry as "stronger" than a host of independent producers.⁵⁵ However, Deputy Oviedo pointed out that, far from strengthening the position of Tarapacá in its competition with the privately held Antofagasta Company, the proposed State management of the Peruvian nitrate industry would weaken it since "governments lose [money] where private [entrepreneurs] make a profit", drawing attention to the massive losses of the State-owned railroads.⁵⁶ Finally, along with warning about the possibility that the population of Tarapacá decided to secede and join Bolivia, Deputy Juan Luna made an almost prophetic statement. He cautioned about the eventual "impact of such measure [i.e., the expropriation] on the relationship [of Peru] with the Republics of Bolivia and Chile", adding that he "would rather not deal with the question from such an extremely delicate point of view." However, he foresaw (erroneously as it turned out) that international conflicts could arise due to Bolivia offering "as many advantages as possible" to attract nitrate producers and workers from Tarapacá, generating "complaints, mistrust, and claims which could very well lead sister nations into a war, which would surely be bloody".⁵⁷ In spite of the mention of a massive exodus which in fact materialized only in part, Luna was right in anticipating that the situation would generate a tense regional atmosphere, and in conjuring up the spectre of war.

The supporters of the 60-cents tax and the expropriation dealt with the Antofagasta issue far too casually. The most common argument was the already familiar notion about the poor location of the

⁵⁴Deputy Suárez, Perú, *DE1875*, 14-Apr-1875, Appendix, p.X.

⁵⁵This was explicitly stated during the *estanco* debate (see above p. 77).

⁵⁶Deputy Oviedo, Perú, *DE1875*, 23-Mar-1875, p.315

⁵⁷Deputy Juan Luna, Perú, *DE1875*, 8-Apr-1875, pp 364-365.

Antofagasta deposits, it was repeated at least twice during the debate.⁵⁸ Deputy Moscoso Melgar added that it was not "conceivable" that more nitrate plants were established elsewhere since Tarapacá nitrate output had "exceeded the limits of consumption."⁵⁹ This was not very persuasive reasoning since the goal of the operation was precisely to cut down such output presumably below current "limits of consumption." Deputy Adán Melgar stressed what he considered a poor performance of the Antofagasta Company during 1874, stating that the CSA's stock was currently sold in Valparaíso with a 50 percent discount, and that it had paid no dividends in 1874. In fact, the published annual report of the CSA for 1874 showed that both exports and net profits had increased, the latter to some 118,000 Chilean pesos, or £23,600.⁶⁰ The fact that the CSA decided not to pay dividends in 1874 simply meant that net profits had been ploughed back into the company. Melgar also reiterated the argument that placing guano and nitrate in the hands of the Peruvian Government would constitute a "threat" which would dissuade potential investors to risk capital in Bolivia.⁶¹ Finally, one supporter of the 60-cents tax, Deputy D.J.M. González, dismissed the competitive edge of the Antofagasta Company in the field of taxation advancing an intriguing notion, particularly in the light of subsequent developments. González noted that Bolivia also needed "fiscal income, and the day might come when, seeing that nitrate is taxed in Perú, she will also tax hers."⁶² Thus, the tax-exempt status of the Antofagasta Company, a key advantage already mentioned in prior discussions, was all too easily discarded by relying on future measures taken by the Bolivian Government.

⁵⁸Deputy Terry, 23-Mar-1875, p.302; Deputy Moscoso Melgar, 7-Apr-1875, pp. 357-358. Perú, *DE1875*.

⁵⁹Deputy Moscoso Melgar, Perú, *DE1875*, 7-Apr-1875, p.358

⁶⁰See above p. 103, Table 6.5

⁶¹Deputy Adán Melgar, Perú, *DE1875*, 16-Apr-1875, p.457.

⁶²Deputy D.J.M. González, Perú, *DE1875*, 15-Mar-1875, pp. 237-242.

The discussion on a closely related issue, the possibility that consumers faced with higher nitrate prices decided to switch to nitrogenous fertilizers other than guano, was also superficial. Sulphate of ammonia was dismissed as a viable substitute due to its current high price relative to that of nitrate and guano. "Mixed" fertilizer factories were viewed as consumers of nitrogen, rather than as rival producers, thus forced to accept the new prices imposed by Perú. Summarizing the view of the nitrogen world market of the supporters of government intervention in Tarapacá, one Deputy stated "it is possible that, given time, chemistry will perform the miracle of finding a substitute, but for the time being Peru is the king of nitrogen". Holding fast to the "king of-nitrogen" premise, the supporters of the expropriation proceeded to deal with the financial aspects of the operation.

6. The Loan Issue

The central financial issue of the proposed expropriation was quite simply how would Peru, in the verge of defaulting on its foreign debt, pay for the Tarapacá nitrate plants. The first expropriation project submitted by José Moscoso Melgar had proposed using income from the sale of nitrate to gradually reimburse the sellers of nitrate plants. The Chinarro bill altered this provision by authorizing the Executive Branch to raise a foreign loan to finance plant purchases, servicing the new loan with the proceeds of the same nitrate sales. The second expropriation proposal appeared as a concession to the owners of nitrate plants since it offered immediate payment in hard currency, but failed to explain how the projected loan could be raised under current conditions. The amount and the cost of the new nitrate loan were also unclear. While Moscoso Melgar had suggested, somewhat vaguely, up to 20 million soles, the Chinarro bill had left the question open, supplying only a definitive figure for the additional railroad loan, i.e., £3 million. However, the estimates on the prospective income from the operation depended heavily on the funds required for the service of the loan. Thus, the first financial requirement was to provide a specific figure for the amount slated to purchase nitrate plants, as well as examining the likelihood of floating yet another Peruvian bond issue.

Both expropriation projects depended on reasonably high and profitable nitrate sales to defray the costs of the operation. Of course, this raised the question of how much income the expropriation could be expected

to yield. Gross income of the operation was equal to the total volume of overseas sales at a given price. The Peruvian Government would fix the total volume of exports and establish an official price. This total gross income had to cover all costs (i.e., cost of the product at point of export, intermediate costs - basically, freight, insurance and storage charges-- , and commissions), as well as the service of the nitrate and "public works" loan; the remainder, if any, would accrue to the Peruvian Government. The question was if there would be enough income left over to service the (yet undefined) nitrate debt, in addition to the £3 million assigned to public works, and to provide additional government income.

Future nitrate income was closely linked to the type of management chosen for the expropriated industry. It was already hinted that the government would operate the expropriated plants through private contractors, and would market nitrate overseas through another agent. The selected contractors would sell their authorized output to the chosen agent at an official price in Iquique. Since private contractors would work for a profit, the government price would have to cover their costs of production. In this respect the relationship between the government, owner of the nitrate plants, and the contractors, sellers of nitrate to the government, faced similar problems as those posed by the aborted *estanco*: a high official price in Iquique would take away from the revenue derived from final overseas sales, slated both for the bondholders and the Peruvian Government, a low official price would be unacceptable for the contractors who might decide to curtail or halt production altogether. In addition, prior discussions had shown that there was no agreement as to what was the "average" cost of production, valid for all the heterogeneous Tarapacá nitrate plants. It is worth noting that there were not many Peruvians able to handle successfully one of the new mechanized nitrate plants, as the recent failures in Tarapaca had demonstrated, and that the government would have to rely on the most efficient enterprises in order to keep costs of production at the lowest possible level. A foreign firm would have to handle overseas sales, in the absence of both local capital resources, and a global marketing network. Of course, overseas nitrate sales could not be too successful under the expropriation scheme since the main goal of the operation was to favour guano. As in the case of the eventual Antofagasta competition, the most accurate reviews of the financial issues came from the critics of government intervention in Tarapacá, while the supporters of the expropriation supplied confusing estimates.

The most vehement argument in favour of a nitrate loan was made by Deputy José Moscoso Melgar. He argued that it was entirely possible to raise the projected new loan because both the interest and the guarantees offered were extremely attractive to foreign investors. Moscoso Melgar stated that it was certain that overseas capital would "rush into the country in search of such placement" because capitalists never "overlooked" a good business opportunity.⁶¹ Another Deputy argued that the nitrate loan was attainable under the conditions stipulated, including the proposed interest of 6 percent per annum.⁶² Strangely enough, although no formal assessment of the Tarapacá nitrate industry had been made, the supporters of the expropriation made all their estimates on the basis of a nitrate loan of 20 million *soles*, a figure provided quite casually by Moscoso Melgar in explaining his expropriation project in mid 1874.⁶³ Moscoso Melgar adopted this figure without further analysis, as did Flores Chinarro, the author of the second expropriation bill during his subsequent speech on the floor of the Chamber. Two more Deputies, Puga and Adán Melgar, also used the same estimate without elaborating.⁶⁴

The 20-million *soles* estimate was promptly termed a "gratuitous premise" by one critic, noting that there was no "positive data" on the total value of the Tarapacá nitrate industry.⁶⁵ Deputy Oviedo also stated that the figure was purely "hypothetical."⁶⁶ More pointedly (and prophetically as it turned out) Deputy Malpartida noted that it was extremely difficult to assess nitrate plants, and predicted that there was a potential for major

⁶¹Deputy José Moscoso Melgar, Perú, *DE 1875*, 7-Apr-1875, p. 360-361.

⁶²Deputy Puga, Perú, *DE 1875*, 1-Apr-1875, p. 331.

⁶³See above p. 121.

⁶⁴Deputy Moscoso Melgar, 7-Apr-1875, pp. 360-361; Deputy Chinarro, 1-Apr-1875, pp. 336-337; Deputy Puga, 1-Apr-1875, p. 331.

⁶⁵Deputy Arbulu, Perú, *DE 1875*, 16-Apr-1875, p. 456.

⁶⁶Deputy Oviedo, Perú, *DE 1875*, 24-Mar-1875, pp. 317-318.

frauds in this field, which could trigger a wave of corruption charges, fed by disaffected sellers supported by the political opposition.⁶⁹

Other critics concentrated on the cost of raising such a loan under current conditions. A supporter of the 60-cents tax noted that "we currently have many unsold bonds from our second [i.e., 1872] loan", suggesting that the new loan might not find buyers.⁷⁰ More directly, Deputy Malpartida, charging that the sponsors of the expropriation had painted a "seductive picture" of the projected loan, pointed out that prospective interest charges for a new Peruvian bond issue would be exorbitant, Peru's credit rating in Europe was extremely poor, and Peruvian bonds were currently quoted as low as 74 to 75 percent of face value. He thus predicted that the nitrate loan, if at all possible, would carry a 9 percent real interest per annum, "entirely erasing" the alleged profits from the operation. In addition, Malpartida drew attention to the fact that the Peruvian State would also need working capital, currently lent at 9 to 10 percent annual interest, estimating that the larger Tarapacá producers could borrow funds at 3 to 4 percent per annum, he cautioned that they could advantageously compete with the government as independent exporters of nitrate.⁷¹ Similarly, Deputy Oviedo declared that the new bond issue "would have to be the most onerous to date" since it was "unthinkable" that it could be sold at face value; he estimated that it might be taken at 60 percent, adding another 10 percent in commissions, thus driving up the real cost of the projected purchase from 20 to 40 million soles.⁷² Deputy Juan Luna reminded the Chamber of Deputies that, besides its exorbitant foreign debt, the Peruvian Government was saddled with an internal debt of over 30 million soles currently traded at 64 percent after a recent additional issue of 1.5

⁶⁹Deputy Malpartida, Perú, *DE1875*, 7-Apr-1875, p. 369.

⁷⁰Deputy D.J.M. González, Perú, *DE1875*, 15-Mar 1875, p.242.

⁷¹Deputy Malpartida, Peru, *DE1875*, 7-Apr-1875, pp. 366-369.

⁷²Deputy Oviedo, Peru, *DE1875*, 15-Apr-1875, p.441

million *soles* in treasury notes.⁷³ Finally, another critic doubted that the nitrate industry could be used as "collateral" for a new loan since "the nitrate plants are already mortgaged for the service of our foreign debt, as attested by the text of the contract for the bonds issued by the prior administration...".⁷⁴

The estimates made by the supporters of the expropriation concerning the prospective income from the operation, albeit varied, were just as optimistic as their views on the nitrate loan. One Deputy stated that it was "certain" that Perú could sell 200,000 long tons of nitrate annually at £17 a ton, a record price achieved only twice since 1842 (see Tables 1.4 and 3.4), because the "intrinsic value" of the nitrogen content of the product was in fact £19 per ton. This high price would yield a total gross income of £3.4 million per annum; he placed total expenses at £13 per ton, or a total of £2.6 million, leaving a profit of £800,000; of this surplus, £280,000 would be applied to the service of nitrate loan, yielding a net profit of £520,000 for the Peruvian Government.⁷⁵ Flores Chinarro supplied a lesser estimate, noting that nitrate could be sold at £15 6sh per long ton if exports did not exceed 4 million Spanish quintals (or some 171,000 long tons); he calculated net profits, after allowing for total costs of £12 per long ton, at £3 per ton, or some £513,000, leaving ample room to service the loan and provide additional State income.⁷⁶ Moscoso Melgar, extolling the advantages of "consolidating" nitrate production and predicting substantial "cost savings" through wholesale purchases of inputs such as coal, forecasted slightly lower net profits of £400,000; but he added that prices could be pushed higher, thus increasing

⁷³Deputy Juan Luna, Perú, *DE1875*, 8-Apr-1875, p.379.

⁷⁴Deputy Duarte, Perú, *DE1875*, 31-Mar-1875, pp. 325-326.

⁷⁵Deputy Puga, Perú, *DE1875*, 1-Apr-1875, p. 331.

⁷⁶Deputy Flores Chinarro, Perú, *DE1875*, 1-Apr-1875, pp. 336-337.

this amount.⁷⁷ Yet another favourable estimate forecasted substantial net profits of £1 million, doubling those provided by other supporters, and leaving £440,000 for the Peruvian Government.⁷⁸

One critic of the operation charged that the production costs used by the supporters of the expropriation were purely "imaginary", as was the notion that exports could be precisely held at 4 million Spanish quintals at fixed prices of £15 or £16 per long ton. No one had established that nitrate would be indeed applied to agriculture at that level of prices, nor that costs of production, as well as freight charges, would remain stable under an inevitably fluid economic context. He also warned that the sale of the industry, based on unproven assumptions, would be irreversible, and as such it had "all the shortcomings of the death penalty"; in addition many nitrate producers could refuse to sell their plants, competing with the government-controlled sector, and nullifying all official efforts to fix the level of exports and prices.⁷⁹ This last point was important (and again entirely accurate), suggesting that, under the proposed scheme based on a voluntary sale of nitrate plants, the Peruvian Government could expect competition, not only from Antofagasta, but from independent nitrate producers in Tarapacá itself. Two other Deputies claimed that production costs in Tarapacá should be computed at a much higher level, of 2 soles per Spanish quintal, anticipating losses for the government, rather than profits, in addition to some 700,000 soles of lost customs revenue, currently generated by the nitrate export duty, inapplicable to government-controlled nitrate.⁸⁰

⁷⁷Deputy Moscoso Melgar, Perú, *DE1875*, 7-Apr-1875, pp. 360-361.

⁷⁸Deputy Adán Melgar, Perú, *DE1875*, 16-Apr-1875, p. 456.

⁷⁹Deputy Arbulú, Perú, *DE1875*, 17-Apr-1875, p. 473.

⁸⁰Deputy Duarte, 9-Apr-1875, p. 399; Deputy Oviedo, 24-Mar-1875, pp. 317-318. Perú, *DE1875*.

7. Nitrate and Railroad Bonds

Since it was predictable that the highly speculative estimates of the eventual profits of the expropriation would be as sharply questioned in the Peruvian Congress as the rest of the assumptions about the world market, Flores Chinarro had furnished in his introductory remarks an additional reason for supporting his bill. He claimed that the expropriation was the only way out of the current economic depression; the new nitrate and "public works" loan, as well as the projected "surplus" income from nitrate sales, would end the current commercial crisis, rescue the local banking system, including its failed investments in Tarapacá, and allow the continuation of railroad construction. Of course, this reasoning was likely to be far more appealing than the increasingly nebulous arguments concerning the "protection" of guano. Thus, rather than relying exclusively on a largely hypothetical increase of guano revenue via the restriction of nitrate sales, the supporters of the expropriation took care to emphasize the urgent need to preclude a collapse of the Peruvian banking system. This line of reasoning also allowed them to present the rather questionable bail out of faltering Tarapacá enterprises as an essential part of a salvage operation of the Peruvian economy at large.

Deputy Solar, underlining that there was "no bank in Lima" which was not "completely involved in the nitrate industry", noted that, through the expropriation, the "bankrupt industrialists" would get their money back "rapidly" reimbursing their creditors "those 15 or 50 million soles" borrowed from them. He added that he "did not care" about the total amount of the projected loan because the proceeds would "have to come here to circulate, saving the banks and the capitalists, making money visible, since currently there is nothing but worthless little green pieces of paper, valueless because the banks cannot support them". Solar went on to conjure up, not without truculence, the spectre of a generalized failure of domestic banks.

The same day one Lima bank goes bankrupt, all other banks will follow. Imagine that the Providencia Bank fails; the mere news of this bankruptcy will make everybody weary, take out their bills and proceed to change them; and as these establishments do not have enough funds to exchange the bills they have issued, they will be forced to close down, the capitalists will be ruined, we will all be ruined, and we would have to use a gun in order to get money to eat.⁸¹

⁸¹Deputy Solar, Perú, *DE1875*, 13-Apr-1875, p.428.

Deputy Pérez went a step further, actually accusing the critics of the expropriation of asking for the collapse of both the banking system and the Peruvian nitrate companies, and pushing the public to exchange their bank bills.⁸² Deputy Adán Melgar stroke a similar, albeit less strident, note, arguing that the expropriation would "correct the lack of capital" in the country, allowing companies and individuals to "make good their portfolios", and increasing all market values, including government securities. He also tried to reinforce the idea that the expropriation was a nationalistic measure by stating that the operation would "eliminate the transactions effected in Iquique with Chilean capital, [currently] taking away more than 9 million *soles*...from Perú".⁸³ Of course, the notion of "stimulating the economy" through a foreign loan sounded very similar to those used to promote the corrupt "consolidations" of Castilla and Echenique in the 1850s, as well as to the massive 1870 and 1872 loans. Significantly, another supporter of the expropriation, also praising the tonic impact of a nitrate loan, hailed the "consolidation" of President Castilla in the 1850s as "ethical and fair".⁸⁴

Deputy Oviedo was quick to term the suggestion that the Peruvian Government should act as the "redeemer of the banks" a "bizarre proposition".

If the banks are bankrupt, as Mr. Solar assures, they, and only they, are responsible for solving their predicament. The State cannot should not, rush to rescue them, for the simple reason that it is not its role to protect bankrupt [institutions] using capital resources which it does not have, and running the imminent risk of destroying its own credit.⁸⁵

These were strong words in a country on the verge of financial collapse, but they show that the position of the critics of the expropriation weakened politically when they were made to appear as arguing for the downfall

⁸²Deputy Pérez, Perú, *DE1875*, 16-Apr-1875, p. 469.

⁸³Adán Melgar, Perú, *DE1875*, 23-Mar-1875, p. 309; 16-Apr-1875, p. 457.

⁸⁴Deputy P.M. Rodríguez, Perú, *DE1875*, 9-Apr-1875, p. 329. However, he admitted that Echenique's similar operation "had lent itself to abuses" being "universally condemned due to the large frauds perpetrated against the State". He warned that such excesses should be avoided in the current expropriation by restricting purchases to plants "which have been and are in actual production".

⁸⁵Deputy Oviedo, Perú, *DE1875*, 15-Apr-1875, pp.442, 445.

of the domestic banking system in the name of a rigid economic liberalism, or, even worse, to protect the narrow regional interests of Tarapacá producers. Oviedo was on firmer political ground when he attacked the expropriation bill for forcing the country to purchase nitrate enterprises "with real values when many of them have only nominal [value]". He was supported by another critic of the operation who stated that the proposed bail out of the failed nitrate plants was "immoral".⁸⁶ However, since another opponent balked at the idea of paying the owners of nitrate plants with "depreciated bonds", demanding "cash in advance";⁸⁷ the attack on the "immoral" bailout could be viewed as yet another aspect of the defense of the special interests of the Tarapacá lobby.

Oviedo supplied perhaps the most interesting criticism of the notion that the projected loan would "revitalize" the Peruvian economy, providing fresh capital for domestic transactions. He noted that it was inaccurate to assume that funds paid out for nitrate plants would remain in Perú since many of the Tarapacá enterprises were foreign-owned, or were heavily mortgaged to foreign lenders; and even if part of the payments went to Peruvian nationals, local capitalists had been traditionally reluctant to invest in their own country, bereft of industries, and invariably looked for "comfortable, certain, and lucrative profits" "It is not hard to guess what will be done with Peruvian capital: it is always waiting [to take advantage of] the problems and the policies of the government".⁸⁸ Oviedo was surely thinking of the discredited "consolidations" of Castilla and Echenique, as well as in the 1870 and 1872 loans, none of which had a discernible impact on the industrialization of the country; it drew attention to the notorious proclivity of the Peruvian elite for shunning real industrial investments, or embracing them in a haphazard fashion as in the case of the Tarapacá joint-stock companies. Another critic also pointed out that, in handing over the nitrate industry to the State, "we will be engaging in

⁸⁶Deputy Estévez, Perú, *DE1875*, 17-Apr-1875, p. 477.

⁸⁷Deputy Duarte, Perú, *DE1875*, 31-Mar-1875, pp. 325-326.

⁸⁸Deputy Oviedo, Perú, *DE1875*, 23-Mar-1875, p. 315.

another consolidation; we will create... a phalanx of employees and administrators...increasing our indebtedness, and incurring in more waste...".⁸⁹

It was particularly striking that the £3-million "public works" loan added to the Chinarro bill was hardly mentioned during the debate, although it increased the total amount of the proposed bond issue from 20 to 35 million *soles*, decisively affecting the much-discussed estimates on the future income from the operation. At an advanced stage in the debate, one Deputy noted that there was a "uniform silence" on the railroad loan, resembling a "golden patina to cover up the poison" since factoring in the service of the "public-works" bonds spelled "bankruptcy" for the entire scheme.⁹⁰ Only one supporter of the expropriation suggested, albeit discreetly, suppressing the £3 million "public works" loan because it would be impossible to raise such an amount.⁹¹

José Moscoso Melgar made an oblique, if not misleading, reference to this aspect of the bill, arguing that £6 million were needed to complete the railroads under construction, and terming the task "one of the primordial duties of our time...since otherwise we would risk losing the capital already invested in them". However, he added that the railroads would be financed by taking some 600,000 to 800,000 *soles* from the estimated 2 million *soles* in "profits" from the operation; thus he seemed to forget that a specific additional loan was proposed for that purpose.⁹² Two of the main critics of the expropriation, Duarte and Oviedo, drew attention to the railroad loan, but quite late in the debate; the former noted that the supplementary loan requested raised the total amount of the loan proposal from £4 to £7 million, and that all estimates should be

⁸⁹Deputy Duarte, Perú, *DE1875*, 31-Mar-1875, pp. 325-326.

⁹⁰Deputy Juan Luna, Perú, *DE1875*, 8-Apr-1875, p. 381.

⁹¹Deputy Terry, Perú, *DE1875*, 9-Apr 1875, p.396. Terry also favoured excluding from the operation, not only the "plants established without foresight and economy", but also the railroad constructed by the Esperanza Company because "the nation should not be expected to pay for negligence, excesses, and waste." Both suggestions fell on deaf ears.

⁹²Deputy Moscoso Melgar, Perú, *DE1875*, 7-Apr-1875, p.362.

made on that basis, including the alleged future "profits" of the expropriation since it was "hopeless" to expect that the railroads would pay for themselves; the latter proposed turning over the railroads to private enterprises willing to risk their own capital, and granting them the right to manage them for a given period of time.⁹³

It was understandable that the advocates of purchasing the Tarapacá nitrate industry showed little interest in highlighting the additional railroad bond issue since it disrupted all their estimates about the eventual cost and profits of the expropriation. It is less clear why the critics of the operation did so little to stress the importance of such a measure, and did it so late in the debate. Perhaps the peculiar way in which the expropriation bill was passed in the Peruvian Chamber of Deputies helps explain the almost "uniform silence", as noticed in the debate, on the railroad issue.

8. The Passage of the Expropriation Bill

As noted before, the majority bill before the Chamber of Deputies was the 60-cents proposal, sponsored by Deputies Moreno y Maíz and Estévez; the Chinarro expropriation bill was endorsed only by a minority of the members of the Auxiliary Finance Commission of the Chamber of Deputies. On March 31, 1875, the Moreno y Maíz-Estévez project was approved for discussion in the floor by 38 votes against 36, thus shelving the Chinarro expropriation proposal. This would have meant killing the expropriation bill without further debate. However, on a spectacular shift, Deputy Moreno y Maíz abruptly decided to withdraw his bill, overtly adhering to the Chinarro bill and allowing it to be discussed in the floor instead. Two dissident Deputies cried foul: Deputy Duarte stated that this procedure "involved a plan aimed at sacrificing the nitrate industry at any cost", while Deputy Luna spoke of "an extremely bizarre incident", noting that Moreno y Maíz' disconcerting abdication in no way served to grant the Chinarro bill a majority status.⁹⁴

Moreno y Maíz offered a rambling explanation for his change of heart, contending that he had previously rejected the idea of purchasing all of the Tarapacá nitrate plants only because it was unclear at the

⁹³Deputy Duarte, Perú, *DE1875*, 9-Apr-1875, p.398; Deputy Oviedo, 15-Apr-1875, p.477.

⁹⁴Perú, *DE1875*, 31-Mar-1875, p.322.

time where the funds would come from. However, currently, he claimed he had time to "consult with more intelligent people", he had "heard the prevailing opinion in the Chamber [of Deputies]", and having verified that "everybody thinks as I do, that is, that being the expropriation feasible it should be preferred to all other proposals, there is nothing more natural than asking for it to be discussed, rather than any other secondary idea"⁹⁵ Subsequently, another Deputy directly addressed the current Minister of Finance, Juan Ignacio Elguera, present in the Chamber of Deputies at the time, requesting his opinion about the expropriation scheme. Minister Elguera gave a pointed answer:

If the project under discussion [i.e., the Chinarro expropriation bill] is sanctioned as a law, the government will have to enact it of necessity, believing it to be feasible, and more in line with the veritable interests of the country.⁹⁶

Elguera's explicit statement certainly helped to bolster the status of the Chinarro bill, currently viewed as a project enjoying only minority support, while the 60-cents duty proposal was in fact thought to reflect the prevailing opinion of the Peruvian Government and Congress. It also shed light on the true intentions of the Pardo Administration, making it fully responsible for the operation.

The second sponsor of the 60-cents duty bill, Deputy Estévez, formally took distance from the retraction of Moreno y Maíz, stating that he had not changed his opinion. He cautioned that there were no funds to finance purchases of nitrate plants, and that the projected loan was a "trivial expedient". Estévez sided with Deputy Constantino Duarte, the Tarapacá representative, sharing his view that the expropriation would only benefit "those who are not [nitrate] producers, those who are currently bankrupt"; "we will buy sand, instead of *caliche*", he added, taking into account the large number of nitrate plants closed down due to their defective condition, "all of which have failed due to the bad quality of their deposits". After questioning the optimistic estimates on costs and profits supplied by the supporters of the expropriation, Estévez concluded that, since the "only purpose" of legislating on the Tarapacá nitrate industry was to "neutralize" nitrate competition to guano

⁹⁵Deputy Moreno y Maíz, Perú, *DE1875*, 31-Mar-1875, p.322.

⁹⁶Deputy Nicanor Rodríguez and Finance Minister Juan Ignacio Elguera, Perú, *DE1875*, 31-Mar-1875, p.326-327.

...all measures but the [nitrate] duty imply distorting the issue, running the risk of carrying out a ruinous operation. The duty would limit exports in a legal fashion, by the only means we have right [to apply]⁹⁷

Indeed the peculiar "distortion" of the whole issue mentioned by Estévez surfaced during the voting of the critical articles dealing with the proposed nitrate and railroad loans. One Deputy voting against the operation, felt compelled to clarify, somewhat defensively, that he did not oppose it because he was against railroad construction in his district, Cuzco,⁹⁸ while another representative of the same area, Távora, voted favourably "in order to continue public works, such as the Cuzco railroad"⁹⁹ Távora's final vote was all the more remarkable considering that only one week before he had strenuously argued against including a railroad loan in the expropriation bill stating that it would "compromise a loan which should only be raised to pay for the nitrate plants", and it would induce "a fall in [the price] of the bonds, particularly if it is a large issue"¹⁰⁰

The significant string of defections which allowed the Chinarro bill to be discussed, and ultimately approved, in the Chamber of Deputies, might be explained by the hidden, but potent, influence of the railroad issue on a debate ostensibly aimed at dealing with the best way to protect guano's share in the world market of nitrogenous fertilizers. As Deputy Estévez noted, the main issue had indeed become "distorted" by the growing awareness of part of the original supporters of the 60-cents proposal that an additional "public works" loan attached to the nitrate bill represented the only possibility of continuing railroad construction, since the prospect of raising funds overseas on the strength of guano income had to be ruled out. The irresistible sway of the railroad problem might help explain why the critics of the expropriation chose to merely broach the issue of the public works loan in the final stages of the debate, perhaps fearing that drawing attention to this part of

⁹⁷Deputy Estévez, Perú, *DE1875*, 1-Apr-1875, pp.332-333.

⁹⁸Deputy Juan Luna, Perú, *DE1875*, 17-Apr-1875, p.478.

⁹⁹Deputy Távora, Perú, *DE1875*, 17-Apr-1879, p.479.

¹⁰⁰Deputy Távora, Perú, *DE1875*, 10-Apr-1875, p.405.

the Chinarro bill was more likely to persuade Deputies to support the expropriation than to convince them to oppose it (as it appeared to have done ultimately). The Chinarro bill was approved in the Chamber of Deputies on April 19, 1875, with two small, but significant changes. Rather than allowing the government to contract a loan "for the amount necessary to carry out [the provisions] of this law", as the original text stipulated, the definitive version limited the total nitrate borrowing to £4 million, or 20 million *soles*, along with establishing a fixed nitrate duty of 60 cents per Spanish quintal for non-government exports, as opposed to the variable rate initially proposed.¹⁰¹

As the extensive discussion in the Peruvian Chamber of Deputies made clear, the expropriation scheme had drawn together a forceful coalition of disparate interest groups, not all of which were directly related to the fertilizer trade. Obviously, the flagging Lima Banks were acutely interested in managing a business which held out the promise of robust commissions both for the handling of the bond issue and the sale of nitrate; even when a foreign firm was almost certain to take charge of the financing and marketing aspects of the operation, the Lima Banks could reasonably expect to be involved. As it was sharply demonstrated in the debate, the owners of bankrupt nitrate enterprises, most of which were connected to the local Banks, looked upon the purchase of their dubious assets by the government as the only hope to recover their investments. Of course, all discussions on the financial prospects of Perú made clear that there were no more sources of credit available in the face of an impending railroad crisis, a depreciated paper *sol*, and dwindling guano revenue. Thus the exceptional emphasis placed by the advocates of purchasing the Tarapacá nitrate industry on the beneficial impact of a new bond issue on railroad construction, bank reserves, and fiscal income: on the whole almost as much time was spent discussing those issues as proving the alleged guano-nitrate competition, and estimating the eventual profits from nitrate sales under a unified State management.

The articulate Lima press was deeply divided on the subject. The opposition to the expropriation made unlikely bedfellows of *El Nacional*, the organ of the *Partido Civil*, President Pardo's organization, and *La Patria*, the representative of the rival Piérola faction. *El Nacional* came down against a voluntary sale of nitrate plants,

¹⁰¹Perú, *DE*1875, 17-Apr 1875, pp.478-482. The official date for the passage of the bill in the Chamber of Deputies was 19-Apr-1875.

calling instead for a formal expropriation during a limited period, coupled with a 15-cents nitrate duty. Denying the existence of a guano-nitrate competition, the newspaper termed the Chinarro bill a "consolidation for the bankrupt nitrate-plant owners", and a "spoliation for the nitrate producers who have prospered"¹⁰² *La Patria* was characteristically more strident, publishing a manifesto from unnamed nitrate producers, dated October, 1874, requesting the neighbouring Bolivian Government to give guarantees in order to move their operations to that country, thus raising the issue of an eventual migration of Peruvian-based entrepreneurs as a result of State intervention in Tarapacá. The newspaper called the Chinarro bill a "declaration of war on the nitrate industry", noting that it was unclear if the projected sale of nitrate plants was truly voluntary or coercive, since it was coupled with a high export duty on the independent producers.¹⁰³ Both newspapers bemoaned the approval of the expropriation bill in the Chamber of Deputies. *El Nacional* hoped that the Senate would reject it, while *La Patria* noted sarcastically that the coastal sugar industry should expect to be expropriated if it was discovered that sugar cane could compete with guano as a fertilizer.¹⁰⁴

Since President Pardo, both directly in his annual addresses to Congress and through the statements of his Minister of Finance, Elguera, had clearly endorsed, if not actually authored, the notion of a destructive guano-nitrate competition, demanding action on the issue, the editorial position of *El Nacional*, his Party's newspaper, seemed to indicate some cleavage in the ranks of the supporters of the Administration. Significantly, the staunchest supporter of the Chinarro bill was *La Opinión Nacional*, a spokesman for the main Lima Banks, the newspaper underlined the need to control the guano-nitrate competition, noting that the operation should not be viewed as an attack on the nitrate producers, since those who could not afford to pay the 60-cents export

¹⁰²*El Nacional* (Lima), 17-Mar-1875, 18-Mar-1875, and 2-Apr-1875.

¹⁰³*La Patria* (Lima), 26-Mar-1875, and 8-Apr-1875.

¹⁰⁴*El Nacional* (Lima), 20-Apr-1875. *La Patria* (Lima), 20-Apr-1875. *La Patria* also presented a peculiar last-minute project, proposing the establishment of a joint-stock company, freely organized by the nitrate producers, who would exchange their Tarapacá assets for stock, the State would pay for their properties in 10 years, and the new company would pledge not to export more than 4 million Spanish quintals of nitrate yearly, while keeping prices no lower than £16 10sh per ton (5-May-1875).

duty could sell their plants to the government. *La Opinión Nacional* charged that the nitrate producers themselves had forced the government to take the measure because they had sabotaged the estanco, and refused to accept further taxation. "The nitrate producers have carried the situation to this extreme. It is their fault" ¹⁰⁵ *El Comercio* remained strangely silent throughout the whole debate, confining itself to opening its pages to both supporters and critics of the operation ¹⁰⁶

On May 10, 1875, the Auxiliary Finance Commission of the Peruvian Senate issued a majority and minority report on the expropriation bill passed by the Chamber of Deputies. The majority report, signed by Senators Emilio Althaus and José N. Hurtado, endorsed the expropriation proposal, arguing that the Tarapacá nitrate industry was crippled by "excessive development" since 1869, and that, with or without additional taxation, there would be an "internal struggle" which would end up crushing the weaker producers. The threatened Tarapacá plants were owned mainly by Peruvians, who had invested heavily in nitrate after 1868, and "whose bankruptcy would trigger that of many of our fellow citizens." The Peruvian Government, stated the report, could not remain "impassive" in the face of this development. The majority report considered the guano-nitrate competition an established fact, admitting that the easier solution would be to reduce guano prices but noting that this would "ruin" the Tarapacá nitrate producers. No reservations were expressed about the alleged impregnable Peruvian "monopoly" on nitrogen: "There is no doubt that Perú can regulate nitrogen prices in Europe." The conclusion of the report emphasized the "stimulating" impact of the projected nitrate and railroad bond issue on the Peruvian economy at large. The purchase of the Tarapacá nitrate plants by the Government

not only will prevent the total bankruptcy of many nitrate producers, but would also allow part of the hard-currency loan to be brought into this market, drained of metallic currency, mobilizing capital [resources] currently seriously affecting all transactions.

¹⁰⁵ *La Opinión Nacional* (Lima), 9-Apr-1875.

¹⁰⁶ I found no editorial statement of *El Comercio* on the expropriation bill during March through April, 1875.

The minority report of the Senate's Auxiliary Finance Commission, signed by Senator J. E. Lama, was concise: it charged that the expropriation was an "abusive" measure, it predicted that it would be impossible to raise the loan projected to purchase the Tarapacá nitrate plants because the Peruvian Government had no more credit available in Europe, and it concluded that the current decline in guano sales was due to causes other than an unproven nitrate threat.¹⁰⁷

The ensuing debate in the Peruvian Senate on the expropriation bill was extremely brief, doubtlessly reflecting the fact that all related issues had been discussed almost *ad nauseam* in the Chamber of Deputies. The only remarkable development in the Senate debate was an additional corroboration of the position of the Pardo Administration on the issue. Senator Aranibar, hostile to the expropriation, directly addressed Finance Minister Elguera to request data on the operation. Minister Elguera stated that there were 145 nitrate plants in Tarapacá, valued at 2.8 million *soles*,¹⁰⁸ assuring that it was entirely possible to float a 14 million bond issue.¹⁰⁹ Thus, the Pardo Government formally endorsed both a fixed figure for the total value of the Tarapaca nitrate plants, although no formal assessment had ever been made, and the prospects of yet another foreign loan, although the country was on the brink of defaulting on a £32 million external debt. Following the Senate's approval of the Chamber's expropriation bill, with no changes, the proposal was formally signed into law on May 28, 1875.¹¹⁰

Almost simultaneously, on May 11, 1875, the Peruvian Congress officially terminated the Dreyfus contract, authorizing the government to sell 2 million tons of guano on its own. At the time, Dreyfus controlled

¹⁰⁷Perú, *SE 1875*, 10-May-1875, as quoted in *El Comercio* (Lima), 12-May-1875.

¹⁰⁸This figure was obviously too low, and it might reflect simply a typographical error, substituting 28 million for 2.8 million.

¹⁰⁹Perú, *SE 1875*, 13-May-1875; as quoted in *El Comercio* (Lima), (evening edition), 13-May-1875.

¹¹⁰Text and date of the expropriation law on Aldunate, *Leyes* (Peruvian Section), pp 33-34.

guano stocks estimated at 850,000 tons.¹¹¹ The repeal of the vital agreement left the Peruvian Government with the improbable task of finding a contractor willing to compete with Dreyfus and service the massive Peruvian foreign debt. It was doubtful that the expropriation law, aimed at increasing nitrate prices, would have any impact on a previously monopolistic guano market abruptly broken by an internal division between competing sellers.

¹¹¹Olinger, "Dreyfus", pp. 165-166.

CHAPTER 5

THE EXPROPRIATION UNDER PARDO, 1875-6

1. *The Assessment*

After the passing of the expropriation law, it was necessary to price all Tarapacá nitrate plants; sign sales contracts with owners willing to sell at the official price; choose which plants to close down; and sign production contracts for State-owned plants eligible to produce. On May 29, 1875, the day following the approval of the expropriation law, the Peruvian Government issued a Decree ordering the assessment of the Tarapacá nitrate plants.¹ On August 26, 1875, a second decree appointed the engineers Felipe Paz Soldán and Felipe Arceibia as the heads of the pertinent Assessment Commission.² At least one of the members of the Commission was not entirely impartial: Paz Soldán subsequently received 37,000 *soles* in bonds for two Tarapacá plants, "Santa Emilia" and "San Benigno", priced by him.³

The Assessment Commission travelled to Tarapacá between September and December, 1875, submitting a preliminary estimate on December 15, 1875, and a more comprehensive report to the government on March

¹Text of the decree in: Bertrand, *Memoria*, Peruvian Documents, pp. 21-23.

²The date of the decree was furnished by Guillermo Billinghurst in "El señor Ministro de Hacienda", editorial, *La Industria* (Iquique), 23-Feb-1883 (Quoted hereafter as Billinghurst, "Ministro"). I have not found this decree in the other collections of documents cited in this work.

³See Table 2, Volume 2.

25, 1876.⁴ Thus, the Assessment Commission took merely three months to complete its survey, a task which, if properly conducted would have taken considerably longer.⁵ However, since the expropriation law had already authorized a maximum of 20 million *soles*, or £4 million, to purchase nitrate plants, the industry as a whole had already been priced. The commissioners candidly admitted in their report that they had been charged with "equitably apportioning" a fixed sum amongst the owners of nitrate plants.⁶

The "general principles" applied by the Commission to assess each plant were confusing. The majority of the owners refused to open their books for inspection, and the commissioners noted that "we simply stopped asking .to do so." The report acknowledged that only fifteen plants (out of some 165) had actually been inspected. The rest of the industry was priced applying what the report termed "a constant proportion", a procedure which admittedly "allowed us to save considerable time". The commissioners admitted that their estimates were "exaggerated", but that they "would rather er. by excess than by fault".⁷ On a particularly striking note, the report recommended that the government support the completion of the controversial Barreñechea plant with a loan of 130,000 *soles*,⁸ in spite of the current fiscal crisis, and the manifest overcapacity of the industry. On the whole, some 40 percent of the total assessed value of the industry, or some 8 million *soles*, was slated for flawed plants.⁹ The hasty assessment of the Tarapacá nitrate plants seems to bear

⁴Perú, "Informe especial".

⁵Billinghurst, "Ministro", Bermúdez, *Salitre*, pp. 333-335.

⁶Perú, "Informe especial", p. XXV.

⁷Perú, "Informe especial", pp. XXVI-XXX.

⁸Perú, "Informe especial", p. LV.

⁹This is my conclusion, supported by post-1876 reports on the condition of the plants. Flawed plants were identified by reports of both Peruvian and Chilean officials in 1875 and 1884, along with monthly evaluations per year. "Flawed" stood for plants which were either unassembled, partly assembled, destroyed, abandoned or otherwise obsolete. See the note to Table 1, Volume 2 for a more elaborate explanation.

out the notion that the real purpose of the expropriation was to issue the projected bonds as soon as possible, even if plants were grossly overpriced, in order to provide some form of reliable currency to a severely depressed domestic market.

2. *The Agreement with the Associated Banks*

The participation of the domestic banking system in the expropriation was officially set forth in a contract between the Peruvian Government and a syndicate of the four main Lima banks, termed the Associated Banks, signed on September 10, 1875.¹⁰ The September agreement was basically a loan contract. The four Associated Banks agreed to lend the government 18 million *soles* (or some £3.6 million) at 6 percent per annum. In exchange, the Associated Banks were entrusted with the overall control of Tarapacá plant sales and management, as well as the export of government-owned nitrate. The dire financial condition of the Associated Banks, recently rescued from collapse by declaring unconvertible their increasingly discredited bills,¹¹ made of their 18-million *soles* loan to the government a dubious transaction since they could only hand over unsecured paper currency; furthermore, an additional injection of bank bills into an already overstrained market was sure to fuel inflation, and exert a downward pressure on the paper *sol*. Of course, their "controlling" role in the expropriation was bound to be perfunctory since the Associated Banks had neither capital resources nor a marketing network to finance and manage overseas nitrate sales.

Three of the four Associated Banks were dominated by Lima capitalists. The *Banco del Perú*, established in 1863, was the largest Peruvian bank (see Table 1.5), and it was linked to the formerly powerful Company of Guano Consignees, one of whose founding members had been President Manuel Pardo himself, all of the members of the Board of Directors were Peruvians. The *Banco de la Providencia*, also organized in 1863 by a Belgian financier, was currently controlled by Peruvian nationals, and it had the lowest paid-up and

¹⁰The full text of the contract was included in: Dancuart, *Anales*, 10: 18-21. The agreement was concluded in a meeting between representatives of the four banks and the government at the end of August, 1875. James Henry to Comber. Private. Lima, 31-Aug-1875. Gibbs Ms. 11,132.

¹¹See above p. 68.

nominal capital of the four Associated Banks; two of its most prominent Directors were Francisco García Calderón, a close associate of Henry Meiggs, and Manuel Moscoso Melgar, brother of the author of the first expropriation bill, and the controlling shareholder of the Rimac Nitrate Company. The *Banco de Lima*, organized in 1869, was from its inception a Peruvian operation and it was currently the third largest bank in the country, one of its General Managers, Julián de Zaraqondegui, had filed for bankruptcy in mid-1874, and it was at the verge of collapse, particularly because of its involvement with the flagging Esperanza Company. The *Banco Nacional*, the second largest Peruvian bank in terms of paid-up capital, was both the sole member of the Associated Banks owned by a foreigner, the financier Auguste Dreyfus, currently controlling guano, and the only one with an active regional branch in Iquique.¹²

Table 1.5

*Capital of the Associated Banks,
Lima, January, 1874
(Soles)*

Bank	Paid-up Capital	Nominal Capital	%Tot. P-up*
Perú	3,926,000	8,000,000	49.08%
Nacional	3,600,000	12,000,000	30.00%
Lima	2,500,000	5,000,000	50.00%
Providencia	1,600,000	3,200,000	50.00%

*Computed by the author.

Source: *El Comercio* (Lima), 10-Jan-1874.

Table 1.5 shows both the paid-up and the nominal capital of the four Associated Banks in January, 1874, while Table 2.5 lists the holdings of the two banks with the largest investments in Tarapacá nitrate enterprises, the *Banco Nacional* and the *Banco de Lima*.

¹²Camprubí, *Bancos*, pp. viii, 1, 39-40, 84-85, 106-107. Data on capital resources is shown in Table 1.5.

Table 2.5

*Nitrate Bonds held by Banks
Nacional del Perú and Lima,
1876-1880*

No. plantus	Plant	Peruvian recipients (1876-1880)	Type	Amount (soles)	% bonds issued per pl.	% total payments
1	Nueva Soledad	B.Nacional	M	596,000.00	91.90	0.05%
2	Tarapacá	B.Nacional	M	250,000.00	71.43	6.55%
3	Sta. Adela	B.Nacional	M	54,000.00	28.42	2.75%
4	Católica	B.Nacional	M	52,000.00	27.37	0.59%
5	Dolores (Cobo)	B.Nacional	M	48,000.00	31.16	0.57%
6	Carmen Alto	B.Nacional	M	30,000.00	10.03	0.53%
7	Yacón (Soruco)	B.Nacional	P	10,000.00	100.00	0.33%
8	Pasto	B.Nacional	P	8,000.00	100.00	0.11%
9	Asunta	B.Nacional	P	5,000.00	100.00	0.09%
10	S. Antonio M	B.Nacional	P	5,000.00	73.42	0.05%
11	S. Antonio (V)	B.Nacional	P	5,000.00	100.00	0.05%
12	S. Nicolás	B.Nacional	P	4,000.00	84.12	0.04%
13	Tránsito	B.Nacional	P	2,000.00	80.00	0.02%
13 Plants		Total		1,069,000.00		11.76%
1	Esperanza	Bco. de Lima	M	837,000.00	84.55	9.20%
	Esperanza	Bco. de Lima	M	63,000.00	6.36	0.69%
2	S. Antonio SF	Bco. de Lima	P	7,000.00	100.00	0.08%
3	Pampa Negra	Bco. de Lima	P	7,000.00	100.00	0.08%
4	Yungay Bajo	Bco. de Lima	P	5,000.00	50.00	0.05%
5	Rincón (B)	Bco. de Lima	P	4,000.00	57.14	0.04%
5 Plants		Total		923,000.00		10.15%

Source: Derived from Table 2, Volume 2.

While the *Banco Nacional* supported 13 nitrate plants, including seven *paradas*, the *Banco de Lima* had virtually all of its loans concentrated on the Esperanza Company. The fact that the nitrate investments of the *Banco de Lima* represented almost 37 percent of its paid-up capital, placed this bank in a more difficult position than the wealthier *Banco Nacional*, with 30 percent of its paid-up capital locked in Tarapacá, in addition, the latter could count with the substantial resources of the Dreyfus guano syndicate. The *Banco Nacional* and the *Banco de Lima* were the two largest individual Peruvian nitrate bondholders. The other two Associated Banks

were much less involved in nitrate ventures: the *Banco del Perú* received merely 38,000 *soles* for seven *paradas*, while the *Banco de la Providencia* held 14,000 *soles* for five *paradas*. However, individual shareholders of these two banks figured prominently as holders of nitrate bonds. Manuel G. Chávez, linked to the *Banco del Perú*, ended up receiving over 800,000 *soles* in nitrate bonds, most of them for the discredited Barrenechea operation, making him the third largest individual Peruvian bondholder. The ubiquitous Francisco García Calderón, President of the Providencia Bank, received 75,000 *soles* in bonds for the plant "Salar del Carmen". Manuel Moscoso Melgar, manager of the Providencia Bank, also managed the Rimac Nitrate Company.¹³ The Peruvian expropriation started by entrusting individuals and institutions deeply involved in Tarapacá investments with assessing, purchasing, and managing nitrate plants.

3. *The Birth of the Nitrate Bonds*

On December 14, 1875 the Peruvian Government issued two complementary decrees further defining the scope of the expropriation of the Tarapacá nitrate industry. The first decree imposed a 0.60 *sol* tax on each Spanish quintal of nitrate exported by private producers from Tarapacá, and the second one established the necessary by-laws for the implementation of the expropriation process authorized in the May, 1875 law.¹⁴ The tax decree merely carried out a provision of the expropriation law, but the 25 articles of the extensive by-laws effectively defined the whole of the expropriation process in full detail.

The by-laws stated that the plants purchased by the Peruvian Government would be fully paid within two years, or before that date if funds were obtained in Europe for that purpose. Payment for the plants would be made by means of 90-day drafts on London at a fixed exchange rate of 44 d per *sol* (i.e., some 5 *soles* to the pound). While the projected European loan materialized, the Associated Banks would pay a two percent

¹³For the detailed data on bond recipients, see Table 2, Volume 2.

¹⁴The decrees were included in Bertrand, *Memoria 1892*, Peruvian Documents, p. 24 (the tax decree), and pp. 25-30 (the by-laws).

quarterly interest on the bonds issued to the plant owners starting on April 1, 1876.¹⁵ The regulatory decree went on to establish three broad categories of nitrate bonds, or *certificados*.¹⁶

The first type of bonds were payable to the bearer, or *al portador*, i.e., fully transferable; the owner could register a special mortgage on the respective plant for the payment of these bonds. The second type were termed non-transferable bonds, because they could not be sold, but the holder was entitled to collect interest payments. In exchange, the bondholder pledged not to produce nitrate, but would not relinquish the respective plant to the government until the projected foreign loan was contracted. The government would pay interest in order to keep the associated plant from competing with the State-controlled sector; the owner would insulate his property both from the vagaries of bond trading, and from outside management by government contractors. The third type of *certificado*, termed a "promise to sell", was not really a bond, but merely a promissory note. The holders of promissory notes would simply sign a contract agreeing to sell their plants to the government within a year, but only if they were paid in cash. They could freely produce and export nitrate, but were not entitled to collect interest payments. Owners of *paradas* or of undeveloped deposits would be paid in cash up to 10,000 *soles*, or £2,000, of total value; the rest would be purchased with regular bonds. Obviously, this concession was aimed at favouring producers with lesser capital resources.

The underlying principle for establishing different types of *certificados* consisted in paying interest exclusively to sellers willing to produce an assigned quota, or discontinue operations altogether. A mere promise to sell was not rewarded with interest payments since it only allowed the government to know the number of owners eventually willing to transfer their plants, not to control output. Only the bonds payable to the bearer could have an impact on the domestic financial market. The overwhelming majority of sellers chose bonds

¹⁵However, the interest payments were actually paid out in paper *soles*, not in London drafts, albeit at the stipulated exchange rate. See below p. 214.

¹⁶The Peruvian Government chose to call the nitrate bonds *certificados salitreros*, or nitrate certificates, a term which was not applied, to the best of my knowledge, to any type of bonds in the Spanish-speaking world at the time (or later). Perhaps the government wanted to underline the provisional nature of the bonds, created exclusively as a temporary document to be promptly exchanged by "real" bonds once the projected foreign loan was contracted. However, the name *certificados salitreros* figures prominently in the historiography of the issue, and it will be used throughout this work along with the more understandable term of "nitrate bonds"

payable to the bearer, although a substantial number, particularly the European firms, opted for keeping them off the market, as post-1879 data shows.¹⁷

The most important feature of the nitrate bonds was that interest on them would be paid at a high and fixed rate of exchange. This turned the *certificados* into an attractive investment in a troubled market. No other Peruvian security, including ordinary government bonds, enjoyed this privilege. It was easy to predict that the price of the nitrate bonds would rise in line with the fall of the Peruvian paper *sol*. The fact that interest on the nitrate bonds would be defrayed out of the proceeds of nitrate sales, and prior to any other expense except for Gibbs' advances and commissions, was reassuring,¹⁸ at least as long as the British firm handled the operation.

The nitrate *certificados* were issued as a form of bridge financing. The temporary bonds allowed the Peruvian Government to take immediate possession of the plants, making only interest payments, and postponing the service of the principal; full payment was pledged within two years with the projected foreign loan. However, not all of the advantages of the *certificados* were contingent upon the success of the authorized loan. For two years the domestic market, gradually drained of reliable currency, could count with a solid security for a whole range of transactions. The decrees of December, 1875 effectively closed the preliminary stage of the expropriation. President Pardo was expected to start actual plant purchases in 1876.

4. *The Peruvian Default*

Perú officially defaulted on its £32 million foreign debt on January 1, 1876, by failing to meet the pertinent payment slated for that date. The Peruvian default was predictable at least since July 1, 1875, when the Dreyfus syndicate ceased to be responsible for the service the country's foreign debt; it was public knowledge that the Pardo Administration had no resources to continue doing so.¹⁹ Furthermore, Perú was

¹⁷I assume that original bondholders who repossessed their plants after 1879 by turning them over to the Chilean Government kept the securities throughout the entire 1876-1879 period. See Table 1, Volume 2.

¹⁸This condition was stipulated in the Gibbs consignment contract. See below p. 178.

¹⁹*The Economist*, 25-Dec-1875, p.1511-1512.

saddled with an additional debt since, upon the termination of the guano contract, Dreyfus claimed 18 million soles in unpaid advances from the Peruvian Government.²⁰ Overseas reaction to the Peruvian default was sharply critical of the country. *The Economist*, evoking the 'Turkish collapse', predicted that "fewer foreign loans" would be made in the future, characterizing Perú as "the worse case of all" "No new foreign loans of this discredited type will probably even be offered to the public for many years".²¹ This negative atmosphere virtually ruled out the projected nitrate loan.

A rambling succession of moves preceded and followed the Peruvian default. The Peruvian Congress had effectively sanctioned the termination of the Dreyfus contract on May, 11, 1875 by authorizing the Executive Branch to sell 2 million tons of guano at will, and look for a new contractor.²² The Dreyfus group was splintered by the new guano concession offered by Perú since the *Société Générale*, a French bank associated to the former syndicate, attempted to obtain the new contract on its own.²³

Following the Congressional approval of the new guano concession, the Pardo Administration instructed two Peruvian Commissioners in Europe to look for a new contractor. The two Commissioners reached agreements with different parties: one approved a contract with the Gibbs firm, while the other signed an agreement with a syndicate headed by the *Société Générale*, Dreyfus' former partner.²⁴ On January 5, 1876, President Pardo chose the *Société Générale*, disallowing the Gibbs contract.²⁵ The decision touched off a wave of opposition, particularly from Dreyfus, supported by Piérola, his Peruvian ally, since the new contract made

²⁰This figure was established in 1878. Rodríguez Montoya, "Historia", p.122.

²¹*The Economist* 25-Dec-1875, p. 1512.; 15-Apr-1876, pp.451-453.

²²Olinger, "Dreyfus", pp. 165-166.

²³Olinger, "Dreyfus", p. 166.

²⁴Rodríguez Montoya, "Historia",p.127; Dancuart, *Anales* 10:36-64.

²⁵San Cristóval, *Pardo*, p.71; Dulanto, *Piérola*, p.159; Rodríguez Montoya, "Historia",p 127.

no allowance for covering the unpaid balance due to the former contractor; Peruvian bondholders were also critical because they argued that the service of the foreign debt was not properly dealt with.²⁶ President Pardo then took back his original decision, and the *Société Générale* refused to continue dealing with the Peruvian Government.²⁷ Antony Gibbs & Sons also balked at further participating in the guano negotiations.²⁸ This confusion had a severe impact on the quotation of Peruvian bonds in Europe, which plummeted as low as 32 percent of face value.²⁹

In these confusing circumstances, on June 7, 1876, the Peruvian Government signed a new guano contract with Raphael & Sons, a London firm; under the Raphael contract, guano would be sold through a new corporation, the Peruvian Guano Company.³⁰ The Raphael contract triggered a lasting storm of controversy. Two rival Committees were formed in London; one Committee, presided over by Sir Charles Russell, supported the Raphael contract, while a second one, headed by James Croyle, opposed it.³¹ Perú was sued simultaneously in English, French, and Belgian courts, closing the door to any further credit on European financial markets.³²

²⁶Dulanto, *Piérola*, p.159.

²⁷*El Comercio* (Lima), 12-Mar-1876; Rodríguez Montoya, "Historia", p.127. Olinger also noted that Pardo rejected the idea that the *Société Générale* accepted to service the Peruvian foreign debt for only three semesters, while holding a monopoly on guano sales for four years ("Dreyfus", p.168).

²⁸Basadre, *Historia* 7:27-28.

²⁹Olinger, "Dreyfus", p. 169.

³⁰*El Comercio* (Lima), 16-Jun-1878; Dancuart. *Anales* 11: 47-51.

³¹Basically, the rival Committees represented bondholders of different loans: the Russell Committee was supported by the holders of bonds of the 1870 loan; the Croyle Committee, by those of the 1872 loan. William Clarke, *Peru: and its Creditors* (London: Ranken and Co., 1877) pp. 24-27 (Quoted hereafter as Clarke, *Peru*); *El Comercio* (Lima), 16-Jun-1876, Olinger, "Dreyfus", p. 172.

³²The foreign bondholders who sued the Peruvian Government lost their case in court, but the credit of Peru was irreparably damaged. Clarke, *Peru*, p.26.

With the Raphael contract the Peruvian monopoly on guano sales was effectively broken since Dreyfus, unencumbered by the new contract, continued selling guano on his own throughout 1876.³³ Guano prices declined steadily in 1876 from £12 to £8 a ton, the inevitable result of the competition of Dreyfus and the Peruvian Guano Company in European markets.³⁴ The default on the foreign debt, the embarrassing sequel to the Raphael contract, and the introduction of competition in the guano trade placed the Pardo Administration on a hopeless position at the very outset of the expropriation.

5. The First Production Contracts

The Pardo Administration approved four production contracts (see Table 3.5), but only two of them, those signed with Gibbs and Gildemeister, involved real exports. The production contract signed with the Barrenechea Company was intended more to help complete the plant, while the agreement with Henry Meiggs was aimed at preventing the neighbouring El Toco region from competing with Tarapacá nitrate.

Given the productive capacity of Gibbs and Gildemeister, it was clear that if both firms chose to remain as independent producers, government control over Tarapacá nitrate exports was seriously jeopardized. The Gibbs firm was quite aware of this major weakness on the part of the Peruvian Government from the very start. In August, 1875, at the beginning of the operation, one of the partners of William Gibbs & Co. wrote

...I gather that in case of the Banks coming to an agreement with the Government about the expropriation, an effort will be made even at a sacrifice in price to induce such people as the Gildemeisters to take a large share in contracting for nitrate production, although it is pretty well understood by those in a position to know that as far as we are concerned we are not at all disposed to for[illegible] in: it might well be however that the price of expropriation purchase be made to some extent contingent upon a Contract of Manufacture.³⁵

³³Olinger, "Dreyfus", p. 173.

³⁴Rodríguez Montoya, "Historia", p.128.

³⁵James Henry to Comber, Lima, 31-Aug-1875. Gibbs Ms. 11,132.

The views of James Henry made clear that all parties saw a clear connection between the price offered for the properties of both firms and the ensuing production contracts. The favourable conditions stipulated in the Gibbs and Gildemeister contracts reflected this situation.

Table 3.5

*Production Contracts signed
under the Pardo and Prado Administrations,
1876
(Spanish Quintals)*

President Year	No.*	Min. Output per annum (Sp.Q.)	Max. Output per annum (Sp.Q.)	% Output (Max.)	Cummul. Output (Sp.Q.)
Pardo-76	2	1,150,000	1,700,000	23.88%	1,700,000
Prado-76	22	501,800	541,800	7.61%	2,241,800
Total76	24	1,651,800	2,241,800	31.49%	2,241,800
Total76-8	47	6,530,000	7,120,000		

*Excluding unfulfilled contracts (in 1876, the Barrenechea and Meiggs contracts).

Source: Derived from Volume 2, Table 3.

Gibbs and Gildemeister were awarded the right to produce a maximum of 850,000 Spanish quintals (38,636 tons) each,³⁶ leaving very little room to accommodate all the rest of the powerful *máquinas* active in Tarapacá at the time. The Gibbs production contract was signed on April 28, 1876,³⁷ while Gildemeister's

³⁶The figures differ in the manuscript version included in Gibbs Ms. 11,132, and the version published by the Associated Banks (Bancos Asociados, *Anexos*, p.16); I have followed the latter text on this point.

³⁷The production contracts are listed by date in Table 3, Volume 2. The provisions of the Gibbs and Gildemeister contracts, as they appear in its manuscript form in Gibbs Ms. 11,132, differ somewhat from the version published by the Associated Banks in their 1877 Annual Report. I have chosen the latter text in all cases of discrepancies, since the manuscript version could have been a draft. Cf. Bancos Asociados, *Anexos*, pp. 15-16. It is worth noting that this publication included a mere outline of the production contracts signed up to January, (continued...)

agreement was approved on May 4, 1876.³⁸ A memorandum listing provisions applicable to both firms was drafted at the time, strongly suggesting that the two production contracts were negotiated in a coordinated fashion.³⁹ Both Gibbs and Gildemeister agreed to sell nitrate to the government at 170 *soles* per Spanish quintal. Gibbs was granted an exchange rate of 42 d, while Gildemeister was awarded 44 d. As the memorandum explained, Gildemeister received the higher exchange rate because it accepted non-interest bearing promissory notes for its properties, while Gibbs was paid in regular bonds.⁴⁰ Thus, Gildemeister traded the right to perceive some £17,500 for nitrate bonds (the yearly interest on the 1,250,000 *soles* offered by the government for his properties)⁴¹ for an additional £30,000 in payments for nitrate sold to the government. The fact that most of the production costs were paid by the producers in declining paper *soles* while output was paid at a higher exchange rate turned manufacturing contracts into extremely attractive propositions.

In addition, Gibbs was granted the right to purchase nitrate from other producers, as well as an authorization to mine government-owned deposits at will and "without payments of any kind".⁴² The former

³⁷(...continued)

1878, and that the subsequent Prado Government was constantly criticized for failing to fully disclose critical data concerning the expropriation (see below pp. 258-265). None of the authors quoted in this work who dealt with the subject quoted the text of a single production contract, and I have been unable to find a complete version, except for the manuscripts found in the Gibbs papers.

³⁸*Bancos Asociados, Anexos*, p.15. The Gildemeister contract was revised in October, 20, 1877, by the Prado Government, making the 850,000 quintal ceiling a fixed quota (i.e., with no minimum)(*Ibid.*,p 16).

³⁹"Memorandum del Convenio de S.E. con Gildemeister y Cía. y Guillermo Gibbs y Cía, que a su debido tiempo se elevará a escritura pública", (no day or month recorded, 1876) Gibbs Ms. 11,132 (Quoted hereafter as Gibbs, "Memorandum Gildemeister").

⁴⁰The manuscript version of the contract included in Gibbs Ms. 11,132 stated that Gibbs was granted an exchange rate of 42 and 44 d., but the 1877 Annual Report of the Associated Banks informed that the exchange rate was in effect 42 d. *Bancos Asociados, Anexos*, p. 16.

⁴¹Gibbs also received the same amount for his assets. See Table 2, Volume 2.

⁴²As with the prior clause, this provision appeared only in the manuscript version of the contract in Gibbs Ms. 11,132.

concession was an open invitation to trade production quotas, running counter to the goal of restricting nitrate output, while the latter was an incentive to mine State deposits, leaving Gibbs' nitrate land on reserve.

The production contract signed with the Barrechea Company on May 24, 1876, authorizing maximum exports of 500,000 Spanish quintals at the same price and exchange stipulated for Gibbs,⁴³ had no relevance since the company was never able to produce nitrate. The fact that the main bondholder of the Barrechea Company, Manuel G. Chávez, played a key role in the management of the *Banco del Perú*, one of the four Associated Banks in charge of the expropriation,⁴⁴ certainly had a bearing in the unusual issue of "repair bonds", not authorized by the expropriation law. Some 7 percent of these "repair" bonds went to the contractor, Thomas Hart, while most of the issue was delivered to Chávez and Barrechea.⁴⁵ The unusual loan to the Barrechea Company, approved on January 15, 1876, set a dangerous precedent, implicitly legitimizing bond deliveries for unauthorized purposes.⁴⁶

The Meiggs contract involved considerably more than assigning the volume and price of nitrate exports for a given group of plants since the region covered by the agreement, El Toco, was located, not in Perú, but in an adjacent area to the south of Tarapacá belonging to Bolivia. The obvious goal of the Peruvian Government was to bring the yet undeveloped El Toco nitrate deposits under control to prevent further outside competition,

⁴³Bancos Asociados, *Anexos*, p.18. The text mentioned 24 d. per sol, but this was surely a typographical error, particularly in the light of the price subsequently granted to the contractor who took over the plant.

⁴⁴Chávez was one of two representatives of the *Banco del Perú* in the negotiations between the Associated Banks and the Government concerning the management of the nitrate industry held in 1875. James Henry to Comber, Lima, 31-Aug-1875, Private. Gibbs Ms. 11, 135.

⁴⁵See Tables 1 and 2, Volume 2.

⁴⁶The Barrechea "repair" bonds were later mentioned by a Minister of Finance of the Prado Administration to justify an equally controversial loan in *certificados* to Henry Meiggs for railroad construction (Minister of Finance Barinaga, Perú, *DO*, 18-Oct-1878). The "repair bonds" were cited also in 1878 as a precedent for accepting increases in assessed prices due to improvements introduced after the Expropriation Law (*Compañía Salitrera del Perú, Exposición que la Compañía Salitrera del Perú presenta a la Legislatura Nacional de 1878 sobre la cuestión salitre* (Lima, n.p., 1878) p.10 (Quoted hereafter as CSP, *Exposición*). This source mentioned a decree dated February 25, 1876, granting a 100,000 soles loan in *certificados* to the Barrechea Company. For the Barinaga episode, see below pp. 271-274.

particularly in the face of the growing threat posed by the Antofagasta Company.⁴⁷ The Bolivian Government had granted nitrate land to private entrepreneurs in El Toco as early as 1872,⁴⁸ but there were no expensive *máquinas* or railroad lines in the area at the time.

Charles Watson, a Henry Meiggs associate,⁴⁹ and Zoilo Flores, a Bolivian diplomat,⁵⁰ traveled to El Toco in May, 1876 to start the acquisition; they both met with George Hicks, manager of the neighbouring Antofagasta Company who recorded the interview.

Mr. Watson told me that they intended to act in agreement with our Company in every way, organizing production in a mutually advantageous fashion, taking into account whatever measure the Peruvian Government may take further on; however, it is said here that the purchase is being done on behalf of the Government of Perú, who has agreed in exchange to advance funds for the railroad to Mejillones [a regional port]...⁵¹

Hicks added that Watson and Flores had bought nitrate deposits in El Toco paying \$8,000 (presumably, *Bolivianos*) per *estaca*⁵², and that "they will own all of them, except those belonging to our Company".⁵³

⁴⁷The Antofagasta Company proved to be out of reach of the Pardo Administration, although it was later reported on the Peruvian press that the engineer Arancibia, one of the members of the 1875 Assessment Commission, had traveled to Antofagasta in an unsuccessful official mission to negotiate the purchase of the Chilean enterprise. The report stated that Arancibia had gone to Antofagasta to examine the Antofagasta Company's properties "which the government wants to purchase", and that the owners had asked £2 million for the enterprise, but it emphasized that the newspaper could not "guarantee the accuracy" of information (*El Comercio* (Lima), 25-Jun-1878). I found no evidence of such visit in the correspondence of the manager of the CSA.

⁴⁸*Semper, Industria*, p.126.

⁴⁹In 1878, Watson was the Chairman the Public Works Company established by Henry Meiggs to build Peruvian railroads, and acted on behalf of his estate after his death that year. *El Comercio* (Lima), 2 and 9-Oct-1878.

⁵⁰Flores was the Bolivian Ambassador to Perú in 1878, and negotiated an important Customs Treaty between the two countries in that date. *El Comercio* (Lima), 25-Sep-1878.

⁵¹Hicks to Soublette, Antofagasta, 23 May-1876. *CSA. AG. Vol.7, fs.447-448*.

⁵²A Bolivian *estaca* was equivalent to 2.56 million square meters, i.e., much larger than both the Chilean and the Peruvian *estaca* (1 million and 27,950 square meters, respectively).

In La Paz, Bolivia, on March 20, 1876, Juan G. [John William] Meiggs brother of Henry Meiggs, signed a first agreement with the Bolivian Government concerning the rental of State-owned deposits in El Toco in exchange for a payment of 10,000 *Bolivianos* per month.⁵⁴ This was followed by a formal agreement between Juan G. Meiggs, and the Peruvian Government, concerning the purchase of the El Toco deposits, signed in Lima, on July 3, 1876.⁵⁵ Meiggs pledged to rent some of the El Toco deposits from the Bolivian Government, and buy others outright, obtaining the right to produce 1 million Spanish quintals for 5 years, and 1.5 million "in the years after that date". The price granted to Meiggs was identical to the one included in the Gibbs contract. 1.70 *soles* per quintal at a rate of 42 d per *sol*, although the contract added that, as a compensation for [unnamed] payments made to the Bolivian Government, the El Toco nitrate would be awarded a 25 cent premium, at the same rate of exchange. The term of the contract coincided with the rental period stipulated with the Peruvian Government: 20 years. The contract was transferable, and Meiggs was authorized to form a company to exploit the deposits.

This general agreement was subsequently supplemented by a formal production contract dated August 4, 1876, which in fact altered some of the terms of the original provisions.⁵⁶ Output was fixed at a minimum of 500,000 Spanish quintals (27,727 tons) and the maximum remained at 1.5 million quintals (68,181 tons), the largest amount authorized in the period. However, Meiggs was allowed to choose any existing State-owned equipment in Tarapacá, and transfer it at his expense to El Toco, the Peruvian Government defraying the cost of installation of the plant or plants he might wish to erect there. This clause, added to the right of Gibbs to mine unused State-owned deposits, constituted yet another instance of the Peruvian Government opening the

⁵⁴(...continued)

⁵⁵Hicks to Soubllette, Antofagasta, 23-May-1876. *CSA. AG. Vol.7, fs.447-448*. It is interesting to know that the Antofagasta Company also owned nitrate deposits in the El Toco region in 1876.

⁵⁶W.M. Bush (on behalf of Juan G. Meiggs) to the President of the Delegation of the Associated Banks, Lima, 23-Jun-1876. Chile, *DFT*, vol. 1037, fs. 23-34.

⁵⁷The manuscript text of the contract is found in. Chile, *DFT*, vol. 1037, fs. 21.

⁵⁸The text of this contract was published in *Bancos Asociados, Anexos*, pp. 19-20.

door to third parties to dismantle its recently acquired Tarapacá properties. This was particularly easy for the authorized contractors since, as the subsequent Chilean authorities found out after 1879, most of the inventories of purchased plants drawn up by the Peruvian officials were deficient or non-existent, enabling the removal of equipment without leaving a trace.⁵⁷ One year later, on August 29, 1877, a second production contract reduced the total output allowed to 500,000 quintals, eliminated the 25-cents premium granted in the July agreement, took away the authorization to transfer Tarapacá equipment to El Toco, although the Peruvian Government pledged 200,000 *soles* at 42 d per *sol*, payable in twelve instalments to cover the cost of establishing a plant in the region, stipulating that only the processing system designed by Otto Harnecker should be installed.⁵⁸

Since the El Toco deposits played a marginal role during the expropriation period, there simply is not enough information in the sources used here to explain some of the provisions of the three agreements concerning the region. It is certain that some nitrate was produced in El Toco in 1876-1879 because there was an attempt to curtail exports from that region in 1879.⁵⁹ It is not known whether Meiggs took advantage of the official permission to seize idle machinery from Tarapacá before it was revoked. The cancellation of this unique privilege in 1877, along with the 25-cents subsidy, was probably the result of the outcry of the Peruvian opposition in the face of the mounting irregularities denounced in the management of the expropriation by the

⁵⁷The danger of the clandestine removal of equipment did not refer exclusively to close-by plants raided by neighbours, but also to plants operated by a contractor other than the prior owner, particularly when the life of the rented plant was expected to be short, and the temporary manager was willing to go on to purchase or administer other plants. Cf. E. Canningham to Jefe Político de Tarapacá, La Noria, 9-Feb-1882 (Chile, *DFT*, Vol. 1240, fs. 65-66).

⁵⁸Bancos Asociados, *Anexos*, p.20.

⁵⁹Deputy Barros Luco in Chile, *DO* 1879, 1-Jul-1879, in: Chile, *Diario Oficial*, 4-Jul-1879, p. 1,114. Hicks reported that there were attempts at "activating" production in El Toco in mid-1878. Hicks to Soubllette, Antofagasta, 7-Jun-1878. *CSA.AG* Vol. 13, fs. 171-172.

subsequent Prado Administration.⁶⁰ The requirement of using the Harnecker system of processing nitrate was certainly a concession to the inventor in exchange for the sale of his properties in El Toco.⁶¹

The El Toco agreement was so exceedingly generous to Meiggs in terms of free equipment, production quotas, and premium prices that it appears more as an incentive to develop, rather than to paralyze, the area. W.M. Bush, the representative of Juan G. Meiggs, in expressing at the time his apprehension towards the El Toco contract, might have spelled out the reason why the railroad entrepreneur abstained from investing in the region.

The full exercise of this right [producing the authorized volume of nitrate in El Toco] would hurt the Banks that I represent, as well as the government who owns the Tarapacá nitrate plants; and, at the same time, it would generate problems and conflicts in the nitrate industry which could only be averted by means of agreements between the various producers.⁶²

Bush's statement shows that he was representing both Peruvian Banks (almost certainly one or more of the Associated Banks) and Meiggs, strongly suggesting that the railroad entrepreneur had no interest in hurting the faltering financial institutions upon which his threatened railroad empire depended. It is also worth noting that at the time Meiggs was struggling to obtain additional funds for railroad construction from the Peruvian Government,⁶³ and if he would have chosen, as Bush feared,⁶³ to fully exercise his right to develop El Toco as a major nitrate-producing region, he would have been forced to stretch his already depleted financial resources to the breaking point. The manager of the CSA provided yet another reason for the absence of

⁶⁰See below pp. 258-265.

⁶¹*Cf.* "Venta.- El señor Otto Harnecker y otros al señor don Juan G. Meiggs" in: Aldunate, *Leyes*, Bolivian Documents, pp. 73-74. Otto Harnecker appeared for the first time in Caracoles as a mine manager in 1870 (Arce, *Antofagasta*, p. 244); in 1876, he was granted a patent for a refining system based on cold-water ore-processing (*Caliche* (Santiago), No. 1, April, 1919, p. 25); Harnecker was authorized by the Antofagasta Company to try his system on a particularly difficult type of ore found in one the deposits of the CSA; in Tarapacá, he subsequently worked as a contractor of State-owned enterprises (see below p. 196).

⁶²W.M. Bush (of behalf of J.G. Meiggs) to the President of the Delegation of the Associated Banks, Lima, 23-Jun-1876. Chile, *DFT*, vol. 1037, fs.23-24.

⁶³See below pp. 271-273.

exports from El Toco: he stated that, given the current state of the exchange, "today there are no capitalists able to develop nitrate works at El Toco". "Thus, the only [nitrate] producers will be ourselves, and the Peruvian Government".⁶⁴ Subsequently, he added that the Bolivian Government had granted enormous deposits in El Toco to "poor devils, without a cent", further ruling out real activity in the area.⁶⁵

6. *The New Nitrate Export Duty*

In mid-June, 1876, both President Pardo and Finance Minister Elguera formally requested an increase on the nitrate export duty from 60 cents to 1.25 *soles*.⁶⁶ Elguera expressed alarm at the growing exports from free producers triggered by an increase in nitrate prices. He argued that even government contractors were benefitting from enhanced prices because most of their costs were paid in falling paper *soles*. Minister Elguera noted that, in spite of larger private exports, government income from the nitrate export duty had actually shrank because the tax was also paid in declining local currency. He urged Congress to speed up the approval of a higher export duty because any delay on the matter would permit higher levels of production followed by price decreases.⁶⁷ Elguera's reasoning was somewhat confusing since the main goal of the expropriation was precisely to induce a raise in nitrate prices to allow for an increase in guano prices. A more plausible interpretation of the tax proposal was that it was intended to make free exports more expensive, and force independent producers to sell their plants to the State.

⁶⁴Hicks to Soubllette, Antofagasta, 15-Jul-1876, *CSA.AG* Vol. 8, fs. 117.

⁶⁵Hicks to Soubllette, Antofagasta, 12-Sep-1876, *CSA.AG* Vol. 8, fs. 242.

⁶⁶President Manuel Pardo, "Mensaje", 15-Jun-1876 in: Perú, *Mensajes* 2: 61-63; Perú, "Informe especial", pp.11-13.

⁶⁷Perú, "Informe especial", pp.11-13.

The Peruvian Senate approved the increased nitrate duty, answering to dissenting Senators, who wanted to stop the operation altogether, that the expropriation had gone too far to attempt to reverse it.⁶⁸ The argument about the irreversibility of the expropriation would be widely used throughout the period by those who originally opposed the operation, but felt compelled to support ancillary measures. The Chamber of Deputies went along with the Senate's recommendation, arguing that the current competition between free and government-controlled plants was unacceptable.⁶⁹

A minority report of the Chamber of Deputies stated that the whole operation was adrift, that current information on actual results was lacking, and that the hybrid system of production adopted in Tarapacá, with State-controlled plants competing with private ventures, made no sense. The report called the higher nitrate prices mentioned by the Finance Minister "a fictitious event", the upshot of a falling exchange which the government itself had brought about by throwing the country into a "vortex of paper money". The dissenting report concluded urging "freedom" for the Tarapacá nitrate industry.⁷⁰ In the floor of the Chamber of Deputies questions were raised about the Gibbs and Gildemeister contracts, and the loan granted to the Barreñechea Company; one Deputy objected to the "dismantlement" of closed-down nitrate plants.⁷¹

However, a more significant type of opposition to the expropriation took shape during the debate on the export duty. Deputy Oviedo, a leading critic of the operation, strongly endorsed both an official valuation of Tarapacá plants deemed illegitimate by the Assessment Commission, and a prompt purchase of all enterprises offered for sale.⁷² Another critic of the expropriation pressed for a 25 percent increase in the prices of all

⁶⁸Quoted in CSP, *Exposición*, p.8.

⁶⁹Perú, *DE1876*, 3-Jul-1876, pp.29-30.

⁷⁰Id., 4-Jul-1876, pp.31-34.

⁷¹Deputies Cisneros and Oviedo in: Perú, *DE 1876*, 19-Jun-1876, 21-Jun-1876.

⁷²Deputy Oviedo, Perú, *DE1876*, 5-Jul-1876.

plants currently not offered for sale; in the subsequent session, he tabled a project stipulating a 20 percent raise in the assessed value of all unsold nitrate plants.⁷³ The Deputies demanding higher prices for nitrate plants were joined by *La Patria*, the organ of the Piérola faction. The dissenting newspaper argued that the official assessment was so inadequate that most of the Tarapacá producers refused to sell at the low prices offered; the newspaper went as far as mentioning the case of the controversial Esperanza Company, stating that more than the 900,000 *soles* awarded had been invested in the enterprise.⁷⁴ Thus, the opponents of the expropriation, although still voicing criticisms against the operation, took the position of demanding higher prices for the unacquired nitrate enterprises, making it more expensive to carry through.

The government ultimately prevailed on the question of increased taxation. The new, 1.25 *soles* nitrate export duty became law on July 8, 1876.⁷⁵ The law stipulated that the tax would be paid in paper *soles*, as was the prior 60-cents duty, but at a variable exchange rate in line with the market quotations of the last two weeks, fixed by a special commission.⁷⁶ An additional contract signed by the Peruvian Government and the Associated Banks on April 28, 1876, granted the Banks, *inter alia*, the right to collect the nitrate export duty.⁷⁷ However, the thorny issue of price increases for unsold plants had been explicitly raised, and remained unanswered.

⁷³Deputy L. Cisneros, Perú, *DE 1876*, 5-Jul-1876, and 6-Jul-1876.

⁷⁴*La Patria* (Lima), 6-Jul-1876.

⁷⁵Text of the law in: Bertrand, *Memoria*, Peruvian Documents, p. 31.

⁷⁶It should be noted that the wording of the pertinent articles was somewhat confusing. Cf. *Ibid.*, Articles 2 and 3. The special commission was reported by *El Comercio* (Lima), 8-Jul-1876, and did not figure in the text of the law.

⁷⁷The contract was extensively analyzed in: CSP, *Exposición*, p. 5. The *Compañía Salitrera del Perú*, or Peruvian Nitrate Company, was left in charge of the expropriation in 1878 (see below pp. 251-253). The agreement was also mentioned in Gibbs Ms. 11,138, Text of Gibbs contract, no day, 1876.

7. *The Reassessment of Nitrate Plants*

In mid-1876, the pressure to increase the prices officially offered for the unsold nitrate plants came from two different sources. Minister Elguera had already acknowledged that growing exports from free producers were threatening to upset the entire operation, stating that there was a need to "complete" the expropriation by buying out all Tarapacá nitrate plants.⁷⁸ Subsequently, critics of the expropriation explicitly requested an increase in the prices fixed by the Assessment Commission. Some of these critics, like Deputy Oviedo, worked as lawyers for nitrate producers,⁷⁹ and might have been acting in the interest of their clients by fighting for higher prices for their plants as a lesser evil, after failing to defeat the expropriation bill.

On July 8, 1876, the Director of Revenue, Simón Irigoyen, requested the two engineers responsible for the original appraisal, Felipe Paz Soldán and F. Arancibia, to report on "improvements" introduced in Tarapacá enterprises after the 1875 assessment. Eight days later, on July 13, 1876, the two engineers replied that, after "consulting our notes", they had concluded that eight plants deserved price increases totalling 415,000 soles (see Table 4.5).⁸⁰ Of course the procedure was highly suspect since it was hardly believable that a decision of such nature could be taken in merely eight days based exclusively on "notes" drawn up on an unspecified date.

⁷⁸Perú, "Informe especial", pp. 11-13.

⁷⁹See above p. 130.

⁸⁰*El Comercio* (Lima), 14-Jul-1876.

Table 4.5

*Recommended Price Increases
for Eight Tarapacá Plants,
July 13, 1876
(Soles)*

Plant	Original Price	New Price	Increase
San Antonio	650,000	700,000	50,000
N. Soledad	600,000	650,000	50,000
Solferino	550,000	600,000	50,000
N. Carolina	330,000	350,000	20,000
La Palma	300,000	325,000	25,000
Peña Chica	300,000	320,000	20,000
S. Pablo-Sta. Rosa	200,000	300,000	100,000
Santa Ana	80,000	180,000	100,000
Total			415,000

Source: *El Comercio* (Lima), 14-Jul-1876.

With one exception, all plants "reassessed" by Paz Soldán and Arancibia were solid operations. This applied particularly to the formidable "San Antonio" owned by the British firm of Campbell, Outram, the first enterprise to feature the new Shanks process which would radically transform nitrate production, particularly after 1879.⁸¹ The sole exception was "Nueva Carolina", a flawed plant owned by a Valparaíso joint-stock company.⁸² Given the condition of these plants, the decision to increase their official valuation was surely dictated by the growing need to stave off competition from efficient independent producers.

Acting upon the recommendation of the two engineers, the Pardo Administration issued a decree dated July 13, 1876, sanctioning the higher prices suggested for the eight nitrate plants.⁸³ The Assessment

⁸¹See below pp. 222-224.

⁸²See Table 1, Volume 2.

⁸³Text of the decree in: Bertrand, *Memoria*, Peruvian Documents, pp. 33-34.

Commission had accepted a *retasación*, or revaluation, of selected plants due to alleged improvements introduced by the owners after the original 1875 appraisal.⁸⁴ However, the pertinent clause also indicated that the owners of unsold plants could make "offers" to the State "based on" (*en vista de*) (i.e., but not restricted to) the initial assessments, implicitly acknowledging that the 1875 prices were not final; this meant opening the door to a wave of revaluations on the grounds of alleged improvements, establishing no definitive term for subsequent upgrades nor a specific limit for the extent of the refurbishment; presumably, it could involve the construction of a brand new *máquina* at any time after the 1875 assessment. Considering that the threat posed to the expropriation by the free producers was growing, as the Minister of Finance had admitted, they would be in an increasingly stronger position to demand higher prices for their plants, drawing on the precedent established by the last Pardo decree. In doing so, the independent producers could easily compel the government to exceed the 20 million *soles* appropriated for the expropriation, by issuing more interest-bearing *certificados*. The decree brought home the point that the pertinent legislation had indeed a distressing loophole in that it froze the establishment of additional plants in unoccupied deposits, restricting payments to existing ventures, but said nothing about "improvements" performed at officially recognized plants after its assessment; additional payments for such "improvements" could drive up the price of the expropriation just as much as the new enterprises disallowed by law.

The decree fixed July 24, 1876 as the final date for the owners of Tarapacá enterprises to offer their plants for sale, banning all plant purchases after such date. Although one author interpreted this clause as an attempt on the part of President Pardo to "halt" plant purchases altogether,⁸⁵ the provision proved to be far less meaningful. Indeed, it was merely one of many "final" terms fixed during the expropriation in a vain attempt

⁸⁴Ibid. Preamble and Article 1.

⁸⁵O'Brien, *Nitrate*, p.35.

to pressure free producers to sell their plants. Since the term was established merely by decree, it could be easily superseded by a subsequent decree fixing yet another "final" date to sell plants to the State- and it was.⁸⁶

Finally, the decree formally declared that all unexploited or abandoned deposits would be considered "national property". This clause inaugurated a protracted struggle between Tarapacá producers whose properties were declared "illegal" or *en despueble* by the courts, and the Peruvian Government, some 80 such owners immediately objected the measure, and submitted their sales proposals to the local authorities.⁸⁷ Ultimately, according to a contemporary estimate, some 66 *paradas* amounting to some 10,000 Peruvian *estacas* were lost to the State due to the decree.⁸⁸

8. *The Gibbs Consignment Contract*

Although the Associated Banks were formally entrusted with the management of the expropriation, it was evident that the local syndicate did not have the resources to finance the operation. In March, 1876, *The Economist* doubted that the expropriation could be carried out at all: "...the financial position of the government [is] too critical to warrant the belief that it [the expropriation] can, at present, at least, be carried into effect".⁸⁹ The only option available was to find a foreign partner to furnish the required funds, and perform the overseas marketing of nitrate.

The chosen partner was, rather predictably, Antony Gibbs & Sons. of London, in conjunction with its Lima subsidiary, William Gibbs & Company. The contract signed by Gibbs and the Associated Banks *circa* July,

⁸⁶See below pp. 208-209.

⁸⁷Billinghurst, "Ministro".

⁸⁸Billinghurst, *Capitales*, p.25.

⁸⁹*The Economist*, "Commercial History and Review of 1875", March 11, 1876, p.14.

1876,⁹⁰ made clear that three basic elements of the expropriation scheme were inseparable: the service of the interest on the nitrate bonds (payable in "hard soles" at a fixed rate of exchange), the payment of nitrate delivered by the holders of production contracts (in soles, but also at a fixed exchange rate), and the consignment of nitrate production (i.e., the shipment and overseas marketing of the product). Both the interest payments on the nitrate bonds and the nitrate sold to the Banks had to be defrayed out of revenue derived from overseas nitrate sales. The text of the consignment agreement reflected the obvious connection between these three operations.

Gibbs pledged to finance the 2 percent quarterly interest payments on nitrate *certificados* issued up to January 1, 1877.⁹¹ The Associated Banks would make the actual payments; a line of credit for up to £40,000 quarterly would be open to them for such purpose by Antony Gibbs of London. The British firm would also advance the funds to the Associated Banks to pay for nitrate bought in Iquique.

In exchange, all nitrate purchased by the Associated Banks would be consigned to Gibbs. The contract stipulated a maximum of 200,000 Spanish quintals, or 9,091 tons, a month during the seven-month period ending on March, 31, 1877. This amount was equivalent to the 2.4 million quintals, or 109,090 tons, per annum prescribed during the expropriation debate. Gibbs would charter the required vessels, and manage nitrate sales with no interference by the Banks, collecting a commission on sales. All expenses related to the operation made by Gibbs would be paid out of the proceeds of nitrate sales prior to any other cost. The contract also stipulated that the British firm would furnish the required funds only if the export duty on privately-exported nitrate remained at the current level.

The Gibbs consignment contract reduced the Associated Banks to a ceremonial role, allowing the syndicate to share a few marginal commissions. However, the Associated Banks were charged with the actual

⁹⁰The manuscript text of the contract included in Gibbs Ms. 11,132 is undated, although the main provisions, particularly the starting date for interest payments on the nitrate bonds as well as the mention of an export duty approved on July 8, 1876, strongly suggests that the document was signed around July, 1876.

⁹¹All of the following provisions are quoted from the full text of the contract (in Spanish) included in Gibbs Ms 11,132, no month, 1876.

purchase of nitrate plants, as well as the granting of specific production contracts. Both activities proved to be politically contentious. Gibbs was prudently sheltered from domestic political squabbles linked to plant prices and output quotas. The fact that the consignment contract was valid for about a year gave the British firm the option of withdrawing from the operation if production contracts, wrested through political pressure, threatened with flooding the market with so much nitrate that the whole scheme would become unprofitable.

The maximum volume of exports stipulated in the Gibbs contract was certainly too high to ensure any significant increase of nitrate prices in the world market, if indeed supply alone dictated the level of such prices. Furthermore, the ceiling of 2.4 million quintals referred solely to government-controlled exports. Independent producers were not forced to respect export restrictions. In pledging to maintain the nitrate export duty, the Peruvian Government signed away its nitrate tax policy.

During the discussions on the consignment agreement, Pardo sought Gibbs' cooperation to restrain exports from the Antofagasta Company, partly owned by the British firm. Since 1876, Gibbs tried unsuccessfully both to curtail Antofagasta production, and to convince the Chilean partners to consign CSA exports to him. After a protracted battle, Gibbs failed on both accounts.⁹² Thus, paradoxically, in selling State-owned Peruvian nitrate in the world market, Gibbs had to compete, not only with independent Tarapacá producers, but also with their own emerging Antofagasta Company, which the British firm was unable to control.

9. Balance of the Pardo Administration

At the end of the Pardo Administration, in early August, 1876, the purchase of nitrate plants fell far short of full government control of the Tarapacá industry. As Table 5.5 shows, only 59 out of a total of 144 plants had been sold to the Peruvian Government, leaving some 60 percent of all assessed enterprises free to produce at will. This was a dangerous legacy since a number of independent producers, particularly the more efficient ones, were in an advantageous position to exact better conditions from the upcoming Administration.

⁹²Thomas F. O'Brien, "The Antofagasta Company: A Case Study of Peripheral Capitalism" *Hispanic American Historical Review* 60(1980) 1-31 (Quoted hereafter as O'Brien, "The Antofagasta Company")

Table 5.5

*Sales Contracts for Nitrate Plants
under the Pardo and Prado Administrations,
1876*

Pre- sid- ent*	Ye- ar	No. Cont- racs.	% Cont- racs.	Total Value Plants	% Value Plants	Cum. Total
Pardo	76	59	40.97%	8,759,555.36	44%	8,759,555.36
Prado	76	24	16.67%	2,084,185.00	11%	10,843,740.36
Total 76-80		144		19,732,293.54		

*Prado took office in 2-Aug-1876.

Source: Derived from Table 1, Volume 2.

However, as Table 6.5 shows, of the 8.7 million *soles* in plants bought by the Pardo Administration, only 2.3 million *soles*, or some 26 percent, were actually paid out in bonds. As Minister Elguera explained, the government was reluctant to issue too many *certificados* at the same time.

...the government has not been inclined to issue bonds in payment for these establishments [i.e., nitrate plants], fearing that the simultaneous offer of these securities by many holders would depress its value, and has preferred instead to sign simple sales contracts, stipulating payment in drafts on Europe in two years at a rate of 44 pence to the *sol*, and paying on the meantime an annual interest of 8 percent.⁹³

Of course, the decision to sign sales contracts and postpone the issue of the actual bonds to pay for them meant simply that the subsequent Administration would have to deal with the problem. As more *certificados* were issued, more income from nitrate sales would have to be set aside to cover the pertinent interest payments. Added to the two formidable production contracts awarded to Gibbs and Gildemeister, which left virtually no room for future contractors, and to the decision to accept reassessments of officially priced plants, which opened

⁹³Quoted in CSP, *Exposición*, p.6.

the door to further similar petitions, the Pardo Administration handed an explosive heritage to the subsequent Peruvian Government.

Table 6.5

*Nitrate Bonds delivered under
the Pardo and Prado Administrations,
1876
(soles)*

Pre- sid- ent*	Ye- ar	No. Deli- vers.	% Deli- vers.	Amount bonds	% bonds **	Yearly Interest (£)***
Pardo	76	23	8.33%	2,341,000.00	11.86%	32,774.00
Prado	76	35	12.68%	3,076,000.00	15.59%	43,964.70

*Prado took office in 2-Aug-1876.

**Percentage of total deliveries 1876-80: 19,732,293.54
soles.

***Computed by the author, at 8% per annum,
and 42 d per sol.

Source: Derived from Table 2, Volume 2.

With respect to the anticipated profits or "surplus" to the government from the expropriation, Minister Elguera predicted that it would reach 3 million *soles*.⁹⁴ President Pardo, in his final annual address boldly increased Elguera's estimate to 6 million *soles*, adding that nitrate would help service the currently unpayable foreign debt.⁹⁵

However, the Pardo Administration had succeeded in turning the country's budgeting process into something close to a fine art, and it is hardly surprising that all official Peruvian projections concerning

⁹⁴Quoted by San Cristóval, *Pardo*, pp.58-59. I have not found these remarks in the copy of the "Informe especial" I consulted.

⁹⁵Manuel Pardo, "Mensaje" 28-Jul-1876 in: Perú, *Mensajes* 2:78.

government revenue from any source were met overseas with open skepticism.⁹⁶ The intricacy of the muddled system adopted to implement the expropriation made it exceedingly difficult to estimate exactly how much State income would ultimately accrue from the operation. What the Peruvian Government could earn on one account could be more than offset by losses on another. An increase in total nitrate exports coupled with falling prices, meant more State revenue from the export tax, but shrank income per unit from government nitrate sales, and possibly diminished total fiscal income from this source due to losses of market share to free producers, guano sales and prices would be expected to dwindle in this case, further affecting total government income. On the other hand, a decrease in total nitrate exports coupled with an increase in prices, would surely trim down revenue derived from the export duty, and possibly total sales income, unless the price increases were large enough to make up for the reduced volume of nitrate sold. It was far from certain that higher nitrate prices would automatically permit the Peruvian Government to raise guano prices -- a central premise of the Pardo doctrine -- since two competing sellers were currently in a position to place large stocks of the fertilizer in the world market. In addition, all estimates concerning income derived from the nitrate duty would have to take into consideration the fact that the expropriation had effectively spawned two types of exporters: the free producers, who paid the duty, and the holders of production contracts, who were exempt. A larger percentage of exports from independent producers implied more government income from taxes and less from sales. Conversely, more exports from State contractors meant less tax revenue and larger sales proceeds. Of course, accurate predictions about the future revenue of the Peruvian Government were further complicated by the uncertainty surrounding the exact amount required for the quarterly interest payments on the outstanding *certificados*, also financed out of nitrate sales income.

As for the main purpose of the expropriation, the increase of nitrate prices, Table 7.5 indicates quite clearly that the 11 sh 3 d recorded in Liverpool for July 1876 was hardly meaningful. Given the fact that two competing guano contractors were currently driving down the price of the fertilizer, the original goal of

⁹⁶Cf. *The Economist* questioned official estimates placing government revenue from the nitrate export duty at 3 million soles (£600,000) (26-Feb-1876, p.245)

favouring guano over nitrate had not been accomplished during Pardo's tenure. At the end of 1876, the pertinent figures on nitrate and guano exports and prices show the failure of the operation even more clearly.⁹⁷

Table 7.5

Nitrate Prices, January August, 1876
(*sh.d. per E.Quintal,*
Liverpool, Arrived)

Average Prices Year	Average Prices (Liv.Ar.)
Jan-76	11
Feb-76	11.3
Mar-76	10.9
Apr-76	11.4
May-76	11.2
Jun-76	11.0
Jul-76	11.3
Aug-76	11.9

Source: *El Ferrocarril* (Santiago),
1876-7.

In spite of the questionable record of the Pardo Administration in sponsoring and launching the expropriation, most of the authors dealing with the matter have exempted President Manuel Pardo from all responsibility in the matter.⁹⁸ However, the state of the expropriation, as well as of Perú, at the close of the Pardo Administration, was clearly disastrous. Gibbs, alarmed at the prospect of facing competition from a growing flood of nitrate exports from free Tarapacá producers, formally pressed the Pardo Administration to purchase all unsold plants to prevent a collapse in nitrate prices, and continued doing so with the subsequent

⁹⁷See below p. 203, Table 2.6.

⁹⁸See below Chapter 9, for a full discussion of the issue.

government up to 1878.⁹⁹ Thus, the operation could not be left half-done without losing the financial support of Gibbs, vital for nitrate overseas sales. Furthermore, the Antofagasta Company, the competitor so ostensibly overlooked by the supporters of the expropriation, showed a remarkable performance during 1875-1876.

10. *The Antofagasta Company, 1875-1876*

Politically, the Antofagasta region in 1875-1876 continued experiencing the impact of Bolivian instability. The year 1875 opened with yet another Bolivian revolt in the littoral region, an upshot of an aborted rebellion in the Highlands. Current Prefect Emilio Fernández Costas was forced to take refuge, albeit briefly, on the CSA premises in Antofagasta; an unnamed Bolivian officer proclaimed himself "Official and Military Dictator of Antofagasta" before order was restored following the defeat of the main revolt in the Highlands.¹⁰⁰ The Bolivian local authorities attempted to levy no less than three different taxes from the CSA, giving rise to disputes over the interpretation of the 1874 Bolivian-Chilean Treaty. A "port and lighting duty", payable by all captains docking in Antofagasta, was enforced on the grounds that it did not directly affect nitrate, although, according to Hicks, it increased freight costs, and ultimately Antofagasta nitrate prices.¹⁰¹ In mid-1875, Hicks noting that Bolivia was not a "rational country", recommended accepting the port and lighting duty, but leaving the payment to the captains, "not through the company". He was supported by former Bolivian Prefect Ruperto Fernández, currently acting as a lawyer for the Antofagasta Company.¹⁰² In May, 1875, the local Municipality assailed the "exceptional privileges" of the CSA, and requested the central government to impose a 3 percent

⁹⁹Robert G. Greenhill and Roy M. Miller, "The Peruvian Government and the Nitrate Trade, 1873-1879" *Journal of Latin American Studies* 5(May, 1973) 107-131 (Quoted hereafter as Greenhill, "Peruvian Government").

¹⁰⁰Hicks to Soubllette, Antofagasta, 15-Jan-1875, 23-Jan-1875, and 16-Feb-1875. *CSA AG* Vol. 6, fs. 046-058, 050, and 75-76.

¹⁰¹Hicks to Soubllette, Antofagasta, 21-Jan-1875. *CSA AG* Vol. 6 fs. 040

¹⁰²Hicks to Soubllette, Antofagasta, 15-Jul-1875, 30-Jul-1875, and 12-Aug-1875; Ruperto Fernández to Hicks, Antofagasta, 2-Sep-1875. *CSA.AG* Vol. 6, fs. 307-308, 358, 379, and 407-408

duty on all nitrate exported through Antofagasta; the Municipal Board in Cobija rejected the proposal as illegal. In June, 1875, the Bolivian Government ordered the collection of a new 2 percent tax on all joint-stock companies operating in Bolivia, resurrecting an aborted bill of 1874.¹⁰³ The affair dragged on until 1878.¹⁰⁴

The failure of the Mejillones-Caracoles railroad, built by Henry Meiggs, became more evident in 1875. Representatives of Caracoles mining concerns, saddled with high freight charges from local cart owners, approached Hicks to propose him to build an extension of the CSA railway to the Caracoles district.¹⁰⁵ Meiggs himself had started sounding the CSA about sharing revenues from the extension of the company's line to Mejillones. In March, 1876, Hicks reported the visit of a Bolivian by the name of Varnassa, the visitor told him he was interested in the concession to carry State cargo in the projected railroad to the port of Mejillones, and wanted Meiggs not only to continue collecting custom duties for the Bolivian Government, but also to be granted the right to do so in Antofagasta.¹⁰⁶ Subsequently, on May, 5, 1876, Hicks received a more specific proposal. The Bolivian lawyer, Napoleón Peró, brother of the architect of the Peró Transaction,¹⁰⁷ approached him to let him know that Meiggs was interested in linking the railroad line of the Antofagasta Company with the future railroad to the port of Mejillones, and could arrange for the Bolivian Government to grant to the Company's railroad the right to carry State cargo. "he told me that Mr. Meiggs expected a consideration (*alguna*

¹⁰³Hicks to Soubllette, Antofagasta, 11-Jun-1875. CSA.AG Vol. 6, fs. 241-242. For the 1874 taxes, see above pp.

¹⁰⁴See below pp. 296-297.

¹⁰⁵Hicks to Soubllette, Antofagasta, 22-Apr-1875, and 30-Aug-1875. CSA.AG Vol.6, fs. 141, 159.

¹⁰⁶Hicks referred to Varnassa in unusually harsh terms, calling him "pretentious" and "an adventurer and boaster without a trace of honesty or discretion". Hicks to Soubllette, Antofagasta, 21-Mar-1876. CSA.AG. Vol. 7, fs. 319

¹⁰⁷See above p. 96.

cantidad) for the affair".¹⁰⁸ Hicks replied to Perú that it was up to the Board of Directors of the Company to decide on this matter, and that "even in this case, I was afraid that Mr Meiggs, induced by exaggerated estimates of the Caracoles cargo, could place on the arrangement a value such that might put us in the unfortunate position of rejecting it."¹⁰⁹

The military coup that brought General Hilarión Daza to power in Bolivia in May, 1876, had an impact on Antofagasta. Fernández Costas, the current Prefect, and Ruperto Fernández, the Daza-appointed Prefect, engaged in actual combat in the area, troops loyal to Daza put an end to the struggle, proclaiming Ruperto Fernández the "Supreme Military Commander" of the littoral, as well as Prefect of the region.¹¹⁰ The Daza coup was viewed by the Meiggs group as inimical to their interests, and Charles Watson, Meiggs' associate, provided funds from the littoral customs, managed by him, to Fernández Costas for his unsuccessful fight against Ruperto Fernández. Watson went as far as requesting and obtaining the support of the US warship "Omaha", which docked in Antofagasta in June, 1876, the captain of the "Omaha", accompanied by Watson, demanded Ruperto Fernández to respect the concession granted to his countrymen.¹¹¹ As the Mejillones railroad project came unravelled, Meiggs started selling off both construction materials, and housing built for the workers. A fire broke out in the Caracoles district in August, 1876, engulfing some five blocks of houses. The episode underlined the need for a railroad line, since both the evacuation of injured workers and the shipment of emergency supplies were compromised by the absence of viable means of transport.¹¹² The increasing local

¹⁰⁸Hicks to Soubllette, Antofagasta, 5-May 1876. *CSA.AG* Vol 7, fs 416-417

¹⁰⁹Hicks to Soubllette, Antofagasta, 5-May-1876, *CSA.AG* Vol 7, fs 416-417

¹¹⁰Hicks to Soubllette, Antofagasta, 12-May-1876, 14-May-1876, 20-May-1876, 23-May-1876, and 30-May-1876. *CSA.AG* Vol.7, fs. 431, 440-441, 445-448, and 467-468

¹¹¹Hicks to Soubllette, Antofagasta, 2-Jun-1876, *CSA.AG* Vol 7 fs 477. Napoleón Perú, the lawyer of the CSA, was also acting on Meiggs' behalf, showing the intricacy of Bolivian politics

¹¹²Hicks to Soubllette, Antofagasta, 8-Aug-1876, 10-Aug-1876, 12-Aug-1876, and 15-Aug-1876. *CSA.AG* Vol.8, fs 160-161, 165-166, 173-174, and 175-176

support from miners for a government authorization to connect the CSA railroad with Caracoles was matched by the violent hostility of local cart-owners, resulting in incidents of actual sabotage to the railway¹¹³ Another brief insurrection in Caracoles, in November, 1876, showed that the local Prefect was unable to send troops to the district without a railroad line¹¹⁴ However, in spite of political unrest, the CSA managed to continue producing nitrate, and decreasing production costs

Indeed, the years 1875 and 1876 were important for the development of the Antofagasta Company. Faced with the need to finance substantial capital outlays, mainly a railroad expansion into new deposits, and constantly struggling with a type of ore requiring special treatment, the manager of the CSA saw the interventionist policies of the Peruvian Government in Tarapacá, first through the estanco scheme, then through the expropriation, as positive to the company since he expected that they would lead to much-needed price increases in the world market.

¹¹³Hicks to Soublette, Antofagasta, 7-Oct-1876, 13 Oct-1876, 3-Nov-1876, and 1-Dec-1876. CSA.AG Vol.9, fs. 006-007, 017, 046-048, 117, and 119.

¹¹⁴Hicks to Soublette, Antofagasta, 14-Nov-1876, 21-Nov-1876, and 5-Dec-1876. CSA.AG Vol.9, fs. 077-078, 086-087, 092, and 130

Table 8.5

*The Antofagasta Company,
Exports, Costs, Prices, and Profits,
Antofagasta and Valparaíso, 1872-1876
(Spanish Quintals and Chilean Pesos)*

Year	(1) Exports	(2) Cost p.Sp.Q.	(3) Total Cost*	(4) Prices Valpso	(5) Net Profits
1872	121,558.00	1.68	204,217.44		
1873	185,028.00	1.31	241,461.54	2.01	102,050.73
1874	231,283.00	1.49	344,611.67	1.69	118,638.61
1875	243,420.22	1.09	265,328.04	1.87	216,642.09
1876	242,630.32	1.29	312,993.11	2.30	254,116.58

Computed by the author:(1)(2).

Source: (1),(2),(5)- CSA, *Memorias*, 1873-9.
(4)- *La Patria* (Valparaíso),
July 1873-August 1874.
(4)- 1875-6, CSA, *Memorias*, 1876-9.

However, as Table 8.5 shows, the growth of the CSA during 1875-1876 was steady, but not spectacular. Net profits of some 216,000 and 254,000 pesos for both years implied an improvement over the two preceding years, but still they represented merely a return of some 10 percent on a 2.5 million pesos investment. Exports from Antofagasta doubled between 1872 and 1876, but as Table 9.5 indicates, the share of the CSA in the total amount of nitrate shipped to world markets did not rise above 3 percent, Tarapacá nitrate clearly dwarfing the competition with some 96 to 97 percent of total exports.

Table 9.5

*Nitrate Exports,
Tarapacá and Antofagasta, 1872-6
(Spanish Quintals)*

Year	Tarapacá Exports (S.Q.)	(1) % Tara- pacá*	Antofagasta Output (Sp.Q)	(2) % Anto- fag.*	Total Exports (S.Q.)**
1872	4,220,764	97.20%	121,558.00	2.80%	4,342,322.00
1873	6,263,767	97.13%	185,028.00	2.87%	6,448,795.00
1874	5,583,260	96.02%	231,283.00	3.98%	5,814,543.00
1875	7,205,652	96.73%	243,420.22	3.27%	7,449,072.22
1876	7,035,693	96.67%	242,630.32	3.33%	7,278,323.32

*Computed by the author.

**Sum of Tarapacá exports and Antofagasta output.

Source: (1) *El Veintiuno de Mayo* (Iquique), 14-May-1884.
(2) CSA, *Memorias*, 1873-1879.

Two fundamental factors seem to explain the modest gains made by the CSA in the face of an increasingly overt government intervention in Tarapacá. The first factor was related to the instability generated by the decisions of the Peruvian Government. The estanco and the succeeding expropriation, although originally intended to curtail Tarapacá output, actually resulted in abrupt increases in exports, leading to the swelling of unsold stocks and a temporary plunge in nitrate prices. The aborted estanco induced Tarapacá producers to flood the world market in 1873-1874 in order to sell as much nitrate as possible prior to the actual enactment of the law. The subsequent liquidation of stocks brought prices (and many Tarapacá producers) down. The ensuing expropriation, linked to exorbitant production contracts and at least two years of free exports by important plants, could never really reduce Tarapacá output, except for temporary spells. Thus the substantial expansion of Tarapacá exports during 1875 and 1876, exceeding 7 million quintals (some 318,000 tons) in both years (see Table 9.5), were certainly not helpful for the Antofagasta Company, although prices increased slightly in 1876. The second factor was associated to the internal problems of the CSA. Perhaps the most important was the quality of the *caliche* ore from Salar del Carmen, forcing expensive experiments with new machinery and

the mixing of ores from better-quality deposits. Table 10.5 shows that the CSA steadily reduced costs of production per quintal of nitrate manufactured from 1.69 pesos in 1871 to 1.29 pesos in 1876, although the dependency on a random factor, i.e., the unpredictable grade of the ore mined, induced some erratic annual shifts, as seen by the abrupt fall to 1.09 pesos in 1875 immediately followed by an increase to 1.29 pesos in 1876. Table 10.5 indicates that costs varied by semester, reflecting not only the uneven quality of the ore, but also fluctuations in the price of basic inputs, particularly imported coal.

Table 10.5

*The Antofagasta Company,
Costs of Production,
1871-1876
(Chilean Pesos per Spanish Quintal)*

Sem- est.	Year	Cost p.S.Q.	Cost Annual*
	1871		1.69
	1872		1.68
1st	1873	1.24	
2nd	1873	1.37	1.305
1st	1874	1.51	
2nd	1874	1.47	1.490
1st	1875	1.03	
2nd	1875	1.14	1.085
1st	1876	1.14	
2nd	1876	n.a.	1.29

*Computed by the author,
except 1871 and 1872,
computed by Hicks, and 1876
from CSA, *Memoria* 1878.

Source: Hicks to Soubllette,
13-May-1873, Vol.4, fs.371;
12-Aug-1875, fs. 378, Vol.6;
28-Feb-1876, Vol.7, fs.275-7;
15-Aug-1876, fs.208;
13-Oct-1876, fs.072, Vol. 8.
CSA.AG.

However, since the attempts at forcibly restricting Tarapacá output through the estanco and the expropriation were a mixed blessing for the CSA, at least in the short term, it was clear that the Antofagasta Company's successful development relied far more on the efficiency of its own operations than on uncontrollable outside factors such as the mercurial policy of the Peruvian Government on an adjacent nitrate region. The Antofagasta Company was acutely aware of the implications of any major measure taken by the Peruvian Government in Tarapaca, and from the onset of the expropriation Hicks predicted that it would induce a steep increase in nitrate prices. During 1874, the CSA recorded sales as low as 1.65 pesos in June, 1874, although in December, 1874, it succeeded in selling 17,000 Spanish quintals at a record 2.15 pesos (see Table 11.5), perhaps reflecting an early market reaction to impending Peruvian measures, as well as the clearing of previously bloated overseas stocks. In April, 1875, about one month prior to the enactment of the expropriation law in Perú, the manager of the CSA regretted that nitrate prices were too low, but praised "the fact that the measures projected by Perú will trigger a remarkable market reaction allowing our company to unload nitrate at favourable prices".¹¹⁵ As far as 1875 and 1876, Hicks proved to be right, although, as Table 11.5 shows, price increases were neither stable nor predictable.

¹¹⁵Hicks to Soubllette, Antofagasta, 13-Apr-1875. CSA.AG. Vol.6, fs. 131.

Table 11.5

*Nitrate Prices, Antofagasta,
July, 1873-December, 1876
(Chilean Pesos per Spanish Quintal)*

Date	Price p.S.Q.* (Pesos)	Amount Sold (S.Q.)	Grade	Type
29-Jul-73	2.07		95%	Valuation Stock.
04-Nov-73	2.10	20,000	96%	Actual Sale.
08-Jan-74	1.87	11,000	95%	Actual Sale.
22-Jun-74	1.65	20,000	96%	Actual Sale.
03-Jul-74	1.70		95%	Asking Price.
14-Jul-74	1.75	36,000	95%	Actual Sale.
28-Aug-74	1.87		95%	Asking. Rejected.
11-Sep-74	1.90		95%	Asking. Possible.
01-Dec-74	2.15	17,000	95%	Actual Sale.
28-May-75	2.00	1,600	95%	Actual Sale.
21-Jun-75	2.00	16,000	95%	Actual Sale.
27-Jul-75	2.00	11,000	95%	Actual Sale.
17-Aug-75	2.10	17,000	95%	Actual Sale.
05-Oct-75	2.00	2,000	95%	Actual Sale.
18-Jul-76	2.50	18,000	95%	Actual Sale.
22-Aug-76	2.55	19,500	95%	Actual Sale.
16-Sep-76	2.70	26,000	95%	Actual Sale.
03-Oct-76	2.70	30,000	95%	Actual Sale.
19-Dec-76	2.40	2,000	95%	Actual Sale.

*Free alongside ship, Antofagasta.

Source: CSA.AG. Vols. 4-6, 8, 9;
CSA.AG. Copiador Soubllette. Vol. 46.

In June, 1875, with the Expropriation Law formally promulgated and sales reported at 2.00 pesos (see Table 11.5), Hicks thought that the market was at a turning point

I deem this juncture as critical for nitrate sellers because, with the measures taken by the Peruvian Government, it is impossible that we do not see soon a rise in prices, thus, although we should consider ourselves fortunate if we can obtain prices allowing for the revaluation of our stocks at the end of this month [June, 1875], I believe it is probable that, within two months, its value will be even higher, since in Europe up to now [the buyers] have not believed that the expropriation of the Peruvian nitrate industry was likely to happen,

but once [the expropriation] has been confirmed, bolstered by an increase in export duties, the price of the article will surely rise¹¹⁶

While the manager of the CSA viewed a series of sales at 200 *pesos* in May-June 1875 as "the beginning of a new era in the nitrate market, due to the upheaval in Peruvian production", and greeted the fact that new vats for the projected Salar del Carmen plant had already been ordered, allowing the company to take advantage of "very lucrative prices", he subsequently noted that prices had gone down due to the hasty unloading of output by private Tarapaca producers eager to sell their stocks "before they have to pay the new tax"¹¹⁷

Perhaps influenced by the perception of growing profits due to price increases, a group of senior employees of the CSA in Antofagasta requested and obtained a higher salaries in June, 1875¹¹⁸ Hicks recommended doubling production in the Salar del Carmen using ore extracted from the new Salinas deposits in order to take advantage of "an eventual high price for nitrate in the upcoming year as a result of the measures taken by the Government of Perú " The manager of the CSA believed that the Tarapacá producers could not afford to keep up current levels of output due to the erosion in profits linked to the new export duty

It is true that Iquique's production for this year has been enormous, [since the producers have been] forced to make every possible effort prior to the increase in export duties, they have accomplished miracles, but with nitrate at \$2 [*pesos*], and a 30 cents duty, they will be left with only \$1 70, thus barely covering their expenses, that is why I have no doubts that we will be able to reevaluate our stocks at the end of June at \$2 [*pesos*]

However, very cautiously, in mid-July the CSA decided to price its nitrate stock at 1 95 *pesos*, rather than at 2 *pesos*¹¹⁹ In October, 1875, it was reported that the Antofagasta Company had decided to increase its capital

¹¹⁶Hicks to Soublette, Antofagasta, 18-Jun-1875. *CSA AG*. Vol 6, fs 254-255.

¹¹⁷Hicks to Soublette, Antofagasta, 21-Jun-1875 and 29-Jun-1875. *CSA.AG*. Vol.6, fs. 261, fs. 271.

¹¹⁸Hicks to Soublette, Antofagasta, 25-Jun-1875 *CSA AG* Vol 6, fs. 266.

¹¹⁹Hicks to Soublette, Antofagasta, 5-Jul-1875, 13-Jul-1875 and 15-Jul 1875. *CSA.AG*. Vol.6, fs. 293, 304, 309

in order to expand operations, thus responding to the new market conditions brought about by the Peruvian expropriation¹²⁰

The prudent revaluation of nitrate stocks at 1.95 pesos appeared justified at the end of 1875, since Hicks, albeit still optimistic, further postponed his prediction of the much-heralded price raise for 1876.¹²¹ In fact, the most tangible benefit derived by the CSA from the Peruvian expropriation in 1876 came from departing Tarapacá workers willing to move to Antofagasta. In January, 1876, Hicks was complaining about the scarcity of labour in Antofagasta, and announced that several workers had arrived in the last ship from Iquique. Around July, 1876, the number of paralyzed plants in Tarapacá moved the Antofagasta Company to organize an *enganche*, or hiring operation through private contractors, in the Peruvian nitrate region, the new workers, brought to work the new Salinas deposits, as well as to teach the novices, were reportedly very experienced. Hicks hoped "they will attract their friends in Tarapaca when we need more people." He stated that he had "some disagreements at the beginning" over payments, some Tarapaca workers rejected the CSA's offer and left the area, "but those who chose to stay are satisfied." The workers were paid 5 cents per quintal of *caliche* extract with a 45 and 50 percent nitrate content, exclusive of gunpowder and tools. Some £80 were paid to the Lima branch of the Gibbs house for the transport of the Tarapacá workers, and at the end of October, one more contractor left for the Peruvian nitrate region to bring 150 additional workers.¹²²

Although some selected sales at prices fluctuating from 2.50 to 2.70 pesos between July and December, 1876 (see Table 11.5), seemed to bear out the predictions about higher prices, Hicks was still surprised at the large amount of Tarapacá nitrate exports at the end of 1876.

¹²⁰This capital increase, mentioned in the company's correspondence, could have referred to a decision to borrow from Gibbs or Edwards, since the Annual Reports of the CSA for 1875 and 1876 did not record any formal increase in nominal capital. The letter quoted here also mentioned a change in the statutes of the CSA approved on 26-Apr-1875, also unrecorded in the Annual Reports. Ruperto Fernández to Hicks, Antofagasta, 8-Oct-1875. CSA AG Vol 6, fs 402-403.

¹²¹Hicks to Soubllette, Antofagasta, 24-Dec-1875. CSA AG Vol 7, fs 125.

¹²²Hicks to Soubllette, Antofagasta, 14-Jan-1876, 11-Jul-1876, 15-Aug-1876 and 20-Oct-1876. CSA AG Vol 7, fs. 217; Vol.8, fs 086, 181-182, Vol 9, fs. 121.

As you point out, these large exports from Perú are very strange, considering the high export duty, maybe the government is exporting on its own account, and the Banks are compelled to do so in order to get the funds to pay interests and instalments on the nitrate plants [purchased]; this is merely a tentative opinion, but this [situation] is better for us than an outright cancellation of the [Peruvian Government's] monopoly.¹²³

For the Antofagasta Company, the most important benefit derived from the high prices prevailing in the second half of 1876 was the possibility to profitably process low-grade ore from the troublesome Salar del Carmen deposits

As long as nitrate prices exceed 2.25 [pesos per quintal] we can profitably work any type of *caliche*, but in case of a drop in prices I believe that we would be compelled to discontinue the processing of Salar [del Carmen] ore.¹²⁴

Throughout 1875 and 1876, Hicks had been singling out the poor quality of the Salar del Carmen *caliche* as the major obstacle for reducing costs. The procedure of mixing the flawed ore with better quality *caliche* was tried out, "using ten percent of [the best ore] to cover the pipes carrying steam to heat the solution"; the goal was to prevent the large amounts of *borra*, or viscous insoluble matter, found in the inadequate ore, to block the steam pipes, slowing down the refining process, and forcing an expensive cleaning of the vats. In early 1875, the good ore was extracted from an area referred to as Pampa del Salar, located further East from the processing plant and the coast than the poor Salar del Carmen deposits; Hicks estimated that some 400,000 Spanish quintals (18,182 tons) of nitrate could be extracted from the area.¹²⁵ This was not a substantial amount, even if it was used sparingly, and in mid-1875 Hicks proposed using the more extensive Salinas deposits to double production after the expropriation law was approved in Perú.¹²⁶

¹²³Hicks to Soubllette, Antofagasta, 21-Nov-1876. CSA.AG. Vol.9, fs. 088.

¹²⁴Hicks to Soubllette, Antofagasta, 5-Dec-1876. CSA.AG. Vol.9, fs. 124-125.

¹²⁵Hicks to Soubllette, Antofagasta, 19-Feb-1875. CSA.AG. Vol.6, fs. 094.

¹²⁶Hicks to Soubllette, Antofagasta, 5 Jul-1875. CSA.AG. Vol.6, fs. 293.

However, as output was increased in line with Peruvian developments, the low-grade ore proved expensive to work, not only in the processing stage, but also in the mining phase "it demands [extracting] a considerably larger amount of quintals for processing to produce the same (or less) amount of nitrate".¹²⁷

At the end of 1875, the grade of the Salar del Carmen ore dropped to less than 15 percent, a level which made it entirely unsuitable to process because it required protracted heating and drying, reducing the number of *fondadas*, or processing cycles, to merely seven per day. Thus, the ore-blending method had to be supplemented by the use of a new type of vat, specifically designed to pulverize and dilute the *borra* to a much greater extent. Hicks wrote that "the life" of the company depended on the new vat "until the railroad reaches Salinas". Otto Harnecker, a German entrepreneur, also active in El Toco and Tarapacá,¹²⁸ requested and obtained permission to try out a new processing system in 500 quintals of Salar del Carmen, doubtlessly reflecting the concerns of the CSA, particularly when even the good ore dropped to 17 percent (down from 19-20 percent).¹²⁹

Although Harnecker reported good results with his new system, the CSA chose to install another type of vat at the end of 1875, and the initial yield was termed "disappointing". Hicks subsequently reported that the poor performance of the new vat was induced partly by the abrupt decline in quality of the formerly good ore from the Pampa del Salar deposits: it had unexpectedly turned so hard that "it looks like granite", forcing a drastic cut in production; the results of the new vat, he remarked, would have been different with Salinas' *caliche*. However, the new vat was riddled with mechanical problems, and the manager of the CSA recommended taking note of the flaws in design in order to improve future models.¹³⁰ The data provided by

¹²⁷Hicks to Soubllette, Antofagasta, 12-Aug-1876. CSA.AG. Vol.6, fs. 466.

¹²⁸For Harnecker, see above p. 170, note 61.

¹²⁹Hicks to Soubllette, Antofagasta, 25-Nov-1875 and 13-Dec-1875; Foster to Soubllette, Antofagasta, 17-Dec-1875. CSA.AG. Vol.7, fs. 086, 105, 108.

¹³⁰Hicks to Soubllette, Antofagasta, 28-Dec-1875, 14-Jan-1876, 25-Jan-1876, 29-Jan-1876 and 1-Feb-1876. CSA.AG. Vol. 187-189, 198, 203, 205-215, 221

Hicks does not allow to precisely identify the novelty of the vat adopted, although it included some new type of doors because Hicks complained that they were all too easily jammed.¹³¹ The complaints about the new vat persisted throughout 1876, the manager of the CSA noting that the devise, an exact copy of the one used at "Limeña", Gibbs' Tarapacá operation could give good results in Peru, but that the Antofagasta ore was quite different.¹³²

Thus, the problems posed by the uneven and falling quality of the ore were not completely solved during 1875 and 1876, forcing the construction of some expensive side tracking for the railroad in order to reach the better deposits, as older patches of *caliche* dropped in quality.¹³³ Clearly, the high prices brought about by the Peruvian expropriation in mid-1876 saved the day, by allowing the CSA to worry less about ore quality, and more about expanding output. In that sense, the Peruvian Government was unequivocally helping the competition. This unwitting Peruvian contribution could only intensify as more Tarapacá plants came under an increasingly chaotic State management.

¹³¹A long report about the new vat was written in January, 1876. Hicks to Soubllette, Antofagasta, 29-Jan-1876. CSA.AG. Vol.7, fs. 205-215.

¹³²Hicks to Soubllette, Antofagasta, 8-Feb-1876, 29-Feb-1876, 3-Mar-1876, 9-Mar-1876, 13-Apr-1876, 28-Apr-1876 and 14-Nov-1876. CSA.AG. Vol.7, fs. 226, 267, 284, 297, 357-358, 400-401; Vol. 8, fs. 072.

¹³³Hicks to Soubllette, Antofagasta, 15-Aug-1876. CSA.AG. Vol.8, fs. 180.

CHAPTER 6

THE EXPROPRIATION UNDER PRADO, 1876-7

1. The Political Context

General Mariano Ignacio Prado replaced Manuel Pardo as President of Perú on August 2, 1876. It was his second term in the Presidency of the country. General Prado took office in 1865 through a Chilean-supported military coup aimed at presenting a united front in the War against Spain.¹ Most of the criticism levelled at the new Prado faction stressed its close ties to the Pardo group.² Manuel Pardo had served as Minister of Finance during General Prado's first government (1865-1868), and Pardo had sent the former President as his representative to negotiate the controversial Raphael guano contract in 1876.³

The private thinking of incumbent President Prado with respect to the ongoing expropriation is not known, due largely to the absence of available personal papers. However, one associate, Jaime Landa disclosed in 1878 that President Prado was initially "unsure" about nitrate policy, favouring an export tax instead, but came to understand that the expropriation law, not only prevented him from "going back", but compelled him to go forward.⁴ Other, less charitable, interpretations contended that a corrupt circle of followers pushed

¹Along with the current Bolivian President Mariano Melgarejo, and the current Ecuadorian President, Jerónimo Carrión, Prado was made an honorary General of the Chilean Army, a paradoxical tribute since he subsequently led Perú in the 1879 war against Chile. A brief biography of General Prado is included in *Perú, Mensajes* 2:103-196 (note). See also (in English), Dobyns, *Perú*, pp 180-189, for Chile and Prado during the 1865 war with Spain, Burr, *By Reason*, p 98; the information on honorary titles was provided by Hernández (*Salitre*, p. 184).

²Cf. *El Comercio* (Lima), and *La Patria* (Lima) issues of late July, 1876.

³*El Comercio* (Lima), 12-Mar-1876, Rodríguez Montoya, "Historia", p 127; Olinger, "Dreyfus", p 168

⁴*El Comercio* (Lima), 18-Sep-1878.

President Prado to make further purchases of nitrate plants to foster speculation⁵ However, regardless of the personal position of the new President, the Prado Government could continue implementing the expropriation virtually without opposition since neither the Piérola faction nor former President Prado questioned the original goals of the operation during his term.

Nicolás de Piérola persisted in using Chile as a springboard for aborted invasions of Perú. A first unsuccessful attack on Arequipa was launched shortly after General Prado took office, in September, 1876. A second attempt in May, 1877 included the capture of the Peruvian ironclad "Huáscar", followed by a spectacular clash with two British warships prior to Piérola's surrender.⁶ Although these uprisings were financed by Guillermo Billinghurst, an opponent of the operation with investments in Tarapacá, neither Piérola nor his newspaper *La Patria* took a consistent stance for or against the expropriation.⁷ A manifesto issued by Piérola in Valparaíso in 1877 accused the Prado Administration of delivering the public exchequer "into the hands of moneylenders",⁸ but said nothing about nitrate policy. The piérolista newspaper *La Patria*, reflecting the interests of its owner, August Dreyfus, appeared far more concerned with the guano contract awarded to the Raphael firm than with the course of the expropriation. In fact, in August, 1877, *La Patria* endorsed the idea of placing both guano and nitrate under Dreyfus' control to avoid further competition between the two products, thus fully embracing Prado's ideas on the subject.⁹ Of course, the fact that Dreyfus' *Banco Nacional* was part of the Associated Banks, as well as the most important individual Peruvian holder of *certificados*, influenced Piérola's position with respect to the expropriation.

⁵See below, Chapter 9, for a broader discussion of the issue.

⁶*El Comercio* (Lima), 27-May-1877; Dulanto, *Piérola*, pp.170-172, 174, 176-180; and San Cristóval, *Prado*, pp. 223, 225.

⁷Billinghurst was a consistent critic of the expropriation, particularly upon his return to Perú in 1876, although he changed his stance briefly in 1879. See below p. 318.

⁸Quoted and translated by Clarke, *Perú*, p. 45.

⁹*La Patria* (Lima), 22-Aug-1877.

The stance of the Peruvian political factions with respect to the expropriation was further compounded by local political divisions in Tarapacá itself. The known *piérolistas* among the owners of nitrate plants were Pedro Elguera,¹⁰ the powerful Ramón Montero, Senator for Tarapaca in 1878 and contractor of the Iquique railroad,¹¹ and at least one of the members of the Vernal family¹² Manuel A. Loayza and E. Marquezado belonged to the *Partido Civil*, Pardo's party.¹³ Violent clashes between the two groups left four people dead in Iquique during Congressional elections held at the end of 1877.¹⁴ Since the Tarapaca interests ranged from wealthy entrepreneurs such as railroad baron Ramón Montero to owners of lesser *paradas* struggling for production quotas like the Vernal family¹⁵ (both fighting for the same side), it was difficult to discern clear ideological boundaries in the region with respect to the expropriation.

The followers of former President Pardo, through the Lima newspaper *El Nacional*, continued supporting the operation as Pardo left for Chile on June 27, 1877.¹⁶ Manuel Pardo himself took full responsibility for the expropriation during his stay in Chile.¹⁷ In addition, upon his arrival in Chile, the former Peruvian President was greeted by a scathing attack from *La República*, a Santiago newspaper, for his leading role in the expropriation.

Chilean intelligence, hands, and capital discovered and developed substantial resources in Iquique. Mr. Pardo did not hesitate to sacrifice his own country in order to sacrifice ours, and expropriate the nitrate plants. Twelve thousand

¹⁰Elguera was chosen by the *Partido Nacional*, Piérola's party, as the candidate to the Peruvian Chamber of Deputies for the Huarochí Province in late 1877. *El Comercio* (Lima), 1-Sep-1877.

¹¹*El Comercio* (Lima), 17-Sep-1877, and 14-Aug-1878.

¹²*El Comercio* (Lima), 8-Oct-1877, the newspaper mentioned Vernal only by his family name.

¹³*El Comercio* (Lima), 8-Oct-1877; *El Peruano* (Lima), the official organ of the Prado Government, referred to Loayza as a "gratuitous enemy of the current [Prado's] Administration" (5-Jun-1878).

¹⁴*El Comercio* (Lima), 8-Oct-1878.

¹⁵Juan Vernal y Castro addressed a petition to the Peruvian Congress on behalf of the owners of *paradas* Perú, DE1878, 18-Sep-1878.

¹⁶*El Comercio* (Lima), 17-Jul-1877, Dulanto, *Piérola*, p. 182, 199.

¹⁷See below Chapter 9, p. 363.

Chileans had to emigrate, and hundreds of families who had forwarded their savings, under the public faith of Perú, to promote and develop an industry of which Perú should have benefitted the most, were ruined by the will of the American, omnipotent yesterday, now in flight, who has just landed on our shores.¹⁸

Two Lima newspapers were quick to respond.

The nitrate monopoly in Tarapacá [wrote *El Comercio*] might have hurt some private interests, some of which are Chilean and some Peruvian; but this monopoly was established to meet a public need, and nobody can think that it was inspired by a hostile attitude towards Chilean industry or trade.¹⁹

La Opinión Nacional, the organ of the Associated Banks, was more aggressive

Chilean capital [in Tarapacá] was engaged in usurious speculations, and it has departed unencumbered, when it could have been mortally wounded by subjecting it to severe investigations. That was not done: [Chileans] were promptly paid some millions of pound sterling which will go to reinforce Chilean markets, formerly living off our resources. If Chile has experienced a crisis it is because she based her economic affairs on an industry which happens to belong to us, in exchange, Perú has earned a source of government income worth 6 million [soles] a year, and the nitrate operation constitutes the redemption of our financial woes.²⁰

This exchange of views, coloured by animosity, suggests that at least some Chileans failed to understand at the time how convenient the expropriation was for the Antofagasta Company, for the emerging Taltal and Aguas Blancas regions, as well as for the floundering Chilean Tarapacá companies and Chilean holders of production contracts. In turn, *La Opinión Nacional*, due the same misunderstanding, greatly overstated the importance of Tarapacá nitrate in the Chilean economy at large.

Pardo remained far more aloof from domestic politics than Piérola during 1877, and did not return to Perú until mid-1878, when he was elected Senator (and assassinated shortly thereafter in November, 1878).²¹ With both dissenting factions showing a basic agreement with the expropriation, the Prado Administration

¹⁸*La República* (Santiago), 28-Jun-1877.

¹⁹*El Comercio* (Lima), 11-Jul-1877.

²⁰*La Opinión Nacional* (Lima), 11-Jul-1877.

²¹See below p. 246.

started signing both sales and production contracts, as well as issuing additional nitrate bonds, as soon as it took office.

2. First Developments under Prado, 1876

Former President Prado had barely implemented the expropriation by signing sales contracts for 59 plants, out of total of 144. Only two major enterprises, Gibbs and Gildemeister, were tied by production contracts. The Barrenechea and Meiggs production contracts had no relevance in terms of actual output. Thus all other enterprises in Tarapacá were free to produce at will, threatening the stated goal of curtailing nitrate exports. The results of this situation are shown in Table 1.6. Tarapacá exports remained at over 7 million Spanish quintals (or over 300,000 tons) fully one year after the passage of the Expropriation Law, i.e., over 3 million quintals above the 4 million quintals stipulated for the operation.

Table 1.6

*Tarapacá Nitrate Exports
and Ships Used,
1870-1876
(Sp. Quintal and M Tons)*

Year	Tarapacá Exports (Sp.Q.)	(M.Tons)*	No. Ships
1870	2,943,413	133,792	227
1871	3,605,906	163,905	255
1872	4,220,764	191,853	308
1873	6,263,767	284,717	417
1874	5,583,260	253,785	332
1875	7,205,652	327,530	424
1876	7,035,693	319,804	387

*Computed by the author

Source: *El Veintiuno de Mayo*
(Iquique), 14-May-1884.

Of course, since the aim of the operation was to induce an increase of nitrate prices through exports restrictions in order to expand guano sales, Table 2.6 shows that this goal was defeated in 1876. Indeed, nitrate prices remained lower than guano prices, i.e., £11 10sh per long ton and £12 10sh respectively, while guano exports stood at the same modest level recorded in 1875.

Table 2.6

*Guano and Tarapacá Nitrate,
Exports and Prices, 1870-1876
(Long Tons, £ per Long Ton)*

Year	(1) Guano Exports (a)	(2) Nitrate Exports (a)(b)	(3) Price Guano (c)	(4) Price Nitr. (c)	Total Exports (d)	% Guano (d)	% Nitrate (d)
1870	698,176	125,252	14.00	16.05	823,428	84.79%	15.21%
1871	363,200	153,443	12.00	17.00	516,643	70.30%	29.70%
1872	404,097	179,607	12.00	15.05	583,704	69.23%	30.77%
1873	342,425	266,543	12.15	14.15	608,968	56.23%	43.77%
1874	336,476	237,586	13.00	13.00	574,062	58.61%	41.39%
1875	373,688	306,623	12.10	11.15	680,311	54.93%	45.07%
1876	379,000	299,391	12.10	11.10	678,391	55.87%	44.13%

(a) Long tons.

(b) Original in Sp. Quintals, converted by the author into long tons dividing by 23.5; Tarapacá, exclusive of Antofagasta.

(c) British pounds per long ton, FOB, UK.

(d) Computed by the author.

Source: (1)-(3) Greenhill, "Peruvian", p.111; Rodríguez, "Historia", p.110.

(2) El Veintiuno de Mayo (Iquique), 14-May-1884.

(4) The Economist (London), 13-Mar-1880;

Greenhill, "Peruvian", p.110.

The exports figures given in Table 2.6 do not include Antofagasta nitrate exports for 1876, which reached over 240,000 Spanish quintals (i.e., some 10,300 long tons)²², adding 3 percent to the combined total, a modest but threatening increase, since it came from an area which was out of the reach of the Peruvian Government.

It is worth noting that the data provided in Table 2.6 refers to average yearly prices, i.e., without showing the monthly trends which were surely informing current Peruvian nitrate policy. As Table 3.6 indicates, the monthly fluctuations during 1876 were somewhat more auspicious for the Peruvian Government: indeed, nitrate prices shot up around June from 11 shillings per English Quintal to some 11sh 9d in December. This short-term increase, albeit not nearly enough to make a significant difference in the world market, appeared to hold out some hope for the troubled operation, but on the condition that nitrate exports were drastically curtailed. Of course, the desired high nitrate prices were not an unmixed blessing for Peru, since they were certain to stimulate Antofagasta competition. Nothing shows better that the expropriation was essentially a self-defeating scheme.

²²See above p. 189, Table 9.5.

Table 3.6

Nitrate Prices, 1876
(sh.d. per E.Quintal,
Liverpool, Arrived)

Average Prices Year	Average Prices (Liv.Ar.)
Jan-76	11
Feb-76	11.3
Mar-76	10.9
Apr-76	11.4
May-76	11.2
Jun-76	11.0
Jul-76	11.3
Aug-76	11.9
Sep-76	12
Oct-76	12.1
Nov-76	12
Dec-76	11.9

Source: El Ferrocarril (Santiago),
 1876-7.

The overall situation of guano and nitrate induced the new Prado Administration to intensify the efforts to purchase the whole of the Tarapacá nitrate plants, and sign production contracts with all major producers. However, from August to December, 1876, President Prado only succeeded in signing sales contracts for 24 additional plants, while Pardo had purchased 59, thus leaving 61 plants free to compete with the State-owned enterprises (see Table 5.5). Production contracts in the last five months of 1876 numbered 22, as opposed to only 2 for Pardo, but they merely added some 541,000 quintals to government-controlled output, as opposed to the 1.7 million inherited from the prior Administration (see Table 3.5), because they involved lesser operations.²³

²³See the detailed listing in Table 3, Volume 2.

One of the last decrees of the Pardo Government had fixed a limit of 2 million Spanish quintals for State exports, authorizing the government to purchase nitrate from independent producers to fill this quota, since current production contracts did not suffice²⁴ In mid-August, the agent for the Associated Banks in Iquique purchased 227,000 quintals through open bidding²⁵, but this was barely enough to cover the some 5 million quintals exported by independent producers in 1876²⁶ Thus, the threat of growing exports from independent producers remained alive at the end of 1876

3. The Nitrate Bonds at the End of 1876

Perhaps one of the most remarkable developments of the last five months of 1876 was the emergence of the nitrate *certificados* as a publicly-traded security In the last five months of 1876, the Prado Administration delivered more bonds than the prior government Out of some 5.4 million *soles* in nitrate bonds delivered in 1876, 2.3 million were issued by Pardo and 3 million by Prado (see Table 6.5) However, not all the nitrate bonds were actually traded At least 1.25 million in *certificados*, or some 23 percent of the total, were handed over to Gibbs in November 20, 1876 for its properties,²⁷ and were never placed in the market²⁸ The same can be said of the 230,000 *soles* in bonds delivered for Paposo to the German firm of Folsch and Martin²⁹ This would narrow down to some 3.9 million *soles* the maximum total value of potentially saleable *certificados* in 1876.

²⁴*El Comercio* (Lima), 14-Jul-1876.

²⁵It is interesting that John Thomas North, subsequently a major figure in Tarapacá after 1879, was mentioned as one of the sellers of nitrate to the government. *El Comercio* (Lima), 27-Aug-1876

²⁶There is no data available for government and private exports in 1876 Since total exports for 1876 exceeded 7 million quintals, and the government was limited to 2 million, it is fair to assume that private exports made up the difference.

²⁷See Table 2, Volume 2, for a complete listing of bond deliveries

²⁸Gibbs repossessed all of its Tarapacá properties after 1879 in exchange for the original *certificados* See Volume 2, Table 1

²⁹Folsch and Martin operated the plant in 1876-1879, and also repossessed it after the War of the Pacific See Volume 2, Table 1.

Table 4.6 shows that the securities were exceptionally well received by local investors. The first available quotation, on August 12, 1876, stood at 96 percent of face value, declining to 89 percent in October, and ending the year at 106 percent.³⁰ The rise of the nitrate *certificados* was tightly connected to the decline of other alternative means of savings and investment, particularly the country's own currency. The paper *sol's* value in terms of pence fell steadily in the last five months of 1876 from an average of 29 d in August to 26 d in December. The bonds of the internal debt also lost some two percentage points in the same period and were traded fully some 26 to 40 percent below the nitrate bonds.

Table 4.6

*Average Quotations of Nitrate
Bonds, Exchange, and Bonds of
the Internal Debt,
Lima, August-December, 1876*

Average Price Month- Year	Average Certif. (1,000)	Average pence p. sol	Average Price Int. Deb.
Aug-76	96.00%	29.00	69.00%
Sep-76	95.00%	28.89	69.00%
Oct-76	89.20%	26.20	67.63%
Nov-76	99.13%	25.63	62.29%
Dec-76	105.80%	26.60	65.29%
1876	97.03%	27.26	67.57%

Source: Derived from Table 5,
Volume 2.

The persistent fall of the paper *sol* was particularly damaging since it was ascribed to the precarious backing of the outstanding bills in circulation, and to an unhealthy alliance of the Lima Banks with the government which made no effort to force the banking system to convert its paper bills into metallic currency, as originally pledged. Typically, a project was tabled in September, 1876, calling for the establishment of a new

³⁰The detailed, day-by-day listing is included in Table 5, Volume 2.

Banco Nacional de la República del Perú, which would be owned partly by private stockholders and partly by the government. The new institution would use as assets the "profits (*productos libres*) of nitrate [sales]" accruing to the Peruvian State, would settle the outstanding government debt with the Associated Banks, and would issue bills for up to two-thirds of its capital; the Bank would also take charge of the expropriation until a "special law" on the matter was approved. The main justification for the new Bank was that the current banking system "has no metallic currency to convert its bills", and that the paper *sol* was depreciating in some 40 percent "favouring the speculators".³¹ Of course, the proposal would have upset all current arrangements concerning the nitrate business, and it fell through; but it did serve to illustrate the growing impatience in Peru in the face of a discredited and falling *sol*. This mood would only increase in 1877.

4. *The Financial Crisis in 1877*

The Prado Administration indicated that it was fully committed to continue the expropriation of the Tarapacá nitrate industry by means of a statement made by the current Minister of Finance in the Chamber of Deputies in January, 1877. The Finance Minister endorsed the Pardo doctrine on guano and nitrate, defining the goal of the "great pending operation" as the attainment of a monopoly "in order to preclude nitrate from competing against guano", it was necessary, he said, to achieve a "complete monopoly" of nitrate in order to raise its price to 18 shillings [per English quintal], "and in that case we could easily obtain £16 per ton for our guano". The Minister explained that the government "has been unable to force developments" due to outstanding production contracts: it was necessary to allow them to expire. He acknowledged that the price of nitrate had dropped to 11 shillings, but added that through a monopoly they could be pushed "in no time" to 14 shillings. The Finance Minister closed his statement with an extensive citation from Antonio Ramondi, the Italian scientific advisor to the Peruvian Government, one of the main sources of former President Pardo's thinking on the matter:

³¹The project was tabled in the Chamber of Deputies on 23-Sep-1876. Perú, *DO* 1876, 27-Sep-1876.

Perú [the Minister quoted] is the main and perhaps the only producer of nitrogen „thus once it becomes the owner of all of this product in the form of both guano and nitrate, it will be able to price it at will, and our guano will not be sold in Europe, as it has been so far,...depreciated as what it has been termed bad-grade guano, rather, Perú will sell directly to farmers at a price which could not possibly be lower than £12 10 shillings.³²

The only trace of discrepancy with respect to former President Pardo's policy was the reference to current production contracts, portrayed as temporarily tying the hands of the government, and suggesting that some undefined new criteria would be followed in this respect upon its termination. However, the Pardo Administration had left a more serious gap in nitrate policy: the projected loan slated to pay for nitrate plants was seriously imperiled.

The Peruvian default triggered additional public disputes in Great Britain and France in 1877, as British and French bondholders made attempts to compel Dreyfus and other guano contractors to transfer the proceeds of guano sales to them. Both the British and French Courts ruled against the bondholders.³³ These judicial decisions allowed Dreyfus to continue competing with government-controlled guano, and they effectively closed European financial markets to any further borrowing by the Prado Administration.

Aware of the prevailing international skepticism towards a new Peruvian loan, the Prado Administration made an effort to link the support for a new loan with the combined management of guano and nitrate. On July 12, 1877 Francisco Rosas, Commissioner of the Associated Banks, left for Europe to seek out both a new guano contractor and a firm to service the quarterly interest on the nitrate bonds, upon the upcoming expiration date of the Gibbs contract.³⁴ On the same day, the Prado Administration sent Carlos Pividal to Europe to seek out a lender.³⁵ Pividal contacted main financial houses in Europe, including Rothschild, and Baring Brothers, without success; he also approached the group of financiers behind the Peruvian Guano Company, holders of the Raphael Contract, to propose a vast merger between the guano and nitrate operations, with the participation

³²Perú, *DO* 1876, 12-Jan-1877.

³³*The Economist*, 10-Mar-1877, p.270; 21-Apr-1877, p.446; and 30-Jun-1877, p.765.

³⁴*El Comercio*, (Lima), 12-Jul-1877.

³⁵Dancuart, *Anales* 11:75.

of both the *Société Générale* and Dreyfus, thus stopping the competition between opposing stocks of the fertilizer.³⁶ It was during these negotiations that *La Patria*, organ of Piérola and financed by Dreyfus, chose to abandon its prior criticism of the Prado-conceived expropriation. The newspaper urged the Prado Administration to put both guano and nitrate "in one deft and powerful hand" and to "expropriate *all* plants remaining in private hands".³⁷ In spite of *La Patria's* change of heart with respect to the expropriation, the merger project fell through. Furthermore, on August 14, 1877, Gibbs, approached by the Prado Administration, rejected the idea of taking over the combined management of guano and nitrate, on the grounds that the nitrate monopoly was not yet fully established, that even if the current independent producers were bought out, the competition from Antofagasta would remain unabated, and that European investors were not prepared to accept a new Peruvian loan.³⁸

5. Financial Crisis and Nitrate Bonds

Shunned by every major financial firm in Europe, shattered by falling guano prices, the Prado Administration faced a growing financial crisis whose most visible sign was the fall of the *sol*, sliding as low as 20.75 pence in September, 1877; the outstanding bonds of the internal debt (also payable in *soles*) followed closely, trading at 66 percent of their nominal value in October and November of 1877 (Table 5.6)

³⁶Dancuart, *Anales* 11:76-77.

³⁷*La Patria* (Lima), 22-Aug-1877. Emphasis on the original.

³⁸Dancuart, *Anales*, 11:76-77.

Table 5.6

*Average Quotations of Nitrate Bonds,
Exchange and Bonds of the Internal Debt,
Lima, 1877*

Average Month- Year	Average Price Certif. (1,000)	Average Price Certif. (10,000)	Average pence p. sol	Average soles p. £	Average Price Int. Deb.
Jan-77	103.20%	n.a	28.00	n.a	69.00%
Feb-77	100.00%	n.a	27.33	n.a	69.00%
Mar-77	99.80%	n.a	26.00	n.a	67.63%
Apr-77	98.50%	n.a	25.12	n.a	62.29%
May-77	93.57%	n.a	24.29	n.a	65.29%
Jun-77	95.00%	n.a	21.14	n.a	67.57%
Jul-77	96.71%	n.a	22.36	n.a	67.43%
Aug-77	97.20%	n.a	22.29	n.a	67.29%
Sep-77	99.89%	n.a	22.36	n.a	67.14%
Oct-77	96.67%	96.17%	22.43	n.a	66.57%
Nov-77	98.75%	98.00%	22.50	n.a	66.14%
Dic-77	99.09%	98.50%	21.82	11.00	65.57%
1877	98.20%	97.56%	21.91	11.00	65.00%

Source: Derived from Table 5, Volume 2.

The Peruvian fiscal budget for 1877-1878 showed the impact of the crisis in that revenue decreased by some 23 million *soles* (£4.3 million at the old rate of 5 *soles* to the pound, but currently about half that amount), and expenses also shrank by over 30 million *soles* with respect to 1875-1876; the resulting small surplus of 748,578 *soles* could not possibly compensate for the formidable accumulated deficit of the four past years, and spelled instant political distress for the Prado Government (see Table 6.6).

Table 6.6

*Peruvian Budget,
Revenue and Expenses, 1869-1880
(Soles)*

Year	Revenue*	Expenses*	Surplus/ Deficit***
1869-1870	44,723,100	61,948,896	(17,225,796)
1871-1872	55,582,851	55,582,851	0
1873-1874	66,188,542	80,143,415	(13,954,873)
1875-1876**	66,567,032	74,377,380	(7,810,348)
1877-1878	43,978,168	43,229,590	748,578
1879-1880	35,190,170	36,051,394	(861,224)

*Silver soles, after 1869-70; before, pesos.

**Default on foreign debt, 1-Jan-1876.

***Computed by the author.

Source: McQueen, *Peruvian Finance*, p. 36.

The fact that the Peruvian population was forced to conduct all of its daily transactions with declining paper *soles* issued by Lima Banks, and exempted by the government since 1875 from its original pledge to convert them into metallic currency, triggered a generalized hostile reaction against the banking system at large. The Lima Banks were accused of artificially prolonging the financial crisis out of fear of the metallic conversion "since in the current state of discredit in which they find themselves, they can count on the fact that nobody would keep a single one of their bills if there was an opportunity to exchange them" Exchanging currency became both an obsession and a business taking on undesirable proportions. "Between Lima and Callao, there are more than 20 establishments in which almost nothing is traded except gold and silver coins for paper bills".³⁹ In September, 1877, the payment of wages of State employees and of pensions had been delayed for some five months, and a group of local moneylenders advanced funds to public officials and pensioners, with

³⁹*El Comercio* (Lima), 31-Jul-1877.

a substantial discount, in exchange for a "*recibo*", or receipt, granting the right to collect the wages when paid; it was estimated that the "*recibo* system" covered "half of the salaries of the public servants".⁴⁰

Workers were vitally affected by the falling *sol*. In Iquique the union of boat operators (*lancheros*) agreed to receive payment in bank bills only if "market depreciation is computed; they [the boat operators] state that the food merchants take into account this depreciation in their sales".⁴¹ Violent clashes and strikes paralyzed railroad construction for some three days in July, 1877 because the workers rejected payment in paper *soles*; fired workers prevented others from continuing operations.⁴² Clarke, the representative of some of the European bondholders visiting Perú in mid-1877, reported that "even workmen employed by private individuals experienced considerable difficulty in obtaining payment of the amounts earned by them".

At one time so great was the disorganization of trade affairs that for several days the city of Lima was deprived of its ordinary supply of fresh meat. In this emergency the requisite quantities of animal food were obtained from the estates of Mr. Henry Meiggs and his relative, Mr. Charles Watson.⁴³

In June, 1877, Henry Meiggs, the railroad contractor, facing a wave of strikes from unpaid workers, formally petitioned the Peruvian Government to allow him to issue 15 million *soles* in bonds (in addition to the outstanding 1 million *soles* in "Meiggs' bonds"), in order to continue the construction of unfinished lines; he stated that "timid and mistrustful bankers" refused to deal any further with Treasury Bonds, and a fresh injection of funds was required.⁴⁴ On August 1st, 1877, the Prado Administration formally assumed 5 million *soles* in notes issued by Meiggs (i.e., 10 million less than requested), as well as all of the outstanding bank bills, turning them into *billetes fiscales*, or fiscal bills.⁴⁵ As Table 5.6 shows, the legal metamorphosis of bank bills into fiscal

⁴⁰*El Comercio* (Lima), 14-Sep-1877.

⁴¹*El Comercio* (Lima), 2-Jul-1877.

⁴²*El Comercio* (Lima), 19-Jul-1877.

⁴³Clarke, *Perú*, pp.56-57

⁴⁴Full text of the petition in: Clarke, *Peru*, pp.57-60. Clarke stated that it was he who suggested to Meiggs the idea of issuing 15 million *soles* in additional bonds.

⁴⁵McQueen, *Peruvian Finance*, p.96.

notes did nothing to stop the decline of the *sol*: the exchange fell in September, 1877 to 20.75 pence, the lowest price in two years

In the midst of the Peruvian financial chaos, the consistently superior price of the nitrate *certificados* appeared as the sole positive indicator. Table 5.6 shows that, while the bonds of the domestic debt were valued at about half of face value, and the paper *sol* declined in a similar proportion, the nitrate *certificados* were priced from 96 to over 103 percent of their nominal value. It should be noted that the nitrate bonds were exchanged by paper *soles*, and that the listed quotations represented in fact a lower real price since they were denominated in "hard" *soles* at a fixed exchange of 44 d to the *sol*. Thus an investor paying 100 percent of the nominal value of a *certificado* in paper *soles* priced at some 20 d at the time, was in fact acquiring a security for less than 50 percent of its par value. However, this does not detract from the fact that the nitrate bonds enjoyed a clearly superior position to that of the paper *sol* itself, as well as to all other quoted securities in the Lima market in 1877 and 1878.⁴⁶ The lower denominated, 1,000 *soles certificados* commanded a slightly higher price than the more expensive, 10,000 *soles* nitrate bonds, doubtlessly because the former could be traded easier than the latter, indicating that a premium was granted to liquidity. The 10,000-*soles* bonds were quoted only since October, 1877, because they were delivered later than the cheaper *certificados*.

The high quotations for the *certificados* registered in January and February, 1877, were ascribed to a proposal from an unnamed London firm to take charge of the service of the bonds at 85 percent with 5 percent annual interest, using the profits from nitrate sales as the sinking fund; since the Peruvian Government was counting with those profits to defray State expenses, the project was shelved, but not without triggering a short-term increase in nitrate bond prices.⁴⁷ In April, 1877, noting the "strength" of the *certificados*, it was pointed out that the interest for the bonds should wane in reaching a saturation point.

However, the moment will come when not all capital resources will be placed in such securities, and since the bonds of the internal debt inspire mistrust to

⁴⁶The data on the real price of the *certificados* was provided by Francisco García Calderón in: CSP, *Exposición*, p.15.

⁴⁷*El Comercio* (Lima), 22-Feb-1877 and 24-Feb-1877.

some, and justified reservations to others, the [capitalists] will be compelled to search outlets in industrial values.⁴⁸

Since the popularity of the *certificados* continued after the quarterly interest payment due on April 1, *El Comercio* offered a different interpretation. The newspaper remarked that the "paucity of business" was pushing new buyers to purchase the securities "day after day", adding that the nitrate bonds were "mainly in the hands of investors who purchased them as a rent", and with a falling exchange, even buying them as high as par translated into earning a solid 13 to 14 percent interest per annum.⁴⁹ Of course, this referred to the fact that the *certificados* were traded in current, depreciating paper *soles*, while, according to the pertinent law, interest on the bonds was paid on the basis of an artificial 42 d "nitrate *sol*", thus those who bought the *certificados* in the open market paid for them with *soles* which ended up being 30 to 50 percent cheaper than the 42 d-*sol* in 1877 (see Table 5.6), while collecting interest on the higher value.

The brief decline in *certificados*' prices in late April to June 1877 (see Table 5.6)⁵⁰ was first considered "inexplicable", and subsequently attributed to the growing competition made to the government-controlled nitrate exports by the "intransigent" free Tarapacá producers, who "were growing each day as the most powerful rival of the State".⁵¹ *El Comercio* also mentioned the grim prospects of the foreign loan stipulated to make the final payment for the nitrate bonds as a cause for the temporary plunge in the quotations of the *certificados*, and urged the bondholders to form a "syndicate" to protect their interests; it also suggested that a new Bank could be established using the priced nitrate bonds as capital assets, because the securities "constitute a value just as positive and solid as those which support current [paper-money] issues".⁵²

⁴⁸*El Comercio* (Lima), 4-Apr-1877.

⁴⁹*El Comercio* (Lima), 6-Apr-1877 and 7-Apr-1877.

⁵⁰The day-by-day listing included in Table 5, Volume 2, shows short-term fluctuation with more detail.

⁵¹*El Comercio* (Lima), 20-Apr-1877, 21-Apr-1877, and 24-Apr-1877. Sales as low as 89 percent were reported, although this transactions were not listed in the official quotations.

⁵²*El Comercio* (Lima), 24-Apr-1877.

The financial difficulties of two of the Associated Banks had an adverse effect on the quotations of the *certificados*. The manager of the *Banco Nacional*, Rufino P Echenique, resigned under a cloud in April, 1877.⁵³ Following rumours that Echenique owed 135,000 *soles* to the bank, depositors flocked to the *Banco Nacional* in an unsuccessful attempt to exchange their bills, while some merchants refused to accept them. The Peruvian Government moved to prevent a run on the institution by appointing an *ad hoc* commission which ultimately cleared the *Banco Nacional*, albeit applying a 10 percent discount to the value of 723,000 *soles* in *certificados* held by the Bank as capital.⁵⁴ A stormy meeting of the stockholders and the Board of Directors of the *Banco Nacional* brought to light the embarrassing disclosure that the Bank had falsified financial statements to conceal the issue of 300,000 *soles* in bills above the legal limit.⁵⁵ The episode triggered a downward movement in the quotations of the nitrate bonds.⁵⁶

The situation of the *Banco de Lima* was so critical that the Peruvian Government took over all assets and liabilities of the institution in August, 1877.⁵⁷ A stockholders' meeting in November, 1877 voted for the liquidation of the *Banco de Lima* "due to the absence of real capital", further stating that "it would be a commercial travesty to continue supporting an establishment unable to serve the public and generating only losses for its stockholders".⁵⁸ The crisis of the *Banco de Lima* heralded the breakdown of the Associated Banks, as well as the imminent sale or auction of the 923,000 *soles* in "Esperanza" bonds delivered to the Bank. The fact that the *Banco Nacional* and the *Banco de Lima* were the two largest Peruvian holders of nitrate bonds strongly suggests that the purchase of Tarapacá plants by the government had given them a short lease on life. Throughout May, 1877, the *certificados* stood at some 93 percent, the lowest level recorded since they were first

⁵³*El Nacional* (Lima), 27-Apr-1877.

⁵⁴*El Comercio* (Lima), 28-Apr-1877, and 1-May-1877.

⁵⁵*El Comercio* (Lima), 5-May-1877, and 8-May-1877. Predictably, *La Patria* sided with the Board of Directors (6-May-1877).

⁵⁶*El Comercio* (Lima), 4-May-1877, and 7-May-1877.

⁵⁷*El Comercio* (Lima), 17-Jan-1878.

⁵⁸*El Comercio* (Lima), 6-Nov-1877.

quoted, in August 1876; the drop was blamed on substantial new deliveries of the securities, the uncertainty regarding the payment of the interest charges, as well as on the problems encountered in raising the foreign loan slated to pay off the principal.⁵⁹

A squabble between the Associated Banks, the managers of the expropriation, surfacing in late April, 1877, had a negative impact on the *certificados*. The controversy opposed the Providencia Bank on the one hand, and the three other Associated Banks, the *Banco de Lima*, *Nacional*, and *del Perú*, on the other. The Providencia Bank argued that the government should not pay its debt to the Banks in bonds of the internal debt, shunned by the market, but in silver *soles*, in order to allow the withdrawal of the discredited Bank bills, and the corresponding strengthening of the falling exchange. According to the Providencia plan, the £30,000 a month in hard currency required for this operation should be obtained by stipulating that the Tarapacá nitrate duty should be paid in silver *soles* or good drafts on London; thus, the free producers should be forced to pay more in taxes, and the government should consent to perceive less of the nitrate income in order to safeguard the currency. The other three Associated Banks, as well as the Prado Administration, balked at the Providencia scheme. *El Comercio* probably reflected the prevailing view on the issue in stating that the rejection of the bonds of the internal debt was certainly sound since those securities amounted to "a financial mirage", but that the nitrate law "categorically" ruled out the payment of the nitrate duty in silver *soles* or London drafts; State nitrate income should be increased and stabilized by achieving a complete "monopoly" of the product, i.e., buying out all of the independent Tarapacá producers.⁶⁰ The Providencia plan was ultimately shelved, but the short-lived disagreement triggered a brief wave of panic selling, with a negative impact on the quotation of the nitrate bonds, with isolated transactions recorded as low as 87 percent at the end of May, 1877.⁶¹

⁵⁹*El Comercio* (Lima), 12-May-1877, 14-May-1877, 15-May-1877, 19-May-1877, 22-May-1877, and 24-May-1877.

⁶⁰*El Comercio* (Lima), 3-May-1877.

⁶¹*El Comercio* (Lima), 28-May-1877. As stated before, these transactions were not reflected on the official listing of security prices published by the newspaper, but were mentioned on the weekly commercial review.

At the end of June, as the quarterly interest payment drew near, the *certificados* climbed up again to par, fuelled by a frantic spell of anxious buying. Noting this market reaction, *El Comercio* commented that a definitive solution to the operation, i.e., the settlement of the foreign loan, would provide "a first-class value" to local investors.⁶² In July, 1877, remarking that the exchange had fallen, and noting that it had gone up previously due to speculative purchases effected by hoarders ("resellers of drafts who cornered the market"), *El Comercio* attributed in part the decline of the *sol* to the interest payments on the *certificados*, an influence described as "transitory" because it happened every six months.⁶³

In August, 1877, the Lima Board of Trade provided an extremely clear description of the considerable importance ascribed to the nitrate bonds by all sectors of the Peruvian economy.

Of course, [it stated, referring to the nitrate *certificados*] there is no more comfortable investment for money, due to the ease with which these titles are traded, in cash or by instalments, in Banks and private enterprises, in the morning and the afternoon, in all places and circumstances. It is not necessary to recall the inherent privileges linked to the possession of these securities, which expedite all aspects of the lending activities, and whose smaller denominations have become a veritable currency, acceptable to all, payable without delay, in the manner and at the time required by those who rely on savings. There cannot be a safer investment either... it is a fact that the big, medium, and small investors have purchased these titles, which circulate more every day, favouring the progressive raise in their prices.⁶⁴

In September, 1877, the same Lima newspaper, noting that the nitrate bonds were traded at par value, stated that the *certificados* "had always been the favourite securities of investors", adding that "it is superfluous to say that if this negotiation [the contracting of the £7 million loan to pay for the bonds] were successful, no other security in the market could compete with the *certificados*".⁶⁵ Some two months later, in November, 1877, the Lima Board of Trade continued extolling the virtues of the nitrate bonds. "The nitrate *certificados* have always

⁶²*El Comercio* (Lima), 27-Jun-1877.

⁶³*El Comercio* (Lima), 9-Jul-1877.

⁶⁴*Junta Comercial* (Board of Trade) in: *El Comercio* (Lima), 27-Aug-1877.

⁶⁵*El Comercio* (Lima), 7-Sep-1877.

provided an attractive placement for savings, and in all earnestness, they deserve it, because there are no funds with a better guarantee in our market, both in terms of principal and interest" ⁶⁶

The *certificados* rose to prominence in Lima because all other tradable securities, particularly the Peruvian currency itself, sank dramatically to the point of collapse: the price of the nitrate bonds swelled by default. The *certificados* came to be universally regarded both as a monetary haven for weary investors, and a substitute currency for daily transactions. A critical implication of the enhanced role of the nitrate bonds was that, as the Lima Board of Trade explained, in the absence of an alternative medium of store and exchange, Peruvian investors were virtually compelled to trade them. Furthermore, the outstanding *certificados* came to be bought and sold in Lima without the slightest regard to the value of the plants for which they had been issued: the nitrate bonds were simply viewed as the only security able to steadily yield quarterly interests at a predictable and superior exchange rate. However, since the nitrate bonds represented in fact real values in terms of Tarapacá plants, the active circulation of the *certificados* greatly contributed to the early fragmentation of nitrate property. The cheaper, 1,000-*soles* *certificados* appeared to have been more broadly disseminated than the larger, 10,000-*soles* bonds because a smaller denomination could be used for a wider range of routine transactions. This phenomena favoured the splitting of the bond issues of the less expensive *paradas* relatively more than those of the larger properties. This was true even of those *paradas* paid in cash. The Pardo Administration had secured a 1 million *soles* loan from the Associated Banks on December, 14, 1875 to pay for the *paradas*, stipulating that the Banks would receive *certificados* in exchange for this advance.⁶⁷ Thus, cash payments for lesser enterprises also ended up increasing the number of nitrate bonds in the market. In addition, the larger European firms operating in Tarapacá could afford *not* to sell their *certificados*, and in fact purchase those of other bondholders, thus reinforcing foreign control in the region.

Also, the expropriation law had given the sellers of nitrate plants the right to choose between bonds payable to the bearer (*al portador*) with or without specific reference to the respective plant (which in the

⁶⁶Junta Comercial in: *El Comercio* (Lima), 20-Nov-1877.

⁶⁷CSP, *Exposición*, p.6.

former case would be considered as mortgaged to guarantee payment), and 'nominal' bonds (i.e., including the name of seller, and not transferable). If most sellers had chosen non-transferable bonds, the transactions with *certificados* would have been far more limited. However, as an 1878 official account of the operation stated, this was not the case:

Since the *certificados* found buyers in the market from the very start, the majority of the owners of nitrate plants requested bonds payable to the bearer in order to sell them, and meet their needs, and thus the larger part of these securities fall in this class [i.e., transferable], and are nothing more than notes payable to the bearer.⁶⁸

Of course, the substantial number of owners of flawed or doomed nitrate plants would have chosen the transferable bonds in any case, and only the owners of truly valuable and well financed enterprises (typically, Gildemeister)⁶⁹ would forgo the immediate benefit derived from saleable bonds for the long-term advantage of securing their plants.

The controversial Barrechea Company collapsed in 1877, although the Peruvian Government continued supporting the operation. As stated before,⁷⁰ in 1876 the company had been granted an unusual loan in "repair" bonds by the preceding Prado Administration, as well as a production contract held by Thomas Hart & Co., granted on the condition that production should start in 1877. In January, 1877, a special commission named by the Peruvian Government, and presided over by Francisco Paz Soldán, the author of the questionable 1875 assessment of the industry, inspected the condition of the Barrechea, expressing doubts about its status.⁷¹ On March 10, the Prado Administration ordered the auction of the assets of the Barrechea Company, declaring that the conditions of the 1876 contract had not been met because only one vat had been installed, and the company's nitrate offered for sale was merely the result of unsuccessful experimental trials with a new

⁶⁸CSP, *Exposición*, p.4. The *Compañía Salitrera del Perú*, or Peruvian Nitrate Company was left in charge of the expropriation in July, 1878. See below pp. 252-253.

⁶⁹See above pp. 164-165.

⁷⁰See above p. 166.

⁷¹*El Comercio* (Lima), 29-Jan-1877.

processing technique.⁷² Furthermore, it was reported in May, 1877, that the company had lost all its equipment as a result of an earthquake.⁷³ However, the Prado Administration, providing no explanation, reconsidered the decision on September 6, 1877, and signed yet another production contract with Thomas Hart & Co.; the new contract granted a grace period up to December 31, 1877 to deliver nitrate, coupled with an additional issue of 55,000 *soles* in bonds "for repairs", stipulating that if this new date was not met, the contract would be rescinded.⁷⁴ At the time, there were buyers for shares of the Barrechea Company at 15 percent of face value.⁷⁵ Shortly thereafter, on November 19, 1877, a newspaper ad announced the formal liquidation of the company, requesting the stockholders to submit their titles for payment.⁷⁶ At the end of the year, on December 20, 1877, the *Consulado de Lima* or Lima Merchant Guild, "rehabilitated" the Barrechea Company "so as to [allow it] to continue its line of business", after "examining original documents exhibited by its creditors".⁷⁷ Of course, this sequence of contradictory decisions reflected the considerable political clout of the organizers of the Barrechea Company, exercised to keep the venture alive on paper only, and continue receiving "repair" bonds after it was quite clear that it had failed as viable producing enterprise. However, as the Peruvian Government was investing money in unlikely refining procedures, private producers in Tarapacá were establishing a real innovation, which made them far more dangerous as competitors of the State-controlled sector.

⁷²*El Comercio* (Lima), 14-Mar-1877.

⁷³*La Opinión Nacional* (Lima), 18-May-1877. The earthquake reportedly destroyed "Peña Grande", "Nueva Carolina", and "Matillana", along with "Barrechea". Total damages were placed at 392,000 *soles* in plants and equipment, 360,000 *soles* in nitrate; and 580,000 *soles* in merchandise, amounting to a total of 1.65 million *soles* (*El Comercio* (Lima), 27-May-1877)

⁷⁴*Bancos Asociados, Anexos*, p 19. The actual delivery of the new "repair" bonds to Hart took place on September 28, 1877(Chile, *Diario Oficial*, 3-Jul-1880, p.1070). Complete listing of the recipient of the Barrechea bonds in Volume 2, Table 2

⁷⁵*El Comercio* (Lima), 29-Sep-1877

⁷⁶The add was first published in *El Comercio* (Lima) on November 19, 1877, and subsequently repeated for several days. It was signed by José Antonio Barrechea, J.F. Puente, and E. Fort.

⁷⁷*El Comercio* (Lima), 22-Dec-1877.

6. The Shanks System

By far the most important development of 1876-1877 in Tarapacá was the introduction of a novel system known as the Shanks process at both "San Antonio de Campbell" and "Agua Santa". The new refining process was designed by the British mining engineer James [Santiago] T. Humberstone, who arrived in Tarapacá, hired by Campbell, on January 6, 1875,⁷⁸ i.e., just prior to the expropriation law. At the time, the old steam *máquinas* were experiencing difficulties handling lower-grade ores. The higher-grade deposits became increasingly scarce as levels of output grew with the 1870s boom. With progressively inferior ores, nitrate became more saturated with insoluble material, or *borra*, requiring additional washings, resulting in higher costs.⁷⁹ Several systems were tried out at the time, including one at "Limeña", a Gibbs operations, and one at the Gildemeister plant, "San Juan".⁸⁰

Humberstone's solution was to adapt the Shanks system used in England to leach sodium nitrate from black ash, a critical stage in the production of alkali, on which products such as soap, glass and textiles depended.⁸¹ The Shanks process consisted in moving the pertinent solution through a series of vats, as opposed to treating it on a single tank. This system replaced both the laborious system of shovelling black ash from tank to tank, and more cumbersome methods of filtration. Essentially, Shanks solved the problem of moving a given solution through a series of containers placed at the same level, creating a flow circulating diagonally, rather

⁷⁸Kaempfer, *Industria*, p. 179.

⁷⁹Belisario Díaz Ossa, "Observaciones" *Caliche* 1 (May, 1919) no. 2, p. 69 (Quoted hereafter as Díaz Ossa, "Observaciones").

⁸⁰Humberstone, "Historia", pp. 210-211. This was Humberstone's own account of the birth of the Shanks system in Tarapacá.

⁸¹A brief (and perhaps the only) biography of James Shanks (1800-1867) was included in J. Fenwick Allen, *Some Founders of the Chemical Industry. Men to be Remembered* (London: Sherratt and Hughes, 1906) pp. 201-230 (Quoted hereafter as Allen, *Founders*). Allen claimed that the Shanks vat had never been patented, but Donald found that a patent had indeed been issued in 1863 ("Nitrate", p. 195).

than vertically, downwards, and continuing its course automatically, partly by the specific gravity of the solution, partly by applying additional pressure.⁸²

The variation of the Shanks process adopted in Tarapacá included a series of 6 to 8 rectangular vats, or *cachuchos*, measuring 28 to 32 feet in length, and 6 to 9 feet in width and height.⁸³ In contrast, the old steam *máquina* worked with merely 2 tanks with a slightly reduced capacity.⁸⁴ Closed serpentine-shaped coils replaced the old perforated pipes to heat the improved vat, in order to avoid the dilution of liquors by condensed water.⁸⁵ Special valves regulated pressure, while the mixture of *caliche* ore and water was treated at different temperatures, and with richer liquors at each vat.⁸⁶

The exact date of the introduction of the Shanks process in Tarapacá is unclear, although it is certain that it was first adopted at "San Antonio de Campbell" perhaps in 1876,⁸⁷ and that the revamped "Agua Santa" became operational around mid-1878.⁸⁸ The new system transformed the entire industry since its inception around 1876-1877, particularly after it was fully installed in "Agua Santa" in 1878.⁸⁹ In increasing the capital requirements to produce profitably nitrate, the Shanks process dealt a definitive blow to the declining *paradas*, as well as the older steam *máquinas*. In the short term, the resulting reduction in average costs of production,

⁸²Allen, *Founders*, pp. 213, 221-222; Trevor I Williams, "Heavy Chemicals" in: Singer, *Technology*, 5: 235-356 (Quoted hereafter as Williams, "Chemicals"); Donald, "Nitrate", p. 195.

⁸³Measurements given for around 1890 in Semper, *Industria*, p. 62.

⁸⁴Measurements given by Humberstone for the old vats of "San Antonio de Campbell" ("Historia", p. 211).

⁸⁵Hobsbawm, "Nitrate", 52-63. Hobsbawm was Gibbs' leading chemist in Tarapacá around 1917.

⁸⁶Prieto, "Explotación", pp. 370-373.

⁸⁷Kaempffer dated the first trials of the Shanks system in "San Antonio de Campbell" in 1876 (*Industria*, p. 179).

⁸⁸The Assessment Commission commented (erroneously) on the new "San Antonio" system at the end of 1875, and Bermudez dated the inauguration of "Agua Santa" after March, 1878 (*Salitre*, p.343).

⁸⁹Humberstone wrote that "some *oficinas*" had "immediately" (i.e., perhaps 1876 or 1877) made the "required changes". "but it was not until the small *máquina* of "Agua Santa" had been fully operational that the producers were convinced of the advantages of the system" ("Historia", p. 212).

perhaps by as much as 50 percent.⁹⁰ made it far more difficult for the Peruvian Government to curb private nitrate exports by increasing the export duty. It also placed Campbell on a stronger position to negotiate the sale of his renovated plants with the Peruvian Government.

The unsuspecting Lima legislators could not take into account the technological impact of the Shanks system in their rambling estimates of costs and income made during the discussion of the expropriation law since Humberstone had just started working at "San Antonio" at the time. The Assessment Commission, visiting Tarapacá at the end of 1875, seriously underestimated the potential of the incipient Shanks system. The report of the Commission praised the process tried out at the time in "San Antonio" as "very rational", but preferred the methods currently adopted at "Limeña" by Gibbs, and at "San Juan" by Gildemeister.⁹¹ However, in 1877 the Peruvian Government was forced to come to terms with the fact that it would have to pay more for the Campbell plants, or face a formidable competition.

Campbell requested a patent, or "exclusive privilege", to the government for the new system established in "Agua Santa", but it was denied due to local opposition. Other Tarapacá producers claimed that Campbell's machinery was not "a new invention", but "a known system to save coal", noting that "several enterprises" were trying out vats "identical" to those used in "Agua Santa".⁹² An Italian engineer, Eduardo Cavallero installed similar vats on the "San Pablo" plant, owned by Pedro Elguera.⁹³ The net effect of an unpatented, and thus license-free, invention, was to strengthen the position of the more efficient independent producers in their quest for higher prices for their plants, coupled with more substantial production contracts.

Rumours that the Prado Administration was considering an upward revision of the 1875 price offered for the Campbell properties prompted *El Comercio* to raise questions about the affair. Stating that the

⁹⁰Bermúdez estimate for 1882 (*Salitre*, p. 276).

⁹¹Perú, "Informe especial", p. XXVI.

⁹²*El Comercio* (Lima), 22-Aug-1878.

⁹³Kaempffer considered the Cavallero vat superior to that of Humberstone, claiming that the former rather than the latter was the one adopted by the rest of the industry, but no other authority supported this contention. No date was supplied for the introduction of Cavallero's vat. Kaempffer, *Industria*, pp. 179-180.

government was currently offering 950,000 *soles* for the Campbell plants, officially valued at 750,000 *soles* in 1875, the newspaper remarked pointedly: "We assume that very powerful financial considerations have moved the government to offer such large sums for establishments appraised at a much lower price."⁹⁴ *El Peruano*, the government's newspaper, replied that the prior Administration had made every effort to purchase the Campbell enterprises, offering up to 1 million *soles*, that the reassessment was called for since a new plant, "Agua Santa", had not been considered in the original appraisal, and that the negotiations with Campbell had not been concluded "quite simply, because the government refuses to accept the price requested".⁹⁵ In fact, the Prado Administration had "reassessed" "San Antonio de Campbell" in July, 1876, offering an additional 50,000 *soles*.⁹⁶

The outcome of the negotiations with Campbell is instructive: on December 17, 1877, the Peruvian Government ended up paying the 950,000 *soles* denounced by *El Comercio* for "San Antonio (Campbell)" and "Agua Santa", simultaneously signing a production contract for 600,000 Spanish quintals, the largest export quota approved during the Prado Administration.⁹⁷ The fact that Campbell consented to a rather moderate price under its production contract, i.e., merely 1.53 *soles* per Spanish quintal, as opposed to 1.70 for Gibbs and Gildemeister,⁹⁸ suggests that both parties viewed the expanded bond issue accepted by the Peruvian Government as a compensation for the lower price per quintal stipulated. Over 90 percent of the Campbell issue, or 908,000 *soles*, was delivered on December 19, 1877, only two days after the signing of the sales and production contracts.⁹⁹ The delivery of such a substantial amount of bonds had no discernible impact on the

⁹⁴*El Comercio* (Lima), 17-Nov-1877.

⁹⁵*El Peruano*, (Lima), 21-Nov-1877.

⁹⁶See above Table 4 5.

⁹⁷The production contracts signed by Prado with Meiggs for El Toco in 1876 (reduced in 1877), the Barrenechea contracts of 1877, and the Gildemeister 1877 contract, were larger than the Campbell agreement; but the first was not intended for actual implementation, and the other two were renewals or amendments to agreements concluded by Prado in 1876. See the complete listings in Table 3, Volume 2.

⁹⁸See Table 3, Volume 2, for complete listing of prices granted in production contracts.

⁹⁹See Table 2, Volume 2.

price of the *certificados* in the Lima market, which climbed comfortably to over 99 percent in December, 1877. By the end of 1877, total deliveries of *certificados* had reached some 11.9 million *soles* (about £2.4 million), more than doubling the quarterly interest payments outstanding at the end of the prior year.¹⁰⁰

7. Balance of the Expropriation, 1877

As Table 7.6 shows, the Peruvian Government achieved in 1877 the desired reduction in nitrate exports coupled with the long-awaited increase in nitrate prices. Exports for 1877 fell rather drastically to some 192,000 long tons, a decrease of over 100,000 tons with respect to the prior year. Average nitrate prices for 1877 shot up to £14 15 sh per long ton, some £3 higher than in 1876. However, as predicted during the expropriation debate, any success in increasing Tarapacá nitrate prices, would inevitably trigger countervailing forces. Tarapacá free producers responded to higher nitrate prices by increasing exports, as did the Antofagasta Company. This predictable reaction made any increase in nitrate prices a temporary victory. More importantly, since the whole thrust of the operation was to allow the Peruvian Government to fix guano prices to a level which would induce consumers to switch from nitrate to guano, the current fragmentation of guano sales prevented any significant change on that account. In fact, guano prices actually declined to £12 per long ton in 1877 (see Table 7.6).

¹⁰⁰Total accrued yearly interest on the nitrate bonds increased from £75,838 at the end of 1876 to £167,486 at the end of 1877. See Table 5.7 below.

Table 7.6

*Guano and Tarapacá Nitrate,
Exports and Prices,
1870-1877
(Long Tons, £ per Long Ton)*

Year	(1) Guano Exports (a)	(2) Nitrate Exports (a)(b)	(3) Price Guano (c)	(4) Price Nitr. (c)	Total Exports (d)	% Guano (d)	% Nitrate (d)
1870	698,176	125,252	14.00	16.05	823,428	84.79%	15.21%
1871	363,200	153,443	12.00	17.00	516,643	70.30%	29.70%
1872	404,097	179,607	12.00	15.05	583,704	69.23%	30.77%
1873	342,425	266,543	12.15	14.15	608,968	56.23%	43.77%
1874	336,476	237,586	13.00	13.00	574,062	58.61%	41.39%
1875	373,688	306,623	12.10	11.15	680,311	54.93%	45.07%
1876	379,000	299,391	12.10	11.10	678,391	55.87%	44.13%
1877	310,000	192,411	12.00	14.15	502,411	61.70%	38.30%

(a) Long tons.

(b) Original in Sp. Quintals, converted by the author into long tons dividing by 23.5; Tarapacá, exclusive of Antofagasta.

(c) British pounds per long ton, FOB, UK.

(d) Computed by the author.

Source: (1)-(3) Greenhill, "Peruvian", p.111; Rodríguez, "Historia", p.110.
(2) *El Veintiuno de Mayo* (Iquique), 14-May-1884.
(4) *The Economist* (London), 13-Mar-1880;
Greenhill, "Peruvian", p.110.

The reaction of free Tarapacá producers to the increase in nitrate prices is clearly shown in Table 8.6. The share of private nitrate exports ranged from 41 to 79 percent of total Tarapacá exports in 1877, with an average of 58 percent for the entire year. The 12-month series included in Table 7.6 does not show a progressive dwindling of private exports towards the end of the year: quite the contrary, in November, 1877 independent producers shipped fully 75 percent of all Tarapacá nitrate exports, a share second only to the 79 percent exported in July.

Table 8.6

*Private and State Nitrate Exports,
Tarapacá, January - December, 1877
(Spanish Quintals)*

Month	Private	State	Total Month	% Priv.	% St.
Jan-1877	271,543.77	240,550.54	512,094.31	53%	47%
Feb-1877	78,375.83	112,116.22	190,492.05	41%	59%
Mar-1877	171,753.58	211,955.77	383,709.35	45%	55%
Apr-1877	337,497.37	119,459.73	456,957.10	74%	26%
May-1877	18,501.58	53,591.36	72,092.94	26%	74%
Jun-1877	202,287.20	140,690.46	342,977.66	59%	41%
Jul-1877	352,742.85	93,818.62	446,561.47	79%	21%
Aug-1877	161,135.22	161,679.22	322,814.44	50%	50%
Sep-1877	214,647.88	309,033.76	523,681.64	41%	59%
Oct-1877	353,853.55	200,784.65	554,638.20	64%	36%
Nov-1877	353,191.97	117,265.32	470,457.29	75%	25%
Dec-1877	235,593.65	220,613.68	456,207.33	52%	48%
Totals	2,751,124.45	1,981,559.33	4,732,683.78	58%	42%

Note: Total for December 77, totals for private exports, and totals for all months do not add up in source.

Source: *El Comercio* (Lima), 9-Jan-1878.

The information on monthly prices furnished in Table 9.6 help explain the fluctuations in private exports shown in Table 8.6. Private nitrate exporters withheld deliveries during the months of lower prices (typically May, 1877), while increasing sales in the months of higher prices (typically November, 1877). The price situation with respect to nitrate was all but stable, since higher prices could only contribute to stimulate larger free exports which in turn dragged prices down: as long as important Tarapacá producers remained outside government control, any successful effort of the Prado Administration to boost nitrate prices would be almost certainly ephemeral, defeated by a balancing flow of unconstrained nitrate output. Thus, the upsurge in private exports underlined the need to expand the number of new sales and production contracts to bring the reluctant free producers into the government-controlled sector.

Table 9.6

*Nitrate Prices, Liverpool,
January - December, 1877
(Shillings and Pence per English Quintal)*

Date (Eng.Q) (100 lb)	Arrived Liverpool (Sh d)	Date El Comercio
01-Jan-77	11.9	3-Oct-78
16-Jan-77	12.0	3-Oct-78
01-Feb-77	12.0	3-Oct-78
16-Feb-77	12.6	3-Oct-78
01-Mar-77	12.6	3-Oct-78
16-Mar-77	12.4	3-Oct-78
31-Mar-77	12.6	3-Oct-78
16-Apr-77	12.9	3-Oct-78
01-May-77	13.0	3-Oct-78
16-May-77	14.9	3-Oct-78
01-Jun-77	14.6	3-Oct-78
16-Jun-77	14.3	3-Oct-78
30-Jun-77	14.3	4-Aug-77
16-Jul-77	14.3	3-Oct-78
01-Aug-77	14.6	3-Oct-78
16-Aug-77	14.7	3-Oct-78
17-Aug-77	14.9	18-Sep-77
30-Aug-77	14.6	17-Sep-77
01-Sep-77	14.7	3-Oct-78
15-Sep-77	14.6	3-Oct-78
01-Oct-77	14.6	3-Oct-78
16-Oct-77	14.6	3-Oct-78
01-Nov-77	14.7	21-Nov-77
05-Nov-77	14.9	26-Nov-77
14-Nov-77	18.0	16-Jan-78
16-Nov-77	15.0	3-Oct-78
01-Dec-77	15.0	3-Oct-78
16-Dec-77	15.0	3-Oct-78

However, as the Campbell agreement had shown, the Peruvian Government was not in a position to compel private nitrate producers, strengthened by higher prices, to join the expropriation scheme without major concessions, both in terms of sales prices and production contracts. Besides economic considerations, political

influence from the owners of floundering Peruvian companies also had a bearing in awarding large production contracts. The concessions granted to private producers threatened to be self-defeating. Indeed, if the free producers wrested large production contracts in exchange for selling their plants, they would nullify the attempt to curtail exports: a large production quota granted to a given plant, regardless of whether it was formally under government "control", increased total exports just as much as large private shipments.

Table 10.6

*Production Contracts for Active
Nitrate Plants*,
1876 - 1877
(Spanish Quintals)*

President/ Year	No.	Min. Output per annum	Max. Output per annum	% Total (Max.)	Cummul. Output
Pardo-76	2	1,150,000	1,700,000	53.13%	1,700,000
Prado-76	22	501,800	541,800	16.93%	2,241,800
Prado-77	8	958,200	958,200	29.94%	3,200,000
Total	32	2,610,000	3,200,000		

*Excluding renewals and inactive plants.

Source: Derived from Table 3, Volume 2.

As Table 10.6 shows, the Prado Administration more than doubled total authorized output under 30 new production contracts in 1876-1877, raising it to some 3.2 million Spanish quintals (145,454 tons). This figure exceeded, during the first year of the expropriation, the total of 2.4 million quintals widely used in the expropriation debate as the desirable ceiling for Tarapacá nitrate exports. However, not all production contracts signed during 1877 were equally significant. Besides the Campbell agreement, the Prado signed only two additional production contracts concerning active mechanized operations during the period 1876-1877, but they included substantial quotas. The first one was concluded with Manuel Moscoso Melgar for "Carmen Bajo" and

"Perla", two plants formerly owned by the Rimac Nitrate Co., a Peruvian joint-stock company.¹⁰¹ The fact that Melgar obtained a bounteous quota of 300,000 Spanish quintals, and an even more generous price of 1.60 soles per quintal, was surely related to his current position as manager of the *Banco de la Providencia*, one of the four Associated Banks.¹⁰² "Carmen Bajo" was described as brand new in 1876,¹⁰³ and produced virtually its entire quota in 1877.¹⁰⁴ However, the actual sale and the corresponding bond issue for the two plants of the Rimac Company were delayed until 1878; the sales contract was signed on February 7, 1878, and the bonds were auctioned on September, 30, 1878. The Gibbs firm purchased most of the issue at 94, after some spirited bidding, further underlining the considerable value currently assigned to nitrate bonds. "This auction --it was remarked at the time-- had a powerful influence on the market of nitrate *certificados*. Before the auction, the *certificados* were quoted at 94 ½; after the auction, there were buyers at 95 and sellers at 96".¹⁰⁵ Both the delay in the signing of the contract and the need to auction out the corresponding bonds, suggest that the Rimac Company had borrowed heavily to construct "Carmen Bajo", and that the profits of 1876-1877 were not sufficient to cover prior commitments.

The second large production contract signed by the Prado Administration in 1876-1877 involved "Bearnés", a plant described in somewhat mediocre condition in 1875.¹⁰⁶ Although the "Bearnés" bonds were

¹⁰¹The pertinent information about the Melgar contract included in the 1877 report of the Associated Banks referred to a plant designated as "Santa Adela (formerly Carmen)" (*Bancos Asociados, Anexos*, p. 17), but data provided in 1878 by M.S. Lombard, Chief of Customs and Nitrate, identified the plants under this agreement as "Carmen" and "Perla", both formerly owned by the Rimac Nitrate Company. The omission of the standard name, "Carmen Bajo", made it relatively difficult to properly identify the plant concerned. Cf. Report of M.S. Lombard, *Jefe de Aduanas y Salitres*, Lima, 11-Oct-1878 published in *El Peruano* (Lima), 15-Oct-1878, and in *El Comercio* (Lima), 16-Oct-1878.

¹⁰²*El Comercio* (Lima), 10-Aug-1877. The Providencia Bank went on to take charge of the entire expropriation in 1878, always under Melgar's management. See below p. 251.

¹⁰³Perú, "Memoria especial 1876", p. IL. "Perla" was described as paralyzed (Id. Table 2).

¹⁰⁴*Bancos Asociados, Anexos*, p.17. "Carmen" produced 282,195.87 quintals of 95% nitrate in 1877.

¹⁰⁵Alfred Bohl, head of the Gibbs Lima office, offered 93 for the entire issue, but other interested buyers objected, and Bohl had to pay 94 for 480,000 soles worth of bonds; no information was provided about the purchasers of the rest of the issue. *El Comercio* (Lima), 1-Oct-1878.

¹⁰⁶See Table 1, Volume 2.

delivered to Francisco Layous, the prior owner of the plant,¹⁰⁷ the production contract was granted to Otto Harnecker, a German entrepreneur, on February, 27, 1877, with a view to establish a new processing system.¹⁰⁸ The contract was renewed some five months later in order to allow for additional time to install the system, stipulating a 2-year term "from the date of the first successful test"¹⁰⁹ It is worth noting that, in spite of the fact that "Bearnés" does not seem to have been operational prior to 1879, the decision to encourage the testing of new nitrate-processing technology in Tarapacá was clearly at odds with the stated goal of curtailing production: a new, powerful system added to the already dangerous innovation introduced by Campbell was clearly not in the interest of the Peruvian Government. Harnecker's privilege might have been part of the price paid for relinquishing his properties at El Toco.¹¹⁰

With the exception of a renewal of the Gildemeister contract on October, 20, 1877, which simply suppressed the minimum output quota leaving all other provisions intact,¹¹¹ and new contracts for "Barrenechea" and the El Toco deposits¹¹², meaningless since no real output was involved in both inactive ventures, all other contracts signed by the Prado Administration were *paradas*. The 27 *paradas* contracts carried little weight since their combined export quotas, 300,000 Spanish quintals, merely matched the output of a single *máquina* such as "Carmen Bajo".¹¹³ Of course, it is worth noting that since production contracts were sold, it was profitable to obtain one even for a flawed plant, transferring the assigned quota to a real producer. In contrast with the limited results obtained by the Prado Administration in terms of incorporating free producers into the expropriation through production contracts, the sales contracts signed from the second half of 1876 up

¹⁰⁷See Table 1, Volume 2.

¹⁰⁸Bancos Asociados, *Anexos*, p. 18.

¹⁰⁹*Ibid.*

¹¹⁰See above p. 170.

¹¹¹Bancos Asociados, *Anexos*, p. 15.

¹¹²See Table 3, Volume 2.

¹¹³See Table 3, Volume 2.

to the end of 1877 added some 6.5 millions *soles* in plants to the 8.7 million inherited from the Pardo Government (see Table 12.6). Most of the 54 plants bought by the Prado Administration were not granted a matching production contract, i.e., the government was paying merely to close them down, or to bail out a failed venture.

Table 11.6

*Sales Contracts for Nitrate Plants,
1876-1877
(Soles)*

Pre- sid- ent*	Ye- ar	No. Cont- rcs.	% Cont- rcs.	Total Value Plants	% Value Plants	Cum. Total
Pardo	76	59	40.97%	8,759,555.36	44%	8,759,555.36
Prado	76	24	16.67%	2,084,185.00	11%	10,843,740.36
Prado	77	30	20.83%	4,501,476.18	23%	15,345,216.54
Total 76-80		144		19,732,293.54		

*Prado took office in 2-Aug-1876;
he was replaced by Piérola in 19-Dic-79.

Source: Derived from Table 1, Volume 2.

Excluding the 950,000 *soles* paid for the Campbell properties, the two largest payments approved by the Prado Administration during 1876-1877 went to dubious enterprises: a formidable payment of 990,000 *soles* for the premature and unassembled "Esperanza", and almost 800,000 *soles* for the flagging "Barrenechea". In only one case, the government signed a sales contract in 1877 allowing the plant to reopen in 1878 under a production contract: "Solferino", sold for a substantial 600,000 *soles* in July 12, 1877 was granted a 300,000 quintals quota on November 1, 1878.¹¹⁴ In all other cases, plants were either bought and permanently shut

¹¹⁴See listings Table 3, Volume 2.

down, or purchased in conjunction with the approval of a production contract which allowed operations to continue. The net result of the Peruvian expropriation at the end of 1877, was that a dangerously large number of plants still remained outside government control, and the important enterprises brought into the fold during Prado's tenure, like the Campbell group, had exacted a heavy price, both in terms of bond payments and production quotas.

Considering the balance of sales and production contracts signed in 1876-1877, the outlook of the expropriation for 1878 was grim indeed; taking into account the enhanced performance of the Antofagasta Company, it was virtually hopeless. One of the leading critics of the expropriation pointed out that current developments proved that a State monopoly in Tarapacá was "impossible today, as well as tomorrow", stating that the Antofagasta Company would continue producing nitrate, and that it was "an illusion" to think that Perú was "the only producer of nitrogen"; in spite of Raimondi's opinion to the contrary, Oviedo warned that the production in Antofagasta could "reach colossal proportions".¹¹⁵ This prediction took shape in 1877

8. *The Antofagasta Company in 1877*

In 1877, political developments in Antofagasta, such as conflicts with the Municipality over taxes and land titles, were dwarfed by the sheer magnitude of the growing economic impact of the Peruvian expropriation. CSA exports almost doubled in line with an additional 12 percent increase in nitrate prices.¹¹⁶ However, the political truce between local authorities and the Antofagasta Company was due largely to the appointment of perhaps the most important Prefect of the littoral, General Manuel Othon Jofré, in July, 1877

In early 1877, the CSA lost a valuable ally when Prefect Ruperto Fernández passed away, Hicks wrote that he was "a friend of mine who has lend me so much support.. and nobody will miss him more than me"¹¹⁷ The loss of Fernández was compounded by the appointment of Narciso de la Riva to replace him, described

¹¹⁵Perú, *DO*1876, 12-Jan-1877.

¹¹⁶See below p. 241.

¹¹⁷Hicks to Soubllette, Antofagasta, 3-Feb-1877. *CSA.AG.* Vol.9, fs. 255

by Hicks as "one of the oldest enemies of our company". De la Riva visited Hicks, stating that he wanted to "take advantage of the friendship which has always existed among us to ask for a loan of a few thousand [pesos] which will be reimbursed immediately." The manager of the CSA answered that he was not authorized to advance funds, and reminded him that the Bolivian Government had received a 24,000 pesos loan from the company in 1870, currently outstanding. De la Riva then requested 1,000 [pesos] for "patents", but Hicks parried the threat by demanding a receipt for such payment from the Ministry of Finance and Industry, which the new Prefect was unable to produce. "I think that his term as Prefect will be brief, and he is naturally trying to collect as much money as possible"¹¹⁸ This last prediction turned out to be accurate, since Narciso de la Riva was replaced by one Colonel Granier some four months later, on June, 1877¹¹⁹

During Narciso de la Riva's short tenure as Prefect of the littoral, yet another revolt erupted in neighbouring Caracoles, in March, 1877. The CSA allowed the local authorities to use the company's railroad and telegraph, but wanted to charge them for this service. The Prefect of the littoral initially refused to pay, but subsequently consented in reimbursing the company by a reduction in future local taxes. The Caracoles uprising was described as a "mere riot", and it was set in motion by an incursion of some twenty men into the mining district, led by former Deputy Juan D. Rivera Quiroga, favouring Casimiro Corral, Melgarejo's Finance Minister, as President of Bolivia, the Subprefect of the littoral, Apodaca, defected to Rivera Quiroga and fled to Caracoles. Antofagasta was temporarily left without authorities; Hicks noted that most of the Bolivians in Antofagasta were sympathetic to Corral, but that if the CSA was threatened "with 780 Chileans and 250 Bolivians we can scare off any of the two parties." The Caracoles movement was easily crushed in about a week.¹²⁰

Meiggs' controversial railroad project between Mejillones and Caracoles finally came unravelled in early 1877, and the Daza Government rescinded his right to collect taxes in the littoral. Hicks suggested that

¹¹⁸Hicks to Soubllette, Antofagasta, 20-Feb-1877. CSA.AG. Vol.9, fs. 299-300.

¹¹⁹Hicks to Soubllette, Antofagasta, 22-Jun-1877. CSA.AG. Vol.10, fs. 267.

¹²⁰Hicks to Soubllette, Antofagasta, 24-Mar-1877, 29-Mar-1877, 27-Mar-1877, 29-Mar-1877, 2-Apr-1877; Kay to Comber, Caracoles, 26-Mar-1877. CSA.AG. Vol.10, fs. 064-069, 071-073, 096-097.

"something should be done" at this time to obtain permission for the CSA railroad to carry public freight and passengers "otherwise some adventurers will get an extension" of the old and discredited Meiggs concession¹²¹

The cancellation of the Mejillones-Caracoles railroad concession was part of a vast reorganization of Bolivian public finances, announced by Daza's Minister of Finance, Salvatierra, to a cheering Congress, which accorded him "a vote of honour and confidence", "amidst frantic applause" The financial overhaul liquidated an onerous foreign loan by turning over £700,000 of the proceeds deposited in the Bank of England to the bondholders, a Mejillones guano concession granted to Meiggs was transferred to one Dionisio Dertcano, drastically reducing the government debt on that account; the service of the Concha y Toro loan was entrusted to the Huanchaca Company, authorizing it to use income from the export duties for silver, and freeing the Bolivian Government from such obligation; an extreme financial decentralization enacted in 1872 was drastically curtailed, reinforcing central control; the *Banco Nacional de Bolivia*, an institution dominated by Chilean investors, was authorized to sever its links with the *Banco Consolidado de Chile*, thus "bolivianizing" the crucial institution, in an unsuccessful, and marginally fraudulent operation, yet another attempt was made to withdraw the infamous outstanding issues of *moneda feble*, or debased currency, and the abrogation of the Mejillones-Caracoles railroad scheme, succeeded in reducing a total debt of 15 million *Bolivianos* to Meiggs to some 2.6 million at the end of 1877.¹²²

When informed about the definitive rescision of the contract for the Mejillones-Caracoles railroad, Hicks advised not to press immediately for a concession to carry goods from the area until the CSA had more experience with its own railway, and could calculate costs better¹²³ One month later, in early August 1877, Prefect Jofré formally notified the manager of the CSA that he had decided to grant permission to the CSA to transport copper and silver from the mines "Flor en el Desierto", located in Caracoles Furthermore, Jofré

¹²¹Hicks to Soubllette, Antofagasta, 6-Apr-1877 CSA AG. Vol.10, fs 104

¹²²Rojas, *Historia*, pp. 374-375, 377-381, 383-384, 391. In spite of the undeniable positive aspects of the Salvatierra reforms, Rojas found them wanting, corrupt in certain cases, and certainly overblown to buttress the popularity of Salvatierra and the Daza regime

¹²³Hicks to Soubllette, Antofagasta. 3-Jul-1877 CSA.AG vol 11, fs. 003-004

showed Hicks a communication to the Bolivian Government, stating that "the only way out for Caracoles and the Littoral" lied in the use of the CSA railroad, and "imploring" the authorities to allow the company to carry freight and passengers freely. However, the CSA Council in Valparaíso instructed Hicks not to accept the offer since the government decree forbidding the company from carrying outside freight had not been annulled, and the Prefect's concession did not have enough weight to override such measure. Jofré was evidently anxious to reach an agreement on the issue, because he visited Hicks suggesting that the CSA requested permission to carry public transport: the manager of the company noted that they were in a good position because "the Bolivians now acknowledge that our railroad is the only hope [left] for their country."¹²⁴ During the next few days the Prefect received several petitions from Caracoles mine owners, requesting permission to use the CSA railroad; Hicks thought that it was a good moment to negotiate a concession.

The political situation in the interior [of Bolivia] is not peaceful, but I think it would be in the interest of the Company to take advantage of the current conditions before another revolution breaks out, precluding any agreement.¹²⁵

One week later, Prefect Jofré issued a "provisional permit" allowing the CSA railroad to carry any type of cargo, and showed Hicks official letters "from the President [of Bolivia] himself, and some of his Ministers" in which

it is clear that they are anxious to reach a definitive settlement with the Company, and, also, they feel somewhat humiliated by being forced to make this advanced overture towards the company. I do not know if, behind all this, they want to derive some advantage from the company but I do not think that this is the [right] way of viewing this affair. They finally acknowledge that this railroad is the only hope [left] for the Littoral, and for the increase of fiscal revenue.

¹²⁴Hicks to Soubllette, Antofagasta, 10-Aug-1877; Manuel Othon Jofré to owners of "Flor en el Desierto", Antofagasta, 10-Aug-1877; Hicks to Manuel O. Jofré, Antofagasta, 10-Aug-1877; Hicks to Soubllette, Antofagasta, 20-Aug-1877. CSA.AG. vol.11, fs. 077-080, 083-084, 102-104.

¹²⁵Hicks to Soubllette, Antofagasta, 24-Aug-1877 and 28-Aug-1877. CSA.AG. vol.11, fs. 112, 119-120.

The manager of the CSA noted that revenue from Caracoles cargo would become more relatively more important as the high nitrate prices currently prevailing went down, and that the capacity of the railroad was "more than double" than that required to meet the needs of company¹²⁶

Finally, after much pressure from Prefect Jofré and some objections from Hicks with respect to suppressing all liability for the company for accidents in the railroad, on October 2, 1877 an agreement was signed, stipulation a 50 cents per quintal freight charge for the route Antofagasta-Carmen-Alto-Salinas (i.e., inbound traffic or *de subida*), and 25 cents for the route Salinas-Carmen Alto-Antofagasta (i.e., outbound traffic or *de bajada*). A one-third discount was accepted for the transport of Bolivian public officials and cargo. The final rates were cut from an original 60-cents and 30-cents per quintal scheme, after Caracoles owners objected, stating that those prices were no different from the ones charged by the cart owners.¹²⁷

However, the agreement left Caracoles without a complete railway to the coast, since the miners were forced to take their cargoes by carts to the Salinas deposits. In his subsequent official dealing with the new Prefect Jofré, Hicks indicated that, due to the "current situation in Caracoles", the CSA would not build "a single track" to that mining district; in turn, the Prefect complained that the company's railroad refused to accept Bolivian currency in payment, and that the passenger rates were too expensive.

Although I fear that there is some truth in [the Prefect's complaints], I am prepared to answer him firmly, letting the Prefect know that I will not allow anyone to interfere in the internal affairs of our business.¹²⁸

However, Hicks praised Prefect Jofré, stating that "we never had a more rational Prefect, and it seems to me that he wants to have good relationships with the company." He considered that an amicable Prefect would be an asset in the ongoing struggle between the CSA railroad and the local cart owners, who were charging high rates for the transport of minerals from Caracoles, moving the miners of the area to press for the

¹²⁶Copy of the permit issued by Prefect Manuel Othon Jofré, 3-Sep-1877; Hicks to Soubllette, Antofagasta, 6-Sep-1873. CSA.AG. vol.11, fs. 135-136, 140-141.

¹²⁷Manuel Othon Jofré to Hicks, Antofagasta, 2-Oct-1877; José Tomás Segundo Cortés to Hicks, Caracoles, 24-Sep-1877. CSA.AG. vol.11, fs. 230-231, 233-234.

¹²⁸Hicks to Soubllette, Antofagasta, 23-Nov-1877. CSA.AG. Vol.12, fs. 018-019.

construction of a direct railway link to the region, as opposed to the more limited route available, starting in the Salinas deposits. An understanding regarding a railroad extensions to a new town, named Dalence, formally inaugurated on December 14, 1877, was also important, both to prevent a cart monopoly, and allow the local authorities to reach it easily in case of disorders.¹²⁹ However, it is almost certain that the milder political climate prevailing in Antofagasta during 1877 sprang from the exceptionally favourable economic conditions resulting from the high nitrate prices triggered by the Peruvian expropriation.

Table 12.6 clearly shows that the year 1877 was a turning point for the CSA, since Antofagasta exports, holding at a marginal 3 percent of total nitrate exports during 1875 and 1876, suddenly jumped to almost 9 percent in 1877.

Table 12.6

*Nitrate Exports,
Tarapacá and Antofagasta,
1872-1877
(Spanish Quintals)*

Year	(1) Tarapacá Exports (S.Q.)	% Tara- pacá*	(2) Antofagasta Output (Sp.Q)	% Anto- fag.*	Total Exports (S.Q.)**
1872	4,220,764	97.20%	121,558.00	2.80%	4,342,322.00
1873	6,263,767	97.13%	185,028.00	2.87%	6,448,795.00
1874	5,583,260	96.02%	231,283.00	3.98%	5,814,543.00
1875	7,205,652	96.73%	243,420.22	3.27%	7,449,072.22
1876	7,035,693	96.67%	242,630.32	3.33%	7,278,323.32
1877	4,521,654	91.24%	434,392.00	8.76%	4,956,046.00

*Computed by the author.

**Sum of Tarapacá exports and Antofagasta output.

Source: (1) *El Veintiuno de Mayo* (Iquique), 14-May-1884.

(2) CSA, *Memorias*, 1873-1879.

¹²⁹Hicks to Soubllette, Antofagasta, 11-Dec-1877 and 14-Dec-1877. CSA.AG. Vol.12, fs. 070-071, 077.

Thus, the predictions of the critics of the expropriation in the Peruvian Congress were fully borne out as Tarapacá restricted exports in its attempt to leave more room for guano in the world market, the Antofagasta Company was starting to fill the gap, stepping up its output, and gradually nullifying the Peruvian attempt at restricting the supply of nitrate. However, it is worth noting that the CSA was not fully prepared in 1877 to substantially expand exports to totally make up for the Tarapacá restriction. This was partly due to the fact that the new Salinas plant, although formally inaugurated in 1876, did not report actual production until 1878¹³⁰. Thus, in spite of the doubling of Antofagasta exports, total nitrate exports declined from 7.2 million in 1876 to 4.9 million quintals in 1877, triggering an increase in prices which certainly favoured the CSA (Table 13.6)¹³¹.

¹³⁰CSA, *Memorias*, 1876, 1879.

¹³¹Since the CSA did not publish an Annual Report in 1878, Valparaíso prices are quoted from: Miguel Cruchaga, *Estudios Económicos* 2 vols. (Madrid: Editorial Reus, S.A., 1931) 2.13 (Quoted hereafter as Cruchaga, *Estudios*).

Table 13.6

*The Antofagasta Company,
Exports, Costs, Prices, and Profits,
(Spanish Quintals and Chilean Pesos)*

Year	(1) Exports	(2) Cost p.Q.*	(3) Total Cost**	(4) Prices Valpso	(5) Net Profits
1872	121,558.00	1.68	204,217.44		
1873	185,028.00	1.31	241,461.54	2.01	102,050.73
1874	231,283.00	1.49	344,611.67	1.69	118,638.61
1875	243,420.22	1.09	265,328.04	1.87	216,642.09
1876	242,630.32	1.29	312,993.11	2.30	254,116.58
1877	434,392.00	1.46	634,212.32	2.57	

*Costs for 1877, average for November and December only.

**Computed by the author: (1)*(2).

Source: (1), (2), (5) - CSA, *Memorias*, 1873-9.

(4) - *La Patria* (Valparaíso),
July 1873-August 1874.

(4) - 1875-6: CSA, *Memorias*, 1876-9

(4) - 1877: Cruchaga, *Estudios*, 2:13.

Although no data is available on net profits for 1877, the data compiled in Table 13.6 shows that the CSA had a very strong incentive to continue expanding exports; if costs of production for 1877 were indeed higher in that year, possibly due to the rush to mine as much ore as possible, with some disregard for its quality, they were clearly compensated by increased prices.

As more plants were closed in Tarapacá, a steady flow of experienced nitrate workers flocked to Antofagasta. Hicks reported that "all types of workers" requested positions in the CSA

due to the stoppage of the Tarapacá plants, and the generalized decline of all industries in this littoral. Also, the fall of the Peruvian exchange without a matching increase in wages, have shrank workers' salaries to a purely nominal amount, and it is due to this exceptional circumstance that Peruvian producers can manufacture nitrate without incurring in substantial losses, covering the high duties enacted by the government.

The manager of the CSA stated that he fully intended to take advantage of the labour surplus; he reported that he was selecting the best workers, and that the wages he paid, 37 *pesos* a month "naturally without food or water", were "less than the salaries in other enterprise in the littoral. However, were we trying to reduce wages or increase the prices of all articles of consumption; if we reduce wages, we could stand to lose the best people". Hicks wrote that he would rather let the contractors (who provided the workers in the *enganche* operations) curtail wages and compete among them.¹³²

As for the labour contracts, the manager of the CSA recommended making them "as simple as possible, always reserving the company the right to cancel it at will"; in fact, he favoured "verbal contracts without fixed terms because I intend to introduce gradually competition amongst the contractors". Hicks complained that salaries for good workers did not go down "in spite of the large number of unemployed people" in the littoral "our only device is to squeeze them a little at the [company] store; fortunately, a great variety of articles are arriving from Europe and Chile, and subsequently this diversity of merchandise will be of great help to [reduce] manufacturing costs".¹³³ Since Hicks continued reporting up to the end of 1877 that current manufacturing costs could not be reduced due to the persistently poor grade of the ore mined,¹³⁴ it was clear that he intended to effect economies at the expense of workers' salaries, albeit indirectly, by overpricing merchandise at the company store.

The newly-constructed *oficina* Antofagasta proved much less productive than anticipated due to technical problems, including insufficient heating, and a poorly constructed elevator, however, some "splendid" improvements were reported in early September through the use of *agua vieja*, or mother liquor, in the processing of the ore, a method learned by Hicks in his visit to Tarapacá.¹³⁵ Indeed, as Table 14.6 shows, the

¹³²Hicks to Soubllette, Antofagasta, 13-Feb-1877. CSA.AG. Vol.9, fs. 284-285

¹³³Emphasis in the original. Hicks to Soubllette, Antofagasta, 13-Feb-1877, 27-Feb-1877, and 5-Mar-1877. CSA.AG. Vol. 9, fs 285, 311; Vol. 10, fs. 029-030.

¹³⁴Hicks to Soubllette, Antofagasta, 14-Dec-1877 CSA.AG. Vol.12, 078.

¹³⁵Hicks to Soubllette, Antofagasta, 6-Jul-1877, 27-Jul-1877, 4-Sep-1877 CSA.AG vol 11, fs. 007, 043, 127-128.

average yield achieved in the first semester of 1877 increased substantially, to some 23 percent, compared to slightly over 19 percent during the preceding six-month period. The volume of output was, of course, crucial in a fortunate spell of high prices.

Table 14.6

*The Antofagasta Company,
Ore Processed, and Nitrate Yield,
January 1875-June 1877
(Spanish Quintals)*

Period	Ore Processed	Nitrate Yield	% Yield
Jan-Jun 1875	653,809	125,912	19.26%
Jun-Dec 1875	728,555	117,504	16.13%
Jan-Jun 1876	652,538	102,000	15.63%
Jun-Dec 1876			
Salar	528,826		
Salinas	194,364		
Total	723,190	140,630	19.45%
Jan-Jun 1877			
Salar	118,613		
Salinas	298,000		
Total	416,613	96,427	23.15%
Total*	3,174,705	582,473	18.35%

*Computed by the author.

Source: Hicks to Soublette, Antofagasta, 10-Sep-1877. CSA.AG. vol.11, fs. 154.

The amount of ore extracted from the Salinas deposits was described as "enormous" in June, 1877 (see Table 14.6), and one of the labour contractors had made "extraordinary" profits of \$2,000 Chilean *pesos* with a crew of 200 men: the substantial volume of ore extracted during the first six months of 1877 moved the manager of the CSA to curtail ore extraction in Salinas, reducing the labour force to 500 men, and restricting

work to the richer deposits.¹³⁶ The exceptional sales of the period triggered dissatisfaction amongst the fixed-wage workers of the CSA, i.e., the crews of auxiliary personnel, normally referred to as "artisans", surely because they felt that the company was not giving them a fair share of the profits

Our artisans have strong demands, and want higher wages; the [situation] is so extreme that I consider it will be necessary and more economic to look for new people in Europe once and for all, and then dismiss all the current [artisans], who have been treated too kindly.¹³⁷

In September, 1877, Hicks applauded the "magnificent price" of 2.78 3/4 Chilean *pesos* per quintal obtained in Valparaíso for the sale of some 97,000 quintals in Antofagasta; he reported an average price of 2.2649 *pesos* per quintal for the semester January-June 1877, and net profits of 55,996.31 *pesos*. In November, 1877, a price of 2.80 *pesos* was accepted for the sale of 47,000 quintals, showing a definitive upward trend in nitrate prices.¹³⁸

Endowed with two plants, one at Salar del Carmen and another at Salinas, bolstered by the success of its railroad currently transporting minerals from neighbouring Caracoles, enjoying spectacular prices and a plentiful supply of workers, the company was certainly poised to continue expanding its share in the nitrate world market, further eroding the position of the Tarapacá nitrate industry, and decisively disrupting the Peruvian Government's scheme

¹³⁶Hicks to Soubllette, Antofagasta, 6-Jul-1877. CSA.AG. vol.11, fs. 007-008.

¹³⁷Hicks to Soubllette, Antofagasta, 11-Sep-1877. CSA.AG. vol. 11, fs. 162.

¹³⁸Hicks to Soubllette, Antofagasta, 6-Sep-1877 and 9-Nov-1877. CSA.AG. vol. 11, fs 154-155, 298

CHAPTER 7

THE EXPROPRIATION UNDER PRADO, 1878

1. *The Turning Point*

As it had evolved since May, 1875, the expropriation rested upon a volatile foundation of interim arrangements, all of which were slated for review or termination in 1878. The decree of December 14, 1875 stipulated that the nitrate plants acquired by the State with temporary *certificados* should be fully paid in two years.¹ Both the overseas sales of nitrate, and the service of the *certificados*, had been carried out in 1876 and 1877 by means of a contract with the Gibbs firm coming up for renewal in July, 1878. After a massive, two-year wave of nitrate plant purchases, 1878 was expected to be the crowning year in which a total State control of the Tarapacá nitrate industry would be finally achieved. Of course, the fundamental stumbling block standing in the way of all of these expectations was the patent bankruptcy of the Peruvian Government: there were no more funds to defray ordinary State expenditures, to continue railroad construction, or to finance nitrate sales and the payment of the outstanding *certificados*. Overseas borrowing, decisively obstructed by a protracted default on the foreign debt, was out of the question. The fact that the nitrate industry had become State property induced groups of European bondholders to lay claim to nitrate, as well as guano, income to service the massive and unpaid Peruvian foreign debt.² These disputes further discredited Perú in the eyes of foreign lenders, as the ongoing fragmentation of the vital guano trade continued eroding government income.

¹Article 10 stated that the nitrate plants would be "paid in two years, or before, as soon as funds are raised in Europe to do so". See above pp. 158-159.

²See below pp 277-278.

In implementing the expropriation, the Peruvian Government had conjured up two powerful new interest groups: the holders of *certificados*, strengthened through intractable transactions, and the holders of production contracts, who had a legal right to demand payment in "hard" *soles* for their nitrate quotas. Both groups stood firmly on the way of undoing the operation. In 1878, the expropriation looked both irreversible and untenable.

The opposition had no solution to the nitrate problem; cornered, the Prado Administration, besides pointing out that the expropriation was a legacy of the Pardo Government, could only come up with feeble schemes which triggered further dissent. The year ended with the first formal proposal to put an end to the expropriation. Former President Pardo returned to Perú in 1878, after a brief stay in Chile, to preside over the Senate. So did Guillermo Billinghurst, Piérola's ally, taking his seat in the Chamber of Deputies. However, the return of exiled politicians did not lessen the growing acrimony of Peruvian politics. The clashes between the Pardo and Piérola factions, as shown by the increasingly virulent language used in the Lima press, particularly in *La Patria*, reached extreme proportions with the assassination of former President Pardo, on November 10, 1878.³ A ludicrous sequel to the Pardo murder was a public debate on the possible involvement of Piérola in the event.⁴ Within this rarefied political atmosphere, the debate on the expropriation took on a much sharper tone, and loomed larger, in 1878 than in the two previous years.

2. *The Renewal of the Gibbs Contract*

The consignment contract signed by Gibbs and the Peruvian Government in mid-1876 was the cornerstone of the expropriation. The agreement provided for the payment of nitrate to contractors in Iquique, the overseas sales of State-owned nitrate, and the quarterly service of the *certificados*.⁵ It was clear for all

³*El Comercio* (Lima), 10-Nov-1878; San Cristóval, *Pardo*, p. 123.

⁴See both *El Comercio* (Lima), and *La Patria* (Lima), 12 to 20 November, 1878.

⁵See Chapter 5, pp. 177-179.

parties involved that no local company or syndicate had the capital and the expertise to undertake the wide range of operations performed by the Gibbs firm. The Associated Banks played largely a perfunctory role, enjoying commissions from some of the transactions, but staying away from actual marketing activities. However, the Peruvian Government and the Associated Banks had full authority to decide two key aspects of the expropriation: the purchase of nitrate plants, including pricing and bond issues, and the awarding of production contracts, including price per quintal and size of individual quotas. Since the Peruvian Government and the Associated Banks could either issue too many bonds, overpricing plants and increasing quarterly interest payments, or grant excessive production contracts, forcing the storage or marketing of an unsaleable volume of nitrate, Gibbs chose to sign its consignment contract for one-year periods. This would allow the British firm to discontinue its commitments if the service of the *certificados* or the volume of nitrate contracted exceeded manageable proportions. Of course, Gibbs' departure would spell disaster for the Peruvian Government since there was no available domestic or foreign substitute.

The negotiations between the Gibbs firm and the Peruvian Government for the renewal of the consignment agreement broke down *circa* March, 1878. The main discrepancy lay in the fact that the Peruvian Government wanted the 1878 agreement to cover much more than the consignment of nitrate and the service of the *certificados*, the two basic functions of the prior contract. The new government proposal to Gibbs included a £6 million bond issue in charge of the British firm; £4 million of the proceeds were slated to pay for nitrate plants, £1 million for public works, and £1 million would remain in Gibbs' hands as a guarantee for advances. Gibbs would remain totally in charge of marketing nitrate on consignment. The Peruvian Government pledged to increase the nitrate tax to at least 120 d, and limit exports to between 5 and 5.5 million quintals annually (227,273 to 250,000 tons). Gibbs would take over the management of the expropriation from the Associated Banks, including a £360,000 debt of the government to the Banks, payable to the former in £30,000 monthly instalments. In addition, Gibbs would provide a £360,000 "advance" to the Peruvian Government, also payable in £30,000 instalments for a period of six months. The proposal of the government to Gibbs concluded by stating that, in the "improbable" case that income from nitrate sales did not cover Gibbs' advances, the Peruvian Government would reimburse the British firm "from other sources of revenue", adding that this could

come about "only as result of consumption being lower than production" In the manuscript version consulted, the last statement was signalled by a large question mark placed at the left margin⁶

The new proposal proved unacceptable for Gibbs. The prior consignment contract was merely a tightly secured instrument to sell nitrate overseas and service the nitrate bonds. The agreement shielded the British firm from all direct contact with the nitrate producers. All payments were solidly guaranteed, including a provision in the case that sales income did not match the sums advanced, while the British firm moved in the background, removed from the chaotic domestic controversy surrounding the operation. In contrast, the central feature of the new government proposal was most certainly a new foreign loan, forcing Gibbs to organize yet another bond issue in Europe for a State already discredited by a drawn out default. Equally important was the fact that the new proposal eliminated all prior buffers separating Gibbs from the Peruvian Government and public opinion. The British firm was immediately placed in the limelight, as a leading lender and a direct administrator of the entire operation, a position strikingly similar to that of Dreyfus with respect to guano, and Meiggs in the case of railroads. Both prior experiences had proved that accepting too much involvement in the muddled finances of the Peruvian State was a risky venture. The new proposed arrangement would have made Gibbs' income and profits derived from the expropriation directly dependent upon nitrate prices, providing no guarantee for the firm in the case of nitrate revenue falling short of the amount of advances other than a vague promise to use alternate and unspecified sources of government income.

The fact that the Peruvian Government had stated in its proposal that nitrate revenue would be unable to cover Gibbs' advances "only" in the case of "consumption being lower than production" deserved the question mark written at the margin of the manuscript version. At the time, there were many adverse factors eroding nitrate prices, including a growing number of exceedingly generous production contracts, powerful free producers which would have to be brought into the fold by paying more for their plants or granting voluminous output quotas, or both; and a growing threat from nitrate exported from the Bolivian region of Antofagasta, and the emerging Chilean regions of Taltal and Aguas Blancas. In fact, the total amount of quotas granted to holders

⁶"Memorandum No.3" (no day, no month, 1878) Gibbs Ms. 11,132.

of production contracts in 1878 vastly exceeded the ceiling pledged in the government's proposal.⁷ A study on the subject showed that the British firm had benefitted substantially from the consignment of nitrate in 1876-1877, but that Gibbs lost faith in the business due to the exorbitant production contracts subscribed in 1878, and to the spectacular performance of its own Antofagasta Company, whose growth was governed entirely by the Chilean partners.⁸

From the point of view of the Peruvian Government, it was perhaps inevitable that a mere renewal of the old agreement with Gibbs would prove unacceptable in 1878. The Prado Administration had to struggle for a foreign loan, rather than a mere consignment contract, partly because it was compelled by law to pay the nitrate plants purchased with *certificados* in 1878, and partly because it had exhausted all alternative sources of income. After the negotiations with Gibbs broke down, the Prado Administration could only appeal to domestic financial groups, hardly qualified to take charge of the operation.

3 *The Providencia Contract*

While the Peruvian Government was negotiating the renewal of the Gibbs contract, a simultaneous attempt was made to incorporate the Raphael firm, currently in charge of Peruvian guano, into the nitrate business. In late March, 1878, *La Opinión Nacional*, the Lima newspaper linked to the Associated Banks, made the case for a "merger" of guano and nitrate, coupled with a foreign loan. Arguing that the government had the "moral duty" to pay the *certificados* in full in 1878, the newspaper stated that there were only three alternatives open to the government in that respect: an extension of the full payment of the *certificados* "until our economic situation improves", maintaining interest payments at the stipulated rate; a loan to pay the securities in full, "in line with the original commitment"; or a "debt consolidation" (i.e., a domestic bond issue), paying an annual interest of 8% and a 2% yearly amortization. *La Opinión Nacional* dismissed the option of a postponement of

⁷See below pp. 291-295.

⁸Greenhill and Miller, "The Peruvian Government", pp. 120-124; for the internal struggle within the Antofagasta Company, see O'Brien, "The Antofagasta Company", pp. 13-15.

the full payment of the *certificados*, noting that "nobody benefits". the bondholders would face an immediate drop in the price of the securities, and the State would be forced to defray "exorbitant interest [payments]", given the fact that the stipulated 8 percent at par value had climbed to 16 percent in real terms due to the falling exchange. Warning that the internal bond issue should be used only as a solution of "last resort", the newspaper went on to advocate the raising of a foreign loan, arguing that it had not been "proven" that overseas financing was impossible, and that a "merger" of guano and nitrate would make such an operation extremely attractive⁹

El Nacional was quick to state that the idea of raising another foreign loan "was entirely unacceptable".¹⁰ A few days earlier, *El Comercio* remarked that the government would act with "imprudence" if it attempted to obtain a loan to pay the *certificados*, warning that the payment of nitrate bonds should be left in the hands of a firm of "recognized honesty", and rejecting the idea of leaving the operation in charge of the Raphael firm, already managing guano, overextending its resources¹¹

After the "merger" scheme of guano and nitrate collapsed, the only possible candidates left to finance the expropriation were the notorious Associated Banks, already nominally in charge of the operation. On June 11, 1878, *La Opinión Nacional*, organ of the banking group, dropping its earlier support for a foreign loan coupled with a merger of the guano and nitrate businesses, endorsed the idea of transferring the control of the expropriation to "entrepreneurs linked to the destiny of the country" The newspaper admitted that "at first sight" it seemed "anomalous" to look for financing in Lima, "a market short of capital and where capital is thus very expensive".

But even to those less knowledgeable in business matters, it must be evident that both the richest capitalist in Lima and the wealthiest Englishman have to draw resources from the money markets of Paris or London which are, so to speak, the universal deposit boxes....,and since the source of money has to be identical it only remains to decide if it is more advantageous to have the management of nitrate in or outside the country.

⁹*La Opinión Nacional* (Lima), 22-Mar-1878.

¹⁰*El Nacional* (Lima), 28-Mar-1878

¹¹*El Comercio* (Lima), 14-Mar-1878.

After a cursory examination of the current status of the nitrate trade, the newspaper of the Associated Banks concluded that the operation had a "solid basis", although it admitted that it was not possible "right now" to sell 5 million quintals (227,273 tons) of nitrate at £16 a ton, required to yield a "surplus" for the government.¹²

The first reaction to the ideas voiced by *La Opinión Nacional* was one of alarm: the holders of nitrate *certificados* were summoned on July 10 to a meeting for July 16, 1878 to reject the nitrate management project submitted by the Associated Banks "because, aside from being threatening and illegal, such Banks offer no guarantees".¹³ *El Nacional*, the organ of the *Partido Civil*, former President Pardo's movement, noted that "the background of the Associated Banks is hardly one that can guarantee the success of the business", pointing out that the income from "nitrate sales is insufficient to meet the investments required by the entire operation".¹⁴

However, other than rejecting the transference of nitrate sales and the service of the *certificados* to domestic financial groups, the opposition offered no alternatives to the Prado Administration. In that context, on July, 10, 1878, a new nitrate agreement was formally submitted as a proposal of Manuel Moscoso Melgar, general manager of the Bank *La Providencia*, one of the four Associated Banks.¹⁵ The document stated that the purpose of the new contract was to make a "definitive" arrangement with respect to the consignment of nitrate in order to ensure the payment of the *certificados*, as well as the financing of public works and [fiscal] domestic expenditures. The government would consign to the Providencia Bank all nitrate under State control, but "for the time being" the total delivered could not be less than 5 nor exceed 6 million Spanish quintals (227,273 and 272,727 tons, respectively). The Providencia Bank would control nitrate sales in the entire world market, with the exception of the United States and Canada, awarded to another contractor; it had the right to

¹²*La Opinión Nacional* (Lima), 11-Jun-1878.

¹³*El Comercio* (Lima), 11-Jun-1878. The notice was dated 10-Jun-1878.

¹⁴*El Nacional* (Lima), 2-Jul-1878.

¹⁵I am quoting Melgar's proposal from the version published in *El Comercio* (Lima) on July 17, 1878.

confiscate any nitrate sold in violation of the contract. The Bank superseded Gibbs for all the required marketing operations, including freight and insurance, paying the Peruvian Government from October 1, 1878 an advance of £60,000 monthly for six months, reducing that amount to £20,000 after that period. The Providencia Bank would pay the other Associated Banks the monies owed to them by the government, including the unpaid part of the 18.5 million *soles* loaned in 1875,¹⁶ and the outstanding balance owed from the prior nitrate arrangement. All of these expenses, as well as the service of the *certificados*, also in charge of the Providencia Bank, would be paid out of the "net profits" of nitrate sales. The new contract also allowed the government to issue up to £4 million in bonds for the payment of nitrate plants purchased, as well as an additional £2 million in bonds issued over a two-year period for "public works"; after two years, the government could issue an additional £1 million, over a similar period "in agreement with the Bank." The outstanding nitrate *certificados* could be converted into "special bonds", carrying the same guarantees, and denominated in British pounds, also "in agreement with the Bank". The government pledged to "achieve the monopoly [of nitrate production in Tarapacá] as soon as possible, and will maintain such monopoly until the aforementioned bonds are fully amortized". Existing production contracts would be respected, and the Providencia Bank would collect the nitrate export duty. The new special bonds, designed as a replacement for the outstanding *certificados*, would be serviced only "as long as [the Bank] has sufficient nitrate to cover [the pertinent payments] with the income derived from sales". The Providencia Bank would be authorized to establish a joint-stock company to carry out the management of the operation.

The proposal of the Providencia Bank was accepted by the government, and a formal contract was drawn up and signed on July 13, 1878.¹⁷ In keeping with the text of the contract, the Providencia Bank immediately formed a company, the *Compañía Salitrera del Perú* (CSP), as the executive agency, with a capital of £800,000 in shares of £100; the Providencia Bank, the *Banco Nacional*, and two syndicates represented by B. Valdeavillano and C. Elizalde took 1,600 shares each, while Dionisio Derceano, and the banker and Senator

¹⁶See above p. 155.

¹⁷Text of the contract in: Dancuart, *Anales* 12:77-78.

Francisco García Calderón held 800 shares each.¹⁸ On the heels of the signing of the Providencia Contract, on July 15, 1878, the Prado Administration hastened to issue a decree authorizing the Providencia Bank to deliver to the government the *certificados* for public works mentioned in the agreement.¹⁹ In early August, 1878, the CSP hastened to subcontract nitrate sales in the world market with James Sawers & Co., a British firm.²⁰ There were enough controversial provisions in the Providencia contract to trigger a storm of protest, and it did.

4. The First Wave of Criticism

The outcry against the Providencia contract, already leaked to the Lima press some three days prior to the agreement,²¹ broke out in earnest after it was made public. Opposition came from the wide array of interests affected by one or more of the pertinent provisions. The Gibbs firm made an extensive analysis of the position of the CSP at the onset of the Providencia contract, stressing adverse world market conditions.²²

To anyone who knows Lima, it will be immediately evident that the ability of the new Company to find any considerable portion of the £800,000 must entirely depend upon securing extraneous help. That such help can be found in Lima, unless by some new experiment on the currency, no one believes and it is therefore pretty certain that those who formed the Company are looking to Europe for support. In view of the terms of the Contract thus adopted by the new Company, it is difficult to believe that anyone who knows Peru, or has any experience in the nitrate business, will be prepared to lend the necessary assistance.

¹⁸"Memorandum as to the Nitrate business of Peru"(no day, no month, 1878) Gibbs Ms. 11,132. The Board of Directors of the CSP was made up of Francisco García Calderón, as Chairman-President; José Albarracín, Dionisio Dereteano, Adolfo Harismendi and Juan C. Basombrio as Directors; and Luis B. Cisneros, as General Manager (CSP, *Exposición*, p.32).

¹⁹Perú, *Representación de los salitreros al Soberano Congreso* (Lima: Imprenta de "El Nacional", 1878) p. 25 (Quoted hereafter as Perú, *Representación*).

²⁰*La Tribuna* (Lima), 24-Oct-1878.

²¹*El Comercio* (Lima), briefly announced the arrangement on July 13, 1878; *El Nacional* (Lima) gave additional details on July 15, 1878.

²²"Memorandum as to the Nitrate business of Peru" (no day, no month, 1878) Gibbs Ms. 11,132.

The review estimated that, even accepting the most "optimistic assumption" for total nitrate revenue (i.e., some 200,000 [Long] tons of nitrate sold at £15 per ton), and assuming output from the Antofagasta Company to "remain constant", "at the end of the first year, they will find themselves with an uncovered debt of £950,000".

In reality, however, the position is very much worse than this, because not only will it take 6 months before the first vessels chartered by them can have received their cargoes & arrived at their destination but, at the commencement of their career they will have to compete with the existing stocks, which, it is estimated, will equal to about nine months consumption. They will in fact be in the same position as the Peruvian Guano Co. has hitherto occupied vis-a-vis of Dreyfus. In some respects their position will be worse, because the opposing stocks of nitrate will be by no means in one hand, as is the case of Guano.

The British firm was equally skeptical about the possibility of marketing nitrate profitably under current conditions.

Looking to the advances which they will have made on the stuff, it cannot benefit them to force sales at low prices. They must therefore store and hold, but this they can only do in the case of Nitrate at a cost of about [illegible] per month, a charge which will soon toll heavily on their Net proceeds. Should they succeed in selling 100,000 Tons in the first twelve months, it will be very lucky. In that event, they will remain with an enormous stock in warehouses [at a] cost which will leave them no cover for their advancements to Government.

While Gibbs provided a lucid overview of the global context of the Providencia contract, the domestic opposition balked at the idea of issuing additional "public works" *certificados*. In May, 1878, *El Nacional*, terming the projected emission of "public works" bonds a new "consolidation", called the nitrate bondholders to form a "syndicate" to protect their interests.²³ The holders of *certificados* were already alarmed and organized in May, 1878; three days prior to the signing of the Providencia contract, the syndicate of bondholders summoned a meeting held on July 16, 1878. The meeting approved an open letter to the government declaring that the Providencia contract violated "general legal principles governing contracts." Sales contracts for nitrate

²³*El Nacional* (Lima), 8-May-1878, and 9-May-1878.

plants had been modified unilaterally by the government without the consent of the sellers.²⁴ The holders of nitrate bonds requested the President to "suspend the effects" of the contract until Congress decided how to pay for the outstanding *certificados*. The statement rejected the idea of turning the nitrate bonds into "another security with lesser attributes", and claimed that the expropriation law ruled out a loan contracted inside Perú. The bondholders pointed out that in stipulating a 4 percent annual amortization, the Providencia contract had effectively stretched the date of final payment from two to 25 years. The bondholders closed their statement by warning that they would protect themselves "by all means granted to them by law"

The signers of the document claimed to hold some 4.5 million *soles* issued for some 25 plants. Since at the end of 1878 some 177 million *soles* in *certificados* had been delivered,²⁵ the drafters of the statement controlled some 26 percent of the total nitrate bonds currently outstanding. Rather than reflecting the number of dissatisfied bondholders, these percentages reflected the fact that the *certificados* were vigorously traded in Lima at the time, and few original recipients could afford to hold on to them in the absence of a reliable currency. A large amount of bonds had been sent to Chile in exchange for much-needed drafts, increasing the number of non-resident bondholders.²⁶ Major bondholders, mainly the *Banco Nacional*, were parties to the disputed agreement

El Peruano answered for the government stating that the Providencia Contract was "superior" to the proposals submitted in Europe, that the Gibbs firm had "acknowledged" the superiority of the agreement; that the £1 million bond issue for public works would be slated for "finished" tasks; that the fear of nitrate income

²⁴This open letter was published as Annex 3 in: Perú, *Representación*, pp. 29-34. Annex 3 was dated simply July, 1878, but *El Comercio* (Lima), reported that the meeting was held on July 16, 1878.

²⁵See below, Table 5.7, p. 287.

²⁶CSP, *Exposición*, p. 15. According to García Calderón, President of the CSP, the *certificados* were used "in daily transactions; they are constantly bought and sold; they are sought due to the high interest [rate] they afford, providing a good rent, and are given as collateral; finally they are useful for all type of transactions, even perhaps for Stock-Exchange operations". This statement was made in November, 1878.

falling short of the stipulated commitments was "groundless", and that the establishment of a Peruvian joint-stock company "tends to open an immediate and safe field for the investment of national capital"²⁷

The holders of *certificados* pressed further, meeting for a second time, on July 22, 1878,²⁸ and issuing a second public statement addressed to the government.²⁹ The second statement of the bondholders was far more conciliatory than the first one, conceding that the holders of the *certificados* were not "competent" to "analyze nor discuss the legality" of the Providencia Contract, and that they did not wish to "encumber the measures or schemes" which the government might choose to pursue in this matter. However, the bondholders warned that they could not be expected to "sacrifice our most cherished interests, along with our rights." The manifesto argued that the expropriation law had established an "order of preference" between the two authorized loans, implicitly favouring the £4 million loan slated to pay for nitrate plants over the £3 million "public works" loan, and "stipulating that the former should be paid first". Considering that the projected £7 million loan had failed, it was "undeniable that no new issue of *certificados* can be made" before the nitrate bonds had been fully paid; the new £1 million issue released "in a restricted and impoverished market, will increase the supply of these securities in such a disproportionate fashion that it will result inevitably in a ruinous depreciation". Opening an avenue for compromise, the document pointed out that the "bondholders could perhaps resign themselves to accept the renewal of their contracts" under identical conditions, but that they could not accept being "placed in an equal footing with the rest of the State creditors", forgetting that their titles were secured by mortgages enjoying the "preference" granted to them by law. The bondholders closed their statement by "imploring" the government to suspend the projected £1 million issue in "public works" *certificados* until their bonds were fully paid.

²⁷*El Peruano* (Lima), 17-Jul-1878 and 21-Jul-1878.

²⁸*El Comercio* (Lima), 23-Jul-1878.

²⁹Published as Annex 2 in Perú, *Representación*, pp 24-28.

The two most important concessions made in the second statement of the nitrate bondholders were the tacit acceptance of the Providencia contract, and the explicit surrender of the earlier demand for full payment of the principal. The emphasis had shifted from an adamant rebuke of the whole of the Providencia Contract to the mere rejection of an additional issue of "public works" bonds. The notion that the expropriation law had established an "order of preference" was contrived.³⁰ However, the equivocal use of existing legislation might have been deliberate, since any possibility of reaching a negotiated solution to the problem of the payment of the *certificados*, if any existed, hinged on slighting the letter and the spirit of the law rather than respecting it. The moderate tone of the second statement of the bondholders perhaps explains the fact that the number of signatures increased from twenty one to some fifty two, including the addition of the previously reluctant Gibbs firm. However, the manager of the British firm remained skeptical about the new service of the *certificados*:

Certificates. Cisneros tells me that the "Providencia" Bank will undertake the service of 5 million pounds "a firme" for five years, with certain exceptions, *casos fortuitos, guerra, etc.* Should this be the case, it ought to be less difficult to have the 4 million of the old Certificates declared a first charge- as the service of the extra million for *Obras Públicas* is secure. The only *danger* of course is that the "Providencia" or their friends may be unable to carry the business through.³¹

The references made by President Prado to the Providencia Contract in his annual address to Congress, on July 28, 1878, studiously dodged the controversy surrounding the agreement, arguing that the measure "carries the added benefit of rooting the operation on our soil".³² In spite of the presidential optimism, a new opposition front was gradually developing, fuelled by the revised payments made for newly-acquired nitrate plants.

³⁰Article 4 mentioned a £7 million loan, applying £4 million to pay for nitrate plants, and "up to £3 million" for public works, but stipulated no "preference" between the two loans. Aldunate, *Leyes*, Peruvian Documents, p.33.

³¹Bohl to Read, Lima, August 2, 1878. Gibbs Ms. 11,132. Spanish terms and underlining as in the original.

³²President Mariano Ignacio Prado, "Mensaje", July 28, 1878, in: Perú. *Mensajes* 2:94.

5. The Controversy over Plant Purchases

As stated before,³³ the prices paid by the government for nitrate plants had come under fire in 1877, the concern sharpened in 1878 since a substantial increase in payments for the enterprises remaining in private hands could easily push the total amount required over the 20 million *soles* ceiling authorized by law for the operation. The Associated Banks published its first (and only) annual report on the state of the expropriation in the first half of 1878, reflecting purchases of Tarapacá nitrate plants as of January 22, 1878.³⁴ The report showed that 51 *máquinas* and 77 *paradas* had been bought by the government at a total cost of some 17.7 million *soles*, of which some 16.2 million, or close to 92 percent of the total, were paid for mechanized operations. Some 12.5 million *soles* of the total 17.7 million agreed upon had actually been issued and delivered; some 5.2 million in *certificados* were temporarily retained. Only four important *máquinas*, with an assessed price of 890,000 *soles*, and 13 lesser *paradas*, valued at some 313,000 *soles*, remained unsold. Price increases due to reassessments had totalled some 600,000 *soles*, an amount which *El Comercio* rightly termed "insignificant compared to the magnitude of the operation".³⁵

The figures provided by the Associated Banks seemed to indicate that, of all the complex aspects of the expropriation, at least plant purchases were under control. However, *El Comercio* pointed out that current reassessments of private plants could drive up the total price of the operation "in a proportion which would be hard to estimate". The newspaper saw yet another looming threat in plants not yet assessed, "valueless" or "held with dubious property titles", which could "surface" later on to "play the role of reserve divisions in armies, attacking suddenly to grant victory to those who thought that they were already defeated".³⁶

³³See above pp. 224-225.

³⁴Bancos Asociados, *Anexos*. The pertinent Tables appeared in Annex 1, pp. 3-12.

³⁵*El Comercio* (Lima), 9-Apr-1878.

³⁶*El Comercio* (Lima), 9-Apr-1878.

The general concern regarding the purchase of the unsold plants expressed in early April turned into a wave of increasingly specific fraud charges starting in mid-May. *El Comercio* took the lead noting that "comments" had been made about greatly increased prices for nitrate plants, claiming to have "all the information" about specific cases of fraud, and stating that *paradas* and deposits were "surfacing like mushrooms" in Tarapacá. "As the government buys, new deposits mysteriously appear, increasing the number of properties to be bought." *El Comercio* claimed that the 20-million *soles* ceiling had already been reached, and demanded a detailed public account of recent acquisitions.³⁷

Through *El Peruano*, the government replied that plant purchases in 1878 had been conducted by the same personnel manning the same commissions established by the prior Pardo Administration, and that it had no reasons to doubt that the procedures followed had been "legal and honourable".³⁸ The defense was an astute reminder of the responsibility of the Pardo Government, supported by *El Comercio*, and explains the difficulty of launching an overall attack on the operation, including the early 1876 acquisitions. One of the members of the 1875 Assessment Commission, the engineer F. Arancibia, backed current plant purchases by pointing out that "Angela", one of the plants singled out by *El Comercio*, had undergone real improvements, and it was currently worth even more than the increased price accepted by the owner.³⁹

El Comercio insisted that it had information about "illegal works" performed in one specific plant, "Candelaria", owned by Pedro José Osorio,⁴⁰ and that the purchase of "Angela" had "contravened" the law by accepting the installation of machinery after 1876.⁴¹ In mentioning specific plants and owners, *El Comercio* was

³⁷*El Comercio* (Lima), 17-May-1878.

³⁸*El Peruano* (Lima), 19-May-1878

³⁹*El Comercio* (Lima), 20-May-1878. For "Angela" see below p. 284, and Table 1, Volume 2.

⁴⁰*El Comercio* actually referred to the plant as "Sacramento", possibly a blunder, or a former or alternative name. For "Candelaria de Osorio" see Table 1, Volume 2.

⁴¹*El Comercio* (Lima), 20-May-1878.

sure to trigger a stream of rebuttals. The interpretation of the expropriation law endorsed by the Lima newspaper was skewered; the legislation explicitly forbade the granting (*adjudicacion*) of State "nitrate deposits" (*terrenos salitreros*),⁴² but remained silent on the upgrading or outright establishment of nitrate plants on legally-owned private deposits prior or after a specific date. Any attempt by the Prado Administration to challenge plant renovations introduced after the expropriation law of May, 1875, would have been extremely difficult to justify after the prior Pardo Government, in a key decision, had accepted the reassessment of officially valued plants in July, 1876.⁴³ *El Nacional* joined the attack charging that frauds were "rampant" in Tarapacá, and adding that new production contracts signed exceeded the 300,000 Spanish quintals (13,636 tons) limit fixed by the Pardo government.⁴⁴

The Director of Revenue, Simón Irigoyen, in a letter to *El Comercio*, admitted that after spending almost 18 million *soles* in buying up nitrate properties in Tarapacá, the remaining authorized funds were "insufficient" to acquire the unsold plants. He noted that the Prado Government could not be blamed since free producers, posing a growing threat to the State monopoly, had made "substantial investments" in their plants, "doubling or tripling" their initial value; those investments "had to be paid". The government could not halt the development of new plants; the owners had constitutional property rights, enforced by the Judiciary. Irigoyen added that the prior Administration had spent 12 of the 18.4 million *soles* slated for the purchase of nitrate plants, and explained that the new production contracts had been granted "by way of compensation". He concluded claiming, without elaborating, that publishing the data concerning plant purchases would be "damaging" to the State.⁴⁵

⁴²As stated before, this legislation had been in force since 1869; subsequent decrees merely restated the principle.

⁴³See above pp. 174-176.

⁴⁴*El Nacional* (Lima), 20-May-1878.

⁴⁵*El Comercio* (Lima), 21-May-1878.

The rejoinder of *El Comercio* termed "alarming" Irigoyen's admission that the appropriated funds were not sufficient to purchase the rest of the unsold plants. The newspaper opened a new front by claiming that the personnel in charge of purchasing nitrate plants had denounced "irregularities" in the operation. Thus, the responsibility for the purchase of dubious plants fell "entirely upon the government"⁴⁶ *El Peruano* responded by offering a full disclosure of all data on plant purchases,⁴⁷ and the government reacted by issuing a decree on May 22, 1878, doubling the export tax from 1.50 to 3 soles. The measure was justified as a way of pressuring independent producers into selling their plants, ruling out new terms and reassessments for unsold enterprises, and making the new duty subject to future Congressional approval. The text of the provision spoke of "monopolizing" nitrate by purchasing all of the existing Tarapacá plants as "the fulfilment of a duty" and an "imperative need".⁴⁸

El Comercio rejected the decree as "dictatorial", and considered the measure an unacceptable substitute for a "clear explanation" about the allegations concerning "abuses and frauds" in Tarapacá. The provision had "no practical consequences" since owners currently transforming *paradas* into *máquinas* expected Congress to reject it.⁴⁹ *La Patria*, the pro-Piérola newspaper, also opposed the decree, but refused to join *El Comercio's* campaign against plant purchases, denouncing unspecified "abuses" of the prior Pardo Administration.⁵⁰ The rift of both newspapers on this issue was yet another indication that the Prado Administration could count on an increasingly divided opposition. It also reflected the growing acrimony separating the Pardo and Piérola factions, both vehemently competing for the succession. Although *El Comercio* answered that it had disagreed

⁴⁶*El Comercio* (Lima), 21-May-1878.

⁴⁷*El Peruano* (Lima), 21-May-1878.

⁴⁸*El Comercio* (Lima), 22-May-1878.

⁴⁹*El Comercio* (Lima), 23-May-1878.

⁵⁰*La Patria* (Lima), 23-May-1878, and 24-May-1878.

with Pardo on the nitrate question, it hastened to add that the pro-Piérola newspaper had failed to identify the "abuses" mentioned, thus suggesting that there had been none.⁵¹ The exchange illuminates the predicament of *El Comercio*, silent in the face of the some 9 million *soles* spent by Pardo purchasing nitrate plants,⁵² many of them highly questionable,⁵³ and groping in 1878 to justify what could be easily viewed as a belated partisan attack on an operation actually launched in 1876.

El Comercio pushed ahead its campaign by insisting in the "scandalous" case of "Candelaria de Osorio", as well as of "Angela", contrasting these plants with "Esperanza", claiming that the latter was equipped with brand new machinery.⁵⁴ The specific cases used by *El Comercio* were more emblematic of the poor information or the bad faith of the accuser than of the iniquity of the accused. The plants chosen by the Lima newspaper as blatant examples of fraud, "Candelaria de Osorio" and "Angela", were in fact excellent enterprises, two of a selected group of Peruvian-owned nitrate ventures which managed to survive well beyond 1879, producing under truly competitive conditions alongside plants endowed with state-of-the-art technology,⁵⁵ in contrast, the "Esperanza" plant (also known as "Lagunas"), portrayed as exemplary by *El Comercio*, was the embodiment of the frenzied speculation which had swept Peru in the early 1870s.⁵⁶ Since 90 percent of the

⁵¹*El Comercio* (Lima), 24-May-1878.

⁵²The exact amount of sales contracts signed by the Pardo Administration was 8,759,555.36 (see Table 5.5, p. 180). *La Patria's* prior mention of 12 million *soles* was an exaggeration.

⁵³Over 26 percent of the plants purchased under Pardo were flawed in some way, and of the some 6 million *soles* paid out for solid operations, 2.5 million, or some 40 percent, was slated for the Gibbs and Gildemeister plants. See Table 1, Volume 2.

⁵⁴*El Comercio* (Lima), 22-May-1878.

⁵⁵See Table 1, Volume 2.

⁵⁶See above pp. 44-45.

exorbitant 990,000 *soles* in bonds paid for "Esperanza" had gone to the *Banco de Lima*,⁵⁷ it is quite certain that *El Comercio* was taking its clues from some of the financial circles which had benefitted the most from the expropriation.⁵⁸

Simón Irigoyen, the Director of Revenue, addressed a second letter to *El Comercio* accusing the newspaper of juggling figures, and insisting that the Prado Administration was forced to pay higher prices to neutralize the competition from upgraded private plants. In an effort to dispel the notion of covert government activities, Irigoyen chose to attach the official correspondence dealing with selected plant purchases. The documents included a complaint of the Delegate of the Associated Banks stating that purchases on the vast undeveloped Southern sector of Tarapacá should not continue until a "proper map" of the area was drawn up; he deemed "extraordinary" that in "such comparatively small tract of land, showing little or no work, more nitrate deposits have surfaced than [those attached to] all of the *máquinas* of the Province". He concluded that the absence of a map of the Southern region made it all too easy to sell "with perfect good faith" "valueless land, as opposed to nitrate deposits". A report signed by government lawyers requested an official inquiry into "strongly suspected frauds" regarding the sale offers for "nonexistent plants" presented as "real enterprises", and also emphasized the need to map out the southern deposits.⁵⁹

The documents disclosed appeared to lend more support to the opposition's view of plant purchases than to that of the government. *El Comercio* was prompt to provide a tabulated list of reassessed plants (Table 1.7), noting that the purchase system was so flawed that it was "not surprising" that the funds appropriated for

⁵⁷See above p. 157, Table 2.5.

⁵⁸It is worth recalling that only 10 percent, or 90,000 *soles*, of the total amount paid out for "Esperanza" was granted for the value of machinery and deposits, the rest being disbursed for an incomplete railroad line. This fact makes *El Comercio's* figures concerning investments in equipment for "Esperanza" quite suspect. Perú, "Informe especial", pp. XLVI-XLVII.

⁵⁹*El Comercio* (Lima), 24-May-1878.

the operation did not suffice to complete it; unsold plants had "no fixed minimum value since even *paradas* can be transformed, like magic, into *máquinas*...."⁶⁰

Table 1.7

*El Comercio's Data on
Reassessed Nitrate Plants, 1878
(Soles)*

Plants	Original Price	Price Sold	Difference
California	450,000	463,000	13,000
Rimac	300,000	630,000	330,000
Esperanza	900,000	990,000	90,000
Matillana	220,000	240,000	20,000
Pozo Almonte	330,000	350,000	20,000
N. Soledad	600,000	650,000	50,000
Palma	300,000	325,000	25,000
Campbell	650,000	950,000	300,000
S. Pablo	200,000	300,000	100,000
Sta. Ana	80,000	180,000	100,000
Solferino	550,000	600,000	50,000
Total	4,580,000	5,678,000	1,098,000

Source: *El Comercio* (Lima), 24-May-1878.

It is worth noting that *El Comercio* made one major blunder in its table of reassessed plants: "Rimac" was in fact a joint-stock company owning two plants, "Carmen" and "Perla", and the newspaper was forced to retract itself on this point;⁶¹ it also included slightly erroneous figures on "California" and "Nueva Soledad", failing to note that both plants had been purchased during the prior Administration,⁶² it was disingenuous to

⁶⁰*El Comercio* (Lima), 24-May-1878.

⁶¹*El Comercio* (Lima), 27-May-1878.

⁶²"California" was actually sold for 457,611 *soles*, and "Nueva Soledad" for 648,500 in March 4 and 22, 1876, i.e., fully within the Pardo period. See Table 1, Volume 2.

include the debatable "Esperanza" in a list of allegedly overpriced plants after having lavished praise on the enterprise. In fact, seven out of the eleven plants mentioned by *El Comercio* had been reassessed by the Pardo Government.⁶³

In October, 1878, a public proposal advanced by one Julio A. Oviedo, made a sweeping indictment of government purchases of nitrate plants, claiming that at least "two thirds" of the ventures acquired had no workable deposits. He also charged that a group of sellers had simply fabricated property titles to unclaimed deposits. After quoting a substantial list of allegedly fraudulent operations, he demanded an *ad hoc* Congressional committee to look into the matter. Oviedo offered to personally represent the government in the affair, asking for a commission on every case of fraudulent disbursement he succeeded in proving before the Courts.⁶⁴ Oviedo's proposal was unorthodox since it involved the farming out of the investigation on plant purchases to a private contractor acting on a commission basis. It also strongly implied that the Peruvian Congress was either incapable or unwilling to perform what was clearly part of its constitutional duties. Although Oviedo's scheme was ultimately rejected, it is emblematic of the rarefied atmosphere surrounding the operation that the proposal was supported by *El Comercio*, and actually discussed in the Chamber of Deputies.⁶⁵

6. The "Public Works" *Certificados*

The apprehension in the face of an eventual issue of "public works" bonds transpired in the Lima press after early 1878, mostly in the form of rumours. In May, 1878, *El Nacional* expressed fear at the prospect of

⁶³See above Table 4.5.

⁶⁴*La Tribuna* (Lima) 3-Oct-1878.

⁶⁵*El Comercio* (Lima), 7-Oct-1878, 9-Oct-1878, 11-Oct-1878, 15-Oct-1878, 25-Oct-1878, and 29-Oct-1878; *Perú, DO1878*, 13-Nov-1878.

a government issue of 4 million *soles* in additional *certificados* over the 20 million *soles* authorized by law.⁶⁶ *El Comercio* subsequently warned that the government was attempting to issue "illegally" £2 million in *certificados* to finance public works.⁶⁷ In June, 1878, *El Nacional* linked Finance Minister Barinaga with the project of issuing additional *certificados*, advising him not to listen to *La Opinión Nacional*, organ of the Associated Banks, supporting the emission, because it would injure his "political prestige."⁶⁸ This was the first time that Barinaga's name surfaced in the Lima press in this connection. *La Opinión Nacional* replied that the government was indeed authorized to issue nitrate bonds "by itself", and repeating the notion that it was preferable to use "national capital" for such operation, particularly the Peruvian Banks, because they "represented the wealth of many, and would distribute profits to a larger number [of investors]."⁶⁹

A growing number of bondholders issued an extensive, 17-page statement on August 23, 1878, rejecting the provisions of the Providencia contract which stipulated a new issue of "public works" *certificados*.⁷⁰ The novelty of the third bondholder manifesto lay in its explicit appeal to Congress to intervene in the affair to modify clauses of the Providencia contract. In doing so, the holders of *certificados* were stepping into sensitive political territory, since the government had argued all along that Congress would exceed its authority if it chose to alter the controversial agreement. The statement repeated the points made in earlier statements concerning both the arbitrary change in the final date of payment of the *certificados*, and the alleged "preference" granted to nitrate bonds over "public works" bonds. The new statement added that the remaining independent Tarapaca producers would only be persuaded to sell their plants to the government if the bonds offered in payment kept

⁶⁶*El Nacional* (Lima), 7-May-1878.

⁶⁷*El Comercio* (Lima), 31-May-1878.

⁶⁸*El Nacional* (Lima), 27-Jun-1878. The newspaper charged that the current idea in government circles was to issue £5 million in new *certificados*.

⁶⁹*La Opinión Nacional*, 4-Jul-1878.

⁷⁰Perú, *Representación*, pp. 3-20.

their value. The list of signatures, claiming to represent over 10 million *soles* in *certificados*, was indeed impressive, including Gibbs, the Bank of London, Mexico and South America, the Campbell firm, Folsch and Martin, Gildemeister, in addition to the most important Peruvian nitrate producers, Ugarte y Cevallos and Oviedo y Trillo.⁷¹

Congress had been active on the matter prior to the explicit appeal of the bondholders. In September, 1878, the Chamber of Deputies passed a bill, introduced in early August, formally forbidding the Executive Branch to issue *certificados* to pay for public works under penalty of suspending the Providencia contract; the resolution was then referred to the Peruvian Senate.⁷² *La Opinión Nacional* urged the Senate not to endorse the proposal, arguing that nitrate income was "more than enough" to service all the *certificados*, including the projected "public works" bonds, leaving current bondholders on a solid footing.

The nitrate plant owner who keeps his *certificados* receives 12 percent in each of the five years [stipulated in the Providencia contract], [amounting to] 60 percent of capital invested, and [still remains] entitled to claim from the State 80 percent [of total nominal value of his bonds]. The holders of these securities who have already bought them with paper [money] or those who subsequently buy them at current prices, enjoy one added advantage: they get 1,000 *soles* for every 600 spent, recovering the capital invested in 5 years, and remaining as creditors for 80 percent [of the same capital].

The newspaper added that these prospects were sure to "activate the demand for *certificados*" driving up their prices to such an extent that many bondholders were sure to make "substantial profits" out of them.⁷³ The opposition countered by warning that if the market were "flooded with those securities" the price of the nitrate bonds would surely fall as low as 80 percent.⁷⁴

⁷¹Ibid., pp. 16-18.

⁷²Deputy Chinarro introduced the bill (Perú, *DO1878*, 7-Aug-1878). The resolution was dated 9-Sep-1878, and was included in Perú, *DO1878*, 25-Sep-1878, "Documentos Parlamentarios".

⁷³*La Opinión Nacional* (Lima), 10-Sep-1878.

⁷⁴*El Nacional* (Lima), 12-Sep-1878

A long letter by Jaime Landa addressed to *El Comercio* set forth the position of the Prado Administration just prior to the Senate's debate on the issue of the "public works" bonds.⁷⁵ Landa argued that nitrate, Bank bills and railroads were "linked." He admitted that contracting too many public works in 1870 was a mistake, but that currently there was no time for "recriminations." Perú had "dozed off" while foreign funds were available to continue railroad construction, but when overseas financing dried up domestic bond issues could not replace it. Prado had chosen to continue railroad construction, albeit at a slower pace, because abandoning the railroads was a "serious and dangerous" option, he had supported the expropriation as "the sole source of funds for railroads." Subsequently, Prado could not even maintain railroad construction at current levels without generating a monthly deficit of 100,000 *soles*, and "not a single line advanced, not even in roads already opened". Congress appeared to be yielding to "pressure" coming from the holders of *certificados*, but they should be reminded that they did not have an "exclusive right" to nitrate income. "It is true that, in purchasing nitrate plants, the Government pledged to pay them in two years, but it is also manifestly true that all efforts to raise a foreign loan have been unsuccessful." Landa closed his letter by urging the Senate not to give in to the demands of the nitrate bondholders.

In its reply to Landa, *El Comercio* appeared to soften its language, if not its stance, on the subject. The newspaper urged the opposition to take a "higher and deeper" view, "taking into account, not only the interest of the group representing nitrate properties, but also the general interests of the country." *El Comercio* admitted that "the spirit and the letter" of the law authorized the projected issue, and that the failure of the foreign loan made it impossible to apply the law "in a strict and literal fashion." However, it insisted on rejecting the Providencia contract, and only accepted the issue of additional "public works" bonds after the nitrate bonds were paid in full.⁷⁶

⁷⁵*El Comercio* (Lima), 17-Sep-1878. Landa's letter was dated 16-Sep-1878. I have not found further references on the identity of Jaime Landa, but from the text of his letter he appeared to be part of the group of Lima capitalists linked to Meiggs' railroad projects.

⁷⁶*El Comercio* (Lima), 17-Sep-1878

Jaime Landa's rejoinder included two novel ideas⁷⁷ Landa admitted that an export duty on nitrate would have been preferable to the expropriation, but that the former was ruled out because Perú was "vulnerable to domestic convulsion", and a "revolutionary" "could take hold of nitrate ports". This notion was never mentioned when the expropriation was discussed. It is worth noting that the original justification of protecting guano by curtailing nitrate exports was replaced by a political argument concerning the eventual capture of nitrate ports by unnamed "revolutionaries." Moreover, Landa made clear that former President Pardo viewed the nitrate bonds as the "sole" means of paying for railroad construction, further confirming that public finance considerations, rather than manipulating the price of nitrogenous fertilizers, was the main reason for the operation.

The Peruvian Senate discussed the proposal to forbid the issue of "public works" bonds in late September, 1878. The supporters of the bill, led by Senator Fernando Rosas, argued that railroad works had been vastly overpriced, and that issuing and delivering "public works" *certificados* would render irreversible both future railroad contracts and the Providencia agreement. If the issue of "public works" bonds brought down the current price of outstanding *certificados* to 80 percent, the operation would be equivalent to borrowing funds at an exorbitant interest rate of 16 percent per annum. The estimate was based on the fact that the new bonds would be sold in paper *soles*, but interest would be paid in "hard" *soles*, as it was done with current nitrate bonds. A full inquiry into railroad financing was demanded.⁷⁸

Senator Francisco García Calderón, head of the Associated Banks and the controversial CSP, made the case for the government explaining that cost overruns in railroad construction were due partly to increased prices for basic materials, such as rails, and partly to chronic government delays in making stipulated payments. García Calderón stated that nitrate bondholders were not forced to accept the new terms of payment prescribed in the Providencia contract: they could formally request the rescission of their contracts, recover their plants,

⁷⁷*El Comercio* (Lima), 18-Sep-1878.

⁷⁸Senators Rosas, Villarán, and Torres in: Perú, *SO1878*, 20-Sep-1878.

return the bonds, "and that would put an end to the whole affair" "Who could compel them to accept securities they look upon as valueless in payment for their nitrate properties?"

The President of the CSP was fully aware that nobody would rush to accept his proposal. Bondholders who had bought the securities in the open market did so for purely financial reasons, unrelated to nitrate production. Original recipients who had kept their bonds, and managed their own plants, were happily selling nitrate to the government at a guaranteed price, and collecting interest. Sellers of nonexistent, unassembled, or crippled plants had no incentive to repossess valueless assets. All nitrate bondholders were enjoying quarterly interest payments at a high exchange rate. García Calderón's offer to return plants was purely rhetorical, but it underlined exactly how irreversible the expropriation had become in 1878. He closed his speech by noting that the current high quotation of the *certificados* in the Lima market were a sign of confidence in the Providencia contract, and that nitrate bondholders had nothing to fear from an additional bond issue.⁷⁹ It is worth noting that García Calderón, as Jaime Landa before him, made no mention of protecting guano, repeating the idea that the expropriation scheme had been chosen over an export duty on nitrate due to the danger of the capture of Iquique by "a rebel ship" with "an audacious leader."⁸⁰

García Calderón failed to convince the opposition. The Peruvian Senate voted to approve the Chamber of Deputies' resolution barring the issue of *certificados* to pay for public works by an ample margin of 34 votes against 7.⁸¹ However, almost immediately, Congress found out that the Prado Administration had embarked on a clandestine delivery of the same "public works" bonds which it had taken pains to outlaw.

⁷⁹Perú, *SO*1878, 20-Sep-1878.

⁸⁰Perú, *SO*1878, 21-Sep-1878.

⁸¹Perú, *SO*1878, 2.-Sep-1878.

7. The Barinaga-García Affair

On October 1, 1878, some ten days after the Peruvian Congress had passed the resolution precluding the Executive Branch from delivering "public works" *certificados*, *La Tribuna*, a Lima newspaper, announced that it had been informed that the current Finance Minister, Manuel A. Barinaga, after publicly stating that only bonds for the purchase of nitrate plants had been issued, had discovered that his predecessor, Minister José Félix García, had already delivered 900,000 *soles* in *certificados* as a loan to Charles Watson, Meiggs' successor, *La Tribuna* requested Barinaga to confirm or deny the allegation.⁸² The following day, *La Tribuna* added that the 900,000 *soles* would have been delivered by Watson to the Providencia Bank as a guarantee for a loan;⁸³ the Providencia Bank hastened to publish a rebuttal to the charge.⁸⁴ Almost immediately, Deputy Chinarro addressed an official letter to the Finance Minister asking him to clarify the deliveries of *certificados* to Watson.⁸⁵

Minister Barinaga replied recognizing that in March, 1878, the previous Minister of Finance, J.F. García, had handed out some 970,000 *soles*⁸⁶ in *certificados* to Charles Watson, in order to avoid stopping railroad construction. He explained that the bonds had been delivered "as a loan, not as a payment", and that the government had acted "within its purview". Barinaga stressed the fact that there were "no other means" to finance railroad works, and that if the contractor abandoned unfinished railway lines in the hands of the government, the cost would be equal, or higher, than continuing construction.⁸⁷

⁸²*La Tribuna* (Lima), 1-Oct-1878.

⁸³*La Tribuna* (Lima), 4-Oct-1878.

⁸⁴*El Comercio* (Lima), 8-Oct-1878.

⁸⁵Perú, *DO1878*, 9-Oct-1878. The letter was dated 3-Oct-1878.

⁸⁶The actual figure mentioned in the letter was 971,625.55 *soles*.

⁸⁷Perú, *DO1878*, 9-Oct-1878. Barinaga's reply was dated 8-Oct-1878.

The main Lima newspapers, except for *La Opinión Nacional*, representing the Associated Banks, erupted in a storm of criticism. *El Nacional* angrily declared that the Prado Administration was managing public finance as "a foreign conquering nation".⁸⁸ *La Patria*, in rare agreement with the Prado newspaper, stated that Congress stood idle "in the face of the frauds denounced", adding that "the country" should take part in the nitrate debate.⁸⁹ *El Comercio* demanded the impeachment of former Finance Minister García.⁹⁰

Subsequent explanations added to the confusion. The Providencia Bank was compelled to admit that it had received 900,000 soles in *certificados* from Watson.⁹¹ Barinaga, in a second letter to Congress, acknowledged that García had delivered only 500,000 soles in "public works" bonds to Watson.⁹² The affair gradually evolved into a general indictment of Prado's nitrate and financial policy. Deputy León assailed not only the unauthorized delivery of *certificados* but also furtive emissions of paper soles, arguing that these irregular procedures had sowed "panic" in the domestic market.⁹³

Barinaga's speech to the Chamber of Deputies, answering Deputy León's charges, provided additional details about the delivery of nitrate bonds to Watson: the effect of the Finance Minister's fragmented account of an embarrassing episode could not be favourable. Barinaga reported that Charles Watson had demanded funds from the government on April 30, 1878, presenting a letter of former Finance Minister García, and stating that he wanted to avoid the "immediate stoppage of railroad construction". The government saw fit to authorize

⁸⁸*El Nacional* (Lima), 9-Oct-1878.

⁸⁹*La Patria* (Lima), 9-Oct-1878.

⁹⁰*El Comercio* (Lima), 10-Oct-1878. It appears that the revelation about the emission of 5 million soles in paper money surfaced in an address of Barinaga to the Peruvian Chamber of Deputies which is not available.

⁹¹*La Tribuna* (Lima), 11-Oct-1878.

⁹²Perú, *DO1878*, 17-Oct-1878. The letter was dated 14-Oct-1878.

⁹³Deputy León in: Perú, *DO1878*, 18-Oct-1878.

the same type of loan granted to the Barrechea Nitrate Company in January, 1876⁹⁴, and ordered the delivery of 500,000 *soles* to Watson "as a loan bearing the current interest rate", payable on December 31, 1878. On May 31, 1878, Watson had insisted that the 500,000 *soles* did not fully meet the government's debt of some 970,000 *soles*, and demanded the unpaid balance threatening to place the railroads "under State management", rescinding all contracts; on June 8, 1878, the government had ordered the payment of the outstanding balance due to Watson in *certificados*. Barinaga reminded the Chamber of Deputies that the Peruvian Government owed Meiggs' Company over 4 million *soles*, and that the former Prado Administration had made similar loans "doubtlessly compelled by the same current reasons". After ascribing the present state of Perú to "the fever of railroad construction", and stating that it appeared that "it is not possible to be a Minister of Finance and a decent man in our country", Barinaga submitted his resignation.⁹⁵

Minister Barinaga's last statement was damaging in that it acknowledged that he had also been involved in the delivery of railroad *certificados*, a decision previously attributed exclusively to former Minister García. His mention of the Barrechea loan of 1876 was an attempt to find precedents on questionable decisions of the prior Administration. His candour in providing a full account of the episode could be doubted, partly because he seemed to have been coerced into doing so by a succession of revelations coming from the opposition. More importantly, the incident threw light on the insurmountable predicament of the Peruvian Government with respect to ongoing railroad construction. The Prado Administration could neither halt nor continue building railroad lines without recourse to some form of deficit financing. The opposition had no alternative railroad policy, except blocking all attempts to issue securities or paper *soles* for that purpose.

Following Barinaga's statement, the Chamber of Deputies approved the impeachment of Ministers García and Barinaga by 53 votes against 22, setting up a special commission of inquiry.⁹⁶ The Barinaga-García

⁹⁴For the Barrechea government loans, see above p. 166.

⁹⁵Perú, *DO* 1878, 18-Oct-1878.

⁹⁶Perú, *DO* 1878, 23-Oct-1878, and 24-Oct-1878.

affair did not go any further in 1878, partly because of the prescribed terms for the relevant impeachment procedures, and partly because other nitrate-related issues, particularly the discussion of projects aimed at replacing the Providencia contract, dwarfed all other topics in the second half of the year⁹⁷

8. *Alternatives to the Providencia Contract*

The opposition to the issue of "public works" bonds had been purely negative, but in attempting to repeal the Providencia contract the critics of the Prado Administration were compelled to offer an alternative management scheme for the nitrate industry. One powerful interest group, the nitrate bondholders, had shown its strength in successfully precluding the government from throwing more bonds into circulation. A second interest group, the holders of production contracts, made its voice heard during the debate on the Providencia contract. The size of the latter group had grown in unanticipated proportions during 1878 pushing the combined total of authorized government exports to over 7 million Spanish quintals (See below Table 8.7), vastly exceeding all prior ceilings estimated for the operation.

The first alternative project for nitrate management was submitted to Congress by Juan Vernal y Castro, a Tarapacá nitrate plant owner.⁹⁸ The most important feature of the project was the recognition of undeveloped deposits as eligible for sale to the government, and the reassessment of all new *máquinas* established after 1875. This threatened to push the cost of plant purchases to unforeseeable limits. Other aspects of the expropriation were left unchanged, except that *paradas* would be granted some 10 percent of total authorized exports.⁹⁹ The project was so obviously self-serving, and ignored the question of increased costs to such an extent, that it was not considered by the Peruvian Congress.

⁹⁷For the course of the impeachment in 1879 see below pp. 314-317.

⁹⁸Vernal y Castro was currently operating two small *paradas* under a production contract, and belonged to an old Tarapacá family which had sold several plants to the government. See Tables 1 and 3, Volume 2.

⁹⁹Perú, *DO1878*, 18-Sep-1878.

The first serious alternative scheme to the Providencia contract was drafted by the Finance Subcommittee of the Chamber of Deputies.¹⁰⁰ The project called for a complete "reorganization" of nitrate management, without giving up the goal of purchasing all privately-held plants. A separate law would establish a fixed total volume of 5 million Spanish quintals for nitrate exports, i.e., down by about 2 million from the current quotas for production contracts. More importantly, current production contracts would be transformed into "rental contracts" awarded for each plant by open bidding. Renters of nitrate plants would pay 0.10 silver *soles* per quintal, and an export duty of 1.25 *soles*, also in hard currency. Private nitrate producers would pay only a nitrate duty of 3 *soles*. The outstanding *certificados* would be converted into long-term bonds denominated in British pounds for a total of £4 million, with 8 percent annual interest, and 4 percent amortization. This provision implicitly ruled out the additional £3 million in bonds originally slated for public works, and stipulated payment of both principal and interest charges. The nitrate industry would be supervised by a special corporation, charged with overseeing plants, collecting the export duty, and opening a line of credit of 1 million *soles* to the government. Indirectly, if not surreptitiously, the latter measure involved using part of nitrate income to finance government expenses. The most significant innovation introduced by the project was the restoration of free nitrate sales since the government would no longer purchase nitrate at a fixed price, and the current consignment system was abolished. It was not explained how the government could impose a limit on nitrate exports if free sales were reestablished.

The first objections made to the project of the Finance Subcommittee of the Chamber of Deputies stressed that the reduced ceiling established for nitrate exports would hurt the holders of production contracts currently entitled to manufacture "a larger amount";¹⁰¹ and that it was unlikely that they would voluntarily agree to turn them into rental contracts "because it runs contrary to their interests to do so".¹⁰² *La Patria*, organ of

¹⁰⁰Perú, DO 1878, 21-Sep-1878.

¹⁰¹*La Opinión Nacional* (Lima), 24-Sep-1878.

¹⁰²*El Comercio* (Lima), 25-Sep-1878.

the Piérola faction, broke ranks with the opposition making a spirited defense of the Providencia contract, obviously motivated by the fact that its owner, Dreyfus, also controlled the *Banco Nacional*, party to the contested agreement.¹⁰³

Only *El Nacional*, the organ of former President Pardo, endorsed the project, remarking that current holders of production contracts only required that the new rental contracts be awarded "without prior bidding", and that the rent proposed be eliminated, so that they would pay solely the projected 125 *soles* export duty.¹⁰⁴ Responding immediately to the compromise offered through *El Nacional*, the members of the Finance Subcommittee hastened to submitted a modified proposal dropping the requirement of open bids for the new rental contracts, awarding them automatically to current holders of production contracts, but insisting that the government should cut nitrate output "immediately" to 5 million Spanish quintals.¹⁰⁵

The nitrate bondholders issued a statement accepting the exchange of the securities for long-term bonds.¹⁰⁶ The group appeared to come to terms with the fact that the *certificados* could not be paid fully and immediately, as originally pledged. The major concession of the bondholders with respect to final payment of the *certificados* was not lost on the Peruvian Congress and the Executive Branch. The Peruvian Senate and Chamber of Deputies hastened to address a joint statement to President Prado, requesting the government to refrain from issuing railroad *certificados* until the demands of the holders of nitrate bonds had been duly examined by Congress. Within a week, the Prado Administration accepted the congressional request.¹⁰⁷ Thus, the government tacitly abandoned the widely argued official position that Congress had no constitutional right

¹⁰³*La Patria* (Lima), 26-Sep-1878.

¹⁰⁴*El Nacional* (Lima), 27-Sep-1878.

¹⁰⁵Perú, *DO* 1878, 15-Oct-1878.

¹⁰⁶However, Gildemeister, Folsch and Martin, Oviedo y Trillo, and Ugarte y Cevallos, were conspicuously absent from the list of signatures. *El Comercio* (Lima), 15-Oct-1878.

¹⁰⁷*El Comercio* (Lima), 26-Oct-1878.

to interfere with the Executive Branch on the issue of the Providencia contract. The concession was doubtlessly an attempt to mollify the opposition in the face of the García-Barinaga scandal, which had erupted at the same time.

The Tarapacá contractors proved less pliable than the bondholders. In a statement to the Peruvian Congress, a large group of holders of production contracts complained that their rights would be violated by the project of the Finance Subcommittee. More importantly, they drew attention to the fact that, in the new rental system proposed, the Peruvian Government would lose all control of overseas sales. Since most current producers lacked funds to finance marketing operations, they would be compelled to go back to Valparaíso for funds. If Valparaíso merchants could not afford to hold stocks until prices improved, the world market would be flooded with nitrate, defeating the avowed goal of the expropriation. The contractors also warned about the growing amount of nitrate exports coming from Antofagasta and Taltal, "previously dismissed contemptuously". The statement was signed mostly by Peruvian nitrate contractors, including Ugarte y Cevallos, Oviedo y Trillo, Manuel Moscoso Melgar, and Eusebio Peñaranda. The Italian Félix Massardo, and the British contractor W.G. Speedie were the only two foreign signers.¹⁰⁸ The absence of the more important British and German contractors probably reflected the fact that none of them needed production contracts with guaranteed fixed prices in order to survive. In fact, the reintroduction of market forces in Tarapacá, implicit in the proposed rental system, was to their advantage since they were certain to increase their share of the nitrate market at the expense of weaker producers, kept alive only by profitable production contracts. The larger Tarapacá producers acted exclusively to prevent the Peruvian Government from hurting their interests as bondholders, leaving the struggle to preserve production contracts to lesser producers.

The European creditors of Perú also chose to take a stance on the ongoing debate over nitrate management. One of the two feuding Committees of Foreign Bondholders based in Great Britain, the Croyle Committee, declared in an open letter to the Peruvian Congress that they had a decisive influence in blocking

¹⁰⁸The statement was dated 10-Oct-1878, "Representación de los salitreros al Congreso", in: CSP, *Exposición*, pp 33-34.

the failed £7 million loan projected to pay for the Tarapacá nitrate industry.¹⁰⁹ The same Committee officially notified the British Government that the Providencia contract violated the "general mortgage" over State properties granted by Perú in the loan contracts of 1870 and 1872.¹¹⁰ Subsequently, the Croyle Committee stated that the nitrate deposits, which it termed "inextinguishable", were more valuable than the guano islands.¹¹¹ The French Committee of Peruvian Bondholders overtly sided with the holders of nitrate *certificados*, demanding that all of the bondholders be associated with the direct management of both guano and nitrate.¹¹²

Two events placed the embryonic CSP in an unfavourable light. The first one was the defection of its main domestic stockholder, Mariano Goyenechea y Gamio, raising hopes of an early annulment of the Providencia contract, and thus, according to *El Nacional*, driving up the quotation of the *certificados*.¹¹³ The second was the abrupt bankruptcy of the London firm of James Sawers & Co., chosen by the CSP in early August to handle overseas sales.¹¹⁴ A five-year contract for the marketing of nitrate signed by the CSP and the Sawers firm on September 7, 1878 had to be cancelled when the British company suspended payments in late October, 1878; it was estimated that over 1 million *soles* in local funds, guaranteed by stocks afloat consigned to Sawers, were compromised by the default. *El Comercio* urged that Gibbs be entrusted again with the service of the nitrate bonds. The CSP hastened to publish a statement declaring that the stocks afloat were

¹⁰⁹*Daily Telegraph* (London), 12-Jun-1878.

¹¹⁰*Ibid.* (Editorial), 21-Jun-1878.

¹¹¹*The Bullionist* (London) 28-Sep-1878. The letter, addressed to Lord Salisbury, was dated 18-Sep-1878.

¹¹²*El Comercio* (Lima), 24-Dec-1878.

¹¹³*El Nacional* (Lima), 6-Sep-1878.

¹¹⁴*El Comercio* (Lima), 7 Aug-1878.

safe, and that the Sawers collapse did not affect outstanding drafts issued in Peru¹¹⁵ Subsequently, the company offered to exchange drafts on Sawers by new ones,¹¹⁶ and finally announced that the firm of Graham Rowe & Co. would take charge of the outstanding instruments of debt¹¹⁷ The incident contributed to further the skepticism over the current management of the expropriation as demonstrated in the subsequent discussion of the Providencia contract in the Peruvian Senate.

9. *The Beginning of the End*

The last comprehensive attempt to uphold the Providencia contract was made in November, 1878, by Senator Francisco García Calderón, Chairman of the CSP, in the first (and only) annual report of the corporation.¹¹⁸ Senator's García Calderón defense of the Providencia contract largely reiterated points previously made, particularly that there was no alternative due to the failure of the projected overseas loan, and that Congress did not have the right to annul the agreement. His main argument, however, was that the operation could not be undone because the *certificados* had been widely traded as "vouchers payable to the bearer", irrespective of the specific plants for which they had been delivered. He noted that the majority of the recipients had explicitly requested bonds payable to the bearer in order to sell them as soon as possible, thus turning the issue of nitrate *certificados* into "a veritable loan floated in the domestic market", and the securities themselves into virtual "paper money". García Calderón listed a wide range of transactions made with *certificados*, including payment of debts, purchases of urban and rural real estate, savings deposits, collateral for loans, and stock exchange operations. A "large number" of *certificados* had already gone to Chile in exchange for desperately needed drafts on London. This was the best overview of the role of the nitrate bonds in Perú

¹¹⁵*El Comercio* (Lima), 22-Oct-1878.

¹¹⁶*El Comercio* (Lima), 28-Oct-1878.

¹¹⁷*El Comercio* (Lima), 6-Nov-1878.

¹¹⁸CSP, *Exposición*.

prior to 1879, confirming what the Lima press had been reporting for the past two years: the *certificados* were used as a substitute currency in a market bereft of reliable means of payment and savings.

García Calderón joined the holders of production contracts in assailing the rental system proposed in the Chamber of Deputies, appending their statement to his report.¹¹⁹ He added that it was unwise to restore free nitrate sales in the face of growing competition from the Antofagasta Company because the Tarapacá industry would cease to be controlled "by one diligent and powerful hand". Peruvian producers would be "individually weak" and, "not too far into the future", Tarapacá nitrate would have a "secondary position currently held by Bolivian [i.e., Antofagasta] production". This was yet another public recognition of the looming threat posed by the Antofagasta Company. Finally, García Calderón also warned about the danger of Tarapacá producers supporting "a rebel force" if their production contracts were unilaterally revoked since "many have not been born in this country, and are retained only by current profits....: they will leave the first day their profits vanish".

García Calderón's elaborate defense failed to convince the opposition. On December 21, 1878, the Senate's Finance Commission, submitted yet another alternative project, based on a report signed by Senator Fernando Rosas, proposing the actual repeal of the expropriation law.¹²⁰ The report noted that the rental system suggested by the Chamber of Deputies was based on a "blatant contradiction" since it proposed simultaneously to restore free nitrate sales and fixed a ceiling to nitrate exports. Under such a system, any assigned quotas for individual producers would be unenforceable. Significantly, the report stressed the competition from the Antofagasta Company, regretting the "superficial" fashion in which it had been dismissed during the discussion of the expropriation law.

It is an incontestable truth that development of nitrate production in Bolivia [i.e., Antofagasta], as well as current Chilean efforts to install [nitrate plants] in its territory, were spurred by the operations performed in Perú to bring about the monopoly [of the Tarapacá nitrate industry], and the attendant price increases. Without the benefits granted to them by these [price

¹¹⁹See above p. 277.

¹²⁰Perú, SO1878, 21-Dec-1878.

increases], they would have never attempted to exploit the Antofagasta deposits on the scale observed today, nor would they prepare to work other deposits in Chile.

The Commission added that it is was no longer possible to

nurture the illusion that [nitrate] prices depend exclusively on us. What we abstain from producing, others manufacture, and the restrictions we impose serve only to trigger a competition which otherwise could not have emerged. To persist in this course is to condemn ourselves to inevitable ruin.

The report urged the immediate return to a free Tarapacá nitrate industry with no restrictions other than an export duty. All plant purchases should be discontinued, and existing production contracts, termed "unassailable", should be allowed to lapse in the stipulated terms. It was not explained in the proposal if the outstanding nitrate bonds would be simply exchanged for the corresponding Tarapacá assets. With the report of the Senate's Finance Commission in December, 1878, the expropriation of the Tarapacá nitrate industry appeared to have come full circle. After some two years of massive plant purchases, coupled with a flood of nitrate bonds, the most important Commission of the Peruvian Senate officially declared that the expropriation had achieved none of its original goals, and that in fact it had conjured up the very competition it had set out to demolish. The actual performance of the Tarapacá nitrate industry during 1878 supported those conclusions.

10. Balance of the Expropriation, 1878

One of the remarkable developments of 1878 was the exceptional quotations of the nitrate bonds in the face of the turmoil surrounding the Providencia contract. The price of the *certificados* in the Lima market was apparently affected both by the Providencia contract and the Barinaga-García scandal, as Table 2.7 makes clear, but it held at a respectable level.

Table 2.7

*Average Quotations of Nitrate Bonds, Exchange,
and Bonds of the Internal Debt,
Lima, 1878*

Month- Year	Average 1,000 Bonds	Average 10,000 Bonds	Average Price Int. Debt	Average pence per sol	Average Soles per £
Jan-78	96.10%	95.40%	48.60%	22.85	10.66
Feb-78	95.00%	94.25%	54.83%	23.00	10.40
Mar-78	104.81%	104.44%	54.19%	23.50	10.40
Apr-78	105.17%	104.67%	58.00%	26.33	9.17
May-78	99.56%	99.28%	56.83%	28.00	8.72
Jun-78	101.29%	100.71%	54.50%	25.86	9.00
Jul-78	94.50%	93.82%	53.36%	27.27	8.91
Aug-78	93.38%	92.59%	50.41%	26.91	9.00
Sep-78	95.13%	94.41%	51.63%	26.81	9.00
Oct-78	92.34%	91.68%	50.08%	25.10	9.96
Nov-78	96.39%	95.87%	49.95%	24.39	9.70
Dec-78	95.44%	94.94%	50.44%	25.65	9.39
1878 (ave.)	97.42%	96.84%	52.74%	25.47	9.53

Source: Derived from Table 5, Volume 2.

Since the first disclosure about a surreptitious delivery of *certificados* for railroad construction was published in *La Tribuna* on October 1, 1878, and the ensuing debate took place during the same month, it seems that, as Table 2.7 shows, the Barinaga-García scandal pushed the prices of the nitrate bonds to an all-time low of 92.34 in October, it is equally clear that the signing of the Providencia contract on July 16, 1878, did not help the quotations of the *certificados*, since they abruptly dropped from 101.29 in June to 94.50 in July.

Indeed, up to the very last month of 1878, trading in *certificados* was active, and prices held at over 96 percent¹²¹ Only in the very last day of the year, a discernible, albeit still slight, drop in nitrate bond prices was detected, and linked to uncertainties regarding the service of the securities.

¹²¹"Revista Mercantil de la Semana", *El Comercio* (Lima), 24-Dec-1878.

The two percent fall experienced by the nitrate [bonds] constitutes a response to forced sales by some holders at a time when the service [of the securities] is not well defined

The article added that, at that time, there was no decision on the service of interest charges, nor on the corresponding sinking fund.¹²² The surprising resilience of the nitrate bonds, priced consistently at over 90 percent of par value, and reaching the end of 1878 at some 94 percent, in the face of mounting anxiety over their service coupled with a disturbing exposure of covert emissions, could be explained by the fact that Peruvians had no other alternative currency, since the paper *sol* was clearly viewed with equal, if not greater, mistrust.

As Table 3.7 shows, the sales contracts signed in 1878 were fewer in number than those signed in the two previous years. Indeed, only 21 sales contracts out of a total of 144 were approved in 1878, adding some 4 million *soles* to the outstanding nitrate debt, which increased from slightly more than 15 million in 1877 to some 19.3 million *soles* in 1878. In merely eight months of 1876, Prado had agreed to pay 44 percent of the total value of plants purchased; Prado added another 34 percent in the last four months of 1876, and throughout 1877. 1878 was not a major year for plant purchases simply because there was not much left to buy in Tarapacá.

¹²²"Revista Mercantil de la Semana", *El Comercio* (Lima), 31-Dec-1878. The review stated that the price of the nitrate bonds had fallen to 94.5 and 93.

Table 3.7

*Sales Contracts for Nitrate Plants,
1876-1878
(Soles)*

Pre- sid- ent*	Ye- ar	No. Cont- rcs.	% Cont- rcs.	Total Value Plants	% Value Plants	Cum. Total
Pardo	76	59	40.97%	8,759,555.36	44%	8,759,555.36
Prado	76	24	16.67%	2,084,135.00	11%	10,843,740.36
Prado	77	30	20.83%	4,501,476.18	23%	15,345,216.54
Prado	78	21	14.58%	4,032,465.00	20%	19,377,681.54
Total	76-80	144		19,732,293.54		

* Prado took office on 2-Aug-1876; he was replaced by Piérola on 19-Dic-79.

Source: Derived from Table 1, Volume 2.

However, the average value of the sales contracts signed in 1878, some 192,000 soles, was higher than in all other prior periods, indicating that, although in that year there were fewer sales contracts concluded and for a lesser total value, the plants bought were expensive.¹²³ Table 4.7 shows the plants sold in 1878, including the name and nationality of the seller. The most important sellers were the Peruvian Company Rimac, paid 650,000 soles for both "Carmen Bajo" and "Perla", and Ugarte y Cevallos y Compañía, also a Peruvian firm. In fact, the overwhelming majority of the 1878 sellers were Peruvians, since "Angela", a revamped *parada* bought for 300,000 soles, had been transferred to the Peruvian firm of Loayza y Pascal after 1876, for a highly controversial overhaul which beefed up considerably the price of the enterprise.¹²⁴ The significance of this fact is that the 1878 sellers were mostly recalcitrant, independent producers, who crippled the government

¹²³For the first eight months of 1876, i.e., the last Pardo years, the average was some 149,000 soles; for the last four months of 1876, i.e., the first Prado years, the average was 87,000; for 1877, 150,000; and for 1878, 192,000

¹²⁴See above p. 259.

expropriation scheme by competing with State-controlled nitrate, or owners who held out hoping for a better offer. The record shows that most of the late sellers, encumbering the full implementation of the government plan, were Peruvians, and it might not be accidental that most of the plants sold in 1878 were singled out either by *El Comercio* or Julio A. Oviedo as questionable purchases¹²⁵ it was around those plants that suspect dealings were most likely to be made, due to the increasing anxiety of the Prado Administration to complete the purchase of all of the Tarapacá industry, staving off competition

¹²⁵See above pp. 258-265.

Table 4.7

*Nitrate Plants sold,
Contract Date, Price, Seller, and
Nationality, 1878
(Soles)*

No.	Plant	Contract Date	Total Paid	Owner 1876	Nation
1	Carmen B. (1)	07-Feb-78	630,000.00	C.S.Rimac	Per
2	S. Carlos	15-Feb-78	195,000.00	C.S.S.Carlos	Ch
3	Concepción	16-Feb-78	18,365.00	C.S.California	Ch
4	Porvenir	16-Mar-78	150,000.00	Délano,Oloff	Ch
5	Sacramento(D)	16-Mar-78	200,000.00	Délano,Oloff	Ch
6	S.Lorenzo(UC)	18-Mar-78	500,000.00	Ugarte y Cev.	Per
7	S. Jorge	26-Mar-78	50,000.00	Ugarte y Cev.	Per
8	Abra de U.	26-Mar-78	75,000.00	Vernal,R.	Per
9	S. Pablo	30-Mar-78	300,000.00	Elguera,Pedro	Per
10	Angela(2)	09-May-78	300,000.00	Georgeson,T.	Br
11	Sta. Laura(W)	28-May-78	78,000.00	Wendell,Heirs	Per
12	S. Antonio(P)	11-Jun-78	200,000.00	Peñaranda,E.	Per
13	Salar d.l.N.	22-Jun-78	220,000.00	Oliva,Daniel	Ch
14	Chinquiquiray	01-Jul-78	220,000.00	Oviedo Trillo	Per
15	N.Carolina	05-Aug-78	350,000.00	Cía.S.N.Caro.	Ch
16	Sto. Dgo.(V)	28-Nov-78	12,000.00	Vidoliche,D.	Per
17	N.Rosario(3)	30-Nov-78	0.00	Brañez,E.	Per
18	Paccha(B)(3)	30-Nov-78	0.00	Brañez,E.	Per
19	S.Fco.(Brañez.)	30-Nov-78	260,000.00	Brañez,E.	Per
20	Santiago(C)	05-Dec-78	248,200.00	Ossio,Mariano	Per
21	S. José (D)	13-Dec-78	25,900.00	Devéscovi,J.	Per
21	Total Prado 1878		4,032,465.00		

(1)Included "Perla".

(2)Transferred after 1876 to the Peruvian firm Loayza y Pascal.

(3)Sold with S. Fco.(Brañez).

Source: Derived from Table 1, Volume 2.

Due to the fact that the signing of a sales contract for a given amount was not always followed by the delivery of the pertinent *certificados*, the total value of plants sold in a period, as shown in Table 3.7, did not

coincide with the total value of the bonds actually put in circulation. Table 5.7 lists the nitrate bonds delivered from 1876 through 1878.

Table 5.7

*Nitrate Bonds Delivered, and
Yearly Interest Charges,
1876-1878*

Pre- sid- ent*	Ye- ar	Amount bonds (soles)	% of Total	Yearly Interest (£)**	Yearly Cum. Interest (£)
Pardo	76	2,341,000.00	11.86%	32,774.00	32,774.00
Prado	76	3,076,000.00	15.59%	43,064.00	75,838.00
Prado	77	6,546,325.00	33.18%	91,648.55	167,486.55
Prado	78	5,749,606.12	29.14%	80,494.49	247,981.04
Tot. 76-80		19,732,293.54		276,252.11	

*Prado took office on 2-Aug-76; he was replaced by Piérola on 19-Dec-79.

**2 % quarterly interest at 42 d. per sol.

Source: Derived from Table 2, Volume 2.

Clearly, the Pardo Administration, in spite of signing some 8.7 million *soles* in sales contracts, or 44 percent of total plants sold (see Table 3.7), delivered only 2.3 million *soles* in *certificados*, or less than 12 percent of all bonds issued, as reflected in Table 5.7. It was left to the subsequent Prado Administration to deliver the vast majority, or 82 percent, of the pertinent nitrate bonds. Table 5.7 shows that 1877 was the peak year for bond deliveries, with 1878 following closely, in fact, in those two years, some 43 percent of the *certificados* were handed out. The most obvious impact of these massive bond issues in a two-year period was the spectacular growth of the interest charges owed on the securities: it virtually doubled every year after 1876, climbing to close to a quarter of a million pounds in 1878. Since interest on the *certificados* had to be paid out of income generated by nitrate sales on the world market, the increase of these payments gradually crushed all

hope of obtaining some surplus for the government, and explains the reluctance of the Gibbs firm, as well as all other potential foreign contractors, to take charge of nitrate management

The failure of the Peruvian Government in achieving the two original goals of the expropriation, the reduction of nitrate production and the increase in nitrate prices, is best illustrated by the figures included in Table 6.7. Clearly, 1878 represented a major step backwards with respect to curbing exports and beefing up prices: total exports climbed to over 250,000 long tons in 1878 from slightly more than 192,000 in 1877, and prices declined slightly from £14 15s in 1877 to £14 10s in 1878. No information on guano exports is available, but price of the fertilizer declined to a £11 per long ton, the lowest level in the last eight years. All basic assumptions on guano and nitrate held by the supporters of the expropriation were challenged in 1878 since the prices for both fertilizers fell simultaneously. In spite of nitrate prices remaining at over £14 a ton, the Peruvian Government not only was unable to increase guano prices, as originally intended, but was forced to lower them. Furthermore, in June, 1878, the Prado Administration issued a decree stating that the Dreyfus syndicate, striving for two years to collect its outstanding loans to the Peruvian Government, was actually a net debtor to the country.¹²⁶ The ensuing squabble further closed the possibility of reaching a compromise with the French financier over the guano stocks he controlled.

¹²⁶Olinger, "Dreyfus", p. 178.

Table 6.7

*Guano and Tarapaca Nitrate,
Exports and Prices,
1870-1878
(Long Tons, £ per Long Ton)*

Year	(1) Guano Exports (a)	(2) Nitrate Exports (a)(b)	(3) Price Guano (c)	(4) Price Nitr. (c)	Total Exports (d)	% Guano (d)	% Nitrate (d)
1870	698,176	125,252	14.00	16.05	823,428	84.79%	15.21%
1871	363,200	153,443	12.00	17.00	516,643	70.30%	29.70%
1872	404,097	179,607	12.00	15.05	583,704	69.23%	30.77%
1873	342,425	266,543	12.15	14.15	608,968	56.23%	43.77%
1874	336,476	237,586	13.00	13.00	574,062	58.61%	41.39%
1875	373,688	306,623	12.10	11.15	680,311	54.93%	45.07%
1876	379,000	299,391	12.10	11.10	678,391	55.87%	44.13%
1877	310,000	192,411	12.00	14.15	502,411	61.70%	38.30%
1878	n.a.	251,457	11.00	14.10	n.a.	n.a.	n.a.

(a) Long tons.

(b) Original in Sp. Quintals, converted by the author into long tons dividing by 23.5; Tarapaca, exclusive of Antofagasta.

(c) British pounds per long ton, FOB, UK.

(d) Computed by the author.

Source: (1)-(3) Greenhill, "Peruvian", p.111; Rodríguez, "Historia", p.110.

(2) *El Veintiuno de Mayo* (Iquique), 14-May-1884.

(4) *The Economist* (London), 13-Mar-1880;

Greenhill, "Peruvian", p.110.

Table 7.7 shows the decrease of nitrate prices throughout the first nine months of 1878 in more detail. A distinct upsurge during the first months of the year, particularly March, was followed by a gradual decline up to August, capped by an abrupt fall in September. The trend detected in Table 7.7 might illustrate a progressive loss of control over exports, particularly since the withdrawal of Gibbs from nitrate consignment after the rejection of a renewal agreement around May, 1878 paved the way for the Providencia contract signed in July; after that month the CSP was on its own with respect to overseas sales, and it is hardly a coincidence

that the new firm chosen by the CSP to handle overseas sales, Sawers & Co., was selected in August, the pertinent sales contract was signed in September, and the firm collapsed in October

Table 7.7

*Nitrate Prices,
Liverpool,
January - September, 1878
(Shillings and pence per English Quintal)*

Date (Eng. Q) (100 lb)	Arrived Liverpool (Sh d)	Date El Comercio
01-Jan-78	15.1	03-Oct-78
03-Jan-78	15.3	03-Oct-78
16-Jan-78	15.3	03-Oct-78
01-Feb-78	15.6	03-Oct-78
16-Feb-78	15.7	03-Oct-78
01-Mar-78	15.9	03-Oct-78
16-Mar-78	15.10	03-Oct-78
28-Mar-78	16.5	03-Oct-78
29-Mar-78	16.9	03-Oct-78
01-Apr-78	16	03-Oct-78
05-Apr-78	16.3	03-Oct-78
16-Apr-78	16	03-Oct-78
01-May-78	16	03-Oct-78
11-May-78	16	03-Oct-78
16-May-78	16	03-Oct-78
23-May-78	16	18-Sep-77
30-May-78	15	17-Sep-77
01-Jun-78	15.6	03-Oct-78
06-Jun-78	15	03-Oct-78
11-Jun-78	14.9	03-Oct-78
15-Jun-78	15.0	03-Oct-78
27-Jun-78	15	21-Nov-77
01-Jul-78	15.6	26-Nov-77
11-Jul-78	15	16-Jan-78
16-Jul-78	15.3	03-Oct-78
01-Aug-78	15.0	03-Oct-78
26-Sep-78	13.9	03-Oct-78

Table 8.7

*Production Contracts for Active
Nitrate Plants*,
1876 - 1878
(Spanish Quintals and Metric Tons)*

President Year	No.	Min. Output per annum (Sp.Q.)	Max. Output per annum (Sp.Q.)	% Total	Cummul. Output (M.Tons)
Pardo-76	2	1,150,000	1,700,000	23.88%	77,272.73
Prado-76	22	501,800	541,800	7.61%	101,900.00
Prado-77	8	958,200	958,200	13.46%	145,454.55
Prado-78	15	3,920,000	3,920,000	55.06%	323,636.36
Total	47	6,530,000	7,120,000		

*Excluding renewals and inactive plants.

Source: Derived from Table 3, Volume 2.

However, there is little doubt that the most acute problems for the Prado Administration came from the exorbitant volume of output assigned to new contractors in 1878. As Table 8.7 shows, the increase in total output quotas assigned to new holders of production contracts during 1878 was quite spectacular. Prado had signed three production contracts but only two of them, the Gibbs and the Gildemeister agreements, were actually fulfilled. Prado signed 23 and 14 production contracts in 1876 and 1877, but only 22 and 8 respectively corresponded to active operations, including a large number of small *paradas*,¹²⁷ the novelty of 1878 in this respect was that all of the contracts approved corresponded to active *máquinas*, and the combined output assigned, some 178,000 tons, was actually larger than the previous cumulative total for the entire operation, or some 145,000 tons. Total accrued output contracted reached an exorbitant 7,120,000 quintals (323,636 tons), far

¹²⁷See Table 3, Volume 2.

exceeding all expectations, including the 2.4 million-quintals ceiling which figured so prominently during the 1875 discussion of the expropriation.

Table 9.7

*Production Contracts signed in 1878,
Tarapacá
(Spanish Quintals)*

No.	Plant	Ty- pe	Contractor	Date Contract	Output per annum (Sp.Q.)
1	S.José((N)	M	Pío Fasola	07-Feb-78	180,000
2	S.Lorenzo(1)	M	Ugarte y Cevallos	14-Feb-78	500,000
3	Esmeralda	M	Clark, Eck & Co.	19-Feb-78	200,000
4	S.Carlos(2)	M	Folsch & Martin	28-Feb-78	480,000
5	Sacramento	M	Edwards & Co.	23-Mar-78	400,000
6	Sta.Catalina	M	Otto Harnecker	24-Apr-78	200,000
7	Angela	M	Loayza y Pascal	26-May-78	250,000
8	Peña Ch.(3)	M	M.Aguirre	01-Jun-78	250,000
9	Stgo.(C)	M	Pedro Perfetti	01-Jun-78	150,000
10	S.Antonio(P)	M	E.Peñaranda	08-Jun-78	140,000
11	S.Pablo(4)	M	P.Elguera	19-Jun-78	300,000
12	Solferino(5)	M	F.Massardo	01-Nov-78	400,000
13	Sta.Adela	M	J.Devescovi	31-Dec-78	120,000
14	Chinqui.(0)	M	Oviedo y Trillo	31-Dec-78	150,000
15	Porvenir	M	Speedie et al	31-Dec-78	200,000
15 Prado 1878					3,920,000

- (1) Included *paradas* "San Jorge" and "Abra de Ugarte".
 (2) Included "Paposo" and "San José de Yungay".
 (3) Included "San José de Aguirre". Date assumed.
 (4) Included "Santa Rosa".
 (5) Rental agreement turned into production contract.

Source: Derived from Table 3, Volume 2.

Table 9.7 shows that substantial production contracts were signed throughout 1878, including the Peruvian firm Ugarte y Cevallos and the German company Folsch and Martin, for three plants each, in February, the Chilean firm Edwards & Co. in March, and the Italian Félix Massardo in November; all of these

contractors were awarded 400,000 Spanish quintals (18,182 tons) or more each, Ugarte y Cevallos alone being granted a robust 500,000 Spanish quintals (22,727 tons). Only the two first contracts signed by Gibbs and Gildemeister in 1876 were higher, the quotas awarded for "Barrenechea" and the El Toco deposits (800,000 and 1.5 million quintals respectively) remaining unfulfilled¹²⁸

The critical factor behind the 1878 wave of large production contracts was doubtlessly the falling Peruvian *sol*, shrinking costs paid in declining paper *soles* while making nitrate sales at a "hard" (i.e., 44 d) *sol* stipulated by the government increasingly attractive. This greatly reinforced the position of the free producers, making them much less vulnerable to the government's taxation scheme, as García Calderón recognized in the Annual Report of the CSP.¹²⁹ The need to entice free producers with substantial contracts was perceptible in the Harnecker contract for "Santa Catalina": the government accepted Harnecker's proposal of taking over approved contracts for other plants, and granted him the right to use equipment and tools from inactive *oficinas*.¹³⁰

Starting with the first plants purchased from Gibbs and Gildemeister in 1876, the terms of the corresponding production contracts were viewed as part of the overall price paid to a given seller. Since the government could not increase the assessed value of nitrate plants without triggering an outcry from the opposition, it was increasingly forced to award generous production contracts in order to attract reluctant sellers. The method proved self-defeating. If the purpose of neutralizing free producers was to curtail exports, the enormous quotas handed out to bring them into the fold made them just as dangerous as State contractors as they had been as independent exporters. With over 7 million Spanish quintals in authorized output, the Tarapacá government sector ended up being its own worst enemy.

¹²⁸See listing in Table 3, Volume 2.

¹²⁹CSP, *Exposición*, p. 2.

¹³⁰*El Comercio* (Lima), 24-May-1878.

Sensitive to the impact of the falling exchange on the profits of both contractors and free producers, the Peruvian Government abruptly reduced all prices stipulated in production contracts to 1.45 *soles* (down from 1.80 to 1.50 *soles* previously agreed upon, depending on the contract)¹³¹, stirring protests in Tarapacá.¹³² Rumours of a discriminatory implementation of the price reduction fuelled further distress.

Dr. Osorio declares that he will bring action against the Government on account of J.D. Campbell & Co. & I have half a mind to let him fight it out & meanwhile deliver at 1.45 *soles* under protest....It is reported that the Government will not apply the reduction to Gildemeister's original 650,000 quintals, but only to the 200,000 quintals excess --this the other producers will of course make use to strengthen their argument.¹³³

Finally, the conflict was settled by reducing the exchange rate granted to the "nitrate *sol*" paid by the government from 44 to 40d,¹³⁴ but since no such measure could affect the producers who freely sold their output, they could afford to exact the exceptional quotas granted during 1878.

The subject of large production contracts was broached in the opposition press, although not nearly as much as the issues of plant purchases and nitrate bonds, two topics which appeared to have overshadowed all other related concerns. One unsigned comment published in September, 1878, noted that all alternative projects currently discussed failed to acknowledge the fact that production contracts had been signed "without method or measure", making it impossible to curtail nitrate output; placing the total amount contracted in 8 million Spanish quintals (363,636 tons) (actually, as Table 9.7 shows, it was some 7.12 million), a figure "far in excess of demand, even if it is estimated in a careless fashion, higher than the largest consumption [observed], and

¹³¹See Table 3, Volume 2, for the listing of prices awarded to each production contract.

¹³²"Reduction to 1.45. Cisneros tells me that everybody has answered more or less like ourselves--only one Contractor offered to submit, if all others did--& the Delegates submitted the question to the government." Bohl to Read, Lima, 2-Aug-1878. Gibbs Ms. 11,132.

¹³³Bohl to Read, Lima, 18-Sep-1878. Gibbs Ms. 11,132.

¹³⁴García Calderón provided this information in November, 1878 (CSP, *Exposición*, p. 17-18), but the exact date of the pertinent decree is not available. Prices appeared to have been fixed evenly at 1.50 *soles*.

almost double the total contracted in the past two years".¹³⁵ However, this was a truly exceptional, if entirely legitimate, reaction; all of the alternative projects proposed at the time, including the proposal of the Finance Subcommittee of the Chamber of Deputies and the Rosas project in the Senate, explicitly proclaimed that the current production contracts were untouchable without mutual consent. Doubtlessly the Tarapacá contractors were courted by all parties involved, nullifying all attempts to curtail the upsurge in nitrate exports. Besides the obvious effect of an unbridled nitrate output on both overseas markets and the revenue of the CSP, forced to pay for the contracted quotas at a fixed price in Iquique and selling the product at declining prices in Europe, the large production contracts were a major obstacle in finding European partners for long-term financing agreements, and almost certainly explained the embarrassing choice of the tottering British firm, Sawers & Co., to handle nitrate sales, since no reputable subconsignee was found. The year 1878 marked the visible collapse of the Peruvian expropriation, pushing the country closer to the catastrophe of 1879. In sharp contrast, 1878 was a truly outstanding, albeit thorny, year in neighbouring Antofagasta.

11. The Antofagasta Company in 1878

For the Antofagasta Company, 1878 was the Year of the Tax. On February 14, 1878, the Bolivian Government, upon congressional approval, issued a decree imposing a 10-cents duty on each quintal of nitrate exported from Antofagasta.¹³⁶ Since the new duty violated the 1874 Treaty on Limits between Chile and Bolivia, which froze taxation for Chilean enterprises in the Bolivian littoral at current rates,¹³⁷ the measure had major diplomatic repercussions, conjuring up the spectre of war. A military confrontation between Bolivia

¹³⁵*El Comercio* (Lima), 25-Sep-1878.

¹³⁶Text of the Bolivian decree in: Bertrand, *Memoria*, Bolivian Documents, p. 62.

¹³⁷See above pp. 97-98.

and Chile was also likely to involve Perú because the 1873 secret Bolivian-Peruvian Treaty called for joint action in the face of an attack by a third party.¹³⁸

The official approval of the export duty was followed by a tense one-year period of diplomatic negotiations between Bolivia and Chile, conducted mainly in the Bolivian capital. This protracted interval was the result of several factors. First, the measure had broad international implications dictating some caution. In addition, due to the notorious volatility of Bolivian Administrations, taxation in Bolivia was routinely considered as an interim decision, subject to subsequent adjustments or outright repeal. Finally, as transpired from the correspondence of the CSA, the Bolivian Government was involved in a potentially explosive squabble with Perú, erupting in early 1878. On March 22, 1878, the Daza Administration abruptly discontinued negotiations with Perú over the renewal of the expiring Bolivian-Peruvian Customs Treaty.¹³⁹ In early April, 1878, General Manuel Othon Jofré, the current Prefect of the Littoral, approached the manager of the CSA to request 2,000 rifles to prevent a Peruvian attack on the area. Hicks noted that Bolivians in the region were predicting a "revolution" in Tarapacá which would secede from Perú to join Bolivia. Although Hicks viewed the whole affair as a "farce", and declared that his company was "neutral",¹⁴⁰ the question was not settled until October 15, 1878, with the signing of a new Bolivian-Peruvian Customs Treaty.¹⁴¹ The seven-month clash with a potential military ally must have weighed heavily on the decision of the Daza Government to withhold the implementation of the nitrate duty in Antofagasta. It also allowed the CSA to continue expanding exports throughout 1878 without actual interference from the Bolivian authorities.

The news of the discussion of the nitrate duty in the Bolivian Congress at the beginning of 1878 found the manager of the CSA in conflict with the local authorities over a previously-contested lighting tax, and a

¹³⁸See above p. 94.

¹³⁹*El Peruano* (Lima), 8-Apr-1878.

¹⁴⁰Hicks to Soubllette, Antofagasta, 9-Apr-1878. CSA.AG. Vol.13, fs. 071-072.

¹⁴¹Rojas, *Historia*, pp.387-390.

newly-fabricated ballast duty. Hicks ascribed the enthusiastic support of the Antofagasta civil servants for the nitrate duty to the fact that they had gone unpaid for six months.¹⁴² In contrast, Prefect Jofre, alive to the military implications of the controversial duty, "expressed his surprise with genuine feeling" to Hicks, blaming the measure on two "enemies of the company". He added that current Bolivian Minister of Finance Salvatierra did "everything he could" to oppose the measure, and asked Hicks to request the Board of the Directors of the CSA "not to act hastily". Subsequently, Jofré made clear that he disagreed with the nitrate duty, stating that "the matter is not considered to be a law, but rather an authorization given to the government to implement the tax if it deemed fit to do so".¹⁴³

The Prefect returned a week later with an explicit order from the Bolivian Government to collect the nitrate duty, claiming that he was "forced" to do so, and offering to use his "influence" to settle the problem, while Hicks responded by threatening to fire all the company's workers if he was compelled to pay the duty;¹⁴⁴ but discussions over the issue were interrupted when Jofré was appointed Minister of Defense in May, 1878. Upon announcing his promotion to Hicks, Jofré pressured the CSA into hiring his son as the company's lawyer in Antofagasta, pledging to provide confidential information from La Paz through him. After settling the issue of the salary of Jofré's son, reducing it from the 3,000 Chilean *pesos* per annum demanded by the Prefect to

¹⁴²Hicks to Soubllette, Antofagasta, 26-Mar-1878, 29-Mar-1878, and 1-Apr-1878. CSA AG Vol.13, fs 031-032, 037-038, 044.

¹⁴³Hicks to Soubllette, Antofagasta, 1-Mar-1878, and 5-Mar-1878. CSA AG Vol 12, fs 252-253, 258. The Bolivian historian Querejazu made a serious mistake on the issue of the Prefect's identity. He erroneously stated that the Prefect in early 1878 was Narciso de la Riva, further noting that President Daza, "becoming aware that his political representative in Antofagasta was unfit to serve", replaced him by his friend, Colonel Severino Zapata in May, 1878. Querejazu missed the discovery that the Prefect in question was in fact General Manuel O. Jofré, and that, far from being mistrusted by Daza, he was promoted to Minister of Defense, becoming an informer for the Antofagasta Company (See below pp 346-347). Querejazu, *Guano*, pp 185-186.

¹⁴⁴Emphasis in the original. Hicks to Soubllette, Antofagasta, 12-Mar-1878. CSA AG. Vol.13, fs 001-004

2,400 *pesos*, the CSA accepted.¹⁴⁵ Subsequently, Jofré Jr regularly provided Hicks with reports sent to him by his father during his tenure as Defense Minister, including cabinet's discussions and advise.¹⁴⁶

Most of the rest of 1878 was spent waiting for the outcome of diplomatic negotiations held in Bolivia, although Hicks was almost jailed for his stern opposition to the lighting tax, viewed by the manager of the CSA, along with the previous ballast duty, as "merely means to prepare for the 10-cents duty".¹⁴⁷ The judgement was accurate. In the last day of 1878, Colonel Severino Zapata, the Prefect replacing Jofré, demanded the payment of some 90,000 *Bolivianos* on account of the "unpaid balance" of the nitrate duty through the Notary of Antofagasta. At the same time, the Chilean Consul General of Antofagasta officially informed Hicks that negotiations over the issue had broken down in Bolivia.¹⁴⁸ Although Minister Jofré's son recommend yet another legal recourse, this time before the Bolivian Supreme Court, claiming that one of its members, Pantaleón Dalence, would reject the nitrate duty,¹⁴⁹ war was looming over Antofagasta at the end of 1878.

From the first day of 1878, based upon the "current good prices", Hicks received specific instruction from Valparaíso to work the best deposits, mine the largest possible amount of ore, and operate plants at capacity.¹⁵⁰ Table 10.7 shows the unprecedented increase of nitrate prices in Antofagasta during 1878.

¹⁴⁵Hicks to Soublette, Antofagasta, 24-May-1878. CSA.AG. Vol.13, fs. 145-146, 148.

¹⁴⁶The most important reports from Defense Minister Jofré arrived at the end of 1878, when the position of the Bolivian Government towards the nitrate duty hardened. Jofré's son helped out on local affairs, particularly with the litigious land claims. Cf. Hicks to Soublette, Antofagasta, 26-Nov-1878 and 29-Nov-1878. CSA.AG. Vol 15, fs. 004, 008-009.

¹⁴⁷Hicks to Soublette, Antofagasta, 22-Oct-1878 and 25-Oct-1878. CSA.AG. Vol.14, fs. 192-193, 198-201.

¹⁴⁸Hicks to Soublette, Antofagasta, 31-Dec-1878 CSA.AG. Vol.15, fs. 077-079.

¹⁴⁹Report of Jofré Jr to Hicks, Antofagasta, 31-Dec-1878. CSA.AG. Vol.15, fs. 104-107.

¹⁵⁰Hicks to Soublette, Antofagasta, 1-Jan-1878 and 18-Jan-1878. CSA.AG. Vol.12, fs. 114, fs. 147.

Table 10.7

*Nitrate Prices, Antofagasta,
1873-1878
(Chilean Pesos per Spanish Quintal)*

Date	Price p.S.Q.* (Pesos)	Amount Sold (S.Q.)	Grade	Type
29-Jul-73	2.07		95%	Valuation Stock.
04-Nov-73	2.10	20,000	96%	Actual Sale.
08-Jan-74	1.87	11,000	95%	Actual Sale.
22-Jun-74	1.65	20,000	96%	Actual Sale.
03-Jul-74	1.70		95%	Asking Price.
14-Jul-74	1.75	36,000	95%	Actual Sale.
28-Aug-74	1.87		95%	Asking.Rejected.
11-Sep-74	1.90		95%	Asking.Possible.
01-Dec-74	2.15	17,000	95%	Actual Sale.
28-May-75	2.00	1,600	95%	Actual Sale.
21-Jun-75	2.00	16,000	95%	Actual Sale.
27-Jul-75	2.00	11,000	95%	Actual Sale.
17-Aug-75	2.10	17,000	95%	Actual Sale.
05-Oct-75	2.00	2,000	95%	Actual Sale.
18-Jul-76	2.50	18,000	95%	Actual Sale.
22-Aug-76	2.55	19,500	95%	Actual Sale.
16-Sep-76	2.70	26,000	95%	Actual Sale.
03-Oct-76	2.70	30,000	95%	Actual Sale.
19-Dec-76	2.40	2,000	95%	Actual Sale.
23-Jan-77	2.05	24,000	95%	Actual Sale.
05-Mar-77	2.05		95%	Valuation Stock.
29-Jan-78	2.95		95%	Sale.Amount n/a.
12-Mar-78	2.92		95%	Sale.Amount n/a.
15-Sep-78	3.10		95%	Sale.Amount n/a.

*Free alongside ship, Antofagasta.

Source : CSA.AG. Vols. 4-6, 8, 9;
CSA.AG. Copiador Soubllette. Vol. 46.

The three sales recorded in 1878 in Antofagasta were made at the highest prices paid for nitrate during the previous five-year period: two at 2.95 pesos per quintal, and one at a truly exceptional price of 3.10 pesos. The decline of the Chilean exchange in the second half of 1878 contributed to the increase of Valparaíso prices

denominated in *pesos*, but the fall was hardly tantamount to a collapse.¹⁵¹ Table 11.7 shows that the faltering efforts of the Peruvian Government to curtail nitrate production in Tarapacá were rendered futile by a dramatic increase in Antofagasta output.

Table 11.7

*Nitrate Exports,
Tarapacá, Antofagasta, and El Toco,
1872-1878
(Spanish Quintals)*

Year	(1) Tarapacá Exports (S.Q.)	% Tara- pacá*	(2) Antofagasta Output (Sp.Q)	% Anto- fag.*	(3) Total Exports (S.Q.)**
1872	4,220,764	97.20%	121,558.00	2.80%	4,342,322.00
1873	6,263,767	97.13%	185,028.00	2.87%	6,448,795.00
1874	5,583,260	96.02%	231,283.00	3.98%	5,814,543.00
1875	7,205,652	96.73%	243,420.22	3.27%	7,449,072.22
1876	7,035,693	96.67%	242,630.32	3.33%	7,278,323.32
1877	4,521,654	91.24%	434,392.00	8.76%	4,956,046.00
1878	5,909,228	83.97%	1,099,701.00	15.63%	7,036,929.00

*Computed by the author.

**Sum of Tarapacá exports and Antofagasta output; includes 28,000 Sp.Q. from El Toco in 1878 (0.40% of total).

Source: (1) *El Veintiuno de Mayo* (Iquique), 14-May-1884.
(2) CSA, *Memorias* 1873-1879.
(3) Bermúdez, *Salitre*, pp.373, 374;
"Ocupación", p. 166 (for El Toco exports).

In more than doubling its output in 1878, to slightly over 1 million quintals from less than 440,000 quintals in 1877, the Antofagasta Company helped keep total nitrate exports at virtually the same level as in 1875 and 1876, i.e., just prior to the expropriation: distinctively, in 1878 the CSA was in position to fill the gap left by Tarapacá output. The drastic drop in total exports registered in 1877 had pushed prices up, triggering

¹⁵¹See below pp 305-307.

a formidable reaction in Antofagasta. Furthermore, stimulated by the same soaring prices, even the small El Toco region recorded a small (i.e., 28,000 Spanish quintals or some 1,273 tons) amount of nitrate exports, since virtually all of the deposits in the area had been bought by Henry Meiggs on behalf of the Peruvian Government to prevent them from being brought into production,¹⁵² it was clear that the scheme was not working as expected. The fact that 1878 prices remained high in spite of mounting exports appeared to confirm the fact that nitrate prices were not invariably correlated to supply, as assumed by the supporters of the Peruvian expropriation. Given the substantial level of exports, it was also clear that Gibbs had succeeded in increasing temporarily nitrate prices by withholding sales, obviously, this procedure could not be sustained in the long run.

The most important factor determining the superior performance of the CSA in 1878 was the opening of a second processing plant in Salar del Carmen, known as Oficina Salar, which could join in with the older plant, known as Oficina Antofagasta, to greatly expand production. No data for the separate output of both plants is available, but in May 1878 it was reported that Oficina Antofagasta had produced 83,000 quintals, while Oficina Salar yielded 14,388,¹⁵³ i.e., some 85 and 15 percent, respectively, although these relative proportions might have changed later in the year. Costwise the new Oficina Salar performed better than the older plant, as Table 12.7 shows.

¹⁵²See above pp. 166-171.

¹⁵³Hicks to Soublette, Antofagasta, 9-Jul-1878. CSA.AG. Vol.13, fs. 174.

Table 12.7

*The Antofagasta Company,
Costs of Production,
Oficinas Antofagasta and Salar,
July-October, 1878
(Ch.Pesos per Sp.Quintal)*

Mon- th	Year	Cost Ofic. Anto.	Cost Ofic. Salar	Average Cost*
Jul	1878	1.56	1.24	1.40
Aug	1878	1.49	1.50	1.50
Sep	1878	1.49	1.39	1.44
Oct	1878	1.52	1.31	1.42
Avg	1878*	1.52	1.36	1.44

*Computed by the author.

Source: Hicks to Soubllette, 9-Jul-1878, Vol.13, fs. 117; 12-Nov-1878, Vol.14, fs.262; 27-Dec-1878, Vol.15, fs.070. CSA.AG. Correspondencia.

Table 13.7

*The Antofagasta Company,
Costs of Production,
1871-1878
(Ch.Pesos per Sp Quintal)*

Sem- est.	Year	Cost p.S.Q.	Cost Annual*
	1871		1.69
	1872		1.68
1st	1873	1.24	
2nd	1873	1.37	1.305
1st	1874	1.51	
2nd	1874	1.47	1.490
1st	1875	1.03	
2nd	1875	1.14	1.085
1st	1876	1.14	
2nd	1876	n.a.	1.29
Nov	1877	1.50	
Dec	1877	1.37	1.435
1st	1878	1.49	
2nd	1878	n.a.	1.52

*Computed by the author,
except 1871 and 1871,
computed by Hicks, and 1876
from CSA, *Memoria* 1877; costs
for 1877, derived from costs
for November and December
only. Costs for 1878 from
CSA, *Memoria* 1879.

Source: Hicks to Soubllette,
13-May-1873, Vol.4, fs.371;
12-Aug-1875, fs.378, Vol. 6;
28-Feb-1876, Vol.7, fs. 275-
277; 15-Aug-1876, fs.208;
13-Oct-1876, fs.072, Vol. 8;
14-Dec-1877, fs.073; 25-Jan-
1878, fs.170; Vol.12.
CSA.AG.Correspondencia.
15-Sep-1878, fs.138; Vol.46.
CSA.AG.Copiador Soubllette.

While Table 12.7 indicates that the new Oficina Salar processed nitrate at a lower cost than the older Oficina Antofagasta, Table 13.7 shows that the average cost of nitrate produced by the CSA in 1878 went up rather than down. In fact, except for 1871 and 1872, when the company was just being established, 1878 production costs were the highest in all of the history of the CSA. Clearly, it was the exceptional prices prevailing during that period, rather than lower production costs, which made 1878 a superb year for the Antofagasta Company.¹⁵⁴ It is certain that the pressure to take advantage of higher prices forced the use of inferior ore, increasing refining costs per unit.

Although profits for 1877 were not published, the almost 1.8 million *pesos* in net profits reported by the Antofagasta Company in 1878 represented an almost seven-fold increase with respect to the 254,000 *pesos* recorded for 1876, being also the highest ever, since profits were first declared in 1872 (see Table 14.7). It is true that the fall in the Chilean exchange starting in July, 1878, could have swelled profits (due to the fact that nitrate was sold in pounds sterling, and most costs were defrayed in *pesos*), but the decline of the Chilean *peso* in the second half of 1878 was too modest, i.e., from some 40 d. to 37-39 d., to account for such a dramatic increase in profits.¹⁵⁵

¹⁵⁴It is worth noting that the fall of the Chilean *peso* after July, 1878, albeit moderate, had a bearing on costs, since most were paid with local currency. See below pp. 305-307.

¹⁵⁵For the fall of the *peso*, see below pp. 305-306.

Table 14.7

*The Antofagasta Company,
Exports, Costs, Prices, and Profits,
1872-1878
(Spanish Quintals and Chilean Pesos)*

Year	(1) Exports	(2) Cost p.Q.*	(3) Total Cost**	(4) Prices Valpso	(5) Net Profits
1872	121,558.00	1.68	204,217.44	n.a	n.a.
1873	185,028.00	1.31	241,461.54	2.01	102,050.73
1874	231,283.00	1.49	344,611.67	1.69	118,638.61
1875	243,420.22	1.09	265,328.04	1.87	216,642.09
1876	242,630.32	1.29	312,993.11	2.30	254,116.58
1877	434,392.00	1.46	634,212.32	2.57	n.a
1878	1,099,701.00	1.52	1,671,545.52	2.90	1,776,634.00

*Costs for 1877, average for November and December only.

**Computed by the author: (1)*(2).

Source: (1), (2), (5) - CSA, *Memorias* 1873-9.

(4) - *La Patria* (Valparaíso), July 1873-
August 1874.

(4) - 1875-6, CSA, *Memorias*, 1876-9.

(4) - 1877-8, Cruchaga, *Estudios*, 2:13.

Hicks noted that in the Peruvian nitrate region workers were paid in falling paper *soles* since 1876 7, while in Antofagasta wages were defrayed in Chilean *pesos* "currently valued at a premium in Tarapacá" "The workers [in Tarapacá] were taken aback by this change, and gradually have migrated elsewhere, and now in Tarapacá, they are looking for people here, and are forced to raise wages."¹⁵⁶ However, this enviable position of the Chilean *peso* changed abruptly on July 23, 1878, with the approval of a bill providing for the "temporary" suspension of specie payments by a group of important Chilean Banks which had recently made a loan to the government. This law effectively took Chile off the gold standard for some half a century, with the exception of a brief three-year experiment at the end of the nineteenth century. The immediate result of the suspension

¹⁵⁶Hicks to Soubllette, Antofagasta, 25-Jan-1878 CSA AG Vol 12, fs. 170

of specie payment was a one-day panic in Santiago and Valparaíso; the long term impact was a fall, albeit moderate, in the exchange, from some 41 d in January 1878 to as low as 37 d in August-November, closing at 39 d in December of the same year.¹⁵⁷ Hicks reported that the measure "has caused here a great surprise and generalized panic".

If by virtue of this state of affairs, our product commands a higher price, and a lower cost of production, resulting on a large figure for the profits of the upcoming semester, in my opinion the benefits accrued will not be equal to our hopes.¹⁵⁸

Hicks recommended advertising in the local newspapers that the CSA was prepared to give drafts on Valparaíso for Chilean bills at par, "thus inducing confidence in the bills, making it easy to pay our people [with them]".¹⁵⁹ As most nineteenth-century businessmen, Hicks believed that leaving the gold standard spelled an almost instantaneous financial collapse.

If Congress had authorized a small income tax, the trust and credit of Chile would have been saved; but with discredited bills, it is inevitable that industry and credit will break down in Chile, as it has happened in other countries resorting to such a measure.

He recommended purchasing "a substantial amount of coal and articles of consumption...because it is certain that prices have to go up"¹⁶⁰ However, the feared financial catastrophe did not happen, and all the letters of the CSA manager for the rest of the year referring to economic matters included no further mention of the Chilean exchange (which improved somewhat towards the end of 1878), dealing mainly with problems linked

¹⁵⁷Close to fifty percent of the Banks' capital of 40 million *pesos* had been loaned out to directors of the same institutions, largely during the few weeks preceding the suspension of specie payments. Frank W. Fetter, *Monetary Inflation in Chile* (Princeton, N.J.: Princeton University Press, 1931) pp. 28-31 (Quoted hereafter as Fetter, *Inflation*).

¹⁵⁸Hicks to Soubllette, Antofagasta, 30-Jul-1878. CSA.AG. Vol.13, fs. 265.

¹⁵⁹Hicks to Soubllette, Antofagasta, 6-Aug-1878. CSA.AG. Vol.14, fs. 007.

¹⁶⁰Hicks to Soubllette, Antofagasta, 13-Aug-1878. CSA.AG. Vol.14, fs. 021.

to expanding output at the lowest possible cost in order to take advantage of higher prices.¹⁶¹ In mid-September, 1878, the upper management of the CSA was clearly delighted by the economic performance of the Antofagasta Company; the Valparaíso manager, Soubllette, stated that "with such prices [3.10 pesos per quintal with a "guaranteed exchange" of 38 1/2 d.], and with a cost [of production] of nitrate at 1.49 [per quintal], as in the first semester, it is to be expected that the profits for the current semester will be at least as high as the previous one".¹⁶²

Clearly, from a purely economic standpoint, the spectacular increase in profits made of 1878 a truly remarkable year for the CSA. The only cloud in the horizon was the decision of the Bolivian Government to enforce the 10-cents nitrate duty, which would be dealt with in early 1879, the year of the war.

¹⁶¹Hicks to Soubllette, Antofagasta, 12-Nov-1878 and 10-Dec-1878. *CSA.AG*. Vol.14, fs. 262; Vol. 15, fs. 027.

¹⁶²Soubllette to Thomas C. Comber, Valparaíso, 15-Sep-1878. *CSA.AG.Copiador Soubllette*. Vol.46, fs. 138.

CHAPTER 8

THE EXPROPRIATION AND THE WAR, 1879

1. Overview

The Peruvian expropriation of the Tarapacá nitrate industry was severely disrupted by the onset of the War of the Pacific (1879-1883). Virtually all 1879 measures concerning nitrate were adopted under the shadow of military developments. As stated before¹, on February 14, 1878, the Bolivian Government issued a decree levying a 10-cents nitrate export duty on the Antofagasta Company. After one year of negotiations with the Chilean Government, including an initial suspension and a subsequent reinstatement of the controversial tax, the Bolivian Government ordered the "repossession" of all nitrate properties and deposits in Antofagasta on February 1, 1879, in the face of the refusal of the CSA to pay the tax. On February 14, 1879, Chilean troops, transported on three Chilean warships, landed on Antofagasta, effectively ending Bolivian control of the region.² Although Bolivia officially declared war on Chile on March 14, 1879, the Bolivian Government never seriously attempted to recover Antofagasta. Thus, the ensuing war was fought almost entirely to the north of the 24th parallel, on Peruvian territory.

Since Perú was linked to Bolivia by a secret Treaty signed in 1873, pledging mutual assistance in case of armed conflict, Chile declared war on Perú on April 5, 1879; the same day, the Chilean fleet blockaded Iquique, Tarapacá's main port. *Circa* May, 1879 the Peruvian Government had mobilized and stationed some 4,000 troops in Tarapacá; thus while Chile controlled the sea lanes around the nitrate region, Perú reinforced her hold on land. A protracted naval confrontation between Perú and Chile followed, including an initial Chilean

¹See above pp. 295-296.

²For the view from Antofagasta, see below Section 10 of this Chapter.

setback in Iquique on May 21, 1879; however, after the capture of "Huascar", Perú's main warship, on October 8, 1879, the road was open for the actual Chilean invasion of Tarapaca, launched on November 2, 1879 and completed on November 23, 1879, with the formal surrender of Iquique, and the subsequent withdrawal of the Peruvian Army from Tarapacá on November 27, 1879. From that date onwards, Tarapacá, including the nitrate region, came definitively under Chilean control.³

Both Perú and Bolivia were thrown into disarray by the loss of Tarapacá. On December 18, 1879, President Prado left for Europe, a decision termed "a flight" and a "shameful desertion" by *El Comercio*,⁴ amidst bloody street confrontations in Lima, Nicolás de Piérola took power by force and officially assumed office on December 23, 1879.⁵ Although Lima fell on January 16, 1881, after the end of November, 1879, the War of the Pacific was fought exclusively on Peruvian territory north of Tarapacá, and the nitrate region was no longer subject to Peruvian law, including nitrate legislation.⁶

In 1879, the Peruvian Congress had to conclude two nitrate-related questions pending since 1878. The proceedings for the impeachment of former Finance Ministers García and Barinaga, charged with an illegal issue of "public works" *certificados*, were slated for 1879. The discussion on the Providencia contract in 1878 ended with a Senate proposal to strike down the entire operation which had to be voted in 1879. However, the advocates of terminating the expropriation pledged to honour the rights of both the holders of current production contracts and outstanding *certificados*. Respecting production contracts implied leaving the CSP in charge of purchasing and selling nitrate until all production contracts had expired. The nitrate bonds posed a more intractable problem. Paying them in full was an impossible commitment due to the absence of domestic and foreign financing; if they were exchanged for the corresponding nitrate plants, the interests of holders of *certificados* issued for flawed ventures were affected; continuing the service of interest payments with the

³The dates and events listed here are standard knowledge, I have used: Gonzalo Bulnes, *La Guerra del Pacífico* 3 vols. (Valparaíso: Imprenta Universo, 1919) 1:84-395 (Quoted hereafter as Bulnes, *Guerra*).

⁴*El Comercio* (Lima), 19-Dec-1879

⁵Dulanto, *Piérola*, pp. 232-234.

⁶Bulnes, *Guerra* 2:344-347.

proceeds of nitrate sales simply postponed a final decision until the production contracts, which generated such proceeds, expired. Perú lost control of Tarapacá without a definitive decision on the issue. However, since the service of the nitrate bonds was made with hard currency, the securities became a central issue in the Peruvian debate over war finance. The refusal of the CSP to continuing paying interest on the *certificados*, claiming declining sales due to the war, made the discussions on nitrate income largely irrelevant.

During the 1879 debate on the expropriation, the Antofagasta Company, whose commanding 1878 performance had not gone unnoticed, figured prominently. The supporters of the expropriation, who had dismissed the company during the 1875 discussions, claimed in 1879 that State control of the Tarapacá nitrate industry was necessary to parry the growing Antofagasta threat. This view also coloured some of the positions taken in Perú towards the explosive Bolivian duty on Antofagasta nitrate.

2. *The Antofagasta Tax in Perú*

The concern in Perú about the growing tension between the Bolivian and Chilean Governments over the Antofagasta nitrate tax gave rise to an assortment of different positions in the Lima press, ranging from unqualified support for Chile to vehement solidarity with Bolivia. *El Comercio* stated in early January, 1879, that Chile was entirely within her rights in refusing to accept the Bolivian 10-cents nitrate duty in Antofagasta,⁷ while *La Opinión Nacional*, the organ of the Associated Banks, cautioning about "bellicose trends" in Santiago, called for a "fraternal" support for La Paz.⁸ The most articulate supporter of the Chilean position was the Lima newspaper *La Tribuna*, which justified the occupation of Antofagasta, and assailed President Prado for "hurting the dignity" of Chile, eliciting an immediate response from *El Peruano*, the official government newspaper, underlining the "neutral" position of Perú.⁹

⁷*El Comercio* (Lima), 3-Jan-1879.

⁸*La Opinión Nacional* (Lima), 11-Feb-1879.

⁹*La Tribuna* (Lima), 11-Feb-1879 and 12-Feb-1879; *El Peruano* (Lima), 12-Feb-1879.

The most determined defense of a pro-Bolivian position came from *El Nacional*, the organ of the supporters of late President Manuel Pardo. The newspaper asserted that *El Comercio* went too far in requesting that Perú remained neutral in the case of a war between Bolivia and Chile, partly due to Peruvian "interventionist traditions", and partly "because it is in our interest that Bolivia taxes her nitrate, thus enabling Peruvian nitrate to compete with advantage".¹⁰ This point was crucial, since it was manifest that the troubled State-controlled Tarapacá nitrate industry would greatly benefit from increased taxation for the Antofagasta Company, explicitly acknowledged in Perú throughout 1877-1878 as the leading obstacle to a complete Peruvian control of the nitrate world market. The pro-Chilean *La Tribuna* took issue with *El Nacional's* reasoning

What advantages could accrue to Perú in fighting against Chile on behalf of Bolivia? It has been said, to halt the competition with Antofagasta¹¹ nitrate by taxing exports with a 10-cent duty; and to this we answer: acting with that aim in mind, justice would not be on our side, we would establish a precedent which would legitimize frequent aggressions, and furthermore, over the life of Antofagasta nitrate, the ten cents would represent four or five million soles, while the war...would cost us twenty or thirty million.

La Tribuna argued that the expenses of the war would preclude servicing the nitrate bonds, the foreign and internal debt, as well as forcing additional issues of paper money. The newspaper concluded that the resources assigned to an eventual war would be better spent "improving the management of the [nitrate] business, consigning the product to a firm...which can concentrate all nitrate sales [in one hand], and this would be easier than going to war".¹² The newspaper subsequently altered its pro-Chilean position as war appeared inevitable, and not without being charged with receiving money from the Chilean Government. *La Tribuna* was indeed vulnerable to this type of attack since it was managed by a Chilean, L. Zegers; *El Comercio* was also established and run at the time by another Chilean, Manuel Amunátegui.¹³

¹⁰*El Nacional* (Lima), 15-Feb-1879.

¹¹The original read "Mejillones", an obvious error.

¹²*La Tribuna* (Lima), 26-Feb-1879.

¹³*La Tribuna* (Lima), 15-Feb-1879, 20-Mar-1879, 3-May-1879; *El Nacional* (Lima), 20-Feb-1879; and *La Patria* (Lima), 19-Mar-1879.

The most significant aspect of the Peruvian debate on the Bolivian-Chilean conflict over the Antofagasta nitrate duty was that it made clear that the controversial tax was viewed in Perú as a helpful, if not fraternal, measure favouring their own flagging Tarapacá monopoly. This raises the question of exactly how much had the Peruvian Government to do with the enactment of the duty itself, an issue which exceeds the scope of this work, but which appears as entirely legitimate once the goals of the expropriation scheme are clearly understood. It is worth noting that the notion of a Peruvian-induced Antofagasta duty was broached in the Chilean Chamber of Deputies during the debate on war finance.

...the [nitrate] monopoly...has been the flag under which Perú entered this war and [under which she] will have to conclude it; because Perú started by establishing the monopoly of nitrate, and induced Bolivia first to rent her nitrate works [i.e., in El Toco], and subsequently to violate her treaties with Chile, so as to round up the monopoly business.¹⁴

It is hardly surprising that none of the Bolivian and Peruvian historiography mentions this particular issue; it is less understandable that the pertinent Chilean historiography has ignored it so far.¹⁵

3. Unease over Production Contracts

The development of the Peruvian expropriation continued to be affected in 1879 by the growing awareness that the *Compañía Salitrera del Perú* was unable to control Tarapacá nitrate supply due to the substantial export quotas assigned through production contracts, a concern which surfaced in 1878.¹⁶ Furthermore, the CSP did not make the interest payments slated for January 1, 1879.¹⁷ However, since there

¹⁴Deputy Zorobabel Rodríguez in: Chile, *DO*1879, 1-Jul-1879.

¹⁵A recent review of the subject, including bibliography, in: Harold Blakemore, "The Politics of Nitrate in Chile. Pressure Groups and Policies, 1870-1896. Some unanswered questions." *Revue Française D'Histoire D'Outre-Mer* 66(1979): 285-298 (Quoted hereafter as Blakemore, "Politics"). Characteristically, the article includes an able discussion on Chilean positions on the tax, but leaves out the crucial unanswered question of why Bolivia decided to implement the tax in the first place.

¹⁶See above pp. 291-295.

¹⁷*El Comercio* (Lima), 3-Apr-1879.

was no viable replacement for the CSP, *El Comercio* noted that Perú would probably have to accept the current management of the nitrate industry, even if it entailed the loss of the much-vaunted nitrate income "for such a large number of years that the Tarapacá nitrate plants might well be considered as a gift bestowed upon the fortunate consignees". The newspaper reported that production contracts for a total of 7 million Spanish quintals (318,182 tons) had already been signed, and that the recent approval of additional contracts could drive up that figure to 10 or 15 million quintals (454,545 or 681,818 tons); this implied that the *Compañía Salitrera* could in fact accumulate stock to such an extent that it would dominate the world market in the immediate future.¹⁸ Simón Irigoyen, the Director of Revenue, refuted *El Comercio*' figures, denying that new production contracts had been signed, and that total quotas could reach 10 to 15 million Spanish quintals; he claimed that total exports stipulated for all production contracts signed was in fact 7,180,000 Spanish quintals (326,364 tons), but that 1.37 million should be discounted since they were exported to the United States. *El Comercio* replied that it was "public knowledge" that additional production contracts had been signed, and that the figures furnished by the Ministry of Finance did not match those provided by Irigoyen.¹⁹

On the heels of Irigoyen's rebuttal, Senator Francisco García Calderón, President of the *Compañía Salitrera del Perú*, addressed a letter to Simón Irigoyen rejecting the production contracts signed by the Director of Revenue in 1878 with the Gildemeister firm for 650,000 Spanish quintals, as well as two other 1878 contracts for an additional 280,000 quintals. García Calderón argued that massive exports by free producers during the past two years coupled with large fiscal exports stipulated in binding production contracts, had resulted in stocks in Europe of 110,000 long tons, stocks afloat of 50,000 long tons, without considering exports by independent Tarapacá producers, and by the Antofagasta Company. Tarapacá nitrate exports for some 245,000 long tons were projected for 1879, and if the Antofagasta Company exported an additional 45,000 long tons, total nitrate exports for the year would reach 310,000 long tons, an amount "disproportionate to the natural consumption requirements", estimated at merely 245,000 long tons. The figures provided by García Calderón roughly matched

¹⁸*El Comercio* (Lima), 21-Jan-1879.

¹⁹*El Comercio* (Lima), 22-Jan-1879.

the 1878 export data for both Tarapacá and Antofagasta.²⁰ Significantly, this was the first time that Antofagasta exports were precisely evaluated in Perú, acknowledging the spectacular performance of the CSA in 1878. The Peruvian Senator noted that the combined impact of low nitrate prices, storage expenses of £1.10 per ton per annum, and losses in stocks due to combustion and humidity would most likely produce "a deficit" in the final accounts for the year, jeopardizing simultaneously the service of the nitrate bonds, government income, and the honouring of the outstanding production contracts at the stipulated sales price. The President of the *Compañía Salitrera* concluded requesting the "powerful cooperation" of the government in curbing Tarapacá nitrate exports.²¹ Of course, the official acknowledgement that the service of the *certificados* was in jeopardy did not help the quotation of the nitrate bonds. The impeachment of former Ministers Barinaga and García on account of illegal issues of "public works" bonds had the same adverse impact.

4. The Barinaga-García Impeachment

The hearings on the impeachment of former Finance Ministers José Félix García and Manuel A. Barinaga took place in January, 1879, amidst reports that the nitrate *certificados* had suffered a major setback in the bond market. In early January, 1879, noting that the price of the nitrate bonds had fallen abruptly from 97 to 82 percent in the two first weeks of the year, one Deputy placed the losses for bondholders at 2.5 million soles.²² Since the impeachment was related to questionable bond issues, the falling price of the *certificados* certainly did not help the case of the two accused Ministers.

The special Impeachment Commission established in 1878 to investigate the charges brought against former Finance Ministers José Félix García and Manuel A. Barinaga,²³ rendered its verdict on January 9,

²⁰See below Table 9.8.

²¹*El Comercio* (Lima), 23-Jan-1879.

²²Deputy Elías Malpartida in Perú, *DO1878*, 2: 28-Jan-1879. The Deputy ascribed the fall to the failure of the CSP to stipulate a definitive payment method for the sinking fund.

²³See above pp. 273-274.

1879.²⁴ The report of the Commission stated that, on March 1, 1878, the Prado Administration had loaned 500,000 *soles* in nitrate bonds to the representative of Henry Meiggs, Charles Watson, until December 31, 1878; on June 8, 1878, the President of the Associated Banks had delivered another 471,000 *soles* in *certificados*, for a total of 971,000 *soles*. The Commission also accused the government of issuing 1.4 million *soles* in unauthorized bank bills. The report viewed these measures as "serious" legal violations, claiming that the pertinent legislation allowed the issuing of *certificados* to pay only for nitrate properties. According to the Impeachment Commission the delivery of 971,000 *soles* in additional bonds

has triggered a depreciation [in *certificados*'s prices] unrelated to market fluctuations in supply and demand, due to the mistrust sowed by these securities in the marketplace, since it was known that the government was handing out these bonds to the public without its attendant legal sanction, i.e., without representing true values in terms of nitrate properties sold.

The report concluded by charging the two Finance Ministers with violating the Constitution, as well as with misappropriation of public funds, a specific criminal offense included in the current Peruvian Penal Code.

The defense of former Ministers García and Barinaga stressed the fact that the disputed bonds had been issued in order to prevent the stoppage of public works, which, if effected, would have cost the country "two or three times" as much. The measure would have been legal, since the additional bond issue for public works was included in the expropriation law, and did not personally benefit either Minister.²⁵ A government supporter added that it was not "credible" that the emission of the contested *certificados* had elicited "panic and distrust" in the bond market, as claimed by the opposition, since the same type of securities payable to the bearer were being delivered "daily to the true sellers of nitrate plants".²⁶ However, another Deputy supporting the government admitted in the same session that the "public works" bonds had inflicted "temporary and passing damage" to the outstanding *certificados*, estimating that in any case it was preferable to the more ominous threat posed by an eventual stoppage of railroad construction. He went on to blame the "breakdown" of the nitrate

²⁴Perú, *DO1878*, 2:15-Jan-1879. The report of the Commission was dated 7-Jan-1879.

²⁵Deputies Ignacio García and Isidoro Macedo in: Perú, *DO1878*, 2:15-Jan-1879.

²⁶Deputy Cornejo in Perú, *DO1878*, 2:16-Jan-1879.

bond market on the "noise" made by the opposition over the issue, concluding that, if nothing had been said in that respect, the railroad *certificados* would have remained "unnoticed".²⁷

The supporters of the impeachment noted that "not one cent" of the *certificados* had been invested in public works, just as Henry Meiggs had failed to finance railroad construction with previously authorized emissions of Bank bills for that purpose. It was also emphasized that the deliveries had been ordered "surreptitiously and without notification" to Congress. Furthermore, the operation had not been performed free of charge, since the Providencia Bank had collected interest charges on the issue, and it had a "devastating effect" on the market quotations of the outstanding *certificados*. Not to impeach the Ministers, stated one Deputy, would be tantamount to allowing "uncontrollable emissions of paper money and bonds, so as each loaf of bread would end up costing a full-day's wages to the people".²⁸

During the following session, one Deputy made a detailed description of the impact of the "public works" *certificados* on the local bond market.

Once the 971,000 *soles* in nitrate *certificados* were loaned out, you all know that the following day they were put into circulation; and in lots of tens and one-hundreds, they surfaced gradually in the hands of brokers who had to sell them at a heavy discount, since [sales] offers multiplied, and large sums of these securities, well in excess of demand, were placed in the market. The sellers of nitrate properties who had kept their *certificados* as valued securities with high quotations started feeling the impact of that additional issue; they saw the fall in the value of their bonds, without having done anything to depress their price. . . I know of many brokers who inquired in private and commercial circles about the source of these sales. . . failing to discover the origin of the emission.²⁹

Following the remarks of another critic of the operation, who pointed out that the *certificados* delivered to Watson could "never be returned" since they had "evaporated like sugar in water" through multiple transactions, and the recipient did not have funds to reimburse them, the Chamber of Deputies voted to impeach

²⁷Deputy I. García in Perú, *DO1878*, 2:16-Jan-1879.

²⁸Deputy León in Perú, *DO1878*, 2:15-Jan-1879.

²⁹Deputy Jiménez in Perú, *DO1878*, 2:16-Jan-1879.

both García and Barnaga.³⁰ The success of the impeachment was an indication of the growing weakness of the Prado Administration, and a preamble to the final attack on the expropriation itself.

5. *Alternative Management Projects*

In 1879, the Peruvian Congress discussed three different projects regarding the management of the Tarapacá nitrate industry, all of them drafted in 1878: the government's decree on May 22, 1878, raising the export duty for free producers from 1.25 to 3 *soles*, specifically requiring congressional approval, the revised project of the Finance Subcommittee of the Chamber of Deputies changing current production contracts into rental agreements, cancelling the consignment system and restoring free overseas sales, and the Rosas project, approved by the Finance Commission of the Senate, undoing the entire operation, including State ownership of nitrate plants, in exchange for a uniform export duty of 1 silver *sol* per Spanish quintal (i.e., 44 d)³¹ The Antofagasta Company was repeatedly mentioned in the congressional debate over the expropriation.

In the Chamber of Deputies, the idea of increasing the current export tax to 3 *soles* was termed "an economic absurdity" because it would make Tarapacá nitrate more expensive than the competing Antofagasta nitrate, "stimulating production in a neighbouring country". The Finance Minister, present at the time on the floor of the Chamber, was then directly requested to provide information on Antofagasta, he answered that the adjacent nitrate region exported some 900,000 to 1 million Spanish quintals annually (40,909 to 45,455 tons), and did not pose any problems for Perú, because the Peruvian government fully controlled Tarapacá production, and could "export any amount it deems fit, flooding European markets, and selling [nitrate] at a lower price than that of Antofagasta".³²

³⁰The charges were subject to a separate vote. The votes in favour of the impeachment were 40 for and 27 against; to charge García with illegal bond issues, 53 for and 36 against, to charge the same Minister with illegal issues of securities from Meiggs' company, 50 for and 38 against, and to charge Barnaga with illegal issues of the same Meiggs' bonds, 46 for and 44 against. Perú, *DO1878*, 2:16-Jan-1879

³¹See above pp. 275-276, 280-281.

³²Perú, *DO1878*, 2:28-Jan-1879.

In a surprising reversal, one of the leading critics of the expropriation, Guillermo Billinghurst, took the floor to make a defense of the current management system. He acknowledged that the operation had been a major mistake, because the State was not "an industrialist", and knew "nothing or very little" about the "currently threatening foreign nitrate industry". However, after fighting against the State monopoly of nitrate production "for six years", he had decided to endorse it "because it was required by the special circumstances" prevailing at the time. He explained that the "special circumstances" he mentioned were related to the growing competition from both Antofagasta and the nascent nitrate regions of Taltal and Aguas Blancas. Billinghurst pointed out that the latter appeared even more formidable than the former.

The competition I fear the most, and with good reason, is the one emerging in Chile, showing all the signs of being a colossal enterprise; [Chile], a perfectly organized and eminently hard-working country, grasping the economic blunder we made in taking away the nitrate industry from private hands, has hastened to open her doors to the industrialists migrating from our territory, has approved favourable legislation for the [nitrate] industry in order to stimulate production in her deserts, and has now...an industry which will replace ours..

He added that the new nitrate plants in Taltal and Aguas Blancas had been established by entrepreneurs formerly working in Tarapacá, and "chased away by Perú", providing data on specific ventures.³³ Billinghurst concluded by endorsing an idea advanced by the supporters of the expropriation in the 1875 debates and by García Calderón in 1878: in order to check foreign competition, the Tarapacá nitrate industry had to be controlled by "one hand"; however, he added that it had to be "a strong and vigorous hand", and the CSP, currently managing the operation, was a poor choice, since it was "a company which expired before being born". According to Billinghurst, only the Peruvian State had the "enormous" capital resources required to "successfully oppose the competition from Bolivia and Chile, and oppose it directly and energetically". He also rejected the decree increasing the export duty to 3 silver *soles* for the independent producers, claiming that they were "the poor, the natives of Tarapacá, the founders of the industry", and "know no other occupation".³⁴

³³Of the names quoted by Billinghurst, only Daniel Oliva and Jorge [George] Hillinger, are known to have worked in Tarapacá

³⁴Perú, *DO* 1878, 2:29-Jan-1879.

Three Deputies hastened to challenge Billingham's novel opinion by advocating a return to a privately-controlled nitrate industry as the most efficient method of fighting foreign competition.³⁵ To the argument that, in freeing exports, the world market would be flooded with cheap nitrate, injuring guano, one of the opposing Deputies pointed out that the more Tarapacá output was reduced, the larger the advantage for foreign competitors, adding that private producers would automatically curtail output in line with current demand.³⁶

Except for Billingham's change of heart, the discussions held in the Peruvian Chamber of Deputies in January, 1879, added little to the ideas voiced at the end of 1878, during the initial debates on alternative projects. As the final vote showed, the prevailing opinion in both House of Congress was that the State monopoly on nitrate had to be cancelled, albeit providing both for the payment of the *certificados*, and the preservation of current production contracts.

6. *The Congressional Repeal of the Expropriation*

On January 29, 1879, the Chamber of Deputies voted a bill explicitly striking down the expropriation law of May 1875 in its entirety with the exception of Article 2, i.e., the prohibition of awarding property rights over nitrate deposits.³⁷ The project disallowed the signing of new production contracts, as well as the extension or the renewal of current ones; the Executive Branch was authorized to exchange the outstanding *certificados* for new "special nitrate bonds" to be issued in denominations of £100, £500 and £1,000, and guaranteed by a first mortgage on the State-owned nitrate plants and deposits, as well as on the income accruing from rentals of nitrate plants,³⁸ the nitrate export duty, and nitrate sales; the bond issue should not exceed £4 million, the new nitrate bonds would earn an 8 percent annual interest, and would be subject to a cumulative amortization of 4 percent; they would be paid in "good drafts on London 90-days sight", and the former *certificados* would

³⁵Deputies Pinzás, J. Agula, and Cornejo in Perú, *DO1878*, 2:29-Jan-1879.

³⁶Deputy Valle in Perú, *DO1878*, 2:29-Jan-1879

³⁷Technically, however, Article 1 was also left standing since it had formally abolished the estanco.

³⁸This mention of rentals in the project appears as a remnant of the 1878 proposal to turn the production contracts into rental contracts.

be exchanged at a rate of 44 d per *sol*. The bill concluded by stipulating that the Government should attempt to reduce total nitrate output to 4 million Spanish quintals (181,818 tons), and accepted the 3 silver *soles* export tax for private nitrate exports, effective March 1, 1879.³⁹ Billinghurst submitted an additional provision to the project, authorizing the Executive Branch to invest 1 million *soles* in purchasing unsold plants, and granting a two-month extension to the free producers to sell their properties to the government.⁴⁰ The Chamber of Deputies approved Billinghurst's proposal, but added that the 1 million *soles* authorized for further acquisitions of nitrate plants should be included within the £4 million ceiling approved for the new issue of special nitrate bonds.⁴¹

The Peruvian Senate rejected the proposed increase of the export duty to 3 *soles*, insisting on the current tax of 1.25 *soles*, but accepted the rest of the project. The Chamber of Deputies, after a brief discussion, chose to compromise, reducing the export duty to 1.25 *soles*, in order to sanction the rest of the provisions.⁴² On February 4, 1879, the project of the Chamber of Deputies, endorsed by the Senate, effectively abolishing the expropriation law of May, 28, 1875,⁴³ was sent to the Executive Branch. However, President Prado returned the bill to Congress one week later, on February 13, 1879, fearing that free sales would bring a flood of nitrate, with an ensuing collapse in nitrate prices.⁴⁴

Superficially considered, the bill of February 4, 1879, appeared quite radical in that it explicitly repealed the original expropriation legislation. In actual practice, this rebuttal was mostly formal. Indeed, the proposal left standing all current production contracts, the cornerstone of the existing nitrate management system. Since the production contracts committed the government to purchase the export quotas assigned to the contractors

³⁹Perú, *DO1878*, 2:29-Jan-1879.

⁴⁰Perú, *DO1878*, 2:30-Jan-1879.

⁴¹Perú, *DO1878*, 2:31-Jan-1879.

⁴²Perú, *DO1878*, 2:4-Feb-1879.

⁴³The text of the law proposal was included in Dancuart, *Anales*, 12:133-134.

⁴⁴Basadre, *Historia*, 7: 289. Basadre erroneously interpreted the Congressional repeal as a mere ban on additional production contracts.

at a fixed price in Iquique, its subsistence implied the tacit preservation of the CSP in its double role of buyer of nitrate at port of export and seller in overseas markets (although the company subcontracted these tasks to the British firm of Graham and Rowe in 1878).⁴⁵ The survival of the production contracts was thus inseparable from the consignment system, since they implicitly required an agency in charge of purchasing nitrate from the producers, and subsequently financing the pertinent transport and marketing operations in the world market. Thus, the new bill actually postponed the abrogation of the current nitrate management system until the expiration date of the production contracts. Of course, since total nitrate production already contracted had reached an exorbitant 7 million Spanish quintals, or 323,000 tons, in 1878⁴⁶, the Peruvian government could hardly attempt to reduce output to 4 million quintals as stipulated by Congress.

After President Prado returned the Congressional proposal to repeal the expropriation, three different projects were discussed in the Peruvian Congress to regulate the return the nitrate industry to private hands. The first one prescribed renting out the State-owned plants to private entrepreneurs; the second one proposed giving them back in exchange for the corresponding *certificados*; and the third one stipulated sales by public auction, accepting the nitrate bonds in payment (presumably for part of the price). One of the articles of the second project, dictating the exchange of *certificados* for nitrate plants, considered the holder of fifty percent of the matching bonds, identified by series and numbers, as the legitimate owner of a specific enterprise. According to Billinghamst, this provision "sounded the alarm for those who speculated in nitrate bonds"

The speculators of the Lima Stock Exchange understood immediately that the value of the nitrate *certificados* lied in the importance of the corresponding establishment, according to its series and number. Thus, the most astute choices in this matter were made by those who, besides being [speculators], knew the local and industrial conditions in Tarapacá.⁴⁷

⁴⁵See above p. 279.

⁴⁶See above Table 9.7, p. 292.

⁴⁷Guillermo Billinghamst, "El Remate de las Salitreras", *La Industria* (Iquique), October 13, 1882 (Editorial).

In another essay, Billinghurst dated this speculative movement in August-September, 1879.⁴⁸

It is worth noting that Billinghurst changed his mind a second time, formally submitting a project to privatize the Tarapacá nitrate industry on August 17, 1879; the proposal had merely two articles, the first stipulating the return of the nitrate plants to private hands "in exchange for the securities issued for the same", and the second establishing a 50-cents (*soles*) export duty.⁴⁹

Billinghurst's statements are important, partly because they throw light on a severely undocumented period, and partly because they point to an additional pre-1879 source of speculation with nitrate bonds. The *certificados* were already sought for two years as a substitute currency in the face of the collapse of the paper *sol*, and, according to Billinghurst, the privatization projects discussed in 1879 provided yet another reason to purchase them. The discussions on war finance in the Peruvian Congress also touched upon the nitrate bonds, and certainly affected the quotations of the securities.

7. The Nitrate Bonds and War Finance

When Chile declared war on Perú, on May 5, 1879, the Peruvian foreign debt amounted to £32 million foreign debt, unpaid since 1876; it was by far the largest default in Latin America, representing some 45 percent of all unpaid loans in the region (Table 1.8). Of course, the protracted Peruvian default blocked further overseas loans to help finance wartime expenses, compelling the government to turn to an already exhausted domestic economy.⁵⁰

⁴⁸Billinghurst, *Capitales*, p. 40. The original read "1876", reflecting a typographical error.

⁴⁹The project was published in full in *El Ferrocarril* (Santiago) 9-Sep-1879.

⁵⁰It is worth noting that Chile, although regularly servicing a foreign debt of some £8 million (*circa* 1880), could not expect any overseas financing either, due to stringent market conditions, and payed for the war with emissions of fiscal bills. The extraordinary war expenses amounted to some 34.8 million *pesos*, of which only some 6.8 million were raised by means other than government paper money. The Chilean *peso* was quoted at 38½ d prior to the war, and subsequently fell and rose in line with military developments. Fetter, *Inflation*, pp. 35-37. Cf. also: W.F. Sater, "Economic nationalism and tax reform in late nineteenth century Chile" *Americas* 33(1976) 331-335; and W.F. Sater, "Chile and the world depression of the 1870s" *Journal of Latin American Studies* 11(1979) 67-99. The figure for the Chilean foreign debt was given by: J. Fred Rippy, "A Century of British Investments in Chile" *Pacific Historical Review* 21(1952) 341-348. For Bolivia see: Richard S. Phillips, Jr., "Bolivia in the War of the Pacific, 1879-1884" (Unpublished Ph.D. dissertation, University of Virginia, 1973).

Table 1.8

*Latin American Countries
in Default, 1879*

Country	Amount (£)	% Total*	Date Default
Perú	32,688,320	45.98%	1876
Mexico	23,540,800	33.11%	1866
Costa Rica	3,304,000	4.65%	1874
Honduras	3,222,000	4.53%	1872
Colombia	2,100,000	2.95%	1879
Ecuador	1,824,000	2.57%	1868
Bolivia	1,654,000	2.33%	1875
Paraguay	1,505,400	2.12%	1874
Dominican R.	714,300	1.00%	1872
Guatemala	544,200	0.77%	1876
Total	71,097,020		

*Computed by the author

Source: Rippy, *British Investments*,
p.35.

The two outstanding domestic obligations of the Peruvian Government, the internal debt and the nitrate bonds, came into sharp focus in the ensuing debate on war finance. Some viewed the *certificados* as an unbearable encumbrance at a time of national emergency. The service of the nitrate bonds compromised two fundamental sources of government income, the proceeds of nitrate sales and of the nitrate export duty, sorely needed to pay for wartime expenses. The new nitrate law of February 4, 1879, had formally transformed the *certificados* into long-term bonds. However, although its service had been specifically guaranteed by the proceeds of nitrate sales, as well as by the nitrate export duty, war pressures on the national budget reopened the discussion on the *certificados*.

An early proposal to establish an income tax to pay for the war, as well as a compulsory loan of 10 million *soles*, was rejected offhand, before the Peruvian Congress opened the debate on war financing, one week

after Chile's formal declaration of war.⁵¹ A tax on sugar, affecting coastal sugar producers, also proved unacceptable.⁵² Since taxation had no success in the Peruvian Congress, the Prado Administration proposed an additional issue of up to 8 million *soles* in government bills, increasing outstanding paper currency from 17 million to 25 million *soles*. The government project was met in the Peruvian Congress with a plethora of divergent ideas. A suggestion to finance the war through voluntary loans, based mainly on optional discounts on wages of State officials, guaranteeing it by a general mortgage on all "national and ecclesiastical properties", including the outstanding nitrate *certificados*, was dismissed on the grounds that wages were rarely paid, the government would receive its own declining paper money, and the measure would "depreciate" the nitrate bonds, "the only valuable security left, enjoying the privilege of being actively sought, commanding a good premium". Deputy's Malpartida proposal of issuing only 2 million *soles* in new bills was discarded as "timid", and a project of Deputy González favouring a compulsory loan was rejected as "dictatorial".⁵³

The defense of the government's proposal was undertaken by Deputy Yarlequé, advocating an even larger emission of 85 million *soles*, slating part of it to buy up all the domestic debt, including the nitrate *certificados*, at face value. He pointed out that the "mere expectation" of an additional issue of government bills had "sowed panic" among local merchants who, he warned, would soon start hoarding their wares on the assumption that more emissions would follow, forcing them to exchange real goods for valueless paper. Yarlequé noted that the Ministry of Finance had placed future war expenditures at 3 million *soles* a month, and thus the 8 million *soles* proposed by the government would last "only until July". He urged Congress to avoid the "commotions generated by partial emissions", and "apply the heroic remedy of salvation at once", "not administering the poison drop by drop, but all of it at the same time". Pointing out that the Peruvian Government currently had only two major commitments, the service of some 20 million *soles* in nitrate

⁵¹Perú, *DE* 1879, 2-May-1879.

⁵²Deputy Cudlipp in Perú, *DE* 1879, 12-May-1879. The date of the rejection of the proposed sugar tax was omitted in the source.

⁵³Perú, *DE* 1879, 12-May-1879.

certificados coupled with some 10 million in bonds of the domestic debt, Yarlequé extolled the salutary effect of buying up both types of securities through a massive emission of government bills.

Those stagnant capital resources locked in titles of the internal debt and in nitrate *certificados* will keep their current status, i.e., they will continue being stagnant, dead for our industries. This will not happen if we turn those 30 million *soles* of domestic debt into 30 million *soles* in bills. They would become...a solid and efficient instrument to stimulate and develop our industries...

He added that the holders of nitrate bonds would benefit since the *certificados* were currently priced at 30 to 40 percent of face value. Through the new emission the bondholders would receive fully 100 percent of nominal value in paper *soles*, remarking that he knew many who would be content with securing merely 75 percent of face value. Specifically, Yarlequé proposed an emission of 60 million *soles* to buy up all of the outstanding domestic debt, including the *certificados*, and an additional 25 million *soles* to finance government expenditures, claiming that the new bills would not depreciate because they had a "clean guarantee" in the nitrate industry and the guano deposits. However, he also suggested the establishment of a special board to supervise the operation since "the government has not always respected the legislation governing public finance, nor the public faith".⁵⁴

While Yarlequé's bold proposal found no support in the Chamber of Deputies, his statements provided information on the status of the nitrate *certificados* in mid-May 1879, showing a dramatic decline in the price of the securities, to a level as low of 30 percent of their face value. According to the current quotations, the price was actually some 59 to 60 percent in May, 1879, the lowest level ever.⁵⁵ The fact that other statements during the same session reported the *certificados* as valued securities does not necessarily contradict Yarlequé's figures; indeed, the nitrate bonds could have been actively sought at the time, even at drastically reduced prices,

⁵⁴Deputy Yarlequé in Perú, *DE1879*, 12-May-1879.

⁵⁵However, Yarlequé was surely referring to the real price of the bonds, i.e., discounting the declining exchange which had fallen to 16 to 17 d, down from 25 d at the beginning of the year. The *certificados* were traded in paper *soles*, while they were actually denominated in "hard" *soles* of 44 d. See below Table 2.8, and Table 5, Volume 2.

as a result of an even sharper collapse of other alternatives means of payment and savings, particularly government bills.

An opposing Deputy took the floor remarking that there was already panic in Perú, and the paper *sol* had declined from some 26 d to 16 d. Yarlequé's new *soles*, he argued, should be compared to the notorious "assignats" issued during the French Revolution, rather than to the "greenbacks" used to finance the Civil War in the United States, because Perú, unlike the latter country, had no real resources to support such a massive emission. Further depreciating the currency, he added, would erode the wages of soldiers and workers, stimulating speculation and usury. He also vehemently rejected the notion of trading the nitrate bonds for paper *soles*.

I would like to know with what right, on the authority of which principle, could the State force the holders of nitrate *certificados* to receive payment in unconvertible bills representing perhaps a fifth of what is owed to them. And how can somebody imagine that those who have sold their equipment, their properties, to the State in exchange for good currency, with a special mortgage on the plants, could accept such a proposal?⁵⁶

These ideas ultimately prevailed, and on May 16, 1879, the Peruvian Congress decided to accept the more moderate government's proposal, authorizing an emission of government bills not exceeding 8 million *soles*.⁵⁷ Between July and November, 1879, Finance Minister J.M. Quimper avoided further emissions of paper money, and proposed using the combined income of guano and nitrate to service both the foreign debt and the *certificados*.⁵⁸ Thus, the nitrate bonds survived all proposals to exchange them for paper money, although this development was not enough to prevent their price from falling continuously throughout 1879.

⁵⁶Deputy Cudlipp in Perú, *DE1879*, 12-May-1879.

⁵⁷Perú, *DE1879*, 16-May-1879.

⁵⁸Basadre, *Historia*, 8: 155; Bermúdez, *Salitre(2)*, 89-91. Of course, it was an open question whether this "combined income" could cover those commitments.

8. The Nitrate Bonds in 1879

As Table 2.8 shows, the *certificados* could no longer command in 1879 the remarkable prices recorded in 1876-1878: quoted at some 94 percent in early January 1879, they dropped below 90 percent in February, below 80 percent in March, below 70 percent in April, ending at about 58 percent in June, the last month for which quotations are available.

Table 2.8

*Average Quotation of Nitrate Bonds,
Exchange, and Bonds of the Internal Debt,
Lima,
(January-June, 1879)*

Month- Year	Price Certif. (1,000)	Price Certif. (10,000)	Average pence p. sol	Average soles p. L	Average Price Int. Deb.
Jan-79	88.89%	88.17%	23.98	9.91	50.57%
Feb-79	87.12%	86.60%	23.83	10.47	49.29%
Mar-79	77.41%	76.54%	23.67	11.84	48.57%
Apr-79	63.42%	63.08%	23.52	13.04	48.00%
May-79	59.58%	59.06%	23.39	14.82	47.29%
Jun-79	58.80%	57.83%	23.26	15.95	46.57%
1879	72.54%	71.88%	23.13	12.67	48.38%

Source: Derived from Table 5, Volume 2.

Undoubtedly, the single most important cause driving down *certificados* prices in 1879 was the failure of the *Compañía Salitrera del Perú*, the new company managing the operation, to service the corresponding interest payments since January of that year under the terms of the controversial Providencia contract, confirming the worse fears of its detractors. The first substantial drop in the quotation of the nitrate bonds, below 90 percent (the first time in three years), was ascribed in *El Comercio* to the exhaustion of the lower-priced *certificados*, i.e., the 1,000-soles type.⁵⁹ *El Nacional* ascribed the fall to declining nitrate prices, triggered

⁵⁹*El Comercio* (Lima), 21-Jan-1879.

by unrestrained exports from Tarapacá.⁶⁰ The letter from García Calderón to the Director of Revenue, indicating that exports were indeed out of control due to the substantial production contracts approved, and doubting that the nitrate bonds could be serviced,⁶¹ was viewed as an additional reason for the gradual decrease of *certificados* prices.⁶² In February, 1879, with nitrate-bond prices sliding close to 80 percent, *El Nacional* announced that all attempts by the *Compañía Salitrera* at finding a replacement for Gibbs for some sub-consignment agreement had failed, charged that the company had "violated the national faith", and demanded that it overtly declared its "insolvency", rather than attempting to conceal the fact that it was unable to fulfil the Providencia contract.⁶³ *El Comercio* was more optimistic, forecasting an imminent rise in the price of the nitrate bonds "as soon as the decree [regulating] the service of the *certificados* is issued", adding that there were "no reasonable grounds to assume" that such provision would not bolster the position of the securities, "depressed more due to the alarm of some bondholders than for real causes". One week later the newspaper reported that there was a "remarkable abundance of disposable funds", lowering interest rates, coupled with active trading in nitrate bonds, albeit at 87 percent of face value.⁶⁴ Immediately after the Chilean occupation of Antofagasta, on February 14, 1879, a further decline in the quotation of the nitrate bonds was ascribed to the prospects Peruvian involvement in a war between Bolivia and Chile, while *El Nacional*, more aggressively, requested the government to "demand" the *Compañía Salitrera* to meet its obligations, since it had to be "compelled" to do so.⁶⁵

As the Peruvian Congress pondered alternative schemes of war finance, *El Comercio* rejected further issues of paper money, warning against the "spirit of criminal speculation of a few adventurers who have thrived

⁶⁰*El Nacional* (Lima), 21-Jan-1879.

⁶¹See above p. 314.

⁶²"Revista mercantil de la semana" *El Comercio* (Lima), 28-Jan-1879. A "large-scale speculation" was also cited as a cause, with capital "eschewing" all type of securities.

⁶³*El Nacional* (Lima), 10-Feb-1879.

⁶⁴"Revista mercantil de la semana", *El Comercio* (Lima), 11-Feb-1879, and 18-Feb-1879.

⁶⁵"Revista mercantil de la semana", *El Comercio* (Lima), 4-Mar-1879; *El Nacional* (Lima), 4-Mar-1879.

through the illegal emissions of paper currency, ruining the entire country"; the newspaper proposed a combined package, made up of a war tax, an export duty on sugar, a 25 percent discount on wages, coupled with a reduction in the service of the internal debt and the nitrate bonds. Another newspaper objected to a reduced service of the internal debt and the nitrate *certificados*, since it would discriminate against a specific group of people, and it would block further sources of credit.⁶⁶

As war loomed larger, *El Comercio* showed an unflinching faith on the nitrate bonds, arguing that its service would be 'ensured'; even the Chilean naval blockade of Iquique, the main Tarapacá nitrate port, in May, 1879, accompanied by a heavy concentration of Peruvian troops in the region, did not temper the optimism of the newspaper: it claimed that the *certificados* were guaranteed by a stock of 3 million quintals in Europe, whose price would rise "considerably" due to nitrate shortages, "meeting consumption needs for [a period] of some months, which will be shorter in any case than the expected duration of the war".⁶⁷ A possible explanation for the overly sanguine outlook of *El Comercio* might lie in the fact that the financial news of the newspaper were written by Cox Brothers, a local brokerage firm, one of whose partners, Enrique Cox, was also a Director of the *Banco Nacional*; the latter Bank had a subsidiary in Iquique, and held a substantial number of *certificados*, which were officially reported as part of the assets of all financial institutions.⁶⁸ Thus, as brokers, the Cox brothers were obviously interested in staving off the downfall of one of the few, if not the only, highly-regarded security, while as stockholders of a bondholding Bank they stood to lose by a collapse in the price of the *certificados*, not only by the decrease in value of an investment, but also by being compelled to write down banking capital assets.

⁶⁶*El Comercio* (Lima), 12-Mar-1879; *La Tribuna* (Lima), 12-Mar-1879.

⁶⁷"Revista mercantil de la semana", *El Comercio* (Lima), 18-Mar-1879, 1-Apr-1879, and 8-Apr-1879

⁶⁸Perú, *Directorio de Lima para 1879-1880* (Lima: Imprenta del Estado, 1879) p 95, Cox also placed a bid in the auction of the bonds issued for the Rimac Company in September, 1878, and might have bought some since not all the buyers are known (*El Comercio* (Lima), 1-Oct-1878), the nitrate bonds appeared listed as assets of all the Associated Banks in all official accounts published in *El Comercio* in 1877 through 1879. For the specific holdings of the *Banco Nacional* see above p. 157, Table 2.5.

In spite of the assurances furnished by *El Comercio*, on March, 13, 1879, the *Compañía Salitrera* officially notified the Peruvian government that it could not service the nitrate bonds. The Prado Administration replied with a decree ordering the company to meet the interest and amortization charges due on May 1, 1879, and regretting the fact that the payment slated for January 1, 1879 had not been made; the decree noted that nitrate prices had risen to 13 sh, and that this level of prices was sufficient to cover "not only the full service [of the nitrate bonds] but also the commission [to the company] stipulated in the [Providencia] contract".⁶⁹

The *Compañía Salitrera* did not yield to the government decree, and never made any type of payment to the nitrate bondholders. Subsequently, all comments concerning the *certificados* in the Lima press were either apprehensive or angry; they including announcements of a further decline in its quotations; expressions of alarm at the prospect of massive emissions of paper money coupled with proposals to use the depreciated currency to purchase the nitrate bonds; and explicit protests, ascribing the default to undue "influences and favour" which had delivered the management of nitrate into "hands, undoubtedly honourable, but in no way competent to properly meet the corresponding commitments and obligations of an operation of this sort".⁷⁰

On June 26, 1879, the nitrate bondholders named a commission formed by Hans Gildemeister, Carlos Elizalde and Modesto Basadre to approach the government protesting the refusal of the *Compañía Salitrera* to service the *certificados*.⁷¹ García Calderón, Chairman of the company, simply replied that the upcoming quarterly payment of the nitrate bonds could not be met due both to the termination of Tarapacá exports as a result of the war, and to poor sales in Europe.⁷² At the time, on June 30, 1879, the last available quotation of the *certificados* stood at 58 percent (and the 10,000-soles type at 57 percent), the lowest price recorded since they were first issued in August, 1876. However, it is worth noting that both the Peruvian exchange and the bonds of the internal debt fared far worse, the former quoted at 15 3/4 d, or about 36 percent of its pre-1875

⁶⁹The decree was signed by President Prado, and Finance Minister Izcue. *El Comercio* (Lima), 3-Apr-1879.

⁷⁰*El Comercio* (Lima), 22-Apr-1879, 6-May-1879, 20-May-1879, and 7-Jun-1879; *El Nacional* (Lima), 23-Jun-1879.

⁷¹*El Comercio* (Lima), 26-Jun-1879. The list of signatures included both Peruvian and foreign bondholders.

⁷²*El Comercio* (Lima), 30-Jun-1879.

value of 44 d, and the latter at 41 percent of par value.⁷³ The higher quotation of the nitrate bonds relative to the exchange and the internal debt, in spite of a publicly acknowledged default, suggests that the *certificados* were still used as a substitute currency in the face of the gradual collapse of all other alternative means of payment and savings.

9. The Final Stage of the Expropriation

The combined pressure of wartime expenses and the domestic outcry against further plant purchases virtually halted sales of nitrate properties during 1879. However, as Table 3.8 shows, even the formidable weight of war financing did not keep the Prado Administration from buying eight additional nitrate plants, in fact, even the brief and besieged Piérola Dictatorship (December, 1879-January, 1881) found time to purchase another two *paradas*.

⁷³See Table 5, Volume 2.

Table 3.8

*Sales Contracts for
Nitrate Plants,
1879-1880
(Soles)*

No.	Plant	Contract Date	Total paid (soles)	Owner (1876)	Nation
1	Sta. Rosita	11-Jan-79	12,391.00	Contreras, C.	Per
2	Carmelitana	14-Jan-79	134,581.00	Lecaros, D.	Per
3	S. José (Alva)	15-Jan-79	19,000.00	Cevallos, N.	Per
4	Jazpampa (Z)	11-Feb-79	65,000.00	Zavala Bros.	Per
5	Yungay (Al)	14-Feb-79	6,000.00	Albarracín, L.	Per
6	Sta. María	09-Mar-79	9,640.00	Hidalgo/Dews.	Per*
7	Sta. Lucía	17-Mar-79	12,000.00	Albarracín, L.	Per
8	S. Miguel (Ca)	17-Mar-79	80,000.00	Cauvi, Juan	Per
9	Candelaria (C)	21-May-80	4,000.00	Carpio, H. de	Per
10	Cordillera	21-May-80	12,000.00	Cano, J.	Per
Total 79-80			354,612.00		

*Owned also by P. Dewsberry, possibly British.

Source: Derived from Table 1, Volume 2.

All plants bought by the Peruvian State in 1879 and 1880 were severely flawed. The only *máquina* purchased during the period, "Carmelitana", was a mere project in 1875, and it was never actually built. Only three *paradas*, "Jazpampa de Zavala", "Santa Lucía", and "Santa María", are known to have been active after 1876. However, five of the ten plants sold during this period were repossessed after 1880, and three were endowed with new *máquinas*, an indication that they had at least workable deposits.⁷⁴ As Table 4.8 shows, the purchase of the additional ten plants in 1879-1880 added a marginal 2 percent to the total amount already applied to the acquisition of nitrate properties. The restraint of 1879-1880 reflected the staunch congressional

⁷⁴The five plants repossessed after 1880 were "Candelaria de Carpio", "Cordillera", "Jazpampa de Zavala", "Santa Lucía", and "Santa María"; the two first operations were equipped with new *máquinas* in 1884, the third one in 1882. See Table 1, Volume 2.

resistance to allow the government to exceed the ceiling of 20 million *soles*, formally stipulated in the Congressional proposal of February, 1879.

Table 4.8

*Sales Contracts for
Nitrate Plants,
1876-1880
(Soles)*

Pre- sid- ent*	Ye- ar	No. Cont- rcs.	% Cont- rcs.	Value Plants	% Value Plants	Cum. Total
Pardo	76	59	40.97%	8,759,555.36	44%	8,759,555.36
Prado	76	24	16.67%	2,084,185.00	11%	10,843,740.36
Prado	77	30	20.83%	4,501,476.18	23%	15,345,216.54
Prado	78	21	14.58%	4,032,465.00	20%	19,377,681.54
Prado	79	8	5.56%	338,612.00	2%	19,716,293.54
Piérola	.80	2	1.39%	16,000.00	0%	19,732,293.54
Total 1876-80		144		19,732,293.54		

*Prado took office on 2-Aug-1876; he was replaced by Piérola on 19-Dic-79.

Source: Derived from Table 1, Volume 2.

Fifty additional deliveries of *certificados* were made during 1879-1880 (Table 5.8), amounting to slightly more than 2 million *soles*. However, the 1.25 million *soles* in promissory notes (*vales provisionales*) handed out to Gildemeister on May 5, 1879, represented over 50 percent of all deliveries made in 1879-1880.⁷⁵ Virtually none of the recipients of nitrate bonds delivered in the period was registered by the Peruvian authorities. Aside from Gildemeister and a residual amount of *certificados* (i.e., 8,000 *soles*) delivered to the Campbell firm, only

⁷⁵See detailed listing in Table 2, Volume 2.

three other recipients of nitrate bonds in 1879-1880 were identified by the Peruvian Government.⁷⁶ One possible explanation for this absence of records could lie on the confusion sowed by war; this is particularly true of 1880, since at the end of that year, most of Perú had fallen, and the Chilean army was massing at the doors of Lima.

Table 5.8

*Nitrate Bonds Delivered
and Yearly Interest Charges,
1876-1880*

Pre- sid- ent*	Ye- ar	No. Deli- vers.	% Deli- vers.	Amount (soles)	% bonds	Yearly Interest (£)**
Pardo	76	23	8.33%	2,341,000.00	11.86%	32,774.00
Prado	76	35	12.68%	3,076,000.00	15.59%	43,064.00
Prado	77	69	25.00%	6,546,325.00	33.18%	91,648.55
Prado	78	99	35.87%	5,749,606.12	29.14%	80,494.49
Prado	79	43	15.58%	1,706,362.42	8.65%	23,889.07
Piérola	80	7	2.54%	313,000.00	1.59%	4,382.00
Total 76-80		276		19,732,293.54		276,252.11

*Prado took office on 2-Aug-1876; he was replaced by Piérola on 19-Dic-79.

**Computed by the author, at 8% per annum, and at 42 d per sol.

Source: Derived from Table 2, Volume 2.

The available data on the actual management of the expropriation up to November, 1879, is fragmentary. No new production contracts were signed during this period, but around September, 1879, the Peruvian Government lowered the price paid to State contractors to 1.45 soles; the measure appeared to have

⁷⁶The three other known recipients are the Zavala brothers, Pedro José and Manuel José, (100% of "Jazpampa de Zavala"); the CSP (31% of "Sacramento de Castilla"); and José Bonilla y Córdova (a residual payment for "San Agustín"). It seems peculiar that the CSP, a corporation established specifically for the management of the expropriation, would receive nitrate bonds issued by the same company; it is possible that the CSP was acting on behalf of, or in conjunction with, the Providencia Bank. See Table 2, Volume 2.

reduced, but not eliminated, the profit margin of the most efficient producers, as the correspondence of the Gibbs firm makes clear.

Selling Nitrate to the Government at 1.45 *soles* per quintal does not leave a very wide margin for profit, when we estimate freight on Coal...I estimate that the [illegible] of the newest improvements made in the "Limeña", we will be able to make Nitrate in Cancha at something close to 30 pence per quintal.⁷⁷

Of course, the extent in which a decrease in the price paid to contractors had a negative impact on profits was directly related to the costs of production of the individual plants. High-cost producers, particularly the ailing *paradas*, would be hurt relatively more than the efficient contractors, such as Gibbs. In a deregulated environment, plants unable to work profitably at a lower price level would have been forced to either shut down or produce at a loss. However, within the framework of the Peruvian expropriation, the less efficient producers had the option of transferring their output quotas, in effect allowing the larger producers to manufacture (at a lower average cost) the share of nitrate assigned to lesser plants. Of course, the free plants were not subject to output restrictions, and it was entirely possible for State contractors to channel exports exceeding their prescribed quotas through independent producers.

The free producers remaining in 1879 were few in number (i.e., 15 *paradas* and 5 *máquinas*), and its combined capacity, slightly less than 1 million Spanish quintals, or some 67,000 tons,⁷⁸ could not seriously threaten the government's hold on the industry, particularly since the capacity estimates, derived from the report of 1875 Assessment Commission, are suspect. Furthermore, the owner of one of the important unsold *máquinas*, Peña Chica, actually signed a production contract with the government in 1878.⁷⁹ However, the 19 independent plants remaining could serve as a front for the exports of larger producers regardless of its real capacity.

⁷⁷Smal to Read, Oficina Limeña, La Noria, 10-Sep-1879. Gibbs Ms 11,132. "*In Cancha*" referred to nitrate at the plant, as opposed to at the port of export.

⁷⁸See Table 1, Volume 2.

⁷⁹See Table 3, Volume 2.

Although the transferring of production quotas was entirely legal, and it had been widely used by the government as a tool for persuading reluctant free producers to sell their plants,⁸⁰ the operation came under attack in the Peruvian Congress. One critic of the expropriation pointed out that the output of free producers was in fact three or four times larger than the actual capacity of their plants; he denounced "production smuggling", as opposed to "smuggling of exports", stating that "it is not possible to determine the respective manufacturing plant of an enormous amount of nitrate brought to customs for export".⁸¹ The Minister of Finance, present at the time in the floor of the Chamber of Deputies, dismissed "production smuggling" as "a mere conjecture", but admitted that he could not estimate current productive capacity of the Tarapacá nitrate industry, and had no information about intractable nitrate exports.⁸²

In Tarapacá, the Gibbs firm was actively involved in purchasing production contracts from other contractors. Smail, the manager of "Limeña", negotiated the sale of the production contract and the *certificados* for "Esmeralda" with the British firm of Clark, Eck & Co., noting that the partners were divided on the issue, and that one of them, Trevor,

would take 15 silver for the Contract, and the others may give way, should they succeed in disposing of the Certificates. I believe Trevor will rather buy in his share of the Certificates than part with them at present prices.⁸³

The Clark firm ultimately decided to keep both their bonds and their production contract,⁸⁴ but Smail reported that the Gibbs firm had taken over a production contract granted to the Chilean entrepreneur F.A. Oliván.⁸⁵ A project to purchase the production contract held by Italian producer Félix Massardo fell through, partly

⁸⁰See above pp. 165-166.

⁸¹Deputy Moreno y Maíz in Perú, *DE1879*, 28-Jan-1879.

⁸²*Ibid.*

⁸³Smail to Read, Oficina Limeña, La Noria, 6-Mar-1879, Gibbs Ms 11,132.

⁸⁴Smail to Read, Oficina Limeña, La Noria, 13-Mar-1879. Gibbs Ms 11,132.

⁸⁵The date and the plant were not mentioned; Oliván had been granted a transferable production contract, albeit not for his original plant, "Santa Catalina". Smail to Read, Oficina Limeña, La Noria, 10-Sep-1878. Gibbs Ms 11,132.

because the Gibbs firm found the holder's "pretensions somewhat exaggerated", and partly because "he [Massardo] seemed to think that there would be some difficulty, even if we were to come to terms, in gathering the President's sanction to the transfer of the contract to be worked in another *oficina*".⁸⁶ The last remark indicates that there was growing government pressure, doubtlessly linked to congressional criticism, to restrict the transference of production contracts amongst Tarapacá contractors. In March, 1879, the CSP prevented one contractor from purchasing nitrate from another plant to fulfil his quota, while another was thinking of turning to the manufacture of nitrate of potash to stretch his assigned quota.⁸⁷

The interest in purchasing production contracts for other plants was not rooted exclusively on the search for increased profits; there was a pressing need to keep large *máquinas* working as close as possible to full capacity to avoid damage to the equipment.

It must always be borne in mind that if we do not secure any employment for the Limeña, we will have to bear the heavy expense of keeping the *Oficina* in good order, and after all it is impossible to avoid serious deterioration while standing.⁸⁸

Since 1879 was the first year of the War of the Pacific, with its attendant disruption of production and trade, it is unclear how effective was the CSP's attempt at curtailing transfers of output quotas between contractors. As Table 6.8 shows, Tarapacá nitrate exports declined sharply by some 130,000 Long tons, and prices rose to a record £18 10sh, reflecting the impact of naval blockades in the area.⁸⁹

⁸⁶Smail to Read, Oficina Limeña, La Noria, 10-Sep-1878, and 28-Sep-1879. Gibbs Ms 11,132

⁸⁷The first contractor was identified as Harvey, currently working "Santa Beatriz"; this is the first mention I have found of that name prior to 1879. The reference has some interest since Robert (later Sir) Harvey figured prominently in the Tarapacá industry during the subsequent Chilean period. Smail to Read, Oficina Limeña, La Noria, 6-Mar-1879. Gibbs Ms 11,132.

⁸⁸Smail to Read, Oficina Limeña, La Noria, 10-Sep-1878 Gibbs Ms 11,132.

⁸⁹Other authors supply different figures. Aikman (*Manures*, p. 351) reported a drop of merely 90,000 long tons, and one Chilean Senator reported prices falling, rather increasing, from 14sh 10d in 1878 to 14sh 6d in 1879 (see Table 7.8 below). The latter appears extremely unlikely due to the unanimous agreement on a drastic decline of nitrate supply. For a discussion on the issue, see below pp 353-354

Table 6.8

*Guano and Tarapacá Nitrate,
Exports and Prices,
1870-1879
(Long Tons, £ per Long Ton)*

Year	(1) Guano Exports (a)	(2) Nitrate Exports (a)(b)	(3) Price Guano (c)	(4) Price Nitr. (c)	Total Exports (d)	% Guano (d)	% Nitrate (d)
1870	698,176	125,252	14.00	16.05	823,428	84.79%	15.21%
1871	363,200	153,443	12.00	17.00	516,643	70.30%	29.70%
1872	404,097	179,607	12.00	15.05	583,704	69.23%	30.77%
1873	342,425	266,543	12.15	14.15	608,968	56.23%	43.77%
1874	336,476	237,586	13.00	13.00	574,062	58.61%	41.39%
1875	373,688	306,623	12.10	11.15	680,311	54.93%	45.07%
1876	379,000	299,391	12.10	11.10	678,391	55.87%	44.13%
1877	310,000	192,411	12.00	14.15	502,411	61.70%	38.30%
1878	n.a.	251,457	11.00	14.10	n.a.	n.a.	n.a.
1879	n.a.	90,358	11.00	18.10	n.a.	n.a.	n.a.

(a) Long tons.

(b) Original in Sp. Quintals, converted by the author into long tons dividing by 23.5; Tarapacá, exclusive of Antofagasta.

(c) British pounds per long ton, FOB, UK.

(d) Computed by the author.

Source: (1)-(3) Greenhill, "Peruvian", p.111; Rodríguez, "Historia", p.110.

(2) *El Veintiuno de Mayo* (Iquique), 14-May-1884.

(4) *The Economist* (London), 13-Mar-1880;

Greenhill, "Peruvian", p.110.

However, the discrepancy in prices reported by different sources in different locations (Table 7.8) blurs the impact of the first year of the War of the Pacific on nitrate prices, since data on prices before and after the Chilean occupation is not available. The prices in Iquique (f.a.s or free alongside ship) were, of course, largely regulated since the government bought most of nitrate exports at a fixed price; the drop registered at port of export during 1879 relative to 1878 was certainly influenced by the unilateral reduction in prices enacted by the CSP, but it is not known how much nitrate was exported before and after November, 1879.

Table 7.8

*Nitrate Prices,
Iquique, Valparaiso, UK,
and Continental Europe,
1873-1879*

Year	(1) Price f.a.s (£ per L.Ton)	(2) Price Valpso. (Pesos p.S.Q.)	(3) Price UK (sh.d. p.E.Q.)	(4) Price Europe (sh.d. p.E.Q.)	(5) Price Europe (£ per L.Ton)
1873	11.30	2.13	11.9	14.3	14.15
1874	9.92	1.83	12.7	12.3	13.00
1875	8.54	1.86	11.7	11.9	11.15
1876	9.39	2.20	12.1	11.6	11.10
1877	11.20	2.57	15.6	14	14.15
1878	10.61	2.90	14.10	14.6	14.10
1879	8.13	3.57	14.6	14.3	18.10

Source: (1) Partington, *Nitrogen*, p.77.
 (2)-(4) Cruchaga, *Estudios*, 2:13.
 (3) Sen. Claro, *SO1880*, pp.281-287.
 (5) Greenhill, "Peruvian", p.110;
 (1879) *The Economist*, 13-Mar-1880.

The conflict between the owners of the nitrate railroad and the Tarapacá producers, triggered by the initial approval of the Peruvian Courts of freight charges denominated in silver *soles* in mid-1878, continued during 1879. The problem arose from the need of a syndicate of European lenders, engaged in a dispute over the control of the railroad with the controversial Montero Brothers since 1875, to service loans payable in British pounds.⁹⁰ The nitrate producers had a lawsuit pending against the railroad company in March, 1879, and the head of the Lima office of the Gibbs firm thought that "it was by no means certain" that the Montero brothers, owners of the nitrate railroad, would win it. However, the British firm took a very cautious stance on

⁹⁰*El Comercio* (Lima), 6-Jul-1878, 22-Jul-1878, 27-Jul-1878, and 2-Aug-1878; *El Peruano* (Lima), 5-Jul-1878. For the overall history of the nitrate railroad during the Peruvian period see: Bertrand, *Memoria*, pp. XCI-XCIII.

the matter. "As we are anxious to keep well with the Monteros for the present, you had better keep as much in the background as you can, and let the other *Salitreros* fight out the battle".⁹¹

In March, 1879, the railroad company was demanding an 80 percent premium on the usual rate. Otto Herrmann and Pedro Elguera paid up, while another contractor refused to do so "and his traffic is stopped in consequence"; Félix Massardo made an arrangement to obtain a preferential exchange rate of 36 pence, "but some people say that he only really pays 32 pence"; and "Folsch and Martin say they cannot bring matters to a head, because they had previously advanced the Railroad Co. money".⁹² The clash spurred a movement to resort to transporting nitrate to port by mules, effectively sabotaging the railroad. However, the manager of "Limeña", after reporting that he had started assembling *arrieros*, or muleteers, "in order to be prepared for the worse", noted that "freight by *arrieros*...will not be very cheap after all, and you will know what [illegible] business it is to work", hoping that Montero would "attempt to settle to avoid loosing out to *arrieros*".⁹³ The Lima manager also advised caution in this matter: "perhaps your best plan will be to hold back as much as you can for your immediate and urgent requirements to pay the Monteros the premium they may ask".

The larger producers will probably prefer to pay more to *arrieros* so as to bring the Monteros to reason, and if they succeed in doing so we shall reap the benefit, and if they should be unsuccessful we shall have been prejudiced to a small extent.⁹⁴

As the war advanced, the spectre of military requisitions also dampened the attraction of land transport.

I have now at my disposal a sufficient number of *arrieros* to carry to port our...monthly quota of Nitrate....I tried to get them to start at once to bring up our Stock of Coal in Iquique,...but they would not consent, owing to the great danger they would incur of having their mules taken from them.⁹⁵

⁹¹Read to Smail, Lima, 5-Mar-1878. Gibbs Ms 11,132.

⁹²Smail to Read, Oficina Limeña, La Noria, 13-Mar-1879. Gibbs Ms 11,132.

⁹³Smail to Read, Oficina Limeña, La Noria, 13-Mar-1879. Gibbs Ms 11,132.

⁹⁴Read to Smail, Lima, 20-Mar-1879. Gibbs Ms 11,132.

⁹⁵Smail to Read, Oficina Limeña, La Noria, 30-Apr-1879.

In September, 1879, about two months prior to the Chilean invasion of the region, the conflict was still unresolved, and some of the main nitrate producers had discussed the actual construction of roads joining plants with Iquique, further motivated by the price reductions ordered by the Peruvian Government

The main objection to the high freight is that our contracts with the Government were arranged on the basis of freight in paper currency, and the low price of 1,45 soles paid for the Nitrate leaves a very narrow margin for profits.⁹⁶

The railroad conflict was one of the most enduring legacies of the Peruvian period, since it continued well after 1879, generating far more divisions in Tarapacá than any other issue, including the mercurial nitrate *certificados*.⁹⁷

However, in November, 1879, the Peruvian expropriation came to an end with the Chilean occupation of the nitrate region. All ensuing activities took place in the framework of privately-held nitrate plants, in effect accomplishing the return of the industry to private hands already prescribed in the last Peruvian nitrate law of February, 1879, albeit much earlier, and certainly far more dramatically, than anyone had anticipated.⁹⁸

10. *The Antofagasta Company in 1879*

Since Chilean troops occupied Antofagasta on February 14, 1879, and no major battles were fought in the littoral region, the correspondence of the CSA during the first two months of that year focused on the looming military confrontation to the exclusion of economic developments. There was a marginal reference to a temporary decline in nitrate prices in early January,⁹⁹ but all the rest of the letters were concerned exclusively with the political and diplomatic struggle over the inflammatory 10-cents export duty. The arrival

⁹⁶Smail to Read, Oficina Limeña, La Noria, 10-Sep-1879. Gibbs Ms 11,132.

⁹⁷Cf. Chile, *Recopilación de documentos relativos a los ferrocarriles de Tarapacá* 2 vols. (Santiago de Chile: Imprenta de la República, 1883 and 1891); Joseph R. Brown, "The Chilean Nitrate Railways Controversy" *Hispanic American Historical Review* 38(November, 1958): 465-481; and Fernando Silva Vargas, "Los ferrocarriles salitreros de Tarapacá durante el Gobierno de Santa María" *Estudios de Historia de las Instituciones Políticas y Sociales* (Universidad de Chile) 1(1966) 43-120.

⁹⁸The best available study on post-1879 Tarapacá (up to 1891) is O'Brien, *Nitrate*.

⁹⁹Hicks to Soubllette, Antofagasta, 3-Jan-1879. CSA.AG. Vol.15, fs. 109.

of the Chilean warship "Blanco Encalada" in Antofagasta on January 7, 1879,¹⁰⁰ along with the General Manager of the CSA in Valparaíso, Evaristo Soubllette,¹⁰¹ strengthened the position of the previously isolated George Hicks; since Soubllette was a higher-placed official, his letters from Antofagasta, normally addressed to Miguel Saldías, Vicepresident of the CSA, furnish a better view of the overall policy of the company, particularly with respect to the divisions within the Chilean Government, already perceptible in 1878.

The local Bolivian authorities continued pressing Hicks to pay the nitrate duty, and on January 3 the manager of the CSA was presented with an official breakdown of the funds demanded: from February 1878 (the date of the approval of the tax) to February 1879, 908,481.33 Spanish Quintals (41,295 tons) had been exported, which at 10 cents a quintal amounted to 90,848.13 *Bolivianos*, or some £18,170.¹⁰² The Bolivian Government was going to war for less than £20,000.

Hicks reported that the arrival of the "Blanco Encalada" "has caused a great commotion in Antofagasta, and it seems to me that, albeit belatedly, the Bolivians are taking stock of the seriousness of the situation". He went aboard the Chilean warship to visit Commander Juan S. López, who told him that he was not fully informed about the current situation in Antofagasta, that he was waiting for official instructions, and that "on the meanwhile he would not take any active measures, unless something very urgent comes up." The manager of the CSA regarded the fact that he had been requested exclusively to pay up or to face an embargo as a fortunate development, since "up to now, they have been prudent enough not to order coercive measures against me personally". "Currently, I have been unable to decide as to the form of resistance, or if I should resist at all; I will think about this later on, but I think it is best to give them leeway".¹⁰³ Perhaps emboldened by the

¹⁰⁰Hicks to Soubllette, Antofagasta, 7-Jan-1879. CSA.AG. Vol.15, fs. 118.

¹⁰¹The acting General Manager temporary replacing Soubllette was Carlos E. Browne. Hicks to Soubllette, Antofagasta, 10-Jan-1879. CSA.AG. Vol.15, fs. 121.

¹⁰²I am assuming that the payment was demanded in silver *Bolivianos*, and that the current exchange was 5 *Bolivianos* to the British pound. Aduana de Antofagasta, Bolivia. "Pliego de Cargo y Recibo contra la Compañía de Salitres y Ferrocarril de Antofagasta", 3-Jan-1879. CSA.AG. Vol.15, fs. 112.

¹⁰³The actual term used "*darles sogá*", or "give them rope", was obviously used in the sense of giving the Bolivians rope to hang themselves.

presence of the "Blanco Encalada", Hicks wanted to speed up the first shipment of iodine, a byproduct of nitrate, from Antofagasta, "while the issue of the new taxes is alive; I suppose the Bolivians would not attempt now to add another [contravention] to their long list of violations to the Treaty"¹⁰⁴ Commander Lopez was formally notified by Hicks that the local authorities had demanded payment of 90,848 13 *Bolivianos* within three days.¹⁰⁵

Three days after his arrival at Antofagasta, on January 10, 1879, Evaristo Soubllette, General Manager of the company, issued his first report to Miguel Saldías, Vicepresident of the CSA. He tried to contact the Prefect to request the suspension of the nitrate duty, but in spite of going "several times" to visit him "with the excuse that he was sleeping, I was not received". Soubllette then met with both the current manager of the CSA, and Greene, his successor.¹⁰⁶ Soubllette informed Hicks and Greene that "the Board wanted to win time, so as to allow that the instructions sent to Mr. Videla by the Chilean Government reached La Paz, and then see the position that Bolivia would take with respect to the affairs of the company". He disclosed the idea, ascribed to Francisco Puelma, one the CSA Directors, of asking for the acceptance of the deposit of the amount demanded on a Chilean Bank outside Bolivia; the request was presented by the young Jofré to the Customs Manager, Mr. Larriva, "who deplored the behaviour of the Bolivian authorities, and who is not unaware of the consequences...". Jofré was charged with transmitting the idea to the Prefect, who accepted the proposal, waiting for a final settlement between the Bolivian and Chilean Governments; the order to embargo the company's properties would be suspended, but the Prefect warned that he would forbid any further exports of nitrate from Antofagasta. Soubllette interpreted this ban on exports as the work of "the ring who dominates and directs all the decisions of the Prefect" in an attempt to "annul the compromise". Thus, he instructed Hicks to continue shipping nitrate until he received a written order "or was physically restrained" from doing so. Since no attempt

¹⁰⁴Hicks to Soubllette, Antofagasta, 7-Jan-1879. *CSA.AG*. Vol.15, fs. 117-119.

¹⁰⁵Hicks to Juan S. López, Commander of the ironclad "Blanco Encalada", Antofagasta, 7-Jan-1879. *CSA AG* Vol.15, fs. 114.

¹⁰⁶Greene arrived at Antofagasta on December 13, 1879, and was slated to replace Hicks upon his upcoming retirement, in March, 1879. Hicks to Soubllette, Antofagasta, 13-Dec-1878. *CSA.AG* Vol.15, fs. 039

was made to enforce the embargo, Soubllette thought that the Prefect feared that the company would interrupt all work at the moment such measure was taken, and "feared the consequences." He reported that "spirits are quite high, to the point that no Chilean wants to hear of calm and moderation. And such a situation makes me fear that the smallest incident, the most insignificant event could act like a spark which brings about a fire". He assured that "both myself and Mr. Greene will do the utmost to prevent that the spark comes from the company". Soubllette's view of Bolivians closely mirrored that of Hicks, although he seemed to have had a wider political outlook, describing a local "Federalist Party" conspicuously absent from the correspondence of the manager of the CSA.

From what I can tell, [the Bolivians], in their aggressive methods against the company, even though they are moved by their hate of Chile, are motivated here mainly by political opinions. It seems that the Federalist Party is active again; and its local followers believe that any upheaval in the littoral will serve their cause. Behind them, there are some --quite a few--, very corrupted, who influence others, and press the authorities seeking personal advantages on all of these matters, without a clear view of the final outcome. For those of us who are used in Chile to have authorities who respect themselves and others, you can imagine...the revulsion with which one observes what happens [here], and it is not surprising that, involuntarily, one starts thinking that the only possible solution, the only way of having guarantees here, is to revert to the situation of [18]72.¹⁰⁷

Matters started getting to a head on January 13, 1879, when the local authorities ordered simultaneously the embargo of the company's properties, and the arrest of Hicks, along with stopping further shipments of nitrate. The loading of one ship, the "Maida", already carrying some 10,000 quintals of nitrate, was forcibly interrupted. The manager of the CSA promptly sought asylum aboard the "Blanco Encalada".¹⁰⁸ Soubllette explained that the purpose of seeking asylum in the Chilean ironclad was not only to protect Hicks, but also "to secure, by means of the pertinent note of the [Chilean] Consul to the Prefect, a copy of all actions related to the embargo, of which...we did not have the slightest knowledge".¹⁰⁹ Some ten days later, on January 22, 1879,

¹⁰⁷Soubllette to Miguel Saldías, Antofagasta, 10-Jan-1879. CSA.AG. Vol. 15, fs. 121-125.

¹⁰⁸Hicks to CSA (Telegram dispatched from Iquique), 14-Jan-1879; David Sim to Carlos E. Browne, Antofagasta, 14-Jan-1879. CSA.AG. Vol.15, fs. 129.

¹⁰⁹Soubllette to Miguel Saldías, Antofagasta, 14-Jan-1879. CSA.AG. Vol.15, fs. 131-132.

Hicks was informed from Iquique (apparently in a confidential fashion) that the Prefect had been ordered to discontinue all measures taken against the company, the manager of the CSA hastened to request an order to continue loading nitrate, "and this order will force the Prefect and his circle to make public the orders received, which will be doubtlessly confirmed by the correspondence coming in by steamship on Saturday"¹¹⁰ However, the Antofagasta Customs Manager denied permission to load nitrate arguing that he required an "explicit order" from the Prefect.¹¹¹ One account of the episode stated, without providing a source, that the local authorities finally agreed to allow the loading of an additional 5,000 quintals so as to spare the owner of the "Matta",¹¹² but there is no reference to this fact in the correspondence of the manager of the CSA

Soublette had an opportunity to take a first hand look at the situation in the Carmen Alto deposits, previously known to him only by the alarming reports issued by Hicks

The freedom of trade [in Carmen Alto] ...is in fact the freedom to vandalize Carmen Alto is a haven for all the criminals who could not dwell on any place having even the semblance of a police force; yesterday, at the very door of the manager's house, one outlaw almost stabbed another one on plain sight of all of us. And since here there are no authorities or police to enforce order, this and all crimes perpetrated daily remain unpunished, the manager has stopped sending criminals to the port because, since they have no money that the petty local lawyers (*tinterillos*) can squeeze out of them, they are released immediately

He thought that it would be better to request permission to hire some six to eight armed men.

To ask for a police force made up of Bolivians would be to worsen the damage. These policemen would not be alive twenty four hours upon arrival, thus encouraging these outlaws entrenched here, and posing the greatest threat to the company's employees¹¹³

However, the concern about Carmen Alto was dwarfed by the hardening of the Bolivian position with respect to the nitrate duty. Hicks was informed that Perú was actually supporting Bolivia on the issue "I believe, according to a good source, that Perú is offering her immoral influence to deflect these confounded Bolivians

¹¹⁰Soublette to Miguel Saldías, Antofagasta, 23-Jan-1879. CSA.AG Vol 15, fs 163

¹¹¹Hicks to Carlos E. Browne, Antofagasta, 28-Jan-1879 CSA.AG. Vol.15, fs. 169.

¹¹²Querejazu, *Guano*, p.207.

¹¹³Soublette to Miguel Saldías, Antofagasta, 23-Jan-1879. CSA.AG Vol.15, fs. 165-166.

from the path of honesty and national prosperity". A week prior to the actual landing of Chilean troops, the manager of the CSA could sense that war was inevitable. "It seems that Bolivians are looking for a war, which should be brief and energetic".¹¹⁴

A final attempt to settle the matter by accepting the Emperor of Brazil as an arbiter was notified to Hicks by Defense Minister Jofré.

According to reports of Mr. Jofré Jr., referring to a letter from his father, it seems that the idea of accepting the arbitration without suspending the enactment of the Assembly's decree [i.e., the nitrate duty] prevails in [Bolivian] Government circles; this means that the bellicose, and not the prudent, are dominating, as we already know, confirming the rumour, widely accepted here, that Jofré is leaving the cabinet, and that his successor has been chosen.¹¹⁵

It is worth noting that, on February 11, 1879, merely three days prior to the landing of Chilean troops in Antofagasta, the General Manager of the CSA viewed the Brazilian arbitration as an attempt to weaken the company's position, and thought that Chile would not wage war on account of the nitrate duty.

Through Mr. Jofré, informed by a letter from his father, we knew that the Chilean question has taken a new turn, with the arbitration of the Emperor of Brazil; but --adds Mr. Jofré senior-- "I fear that the victim of this arrangement will be the company".

Soublette stated that initially he did not understand Minister Jofré's remark.

But after receiving your letters, and seeing that the attitude of the Chilean Government sharply departs from the first note of Mr. Fierro [i.e., a strongly worded ultimatum issued by the Chilean Minister of Foreign Affairs]....I have come to believe that the Bolivian Government has offered Mr. Videla [the Chilean Ambassador in Bolivia] all the assurances, which it normally lavishes, in the sense that there would be no further violations of the Treaty, and that it would be the company's question what would be submitted to arbitration, thus completely separating this issue from the Chilean diplomatic intervention. Will Chile be satisfied with this solution? In spite of some harm to my national pride, everything induces me to believe that it will.

Soublette, like Hicks in 1878, showed a deep mistrust of Pedro Nolasco Videla, the Chilean Ambassador in La Paz.

¹¹⁴Hicks to Carlos E. Browne, Antofagasta, 4-Feb-1878 and 7-Feb-1878. CSA.AG. Vol.15, fs. 182, 196.

¹¹⁵Soublette to Miguel Saldías, Antofagasta, 4-Feb-1879. CSA.AG. Vol.15, fs. 186.

Videla's silence during the negotiation, as confirmed by the letter of the Defense Minister; the idea held by Videla at the beginning of conflict that the company should pay some sort of tax, and his firm determination of not interrupting his diplomatic mission, and not leaving La Paz, where, according to reliable local sources, he is tied by an affair, makes us fear that the Chilean diplomat would not be hostile to a compromise which would allow him to satisfy his desires.¹¹⁶

The skepticism of the General Manager of the CSA merely three days away from the Chilean military intervention in Antofagasta reflects the fact that the Chilean Government was deeply divided on the issue on declaring war.¹¹⁷

The same day Soublette outlined his critical view of the current official Chilean position, the Antofagasta Company was formally notified that its properties would be assessed in preparation for the embargo and the ensuing auction slated to take place on February 14, 1878.¹¹⁸ The projected embargo and auction never took place: on the assigned date, Chilean troops disembarked from the ironclad "Blanco Encalada", taking Antofagasta without any significant resistance from the local Bolivian authorities, signalling the onset of the War of the Pacific.

Perhaps the most important economic development for the Antofagasta Company in early 1879 was its radical restructuring: capital was doubled, from 2.5 million to 5 million Chilean *pesos*, incorporating several prominent political figures. Table 8.8 shows the change in detail. Obviously, the drastic reduction of the percentage of total shares held by the Gibbs firm, from almost 37 percent in 1876 to less than 7 percent, coupled with the marked increase in the Chilean share of the company (perhaps as much as 85 percent), constituted a strong indication that the CSA was bracing itself for a diplomatic and military conflict, requiring

¹¹⁶Soublette to Miguel Saldías, Antofagasta, 11-Feb-1878. CSA.AG. Vol.15, fs. 224-225

¹¹⁷This internal Chilean division was clearly documented by Gonzalo Bulnes as early as 1919, based on the papers of his uncle, current President of Chile Aníbal Pinto, adamantly opposed to the war (*Guerra passim*), more recently, the split has been further highlighted by Thomas F O'Brien, "The Antofagasta Company A Case Study of Peripheral Capitalism" *Hispanic American Historical Review* 60(1), 1980, pp 1-31 (Quoted hereafter as O'Brien, "Antofagasta Company"). See also John Mayo, "La Compañía de Salitres de Antofagasta y la Guerra del Pacífico" *Historia* (Santiago de Chile) 14(1979) pp. 71-102. Both Mayo and Querajazu based their accounts on an incomplete summary of Hicks' correspondence because the complete version was not available at the time.

¹¹⁸Hicks to Carlos E.Browne, Antofagasta, 11-Feb-1878. CSA.AG Vol 15, fs 197

determined State support, by "Chileanizing" its ownership; the fact that important politicians, such as the current Minister of Foreign Affairs, Alejandro Fierro, the current Minister of Finance, Julio Zegers, the current Minister of War and Marine, Cornelio Saavedra, and the succeeding President of the country, Domingo Santa María, were incorporated as shareholders only confirms this notion.¹¹⁹ The demise of Gibbs also reflected the fact that the efforts of the British firm to curtail CSA exports to help Tarapacá sales under his control had utterly failed.¹²⁰

¹¹⁹A discussion on the subject can be found in: Blakemore, "Politics".

¹²⁰O'Brien, "The Antofagasta Company", pp. 13-15.

Table 8.8

*Stockholders of the Antofagasta Company,
1876, 1879
(Chilean Pesos)*

Known Stockholders	Nat- ion	Amount	% Total(1)
A. Edwards	Ch	1,066	42.64%
William Gibbs & Co.	Br	939	37.56%
Uldaricio Prado	Ch	200	8.00%
Federico Varela	Ch	100	4.00%
Luis Pereira	Ch	75	3.00%
Total Stock 1876(2)		2,500	
A. Edwards	Ch	4,194	41.94%
Francisco Puelma	Ch	909	9.09%
William Gibbs & Co.	Br	638	6.38%
Santiago Hayne	Ch	614	6.14%
Federico Varela	Ch	400	4.00%
Luis Pereira	Ch	300	3.00%
Alejandro Fierro(3)	Ch	20	0.20%
Domingo Santa María(3)	Ch	20	0.20%
Antonio Varas(3)	Ch	15	0.15%
Julio Zegers(3)	Ch	15	0.15%
Rafael Sotomayor(3)	Ch	12	0.12%
Enrique Cood(3)	Ch	10	0.10%
Eugenio Vergara(3)	Ch	10	0.10%
Francisco Vergara(3)	Ch	10	0.10%
Jorge Hunneus(3)	Ch	10	0.10%
Miguel José Urmeneta(3)	Ch	10	0.10%
Cornelio Saavedra(3)	Ch	8	0.08%
Máximo del Campo(3)	Ch	5	0.05%
Miguel Subercaseaux(3)	Ch	5	0.05%
Total Stock 1879(4)		10,000	

(1) Computed by the author.

(2) Shares of 1,000 Chilean pesos each.

(3) New shareholders as of December, 1878; data from Ortega, "Change", 510, and Blakemore, "Politics", p.292. Other stockholders given for 1880 in the Annual Report of the Company.

(4) Total capital raised to 5 million Chilean pesos in 1879.

Source: CSA, *Memorias*, 1878, 1880.

From a strictly economic standpoint, 1879 was a turbulent year for the nitrate trade, largely due to the disruption of Tarapacá production as a result of the war, since, as Table 9.9 shows, Antofagasta output remained virtually unchanged, reflecting the absence of significant military confrontations in the Bolivian littoral region. In contrast, due to the disruption of the War of the Pacific, including a protracted naval blockade of Iquique, Tarapacá output dropped to about a third of that of 1878, shrinking world supply from slightly over 7 million quintals in 1878 to 3.4 million in 1879, by far the lowest figure since 1872.

Table 9.8

*Nitrate Exports,
Tarapacá and Antofagasta,
1872-1879
(Spanish Quintals)*

Year	(1) Tarapacá Exports (S.Q.)	% Tara- pacá*	(2) Antofagasta Output (Sp.Q)	% Anto- fag.*	Total Exports (S.Q.)**
1872	4,220,764	97.20%	121,558.00	2.80%	4,342,322.00
1873	6,263,767	97.13%	185,028.00	2.87%	6,448,795.00
1874	5,583,260	96.02%	231,283.00	3.98%	5,814,543.00
1875	7,205,652	96.73%	243,420.22	3.27%	7,449,072.22
1876	7,035,693	96.67%	242,630.32	3.33%	7,278,323.32
1877	4,521,654	91.24%	434,392.00	8.76%	4,956,046.00
1878	5,909,228	83.97%	1,099,701.00	15.63%	7,036,929.00
1879	2,123,418	61.39%	1,058,034.00	30.59%	3,458,969.00

*Computed by the author.

**Sum of Tarapacá exports and Antofagasta output; includes 28,000 Sp.Q. from El Toco in 1878(0.40% of total), and 68,000 from El Toco and 211,517 from Taltal (second semester in 1879(8.02%).

Source: (1) *El Veintiuno de Mayo* (Iquique), 14-May-1884.

(2) CSA, *Memorias* 1873-1879.

(3) Bermúdez, *Salitre*, pp.373, 374;
"Ocupación", p. 166.

Equally remarkable was the opening up of two new nitrate areas during the year, Taltal and Aguas Blancas, both close to Antofagasta but located in pre-1879 Chilean territory, of which the first one managed to export over 210,000 Spanish quintals (some 9,600 tons). Table 10.9 shows the extent of the enthusiasm in Chile for the new nitrate region, obviously triggered by the unusually high prices prevailing in 1878

Table 10.8

*Taltal Nitrate Plants,
1884
(Sp. Quintals and Chilean pesos)*

No.	Status 1884	No. Vats	Output (S.Q.)	% Out-put	Num. Wor-ers	Num. Inha-bil.	Value (pesos)	% Va-lue
7	Working	18	63,000	41%	1,365	2,610	1,725,000	40%
4	Part.Work.	8	29,000	19%	620	1,150	755,000	17%
5	Closed.AT.	12	51,000	33%	1,090	2,170	1,435,000	33%
2	Closed.BT.	3	8,000	5%	240	420	220,000	5%
1	CD.Un.BT.	2	4,000	3%	100	150	180,000	4%
19	Total	43	155,000		3,415	6,450	4,315,000	

Codes: AT: After nitrate tax of 11-Sep-1881.
BT: Before nitrate tax of 11-Sep-1881.
CD: Closed down.
Part.: Partially.
Un: Unassembled.

Source: *La Industria* (Iquique), 14-May-1884; data derived from Attachment 1.8.

Indeed, by 1884, Taltal had attracted some 3,400 workers to almost twenty plants, valued at more than 4.3 million pesos, or about half of the capital invested by the adjacent Antofagasta Company.¹²¹ Aguas Blancas

¹²¹Immediately after the occupation of Antofagasta, the Taltal plants were the subject of an intense debate in the Chilean Congress, since a proposed nitrate duty was viewed by some as crippling for a nascent Chilean nitrate region to the benefit of foreign-dominated Tarapacá. For a recent discussion of the issue, see O'Brien, "Antofagasta Company".

never really exported a significant amount of nitrate in the period, but *circa* 1881 the value of the plants installed or projected in that area, mostly by Valparaíso joint-stock companies, was placed at some 1.4 million *pesos*, with an estimated capacity of 50,000 Spanish quintals (some 2,273 tons).¹²² Both areas obviously sprang to life as a result of the distorted prices prevailing during the Peruvian expropriation, and could not survive the subsequent stabilization of the market at a lower price level. In contrast to the two fragile and emergent nitrate areas to the south, the CSA was fully prepared to take advantage of the market turmoil generated by the War of the Pacific, and thrived during 1879, increasing its spectacular 1878 net profits by some 300,000 *pesos* (Table 11.8). The data provided here also indicates quite clearly that the enhanced profits of 1879 did not come from costs reductions, since costs of production for the year rose from 1.52 *pesos* per quintal in 1878 to 1.65 *pesos* in 1879 (the highest since the establishment of the company, except for 1872), nor were related to a marked output expansion, since production dropped slightly with respect to the previous year: the high profits of 1879 were unmistakably the result of soaring prices, advancing from a five-year high of 2.90 *pesos* per quintal in 1878 to 3.57 *pesos* in 1879.

¹²²Arce, *Antofagasta*, pp.391-392, 395-396.

Table 11.8

*The Antofagasta Company,
Exports, Costs, Prices, and Profits,
1872-1879
(Spanish Quintals and Chilean Pesos)*

Year	(1) Exports	(2) Cost p.Q.*	(3) Total Cost**	(4) Prices Valpso	(5) Net Profits
1872	121,558.00	1.68	204,217.44	n.a	n.a.
1873	185,028.00	1.31	241,461.54	2.01	102,050.73
1874	231,283.00	1.49	344,611.67	1.69	118,638.61
1875	243,420.22	1.09	265,328.04	1.87	216,642.09
1876	242,630.32	1.29	312,993.11	2.30	254,116.58
1877	434,392.00	1.46	634,212.32	2.57	n.a.
1878	1,099,701.00	1.52	1,671,545.52	2.90	1,776,634.00
1879	1,058,034.00	1.65	1,024,363.00	3.57	2,098,130.43

*Costs for 1877, average for November and December only.

**Computed by the author: (1)*(2).

Source: (1), (2), (5)- CSA, *Memorias* 1873-9.

(4)- *La Patria* (Valparaíso), July 1873-
August 1874.

(4)- 1875-6, CSA, *Memorias*, 1876-9.

(4)- 1877-9, Cruchaga, *Estudios*, 2:13.

A surprising number of authors actually record a *decrease* in nitrate prices in 1879 relative to 1878. Partington reported a drop from £10 61sh in 1878 to £8 13sh in 1879 (per long ton, Chilean ports, f a.s.);¹²³ an 1880 report submitted to the Chilean Senate also registered a fall from 14sh 10d in 1878 to 14sh 6d in 1879 (per English quintal, United Kingdom, ¹⁷ O.B.);¹²⁴ and a recent study listed 1878 prices at £14 10sh, declining to £14 5sh.¹²⁵ A possible explanation for this discrepancy might lie in the confusion between prices given for a specific date (i.e. January 1 or July 1) during a given year, and average prices for a whole year. This

¹²³Partington, *Nitrate*, p.77.

¹²⁴Chile, *SO1880*, pp. 280, 287.

¹²⁵O'Brien, *Nitrate*, p.9, Table 1.

divergence can be clearly seen in data provided by *The Economist*, where nitrate prices for January 1 were listed in the same page as falling from 15sh 3d in 1878 to 12sh 10½d in 1879 (per cwt., United Kingdom), while average prices were recorded as rising from £13 5sh in 1878 to £18 10sh in 1879 (per ton, United Kingdom).¹²⁶

The unusually high nitrate prices prevailing in 1879, coupled with disorganized guano exports, gave renewed strength to sulphate of ammonia, the chemical by-product used as a nitrogenous fertilizer and churned out at an increasing rate by gas, iron, shale and coke works, taking advantage of a weakened competition. As Table 12.8 shows, sulphate of ammonia increased its share of the sulphate-nitrate market from 16 percent in 1878 to 30 percent, its higher share ever.

¹²⁶"Commercial History and Review of 1879", *The Economist*, March 13, 1880, p.18.

Table 12.8

*Sulphate of Ammonia and Nitrate
Exports, 1870-1879
(Long Tons)*

Year	(1) Sulphate Ammonia*	(2) % Am.	(3) Total Nitrate**	(4) % Nit.	(5) Total Market**
1870	40,000	24%	125,251.62	76%	165,251.62
1871	41,000	21%	153,442.81	79%	194,442.81
1872	42,000	19%	184,779.66	81%	226,779.66
1873	43,000	14%	274,416.81	86%	317,416.81
1874	45,000	15%	247,427.36	85%	292,427.36
1875	46,000	13%	316,981.80	87%	362,981.80
1876	48,000	13%	309,715.89	87%	357,715.89
1877	52,000	20%	210,895.57	80%	262,895.57
1878	55,000	16%	298,252.30	84%	353,252.30
1879	57,000	30%	135,380.94	70%	192,380.94

*24% grade.

**1870-1871, Tarapacá only; 1872-1879, Antofagasta included; 1878, El Toco included; 1879, Taltal included. Original data in Spanish Quintals, turned by the author into Long Tons by dividing it by 23.5.

Source: (1) Aikman, *Manures*, p.358.
(2), (4), (5) Computed by the author.
(3) *El Veintiuno de Mayo* (Iquique), 14-May-1884; CSA, *Memorias 1873-1879*; Bermúdez, *Salitre*, pp.373. 374; "Ocupación", p.166.

In the United Kingdom, a "good demand" for sulphate of ammonia was reported as early as June, 1877, with prices increasing steadily: "anything offered has been fully taken"; at the same time, guano imports had "fallen off", and nitrate was "less in favour at the advanced prices now sought", lowering consumption¹²⁷ During 1878 and up to early 1879, while it was noted that the Peruvian expropriation was a "suicidal" policy

¹²⁷Commercial History and Review of 1877" *The Economist*, March 9, 1878, p.24.

since it stimulated the consumption of "all artificial manures", prices for sulphate of ammonia were reported as advancing, and its demand was termed "good...all through".¹²⁸

Table 13.8

*Sulphate of Ammonia and
Nitrate Prices,
1870, 1873-4, 1878-9*

Year	Nitrate	Sulphate Ammonia
1870	15.05	16.10
1873	13.00	16.10
1874	13.10	18.10
1878	13.05	18.15
1879	18.10	19.15

Br. Pounds per Long
Ton, UK, F.O.B.

Source: *The Economist*,
13-Mar-1880, p. 18.

Table 13.8 shows that prices for sulphate of ammonia remained higher than nitrate prices at all times, and that what might have attracted foreign consumers to the chemical competitor of nitrate was the fact that the substantial gap separating the prices of both products in past years dwindled rather spectacularly in 1879. Although the post-1879 evolution of the competition between the emerging sulphate of ammonia and sodium nitrate lies outside the scope of this work, it is worth noting that at least one authority dated the beginning of the growth in consumption of sulphate of ammonia as a nitrogenous fertilizer from 1880.¹²⁹ The advance of

¹²⁸"Commercial History and Review of 1878", *The Economist*, March 8, 1879, p.20.

¹²⁹The strongest inroads of sulphate of ammonia, however, were made in 1890-1900. Hendrick, "Trade", p.10.

sulphate of ammonia gave rise to alarm in Chile, after the entire nitrate region had been military occupied,¹³⁰ suggesting that the strengthening of synthetic competition was part of the legacy of the Peruvian expropriation

¹³⁰*La Industria* (Iquique) warned that it was dangerous to increase nitrate prices, or overtax the producers, because it would "stimulate the production of artificial fertilizers"(2-Dec-1882).

ATTACHMENT 1.8

*Taltal Nitrate Plants,
Owners, Output, Type and Value, 1884
(Chilean Pesos and Spanish Quintals)*

No. Plant	Owner	Output (S.Q.)	Ty- pe	Value (Pesos)	
1	Sta. Luisa	Keating Quest Fas.	22,000	M	525,000
2	Sta. Catalina N.	D. Oliva y Cia.	12,000	M	300,000
3	Jermania	Ste. Marie y Lappé	10,000	P	250,000
4	C.B. Severin	Severin y Cia.	8,000	M	150,000
5	Unión	Ste. Marie y Lappé	8,000	P	400,000
6	Guillermo Matta	Keating Quest Fas.	3,000	M	50,000
7	Bellavista	D. Oliva y Cia.		P	50,000
7	Total Working 1884		63,000		1,725,000
1	Catalina Sur	Arias y Ferrera	12,000	P	325,000
2	Atacama	Marambio y Cia.	8,000	M	180,000
3	Julia	Vitrarius & Klemch	6,000	M	175,000
4	Chileno Españ.	Martínez Piava&C.	3,000	M	75,000
4	Total Partially Working 1884		29,000		755,000
1	Lautaro	Lamarca Ossa Hnos.	28,000	M	675,000
2	F.A. Moreno	R. Barazarte y Cia	8,000	M	230,000
3	Flor de Chile	Peters y Cia.	6,000	M	250,000
4	Sud Americana	Berger y Cia.	6,000	M	220,000
5	Alianza	Pérez Cena y Cia.	3,000	M	60,000
5	Total paralyzed after tax 1884		51,000		1,435,000
1	Los Amigos	Joint-Stock Co.	6,000	M	150,000
2	Sara	Santos Cienfuegos	2,000	M	70,000
2	Total paralyzed before tax 1884		8,000		220,000
1	Rosario	Baron y Cia.	4,000	M	180,000
1	Dismantled before tax 1884		4,000		180,000
19	Total		155,000		4,315,000

Source: *La Industria* (Iquique), 14-May-1884.

CHAPTER 9

THE AFTERMATH AND THE HISTORIOGRAPHY

1. The Aftermath, 1879-1887

In taking over the Tarapacá nitrate industry in 1879, the Chilean Government inherited the issues discussed in Perú in the last phase of the expropriation. Given the consistent free-market orientation of the country, there was little doubt that Chile would strike down the State monopoly established in Tarapaca, a measure already sanctioned in Perú with the Congressional repeal of the expropriation law in February, 1879. There is no record of a single voice raised to propose the preservation of the Peruvian system in Chile on the aftermath of the war, although some suggested that the Chilean Government should pay the outstanding *certificados* with a heavy discount to subsequently sell or rent out the corresponding nitrate plants. Ultimately, however, those rejecting the notion of an "industrialist" State in Tarapacá won out.¹ The post-1879 Chilean debate on nitrate policy revolved mainly around the level and scope of taxation for the three nitrate regions now under Chilean rule.²

The two crucial questions directly related to the reversal of the Peruvian expropriation were what to do about the current production contracts, and how to honour the outstanding *certificados*. The former was settled by renewing some of the contracts while a definitive nitrate legislation was drafted, and subsequently

¹The idea of buying the nitrate bonds was raised, *inter alia*, by Deputy Donoso Vergara (Chile, *DO*1880, 19-Aug-1880); the rejection of all government involvement in Tarapacá was argued, *inter alia*, by Senator José Eugenio Vergara (Chile, *SO*1880, 13-Sep-1880). See below pp 364-365 for the early Chilean views on the issue.

²The best study on the subject is Thomas F. O'Brien, "Chilean Elites and Foreign Investors: Chilean Nitrate Policy, 1880-1882" *Journal of Latin American Studies* 11(1979) 101-121

allowing them to lapse; the last production contract expired in 1887.³ There were only two possible ways of dealing with the Peruvian *certificados*: either reimbursing the bondholders in cash at face or market value, or accepting the securities in payment for the corresponding nitrate plants. Paying cash for the nitrate bonds would have favoured bondholders who had kept or bought the securities with a heavy discount for purely financial considerations, unrelated to the corresponding Tarapacá nitrate works.⁴ As described in this work, the vigorous trading of *certificados* during 1876-1879 was due to the absence of reliable currency, and had little to do with speculation related to Tarapacá assets. Billinghurst reported that only in the second half of 1879, when the Peruvian Congress was considering returning the nitrate plants, there was some interest in Lima in purchasing *certificados* issued for specific ventures.⁵ Reimbursing bondholders in cash at face value after 1879 would have entailed also acquiring an unknown number of crippled or nonexistent nitrate plants at the inflated prices granted by the Peruvian Government. However, the second alternative, i.e., to exchange the *certificados* for the pertinent assets, implied forcing the bondholders to reopen their nitrate plants, or find someone who was willing to do so. In this case, the profits, if any, derived from the possession of *certificados*, would only accrue through subsequent nitrate production and sales.

It is worth noting that the value of nitrate plants had changed drastically after the War of the Pacific due to the introduction of the revolutionary Shanks system in 1876-1877. Even plants rated as superb in 1875 required a radical overhaul to remain competitive. The new Shanks vat was not merely an incremental improvement over the old "steam" vats, compelling post-1879 prospective producers to invest heavily on equipment. The officially sanctioned looting of unused State-controlled plants and deposits by government contractors during the Peruvian period also took away from the original value of paralyzed Tarapacá enterprises.

³Cf. Chile, *JPT*, Vol.2, 10-Nov-1883, fs 667. Government decree of 30-Oct-1883.

⁴This point was well made by O'Brien, *Nitrate*, p. 66.

⁵In 1880, one Chilean Deputy placed the market value of the *certificados* at 20 to 25 percent of face value (Deputy Donoso Vergara in Chile, *DO* 1880, 19-Aug-1880). It should be noted, however, that if the government announced the decision to purchase nitrate bonds, the current market value of the securities would have most certainly shot up.

Thus, it is fair to conclude that there were no really adequate idle State-owned plants in 1879, and that returning them to private owners implied merely a forced obligation to invest in Tarapacá

Through three successive decrees, issued in 1881-1882, the Chilean Government authorized the exchange of outstanding *certificados* for the corresponding nitrate plants.⁶ The last decree, dated March 28, 1882, announced the auction of all nitrate plants not repossessed up to that date, accepting the *certificados* in payment. The statutory auctions carried out in September, 1882, attracted very little interest in the Chilean press, and resulted in the sale of merely 18 plants.⁷ Adding the enterprises claimed by *rescate*, or repossession upon delivery of *certificados*, 55 out of 145 plants bought by the Peruvian Government, or merely 38 percent, were recovered by bondholders up to end of 1882 (Table 1.9). This left the Chilean Government as the unwilling holder of some 90 plants, representing some 10.5 million *soles* in outstanding *certificados*. The remaining bondholders pressured the government for five years to pay their securities in cash, rather than in plants. The affair was settled in 1887, accepting the payment of the outstanding nitrate bonds at fifty percent of face value. Prior to the final payment of 1887, an additional 23 plants were repossessed, as a result, the State acquired, reluctantly, 67 plants shunned by the last bondholders (Table 1.9).

⁶The text of decrees, dated 11-Jun-1881, 6-Sep-1881, and 28-Mar-1882 is found in. Bertrand, *Memoria*, XII, and Document 37 (Chilean section), pp. 95-99.

⁷Chile, *Diario Oficial*, 3-Oct-1882, and 5-Oct-1882, "Actas del Remate", Chile, MH, *Memoria 1882*, p. LXXXI. The Chilean press was far more interested in the current elections, and the few reference to the auctions were overwhelmingly supportive of the measure. Cf. *La Industria* (Iquique), 11-Sep-1882, *La Epoca* (Santiago), 3-Apr-1882; and *El Veintuno de Mayo* (Iquique), 29-Apr-1882. However, one newspaper, *La Epoca* (Santiago), included an article stating that "a few industrialists" who allegedly had "prior knowledge" of the government decision to auction out nitrate plants had "grabbed" the best plants, and demanded cash payments of the *certificados* instead (30-Sep-1882).

Table 1.9

*State and Private Nitrate Plants,
Tarapacá, 1882-1887
(Sp. Quintals, Soles, and P. Estacas)*

Owner	Features	1882	%	1887	%
Private	Number	55	38%	78	54%
Private	Capacity	8,084,000	41%	8,984,800	46%
Private	Value	9,280,755.00	47%	10,192,580.00	52%
Private	Land	6,454	43%	7,404	49%
State	Number	90	62%	67	46%
State	Capacity	11,548,800	59%	10,648,000	54%
State	Value	10,451,538.54	53%	9,539,713.54	48%
State	Land	8,606	57%	7,656	51%
Total	Number	145			
	Capacity	19,632,800			
	Value	19,732,293.54			
	Land	15,060			

Source: Derived from Table 1, Volume 2.

The bulk of the 1887 payments, or some 66 percent, went to Chilean bondholders, the *Banco de Valparaíso* alone receiving almost 54 percent of the total (Table 2.9).⁸

⁸The complete list of recipients is included in Table 4, Volume 2.

Table 2.9

*Recipients of Payments
for Certificados,
Santiago, 1887*

Recipients	Pounds	Sh	d	% Total
Gibbs	73,395	0	0	8.55%
George Petrie	11,130	0	0	1.30%
Grace & Co.	4,095	0	0	0.48%
Various British	30,404	0	6	3.54%
Total British	119,022	0	6	13.87%
Banco de Valparaíso	459,029	0	1	53.49%
Banco Mobiliario	53,550	0	0	6.24%
Ventura Marcó del Pont	28,350	0	0	3.30%
Various Chilean(12)	29,812	13	5	3.47%
Total Chilean	570,741	0	1	66.51%
Total French(2)	5,565	0	0	0.65%
Gildemeister	65,876	1	2	7.68%
Various German(6)	40,950	0	0	4.77%
Total German	106,826	1	2	12.45%
Total Italian(6)	43,943	2	1	5.12%
Nationality n.a.(4)	11,970	0	0	1.39%
Total	858,190	0	1	
Adjusted Total*	857,576	1	1	
*Total given in source after discounting one cancelled draft.				

Source: Chile, MH, *Dirección del Tesoro*, Vol. 1708, 25-Jul-1887 and 10-Aug-1887.

However, in spite of the radical privatization of the Tarapacá nitrate industry, the old Peruvian regime was not entirely undone. The Chilean Government decided to keep all unclaimed deposits as a State-owned reserve, closing them to private exploration; the Chilean Finance Minister in 1884 justified the measure as a means to

prevent "a strong competition between nitrate producers...".⁹ Thus, in spite of its avowed economic liberalism, the new Chilean regime in Tarapacá, included a substantial State sector, made up of unwanted nitrate plants, and of massive unexplored deposits. The former was an involuntary development, resulting from the reluctance of bondholders to trade in their *certificados* for nitrate plants; the latter was specifically established to stave off competition to existing nitrate enterprises, giving the Chilean Government a crucial role in the further expansion of the industry. It was the presence of this peculiar State sector in Tarapacá what subsequently contributed to a change of heart in Chile about the originally rejected Peruvian expropriation.

2. Early Views on the Expropriation

Views on the Peruvian expropriation changed considerably over time. One of the major themes of the subsequent historiography on the issue, the position of President Manuel Pardo, was broached as early as 1877 by A.J. Duffield, a contemporary British observer. Duffield praised President Pardo as "business Pardo", stating that he "came to deeply regret" the decision to launch the expropriation, after he "discovered...a portentous wasps' nest".¹⁰ However, during his stay in Chile in the same year 1877, Pardo told the Chilean historian Benjamín Vicuña Mackenna that, with respect to the expropriation, he saw "that guano was disappearing, and that Perú, with no working habits yet, would plunge into an abyss if at the time a substitute for the exchequer was not found...".¹¹ Thus, the image of Pardo as reluctant, if not hostile, to the operation, and overwhelmed by the dishonesty of an unnamed inner circle, appeared to have been held by some contemporaries as early as 1877, in spite of the fact that the President himself was quite explicit in endorsing it. Of course, the strongest judgement on the operation was subsequently rendered by the Peruvian Congress itself, in repealing the

⁹As quoted in *El Veintiuno de Mayo* (Iquique), 13-Sep-1884.

¹⁰A.J. Duffield, *Peru*, pp. 2-3, 92. The account was dated in 1877.

¹¹Benjamín Vicuña Mackenna, *Manuel Pardo, Ex-Presidente del Perú. Breves apuntes i revelaciones sobre su vida (Homenaje de un chileno a su memoria)* (Santiago de Chile: Imprenta de la Librería del Mercurio, 1878). This book was a revised version of an essay published by Vicuña Mackenna in the Santiago newspaper *El Ferrocarril* the same day of Pardo's murder (i.e., November 18, 1878).

expropriation law in February, 1879. By that time, the Peruvian supporters of the expropriation were placed on the defensive, and were forced to resort to political arguments such as the fear of an eventual loss of Iquique to a rebel force, or the need to counteract the Antofagasta threat by "unified" management of Tarapaca. The original goal of protecting of guano had evaporated from the pertinent discussion.

The first official Chilean assessment of the expropriation was made immediately after the occupation of Tarapacá (November, 1879), on December 26, 1879, by Baltazar Sánchez, a special envoy of current Finance Minister, Augusto Matte.¹² Sánchez admitted not being an expert on nitrate, but he discussed the issue with "all interested parties" in Tarapacá, particularly with those he called the "serious" foreign firms Gibbs, Gildemeister, Campbell, Clark and Eck, and Folsch and Martin. His opinion of these European concerns was guarded.

Although they [the foreign Tarapacá firms] complain about the abuses of Peruvian authorities, it is not less true that the advantages they have wrested from a greedy and immoral administration are greater than the inconveniences they had to withstand.

Sánchez believed that the good disposition that foreign firms showed towards Chile concealed "a surreptitious bad will" because they feared that "the drive and capital resources of Chilean industry" would push them to a "secondary position" in Tarapacá. He recommended putting an end to mutual mistrust by "doing them justice" but "without showing weakness". Sánchez went on to make a scathing assessment of the Peruvian expropriation

What was termed the "expropriation of nitrate" has been not more than an administrative farce which was not yet entirely over [when Chile occupied Tarapacá]. It is extremely difficult for us to understand how this affair was managed.

This negative opinion was unanimous held in Chile at the time. In the ensuing discussion over the future legal framework of Tarapacá, the evils of the operation were widely exposed to justify the prompt return of the State-controlled nitrate plants to private hands. The final report of a special commission on nitrate, established in 1880, warned that

¹²Chile, Archivo Nacional, *Fondos Varios*. Baltazar Sánchez to Augusto Matte, Iquique, 26-Dec-1879. Carta 73, Volume 826.

if the system adopted by the Peruvian Administration is not changed in its entirety, it could well represent a disastrous legacy, or at least a difficult venture leading to harmful practices of dubious morality¹³

The commission viewed the expropriation as the preservation of the *estanco* on nitrate "on a more radical form", making President Pardo fully responsible for adopting it, albeit noting that he would have preferred an export duty on nitrate instead. The report noted that the sale of nitrate plants to the government had been "merely fictitious" since a large number of sellers continued in charge of their enterprises under production contracts. As the operation "fell into the hands of tax-collectors, managers, shippers and consignees or sellers of nitrate, the profits or benefits for the State declined, and even proved chimerical". Although an "hypothetical" nitrate revenue of 2 million *soles* per annum was included in the 1879-1880 Peruvian budget, government nitrate income had "virtually eclipsed". Both the service of the nitrate bonds and the costs of marketing nitrate had swallowed up most prospective earnings. The commission was the first to make a crucial point subsequently repeated by other authors: the Peruvian Government made more money collecting an export duty on nitrate in 1876 than as a fictional owner of the nitrate industry during 1876-1879. The report concluded by stressing that the Peruvian expropriation confirmed "the axiom that governments are, and will always be, poor businessmen", urging Chile to reject a "dangerous and absorbing system".

Early Peruvian thinking on the issue was marked by the recent loss of Tarapacá, linked in Perú to Chilean ambitions over the nitrate region. In 1882, Luis Esteves, a Peruvian author, viewed the expropriation as a culmination of "nationalistic" attempts to wrest control of Tarapacá from Chilean capital.¹⁴ Esteves charged "Chilean capital" from taking advantage of "free grants of nitrate deposits" before 1874 to turn the Tarapacá nitrate industry "into an element of Chilean trade"; President Pardo, out of "patriotic zeal" would have chosen to "reclaim" the nitrate industry for Perú in 1874 through the failed *estanco*. Chile would have prevented the

¹³"Informe de la Comisión Consultiva de Salitres", Santiago, 8-Jun-1880, in: Chile, *Memoria del Ministro de Hacienda presentada al Congreso Nacional por el Ministro del Ramo en 1880* (Santiago de Chile: Imprenta Nacional, 1880) pp.1-24 (insert).

¹⁴Luis Esteves, *Apuntes para la historia económica del Perú* 1st edition 1882 (Lima: Centro de Estudios de Población y Desarrollo, CEPO, 1971), pp. 139-140.

measure by sending "a threatening letter" to the Peruvian Government, forcing Pardo to send "two warships" to Iquique. Due to the failure of the estanco, Pardo would have proposed a choice between a nitrate export duty and the expropriation. The export duty was a better measure, but it would have been resisted by owners of "poor deposits" who had bought them only to "resell them", and by those who "sought to profit from State operations". The expropriation "gave rise to a shameful speculation leaving the burden of a new debt on the [Peruvian] State" Esteves' view of the expropriation as a nationalistic, anti-Chilean measure was adopted by subsequent Peruvian historians. So was his favourable description of President Pardo's nitrate policy

In the same year 1882, C.R. Markham, a British author, published the first pro-Peruvian account of the war.¹⁵ Markham did not attempt to justify the expropriation, presenting it as a measure taken by President Manuel Pardo "in his efforts to alleviate the difficulties of his country, and as almost a last hope" He added that the decision "might have been unwise, and it may have been disadvantageous to the English, Chilean, and other speculators who had embarked their capital on the nitrate works " Markham's main point, however, was that "it cannot be pretended that Peru was not within her right in adopting these measures They could not form a just pretext for war", arguing that Chile had "made use" of the expropriation "as a grievance" to justify "her aggressive policy".¹⁶ This opinion coincided with Esteves in describing the operation as detrimental to unnamed foreign "speculators". In a subsequent pro-Peruvian account of the War of the Pacific, published by the Italian Tomás Caivano in 1883, another durable interpretation was advanced: the expropriation worked well under Pardo, but Prado's followers corrupted it. Caivano wrote that the expropriation was Pardo's "greatest financial plan", but he was unable to complete it.

...his successor, General Prado, an honest man but with a narrow outlook, blinded by the habitual circle of political schemers, allowed them to make of Tarapacá nitrate a shameful windfall for their own benefit, turning the

¹⁵Clements Robert Markham, *The War Between Peru and Chile, 1879-1882* (London: Sampson, Low, Marston, Searle & Rivington, 1882) (Quoted hereafter as Markham, *War*).

¹⁶Ibid., pp. 89-90.

incipient Pardo project, undoubtedly called to restore [the health of] public finances, in a new source of disasters for the exchequer¹⁷

Caivano's work has been judged too sectarian in Perú itself,¹⁸ and his remarks had more to do with assailing the Prado faction than with properly analyzing nitrate policy, but his partisan efforts compelled him to forge an idealized view of the expropriation under Pardo, shifting the responsibility for the collapse of the operation to the following administration. This interpretation earned currency in the twentieth century.

Guillermo Billinghurst (1851-1915) was undoubtedly the most knowledgeable author writing about Tarapacá in the period immediately following the War of the Pacific. After serving as a Deputy for Iquique during 1878-1879, he fought as a Colonel in the Peruvian Army, was taken prisoner by Chilean troops, and was subsequently released.¹⁹ In 1882 Billinghurst established the newspaper *La Industria* in Iquique, backed by the Montero Brothers, owners of the nitrate railway.²⁰ He was also a stockholder of local silver companies,²¹ was involved in banking operations,²² sold potable water in Iquique, and owned stock of several nitrate

¹⁷Tomás Caivano, *Historia de la Guerra de América entre Chile, Perú y Bolivia* 1st edition, Florence, 1883; 2 vols (Lima. Publicaciones del Museo Naval, 1979) 1: 190.

¹⁸A recent Peruvian review of the issue viewed Caivano as a "good friend of Perú", but added that he "wrote in a partisan fashion, exacerbating fraternal conflicts and causes among our people...." Héctor López Martínez, *Guerra con Chile. Episodios y personajes, 1879-1885* (Lima: Editorial "Minerva", 1989), pp. 73-74.

¹⁹Billinghurst proposed a plan to reconquer Tarapacá through Bolivia. Cf. [Guillermo Billinghurst], *Guerra del Pacífico: Reconocimiento militar del Río Desaguadero y de la altiplanicie andina por el coronel Guillermo E. Billinghurst* (Lima. Imprenta "La Patria, 1880). References to Billinghurst in the War of the Pacific are found in: Bulnes, *Guerra*, 2: 339-340, and Basadre, *Historia*, 12: 219-220.

²⁰This connection became apparent in subsequent debates with *El Veintiuno de Mayo*, a rival newspaper critical of the railroad company. Cf. *El Veintiuno de Mayo* (Iquique), 16-Sep-1884, and 17-Sep-1884.

²¹He was a partner of British entrepreneurs John Thomas North and John Dawson. *El Veintiuno de Mayo* (Iquique), 1-Jul-1884, and 21-Oct-1884.

²²Dulanto called him a "banker" and financier of Piérola's uprisings prior to 1879 (*Piérola*, p.20), while Camprubí suggested that his dark portrail of British banks in the Peruvian period could be related to his involvement in the Iquique subsidiary of the controversial *Banco Nacional*, a Dreyfus concern (*Bancos*, p. 106, and Billinghurst, *Capitales*, p. 35).

companies.²³ Billinghurst had been a leading critic of the expropriation prior to the War of the Pacific, although he briefly reversed his position in 1879.²⁴ However, after the war, he returned to his original views on the issue. In 1882, Billinghurst wrote that the aim of establishing a Peruvian monopoly on nitrate involved "two economic absurdities": forgetting that an increase in the price of Tarapaca nitrate would stimulate foreign competition, and substituting State management for private ownership in the nitrate industry. Billinghurst also made a devastating review of the work of 1875 Assessment Commission, calling its work "whimsical", "superficial", "inaccurate", and "inspired by favouritism". "The commission came [to Tarapaca] to speculate, not to assess".²⁵ In 1883, he also subscribed to the view that President Pardo was not responsible for the questionable development of the expropriation, arguing that Pardo attempted to "halt" the whole operation before leaving office in order to prevent an "irresponsible" General Mariano Prado and his "new circle" from "throwing themselves into extravagant speculations".²⁶ In 1884, Billinghurst published a collection of articles on nitrate, terming the expropriation "the clumsiest economic blunder" of the Peruvian Government.²⁷ In a second pamphlet published in the same year, he provided the best statistical illustration of the failure of the operation by noting that, from 1873 through July, 1879, the Peruvian Government had received £1.9 million from the various nitrate export duties, while the much-vaunted net nitrate income from sales of State-controlled nitrate under the expropriation bill had amounted to merely some £455,000.

And to obtain such result, Perú compromised its credit for over £4 million, suppressed the source of natural fiscal income in Tarapacá; and chased away

²³His father was a partner in the British firm of Campbell, Outram, and he won a substantial claim against that company in 1889. Basadre, *Historia*, 12: 219-220.

²⁴See above p. 318.

²⁵Emphasis in the original. "El Remate de las Salitreras" (editorial), *La Industria* (Iquique), 13-Oct-1882.

²⁶Billinghurst, "Ministro".

²⁷G[uillermo] E. B[illinghurst], *La Cuestión Salitrera* (Santiago de Chile: Imprenta de la República, 1884).

more than five thousand workers who strengthened the vigorous competitors in El Toco, Salinas [i.e., Antofagasta], Aguas Blancas, and Taltal.²⁸

In a short essay published in 1884, Francisco Valdés Vergara, the current Tarapacá Political Authority (*Jefe Político*), provided a somewhat ambiguous assessment of the Peruvian expropriation.²⁹ On one hand, he clearly stated that Perú had "destroyed" private property in the region, and Chile had restored it "on a solid footing." He also urged the government to auction out all unclaimed nitrate plants as soon as possible. However, Valdés Vergara added that imposing a Chilean State monopoly over nitrate five years earlier, in 1879, would have been both feasible and desirable. He argued that "the attention demanded by war" had not given the Chilean Government enough "time and tranquillity" to realize that the best solution for the nitrate problem was to exchange the Peruvian *certificados* for bonds of the Chilean domestic debt. In "a short period and with little expense", Chile could have thus acquired all Tarapacá plants, expropriating the assets of the Antofagasta Company by law would have completed the "perfect" monopoly over nitrate which Perú had sought in vain prior to 1879. Valdés concluded that this monopoly was no longer possible in 1884 because the privatization of 1880-1882 had brought "great private interests" to life. He also expressed alarm about the negative impact that any major commotion in the nitrate industry could have on the Chilean banking system. Not without inconsistency, he went on to sound a cautionary note about the danger of a nitrate industry managed by "a group of bureaucrats" who would thus control most of Chile's public finances. Valdés Vergara's "perfect" State nitrate monopoly was the first hint of a favourable view on the expropriation's goals formulated in Chile, albeit in a purely hypothetical fashion. He was also the first to speculate on an alternative State nitrate monopoly after the war.

²⁸The exact figures were £1,921,684 11sh, and £454,329 12sh, respectively. Guillermo Billinghurst, *Condición legal de los establecimientos salitreros de Tarapacá* (Iquique: Imprenta "La Industria", 1884).

²⁹Francisco Valdés Vergara, *La crisis salitrera y las medidas que se proponen para remediarla* (Santiago de Chile: Imprenta de "La Epoca", 1884).

3. The "Nationalist" View, 1887-1894

By the late 1880s, the situation in Tarapacá had changed dramatically, with a growing number of large British joint-stock companies dominating nitrate production. In Chile, there was an incipient perception that the post-war liberalization of the nitrate industry had ended up favouring British entrepreneurs, thus making government intervention in Tarapacá much less undesirable than in 1879-1882.³⁰ In his annual address to Congress in 1887, current President J.M. Balmaceda stated that the means of nationalizing "national industries" were being "looked into" (*se medita*).³¹ The term "nationalization" was used at the time to denote control of industries by private Chilean capital, not by the Chilean State.³² In the same year, the Inspector General of Nitrate Works, Gustavo Jullian, recommended the sale of all nitrate plants under government control, however, because foreign companies could unduly benefit from the sale, he urged the government to transfer them at a fixed price to "a national corporation which could be established under the auspices of the Supreme Government". The Chilean State should not be part of the proposed company, leaving it exclusively to "private industry".³³

Along similar lines, in a heated Congressional debate in 1888, Senator Luis Aldunate vigorously called for the establishment of "a great company exclusively reserved to Chilean nationals" made up of the remaining State-controlled nitrate plants; he opposed President Balmaceda's project of auctioning out government plants

³⁰For this period see: Harold Blakemore, *British Nitrates and Chilean Politics, 1886-1896: Balmaceda and North* (London: Athlone Press, 1974).

³¹Quoted by Hernán Ramírez Necochea, *Balmaceda y la contrarrevolución de 1891* (Santiago de Chile: Editorial Universitaria, 1969), p.88, note 27.

³²This point was stressed by Jose Miguel Yrarrázabal, *La política económica del Presidente Balmaceda* (Santiago de Chile: "La Gratitude Nacional", 1963), p. 9 *et passim*

³³"Memoria pasada al señor Ministro de Hacienda por el Inspector General de Salitreras, correspondiente al año 1887", Iquique, 31-Mar-1888, in: Chile, Ministerio de Hacienda, *Memoria del Ministerio de Hacienda presentada al Congreso Nacional por el Ministro del Ramo en 1888* (Santiago de Chile: Establecimiento Tipográfico de "La Epoca", 1888), pp 13-14.

or deposits arguing that foreigners were in a better financial position to buy them up.³⁴ The idea was thoroughly defeated in the Chilean Congress, but it marked the birth of a "nationalist" group, bent on obtaining some government support in Tarapacá to stimulate Chilean investments in the nitrate region.

In 1889 Billinghamurst added fuel to the fire by publishing a short essay including a highly idealized portrait of pre-1879 Tarapacá.³⁵ Putting aside his early mistrust of State involvement in the economy, he inquired.

Is it prudent that the [Chilean] State, whose main financial resource is the [nitrate] export duty, remains impassive in seeing that [the nitrate industry] is concentrated in the hands of a specific group of foreigners?³⁶

Charging that the evolution of the Tarapacá nitrate industry had been "forgotten", Billinghamurst went on to summarize the history of the region since the early nineteenth century. His main point was that "it has not been British capital, but Peruvian capital first, then Chilean capital, what gave life to the sodium nitrate industry".³⁷ However, in order to substantiate this statement, he used uncritically the data furnished by the discredited 1875 Assessment Commission, strongly criticized by himself seven years earlier in 1882.³⁸ By adding up all the flawed Peruvian plants, and computing the bloated prices granted by the Peruvian Government, Billinghamurst claimed that British investors controlled merely 14 percent of the Tarapacá nitrate industry in 1876, prior to the expropriation.³⁹ He abstained from examining the impact of the expropriation itself, which granted control of major plants and a monopoly on sales to foreign producers. Billinghamurst also praised at length the policy of the

³⁴Chile, *SO*1888, 25-Jul-1888, 27-Jul-1888, 30-Jul-1888, and 1-Aug-1888.

³⁵Billinghamurst, *Capitales*.

³⁶Ibid. p.4.

³⁷Ibid. p.9.

³⁸See above p.

³⁹Billinghamurst, *Capitales*, p. 31. See Attachment 1.2 above for a complete listing.

dubious *Banco Nacional* in Tarapacá.⁴⁰ Although he called the expropriation "an utopian monopoly crippling for the State", and praised the Chilean decision of returning the industry to private hands as inspired by "sound economic doctrines",⁴¹ he also added that the post-1879 liberalization had been the "origin of the private fortune" of two of the most important British nitrate industrialists of the time, Robert Harvey and John Thomas North,⁴² recommending a more stringent regulation of foreign joint-stock companies operating in Tarapacá.⁴³

Senator Luis Aldunate continued in 1893-1894 his campaign to increase the share of Chilean-owned plants in Tarapacá nitrate production. However, he went further than in 1888 by proposing the renting of all State-controlled plants to Chilean entrepreneurs by means of "the same production contracts" granted by Peru during the expropriation, stating that this Peruvian system was "not impractical".⁴⁴ This appears to have been the first indication, some 15 years after the War of the Pacific, of the development of a "revisionist" view on the Peruvian expropriation in Chile. The fact that Senator Aldunate could sponsor these ideas was particularly striking since, as the Chilean Finance Minister in 1882, he signed the crucial liberalization decree which restored free competition in the Tarapacá nitrate industry.⁴⁵ In 1894, Manuel José Vicuña, a Chilean Deputy, supported Aldunate's ideas, adding that the government should sell State-controlled nitrate plants only to Chilean citizens,

⁴⁰Ibid., p. 36.

⁴¹Ibid. pp.39-40.

⁴²Ibid., p.47.

⁴³Ibid., pp. 122-123, 129.

⁴⁴Luis Aldunate, *Algunas rectificaciones necesarias* (Santiago de Chile. Imprenta Cervantes, 1894), p. 107. Cf. also: Luis Aldunate, *Indicaciones de la balanza comercial* (Santiago de Chile: Imprenta Nacional, 1893), pp. 211, 214.

⁴⁵Chile, Ministerio de Hacienda, *Memoria del Ministerio de Hacienda presentada al Congreso Nacional por el Ministro del Ramo en 1882* (Santiago de Chile: Establecimiento Tipográfico de "La Epoca", 1882)

making them "untransferable" to foreigners.⁴⁶ In the twentieth century, this early "nationalist" outlook on the Peruvian expropriation was taken much further by a growing number of Chilean and foreign authors.

4. *The Expropriation Vindicated, 1908-1930*

The turning point in the historiography of the Peruvian expropriation was reached in 1908. In that year, the Chilean medical doctor Nicolás Palacios (1854-1911), who had lived in Tarapacá for some ten years,⁴⁷ gave a conference on the nitrate industry, marked by sharp xenophobic overtones.⁴⁸ Regretting the growing influence of the "foreign merchant" in the country, Palacios flatly stated that after the War of the Pacific it would have been more advantageous for Chile "to have continued the system of nitrate monopoly established by the Peruvian Government", in spite of "the problems associated to State management of industries". He claimed that the post-1879 privatization of the industry influenced German Chancellor Bismarck "to allow our country to keep the fruits of its [military] victories". These reasons were no longer valid, although "European greed" currently assumed a different form, seeking to defeat Chile "in an open industrial competition".

I repeat: nitrate is today a foreign commodity; we conquered it with the blood of our people, and the weakness of our leaders has delivered it to foreign capital, making of the North [Tarapacá] a factory in the hands of other countries

Palacios recommended State control of the nitrate industry only because "today in Chile there are no capitalists, except for some foreign merchants and the [Chilean] State..." "The Welfare State is a fact imposed by the force of circumstances". He concluded that Chile should strive to overcome "this lethal State socialism, stimulating the development of private capital". Palacios appeared to have been the first to publicly articulate the view that

⁴⁶Manuel José Vicuña, *Conferencia sobre la industria salitrera dada en el Congreso Minero de 1894* (Santiago de Chile: Imprenta y Encuadernación Barcelona, 1894), pp. 52-53.

⁴⁷Cf. Oscar Bermúdez, "El doctor Nicolás Palacios y la industria del salitre" *Revista chilena de historia y geografía* 136(1968): 201-249

⁴⁸Nicolás Palacios, *Nacionalización de la industria salitrera. Segunda Parte* (Santiago de Chile: Salón Central de la Universidad de Chile, 1908)

the privatization of Tarapacá after the War of the Pacific was tantamount to irresponsibility or treason, and that Chile should have kept the State monopoly on nitrate established during the Peruvian expropriation

Five years after Pañacios' essay, one of the leading members of the Administration responsible for the liberal nitrate policy of 1880-1882 chose to make a spectacular retraction. Francisco Valdés Vergara, *Jefe Político* of Tarapacá in 1883-1884, bluntly stated in 1913 that the repudiation of the Peruvian State monopoly after 1879 had been "a mistake because the Peruvian [nitrate] regime was well conceived, harmonizing the national interest with the freedom to work, without eliminating private initiative from the nitrate industry"⁴⁹ He ascribed the Chilean nitrate policy of 1880-1882 to "the doctrinaire spirit" prevailing at the time, arguing that the "general rules condemning monopolies" should not have been applied to the Peruvian system. The Chilean Government should have established "exceptional rules" for the Tarapacá nitrate industry because the Peruvian State monopoly was "a very special case, unique in the world, a *de facto* monopoly dictated by circumstances beyond human will and foresight".

Valdés Vergara also disapproved of the way in which the Chilean Government broke down the Peruvian nitrate monopoly, lending credence to Billingham's earlier charge that British investors had seized the opportunity to "take to London at least £100 million which should have remained as a Chilean patrimony". According to Valdés Vergara, the chief cause for the mistaken nitrate policy followed in 1880-1882 was ignorance. "In 1880, this product [nitrate] did not have a past on the basis of which one could have predicted its future", and "the nitrate industrialist themselves lacked the necessary experience to forecast the annual growth rate in nitrate consumption". He did not spare the Chilean capitalists, whom, he noted, simply "withdrew" from the nitrate industry after 1879 because they saw only "the risks involved", and not its prospects of great prosperity". Valdés cited the case of the Chilean Eduardo Délano who was forced to transfer nitrate works bought with *certificados* to the British J.T. North because "he found no partners in Chile" willing to join him. Similarly, the Chilean *Banco de Valparaíso* lent funds to British entrepreneurs in Tarapacá because they, "not the Chileans", "knew how to make good use" of them. It appears by implication from Valdés Vergara's version

⁴⁹Francisco Valdés Vergara, *Problemas económicos de Chile* (Valparaíso: Sociedad Imprenta y Litografía Universo, 1913), pp. 359-361

that the Chilean nitrate policy of 1879-1882 was not inherently incorrect, it resulted in the foreign control of the Tarapacá nitrate industry due to the withdrawal of Chilean capitalists, the main culprits of the episode. In part, Valdés Vergara supported the maintenance of the Peruvian State monopoly for the same reason advanced earlier by Palacios: the absence of a Chilean capitalist class. However, his glowing description of the Peruvian expropriation as a "harmonic" alliance between the government and the private sector went further than anybody else, including contemporary Peruvians, in vindicating the operation.

In 1930, Roberto Hernández, a Chilean journalist, published what still remains the only attempt in any language to write a complete history of the nitrate industry.⁵⁰ His view of the expropriation was largely conventional, stressing that the Peruvian Government's control of Tarapacá had been "fictional" because many owners had been left in charge of their plants, and drawing heavily on Billinghurst's 1879 criticisms of the operation.⁵¹ Hernández believed that what he termed *fiscalismo*, or a blind appetite for immediate fiscal revenue, had dictated the liberal legislation approved at the time. He also endorsed the position of some Chilean Congressmen in 1879-1884 with respect to the need to protect or compensate the industrialists who had set up nitrate plants in the emerging regions of Taltal and Aguas Blancas. Hernández thought that the loss of the Tarapacá nitrate industry to European entrepreneurs would have been mitigated if the "compensated" nitrate producers dislodged from Taltal and Aguas Blancas had been allowed to "set up other nitrate ventures."⁵² He did not explain how he ruled out the possibility that the Taltal and Aguas Blancas producers could simply imitate the rest of the contemporary Chilean investors by dropping out of the nitrate industry altogether.

⁵⁰Hernández, *Salitre*. Hernández effort at covering some 120 years of the history of the nitrate industry was far too sketchy to be completely satisfactory. The book remains the standard work on the subject by default.

⁵¹Ibid., pp. 88-90.

⁵²Ibid., p. 154.

5. *The Expropriation as Socialism, 1948-1982*

The succinct account of the expropriation included in the economic history of Perú published in 1949 by the Peruvian historian Emilio Romero followed the early domestic view linking the expropriation to the origins of the War of the Pacific, but he expanded it to make room for a broad international conspiracy.⁵³ He stated erroneously that John Thomas North had been one of the "pioneers" of the Tarapacá nitrate industry in the early 1870s "organizing the financial battle to take away the nitrate works from Perú" by "acquiring bonds of the depreciated Peruvian public debt guaranteed by guano and nitrate, and lending all his support to Chile . . . during the war" The fact that the growth of nitrate threatened guano proved unacceptable to "financiers and industrial capitalists worldwide", who had launched "the first capitalist imperialist war" in South America against Perú and Bolivia to wrest control of the valuable industry.⁵⁴

According to Romero, the expropriation, which he termed "the system of nationalization", had been "rudely opposed by the large nitrate producers" who had "opted not to deliver their plants to the State". The attempted "nationalization" of nitrate had been "an audacious, advanced, and interesting measure, in a time when the socialist system had not been introduced in the world" The operation had been carried out without knowledge of the "intense military preparations of the Valparaíso Banks, the British capitalists, and the usurers of the world", information which "an intelligence service" could have furnished. However, after praising the goals of the expropriation, Romero went on to condemn it.

The government continued its task of nationalizing nitrate, through which it did not attempt to establish or stimulate an industry, but only to lay its hands on a source of wealth against which it could keep on borrowing, i.e., it fell in the same nefarious slope of its guano policy...⁵⁵

It is truly remarkable that this passage, suggesting an interpretation which came closer than any other to match the actual facts of the episode, was buried on what remains as perhaps the least accurate account of the

⁵³Romero, *Historia*, pp. 405-410.

⁵⁴*Ibid.*, pp. 407-408.

⁵⁵*Ibid.*, p. 409.

operation. Although Romero presented the expropriation simultaneously as a harbinger of socialism and a financial sham, his former idea found some echo in Chile

Albeit brief, the description of the Peruvian expropriation made by the Chilean historian Oscar Bermúdez in an important work published in 1963 was the most careful account published up to that date.⁵⁶ Bermúdez correctly traced the origins of the operation in the failure of the estanco law, brought about by the determined resistance of the larger Tarapacá nitrate producers, both Peruvian and foreign, although he did not examine the problems posed by a State control of nitrate sales.⁵⁷ He also highlighted the importance granted in Perú to the "protection" of guano from nitrate competition,⁵⁸ but failed to discuss if this was at all possible. In fact, Bermúdez repeated uncritically the official version provided by Finance Minister Elguera in 1875-1876 to explain the genesis of the expropriation

Since sodium nitrate was left to the free initiative of private entrepreneurs, while guano was owned and monopolized by the State, the only way of harmonizing two different, and even antagonistic, regimes was to establish government control over both fertilizers.⁵⁹

Bermúdez gave no indication that he was aware of the formidable objections to the scheme of controlling the world market for nitrogenous fertilizers advanced in Perú at the time. The current competition from the Antofagasta Company was mentioned,⁶⁰ but there was no discussion of how this would affect the "harmonization" of guano and nitrate. The use of the nitrate industry as a "collateral" to launch yet another foreign loan, reactivating a depressed economy, so clearly presented in Chinarro's introduction to the expropriation bill, and barely broached by Romero, was entirely omitted. There was no mention of the

⁵⁶Bermúdez, *Salitre*, pp. 327-354.

⁵⁷*Ibid.*, pp. 324-326.

⁵⁸*Ibid.*, pp. 327-328.

⁵⁹*Ibid.*, pp. 329-330.

⁶⁰*Ibid.*, pp. 329, 330.

significance of the £3 million "public works" loan authorized by the expropriation law. The crucial role played by the *certificados* in the Lima market in 1875-1879 went wholly unnoticed

Thus, Bermúdez could conclude that "the government plan was well conceived", although its execution was marred by "serious errors originating in the inexperience, and probably the lack of honesty, of the State employees, particularly with respect to the assessment of the *oficinas*"⁶¹ Furthermore, he lavished praise on President Manuel Pardo, arguing that up to the end of his Administration (August, 1876) he had succeeded in "limiting" the operation, while his successor General Prado had been responsible for taken it too far. "However, Pardo had to shoulder, before the political opposition and public opinion in general, the responsibility for the entire development of the State control of nitrate" Pardo's nitrate policy "involved new principles of political economy", and was subjected to "exaggerated and loud criticism". Bermúdez argued that these objections "cannot be accepted today when the evolution of ideas provides a wider outlook", and ended by quoting approvingly Romero's opinion about the expropriation being a precursor of twentieth-century socialism.⁶²

Bermúdez' short summary of the Peruvian expropriation included three fundamental ideas which influenced subsequent accounts of the episode. The first one was that the goal of the operation was to protect guano sales in the world market. The second one was that government control of Tarapaca aimed at establishing a worldwide monopoly of nitrate and guano was an eminently defensible and "advanced" objective, marred only by inadequate implementation. Finally, the expropriation had proceeded smoothly under Pardo, but Prado had mismanaged it. The latter notion was borrowed from the Peruvian pro-Pardo version of the War of the Pacific written by Caivano in 1883, and from Billingham's 1883 article

In an important review of Chile's diplomatic history published in 1965, United States' historian Robert N. Burr noted that "the most immediately obvious *casus belli* [with respect to the War of the Pacific] was the conflict of interests arising from one country's economic predominance in the soil of another". He noted that assessing the Peruvian claim of pre-existing "unbound ambitions" over the nitrate region in Chile was "beyond

⁶¹Ibid., p. 333.

⁶²Ibid., pp. 349-350.

the scope" of his work.⁶³ However, at least with respect to the expropriation, Burr stated that, although the enactment of the operation in Tarapaca was accompanied by expressions of hostility towards Chile in Perú

at this time the friction in Chile's relations with Peru and Bolivia was not sufficient to upset the relative calm that prevailed in the west coast after the Chilean-Bolivian treaty of 1874 and the addition to the Chilean navy of two fast new ironclads⁶⁴

Subsequently, as the expropriation proceeded,

Chilean activities in the Bolivian littoral assumed increasing importance to Perú as its own nitrate industry in Tarapacá, near the Bolivian border, expanded. Whether or not Perú sought an ironclad nitrate monopoly, Chile's activities in the Atacama Desert would have appeared ominous to Lima⁶⁵

Burr's view was so heavily rooted on the assumption of a permanent quest for abstract goals such as "balance of power" and "hegemony" to explain diplomatic and military conflicts that he showed no interest in the intricacies of the world market for nitrogenous fertilizers, central for a proper understanding of the role of nitrate in the region prior to 1879. Thus, the specific threat of the Antofagasta Company to the Peruvian expropriation scheme, summarily mentioned but unexplained in his essay, eluded him. What Burr did document, however, was that the decision to launch the Peruvian expropriation, by and in itself, did not "upset" the prevailing diplomatic "calm" in the region. This finding, based on actual archival research, shed light on the international repercussions of the operation.

A 1967 study by T.M. Bader, a student of Burr, based on extensive research in the records of the Ministry of Foreign Affairs of Chile, touched upon Chilean attitudes towards the expropriation. The essay showed that, in 1875, Chile's leaders, although initially worried about anti-Chilean sentiment in Perú at the onset of the expropriation, had subsequently "ignored" the west coast because of the seriousness of the conflict with Argentina over Patagonia. By 1878, "the [Chilean] policy makers and opinion-shapers forgot the abuses inflicted

⁶³Burr, *By Reason*, pp. 138-139.

⁶⁴*Ibid.*, p. 132.

⁶⁵*Ibid.*, p. 139.

upon their country's nationals in Tarapacá." "Chile, alarmed by the marked deterioration of her relations with Argentina, ignored the difficulties developing in the north"⁶⁶ Bader's findings went further than Burr in demonstrating that Santiago had paid little attention to the expropriation.

Accounts narrowly based on "diplomatic" sources are not likely to take stock of the fact that the expropriation, as well as the prior estanco scheme, were greeted with great enthusiasm in Antofagasta since they held out the promise of higher nitrate prices. The immense benefits derived by European and Chilean producers from generous bond deliveries and production contracts, as well as the substantial profit made by Gibbs from the consignment agreement, are equally beyond the scope of diplomatic histories. An understanding of the economics of the expropriation brings to light the fact that there were several types of Chilean interests involved in nitrate. While Valparaíso trade might have been temporarily hurt, and Chilean workers in Tarapacá were forced to migrate, other Chilean interests, such as the Antofagasta Company, most Chilean Tarapacá producers, and the emerging nitrate regions of Taltal and Aguas Blancas, drew considerable benefits from the expropriation, perhaps explaining the fact that Santiago remained aloof from west coast affairs during the period.

The eminent Peruvian historian, Jorge Basadre, included a brief account of the expropriation in his massive, 17-volume history of Republican Perú. He shared Pardo's view regarding the "inconvenient competition" of guano and nitrate,⁶⁷ noting incorrectly that guano sales were declining at the time "in proportion to the decline in nitrate prices",⁶⁸ and arguing that this situation only benefitted "European buyers". Basadre also judged favourably the Pardo phase of the expropriation, remarking that critics such as Billinghurst

⁶⁶Thomas McLeod Bader, "A Willingness to War: A Portrait of the Republic of Chile during the Years preceding the War of the Pacific" (Unpublished Ph.D. dissertation: University of California, Los Angeles, 1967), pp. 302-306, 308-312, 461-462. For British policy, quite indifferent to the issue, the best study is still: V.G. Kiernan, "Foreign investments in the war of the Pacific" *Hispanic American Historical Review* 35(1955): 14-36.

⁶⁷Basadre, *Historia*, 7: 57

⁶⁸Ibid., 7: 58

had "partisan motives" to attack him, and quoting both Valdes Vergara and Bermudez in support of his position.⁶⁹ According to him, Prado would have "rectified" the limits to the operation imposed by Pardo, noted the "irregularities" in the purchase of nitrate plants, as well as the failure to generate the expected income,⁷⁰ but made no original contribution on the issue.

An important article published in 1973 by Greenhill and Miller improved the knowledge of the expropriation by drawing on the Gibbs archives.⁷¹ A century after the operation, they were the first to note what was so strenuously argued at the time in Peru: "the simple substitution of nitrate for guano is difficult to prove". The article also outlined factors other than nitrate competition affecting guano sales at the time, such as the perceptible decline in quality of the fertilizer, and the emergence of alternative manures, such as superphosphates, which proved superior for specific crops. However, in remarking that "these factors were not generally recognized in Peru" Greenhill and Miller overlooked the protracted domestic debate on the issue.⁷² The profound significance of the break with Dreyfus in 1875, implicitly restoring competition in the guano trade, and further precluding any attempt at establishing a Peruvian monopoly on nitrogenous fertilizers, was ignored. The potential threat of emerging chemical substitutes such as by-product sulphate of ammonia was not mentioned either.

In judging the goals of the expropriation, Greenhill and Miller reached a conclusion similar to that of Bermúdez: "Although the plan was not unattractive, an inexperienced administration committed serious

⁶⁹Ibid., 7: 61-62.

⁷⁰Ibid., 7: 289-294

⁷¹Greenhill and Miller, "The Peruvian Government"

⁷²Ibid., p. 112

errors"⁷³ They further characterized the operation as "a bold, even speculative innovation, which force of circumstances compelled"⁷⁴ However, they also added

Perú used her nitrate monopoly as a means to exploit the consumer. She did not recognize that raising nitrate prices merely encouraged outsiders to export profitably, notwithstanding the newly imposed duties, thus expanding output to a point where the long term supply would alarmingly exceed demand⁷⁵

The description of the origins of the expropriation followed Peruvian historiography and Bermudez account in its attempt to exculpate President Pardo. Greenhill and Miller argued that the "expropriation originated not with Pardo's administration but emanated from Congress which altered or substituted ministerial plans, developments which reflected ministerial weakness. The Government was not committed to state interference." No sources were quoted for this opinion. The view that the Peruvian Government was hostile in principle to "State interference" flies in the face of the policy actually followed, not only on nitrate, but more importantly on guano and railroads. In fact, government intervention in the Peruvian guano age was very much the rule, rather than the exception. Greenhill and Miller did point out that the Pardo Government "regarded nitrate as a solution to the overseas loan problem",⁷⁶ but presented this view as an afterthought emerging with the Peruvian default of 1876, rather than a central justification provided in the very introduction of expropriation bill in 1875. The significance of the £3 million "public works" loan went undetected.

While stating that "Pardo preferred the co-existence of public and private sectors in an industry long accustomed to commercial freedom", the article also admitted that "unhappily, such ineffective state control made forecasting prices and demand difficult".⁷⁷ This was another way of saying that the "co-existence" of a

⁷³Ibid., p. 118

⁷⁴Ibid., p. 128.

⁷⁵Ibid., p. 122.

⁷⁶Ibid., p. 129.

⁷⁷Ibid., p. 121.

government and a private sector in Tarapaca prevented the very control which the expropriation was supposed to accomplish. However, after reviewing the disastrous evolution of the operation, including the predictable strengthening of the competition from the Antofagasta Company, Greenhill and Miller's disconcertingly concluded that the "expropriation might have succeeded but for factors' beyond Peru's control", suggesting that Perú's excessive "dependence" on European investors played a major role in the failure of the scheme.⁷⁸

The latest account of the Peruvian expropriation, published by the United States historian F. F. O'Brien in 1982, albeit brief, included some valuable findings.⁷⁹ However, O'Brien stated that the operation had been launched "to prop up the country's tottering institutions", the vaguest interpretation to date, but noted that it had been "only partially successful" because it ended up enhancing, rather than reducing, the position of European merchant houses in Tarapaca.⁸⁰ He viewed the Peruvian economy as divided between a "modern" sector, totally dependent on guano and foreign loans, and a "traditional" sector untouched by "European capitalism's penetration". The government "served as the primary avenue to wealth", and local factions competed for the control of state revenues.

By 1875 internal conditions necessitated continued economic expansion, while external conditions--that is, the decline of the guano trade and scarcity of foreign loans--dictated contraction. With the entire system now driven at the brink of collapse, Perú turned to its forgotten province for salvation.⁸¹

O'Brien characterized the expropriation as a "desperate attempt" to reconstitute a severely threatened "system",⁸² regarding the "nationalization" goal as purely rhetorical.

⁷⁸Ibid., pp 130-131

⁷⁹O'Brien, *Nitrate*, pp 26-41

⁸⁰Ibid., p 26

⁸¹Ibid., p. 27

⁸²Ibid., p 39

The term "nationalization" in a twentieth-century context evokes images of grand schemes for national development. In this instance, however, nationalization was a desperate effort by an impecunious and unstable government to preserve the contradictory and now faltering system built upon a foreign export enclave. The entire nationalization process would bear the indelible imprint of this reality.⁸³

He added correctly that the operation "was an expropriation only in the most general sense of the term", showing that it represented a bail out of producers on the brink of bankruptcy, granting generous production contracts which ultimately defeated the original goal of cutting nitrate exports. The weakness of the Peruvian Government led to heavy dependence on foreign producers and financiers to carry out the operation. O'Brien's most important finding was that the Peruvian Government wanted Gibbs, part owner of the Antofagasta Company, to limit the output of its competitor to guarantee the success of the expropriation, including a detailed description of the failure of the British firm to do so.⁸⁴ He also showed that Chilean ventures in Tarapacá were negatively affected by the expropriation, further reinforcing the influence of European producers who kept the control of their plants under production contracts.⁸⁵ However, O'Brien also drew a distinction between the Pardo and Prado phases of the operation, arguing that during the former period plant sales had proceeded "smoothly" and that the last decrees of the Pardo Administration "promised" to keep State and private exports "at reasonable levels."⁸⁶ Thus, in attempting to exculpate President Pardo, even the most recent account of the Peruvian expropriation showed vestiges of the remote past.

⁸³Ibid., p. 28.

⁸⁴Ibid., pp. 31, 32-33, the analysis of the struggle within the Antofagasta Company between Gibbs and the Chilean Edwards group was fully described in an important 1980 article. O'Brien, "The Antofagasta Company", pp. 13-15.

⁸⁵O'Brien, *Nitrate*, p. 34-41

⁸⁶Ibid., p. 35.

6. *Conclusions*

The most salient feature of the historiography on the Peruvian expropriation appears to be that, on the whole, the operation was judged far more favourably with the passage of time. As a rule, the closer in time the observer was to the expropriation the more critical the opinion. Except for the 1884 views of Francisco Valdes Vergara, no contemporary author or politician, whether Peruvian or foreign, could justify the operation. However, as an outgrowth of pre-1879 fierce factional struggle, an alternative view emerged since the end of 1876 in Perú itself, contrasting the first months of the expropriation under Pardo, deemed eminently successful, with the disastrous 1877-1879 sequel led by Prado. The Italian Tomas Carvano, as well as Billinghamurst, appear to have been the first authors to embrace this interpretation after the War of the Pacific, the Chilean historian Oscar Bermúdez endorsed it without reservations. A parallel school claimed that the expropriation had been forced on Pardo, who leaned heavily towards an export duty, by an unnamed domestic group. This idea, first suggested in Chile by the special nitrate commission of 1880, was subsequently presented as an established fact by Greenhill and Miller in the twentieth century.

The first line of defense of Pardo led to far more radical conclusions than the second one. If President Pardo rejected the expropriation, as the latter view contended, it becomes possible to simultaneously vindicate Pardo and condemn the entire operation. However, if Pardo actually conceived and soundly executed the first part of the expropriation, as the former school claimed, its supporters are compelled to praise both the goals of the operation and its early phase. Towards the end of the nineteenth century, a Chilean "nationalist" group, indifferent to the Pardo issue, started by demanding government support in Tarapaca against foreign competitors and ended up censuring the dismantlement of the Peruvian State monopoly in the region after 1879. Nicolas Palacios appeared to have been the first to state this idea explicitly, albeit showing some caution in assessing the pre-1879 Peruvian system, while Francisco Valdes Vergara went one step further by boldly stating that the expropriation had been "well conceived". Oscar Bermúdez praised the operation not only to exculpate President Pardo, but on its own right, as ushering in "new principles of political economy". The demonstrable failure of the expropriation was explained away by laying the blame exclusively on President Prado.

It is legitimate to suggest that many of the contentious issues posed by the Peruvian expropriation could have been settled through a proper study of the episode. However, the operation has never been the subject of serious research. The two most detailed accounts of the expropriation, made by Bermudez and O'Brien, amount to slightly over forty pages, and were conceived as mere chapters of books dealing with larger subjects. Furthermore, both authors were specialists in Chilean—not Peruvian, history, and treated the operation as a mere preamble to the 'real' history of the Tarapaca nitrate industry—starting after the War of the Pacific. In their eyes, the expropriation was prehistory.

The uniform neglect of the rich contemporary Peruvian sources, particularly the informative Lima press, explains the fact that we know far more about the most recondite thinking of the Gibbs firm on the expropriation than about the domestic Peruvian debate on the issue. The predilection for the Gibbs archives to the detriment of local sources has left basic data entirely unrecorded. This gap has been particularly damaging for the history of Peruvian *certificados*, crucial for the study of subsequent Chilean nitrate policy. The list of original recipients of *certificados* is published and analyzed here for the first time. The remarkable popularity of the nitrate bonds in the Lima market prior to 1879, as well as the actual quotations of the securities, escaped all notice. Although more relevant to Chilean history, the list of the last nitrate bondholders, reimbursed in 1887, lied buried in the Chilean National Archives up to this date. With the exception of the important, but limited, data gathered¹, O'Brien on the subject, all discussions on the *certificados* assumed that the pre-1879 history of the securities was either intractable or irrelevant. No list of production and sales contracts was ever compiled. No effort was made to assess the condition of all Tarapaca nitrate plants prior to 1879. Only Basadre mentioned that the Peruvian Congress had actually repealed the expropriation law in February, 1879, although he overlooked the significance of the event.

The neglect of Peruvian primary sources affected the level of the discussion on the origins of the expropriation. It would have been easy to find out that a three-year public debate on nitrate policy made clear that President Parde, along with his advisor Raimondi, was fully responsible for spreading, if not coming, the notion that Tarapaca exports should be curtailed in order to protect guano. Both also spoke openly of a Peruvian State "monopoly" on both nitrate and guano as a feasible project. The restriction of Tarapacá exports in order

to increase nitrate prices was the basic premise underlying all of Pardo's rambling nitrate policy. This included his often-mentioned nitrate export duty, proposed not only as a revenue-generating measure, but mostly to beef up nitrate prices relative to guano. For Pardo, the nitrate export duty, the estanco, and the expropriation shared the same goal, the increase of nitrate prices, rather than being truly alternative policies. The supporters of the doctrine on guano-nitrate competition, ostensibly headed by Pardo, brushed aside the impressive objections advanced against the idea in Perú at the time, including the growing threat from the Antofagasta Company, the declining quality of guano, and the unclear figures on the alleged struggle between both fertilizers. The estimates on the level of exports required to reach a given level of nitrate prices, as well as on the actual impact of a percentage increase of nitrate prices on guano sales, were entirely speculative. The total projected level of guano sales, equivalent to the combined exports of both nitrate and guano, was chimeric. Yet, such spurious data was used, by Pardo and others, to define the very goals of the expropriation, which some authors subsequently praised as eminently defensible and innovative. The fact that all authors dealing with the operation, with the exception of Greenhill and Miller, chose not to address the crucial issue of whether the manipulation of the world market for nitrogenous fertilizers was feasible at the time explains the surprising popularity of the expropriation's "goals" in the historiography. Rather than being an "advanced" notion, anticipating twentieth century socialism as Romero and Bermudez claimed, the utopian attempt at controlling world markets for a given product bears an uncanny resemblance to the discredited schemes of Spanish mercantilism, deeply rooted in the old Viceroyalty of Perú. As such, the Peruvian expropriation was a regression to a failed past, rather than a prelude to the future.

The theoretical premises of Pardo's nitrate policy were so far-fetched that his growing obsession with Tarapacá can only be viewed as a desperate attempt to distract attention from the real problems of Perú at the time, the unserviceable foreign debt and the irrepressible railroad network. In fact, by 1875, the year of the debate on the expropriation law, the official estimates on the expected impact of a cut in nitrate exports had been refuted to such a degree that the proponent of the bill explicitly presented the operation as a means to obtain further overseas loans to continue railroad construction. Some of the Deputies who defected to the side of the supporters of the expropriation, allowing the bill to pass, overtly proclaimed that they had done so in

order to allow railroad construction to proceed in their districts. The ostensible goal of the expropriation, the protection of guano, masked a second, purely financial, agenda. The expropriation was adopted as a desperate exercise in bridge financing cloaked as a nitrate policy. It was conclusively proven in Perú at the time that it would be a disaster on both accounts, and it was. Both the ostensible and the hidden goals of the expropriation were known to be flawed long before the Peruvian Government purchased its first nitrate plant.

All interpretations attempting to distinguish a Pardo nitrate policy, as distinct and superior to that of Prado, assume that Perú had at the time the equivalent of a modern party system, including clearly defined boundaries between contending ideologies. In fact, the much-maligned Prado faction was made up of a large number of prominent followers of former President Pardo, who easily switched sides in line with their personal interests. By far the most prominent supporter, if not the actual architect, of Prado's policy, Francisco García Calderón, who stood by the expropriation up to its bitter end, was a prominent founder of Pardo's *Partido Civil*. Piérola was unable to develop an alternative nitrate policy due to the participation of the *Banco Nacional*, owned by his backer, Dreyfus, in all stages of the operation. Billinghurst's position was marred by the same Piérola-Dreyfus connection. As for corruption, the 1877 debate on plant purchases showed clearly that Pardo's acquisitions were just as dubious as those of his successor. Pardo's decision to authorize "repair" bonds for Barrechea opened the way to further clandestine issues of *certificados* in 1878. His acceptance of dubious "reassessments" of officially priced plants was the foundation for the scandals of 1877-1878. Finance Minister Elguera's 3-million *soles* estimate for future government income from nitrate sales, doubled to 6 million in Pardo's final address, were utterly misleading. Those who claimed that President Pardo wanted to "stop" the expropriation in 1876 did not mention that Finance Minister Elguera stressed the need to purchase all Tarapacá plants in one of his last speeches.

Of course, the "real" thinking of Presidents Manuel Pardo and Mariano Prado on any issue is hampered by the absence of personal papers; all biographies of both leaders are based on printed sources, mainly the Peruvian press. The Chilean historian Vicuña Mackenna reported that, during his 1877-1878 exile in Chile, Pardo had assumed full responsibility for the expropriation vaguely hinting that he wanted to protect the national interest of Perú. In a similar vein, the Peruvian historian Pedro Dávalos y Lisson reported that Pardo had told

a commission of Tarapacá businessmen in 1874 that he was not working for them or for Chile, but for the prosperity of Perú. These general statements are not very helpful in understanding Pardo's policy, particularly because he negotiated production contracts which greatly enhanced the position of European firms in Tarapaca, and granted absolute control of nitrate overseas sales to Gibbs. In fact, one visible aspect of the expropriation was that it actually liquidated most of the Peruvian presence in Tarapacá, allowing the sale of bankrupt plants to the government. The bail out was publicly acknowledged during the congressional debate on the subject, presenting it as a means of restoring capital resources to the Peruvian economy. Expressions of vehement "nationalism" in Perú during the guano age were part of the standard political rhetoric, and cannot be used to define a specific nitrate policy.

Prado's private view of the expropriation is unknown, except for one 1878 reference by Jaime Landa stating that the President would have preferred an export duty, but was forced to reject the idea when realizing that the operation could not be undone. He added that Prado considered the operation to be a legacy from Pardo, who saw himself in turn as hostage to an unstoppable railroad program. Landa's testimony appears credible, particularly because he was a strong supporter of the Providencia contract, and his reference to Prado's initial hesitation did not improve his case. If this is accurate, then Prado's position on the expropriation did not differ as much from that of Pardo, as the apologists of the latter claimed. Of course, President Prado is an easy target due to his fateful flight to Europe prior to the end of the War of the Pacific, widely viewed in Perú as a desertion.

The notions that, up to the end of the Pardo Administration in August, 1876, the expropriation had proceeded smoothly, that exports were under control, and that an effort was made to halt the operation due to mistrust in the following government, are untenable. An incomplete expropriation threatened the Peruvian Government with an imminent collapse of nitrate prices. The Gibbs and Gildemeister contracts signed by Pardo left very little room for assigning reasonable quotas to other plants. Since production contracts could be sold, the substantial Barrenechea and Meiggs contracts approved by the Pardo Administration could be used by other producers to further increase government-controlled exports. Powerful free producers such as the Campbell firm were installing the revolutionary Shanks process. Gibbs constantly pressed the government both to keep a high

duty on private exports, included as a formal guarantee in his consignment contract, and to buy out as many independent plants as possible, fearing a flood of unregulated nitrate output. The British firm made clear that a hybrid system of government and private producers in Tarapacá was unacceptable, pressing both the Pardo and Prado Administrations to complete the operation. It is safe to assume that, should have Prado decided to halt plant purchases, allowing an uncontrollable private sector to thrive, Gibbs would have refused to renew his contract earlier than he did. Pardo bequeathed an explosive legacy to Prado, and the latter had no choice but to carry it through to its logical conclusion. The thorny issues raised by outstanding production contracts and *certificados*, which came to light in the 1878-1879 congressional debate on the repeal of the expropriation law, showed that undoing the operation required far more than the last 1876 Pardo decree restricting further purchases of nitrate plants. In fact, both problems lingered in Chile up to 1887.

Clearly, as noted during the domestic debate on the issue, there was a link between railroads, guano and nitrate. The origins of the expropriation went back to the irresponsible Piérola program (supported however by the majority of the Peruvian Congress), including two massive foreign loans, the sale of 2 million tons of guano to Dreyfus, and an extravagant railroad-building program. After this program was implemented, there was little that both the Pardo and Prado Administrations could do, except point out to the "legacy" of prior governments. However, the Piérola reforms had broad congressional support, including followers of Pardo, and all the Peruvian elite had a direct or indirect participation in railroad construction. The Peruvian "system" was made up of a small white elite presiding over a majority of pre-columbian communities. Since Castilla in the early 1850s, no Peruvian leader could survive without devising some sort of "consolidation", i.e., a spurious financial operation aimed at redistributing the proceeds of foreign loans. Perhaps, this was the only way to purchase political support in a deeply fragmented society. After Echenique enacted his "consolidation" in the late 1850s, Piérola followed suit in 1870, on a larger scale than ever before. In a sense, the expropriation could be considered as the fourth consolidation, albeit a particularly desperate one, chosen after all other means had been exhausted.

The measure of the success of a given policy depends on the degree on which the original goals are achieved. Virtually all of the pertinent historiography believed that the purpose of the operation was to curtail

nitrate exports to favour guano sales. A few historians lent credence to the claims that a "nationalization" of the Tarapacá nitrate industry was intended. A more discerning group of authors viewed the measure as a contrived scheme to secure yet another foreign loan. If the expropriation is measured against any of these goals, it was a definitive failure. Furthermore, these objectives were proven to be unattainable in Peru itself prior to 1875. However, if the real purpose of the expropriation was to carry out yet another "consolidation" to recycle £7 million in overseas funds, the resilient *certificados* turned out to be an unexpected success emerging from the failure of the projected foreign loan. The unsung nitrate bonds were the only element of the expropriation which had a positive impact on an otherwise doomed economy, supplying a substitute currency to a market deprived of foreign loans, and terminally weary of government paper. It is true that it was an exceedingly expensive palliative for a deadly financial crisis, but it is perhaps equally true that there was no way out for Perú at the time. Since at least 1875, Peruvian Governments could only choose between different ways of going bankrupt. After mismanaging guano and railroads, the Peruvian elite decided to make a last, futile stance in Tarapacá, because they had left nothing else in the country to mortgage. Few, if any, of them, could have guessed what subsequent historians made of their very narrow and forlorn efforts to buy some time for a social system in the brink of collapse.

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LIST OF ABBREVIATIONS

- Chile, *ANI* - Archivo Nacional, Archivos Notariales de Iquique.
- Chile, *DE* followed by year - Chile, Congreso Nacional, *Boletín de las sesiones extraordinarias de la Cámara de Diputados*.
- Chile, *DO* followed by year - Chile, Congreso Nacional, *Boletín de las sesiones ordinarias de la Cámara de Diputados*.
- Chile, *DFT* - Archivo Nacional, Ministerio de Hacienda, Dirección Fiscal de Tarapacá.
- Chile, *JPT* - Archivo Nacional, Ministerio de Hacienda, Jefatura Política de Tarapacá.
- Chile, *MH*, *Dirección del Tesoro* - Archivo Nacional, Ministerio de Hacienda, Dirección del Tesoro.
- Chile, *SA* - Archivo Nacional, Ministerio de Hacienda, Sociedades Anónimas.
- Chile, *SE* followed by year - Chile, Congreso Nacional, *Boletín de las sesiones extraordinarias de la Cámara de Senadores*.
- Chile, *SO* followed by year - Chile, Congreso Nacional, *Boletín de las sesiones ordinarias de la Cámara de Senadores*.
- Chile, *SSA* - Archivo Nacional, Ministerio de Hacienda, Solicitudes sobre Sociedades Anónimas.
- Chile, *SSS* - Archivo Nacional, Ministerio de Hacienda, Solicitudes sobre Salitre.
- CSA. *AG.* - Archivo Nacional, Archivo SOQUIMICH, Compañía de Salitres y Ferrocarril de Antofagasta, Correspondencia, Original, Administración General, Cartas.
- CSA. *AG. Copiador Soublotte* - Archivo Nacional, Archivo SOQUIMICH, Compañía de Salitres y Ferrocarril de Antofagasta, Correspondencia, Original, Administración General, Copiador, Copiador de Cartas del Sr. C. Soublotte.
- Gibbs Ms. followed by number - Archives of Antony Gibbs & Sons.
- Perú, *DE* followed by year (if extraordinary) - Perú, Congreso Nacional, Cámara de Diputados, *Diario de los Debates*.
- Perú, *DO* followed by year (if ordinary) - Perú, Congreso Nacional, Cámara de Diputados, *Diario de los Debates*.
- Perú, *SE* followed by year (if extraordinary) - Perú, Congreso Nacional, Cámara de Senadores, *Diario de los Debates*.
- Perú, *SO* followed by year (if ordinary) - Perú, Congreso Nacional, Cámara de Senadores, *Diario de los Debates*.

LIST OF CONVERSIONS*A. Weight*

- 1 **English long ton** = 100 English quintals (*cwt*) = 2,240 pounds = 1.12 short tons = 1,015.938 kgs
- 1 **English quintal (*cwt*)** = 112 pounds
- 1 **Spanish quintal (Peruvian)** = 101.61 pounds = 46.09 kgs
- 1 **metric ton** = 2,204.6 pounds

B. Surface

- 1 **Peruvian *estaca*** = 27,949.55 square meters = 2 hectares 795 square meters
- 1 **Chilean *estaca* (1877)** = 100 hectares
- 1 **Bolivian *estaca* (December, 1872)** = 256 hectares

**THE PERUVIAN EXPROPRIATION
OF THE TARAPACA NITRATE INDUSTRY, 1875-1879.
VOLUME 2 - STATISTICS**

by
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September, 1990

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the Degree of Doctor of Philosophy.

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Note on Table 1

Table 1 includes all available data on the ownership and status of Tarapacá nitrate plants from 1870 through 1887. From 1877 onwards, a separate column provides information on the actual operator of each plant. Data on the legal status of the plants, i.e., essentially if it was operated under a production contract, is listed under the heading of "Title". For 1887, the data on repossessed plants is listed under the heading "Payment".

While the data on ownership of nitrate plants requires no explanation, establishing the status, or condition, of the nitrate plants was a more difficult task. The two most important sources for the knowledge of the condition of Tarapacá nitrate plants between 1875 and 1887 are the 1875 report of the Peruvian assessment commission,¹ and the 1884 review of Francisco Valdés Vergara, the Political Authority, or *Jeje Político*, of Tarapacá at the time.² The former document included an evaluation of most of the *máquinas* in the region, while the latter report provided a more comprehensive judgment on virtually every existing plant at the time. The original terms used to rank specific plants were plain: plants were considered "in good condition", "mediocre condition", "bad condition", "destroyed", or "unassembled". Although both surveys were separated by almost ten years, their views on the plants examined matched almost in all cases. In addition, starting at the end of 1879, the Chilean authorities issued periodic internal reports on the output and condition of every existing nitrate plant. Chilean archives also include official Peruvian assessments issued prior to 1879. None of these reports contradicted the data supplied by the Peruvian commission or Valdés Vergara, and they have been used to corroborate the two main documents. The fact that data on actual monthly output per plant became available during the Chilean period also helps to assess the relative strength of each operation. These periodic official reports continued after 1884, and they were supplemented by the daily information on nitrate plants and developments provided by the two leading Tarapacá newspapers, *El Ventiuno de Mayo*, and *La Industria*.

¹Perú, "Informe especial".

²Valdés Vergara, *Memoria*.

The pertinent codes used in Table 1, as well as the footnotes, are included in pages 69 through 72 of this volume. The codes apply to the rest of the tables, when required.

Table 1

*Tarapacá Nitrate Plants, Owners, Nationality,
Title, Status, 1870-1887*

Plants	Owner 1870-1873	Nationality 1870-1873	Notes 1870-1873	Owner 1874-1876 (Prior Expro)	Nationality 1874-1876	Notes 1874-1876
Máquinas						
Agua Santa	Campbell, John D.	British	(1)	Campbell, John D.	British	(1)
Alianza	Cfa.S.Alianza	Peruvian	(12)(13)	Cfa.S.Alianza	Peruvian	(14)
Angela	Georgeson, Thomas	British(?)	(18)	Georgeson, Thomas	British(?)	(18)
Angeles	NE			NE		
Argentina	Gildemeister, Juan(Hans)	German	(21)	Gildemeister, Juan(Hans)	German	(as)
Barrenechea	Cfa.S.Barrenechea	Peruvian	(12)	Cfa.S.Barrenechea	Peruvian	(23)
Bearnes	Layous, Francisco	French	(21)	Layous, Francisco	French	(21)
Buen Retiro	Vicentelo y Quiroga	Peruvian	(12)	Quiroga and Brother	Peruvian	(20)(21)
Calacala	Hilliger, Jorge C.	British	(12)	Hidalgo, E.C. widow of	Peruvian	(21)
California	C.S.California	Chilean	(30)	C.S.California	Chilean	(21)
Canoelaria	Benavides	Peruvian	(21)	Benavides	Peruvian	(as)
Carmelitana	NE			Lecaros, Domingo	Peruvian	(21)
Carmen Alto	Orriols & Co.	Peruvian(?)	(21)	Orriols & Co.	Peruvian(?)	(21)
Carmen Bajo	Cfa.S.Rimac	Peruvian	(21)	Cfa.S.Rimac	Peruvian	(21)
Carolina	Cfa.S.de Tarapacá(Gibbs)	British	(12)(21)	Cfa.S.de Tarapacá(Gibbs)	British	(21)
Católica, La	n.a.			Bagacilupo(e)(a), Juan(Luis)	Peruvian	(20)(21)
China	Figueroa, Demetrio	Chilean	(21)	Figueroa, Demetrio	Chilean	(as)
Chiniquiray(Oviedo y Trillo)	Active	n.a.	(12)	Oviedo y Trillo	Peruvian	(21)
Concepción(Palacio Industrial)	Hugeat and Caplong	British(?)	(33)	C.S.California	Chilean	(21)(30)
Dolores(Cobo)	n.a.	n.a.		Cobo, Juan	Peruvian.CD.	(14)(21)
Esmeralda	Clark, Eck & Co.	British.Wk.	(21)(36)	Clark, Eck & Co.	British	(21)
Esperanza(agunas)	C.S.Esperanza	Peruvian	(12)(21)	C.S.Esperanza	Peruvian	(12)(21)
Hanza(S.Antuio Gildemeister)	Gildemeister, Juan(Hans)	German	(12)(18)(21)	Gildemeister, J.	German	(12)(18)(21)
Limena	Cfa.S.de Tarapacá(Gibbs)	British	(12)(21)	Cfa.S.de Tarapacá(Gibbs)	British	(21)
Magdalena	NE			Montero, José Manuel	Peruvian	(21)
Matillana	Morales y Cfa.	Peruvian	(21)	Morales y Cfa.	Peruvian	(21)
Negreiros	Cfa.S.Negreiros	Chilean/Peruvian	(5)(30)	Cfa.S.Negreiros	Chilean/Peru(as)	
Nueva Carolina(y Pozo Almonte)	Cfa.S.Nueva Carolina	Chilean	(21)(30)	Cfa.S.Nueva Carolina	Chilean	(as)
Nueva Soledad	Cauvi, Juan	Peruvian	(21)	Cauvi, Juan	Peruvian	(21)
Palma	Almonte, Manuel	Peruvian	(13)	Peruvian Nitrate Co.	British	(33)
Paposo(máquina)	Folsch and Martin	German	(21)	Folsch and Martin	German	(21)
Pena Chica	Aguirre y Oviedo	Peruvian	(21)	Aguirre y Oviedo	Peruvian	(21)
Pena Grande	Cfa.S.La Pena	Peruvian	(21)	Cfa.S.La Pena	Peruvian	(21)
Perla	Cfa.S.Rimac	Peruvian	(21)	Cfa.S.Rimac	Peruvian	(21)
Peruana	Loaiza, Virginia	Peruvian	(33)	Loaiza, Virginia	Peruvian	(as)
Porvenir	Lafuente & nephew	Peruvian(?)	(33)	Cfa.S.Pisagua	Chilean	(30)
Providencia	Cfa.S.Providencia	Peruvian	(33)	Cfa.S.Providencia	Peruvian	(33)
Resurrección(y Q.de Pazos)	Zavala, Pedro J.	Peruvian	(33)	Zavala, Pedro J.	Peruvian	(33)
Rosario(Pérez)	Pérez, Manuel M[arfa]	Peruvian	(33)	Pérez, Manuel M[arfa]	Peruvian	(33)
Sacramento(Delano)	Cfa.S.Sacramento	Chilean	(30)	Cfa.S.Sacramento	Chilean	(as)
Salar de la Noria	Hernández, E.	Chilean(?)	(34)	Oliva, Daniel	Chilean	(12)(34)
San Agustín	Balta, Juan Francisco	Peruvian	(33)	Balta, Juan Francisco	Peruvian	(33)(36)
San Andrés	Pérez, M.Marfa	Peruvian	(33)	Pérez, M.Marfa	Peruvian	(33)
San Antonio(Campbell)	Hainsworth & Co.	British	(33)	Cambell, Outram/Jones	British	(12)
San Antonio(Penaranda)	Active	n.a.	(12)	Penaranda, Eusebio	Peruvian	(33)
San Carlos	Marquesado, Eugenio	Peruvian	(21)	Cfa.S.San Carlos	Chilean	(30)
San Francisco(Bramez)	NE			Bramez, Evaristo	Peruvian	(33)

Plants	Owner 1870-1873	Nationality 1870-1873	Notes 1870-1873	Owner 1874-1876 (Prior Expro)	Nationality 1874-1876	Notes 1874-1876
San José(Aguirre)	n.a.	n.a.		n.a.	n.a.	
San José de la Moria	Devescovi and Arredondo	Peruvian(?)	(33)	Devescovi and Arredondo	Peruvian(?)	(33)
San José(Yungay)	n.a.	n.a.		Riveros, Manuel E.	Peruvian	(33)
San Juan(Gildemeister)	Active	n.a.	(12)(18)	Gildemeister, J.	German	(12)(18)
San Juan de Soledad	n.a.	n.a.		Romero, José	Peruvian	(33)
San Lorenzo(Ugarte)	Ugarte y Cevallos y Cía.	Peruvian	(33)	Ugarte y Cevallos y Cía.	Peruvian	(33)
San Pablo	n.a.	n.a.		Elguera, Pedro	Peruvian	(33)
San Pedro	Gildemeister, J.	German	(12)(33)	Gildemeister, J.	German	(12)(18)
San Vicente	Granadino & Bros.	Peruvian	(33)	Granadino & Bros.	Peruvian	(33)
Santa Adela	n.a.	n.a.		Devescovi, José	Peruvian(?)	(33)
Santa Ana	n.a.	n.a.		Pflucker y Cía.	German	(33)
Santa Catalina	Cía. Salitrera América	Chilean	(30)(33)	Cía. Salitrera América	Chilean	(33)
Santa Isabel	Elguera, Pedro	Peruvian	(33)	Elguera, Pedro	Peruvian	(as)
Santa Laura(Barra)	Barra y Riesco	Chilean	(33)	Barra y Riesco	Chilean	(33)
Santa Laura(Wendell)	Wendell, Guillermo	British	(33)	Wendell, Guillermo	British	(as)
Santa Rita	González Vélez, José María	Peruvian	(33)	González Vélez, José María	Peruvian	(as)
Santiago(Camina)	n.a.	n.a.		Ossio, Mariano	Peruvian	(33)
Solferino	Cía. Salitrera Solferino	Chilean	(30)	Cía. Salitrera Solferino	Chilean	(as)
Tarapacá	Vernal y Castro, Juan	Peruvian	(33)	Vernal y Castro, Juan	Peruvian	(as)
Trinidad	Carpio, J. y Cía.	Peruvian	(33)	Carpio, J. y Cía.	Peruvian	(33)
Valparaiso	Cía. Salitrera Valparaiso	Chilean	(30)	Cía. Salitrera Valparaiso	Chilean	(as)
Victoria	Soruco y Cía.	Chilean	(33)	Soruco y Cía.	Chilean	(as)
Paradas						
Abra de Quiroga	Active	n.a.	(as)	Active	n.a.	(as)
Abra de Ugarte	Active	n.a.	(as)	Active	n.a.	(as)
Aguada	n.a.	n.a.		n.a.	n.a.	
Andacollo	n.a.	n.a.		n.a.	n.a.	
Ascención de Capetillo	Active	n.a.	(as)	Active	n.a.	(as)
Ascención de Loayza	Active	n.a.	(as)	Active	n.a.	(as)
Asunta	n.a.	n.a.		n.a.	n.a.	
Banda	Active	n.a.	(as)	Active	n.a.	(as)
Buena Esperanza	n.a.	n.a.		n.a.	n.a.	
Buenaventura	n.a.	n.a.		Barril, Manuel	Peruvian	(14)(20)
Candelaria(de Carpio)	n.a.	n.a.		n.a.	n.a.	
Candelaria(de Osorio)	Active	n.a.	(as)	Active	n.a.	(as)
Candelaria(de Perfetti)	n.a.	n.a.		n.a.	n.a.	
Candelaria(Zavala y Bilbao)	n.a.	n.a.		n.a.	n.a.	
Carmen(Morales)	n.a.	n.a.		n.a.	n.a.	
Carmen(Oviedo)	n.a.	n.a.		Oviedo, Manuel	Peruvian	(14)(20)
Carmen(Scheel)	n.a.	n.a.		n.a.	n.a.	
Chilena	n.a.	n.a.		n.a.	n.a.	
Chinquiray(Zavala)	Active	n.a.	(as)	Active	n.a.	(as)
Compañía(de Tarapacá)	Active	n.a.	(as)	Active	n.a.	(as)
Concepción(Gárate)	n.a.	n.a.		n.a.	n.a.	
Cordillera	n.a.	n.a.		n.a.	n.a.	

Page 3 - Table 1

Plants	Owner 1870-1873	Nationality 1870-1873	Notes 1870-1873	Owner 1874-1876 (Prior Expro)	Nationality 1874-1876	Notes 1874-1876
Cruz de Zapiga	n.a.	n.a.		Rocca y Montefinale	Italian	(14)(20)
Dolores(Compañía América)	Cfa.Salitrera América	Chilean	(30)	Cfa.Salitrera América	Chilean	(as)
Encarnación	n.a.	n.a.		Quiroga,A. and partners	Peruvian	(14)(20)
Fortuna	n.a.	n.a.		Saavedra,Francisco	Peruvian	(14)(20)
Jazpampa(Zavala)	n.a.	n.a.		Cavallero,Eduardo	Spanish	(12)
Matamunqui	Active	n.a.	(as)	Active	n.a.	(as)
Mercedes de Negreiros	n.a.	n.a.		n.a.	n.a.	
Negreiros	Active	n.a.	(as)	Active	n.a.	(as)
Negreiros(Vernal)	Active	n.a.	(as)	Active	n.a.	(as)
Normandía(San Antonio)	n.a.	n.a.		Marquina,Gregoria Coca de	Peruvian	(2)(14)
Nueva Rosario	n.a.	n.a.		n.a.	n.a.	
Paccha	Cfa.Salitrera América	Chilean	(30)	Cfa.Salitrera América	Chilean	(2)(14)(26)
Paccha(Branes)	n.a.	n.a.		n.a.	n.a.	
Pampa Negra	Active	n.a.	(as)	Zegarra,Simón	Peruvian	(14)(20)
Paposo(parada)	n.a.	n.a.		n.a.	n.a.	
Pasto	n.a.	n.a.		Vernal,Domingo and bros.	Peruvian	(14)(20)
Primitiva	n.a.	n.a.		n.a.	n.a.	
Progreso	n.a.	n.a.		n.a.	n.a.	
Ramírez	Active	n.a.	(as)	Active	n.a.	(as)
Reducto	Active	n.a.	(as)	Active	n.a.	(as)
Rincón(Aguirre)	Active	n.a.	(as)	Active	n.a.	(as)
Rincón(Benavides)	Active	n.a.	(as)	Active	n.a.	(as)
Rincón(Soruco)	Active	n.a.	(as)	Active	n.a.	(as)
Rosario(Beas)	n.a.	n.a.		n.a.	n.a.	
Rosario(Luza)	n.a.	n.a.		n.a.	n.a.	
Rosario(Ríos)	Active	n.a.	(as)	Ríos Family	Peruvian	(12)
Sacramento(Baluartes)	Active	n.a.	(as)	Active	n.a.	(as)
Sacramento(Castilla)	Active	n.a.	(as)	Active	n.a.	(as)
Sacramento(Loayza y Pascal)	Active	n.a.	(as)	Active	n.a.	(as)
Sacramento(Soto Flores)	Active	n.a.	(as)	Active	n.a.	(as)
Salar del Carmen	Cfa.Salitrera Chucumata	Chilean	(30)	Cfa.Salitrera Chucumata	Chilean	(14)(20)
San Antonio(Luza)	n.a.	n.a.		Luza,Manuel E.	Peruvian	(14)(20)
San Antonio de Méjico	n.a.	n.a.		n.a.	n.a.	
San Antonio(Soto Flores)	n.a.	n.a.		Soto Flores,Mariano	Peruvian	(14)(20)
San Antonio(Viejo)	n.a.	n.a.		Díaz,Juan Crisóstomo	Peruvian	(14)(20)
San Benigno	n.a.	n.a.		Petit,Francisco	French	(14)(20)
San Cristóbal	n.a.	n.a.		Quiroga,Mariano	Peruvian	(14)(20)
San Fernando	n.a.	n.a.		n.a.	n.a.	
San Francisco(Campodónico)	n.a.	n.a.		Campodónico y Solari	Italian	(14)(20)
San Francisco(Marquezado)	n.a.	n.a.		Marquezado,Francisco	Peruvian	(14)(20)
San Francisco(Zegarra)	n.a.	n.a.		Zegarra,Juan	Peruvian	(14)(20)
San Jorge	n.a.	n.a.		n.a.	n.a.	
San José de Alva	n.a.	n.a.		n.a.	n.a.	
San José (Devescovi)	n.a.	n.a.		n.a.	n.a.	
San José de Putunchara	n.a.	n.a.		Aguirre,Juan de Dios	Peruvian	(14)(20)
San Lorenzo(Granadino)	n.a.	n.a.		n.a.	n.a.	
San Lorenzo(Ramírez)	n.a.	n.a.		Ramírez,Eusebio	Peruvian	(14)(20)
San Lorenzo(Zavala)	n.a.	n.a.		Zavala,Stgo.and bros.	Peruvian	(14)(20)

Plants	Owner	Nationality	Notes	Owner	Nationality	Notes
	1870-1873	1870-1873	1870-1873	1874-1876 (Prior Expro)	1874-1876	1874-1876
San Miguel(Cauvi)	n.a.	n.a.		n.a.	n.a.	
San Miguel(Palacios)	n.a.	n.a.		n.a.	n.a.	
San Nicolás	n.a.	n.a.		n.a.	n.a.	
San Pascual	n.a.	n.a.		n.a.	n.a.	
San Pedro(Ramírez)	n.a.	n.a.		Dávalos Ramírez, Pedro	Peruvian	(14)(20)
San Rafael	n.a.	n.a.		n.a.	n.a.	
San Sebastián	n.a.	n.a.		Mollo, Alejo	Peruvian	(14)(20)
Santa Beatriz	n.a.	n.a.		n.a.	n.a.	
Santa Clara y Challacollito	n.a.	n.a.		Cauvi, Juan and Micaela	Peruvian	(14)(20)
Santa Emilia	n.a.	n.a.		Petit, Francisco	French	(14)(20)
Santa Lucía	n.a.	n.a.		n.a.	n.a.	
Santa Luisa	n.a.	n.a.		n.a.	n.a.	
Santa María	n.a.	n.a.		n.a.	n.a.	
Santa Rosa	n.a.	n.a.		n.a.	n.a.	
Santa Rosita	n.a.	n.a.		n.a.	n.a.	
Santo Domingo	n.a.	n.a.		n.a.	n.a.	
Santo Domingo(Vidoliche)	n.a.	n.a.		n.a.	n.a.	
Silencio	n.a.	n.a.		n.a.	n.a.	
Tordoya	n.a.	n.a.		n.a.	n.a.	
Tránsito	n.a.	n.a.		Luza, Manuel E.	Peruvian	(14)(20)
Tres Marías	n.a.	n.a.		Coques, Damián	Peruvian	(14)(20)
Unión	n.a.	n.a.		Díaz, Flora L. de	Peruvian	(14)(20)
Virginia	n.a.	n.a.		n.a.	n.a.	
Yungay(Albarracín)	Active	n.a.		Active	n.a.	
Yungay Bajo	Active	n.a.		Active	n.a.	
Yungay(Jentilar)	Active	n.a.		Active	n.a.	

Plants	Owner or operator 1876 (After Expro)	Nationality 1876	Title 1876	Status 1876	Notes 1876
Máquinas					
Agua Santa	Campbell, John D.	British	Pr. Owner. Ra.	Cst.	(1)(67)
Alianza	State	Peruvian St.	St.	Un.	(14)
Angela	Georgeson, Thomas	British(?)	Pr. Owner. OUp. PV.	Ul.	(18)(32)
Angeles	State	Peruvian St.	St.	Un.	(18)(20)(21)
Argentina	Gildemeister, Juan (Hans)	German	St. Owner. PC.	Wk.	(18)
Barrenechea	Thomas Hart & Co.	British	Pr. Owner. PC.	Un.	(24)
Bearnes	Harnecker, Otto	German	St. PC.	Ul.	(25)
Buen Retiro	State	Peruvian St.	St. Dis.	Ul.	(20)(21)
Calacala	Hidalgo, Eufemia widow of	Peruvian	Pr. OUp. PV.	Ul.	(32)
California	State	Peruvian St.	St.	Gd.	(2)(18)
Candelaria	State	Peruvian St.	St.	Un.	(14)(20)
Carmelitana	Lecaros, Domingo	Peruvian	Pr. Owner	Un.	(20)(21)
Carmen Alto	State	Peruvian St.	St.	CD. Gd.	(18)(20)(21)
Carmen Bajo	Cfa. S. Rimac	Peruvian	Pr. Owner. PC.	NM.	(18)(21)
Carolina	Cfa. S. de Tarapacá (Gibbs)	British	St. Owner. PC.	CD. Bd.	(18)(20)
Católica, La	State	Peruvian St.	St.	Ul.	(20)(21)
China	Oliva, Daniel	Chilean	Pr. Owner	Ul.	(20)
Chinquiquiray (Oviedo y Trillo)	Oviedo y Trillo	Peruvian	Pr. Owner	NM.	(20)
Concepción (Palacio Industrial)	C. S. California	Chilean	Pr. Owner	CD. Bd.	(14)(21)(30)
Dolores (Cobo)	State	Peruvian St.	St.	CD. Gd.	(21)
Esmeralda	State	Peruvian St.	St.	NM.	(18)(21)
Esperanza (Lagunas)	State	Peruvian St.	St.	Un.	(20)
Hanza (S. Antonio-Gildemeister)	Gildemeister, J.	German	St. Owner. PC.	CD. Gd.	(18)(20)
Lima	Cfa. S. de Tarapacá (Gibbs)	British	St. Owner. PC.	Wk. Gd.	(18)(20)
Magdalena	Montero, José Manuel	Peruvian	St.	Un.	(17)
Matillana	State	Peruvian St.	St.	CD. Gd.	(18)(20)
Negreiros	Cfa. S. Negreiros	Chilean/Peruvian	Pr. Owner	Un.	(14)(18)
Nueva Carolina (y Pozo Almonte)	Cfa. S. Nueva Carolina	Chilean	Pr. Owner. Ra.	CD. Md.	(18)(67)
Nueva Soledad	State	Peruvian St.	St. Ra.	NM.	(18)(21)(67)
Palma	Cfa. S. Peruana	British	Pr. Owner. Ra.	Wk. Gd.	(18)(21)(67)
Paposo (máquina)	State	Peruvian St.	St. Owner.	Wk. Md.	(18)
Pena Chica	Aguirre, Mariano	Peruvian	Pr. Owner.	Wk. Md.	(18)(21)(26)
Pena Grande	State	Peruvian St.	St. Owner.	CD. Gd.	(14)(18)
Perla	Cfa. S. Rimac	Peruvian	Pr. Owner.	CD. Gd.	(14)(18)(21)
Peruana	State	Peruvian St.	St. Owner.	Wk.	(20)(26)
Porvenir	Déllano, Oloff	Chilean	St.	CD. Gd.	(14)(18)(21)
Providencia	State	Peruvian St.	St.	Ul.	(20)
Resurrección (y Q. de Pazos)	State	Peruvian St.	St.	Un.	(14)(20)
Rosario (Pérez)	Pérez, M[anuel] María	Peruvian	Pr. Owner. PNA.	Ul.	(20)
Sacramento (Déllano)	Déllano, Oloff	Chilean	Pr. Owner.	CD. Gd.	(14)(18)(20)
Salar de la Noria	Oliva, Daniel	Chilean	Pr. Owner.	Ul.	(12)
San Agustín	Balta, Juan Francisco	Peruvian	Pr. Owner.	CD. Gd.	(14)(18)(20)(36)
San Andrés	Pérez, M. María	Peruvian	Pr. Owner. PNA.	Ul.	(as)
San Antonio (Campbell)	Campbell, Outram & Co.	British	Pr. Owner. Ra.	Wk. NM.	(12)(67)
San Antonio (Pemaranda)	Pemaranda, Eusebio	Peruvian	Pr. Owner. PNA.	Cst. Gd.	(14)(33)
San Carlos	Cfa. S. San Carlos	Chilean	Pr. Owner.	Wk. Gd.	(18)
San Francisco (Brazez)	Brazez, Evaristo	Peruvian	Pr. Owner. PNA.	NM.	(14)(20)(33)

Plants	Owner or operator 1876 (After Expro)	Nationality 1876	Title 1876	Status 1876	Notes 1876
San José(Aguirre)	Aguirre,Mariano	Peruvian	Pr.Owner.PNA.	Ul.	(14)(20)(32)
San José de la Noria	Fasola,Plo	Peruvian	Pr.PC.Owner.	Wk.Md.	(18)(20)(26)
San José(Yungay)	Riveros,Manuel E.& Bros.	Peruvian	Pr.Owner.	Ul.	(20)(33)
San Juan(Gildemeister)	Gildemeister,Juan(Hans)	German	St.Owner.PC.	NM.Wk.	(18)
San Juan de Soledad	State	Peruvian St.	St.	Un.	(5)(17)(20)
San Lorenzo(Ugarte)	Ugarte y Cevallos y Cfa.	Peruvian	Pr.PC.Owner.	Wk.Gd.	(18)(20)(26)
San Pablo	Elguera,Pedro	Peruvian	Pr.PC.Owner.Ra.	Cst.	(14)(20)(26)(67)
San Pedro	Gildemeister,Juan(Hans)	German	St.Owner.PC.	Wk.Gd.	(18)
San Vicente	Granadino,M.B.	Peruvian	Pr.Owner.	Gd.Imp.	(17)(20)
Santa Adela	State	Peruvian St.	St.PC.Owner.	Wk.Gd.	(2)(18)(20)(26)
Santa Ana	State	Peruvian St.	St.Ra.	Cst.	(14)(18)(20)(67)
Santa Catalina	State	Peruvian St.	St.PC.Owner.	Wk.Gd.	(18)(20)(26)
Santa Isabel	State	Peruvian St.	St.Owner.	Dst.	(2)(14)(18)(20)
Santa Laura(Barra)	Barra y Riesco	Chilean	Pr.Owner.	Ul.	(20)
Santa Laura(Wendell)	Wendell,Heirs of	Peruvian	Pr.Owner.	Un.	(11)(20)
Santa Rita	State	Peruvian St.	St.	Dst.	(14)(18)(20)
Santiago(Camina)	Ossio,Mariano	Peruvian	Pr.Owner.	CD.	(14)(20)(33)
Solferino	Massardo,Félix	Italian	Pr.PC.Owner.Ra.	Wk.Gd.	(18)(20)(26)(67)
Tarapacá	State	Peruvian St.	St.PC.Rented.	Bd.	(18)(20)(26)
Trinidad	Carpio,Joaquín	Peruvian	Pr.Owner.	Ul.Gd.	(18)(20)
Valparaíso	State	Peruvian St.	St.	Gd.	(2)(18)(14)
Victoria	Soruco y Cfa.	Chilean	Pr.Owner.	Wk.Md.	(18)(20)
Paradas					
Abra de Quiroga	State	Peruvian St.	St.	Ul.	(14)(20)
Abra de Ugarte	Hilliger,Rosa Vernal de	Peruvian	Pr.Owner.	Ul.	(48)
Aguada	Flores,Juan	Peruvian	Pr.PC.Owner.	Ul.	(14)(20)(66)
Andacollo	Catalán,José Nieves	Peruvian(?)	Pr.Owner.PNA.	Ul.	(14)(20)
Ascención de Capetillo	State/J.Capetillo	Peruvian St.	St.Owner.PC.	Ul.	(14)(20)(66)
Ascención de Loayza	State	Peruvian St.	St.	Ul.	(14)(20)
Asunta	State	Peruvian St.	St.	Ul.	(14)(20)
Banda	Labernadie,Eugenio	Peruvian	Pr.Owner.	Ul.	(14)(20)
Buena Esperanza	Gárate,Vicente Jorge	Peruvian	Pr.OUp.PV.PC.	Wk.WO.	(14)(20)(32)(66)
Buenaventura	State	Peruvian St.	St.	Ul.	(14)(20)
Candelaria(de Carpio)	Carpio,Hercilia de	Peruvian	Pr.OUp.PV.PA.	Ul.	(2)(14)(32)
Candelaria(de Osorio)	Osorio,Pedro José	Peruvian	Pr.Owner.Dis.	Ul.	(17)
Candelaria(de Perfetti)	State	Peruvian St.	St.	Ul.	(17)(20)
Candelaria(Zavala y Bilbao)	State	Peruvian St.	St.	Ul.	(14)(20)
Carmen(Morales)	State	Peruvian St.	St.	Ul.	(14)(20)
Carmen(Oviedo)	State	Peruvian St.	St.	Ul.	(14)(20)
Carmen(Scheel)	State/T.Scheel	Peruvian St.	St.Owner.PC.	Ul.	(14)(20)(66)
Chilena	State/I.Olgueda	Peruvian St.	St.PC.Owner.	Ul.	(14)(20)(66)
Chinquiquiray(Zavala)	State	Peruvian St.	St.	Ul.	(14)(20)
Compañía(de Tarapacá)	State/J.Ramírez	Peruvian St.	St.PC.Owner.	Ul.	(14)(20)(66)
Concepción(Gárate)	Gárate,Vicente Jorge	Peruvian	Pr.OUp.PV.PA.PC.	Wk.WO.	(2)(14)(20)(66)
Cordillera	Cano,Juan de Dios	Peruvian	Pr.CR.PA.PC.	Ul.	(2)(14)(66)

Plants	Owner or operator 1876 (After Expro)	Nationality 1876	Title 1876	Status 1876	Notes 1876
Cruz de Zapiga	State	Peruvian St.	St.	Ul.	(14)(20)
Dolores(Companfa América)	Cfa.Salitrera América	Chilean	Pr.Owner.PA.	Ul.	(2)(14)(26)
Encarnación	State/A.E.Quiroga	Peruvian St.	PC.Owner.	Ul.	(14)(20)(66)
Fortuna	State	Peruvian St.	St.	Ul.	(14)(20)
Jazpampa(Zavala)	Zavala Brothers	Peruvian	St.VP.CR.	NM.Ul.	(2)(12)(20)
Matarunqui	Baluart, Rosa Lecaros de	Peruvian	Pr.PNA.PV.	Ul.	(14)(20)
Mercedes de Negreiros	State	Peruvian St.	St.VP.	Ul.	(2)(20)(31)
Negreiros	Vernal, Manuel	Peruvian	Pr.Owner.PNA.Ud.	Ul.	(14)(26)(51)
Negreiros(Vernal)	State/J. Vernal y Castro	Peruvian St.	St.PC.Owner.	Ul.	(14)(20)(66)
Normandfa(San Antonio)	State	Peruvian St.	St.PA.CR.	Ul.	(2)(14)
Nueva Rosario	Branes, Evaristo	Peruvian	Pr.Owner.PNA.	Ul.	(2)(14)(31)
Paccha	State	Peruvian St.	St.PA.	Ul.	(2)(14)(26)
Paccha(Branes)	Branes, Evaristo	Peruvian	Pr.Owner.PNA.	Ul.	(2)(14)(31)
Pampa Negra	State	Peruvian St.	St.	Ul.	(14)(20)
Paposo(parada)	Modestio, Pacifico	Peruvian	Pr.Owner.PC.	Ul.	(20)(66)
Pasto	State	Peruvian St.	St.PA.	Ul.	(14)(20)
Primitiva	State	Peruvian St.	St.PA.	Ul.	(14)(20)
Progreso	Quiroga, Evaristo	Peruvian	Pr.Owner.PNA.PC.	Ul.	(2)(14)(31)(66)
Ramírez	State	Peruvian St.	St.PA.	Ul.	(14)(20)
Reducto	State/M.A.Cevallos	Peruvian St.	St.PA.CR.PC.Owner.	Ul.	(14)(20)(66)
Rincón(Aguirre)	Aguirre, Mariano	Peruvian	Pr.Ud.	Ul.	(2)(20)
Rincón(Benavides)	Benavides, Celestino	Peruvian	Pr.Owner.PNA.PC.	Ul.	(14)(20)(66)
Rincón(Soruco)	Soruco y Cfa.	Chilean	Pr.Owner.PNA.	Ul.	(14)(20)
Rosario(Beas)	State/E.Beas	Peruvian St.	St.PA.PC.Owner.	Ul.	(14)(20)(66)
Rosario(Luza)	Luza, Marcelino	Peruvian	Pr.Owner.PNA.PC.	Ul.	(14)(20)(66)
Rosario(Rfos)	State	Peruvian St.	St.PA.	Ul.	(2)(14)(20)
Sacramento(Baluart)	Baluart, Rosa Lecaros de	Peruvian	Pr.Owner.PNA.	Ul.	(14)(20)
Sacramento(Castilla)	Castilla, Eugenio	Peruvian	Pr.Owner.PA.	Ul.	(14)(20)
Sacramento(Loayza y Pascal)	Loayza y Pascal	Peruvian	Pr.Owner.PNA.	Ul.	(14)(20)
Sacramento(Soto Flores)	State/M.S.Flores	Peruvian St.	St.PA.PC.Owner.	Ul.	(14)(20)(66)
Salar del Carmen	Cfa.Salitrera Chucumata	Chilean	St.PA.	Ul.	(14)(20)
San Antonio(Luza)	State/M.Luza	Peruvian St.	St.Owner.PA.PC.	Ul.	(14)(20)(66)
San Antonio de Méjico	Gue, Martina Rodríguez de	Peruvian	Pr.	Ul.	(20)
San Antonio(Soto Flores)	State/M.Flores	Peruvian St.	St.PA.PC.Owner.	Ul.	(14)(20)(66)
San Antonio(Viejo)	State	Peruvian St.	St.PNA.	Ul.	(14)(20)
San Benigno	State	Peruvian St.	St.PA.	Ul.	(14)(20)
San Cristóbal	State	Peruvian St.	St.PA.	Ul.	(14)(20)
San Fernando	Canelo, Jenaro	Chilean	Pr.Owner.PNA.	Ul.	(14)(20)
San Francisco(Campodónico)	State/Campodónico y Solari	Peruvian St.	St.PA.PC.Owner.	Ul.	(14)(20)(66)
San Francisco(Marquezado)	State	Peruvian St.	St.PA.	Ul.	(14)(20)
San Francisco(Zegarra)	State	Peruvian St.	St.PA.	Ul.	(14)(20)
San Jorge	Ugarte y Cevallos y Cfa.	Peruvian	Pr.PC.Owner.	Ul.	(20)(26)
San José de Alva	Cevallos, Nicolás	Peruvian	Pr.Owner.	Ul.	(20)
San José (Devescovi)	Devescovi, J. y Cfa.	Peruvian	Pr.Owner.	Ul.	(20)
San José de Putunchara	Aguirre, Juan de Dios	Peruvian	St.PA.	Ul.	(14)(20)
San Lorenzo(Granadino)	Granadino, M.	Peruvian	Pr.Owner.	Ul.	(20)
San Lorenzo(Ramírez)	State/C.Ramírez	Peruvian St.	St.PA.PC.Owner.	Ul.	(14)(20)(66)
San Lorenzo(Zavala)	State	Peruvian St.	St.PA.	Ul.	(14)(20)

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Plants	Owner or operator 1876 (After Expro)	Nationality 1876	Title 1876	Status 1876	Notes 1876
San Miguel(Cauvi)	Cauvi, Juan	Peruvian	Pr.Owner.	Ul.	(20)
San Miguel(Palacios)	Palacios, Saturnino	Peruvian	Pr.Owner.PA.	Ul.	(14)(20)
San Nicolás	Loayza, Elías Ego-Aguirre	Peruvian	Pr.Owner.PNA.	Ul.	(14)(20)
San Pascual	Lecaros, Domingo	Peruvian	Pr.Owner.PNA.	Ul.	(14)(20)
San Pedro(Ramírez)	State	Peruvian St.	St.PA.	Ul.	(14)(20)
San Rafael	Orriols y Cia.	Peruvian	Pr.Owner.PNA.	Ul.	(14)(20)
San Sebastián	State	Peruvian St.	St.Owner.PNA.	Ul.	(14)(20)
Santa Beatriz	Elguera, Pedro	Peruvian	Pr.Owner.PNA.	Ul.	(14)(20)
Santa Clara y Challacollito	State	Peruvian St.	St.PA.	Ul.	(14)(20)
Santa Emilia	State	Peruvian St.	St.PA.	Ul.	(14)(20)
Santa Lucía	Albarracín, Lucía Cevallos de	Peruvian	Pr.Owner.PNA.	Ul.	(14)(20)
Santa Luisa	Hidalgo, Juan de Dios	Peruvian	Pr.Owner.PNA.	Ul.	(14)(20)
Santa María	Hidalgo and Dewsberry, Pedro	Peruvian/British(?)	Pr.Owner.PNA.	Ul.	(14)(20)
Santa Rosa	State/Olcai y Loayza	Peruvian St.	St.Owner.PA.PC.	Ul.	(14)(20)(66)
Santa Rosita	Contreras, Cayetano	Peruvian	Pr.Owner.PNA.PC.	Ul.	(14)(20)(66)
Santo Domingo	State	Peruvian St.	St.PA.	Ul.	(14)(20)
Santo Domingo(Vidoliche)	Vidoliche, D.	Peruvian	Pr.Owner.	Ul.	(20)
Silencio	Zegarra, Calixto	Peruvian	St.Owner.PA.	Ul.	(14)(20)
Tordoya	Pérez, Manuel María	Peruvian	Pr.Owner.PNA.	Ul.	(14)(20)
Tránsito	State	Peruvian St.	St.PA.	Ul.	(14)(20)
Tres Marías	State	Peruvian St.	St.PA.	Ul.	(14)(20)
Unión	Díaz, Flora L. de	Peruvian	Pr.Owner.PNA.	Ul.	(14)(20)
Virginia	State	Peruvian St.	St.PA.	Ul.	(14)(20)
Yungay(Albarracín)	Albarracín, Lucía Cevallos de	Peruvian	Pr.Owner.PNA.	Ul.	(14)(20)
Yungay Bajo	Solis, Mariano	Peruvian	Pr.Owner.PNA.	Ul.	(14)(20)
Yungay(Jentilar)	Bustos, Héctor	Peruvian	Pr.PC.Owner.PNA.	Ul.	(14)(20)

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Plants	Recipients of nitrate bonds 1876-1879	Nationality 1876-1880	No. of holders	Type of payment	Date of contract	Year delivered	Notes (bonds)76-80
Máquinas							
Agua Santa	Campbell, John D.	British	1	C	17-Dec-77	1877-79	(2)(26)
Alianza	Cía. Salitrera Alianza	Peruvian	4	C	26-Jul-76	1876	(2)(26)
Angela	Loayza y Pascal	Peruvian	1	C	09-May-78	1878	(2)(26)
Angeles	Mendizábal, Mariano	Peruvian	1	C	18-Mar-76	1878	(2)(26)
Argentina	Gildemeister, Juan (Hans)	German	1	VP	07-Jun-76	1879	(2)(26)(31)
Barrenechea	Barrenechea; Chávez; Palacios	Peruvian	4	C	27-Jul-77	1876-79	(2)(26)
Bearnes	Layous, Francisco	French	1	C	29-Apr-76	1876-77	(2)(26)
Buen Retiro	n.a.	n.a.	n.a.	C	06-Nov-76	1878	(2)(26)
Calacala	Unsold	-	0	OUp. PV.	-	-	(2)(32)
California	Serdio Bros.; Bank of London	Chilean/British	2	C	07-Mar-76	1878-79	(2)(26)
Candelaria	Montero, Estevan	Peruvian	1	C	02-Jun-76	1876	(2)(26)
Carmelitana	n.a.	n.a.	n.a.	VP	n.a.	1879	(2)(31)
Carmen Alto	García; Cichero; Banco Nacional	Peruvian	5	C	10-May-76	1876-77	(2)(26)
Carmen Bajo	n.a.	n.a.	n.a.	C	07-Feb-78	1878	(2)(26)
Carolina	Gibbs, Guillermo & Co.	British	1	C	27-May-76	1876	(2)(26)
Católica, La	Bacigalupa; Banco Nacional	Peruvian	2	C	24-Apr-76	1876	(2)(26)
China	Gildemeister, J. & Co.	German	1	C	04-Jan-77	1877, 1879	(2)(26)
Chinquiquiray (Oviedo y Trillo)	Oviedo y Trillo	Peruvian	1	C	n.a.	1878	(2)
Concepción (Palacio Industrial)	Serdio Brothers	Chilean(?)	1	C	16-Feb-78	1878	(2)(26)
Dolores (Cobo)	Cobo; Banco Nacional	Peruvian	2	C	05-May-76	1876-79	(2)(26)
Esmeralda	Bohl, Alfredo	British(?)	1	C. NT.	04-Mar-76	1877	(2)(26)
Esperanza (Lagunas)	Almonte, A.; Banco de Lima	Peruvian	2	C	10-Aug-76	1876	(2)(26)
Hanza (S. Antonio-Gildemeister)	Gildemeister, Juan (Hans)	German	1	VP	07-Jun-76	1879	(2)(26)(31)
Limena	Gibbs, Guillermo & Co.	British	1	C	27-May-76	1876	(2)(26)
Magdalena	Montero, Manuel	Peruvian	1	C	01-Feb-77	1877	(2)(26)
Matillana	Baltierra; Bustos y Cía.; Bco. de Londres	Peruvian/British	2	C	09-Oct-76	1877, 1879	(2)(26)
Negreiros	Larraín; Hernández; Vernal; Serdio	Chilean/Peruvian	4	C	27-Jan-77	1877	(2)(26)
Nueva Carolina (y Pozo Almonte)	n.a.	n.a.	n.a.	C	n.a.	1878	(2)
Nueva Soledad	Bco. Nacional; Cárdenas; Garland; Caja de Ahorros	Peruvian	4	C	22-Mar-76	1877-79	(2)(26)
Palma	Gibbs & Co. (Moir, John)	British	1	C	08-Jan-77	1877	(2)(26)
Paposo (máquina)	Folsch and Martin (Althaus, Emilio)	German	1	C	11-Mar-76	1876, 1878	(2)(26)
Pena Chica	Unsold	-	0	PV	-	-	(2)(32)
Pena Grande	Chávez, M.G.	Peruvian	1	C	07-Jun-76	1876-77	(2)(26)
Perla	n.a.	n.a.	n.a.	C	07-Feb-78	1878	(2)(26)
Peruana	L[oaiza], V.; Irigoyen, M.	Peruvian	2	C	04-Mar-76	1877-79	(2)(26)
Porvenir	Délaro, J.D.	Chilean	1	C	16-Mar-78	1878	(2)(26)
Providencia	Prevost, Luis E.; Prevost y Cía.	Peruvian	2	C	20-May-76	1876-78	(2)(26)
Resurrección (y Q. de Pazos)	Zavala, Pedro José	Peruvian	1	C	12-May-76	1876	(2)(26)
Rosario (Pérez)	Unsold.	-	0	PV	-	-	(2)(32)
Sacramento (Délano)	n.a.	n.a.	n.a.	C	16-Mar-78	1880	(2)(26)(28)
Salar de la Noria	Ugarte y Cevallos y Cía.	Peruvian	1	C	n.a.	1878	(2)
San Agustín	Chavez; Chavez y Cía; Prevost y Cía; Bonilla	Peruvian	4	C	25-May-77	1877-79	(2)(26)
San Andrés	Unsold.	-	0	PV	-	-	(2)(32)
San Antonio (Campbell)	Campbell, John D.	British	1	C	17-Dec-77	1877-79	(2)(26)
San Antonio (Pemaranda)	Pemaranda, Eusebio	Peruvian	1	C	n.a.	1878	(2)
San Carlos	n.a.; Banco de Londres	British	2	C	15-Feb-78	1878	(2)(26)
San Francisco (Bramez)	Unsold	-	0	PV	-	-	(2)(32)

Plants	Recipients of nitrate bonds 1876-1879	Nationality 1876-1880	No. of holders	Type of payment	Date of contract	Year delivered	Notes (bonds)76-80
San José(Aguirre)	Unsold	- -	0	PV	-	-	(2)(14)(32)
San José de la Noria	Fasola,Pfo	Peruvian	1	C	01-Jul-77	1877	(2)(26)
San José(Yungay)	Riveros,Manuel E.& Bros.;Arredondo,G.	Peruvian	2	C	27-Apr-77	1877	(2)(26)
San Juan(Gildemeister)	Gildemeister,Juan(Hans)	German	1	VP	07-Jun-76	1879	(2)(26)(31)
San Juan de Soledad	Romero,Felipe B.; n.a.	Peruvian	1	C	20-May-76	1877-1880	(2)(26)
San Lorenzo(Ugarte)	Ugarte y Cevallos y Cfa.;n.a.	Peruvian	1	C	18-Mar-78	1878	(2)(26)
San Pablo	n.a.	n.a.	n.a.	CR	30-Mar-78	1880	(2)(26)
San Pedro	Gildemeister,Juan(Hans)	German	1	VP	07-Jun-76	1879	(2)(26)(31)
San Vicente	Granadino,M.B. and E.;Graham,Rowe & Co.;n.a.	Peruvian/British	2	C	08-Feb-77	1877-79	(2)(26)
Santa Adela	Devescovi,José y Cfa.;Gibbs;Bco.Nacional	Peruvian/British	3	C	27-Mar-76	1876	(2)(26)
Santa Ana	Dibos,F[élix]	French	1	C	09-Nov-76	1877	(2)(26)
Santa Catalina	Cfa. Salitrera América(Olivan,F.A.)	Chilean	1	C	07-Mar-76	1877	(2)(26)
Santa Isabel	n.a.	n.a.	n.a.	CR	11-Mar-76	1880	(2)(26)
Santa Laura(Barra)	Luhdorff,Roberto	German(?)	1	C	n.a.	1877	(2)
Santa Laura(Wendell)	Orphelan,Fernando;n.a.;n.a.	Peruvian(?)	1	C	n.a.	1878	(2)
Santa Rita	Espinosa,José R.	Peruvian(?)	1	C	11-Mar-76	1877	(2)(26)
Santiago(Camina)	n.a.	n.a.	n.a.	VP	05-Dec-78	1878	(2)(31)
Solferino	Bco.de Londres;Forero,E.;Massardo,F.;Raffo,F.	British/Italian	4	C	12-Jul-77	1878	(2)(26)
Tarapacá	Vernal y Castro,Juan;Bco. Nacional	Peruvian	2	C	14-Sep-76	1877	(2)(26)
Trinidad	Perfetti,Pedro	Italian	1	C	23-Jul-77	1877	(2)(26)
Valparaíso	Cfa.Salitrera Valparaíso;n.a.	Chilean	1	C	04-Mar-76	1876,1878	(2)(26)
Victoria	Bruce,Diego;n.a.	Chilean(?)	1	C	n.a.	1877	(2)
Paradas							
Abra de Quiroga	Quiroga,E[varisto]	Peruvian	1	C	12-Jun-76	1876	(2)(26)
Abra de Ugarte	Ugarte,Cevallos y Cfa.	Peruvian	1	C	26-Mar-78	1878	(2)(26)
Aguada	Flores,Juan	Peruvian	1	C	31-Jan-77	1878	(2)(26)
Andacollo	Catalán,José Nieves	Peruvian(?)	1	C	07-Jan-77	1877	(2)(26)
Ascención de Capetillo	Capetillo,F.	Peruvian	1	C	18-Oct-76	1876	(2)(26)
Ascención de Loayza	Loayza,Ascención	Peruvian	1	C	06-Jun-76	1876	(2)(26)
Asunta	Otafza y Hermanos	Peruvian	1	C	23-Jun-76	1877	(2)(26)
Banda	Banco del Perú	Peruvian	1	C	24-Sep-77	1877	(2)(26)
Buena Esperanza	Unsold	- -	0	OUp.PV.	-	-	(2)(14)(32)
Buenaventura	Torres Becerril y Cfa.	Peruvian(?)	1	C	26-Oct-76	1876	(2)(26)
Candelaria(de Carpio)	n.a.	n.a.	n.a.	PV	21-May-80	n.a.	(2)(25)(32)
Candelaria(de Osorio)	Unsold	- -	0	-	-	-	
Candelaria(de Perfetti)	Perfetti,P[edro]	Italian	1	C	27-May-76	1876	(2)(26)
Candelaria(Zavala y Bilbao)	Zavala y Bilbao	Peruvian	1	C	26-Jun-76	1876	(2)(26)
Carmen(Morales)	Morales,Salvador	Peruvian	1	C	21-Oct-76	1876	(2)(26)
Carmen(Oviedo)	Banco del Perú	Peruvian	1	C	16-Oct-76	1877	(2)(26)
Carmen(Scheel)	Scheel,Teodoro	German	1	C	19-Jul-76	1876	(2)(26)
Chilena	Olgueda,Isidora	Peruvian(?)	1	C	20-Oct-76	1876	(2)(26)
Chinquiquiray(Zavala)	Zavala,Ramón	Peruvian	1	C	12-Jun-76	1876	(2)(26)
Compañía(de Tarapacá)	Ramírez,Juan	Peruvian	1	C	12-Oct-76	1877	(2)(26)
Concepción(Gárate)	Unsold	- -	0	OUp.PV.	-	-	(2)(14)(32)
Cordillera	n.a.	n.a.	n.a.	CR.PA.	21-May-80	1880	(2)(32)

Plants	Recipients of nitrate bonds 1876-1879	Nationality 1876-1880	No. of holders	Type of payment	Date of contract	Year delivered	Notes (bonds)76-80
Cruz de Zapiga	n.a.	n.a.	1	C	09-Nov-76	1879	(2)(26)
Dolores(Compañía América)	Cía.Salitrera América	Chilean	1	C	24-Sep-77	1877	(2)(26)
Encarnación	Quiroga,A.	Peruvian	1	C	28-Jun-76	1876	(2)(26)
Fortuna	Banco del Perú	Peruvian	1	C	28-Jun-76	1876	(2)(26)
Jazpampa(Zavala)	Zavala,Pedro José and Manuel José	Peruvian	2	VP.CR.	n.a.	1879	(2)(3)(31)
Matamunqui	Unsold	-	0	PNA.PV.	-	-	(2)(14)(32)
Mercedes de Negreiros	Vernal,Manuel	Peruvian	1	VP	14-Jan-76	1876	(2)(20)(31)
Negreiros	Unsold	-	0	PNA.Ud.	-	-	(14)(26)(51)
Negreiros(Vernal)	Vernal y Castro,Juan	Peruvian	1	C	07-Nov-76	1876	(2)(26)
Normandía(San Antonio)	n.a.	n.a.	n.a.	CR.PA.	22-May-76	n.a.	(2)(26)(31)
Nueva Rosario	n.a.	n.a.	n.a.	C/VP.PNA.	n.a.	1878	(2)(14)(31)
Paccha	Cía.Salitrera América	Chilean	1	C	03-Mar-76	1876	(2)(26)
Paccha(Bramez)	n.a.	n.a.	n.a.	C/VP.PNA.	n.a.	1878	(2)(14)(31)
Pampa Negra	Banco de Lima	Peruvian	1	C	09-Oct-76	1877	(2)(26)
Paposo(parada)	Modestio,Pacifico M.	Peruvian	1	C	10-Apr-77	1878	(2)(26)
Pasto	Banco Nacional del Perú	Peruvian	1	C	08-Jun-76	1877	(2)(26)
Primitiva	Vernal,D[omingo]	Peruvian	1	C	19-May-76	1876	(2)(26)
Progreso	Unsold	-	0	PNA.PV.	-	-	(2)(14)(32)
Ramírez	Castro,Simeón	Peruvian	1	C	05-Jun-76	1876	(2)(26)
Reducto	Cevallos,Manuela	Peruvian	1	CR.PA.	30-Nov-76	n.a.	(2)(26)
Rincón(Aguirre)	Unsold	-	0	-	-	-	(2)
Rincón(Benavides)	Banco de Lima/Bco. La Providencia	Peruvian	2	C	10-Feb-77	1877	(2)(26)
Rincón(Soruco)	Banco Nacional del Perú	Peruvian	1	C	02-May-77	1877	(2)(26)
Rosario(Beas)	Beas,Emilio	Peruvian	1	C	20-Sep-76	1877	(2)(26)
Rosario(Luza)	n.a./n.a.	n.a.	2	C	03-Feb-77	1878	(2)(26)
Rosario(Rfos)	Rfos,Felipa C. de[widow]	Peruvian	1	C	01-Jul-76	1876	(2)(26)
Sacramento(Baluarte)	Unsold	-	0	PNA.PV.	-	-	(2)(14)(32)
Sacramento(Castilla)	n.a./Cía Salitrera del Perú	Peruvian	1	C	04-Jan-77	1879	(2)(26)
Sacramento(Loayza y Pascal)	Unsold	-	0	PNA.PV.	-	-	(2)(14)(32)
Sacramento(Soto Flores)	Soto Flores,Mariano	Peruvian	1	C	06-Jun-76	1876	(2)(26)
Salar del Carmen	García Calderón,Francisco	Peruvian	1	C	10-Feb-76	1877	(2)(26)
San Antonio(Luza)	Luza,Manuel E.	Peruvian	1	C	30-Jun-76	1876	(2)(26)
San Antonio de Méjico	Banco La Providencia/Bco.Nacional	Peruvian	2	C	07-Dec-77	1878	(2)(26)
San Antonio(Soto Flores)	Banco de Lima	Peruvian	1	C.Csh.	30-Jun-76	1877	(2)(5)(26)
San Antonio(Viejo)	Banco Nacional del Perú	Peruvian	1	C	06-Sep-76	1877	(2)(26)
San Benigno	Paz Soldán,Francisco/n.a.	Peruvian	1	C	09-May-76	1876-77,79	(2)(26)
San Cristóbal	Banco del Perú	Peruvian	1	C	06-Oct-76	1877	(2)(26)
San Fernando	Unsold	-	0	PNA.PV.	-	-	(2)(14)(32)
San Francisco(Campodónico)	Solari,Juan	Italian	1	C	18-Nov-76	1877	(2)(26)
San Francisco(Marquezado)	Zevallos,Ricardo O. de	Peruvian	1	C	07-Dec-76	1876	(2)(26)
San Francisco(Zegarra)	Banco del Perú	Peruvian	1	C	16-Oct-76	1877	(2)(26)
San Jorge	Ugarte,Cevallos y Cía.	Peruvian	1	C	26-Mar-78	1878	(2)(26)
San José de Alva	Cevallos,Nicolás	Peruvian	1	VP	15-Jan-79	1879	(2)(31)
San José (Devescovi)	Devescovi,J. y Cía.	Peruvian	1	VP	13-Dec-78	1878	(2)(31)
San José de Putunchara	Aguirre,Juan de Dios	Peruvian	1	C	08-Jul-76	1876	(2)(26)
San Lorenzo (Granadino)	Unsold	-	0	PV	-	-	(2)(32)
San Lorenzo(Ramírez)	Ramírez,Eusebio	Peruvian	1	C	30-Mar-76	1876	(2)(26)
San Lorenzo(Zavala)	n.a.	n.a.	1	C	26-Apr-76	1879	(2)(26)

Plants	Recipients of nitrate bonds 1876-1879	Nationality 1876-1880	No. of holders	Type of payment	Date of contract	Year delivered	Notes (bonds)76-80
San Miguel(Cauvi)	n.a.	n.a.	1	VP	17-Mar-79	1879	(2)(31)
San Miguel(Palacios)	Banco La Providencia/n.a.	Peruvian	1	C	05-Mar-77	1878-79	(2)(26)
San Nicolás	Banco Nacional/Banco La Providencia	Peruvian	2	C	31-Jan-77	1878	(2)(26)
San Pascual	Lecaros, Domingo	Peruvian	1	C	05-Mar-77	1877	(2)(26)
San Pedro(Ramírez)	Dávalos Ramírez, Pedro	Peruvian	1	C	16-Jun-76	1876	(2)(26)
San Rafael	Unsold	- -	0	PV	-	-	(2)(32)
San Sebastián	Banco del Perú/n.a.	Peruvian	1	C	12-Oct-76	1876	(2)(26)
Santa Beatriz	Unsold	- -	0	PV	-	-	(2)(32)
Santa Clara y Challacollito	Cauvi, Juan/Montel, M.	Peruvian	2	C	03-Apr-76	1876	(2)(26)
Santa Emilia	Paz Soldán, Francisco	Peruvian	1	C	09-May-76	1876	(2)(26)
Santa Lucía	n.a.	n.a.	1	VP	17-Mar-79	1879	(2)(31)
Santa Luisa	Hidalgo, Juan de Dios	Peruvian	1	C	08-Feb-77	1877	(2)(26)
Santa María	n.a.	Peruvian	1	VP	09-Mar-79	1879	(2)(31)
Santa Rosa	Olcay and Loayza	Peruvian	2	C	23-Dec-76	1876	(2)(26)
Santa Rosita	n.a.	n.a.	1	VP	11-Jan-79	1879	(2)(31)
Santo Domingo	Flores, Domingo	Peruvian	1	C	08-May-76	1876	(2)(26)
Santo Domingo(Tidoliche)	n.a.	n.a.	1	VP	28-Nov-78	1878	(2)(31)
Silencio	Zegarra, Cecilio	Peruvian	1	C	07-Jun-76	1876	(2)(26)
Tordoya	Unsold	- -	0	PV	-	-	(2)(32)
Tránsito	Banco Nacional del Perú/n.a.	Peruvian	1	C	30-Jun-76	1877	(2)(26)
Tres Marías	Coques, Damían	Peruvian	1	C	03-Aug-76	1877	(2)(26)
Unión	Banco La Providencia/n.a.	Peruvian	1	C	15-May-76	1877, 1879	(2)(26)
Virginia	Bermúdez Brothers	Peruvian	1	C	10-May-76	1876	(2)(26)
Yungay(Albarracín)	n.a.	n.a.	1	VP	14-Feb-79	1879	(2)(31)
Yungay Bajo	Banco del Perú/Banco de Lima	Peruvian	2	C	01-May-77	1878	(2)(26)
Yungay(Jentilar)	Unsold	- -	0	PV	-	-	(2)(32)

Plants	Owner 1877	Nationality 1877	Operator 1877	Nationality 1877	Title 1877	Status 1877
Máquinas						
Agua Santa	State	Peruvian St.	J.D. Campbell	British	St.PC.Owner.	Cst.
Alianza	State	Peruvian St.	State	Peruvian St.	St.	Un.
Angela	Loayza y Pascal	Peruvian	Loayza y Pascal	Peruvian	Pr.OUp.PV.	Wk.
Angeles	State	Peruvian St.	State	Peruvian St.	St.	Un.
Argentina	State	Peruvian St.	Gildemeister, J.	German	St.PV.PC.Owner.	Wk.
Barrerechea	State	Peruvian St.	Thomas Hart and Co.	British	St.PC.	Wk.
Bearnés	State	Peruvian St.	Harnecker, Otto	German	St.PC.Rented.	Wk.
Buen Retiro	State	Peruvian St.	State	Peruvian St.	St.	CD.
Calacala	Hidalgo, E.C.widow of	Peruvian	Hidalgo, E.C.widow of	Peruvian	Pr.Owner.	Wk.
California	State	Peruvian St.	State	Peruvian St.	St.	CD.
Candelaria	State	Peruvian St.	State	Peruvian St.	St.	Un.
Carmelitana	Lecaros, Domingo	Peruvian	Lecaros, Domingo	Peruvian	Pr.Owner.	Un.
Carmen Alto	State	Peruvian St.	State	Peruvian St.	St.	CD.Gd.
Carmen Bajo	Cla.S.Rimac	Peruvian	Cla.S.Rimac	Peruvian	Pr.Owner.	CD.Gd.
Carolina	State	Peruvian St.	Gibbs & Co.	British	St.PC.Owner.	CD.Bd.
Católica, La	State	Peruvian St.	State	Peruvian St.	St.	CD.
China	State	Peruvian St.	State	Peruvian St.	St.	CD.
Chiniquiray(Oviedo y Trillo)	Oviedo y Trillo	Peruvian	Oviedo y Trillo	Peruvian	Pr.Owner.	Wk.
Concepción(Palacio Industrial)	Serdio Brothers	Chilean(?)	Serdio Brothers	Chilean(?)	Pr.Owner.	CD.
Dolores(Cobo)	State	Peruvian St.	State	Peruvian St.	St.	CD.
Esmeralda	State	Peruvian St.	Clark, Eck & Co.	British	St.PC.Owner.	Wk.
Esperanza(Lagunas)	State	Peruvian St.	State	Peruvian St.	St.	Dst.
Hanza(S.Antonio-Gildemeister)	State	Peruvian St.	Gildemeister, J.	German	St.PV.PC.Owner.	CD.Bd.
Limena	State	Peruvian St.	Gibbs & Co.	British	St.PC.Owner.	Wk.Gd.
Magdalena	State	Peruvian St.	State	Peruvian St.	St.	Dst.
Matillana	State	Peruvian St.	State	Peruvian St.	St.	CD.
Negreiros	State	Peruvian St.	State	Peruvian St.	St.	Un.
Nueva Carolina(y Pozo Almonte)	Cla.S.Nueva Carolina	Chilean	Cla.S.Nueva Carolina	Chilean	Pr.Owner.	CD.
Nueva Soledad	State	Peruvian St.	State	Peruvian St.	St.	CD.
Palma	State	Peruvian St.	Gibbs & Co.	British	St.PC.Owner.	CD.
Paposo(máquina)	State	Peruvian St.	Folsch and Martin	German	St.PC.Owner.	Wk.
Pena Chica	Aguirre, Mariano	Peruvian	Aguirre, Mariano	Peruvian	Pr.PC.Owner.	Wk.
Pena Grande	State	Peruvian St.	State	Peruvian St.	St.	CD.
Perla	Cla.S.Rimac	Peruvian	Cla.S.Rimac	Peruvian	Pr.Owner.	CD.Gd.
Peruana	State	Peruvian St.	M[oscoso] Melgar, M.	Peruvian	St.PC.Rented.	Wk.
Porvenir	Déllano, Oloff	Chilean	Speedie, G. and Brookings, James &	British	Pr.PC.Rented.	Wk.
Providencia	State	Peruvian St.	State	Peruvian St.	St.	CD.
Resurrección(y Q.de Pazos)	State	Peruvian St.	State	Peruvian St.	St.	Un.
Rosario(Pérez)	Pérez, Manuel María	Peruvian	Pérez, Manuel María	Peruvian	Pr.PC.Owner.	CD.
Sacramento(Déllano)	Edwards, A. & Co.	Chilean	Edwards, A. & Co.	Chilean	Pr.Owner.	Wk.
Salar de la Noria	Oliva, Daniel	Chilean	Ugarte, Cevallos y Cla.	Peruvian	Pr.Rented.	Wk.
San Agustín	State	Peruvian St.	State	Peruvian St.	St.	CD.
San Andrés	Pérez, M. María	Peruvian	Pérez, M. María	Peruvian	Pr.PNA.	CD.
San Antonio(Campbell)	State	Peruvian St.	Campbell, J.D.	British	St.PC.Owner.	Wk.
San Antonio(Penaranda)	Penaranda, Eusebio	Peruvian	Penaranda, Eusebio	Peruvian	Pr.PC.Owner.	Ul.
San Carlos	Folsch and Martin	German	Folsch and Martin	German	Pr.PC.Owner.	Wk.
San Francisco(B. Benez)	Benez, Evaristo	Peruvian	Benez, Evaristo	Peruvian	Pr.PNA.	Ul.

Plants	Owner 1877	Nationality 1877	Operator 1877	Nationality 1877	Title 1877	Status 1877
San José(Aguirre)	Aguirre,Mariano	Peruvian	Aguirre,Mariano	Peruvian	Pr.PNA.PC.Owner.	Ul.
San José de la Noria	State	Peruvian St.	Fasola,Pfo	Peruvian	St.Owner.	Wk.
San José(Yungay)	State	Peruvian St.	State	Peruvian St.	St.	Ul.
San Juan(Gildemeister)	State	Peruvian St.	Gildemeister,J.	German	St.PV.PC.Owner.	Wk.
San Juan de Soledad	State	Peruvian St.	State	Peruvian St.	St.	CD.Un.
San Lorenzo(Ugarte)	Ugarte y Cevallos y Cfa.	Peruvian	Ugarte y Cevallos y Cfa.	Peruvian	Pr.PC.Owner.	Wk.
San Pablo	Elguera,Pedro	Peruvian	Elguera,Pedro	Peruvian	Pr.PC.Owner.	Ul.
San Pedro	State	Peruvian St.	Gildemeister,J.	German	St.PV.PC.Owner.	Wk.
San Vicente	State	Peruvian St.	State	Peruvian St.	St.Cst.	CD.Ul.
Santa Adela	State	Peruvian St.	Devescovi,J.	Peruvian(?)	St.PC.Owner.	Wk.
Santa Ana	State	Peruvian St.	State	Peruvian St.	St.Cst.	CD.Ul.
Santa Catalina	State	Peruvian St.	Cfa. Salitrera América	Chilean	St.PC.Owner.	
Santa Isabel	State	Peruvian St.	State	Peruvian St.	St.CR.	CD.Ul.
Santa Laura(Barra)	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Santa Laura(Wendell)	Wendell,Heirs of	Peruvian	Wendell,Heirs of	Peruvian	Pr.Owner.	Un.
Santa Rita	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Santiago(Camina)	Ossio,Mariano	Peruvian	Ossio,Mariano	Peruvian	Pr.Owner.	CD.
Solferino	State	Peruvian St.	Massardo,Félix	Italian	St.Owner.	Wk.
Tarapacá	State	Peruvian St.	Oviedo y Trillo	Peruvian	St.PC.Rented.	CD.
Trinidad	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Valparaiso	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Victoria	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Paradas						
Abra de Quiroga	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Abra de Ugarte	Hilliger,Rosa Vernal de	Peruvian	Hilliger,Rosa Vernal de	Peruvian	Pr.Owner.	CD.Ul.
Aguada	State	Peruvian St.	J.Flores	Peruvian	St.PC.Owner.	Ul.
Andacollo	State	Peruvian St.	State	Peruvian St.	St.	Ul.
Ascención de Capetillo	State	Peruvian St.	Capetillo,T.	Peruvian	St.PC.Owner.	Ul.
Ascención de Loayza	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Asunta	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Banda	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Buena Esperanza	Gárate,Vicente Jorge	Peruvian	Gárate,Vicente Jorge	Peruvian	Pr.Owner.	Ul.
Buenaventura	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Candelaria(de Carpio)	Carpio,Hercilia de	Peruvian	Carpio,Hercilia de	Peruvian	Pr.OUP.PV.	CD.Ul.
Candelaria(de Osorio)	Osorio,Pedro José	Peruvian	Osorio,Pedro José	Peruvian	Pr.Dis.Owner.	Ul.
Candelaria(de Perfetti)	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Candelaria(Zavala y Bilbao)	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Carmen(Morales)	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Carmen(Oviedo)	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Carmen(Scheel)	State	Peruvian St.	Scheel,Teodoro	German	St.	CD.Ul.
Chilena	State	Peruvian St.	Olgueda,Isidora	Peruvian	St.Owner.	Ul.
Chinquiray(Zavala)	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Compañía(de Tarapacá)	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Concepción(Gárate)	Gárate,Vicente Jorge	Peruvian	Gárate,Vicente Jorge	Peruvian	Pr.Owner.	Ul.
Cordillera	Cano,Juan de Dios	Peruvian	Cano,Juan de Dios	Peruvian	Pr.CR.PA.	Ul.

Plants	Owner 1877	Nationality 1877	Operator 1877	Nationality, 1877	Title 1877	Status 1877
Cruz de Zapiga	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Dolores(Compania América)	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Encarnación	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Fortuna	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Jazpampa(Zavala)	State	Peruvian St.	State	Peruvian St.	St.CR.	CD.Ul.
Matamunqui	Baluarde,Rosa Lecaros de	Peruvian	Baluarde,Rosa Lecaros de	Peruvian	Pr.PNA.PV.	Ul.
Mercedes de Negreiros	State	Peruvian St.	Vernal,Manuel	Peruvian	St.Owner.	Ul.
Negreiros	Vernal,Manuel	Peruvian	Vernal,Manuel	Peruvian	Pr.Owner.Ud.	CD.Ul.
Negreiros(Vernal)	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Normandia(San Antonio)	State	Peruvian St.	State	Peruvian St.	St.CR.	CD.Ul.
Nueva Rosario	Branez,Evaristo	Peruvian	Branez,Evaristo	Peruvian	Pr.Owner.PNA.	Ul.
Paccha	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Paccha(Branez)	Branez,Evaristo	Peruvian	Branez,Evaristo	Peruvian	Pr.Owner.PNA.	Ul.
Pampa Negra	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Paposo(parada)	State	Peruvian St.	E.Modestio	Peruvian	St.PC.Owner.	Ul.
Pasto	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Primitiva	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Progreso	Quiroga,Evaristo	Peruvian	Quiroga,Evaristo	Peruvian	Pr.Owner.PNA.	Ul.
Ramirez	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Reducto	State	Peruvian St.	State	Peruvian St.	St.PA.CR.	Ul.
Rincón(Aguirre)	Aguirre,Mariano	Peruvian	Aguirre,Mariano	Peruvian	Pr.Ud.	CD.Ul.
Rincón(Benavides)	State	Peruvian St.	C.Benavides	Peruvian	St.PC.Owner.	Ul.
Rincón(Soruco)	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Rosario(Beas)	State	Peruvian St.	E.Beas	Peruvian	St.PC.Owner.	Ul.
Rosario(Luza)	State	Peruvian St.	M.Luza	Peruvian	St.PC.Owner.	Ul.
Rosario(Rios)	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Sacramento(Baluarde)	Baluarde,Rosa Lecaros de	Peruvian	Baluarde,Rosa Lecaros de	Peruvian	Pr.Owner.PNA.	Ul.
Sacramento(Castilla)	State	Peruvian St.	E.Castilla	Peruvian	St.PC.Owner.	Ul.
Sacramento(Loayza y Pascal)	Loayza y Pascal	Peruvian	Loayza y Pascal	Peruvian	Pr.Owner.PNA.	Ul.
Sacramento(Soto Flores)	State	Peruvian St.	n.a.	n.a.	St.	Ul.
Salar del Carmen	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
San Antonio(Luza)	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
San Antonio de Méjico	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
San Antonio(Soto Flores)	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
San Antonio(Viejo)	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
San Benigno	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
San Cristóbal	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
San Fernando	Canelo,Jenaro	Chilean	Canelo,Jenaro	Chilean	Pr.Owner.	CD.Ul.
San Francisco(Campodónico)	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
San Francisco(Marquezado)	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
San Francisco(Zegarra)	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
San Jorge	Ugarte,Cevallos y Cia.	Peruvian	Ugarte,Cevallos y Cia.	Peruvian	Pr.PC.Owner.	Ul.
San José de Alva	Cevallos,Nicolás	Peruvian	Cevallos,Nicolás	Peruvian	Pr.Owner.	Ul.
San José (Devescovi)	Devéscovi,J. y Cia.	Peruvian	Devéscovi,J. y Cia.	Peruvian	Pr.Owner.	Ul.
San José de Putunchara	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
San Lorenzo(Granadino)	Granadino,M.	Peruvian	Granadino,M.	Peruvian	Pr.Owner.	CD.Ul.
San Lorenzo(Ramirez)	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
San Lorenzo(Zavala)	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.

Plants	Owner 1877	Nationality 1877	Operator 1877	Nationality 1877	Title 1877	Status 1877
San Miguel(Cauvi)	Cauvi, Juan	Peruvian	Cauvi, Juan	Peruvian	Pr.Owner.	CD.Ul.
San Miguel(Palacios)	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
San Nicolás	State	Peruvian St.	E.L.Egoaquirre	Peruvian	St.PC.Owner.	Ul.
San Pascual	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
San Pedro(Famfrez)	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
San Rafael	Orriols y Cia.	Peruvian	Orriols y Cia.	Peruvian	Pr.Owner.	CD.Ul.
San Sebastián	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Santa Beatriz	Elguera, Pedro	Peruvian	Elguera, Pedro	Peruvian	Pr.Owner.	Ul.
Santa Clara y Challacollito	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Sanca Emilia	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Santa Lucía	Cevallos de Albarracín, Lucía	Peruvian	Cevallos de Albarracín, Lucía	Peruvian	Pr.Owner.PC.	Ul.
Santa Luisa	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Santa María	Hidalgo and Dewsberry, Pedro	Peruvian/British(?)	Hidalgo and Dewsberry, Pedro	Peruvian/British(?)	Pr.Owner.	CD.Ul.
Santa Rosa	State	Peruvian St.	n.a.	n.a.	St.	Ul.
Santa Rosita	Contreras, Cayetano	Peruvian	Contreras, Cayetano	Peruvian	Pr.Owner.	CD.Ul.
Santo Domingo	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Santo Domingo(Vidoliche)	Vidoliche, D.	Peruvian	Vidoliche, D.	Peruvian	Pr.Owner.	Ul.
Silencio	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Tordoya	Pérez, Manuel María	Peruvian	Pérez, Manuel María	Peruvian	Pr.Owner.	CD.Ul.
Tránsito	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Tres Marías	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Unión	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Virginia	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Yungay(Albarracín)	Albarracín, Lucía Cevallos de	Peruvian	Albarracín, Lucía Cevallos de	Peruvian	Pr.Owner.	CD.Ul.
Yungay Bajo	State	Peruvian St.	State	Peruvian St.	St.	CD.Ul.
Yungay(Jentilar)	Bustos, Héctor	Peruvian	Bustos, Héctor	Peruvian	Pr.PC.Owner.	Ul.

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Plants	Notes 1877	Owner 1878	Nationality 1878	Operator 1878	Nationality 1878	Title 1878
Máquinas						
Agua Santa	(1)(66)	State	Peruvian St.	Campbell, Outram and Co.	British	St.PC.Owner.
Alianza	(15)	State	Peruvian St.	State	Peruvian St.	St.
Angela	(32)	State	Peruvian St.	Loayza y Pascal	Peruvian	St.PC.Owner.
Angeles	(14)	State	Peruvian St.	State	Peruvian St.	St.
Argentina	(as)	State	Peruvian St.	Gildemeister, J.	German	St.PC.Owner.
Barrenechea	(24)(66)	State	Peruvian St.	Hart, Thomas & Co.	British	St.PC.Rented
Bearnes	(26)(66)	State	Peruvian St.	Harnecker, Otto	German	St.PC.Rented
Buen Retiro	(as)	State	Peruvian St.	State	Peruvian St.	St.
Calacala	(as)	Hidalgo, E.C. widow of	Peruvian	Herrmann, Otto	German	Pr.Rented.
California	(as)	State	Peruvian St.	State	Peruvian St.	St.Ra.
Candelaria	(as)	State	Peruvian St.	State	Peruvian St.	St.
Carmelitana	(as)	Lecaros, Domingo	Peruvian	Lecaros, Domingo	Peruvian	Pr.
Carmen Alto	(18)	State	Peruvian St.	State	Peruvian St.	St.
Carmen Bajo	(as)	State	Peruvian St.	State	Peruvian St.	St.Ra.
Carolina	(7)(26)	State	Peruvian St.	Gibbs & Co.	British	St.PC.Owner.
Católica, La	(as)	State	Peruvian St.	State	Peruvian St.	St.
China	(26)	State	Peruvian St.	State	Peruvian St.	St.
Chinquiray(Oviedo y Trillo)(26)		State	Peruvian St.	Oviedo y Trillo	Peruvian	St.PC.Owner.
Conrepción(Palacio Industrial)(as)		State	Peruvian St.	State	Peruvian St.	St.
Dolores(Cobo)	(as)	State	Peruvian St.	State	Peruvian St.	St.
Esmeralda	(26)	State	Peruvian St.	Clark, Eck & Co.	British	St.PC.Owner.
Esperanza(Lagunas)	(7)(17)	State	Peruvian St.	State	Peruvian St.	St.Ra.
Hanza(S. Antonio-Gildemeister)	(as)	State	Peruvian St.	Gildemeister, J.	German	St.PV.PC.Owner.
Limema	(7)(26)	State	Peruvian St.	Gibbs & Co.	British	St.PC.Owner.
Magdalena	(17)(26)	State	Peruvian St.	State	Peruvian St.	St.
Matillana	(as)	State	Peruvian St.	State	Peruvian St.	St.Ra.
Negreiros	(26)	State	Peruvian St.	State	Peruvian St.	St.
Nueva Carolina(y Pozo Almonte)(as)		State	Peruvian St.	State	Peruvian St.	St.
Nueva Soledad	(as)	State	Peruvian St.	State	Peruvian St.	St.
Palma	(as)	State	Peruvian St.	State	Peruvian St.	St.
Paposo(máquina)	(3)(26)	State	Peruvian St.	Folsch and Martin	German	St.PC.Owner.
Pena Chica	(26)	Aguirre, Mariano	Peruvian	Aguirre, Mariano	Peruvian	Pr.PC.Owner.
Pena Grande	(as)	State	Peruvian St.	State	Peruvian St.	St.
Perla	(as)	State	Peruvian St.	State	Peruvian St.	St.Ra.
Peruana	(26)	State	Peruvian St.	Moscoso/Jacobson	Peruvian/(?)	St.PC.Rented.
Porvenir	(3)	State	Peruvian St.	Speedie, G. and Brooking, James & Co.	British	St.PC.Rented.
Providencia	(as)	State	Peruvian St.	State	Peruvian St.	St.
Resurrección(y Q.de Pazos)	(as)	State	Peruvian St.	State	Peruvian St.	St.
Rosario(Pérez)	(26)	Pérez, Manuel María	Peruvian	Pérez, Manuel María	Peruvian	Pr.PC.Owner.
Sacramento(Déllano)	(26)	State	Peruvian St.	Déllano, E./Montero León	Chilean	St.PC.Owner.
Salar de la Noria	(26)	State	Peruvian St.	Ugarte, Cevallos y Cía.	Peruvian	St.PC.Owner.
San Agustín	(26)	State	Peruvian St.	State	Peruvian St.	St.PC.
San Andrés	(2)	Pérez, M. María	Peruvian	Pérez, M. María	Peruvian	Pr. Il.
San Antonio(Campbell)	(26)	State	Peruvian St.	Campbell, Outram and Co.	British	St.PC.Owner.
San Antonio(Penaranda)	(26)	State	Peruvian St.	Penaranda, Eusebio	Peruvian	St.PC.Owner.
San Carlos	(20)	State	Peruvian St.	Folsch and Martin	German	St.PC.Owner.
San Francisco(Bramez)	(as)	State	Peruvian St.	State	Peruvian St.	St.PNA.

Plants	Notes 1877	Owner 1878	Nationality 1878	Operator 1878	Nationality 1878	Title 1878
San José(Aguirre)	(26)	Aguirre,Mariano	Peruvian	Aguirre,Mariano	Peruvian	Pr.PC.Owner.
San José de la Moria	(26)	State	Peruvian St.	Fasola,Pfo	Peruvian	St.PC.Owner.
San José(Yungay)	(2)(26)	State	Peruvian St.	Folsch and Martin	German	St.PC.Rented.
San Juan(Gildemeister)	(as)	State	Peruvian St.	Gildemeister,J.	German	St.PC.Owner.
San Juan de Soledad	(5)(17)	State	Peruvian St.	State	Peruvian St.	St.
San Lorenzo(Ugarte)	(as)	State	Peruvian St.	Ugarte y Cevallos y Cfa.	Peruvian	St.PC.Owner.
San Pablo	(as)	State	Peruvian St.	Elguera,Pedro	Peruvian	St.PC.Owner.CR.
San Pedro	(as)	State	Peruvian St.	Gildemeister,J.	German	St.PC.Owner.
San Vicente	(26)	State	Peruvian St.	State	Peruvian St.	St.Cst.
Santa Adela	(as)	State	Peruvian St.	Devescovi,J.	Peruvian(?)	St.PC.Owner.
Santa Ana	(as)	State	Peruvian St.	State	Peruvian St.	St.Cst.
Santa Catalina	(as)	State	Peruvian St.	Harnecker,Otto	German	St.PC.Rented.
Santa Isabel	(as)	State	Peruvian St.	State	Peruvian St.	St.CR.
Santa Laura(Barra)	(26)	State	Peruvian St.	State	Peruvian St.	St.
Santa Laura(Wendell)	(as)	State	Peruvian St.	State	Peruvian St.	St.
Santa Rita	(as)	State	Peruvian St.	State	Peruvian St.	St.
Santiago(Camina)	(as)	State	Peruvian St.	Pedro Perfetti	Italian	St.PC.VP.
Solferino	(26)	State	Peruvian St.	Massardo,Félix	Italian	St.PC.Owner.
Tarapacá	(as)	State	Peruvian St.	Oviedo y Trillo	Peruvian	St.PC.Rented.
Trinidad	(26)	State	Peruvian St.	State	Peruvian St.	St.
Valparaíso	(as)	State	Peruvian St.	State	Peruvian St.	St.
Victoria	(26)	State	Peruvian St.	State	Peruvian St.	St.
Paradas						
Abra de Quiroga	(as)	State	Peruvian St.	State	Peruvian St.	St.
Abra de Ugarte	(48)	State	Peruvian St.	Ugarte,Cevallos y Cfa.	Peruvian	St.PC.Rented.
Aguada	(14)(26)(State	Peruvian St.	n.a.	n.a.	St.PC.
Andacollo	(as)	State	Peruvian St.	State	Peruvian St.	St.
Ascención de Capetillo	(as)	State	Peruvian St.	Capetillo,I.	Peruvian	St.PC.Owner.
Ascención de Loayza	(as)	State	Peruvian St.	State	Peruvian St.	St.
Asunta	(as)	State	Peruvian St.	State	Peruvian St.	St.
Banda	(26)	State	Peruvian St.	State	Peruvian St.	St.
Buena Esperanza	(as)	Gárate,Vicente Jorge	Peruvian	Gárate,Vicente Jorge	Peruvian	Pr.Owner.
Buenaventura	(as)	State	Peruvian St.	State	Peruvian St.	St.
Candelaria(de Carpio)	(32)	Carpio,Hercilia de	Peruvian	Carpio,Hercilia de	Peruvian	Pr.OUp.PV.
Candelaria(de Osorio)	(17)	Osorio,Pedro José	Peruvian	Osorio,Pedro José	Peruvian	Pr.Dis.Owner.
Candelaria(de Perfetti)	(as)	State	Peruvian St.	State	Peruvian St.	St.
Candelaria(Zavala y Bilbao)	(as)	State	Peruvian St.	State	Peruvian St.	St.
Carmen(Morales)	(as)	State	Peruvian St.	State	Peruvian St.	St.
Carmen(Oviedo)	(as)	State	Peruvian St.	State	Peruvian St.	St.
Carmen(Scheel)	(as)	State	Peruvian St.	Scheel,Teodoro	German	St.
Chilena	(as)	State	Peruvian St.	Olgueda,Isidora	Peruvian	St.Owner.
Chinquiquiray(Zavala)	(as)	State	Peruvian St.	State	Peruvian St.	St.
Compañía(de Tarapacá)	(as)	State	Peruvian St.	State	Peruvian St.	St.
Concepción(Gárate)	(as)	Gárate,Vicente Jorge	Peruvian	Gárate,Vicente Jorge	Peruvian	Pr.Owner.
Cordillera	(as)	Cano,Juan de Dios	Peruvian	Cano,Juan de Dios	Peruvian	Pr.PC.Owner.CR.

Plants	Notes 1877	Owner 1878	Nationality 1878	Operator 1878	Nationality 1878	Title 1878
Cruz de Zapiga	(as)	State	Peruvian St.	State	Peruvian St.	St.
Dolores(Companfa América)	(26)	State	Peruvian St.	State	Peruvian St.	St.
Encarnación	(as)	State	Peruvian St.	State	Peruvian St.	St.
Fortuna	(as)	State	Peruvian St.	State	Peruvian St.	St.
Jazpampa(Zavala)	(as)	State	Peruvian St.	Zavala Brothers	Peruvian	St.PC.Owner.CR.
Matamunqui	(as)	Baluarde,Rosa Lecaros de	Peruvian	Baluarde,Rosa Lecaros de	Peruvian	Pr.PC.Owner.PNA
Mercedes de Negreiros	(as)	State	Peruvian St.	Vernal,Manuel	Peruvian	St.PC.Owner.
Negreiros	(as)	Vernal,Manuel	Peruvian	Vernal,Manuel	Peruvian	Pr.Owner.Ud.
Negreiros(Vernal)	(as)	State	Peruvian St.	State	Peruvian St.	St.
Normandfa(San Antonio)	(as)	State	Peruvian St.	State	Peruvian St.	St.CR.
Nueva Roserio	(as)	State	Peruvian St.	State	Peruvian St.	St.
Paccha	(as)	State	Peruvian St.	State	Peruvian St.	St.
Paccha(Bramez)	(as)	State	Peruvian St.	State	Peruvian St.	St.
Pampa Negra	(as)	State	Peruvian St.	State	Peruvian St.	St.
Paposo(parada)	(26)(66)	State	Peruvian St.	n.a.	n.a.	St.PC.
Pasto	(as)	State	Peruvian St.	State	Peruvian St.	St.
Primitiva	(as)	State	Peruvian St.	State	Peruvian St.	St.
Progreso	(as)	Quiroga,Evaristo	Peruvian	Quiroga,Evaristo	Peruvian	Pr.Owner.PNA.
Ramfrez	(as)	State	Peruvian St.	State	Peruvian St.	St.
Reducto	(as)	State	Peruvian St.	Cevallos,Manuela	Peruvian	St.PC.Owner.CR.
Rincón(Aguirre)	(as)	Aguirre,Mariano	Peruvian	Aguirre,Mariano	Peruvian	Pr.Ud.
Rincón(Benavides)	(26)(66)	State	Peruvian St.	n.a.	n.a.	St.PC.
Rincón(Soruco)	(26)	State	Peruvian St.	State	Peruvian St.	St.
Rosario(Beas)	(26)(66)	State	Peruvian St.	n.a.	n.a.	St.PC.
Rosario(Luza)	(25)(66)	State	Peruvian St.	n.a.	n.a.	St.
Rosario(Rfos)	(as)	State	Peruvian St.	State	Peruvian St.	St.
Sacramento(Baluarde)	(as)	Baluarde,Rosa Lecaros de	Peruvian	Baluarde,Rosa Lecaros de	Peruvian	Pr.Owner.PNA.
Sacramento(Castilla)	(26)(66)	State	Peruvian St.	n.a.	n.a.	St.
Sacramento(Loayza y Pascal)	(as)	Loayza y Pascal	Peruvian	Loayza y Pascal	Peruvian	Pr.Owner.PNA.
Sacramento(Soto Flores)	(as)	State	Peruvian St.	n.a.	n.a.	St.
Salar del Carmen	(as)	State	Peruvian St.	State	Peruvian St.	St.
San Antonio(Luza)	(as)	State	Peruvian St.	State	Peruvian St.	St.
San Antonio de Méjico	(26)	State	Peruvian St.	State	Peruvian St.	St.
San Antonio(Soto Flores)	(as)	State	Peruvian St.	State	Peruvian St.	St.
San Antonio(Viejo)	(as)	State	Peruvian St.	State	Peruvian St.	St.
San Benigno	(as)	State	Peruvian St.	State	Peruvian St.	St.
San Cristóbal	(as)	State	Peruvian St.	State	Peruvian St.	St.
San Fernando	(as)	Canelo,Jenaro	Chilean	Canelo,Jenaro	Chilean	Pr.Owner.
San Francisco(Campodónico)	(as)	State	Peruvian St.	State	Peruvian St.	St.
San Francisco(Marquezado)	(as)	State	Peruvian St.	State	Peruvian St.	St.
San Francisco(Zegarra)	(as)	State	Peruvian St.	State	Peruvian St.	St.
San Jorge	(as)	State	Peruvian St.	Ugarte,Cevallos y Cia.	Peruvian	Pr.PC.Owner.
San José de Alva	(as)	Cevallos,Nicolás	Peruvian	Cevallos,Nicolás	Peruvian	Pr.Owner.
San José (Devescovi)	(as)	State	Peruvian St.	State	Peruvian St.	St.
San José de Putunchara	(as)	State	Peruvian St.	State	Peruvian St.	St.
San Lorenzo(Granadino)	(as)	Granadino,M.	Peruvian	Granadino,M.	Peruvian	Pr.Owner.
San Lorenzo(Ramfrez)	(as)	State	Peruvian St.	State	Peruvian St.	St.
San Lorenzo(Zavala)	(as)	State	Peruvian St.	State	Peruvian St.	St.

Plants	Notes 1877	Owner 1878	Nationality 1878	Operator 1878	Nationality 1878	Title 1878
San Miguel(Cauvi)	(as)	Cauvi, Juan	Peruvian	Cauvi, Juan	Peruvian	Pr.Owner.
San Miguel(Palacios)	(26)	State	Peruvian St.	State	Peruvian St.	St.
San Nicolás	(26)(66)	State	Peruvian St.	n.a.	n.a.	St.PC.
San Pascual	(26)	State	Peruvian St.	State	Peruvian St.	St.
San Pedro(Ramfrez)	(as)	State	Peruvian St.	State	Peruvian St.	St.
San Rafael	(as)	Orriols y Cla.	Peruvian	Orriols y Cla.	Peruvian	Pr.Owner.
San Sebastián	(as)	State	Peruvian St.	State	Peruvian St.	St.
Santa Beatriz	(as)	Elguera, Pedro	Peruvian	n.a.	n.a.	Pr.PC.
Santa Clara y Challacollito	(as)	State	Peruvian St.	State	Peruvian St.	St.
Santa Emilia	(as)	State	Peruvian St.	State	Peruvian St.	St.
Santa Lucía	(66)	Cevallos de Albarracfn, Lucía	Peruvian	Cevallos de Albarracfn, Lucía	Peruvian	Pr.Owner.PC.
Santa Luisa	(26)	State	Peruvian St.	State	Peruvian St.	St.
Santa María	(as)	Hidalgo and Dewsberry, Pedro	Peruvian/British(?)	Hidalgo and Dewsberry, Pedro	Peruvian/British(?)	Pr.Owner.
Santa Rosa	(as)	State	Peruvian St.	n.a.	n.a.	St.PC.
Santa Rosita	(as)	Contreras, Cayetano	Peruvian	Contreras, Cayetano	Peruvian	Pr.Owner.PC.
Santo Domingo	(as)	State	Peruvian St.	State	Peruvian St.	St.
Santo Domingo(Vidoliche)	(as)	State	Peruvian St.	n.a.	n.a.	St.PC.
Silencio	(as)	State	Peruvian St.	State	Peruvian St.	St.
Tordoya	(as)	Pérez, Manuel María	Peruvian	Pérez, Manuel María	Peruvian	Pr.Owner.
Tránsito	(as)	State	Peruvian St.	State	Peruvian St.	St.
Tres Marías	(as)	State	Peruvian St.	State	Peruvian St.	St.
Unión	(as)	State	Peruvian St.	State	Peruvian St.	St.
Virginia	(as)	State	Peruvian St.	State	Peruvian St.	St.
Yungay(Albarracfn)	(as)	Albarracfn, Lucía Cevallos de	Peruvian	Albarracfn, Lucía Cevallos de	Peruvian	Pr.Owner.
Yungay Bajo	(26)	State	Peruvian St.	State	Peruvian St.	St.
Yungay(Jentilar)	(20)(66)	Bustos, Héctor	Peruvian	Lecaros, Gustavo	Peruvian	Pr.Rented.PC.

Plants	Status 1878	Notes 1878	Owner 1879	Nationality 1879	Operator 1879	Nationality 1879
Máquinas						
Agua Santa	NM.	(1)	State	Peruvian St.	Campbell, Outram and Co.	British
Alianza	Un.	(15)	State	Peruvian St.	State	Peruvian St.
Angela	Wk.	(3)(26)(35)(66)	State	Peruvian St.	Loayza y Pascal	Peruvian
Angeles	Un.	(as)	State	Peruvian St.	State	Peruvian St.
Argentina	CD.	(15)	State	Peruvian St.	Gilomeister, J.	German
Barrenechea	Wk.	(13)(35)	State	Peruvian St.	Hart, Thomas & Co.	British
Bearnes	UL.	(3)	State	Peruvian St.	Harnecker, Otto	German
Buen Retiro	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Calacala	Wk.	(27)	Hidalgo, E.C. widow of	Peruvian	Hidalgo, E.C. widow of	Peruvian
California	CD.	(15)(68)	State	Peruvian St.	State	Peruvian St.
Candelaria	Un.	(15)	State	Peruvian St.	State	Peruvian St.
Carmelitana	Un.	(as)	State	Peruvian St.	State	Peruvian St.
Carmen Alto	CD.Gd.	(15)	State	Peruvian St.	State	Peruvian St.
Carmen Bajo	CD.Gd.	(15)(68)	State	Peruvian St.	State	Peruvian St.
Carolina	CD.Bd.	(7)(26)	State	Peruvian St.	Gibbs & Co.	British
Católica, La	CD.	(15)	State	Peruvian St.	State	Peruvian St.
China	CD.	(as)	State	Peruvian St.	State	Peruvian St.
Chinquiquiray(Oviedo y Trillo)	Wk.	(15)(26)(66)	State	Peruvian St.	Oviedo y Trillo	Peruvian
Concepción(Palacio Industrial)	CD.	(15)(26)	State	Peruvian St.	State	Peruvian St.
Dolores(Cobo)	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Esmeralda	Wk.	(15)(26)	State	Peruvian St.	Clark, Eck & Co.	British
Esperanza(Lagunas)	Dst.	(15)(68)	State	Peruvian St.	State	Peruvian St.
Hanza(S. Antonio-Gilomeister)	CD.Bd.	(15)	State	Peruvian St.	Gildemeister, J.	German
Lima	Wk.Gd.	(7)(26)	State	Peruvian St.	Gibbs & Co.	British
Magdalena	Dst.	(15)	State	Peruvian St.	State	Peruvian St.
Matillana	CD.	(15)(68)	State	Peruvian St.	State	Peruvian St.
Negreiros	Un.	(as)	State	Peruvian St.	State	Peruvian St.
Nueva Carolina(y Pozo Almonte)	CD.	(15)(26)	State	Peruvian St.	State	Peruvian St.
Nueva Soledad	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Palma	CD.	(as)	State	Peruvian St.	State	Peruvian St.
Paposo(máquina)	Wk.	(3)	State	Peruvian St.	Folsch and Martin	German
Pena Chica	Wk.	(15)	Aguirre, Mariano	Peruvian	Aguirre, Mariano	Peruvian
Pena Grande	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Perla	CD.Gd.	(15)(68)	State	Peruvian St.	State	Peruvian St.
Peruana	Wk.	(3)	State	Peruvian St.	Moscoso/Jacobson	Peruvian(?)
Porvenir	Wk.	(3)(26)(66)	State	Peruvian St.	Speedie, G. and Brooking, James &	British
Providencia	CD.	(as)	State	Peruvian St.	State	Peruvian St.
Resurrección(y Q.de Pazos)	Un.	(15)	State	Peruvian St.	State	Peruvian St.
Rosario(Pérez)	CD.	(as)	Pérez, Manuel María	Peruvian	Pérez, Manuel María	Peruvian
Sacramento(Délano)	Wk.	(15)(26)(66)	Edwards, A. & Co.	Chilean	Délano, E./Montero León	Chilean
Salaz de la Noria	Wk.	(15)(26)(33)	State	Peruvian St.	Ugarte, Cevallos y Cía.	Peruvian
San Agustín	CD.	(15)	State	Peruvian St.	State	Peruvian St.
San Andrés	CD.	(9)	Pérez, M. María	Peruvian	Pérez, M. María	Peruvian
San Antonio(Campbell)	Wk.	(3)	State	Peruvian St.	Campbell, Outram and Co.	British
San Antonio(Pemaranda)	UL.	(3)(26)(66)	State	Peruvian St.	Pemaranda, Eusebio	Peruvian
San Carlos	Wk.	(20)(26)(66)	State	Peruvian St.	Folsch and Martin	German
San Francisco(Bramez)	UL.	(26)	State	Peruvian St.	State	Peruvian St.

Plants	Status 1878	Notes 1878	Owner 1879	Nationality 1879	Operator 1879	Nationality 1879
San José(Aguirre)	Wk.	(15)(20)	Aguirre,Mariano	Peruvian	Aguirre,Mariano	Peruvian
San José de la Noria	Wk.	(26)(35)(66)	State	Peruvian St.	Fasola,Pfo	Peruvian
San José(Yungay)	CD.	(3)(15)	State	Peruvian St.	Folsch and Martin	German
San Juan(Gildemeister)	Wk.	(15)	State	Peruvian St.	Gildemeister,J.	German
San Juan de Soledad	Un.	(5)(17)	State	Peruvian St.	State	Peruvian St.
San Lorenzo(Ugarte)	Wk.	(3)(26)(66)	State	Peruvian St.	Ugarte y Cevallos y Cía.	Peruvian
San Pablo	Wk.	(3)(15)(26)(66)	State	Peruvian St.	Elguera,Pedro	Peruvian
San Pedro	Wk.	(3)(15)	State	Peruvian St.	Gildemeister,J.	German
San Vicente	CD.OP.	(3)	State	Peruvian St.	State	Peruvian St.
Santa Adela	Wk.	(3)	State	Peruvian St.	Devescovi,J.	Peruvian(?)
Santa Ana	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Santa Catalina	Wk.	(3)(15)	State	Peruvian St.	Harnecker,Otto	German
Santa Isabel	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Santa Laura(Barra)	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Santa Laura(Wendell)	Un.	(15)(26)	State	Peruvian St.	State	Peruvian St.
Santa Rita	CD.Ul.	(as)	State	Peruvian St.	State	Peruvian St.
Santiago(Camina)	Wk.	(15)(26)(66)	State	Peruvian St.	n.a.	n.a.
Solferino	Wk.	(3)(15)(66)	State	Peruvian St.	Massardo,Félix	Italian
Tarapacá	CD.	(6)(17)	State	Peruvian St.	Oviedo y Trillo	Peruvian
Trinidad	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Valparaiso	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Victoria	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Paradas						
Abra de Quiroga	CD.	(as)	State	Peruvian St.	State	Peruvian St.
Abra de Ugarte	CD.Ul.	(26)(35)(66)	State	Peruvian St.	Ugarte,Cevallos y Cía.	Peruvian
Aguada	Ul.	(15)	State	Peruvian St.	n.a.	n.a.
Andacollo	CD.OP.	(3)(15)	State	Peruvian St.	State	Peruvian St.
Ascención de Capetillo	Ul.	(as)	State	Peruvian St.	Capetillo,T.	Peruvian
Ascención de Loayza	CD.Ul.	(as)	State	Peruvian St.	State	Peruvian St.
Asunta	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Banda	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Buena Esperanza	Ul.	(as)	Gárate,Vicente Jorge	Peruvian	Gárate,Vicente Jorge	Peruvian
Buenaventura	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Candelaria(de Carpio)	CD.Ul.	(32)	Carpio,Hercilia de	Peruvian	Carpio,Hercilia de	Peruvian
Candelaria(de Osorio)	Ul.	(17)	Osorio,Pedro José	Peruvian	Osorio,Pedro José	Peruvian
Candelaria(de Perfetti)	CD.Ul.	(as)	State	Peruvian St.	State	Peruvian St.
Candelaria(Zavala y Bilbao)	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Carmen(Morales)	CD.Ul.	(as)	State	Peruvian St.	State	Peruvian St.
Carmen(Oviedo)	CD.Ul.	(as)	State	Peruvian St.	State	Peruvian St.
Carmen(Scheel)	CD.Ul.	(as)	State	Peruvian St.	Scheel,Teodoro	German
Chilena	Ul.	(as)	State	Peruvian St.	Olgueda,Isidora	Peruvian
Chinquiquiray(Zavala)	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Compañía(de Tarapacá)	CD.Ul.	(as)	State	Peruvian St.	State	Peruvian St.
Concepción(Gárate)	Ul.	(as)	Gárate,Vicente Jorge	Peruvian	Gárate,Vicente Jorge	Peruvian
Cordillera	Wk.	(15)	Cano,Juan de Dios	Peruvian	Cano,Juan de Dios	Peruvian

Plants	Status 1878	Notes 1878	Owner 1879	Nationality 1879	Operator 1879	Nationality 1879
Cruz de Zapiga	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Dolores(Compañía América)	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Encarnación	CD.Ul.	(as)	State	Peruvian St.	n.a.	n.a.
Fortuna	CD.Ul.	(as)	State	Peruvian St.	State	Peruvian St.
Jazpampa(Zavala)	Wk.	(27)	State	Peruvian St.	Zavala Brothers	Peruvian
Matamunqui	Wk.	(27)	Baluart, Rosa Lecaros de	Peruvian	Baluart, Rosa Lecaros de	Peruvian
Mercedes de Negreiros	Wk.	(27)	State	Peruvian St.	Vernal, Manuel	Peruvian
Negreiros	CD.Ul.	(as)	Vernal, Manuel	Peruvian	Vernal, Manuel	Peruvian
Negreiros(Vernal)	CD.Ul.	(as)	State	Peruvian St.	n.a.	n.a.
Normandía(San Antonio)	CD.Ul.	(as)	State	Peruvian St.	State	Peruvian St.
Nueva Rosario	CD.Ul.	(26)(31)	State	Peruvian St.	State	Peruvian St.
Paccha	CD.Ul.	(as)	State	Peruvian St.	State	Peruvian St.
Paccha(Bramez)	CD.	(7)(26)(31)	State	Peruvian St.	State	Peruvian St.
Pampa Negra	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Paposo(parada)	Wk.	(15)	State	Peruvian St.	n.a.	n.a.
Pasto	CD.Ul.	(as)	State	Peruvian St.	State	Peruvian St.
Primitiva	CD.Ul.	(as)	State	Peruvian St.	State	Peruvian St.
Progreso	Ul.	(as)	Quiroga, Evaristo and bros.	Peruvian	Quiroga, Evaristo and bros.	Peruvian
Ramírez	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Reducto	Wk.	(15)	State	Peruvian St.	Cevallos, Manuela	Peruvian
Rincón(Aguirre)	Neq.	(15)	Aguirre, Mariano	Peruvian	Aguirre, Mariano	Peruvian
Rincón(Benavides)	Wk.	(15)	State	Peruvian St.	n.a.	n.a.
Rincón(Soruco)	CD.	(as)	State	Peruvian St.	State	Peruvian St.
Rosario(Beas)	Wk.	(15)	State	Peruvian St.	n.a.	n.a.
Rosario(Luza)	Ul.	(as)	State	Peruvian St.	n.a.	n.a.
Rosario(Ríos)	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Sacramento(Baluart)	Ul.	(as)	Baluart, Rosa Lecaros de	Peruvian	Baluart, Rosa Lecaros de	Peruvian
Sacramento(Castilla)	Ul.	(as)	State	Peruvian St.	n.a.	n.a.
Sacramento(Loayza y Pascal)	Ul.	(as)	Loayza y Pascal	Peruvian	Labernadie, E	French
Sacramento(Soto Flores)	Ul.	(as)	State	Peruvian St.	Soto Flores, Mariano	Peruvian
Salar del Carmen	CD.	(15)	State	Peruvian St.	State	Peruvian St.
San Antonio(Luza)	CD.Ul.	(as)	State	Peruvian St.	State	Peruvian St.
San Antonio de Méjico	CD.	(15)	State	Peruvian St.	State	Peruvian St.
San Antonio(Soto Flores)	CD.Ul.	(as)	State	Peruvian St.	State	Peruvian St.
San Antonio(Viejo)	CD.	(15)	State	Peruvian St.	State	Peruvian St.
San Benigno	CD.	(15)	State	Peruvian St.	State	Peruvian St.
San Cristóbal	CD.	(15)	State	Peruvian St.	State	Peruvian St.
San Fernando	CD.	(15)	Canelo, Jenaro	Chilean	Canelo, Jenaro	Chilean
San Francisco(Campodónico)	CD.Ul.	(as)	State	Peruvian St.	State	Peruvian St.
San Francisco(Marquezado)	CD.	(15)	State	Peruvian St.	State	Peruvian St.
San Francisco(Zegarra)	CD.	(15)	State	Peruvian St.	State	Peruvian St.
San Jorge	Ul.	(3)(66)	State	Peruvian St.	Ugarte, Cevallos y Cia.	Peruvian
San José de Alva	Ul.	(as)	State	Peruvian St.	n.a.	n.a.
San José (Devescovi)	CD.	(15)(26)	State	Peruvian St.	State	Peruvian St.
San José de Putunchara	CD.Ul.	(as)	State	Peruvian St.	State	Peruvian St.
San Lorenzo(Granadino)	CD.Ul.	(as)	Granadino, M.	Peruvian	Granadino, M.	Peruvian
San Lorenzo(Ramírez)	CD.	(15)	State	Peruvian St.	n.a.	n.a.
San Lorenzo(Zavala)	CD.	(15)	State	Peruvian St.	State	Peruvian St.

Plants	Status 1878	Notes 1878	Owner 1879	Nationality 1879	Operator 1879	Nationality 1879
San Miguel(Cauvi)	CD.	(15)	State	Peruvian St.	State	Peruvian St.
San Miguel(Palacios)	CD.	(15)	State	Peruvian St.	State	Peruvian St.
San Nicolás	Wk.	(15)	State	Peruvian St.	n.a.	n.a.
San Pascual	CD.	(15)	State	Peruvian St.	State	Peruvian St.
San Pedro(Ramírez)	CD.	(15)	State	Peruvian St.	State	Peruvian St.
San Rafael	CD.Ul.	(as)	Orriols y Cía.	Peruvian	Orriols y Cía.	Peruvian
San Sebastián	CD.Ul.	(as)	State	Peruvian St.	State	Peruvian St.
Santa Beatriz	Wk.	(15)	Elguera, Pedro	Peruvian	n.a.	n.a.
Santa Clara y Challacollito	CD.Ul.	(as)	State	Peruvian St.	State	Peruvian St.
Santa Emilia	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Santa Lucía	Wk.	(15)	State	Peruvian St.	Cevallos de Albarracín, Lucía	Peruvian
Santa Luisa	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Santa María	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Santa Rosa	Wk.	(15)	State	Peruvian St.	n.a.	n.a.
Santa Rosita	Wk.	(15)	State	Peruvian St.	C. Contreras	Peruvian
Santo Domingo	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Santo Domingo(Vidoliche)	Wk.	(15)(26)	State	Peruvian St.	n.a.	n.a.
Silencio	CD.Ul.	(as)	State	Peruvian St.	State	Peruvian St.
Tordoya	CD.Ul.	(as)	Pérez, Manuel María	Peruvian	Pérez, Manuel María	Peruvian
Tránsito	CD.Ul.	(as)	State	Peruvian St.	State	Peruvian St.
Tres Marías	CD.Ul.	(as)	State	Peruvian St.	State	Peruvian St.
Unión	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Virginia	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Yungay(Albarracín)	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Yungay Bajo	CD.	(15)	State	Peruvian St.	State	Peruvian St.
Yungay(Jentilar)	Ul.	(20)(48)	Bustos, Héctor	Peruvian	Boivin, R. y Cía.	French

Plants	Title 1879	Status 1879	Notes 1879	Owner 1880	Nationality 1880	Operator 1880	Nationality 1880
Máquinas							
Agua Santa	St.PC.	Wk.	(3)(4)	State	Chilean St.	Campbell,Outram and Co.	British
Alianza	St.	Un.	(15)	State	Chilean St.	State	Chilean St.
Angela	St.PC.	Wk.	(3)(4)	State	Chilean St.	Loayza y Pascal	Peruvian
Angeles	St.	Un.	(as)	State	Chilean St.	State	Chilean St.
Argentina	St.PC.Owner	CD.	(7)	State	Chilean St.	Gildemeister,J.	German
Barreñechea	St.PC.Rented	Wk.	(as)	State	Chilean St.	Freraut,Carlos	French
Bearnes	St.PC.Rented	Ul.	(3)	State	Chilean St.	Harnecker/Prieto	German/Chilean
Buen Retiro	St.	CD.	(as)	State	Chilean St.	State	Chilean St.
Calacala	Pr.Owner	Wk.	(4)	Hidalgo,E.C.widow of	Peruvian	Riveros,M.E.	Chilean(?)
California	St.	CD.	(as)	State	Chilean St.	State	Chilean St.
Candelaria	St.	Un.	(26)	State	Chilean St.	State	Chilean St.
Carmelitana	St.	Un.	(26)	Lecaros,Domingo	Peruvian	State	Chilean St.
Carmen Alto	St.	CD.Gd.	(as)	State	Chilean St.	State	Chilean St.
Carmen Bajo	St.	CD.Gd.	(as)	State	Chilean St.	State	Chilean St.
Carolina	St.PC.Owner.	CD.Bd.	(7)	State	Chilean St.	State	Chilean St.
Católica,La	St.	CD.	(as)	State	Chilean St.	State	Chilean St.
China	St.	CD.	(as)	State	Chilean St.	State	Chilean St.
Chinquiquiray(Oviedo y Trillo)	St.	Ul.	(as)	State	Chilean St.	Oviedo y Trillo	Peruvian
Concepción(Palacio Industrial)	St.	CD.	(as)	State	Chilean St.	State	Chilean St.
Dolores(Cobo)	St.	CD.	(as)	State	Chilean St.	State	Chilean St.
Esmeralda	St.PC.Owner.	Wk.	(3)(4)(37)	State	Chilean St.	Clark,Eck & Co.	British
Esperanza(Lagunas)	St.	Dst.	(as)	State	Chilean St.	State	Chilean St.
Hanza(S.Antonio-Gildemeister)	St.PC.Owner.	CD.Bd.	(7)	State	Chilean St.	Gildemeister,J.	German
Limena	St.PC.Owner.	Wk.Gd.	(7)	State	Chilean St.	State	Chilean St.
Magdalena	St.	Dst.	(as)	State	Chilean St.	State	Chilean St.
Matilana	St.	CD.	(as)	State	Chilean St.	State	Chilean St.
Negreiros	St.	Un.	(as)	State	Chilean St.	State	Chilean St.
Nueva Carolina(y Pozo Almonte)	St.	CD.	(as)	State	Chilean St.	State	Chilean St.
Nueva Soledad	St.	CD.	(as)	State	Chilean St.	State	Chilean St.
Palma	St.	CD.	(as)	State	Chilean St.	State	Chilean St.
Paposo(máquina)	St.PC.Owner.	Wk.	(3)	State	Chilean St.	State	Chilean St.
Pena Chica	Pr.PC.Owner.	Wk.	(4)	Aguirre,Mariano	Peruvian	Subercaseaux,Francisco	Chilean
Pena Grande	St.	CD.	(as)	State	Chilean St.	State	Chilean St.
Perla	St.	CD.Gd.	(as)	State	Chilean St.	State	Chilean St.
Peruana	St.PC.Rented.	Wk.	(3)	State	Chilean St.	Moscoso/Jacobson	Peruvian(?)
Porvenir	St.PC.Rented.	Wk.	(3)	State	Chilean St.	Speedie,G.and Brooking,James & Co.	British
Providencia	St.	CD.	(as)	State	Chilean St.	State	Chilean St.
Resurrección(y Q.de Pazos)	St.	Un.	(as)	State	Chilean St.	State	Chilean St.
Rosario(Pérez)	Pr.PC.Owner.	CD.	(as)	Pérez,Manuel María	Peruvian	Pérez,Manuel María	Peruvian
Sacramento(Déllano)	Pr.PC.Owner.	Wk.	(3)	State	Chilean St.	Déllano,E./Montero León	Chilean
Salar de la Noria	St.PC.Owner.	Wk.	(3)	State	Chilean St.	Ugarte,Cevallos y Cía.	Peruvian
San Agustín	St.	PC,CD.	(as)	State	Chilean St.	State	Chilean St.
San Andrés	Pr.	CD.	(as)	Pérez,M.María	Peruvian	Pérez,M.María	Peruvian
San Antonio(Campbell)	St.PC.Owner.	Wk.	(3)(4)	State	Chilean St.	Campbell,Outram and Co.	British
San Antonio(Penaranda)	St.PC.Owner.	Ul.	(as)	State	Chilean St.	Penaranda,Eusebio	Peruvian
San Carlos	St.PC.Owner.	Wk.	(3)(4)	State	Chilean St.	Folsch and Martin	German
San Francisco(Brarez)	St.PNA.	Ul.	(as)	Brarez,Evaristo	Peruvian	Brarez,Evaristo	Peruvian

Plants	Title 1879	Status 1879	Notes 1879	Owner 1880	Nationality 1880	Operator 1880	Nationality 1880
San José(Aguirre)	Pr.PC.Owner.	Wk.	(4)	Aguirre,Mariano	Peruvian	Herrmann,Otto	German
San José de la Noria	St.PC.Owner.	Wk.	(4)	State	Chilean St.	Fasola,Pfo	Peruvian
San José(Yungay)	St.PC.Rented.	Wk.	(3)	State	Chilean St.	Folsch and Martin	German
San Juan(Gildemeister)	St.PC.Owner.	Wk.	(4)	State	Chilean St.	Gildemeister,J.	German
San Juan de Soledad	St.	Un.	(5)(17)	State	Chilean St.	State	Chilean St.
San Lorenzo(Ugarte)	St.PC.Owner.	Wk.	(3)	State	Chilean St.	Ugarte y Cevallos y Cfa.	Peruvian
San Pablo	St.PC.Owner.CR	Wk.	(4)	State	Chilean St.	Elguera,Pedro	Peruvian
San Pedro	St.PC.Owner.	Wk.	(4)	State	Chilean St.	Gildemeister,J.	German
San Vicente	St.Cst.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Santa Adela	St.PC.Owner.	Wk.	(3)(4)	State	Chilean St.	Devescovi,J.	Peruvian(?)
Santa Ana	St.Cst.	CD.	(as)	State	Chilean St.	State	Chilean St.
Santa Catalina	St.PC.Rented.	Wk.	(3)	State	Chilean St.	Harnecker,Otto	German
Santa Isabel	St.CR.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Santa Laura(Barra)	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Santa Laura(Wendell)	St.	Un.	(as)	State	Chilean St.	State	Chilean St.
Santa Rita	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Santiago(Camina)	St.PC.VP.	Wk.	(3)	State	Chilean St.	n.a.	n.a.
Solferino	St.PC.Owner.	Wk.	(4)	State	Chilean St.	Massardo,Félix	Italian
Tarapacá	St.PC.Rented.	Wk.	(3)(4)	State	Chilean St.	Oviedo y Trillo	Peruvian
Trinidad	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Valparaíso	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Victoria	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Paradas							
Abra de Quiroga	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Abra de Ugarte	St.PC.Rented.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Aguada	St.PC.	Ul.	(4)	State	Chilean St.	State	Chilean St.
Andacollo	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Ascención de Capetillo	St.PC.Owner.	Wk.	(4)(49)	State	Chilean St.	Capetillo,T.	Peruvian
Ascención de Loayza	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Asunta	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Banda	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Buena Esperanza	Pr.Owner.	Ul.	(as)	Gárate,Vicente Jorge	Peruvian	Gárate,Vicente Jorge	Peruvian
Buenaventura	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Candelaria(de Carpio)	Pr.OUp.PV.	CD.Ul.	(32)	State	Chilean St.	State	Chilean St.
Candelaria(de Osorio)	Pr.Dis.Owner.	Ul.	(17)	Osorio,Pedro José	Peruvian	Osorio,Pedro José	Peruvian
Candelaria(de Perfetti)	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Candelaria(Zavala y Bilbao)	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Carmen(Morales)	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Carmen(Oviedo)	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Carmen(Scheel)	St.PC.Owner.	Wk.	(4)(49)	State	Chilean St.	Scheel,Teodoro	German
Chilena	St.PC.Owner.	Wk.	(4)(49)	State	Chilean St.	Peñe y Riss	Chilean
Chinquiquiray(Zavala)	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Compañía(de Tarapacá)	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Concepción(Gárate)	Pr.Owner.	Ul.	(as)	Gárate,Vicente Jorge	Peruvian	Gárate,Vicente Jorge	Peruvian
Cordillera	Pr.PC.Owner.CR	Ul.	(as)	State	Chilean St.	State	Chilean St.

Plants	Title 1879	Status 1879	Notes 1879	Owner 1880	Nationality 1880	Operator 1880	Nationality 1880
Cruz de Zapiga	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Dolores(Compania América)	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Encarnación	St.PC.	Ul.	(4)	State	Chilean St.	Peine,Ernesto and Riss,Alfredo	Chilean(?)
Fortuna	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Jazpampa(Zavala)	St.PC.Owner.	Wk.	(20)(26)	State	Chilean St.	Zavala Brothers	Peruvian
Matamunqui	Pr.PC.Owner.PN	Ul.	(as)	Baluarde,Rosa Lecaros de	Peruvian	Baluarde,Rosa Lecaros de	Peruvian
Mercedes de Negreiros	St.PC.Owner.	Ul.	(20)	State	Chilean St.	Vernal,Manuel	Peruvian
Negreiros	Pr.Owner.Ud.	CD.Ul.	(as)	Vernal,Manuel	Peruvian	Vernal,Manuel	Peruvian
Negreiros(Vernal)	St.PC.	Wk.	(4)(49)	State	Chilean St.	State	Chilean St.
Normandia(San Antonio)	St.CR.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Nueva Rosario	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Paccha	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Paccha(Bramez)	St.	CD.	(7)	State	Chilean St.	State	Chilean St.
Pampa Negra	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Paposo(parada)	St.PC.	Wk.	(4)	State	Chilean St.	State	Chilean St.
Pasto	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Primitiva	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Progreso	Pr.Owner.PNA.	Wk.	(4)	Quiroga,Evaristo and bros.	Peruvian	Quiroga,Evaristo and bros.	Peruvian
Ramirez	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Reducto	St.PC.Owner.CR	Wk.	(4)(49)	State	Chilean St.	Cevallos,Manuela	Peruvian
Rincón(Aguirre)	Pr.Ud.	Neq.	(as)	Aguirre,Mariano	Peruvian	Aguirre,Mariano	Peruvian
Rincón(Benavides)	St.PC.	Wk.	(4)	State	Chilean St.	Benavides,Celestino	Peruvian
Rincón(Soruco)	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Rosario(Beas)	St.PC.	Wk.	(4)	State	Chilean St.	n.a.	n.a.
Rosario(Luza)	St.PC.	Ul.	(4)	State	Chilean St.	Peine,Ernesto/Riss,Alfredo	Chilean
Rosario(Rios)	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Sacramento(Baluarde)	Pr.Owner.PNA.	Ul.	(as)	Baluarde,Rosa Lecaros de	Peruvian	Baluarde,Rosa Lecaros de	Peruvian
Sacramento(Castilla)	St.PC.	Ul.	(4)	State	Chilean St.	n.a.	n.a.
Sacramento(Loayza y Pascal)	Pr.PC.Rented.	Ul.	(3)	Loayza y Pascal	Peruvian	Labernadie,E.	French
Sacramento(Soto Flores)	St.PC.Owner.	Wk.	(4)(49)	State	Chilean St.	Peyne,Ernesto/Riss,Alfredo	Chilean
Salar del Carmen	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
San Antonio(Luza)	St.	CD.Ul.	(as)	State	Chilean St.	Peyne,Ernesto/Riss,Alfredo	Chilean
San Antonio de Méjico	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
San Antonio(Soto Flores)	St.	CD.Ul.	(as)	State	Chilean St.	Peyne,Ernesto/Riss,Alfredo	Chilean
San Antonio(Viejo)	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
San Benigno	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
San Cristóbal	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
San Fernando	Pr.Owner.	Wk.	(4)	Canelo,Jenaro	Chilean	Canelo,Jenaro	Chilean
San Francisco(Campodónico)	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
San Francisco(Marquezado)	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
San Francisco(Zegarra)	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
San Jorge	Pr.PC.Owner.	Ul.	(3)	State	Chilean St.	Ugarte,Cevallos y Cia.	Peruvian
San José de Alva	St.PC.	Ul.	(4)	State	Chilean St.	n.a.	n.a.
San José (Devescovi)	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
San José de Putunchara	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
San Lorenzo(Granadino)	Pr.Owner.	CD.Ul.	(as)	Granadino,M.	Peruvian	Granadino,M.	Peruvian
San Lorenzo(Ramirez)	St.PC.	Ul.	(4)	State	Chilean St.	n.a.	n.a.
San Lorenzo(Zavala)	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.

Plants	Title 1879	Status 1879	Notes 1879	Owner 1880	Nationality 1880	Operator 1880	Nationality 1880
San Miguel(Cauvi)	St.	CD.Ul.	(26)	State	Chilean St.	State	Chilean St.
San Miguel(Palacios)	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
San Nicolás	St.PC.	Wk.	(4)	State	Chilean St.	n.a.	n.a.
San Pascual	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
San Pedro(Ramirez)	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
San Rafael	Pr.Owner.	CD.Ul.	(as)	Orriols y Cia.	Peruvian	Orriols y Cia.	Peruvian
San Sebastián	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Santa Beatriz	Pr.PC.	Wk.	(4)	Elguera,Pedro	Peruvian	n.a.	n.a.
Santa Clara y Challacollito	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Santa Emilia	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Santa Lucía	St.Owner.PC.	Wk.	(4)(26)	State	Chilean St.	Cevallos de Albarracín,Lucía	Peruvian
Santa Luisa	St.	CD.Ul.	(26)	State	Chilean St.	State	Chilean St.
Santa María	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Santa Rosa	St.PC.	Wk.	(4)	State	Chilean St.	Peragallo,Gregorio	Chilean(?)
Santa Rosita	St.PC.Owner.	Wk.	(4)(26)	State	Chilean St.	Contreras,Escipión	Peruvian
Santo Domingo	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Santo Domingo(Vidoliche)	St.PC.	Wk.	(4)	State	Chilean St.	State	Chilean St.
Silencio	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Tordoya	Pr.Owner.	CD.Ul.	(as)	Pérez,Manuel María	Peruvian	Pérez,Manuel María	Peruvian
Tránsito	St.	CD.Ul.	(as)	State	Chilean St.	Sanguinetti,Juan	Chilean(?)
Tres Marías	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Unión	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Virginia	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Yungay(Albarracín)	St.	CD.Ul.	(26)	State	Chilean St.	Albarracín,Lucía Cevallos de	Peruvian
Yungay Bajo	St.	CD.Ul.	(as)	State	Chilean St.	State	Chilean St.
Yungay(Jentilar)	Pr.Rented.PC.	Ul.	(20)(48)	Bustos,Héctor	Peruvian	Bustos,Héctor	Peruvian

Plants	Title 1880	Status 1880	Notes 1880	Owner 1881	Nationality 1881	Operator 1881
Máquinas						
Agua Santa	St.PC.Owner.	Wk.	(3)	State	Chilean St.	Campbell, Outram and Co.
Alianza	St.	Un.	(15)	State	Chilean St.	State
Angela	St.PC.Owner.	Wk.	(3)	State	Chilean St.	Loayza y Pascal
Angeles	St.	Un.	(as)	State	Chilean St.	State
Argentina	St.PC.Owner.	CD.	(6)(7)(19)	Gildemeister, J.	German	Gildemeister, J.
Barrenechea	St.PC.Rented.	Wk.	(as)	State	Chilean St.	Freraut, Carlos
Bearnes	St.PC.Rented.	Ul.	(3)	State	Chilean St.	Harnecker/Prieto
Buen Retiro	Sl.	CD.	(as)	State	Chilean St.	State
Calacala	Pr.Rented.	Wk.	(28)	Hidalgo, E.C. widow of	Peruvian	Riveros, M.E.
California	St.	CD.	(as)	State	Chilean St.	State
Candelaria	St.	Un.	(as)	State	Chilean St.	State
Carmelitana	St.	Un.	(as)	Lecaros, Domingo	Peruvian	State
Carmen Alto	St.	CD.Gd.	(as)	State	Chilean St.	State
Carmen Bajo	St.	CD.Gd.	(as)	State	Chilean St.	State
Carolina	St.PC.Owner.	CD.Bd.	(5)	State	Chilean St.	State
Católica, La	St.	CD.	(as)	State	Chilean St.	State
China	St.	CD.	(as)	State	Chilean St.	State
Chinquiquiray (Oviedo y Trillo)	St.PC.Owner.	Ul.	(5)(22)(28)	State	Chilean St.	Oviedo y Trillo
Concepción (Palacio Industrial)	St.	CD.	(as)	State	Chilean St.	State
Dolores (Cobo)	St.	CD.	(as)	State	Chilean St.	State
Esmeralda	St.PC.Owner.	Wk.	(3)(6)(32)	State	Chilean St.	Clark, Eck & Co.
Esperanza (Lagunas)	St.	Dst.	(as)	State	Chilean St.	State
Hanza (S. Antonio-Gildemeister)	St.PC.Owner.	CD.Bd.	(6)(7)(19)	Gildemeister, J.	German	Gildemeister, J.
Limema	St.PC.Owner.	Wk.Gd.	(5)	State	Chilean St.	State
Magdalena	St.	Dst.	(as)	State	Chilean St.	State
Matillana	St.	CD.	(as)	State	Chilean St.	State
Negreiros	St.	Un.	(as)	State	Chilean St.	State
Nueva Carolina (y Pozo Almonte)	St.	CD.	(as)	State	Chilean St.	State
Nueva Soledad	St.	CD.	(as)	State	Chilean St.	State
Palma	St.	CD.	(as)	State	Chilean St.	Gibbs & Co. (Moir and Burt)
Páposo (máquina)	St.	Wk.	(3)	State	Chilean St.	State
Pena Chica	Pr.Rented.	Wk.	(32)	Aguirre, Mariano	Peruvian	Folsch and Martin
Pena Grande	St.	CD.	(as)	State	Chilean St.	State
Perla	St.	CD.Gd.	(as)	State	Chilean St.	State
Peruana	St.PC.Rented.	Wk.	(3)	State	Chilean St.	Moscoso/Jacobson
Porvenir	St.PC.Rented.	Wk.	(3)	North, J.T.	British	Speedie, G. and Brooking, James & Co.
Providencia	St.	CD.	(as)	State	Chilean St.	State
Resurrección (y Q. de Pazos)	St.	Un.	(as)	State	Chilean St.	State
Rosario (Pérez)	Pr.Owner.	CD.	(as)	Pérez, Manuel María	Peruvian	Pérez, Manuel María
Sacramento (Delano)	Pr.PC.Owner.	Wk.	(3)(28)	Edwards, A. & Co.	Chilean	Folsch and Martin
Salár de la Noria	St.PC.Owner.	Wk.	(3)	State	Chilean St.	Ugarte, Cevallos y Cia.
San Agustín	St.	CD.	(as)	State	Chilean St.	State
San Andrés	Pr.	CD.	(as)	Pérez, M. María	Peruvian	Pérez, M. María
San Antonio (Campbell)	St.PC.Owner.	Wk.	(3)	State	Chilean St.	Campbell, Outram and Co.
San Antonio (Pemaranda)	St.PC.Owner.	Ul.	(as)	State	Chilean St.	Pemaranda, Eusebio
San Carlos	St.PC.Owner.	Wk.	(3)	Folsch and Martin	German	Folsch and Martin
San Francisco (Bramez)	Pr.VP.CR.	Ul.	(2)	Bramez, Evaristo	Peruvian	Bramez, Evaristo

Plants	Title 1880	Status 1880	Notes 1880	Owner 1881	Nationality 1881	Operator 1881
San José(Aguirre)	Pr.PC.Rented.	Wk.	(17)	Aguirre,Mariano	Peruvian	Herrmann,Otto
San José de la Noria	St.PC.Owner.	Wk.	(5)	State	Chilean St.	Fasola,Pfo
San José(Yungay)	St.PC.Rented.	Wk.	(3)	State	Chilean St.	Folsch and Martin
San Juan(Gildemeister)	St.PC.Owner.	Wk.	(3)	Gildemeister,J.	German	Gildemeister,J.
San Juan de Soledad	St.	Un.	(5)(17)	State	Chilean St.	State
San Lorenzo(Ugarte)	St.PC.Owner.	Wk.	(3)(5)	State	Chilean St.	Ugarte y Cevallos y Cfa.
San Pablo	St.PC.Owner.CR.	Wk.	(28)	State	Chilean St.	Elguera,Pedro
San Pedro	St.PC.Owner.	Wk.	(3)	Gildemeister,J.	German	Gildemeister,J.
San Vicente	St.Cst.	CD.	(as)	State	Chilean St.	State
Santa Adela	St.PC.Owner.	Wk.	(3)(28)	State	Chilean St.	Devescovi,J.
Santa Ana	St.Cst.	CD.	(as)	State	Chilean St.	State
Santa Catalina	St.PC.Rented.	Wk.	(3)	State	Chilean St.	Harnecker,Otto
Santa Isabel	St.	CD.	(as)	State	Chilean St.	State
Santa Laura(Barra)	St.	CD.UL.	(as)	State	Chilean St.	State
Santa Laura(Wendell)	St.	Un.	(as)	State	Peruvian St.	State
Santa Rita	St.	Un.	(as)	State	Chilean St.	State
Santiago(Camina)	St.PC.VP.	Wk.	(as)	State	Chilean St.	n.a.
Solferino	St.PC.Owner.	Wk.	(5)	State	Chilean St.	Massardo,Félix
Tarapacá	St.PC.Rented.	Wk.	(3)	State	Chilean St.	Oviedo y Trillo
Trinidad	St.	CD.UL.	(as)	State	Chilean St.	State
Valparaíso	St.	CD.UL.	(as)	State	Chilean St.	State
Victoria	St.	CD.UL.	(as)	State	Chilean St.	State
Paradas						
Abra de Quiroga	St.	CD.UL.	(as)	State	Chilean St.	State
Abra de Ugarte	St.	CD.UL.	(as)	State	Chilean St.	State
Aguada	St.	CD.UL.	(as)	Dawson,Juan	British	Dawson,Juan
Andacollo	St.	CD.UL.	(as)	Folsch and Martin	German	Folsch and Martin
Ascención de Capetillo	St.	CD.UL.	(as)	State	Chilean St.	Capetillo,T.
Ascención de Loayza	St.	CD.UL.	(as)	State	Chilean St.	State
Asunta	St.	CD.UL.	(as)	State	Chilean St.	State
Banda	St.	CD.UL.	(as)	State	Chilean St.	State
Buena Esperanza	Pr.Owner.	UL.	(as)	Gárate,Vicente Jorge	Peruvian	Gárate,Vicente Jorge
Buenaventura	St.	CD.UL.	(as)	State	Chilean St.	State
Candelaria(de Carpio)	St.OUp.PV.	CD.UL.	(26)(32)	State	Chilean St.	State
Candelaria(de Osorio)	Pr.Dis.Owner.	UL.	(17)	Osorio,Pedro José	Peruvian	Osorio,Pedro José
Candelaria(de Perfetti)	St.	CD.UL.	(as)	State	Chilean St.	State
Candelaria(Zavala y Bilbao)	St.	CD.UL.	(as)	State	Chilean St.	State
Carmen(Morales)	St.	CD.UL.	(as)	State	Chilean St.	State
Carmen(Oviedo)	St.	CD.UL.	(as)	State	Chilean St.	State
Carmen(Scheel)	St.PC.Owner.	Wk.	(17)	State	Chilean St.	Scheel,Teodoro
Chilena	St.PC.Rented.	UL.	(as)	State	Chilean St.	Payne y Riss
Chinquiquiray(Zavala)	St.	CD.UL.	(as)	State	Chilean St.	State
Compañía(de Tarapacá)	St.	CD.UL.	(as)	State	Chilean St.	State
Concepción(Gárate)	Pr.Owner.	UL.	(as)	Gárate,Vicente Jorge	Peruvian	Gárate,Vicente Jorge
Cordillera	St.	CD.UL.	(26)	State	Chilean St.	State

Plants	Title 1880	Status 1880	Notes 1880	Owner 1881	Nationality 1881	Operator 1881
Cruz de Zapiga	St.	CD.Ul.	(as)	State	Chilean St.	State
Dolores(Compania América)	St.	CD.Ul.	(as)	State	Chilean St.	State
Encarnación	St.Rented.	Wk.	(22)	State	Chilean St.	Peine,Ernesto and Riss,Alfredo
Fortuna	St.	CD.Ul.	(as)	State	Chilean St.	State
Jazpampa(Zavala)	St.PC.Owner.	Ul.	(as)	State	Chilean St.	North,J.T.
Maramunqui	Pr.Owner.PNA.PV.	Ul.	(as)	Baluarde,Rosa Lecaros de	Peruvian	Baluarde,Rosa Lecaros de
Mercedes de Negreiros	St.Owner.	Ul.	(as)	State	Chilean St.	Vernal,Manuel
Negreiros	Pr.Owner.Ud.	CD.Ul.	(as)	Vernal,Manuel	Peruvian	Vernal,Manuel
Negreiros(Vernal)	St.	CD.Ul.	(as)	State	Chilean St.	State
Normandfa(San Antonio)	St.CR.	CD.Ul.	(as)	State	Chilean St.	State
Nueva Rosario	St.	CD.Ul.	(as)	State	Chilean St.	State
Parcha	St.	CD.Ul.	(as)	State	Chilean St.	State
Paccha(Bramez)	St.	CD.Ul.	(as)	State	Chilean St.	State
Pampa Negra	St.	CD.Ul.	(as)	State	Chilean St.	State
Paposo(parada)	St.	CD.Ul.	(as)	State	Chilean St.	State
Pasto	St.	CD.Ul.	(as)	State	Chilean St.	State
Primitiva	St.	CD.Ul.	(as)	Dawson,Juan	British	Dawson,Juan
Progreso	Pr.Owner.PNA.	Ul.	(as)	Quiroga,Evaristo and bros.	Peruvian	Quiroga,Evaristo and bros.
Ramírez	St.	CD.Ul.	(as)	Dawson,Juan	British	Dawson,Juan
Reducto	St.Owner.CR.	Ul.	(as)	State	Chilean St.	Cevallos,Manuela
Rincón(Aguirre)	Pr.Ud.	Neq.	(as)	Aguirre,Mariano	Peruvian	Aguirre,Mariano
Rincón(Benavides)	St.PC.Owner.	Ul.	(17)	State	Chilean St.	Benavides,Celestino
Rincón(Soruco)	St.	CD.Ul.	(as)	State	Chilean St.	State
Rosario(Beas)	St.PC.	Ul.	(5)	State	Chilean St.	Rodolfo Boivin
Rosario(Luza)	St.PC.Rented.	Wk.	(22)	State	Chilean St.	Luza,M[arcelino]
Rosario(Rfos)	St.	CD.Ul.	(as)	State	Chilean St.	State
Sacramento(Baluarde)	Pr.Owner.PNA.	Ul.	(as)	Baluarde,Rosa Lecaros de	Peruvian	Baluarde,Rosa Lecaros de
Sacramento(Castilla)	St.	Ul.	(as)	State	Chilean St.	n.a.
Sacramento(Loayza y Pascal)	Pr.PC.Rented.	Ul.	(5)	Loayza y Pascal	Peruvian	Labernadie,E.
Sacramento(Soto Flores)	St.PC.Rented.	Wk.	(22)	State	Chilean St.	Peyne,Ernesto/Riss,Alfredo
Salar del Carmen	St.	CD.Ul.	(as)	State	Chilean St.	State
San Antonio(Luza)	St.PC.Rented.	Ul.	(22)	State	Chilean St.	Peyne,Ernesto/Riss,Alfredo
San Antonio de Méjico	St.	CD.Ul.	(as)	State	Chilean St.	State
San Antonio(Soto Flores)	St.PC.Rented.	Ul.	(22)	State	Chilean St.	Peyne,Ernesto/Riss,Alfredo
San Antonio(Viejo)	St.	CD.Ul.	(as)	State	Chilean St.	State
San Benigno	St.	CD.Ul.	(as)	State	Chilean St.	State
San Cristóbal	St.	CD.Ul.	(as)	State	Chilean St.	State
San Fernando	Pr.Owner.	Wk.	(5)(22)(28)	Canelo,Jenaro	Chilean	Canelo,Jenaro
San Francisco(Campodónico)	St.	CD.Ul.	(as)	State	Chilean St.	State
San Francisco(Marquezado)	St.	CD.Ul.	(as)	State	Chilean St.	State
San Francisco(Zegarra)	St.	CD.Ul.	(as)	State	Chilean St.	State
San Jorge	Pr.Owner.	Ul.	(as)	State	Chilean St.	Ugarte,Cevallos y Cia.
San José de Alva	St.	Ul.	(as)	State	Chilean St.	n.a.
San José (Devescovi)	St.	CD.Ul.	(as)	State	Chilean St.	State
San José de Putunchara	St.	CD.Ul.	(as)	Sanguinetti,Juan	Chilean(?)	Sanguinetti,Juan
San Lorenzo(Granadino)	Pr.Owner.	CD.Ul.	(as)	Granadino,M.	Peruvian	Granadino,M.
San Lorenzo(Ramírez)	St.	Ul.	(as)	Marincovic,Juan	Chilean	Marincovic,Juan
San Lorenzo(Zavala)	St.	CD.Ul.	(as)	State	Chilean St.	State

Plants	Title 1880	Status 1880	Notes 1880	Owner 1881	Nationality 1881	Operator 1881
San Miguel(Cauvi)	St.	CD.Ul.	(as)	State	Chilean St.	State
San Miguel(Palacios)	St.	CD.Ul.	(as)	State	Chilean St.	State
San Nicolás	St.	Ul.	(as)	State	Chilean St.	Oviedo y Trillo
San Pascual	St.	CD.Ul.	(as)	State	Chilean St.	State
San Pedro(Ramírez)	St.	CD.Ul.	(as)	State	Chilean St.	State
San Rafael	Pr.Owner.	CD.Ul.	(as)	Orriols y Cia.	Peruvian	Orriols y Cia.
San Sebastián	St.	CD.Ul.	(as)	State	Chilean St.	State
Santa Beatriz	Pr.	Ul.	(as)	Elguera,Pedro	Peruvian	n.a.
Santa Clara y Challacollito	St.	CD.Ul.	(as)	State	Chilean St.	State
Santa Emilia	St.	CD.Ul.	(as)	State	Chilean St.	State
Santa Lucía	St.Owner.PC.	Wk.	(22)(28)	State	Chilean St.	Cevallos de Albarracín,Lucía
Santa Luisa	St.	CD.Ul.	(as)	Gildemeister,J.	German	Gildemeister,J.
Santa María	St.	CD.Ul.	(as)	State	Chilean St.	State
Santa Rosa	St.Rented.PC.	Wk.	(5)(22)(28)	State	Chilean St.	Peragallo,Gregorio
Santa Rosita	St.Rented.PC.	Wk.	(5)(22)(28)	State	Chilean St.	Contreras,Escipión
Santo Domingo	St.	CD.Ul.	(as)	State	Chilean St.	State
Santo Domingo(Vidoliche)	St.	CD.Ul.	(as)	State	Chilean St.	State
Silencio	St.	CD.Ul.	(as)	State	Chilean St.	State
Tordoya	Pr.Owner.	CD.Ul.	(as)	Pérez,Manuel María	Peruvian	Pérez,Manuel María
Tránsito	St.Rented.PTx.	CD.Ul.	(37)	State	Chilean St.	Sanguinetti,Juan
Tres Marías	St.	CD.Ul.	(as)	Humberstone,James T.	British	Humberstone,James T.
Unión	St.	CD.Ul.	(as)	State	Chilean St.	State
Virginia	St.	CD.Ul.	(as)	Richardson,David	British	Richardson,David
Yungay(Albarracín)	St.Owner.PC.	CD.Ul.	(5)(25)	State	Chilean St.	Albarracín,Lucía Cevallos de
Yungay Bajo	St.	CD.Ul.	(as)	State	Chilean St.	State
Yungay(Jentilar)	Pr.Owner.	CD.Ul.	(as)	Bustos,Héctor	Peruvian	Bustos,Héctor

Plants	Nationality 1881	Title 1881	Status 1881	Notes 1881	Owner 1882	Nationality 1882
Máquinas						
Agua Santa	British	St.PC.Owner.	Wk.	(3)	Campbell, John D.	British
Alianza	Chilean St.	St.	Un.	(15)	Gibbs & Co.	British
Angela	Peruvian	St.PC.Owner.	Wk.	(as)	Loayza y Pascal	Peruvian
Angeles	Chilean St.	St.	Un.	(as)	State	Chilean St.
Argentina	German	Pr.Owner.Rp.	CD.	(22)	Gildemeister, J.	German
Barrenechea	French	St.PC.Rented.	Wk.	(3)	State	Chilean St.
Bearnes	German/Chilean	St.PC.Rented.	Ul.	(3)	Layous/Deves	French
Buen Retiro	Chilean St.	St.	CD.	(as)	Harvey/Richardson	British
Calacala	Chilean(?)	Pr.Rented.	Wk.	(as)	Herrmann, Otto	German
California	Chilean St.	St.	CD.	(as)	State	Chilean St.
Candelaria	Chilean St.	St.	Un.	(as)	State	Chilean St.
Carmelitana	Chilean St.	St.	Un.	(as)	State	Chilean St.
Carmen Alto	Chilean St.	St.	CD.Gd.	(as)	State	Chilean St.
Carmen Bajo	Chilean St.	St.	CD.Gd.	(as)	State	Chilean St.
Carolina	Chilean St.	St.PC.Owner.	CD.Bd.	(5)	Ribos & Co.	British
Católica, La	Chilean St.	St.	CD.	(as)	State	Chilean St.
China	Chilean St.	St.	CD.	(as)	State	Chilean St.
Chinquiquiray(Oviedo y Trillo)	Peruvian	St.PC.Owner.	Ul.	(5)(22)(28)	Oviedo y Trillo	Peruvian
Concepción(Palacio Industrial)	Chilean St.	St.	CD.	(as)	State	Chilean St.
Dolores(Cobo)	Chilean St.	St.	CD.	(as)	State	Chilean St.
Esmeralda	British	St.PC.Owner.	Wk.	(6)(32)	Clark, Eck & Co.	British
Esperanza(Lagunas)	Chilean St.	St.	Dst.	(as)	Délano et al/North	Chilean/British
Hanza(S. Antonio-Gildemeister)	German	Pr.Owner.Rp.	CD.Bd.	(22)	Gildemeister, J.	German
Limena	Chilean St.	St.PC.Owner.	Wk.Gd.	(5)	Gibbs & Co.	British
Magdalena	Chilean St.	St.	Dst.	(as)	State	Chilean St.
Matilana	Chilean St.	St.	CD.	(as)	State	Chilean St.
Negreiros	Chilean St.	St.	Un.	(as)	State	Chilean St.
Nueva Carolina(y Pozo Almonte)	Chilean St.	St.	CD.	(as)	State	Chilean St.
Nueva Soledad	Chilean St.	St.	CD.	(as)	State	Chilean St.
Palma	British	Pr.PP.PC.Owner.	CD.	(22)	Gibbs & Co.	British
Paposo(máquina)	Chilean St.	St.	Wk.	(as)	Folsch and Martin	German
Pena Chica	German	Pr.Sub-rented.	Wk.	(32)	Aguirre, Mariano	Peruvian
Pena Grande	Chilean St.	St.	CD.	(as)	State	Chilean St.
Perla	Chilean St.	St.	CD.Gd.	(as)	State	Chilean St.
Peruana	Peruvian/(?)	St.PC.Rented.	Wk.	(as)	North/Harvey(C. Colorado)	British
Porvenir	British	Pr.Ps.PC.Rented.	Wk.	(3)(44)	North, J.T.	British
Providencia	Chilean St.	St.	CD.	(as)	State	Chilean St.
Resurrección(y Q.de Pazos)	Chilean St.	St.	Un.	(as)	State	Chilean St.
Rosario(Pérez)	Peruvian	Pr.Owner.	CD.	(as)	Pérez, Manuel María	Peruvian
Sacramento(Délano)	German	Pr.PC.Rented.GR.	Wk.	(5)(45)	Edwards, A. & Co.	Chilean
Salar de la Moria	Peruvian	St.PC.Owner.	Wk.	(3)	State	Chilean St.
San Agustín	Chilean St.	St.	CD.	(as)	State	Chilean St.
San Andrés	Peruvian	Pr.	CD.	(as)	Pérez, M. María	Peruvian
San Antonio(Campbell)	British	St.PC.Owner.	Wk.	(3)	Campbell, John D.	British
San Antonio(Pemaranda)	Peruvian	St.PC.Owner.	Ul.	(as)	State	Chilean St.
San Carlos	German	Pr.PC.Owner.Rp.	Wk.	(5)(28)	Folsch and Martin	German
San Francisco(Bramez)	Peruvian	Pr.VP.GR.	Ul.	(as)	Gibbs & Co.	British

Plants	Nationality 1881	Title 1881	Status 1881	Notes 1881	Owner 1882	Nationality 1882
San José(Aguirre)	German	Pr.PC.Rented.	Wk.	(17)	Aguirre,Mariano	Peruvian
San José de la Noria	Peruvian	St.PC.Owner.	Wk.	(5)	State	Chilean St.
San José(Yungay)	German	St.PC.Rented.	Wk.	(17)(25)	Folsch and Martin	German
San Juan(Gildemeister)	German	Pr.PC.Owner.Rp.	Wk.	(3)(22)	Gildemeister,J.	German
San Juan de Soledad	Chilean St.	St.	Un.	(5)(17)	State	Chilean St.
San Lorenzo(Ugarte)	Peruvian	St.PC.Owner.	Wk.	(5)	Ugarte y Cevallos y Cfa.	Peruvian
San Pablo	Peruvian	St.PC.Owner.CR.	Wk.	(as)	Barreda,E./Schroder,W.	Chilean/German
San Pedro	German	Pr.PC.Owner.Rp.	Wk.	(3)(22)	Gildemeister,J.	German
San Vicente	Chilean St.	St.Cst.	CD.	(as)	State	Chilean St.
Santa Adela	Peruvian(?)	St.PC.Owner.	Wk.	(28)	State	Chilean St.
Santa Ana	Chilean St.	St.Cst.	CD.	(as)	State	Chilean St.
Santa Catalina	German	St.PC.Rented.	Wk.	(as)	State	Chilean St.
Santa Isabel	Chilean St.	St.	CD.	(as)	State	Chilean St.
Santa Laura(Barra)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Santa Laura(Wendell)	Peruvian St.	St.	Un.	(as)	State	Chilean St.
Santa Rita	Chilean St.	St.	Un.	(as)	Brooking, Jorge	British
Santiago(Camina)	n.a.	St.PC.VP.	Wk.	(as)	State	Chilean St.
Solferino	Italian	St.PC.Owner.	Wk.	(5)	Goich and Zayes	Chilean
Tarapacá	Peruvian	St.PC.Rented.	Wk.	(as)	State	Chilean St.
Trinidad	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Valparaíso	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Victoria	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Paradas						
Abra de Quiroga	Chilean St.	St.	CD.Ul.	(as)	Loayza y Pascal	Peruvian
Abra de Ugarte	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Aguada	British	Pr.Ps.Owner.Rp.	CD.Ul.	(22)	Dawson, Juan	British
Andacollo	German	Pr.Ps.Owner.Rp.	CD.Ul.	(3)	Folsch and Martin	German
Ascención de Capetillo	Peruvian	St.	CD.Ul.	(as)	State	Chilean St.
Ascención de Loayza	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Asunta	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Banda	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Buena Esperanza	Peruvian	Pr.Owner.	Ul.	(as)	Gárate,Vicente Jorge	Peruvian
Buenaventura	Chilean St.	St.	CD.Ul.	(as)	Barril, Manuel	Peruvian
Candelaria(de Carpio)	Chilean St.	St.Oup.PV.	CD.Ul.	(32)	State	Chilean St.
Candelaria(de Osorio)	Peruvian	Pr.Dis.Owner.	Ul.	(17)	Osorio, Pedro José	Peruvian
Candelaria(de Perfetti)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Candelaria(Zavala y Bilbao)	Chilean St.	St.	CD.Ul.	(as)	Loayza y Pascal	Peruvian
Carmen(Morales)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Carmen(Oviedo)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Carmen(Scheel)	German	St.PC.Owner.	Wk.	(17)	State	Chilean St.
Chilena	Chilean	St.PC.Rented.	Ul.	(as)	State	Chilean St.
Chinquiquiray(Zavala)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Compañía(de Tarapacá)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Concepción(Gárate)	Peruvian	Pr.Owner.	Ul.	(as)	Gárate,Vicente Jorge	Peruvian
Cordillera	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.

Plants	Nationality 1881	Title 1881	Status 1881	Notes 1881	Owner 1882	Nationality 1882
Cruz de Zapiga	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Dolores(Companfa América)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Encarnación	Chilean(?)	St.Rented.	Ul.	(as)	State	Chilean St.
Fortuna	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Jazpampa(Zavala)	British	St.Ps.CPt.PC.Owner.	Wk.	(3)	North,J.T./Gibbs & Co.	British
Matamunqui	Peruvian	Pr.Owner.PNA.PV.	Ul.	(as)	Baluarte,Rosa Lecaros de	Peruvian
Mercedes de Negreiros	Peruvian	St.Owner.	Ul.	(as)	State	Chilean St.
Negreiros	Peruvian	Pr.Owner.Ud.	CD.Ul.	(as)	Vernal,Manuel	Peruvian
Negreiros(Vernal)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Normandfa(San Antonio)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Nueva Rosario	Chilean St.	St.	CD.Ul.	(as)	Gibbs & Co.	British
Paccha	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Paccha(Bramez)	Chilean St.	St.	CD.Ul.	(as)	Gibbs & Co.	British
Pampa Negra	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Paposo(parada)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Pasto	Chilean St.	St.RpD.	CD.Ul.	(22)(53)	State	Chilean St.
Primitiva	British	Pr.Ps.Owner.Rp.	CD.Ul.	(22)	Dawson,Juan	British
Progreso	Peruvian	Pr.Owner.PNA.	Ul.	(as)	Quiroga,Evaristo and bros.	Peruvian
Ramfrez	British	Pr.Ps.Owner.Rp.	CD.Ul.	(5)	Dawson,Juan	British
Reducto	Peruvian	St.Owner.CR.	CD.Cst.	(3)	State	Chilean St.
Rincón(Aguirre)	Peruvian	Pr.Ud.	Neq.	(as)	Aguirre,Mariano	Peruvian
Rincón(Benavides)	Peruvian	St.PC.Owner.	Ul.	(17)	State	Chilean St.
Rincón(Soruco)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Rosario(Beas)	French(?)	St.Rented.PC.	Ul.	(5)	Rodolfo Boivin	French(?)
Rosario(Luza)	Peruvian	St.PC.Owner.	Ul.	(22)	Vernal y Castro,Juan	Peruvian
Rosario(Rfos)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Sacramento(Baluarte)	Peruvian	Pr.Owner.PNA.	Ul.	(as)	Baluarte,Rosa Lecaros de	Peruvian
Sacramento(Castilla)	n.a.	St.	Ul.	(as)	Granja,Matias	Chilean
Sacramento(Loayza y Pascal)	French	Pr.PC.Rented.	Ul.	(5)	Loayza y Pascal	Peruvian
Sacramento(Soto Flores)	Chilean	St.PC.Rented.	Ul.	(as)	State	Chilean St.
Salar del Carmen	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Antonio(Luza)	Chilean	St.PC.Rented.	Ul.	(as)	Loayza,Juan	Peruvian
San Antonio de Méjico	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Antonio(Soto Flores)	Chilean	St.PC.Rented.PDn.Csh.	Wk.	(5)(6)(17)	State	Chilean St.
San Antonio(Viejo)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Benigno	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Cristóbal	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Fernando	Chilean	Pr.Owner.	Wk.	(5)(22)(28)	Canelo,Jenaro	Chilean
San Francisco(Campodónico)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Francisco(Marquezado)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Francisco(Zegarra)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Jorge	Peruvian	Pr.Owner.	Ul.	(as)	Gibbs & Co.	British
San José de Alva	n.a.	St.	Ul.	(as)	Cevallos,Nicolás	Peruvian
San José (Devescovi)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San José de Putunchara	Chilean(?)	Pr.Ps.Owner.Rp.	CD.Ul.	(22)	Sanguinetti,Juan	Chilean(?)
San Lorenzo(Granadino)	Peruvian	Pr.Owner.GR.	CD.Ul.	(17)(22)	Granadino,M.	Peruvian
San Lorenzo(Ramfrez)	Chilean	Pr.Ps.Owner.Rp.	Ul.	(5)	Marincovic,Juan	Chilean
San Lorenzo(Zavala)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.

Plants	Nationality 1881	Title 1881	Status 1881	Notes 1881	Owner 1882	Nationality 1882
San Miguel(Cauvi)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Miguel(Palacios)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Nicolás	Peruvian	St.PC.Rented.	Wk.	(5)(6)(22)	Loayza y Pascal (Loayza,Juan)	Peruvian
San Pascual	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Pedro(Ramirez)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Rafael	Peruvian	Pr.Owner.GR.	CD.Ul.	(5)	Granja and Astoreca	Chilean
San Sebastián	Chilean St.	St.	CD.Ul.	(as)	Jewell,Maurice	British
Santa Beatriz	n.a.	Pr.	Ul.	(as)	Elguera,Pedro	Peruvian
Santa Clara y Challacollito	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Santa Emilia	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Santa Lucía	Peruvian	St.Owner.PC.	Wk.	(22)(28)	Herrmann,Otto	German
Santa Luisa	German	Pr.Ps.Owner.Rp.	CD.Ul.	(22)	Gildemeister,J.	German
Santa María	Chilean St.	St.	CD.Ul.	(as)	Jewell,Maurice	British
Santa Rosa	Chilean(?)	St.Rented.PC.	Wk.	(5)(22)(25)	State	Chilean St.
Santa Rosita	Peruvian	St.Rented.PC.	Wk.	(5)(22)(28)	State	Chilean St.
Santo Domingo	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Santo Domingo(Vidoliche)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Silencio	Chilean St.	St.	CD.Ul.	(as)	Watters Bros.(Watters,Alfonso)	British
Tordoya	Peruvian	Pr.Owner.	CD.Ul.	(as)	Pérez,Manuel María	Peruvian
Tránsito	Chilean(?)	St.Rented.PTx.	CD.Ul.	(37)	Sanguinetti,Juan(Feliú,Daniel)	Chilean(?)
Tres Marías	British	Pr.Ps.Owner.PP.	Ul.	(5)(22)	Perfetti,Pedro	Italian
Unión	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Virginia	British	Pr.Ps.Owner.PP.	CD.Ul.	(22)	Folsch and Martin	German
Yungay(Albarracín)	Peruvian	St.Owner.PC.PDn.	CD.Ul.	(5)(17)(25)	Albarracín,Idelfonsa	Peruvian
Yungay Bajo	Chilean St.	St.	CD.Ul.	(as)	Folsch and Martin	German
Yungay(Jentilar)	Peruvian	Pr.Owner.	CD.Ul.	(as)	Bustos,Héctor	Peruvian

Plants	Operator 1882	Nationality 1882	Title 1882	Status 1882	Results 1882	Notes 1882
Máquinas						
Agua Santa	Campbell, John D.	British	Pr. Owner.Rp.	Wk.	Nof.	(5)(6)(10)
Alianza	Gibbs & Co.	British	Pr. Owner.	Un.	Auc.	(16)
Angela	Loayza y Pascal	Peruvian	Pr. Owner.	Wk.	Auc.	(10)(16)
Angeles	State	Chilean St.	St.	Un.	Us.	(6)(16)
Argentina	Gildemeister, J.	German	Pr. Owner.	CD. Ul.	Nof.	(10)
Barrenechea	Freraut, Carlos	French	St. PC. Owner.	CD. Ul.	Nof.	(6)(10)(24)
Bearnes	Layous/Deves	French	Pr. Owner.	CD.	Au.	(10)(16)
Buen Retiro	Harvey/Richardson	British	Pr. Owner.Rp.	NM. Wk.	Nof.	(5)(17)
Calacala	Herrmann, Otto	German	Pr. Owner.	Wk.	Nof.	(10)(17)(19)
California	State	Chilean St.	St.	CD. Ul.	Us.	(16)
Candelaria	State	Chilean St.	St.	Un.	Us.	(6)(16)
Carmelitana	State	Chilean St.	St.	Un.	Nof.	(16)
Carmen Alto	State	Chilean St.	St.	CD. Gd.	Us.	(6)(16)
Carmen Bajo	State	Chilean St.	St.	CD. Md.	Us.	(6)(16)
Carolina	Gibbs & Co.	British	Pr. PC. Owner. Rp.	CD. Bd.	Us.	(5)(6)(16)
Católica, La	State	Chilean St.	St.	CD. Md.	Us.	(6)(16)
China	State	Chilean St.	St.	CD. Bd.	Us.	(6)(16)
Chinquiquiray(Oviedo y Trillo)	Oviedo y Trillo	Peruvian	Pr. PC. Owner.	CD. Ul.	Us.	(16)
Concepción(Palacio Industrial)	State	Chilean St.	St.	CD. Bd.	Us.	(6)(16)
Dolores(Cobo)	State	Chilean St.	St.	CD. Gd.	Us.	(6)(16)
Esmeralda	Clark, Eck & Co.	British	Pr. PC. Owner.	Wk.	Us.	(6)(10)(16)
Esperanza(Lagunas)	Délano et al/North	Chilean/British	Pr. Owner. Rp.	Dst	Nof.	(39)(40)
Hanza(S. Antonio-Gildemeister)	Gildemeister, J.	German	Pr. Owner.	CD. Bd. Gd.	Nof.	(6)
Lima	Gibbs & Co.	British	PC. Owner. Rp.	Wk. Gd.	Us.	(5)(6)(10)(16)
Magdalena	State	Chilean St.	St.	Dst.	Us.	(16)
Matillana	State	Chilean St.	St.	CD. Bd.	Us.	(6)(16)(17)
Negreiros	State	Chilean St.	St.	Un.	Us.	(6)(16)
Nueva Carolina(y Pozo Almonte)	State	Chilean St.	St.	CD. Bd.	Us.	(6)(16)
Nueva Soledad	State	Chilean St.	St.	CD. Gd.	Us.	(6)(16)
Palma	Gibbs & Co.	British	Pr. PP. PC. Owner.	Wk.	Nof.	(10)
Paposo(máquina)	Folsch and Martin	German	Pr. Owner. Rp.	Wk.	Nof.	(5)
Pena Chica	Folsch and Martin	German	Sub-rented. Pr.	Wk.	Nof.	(32)
Pena Grande	State	Chilean St.	St.	CD. Gd.	Us.	(6)(16)
Perla	State	Chilean St.	St.	CD. Gd.	Us.	(6)(16)
Peruana	North/Harvey(C. Colorado)	British	Pr. PC. Owner.	Wk.	Au.	(6)(16)(42)(43)
Porvenir	Brooking, James & Co.	British	Pr. PC. Rented.	Wk.	Us.	(6)(7)(10)(16)
Providencia	State	Chilean St.	St.	CD. Gd.	Us.	(6)(16)
Resurrección(y Q. de Pazos)	State	Chilean St.	St.	CD. Bd.	Us.	(6)(16)
Rosario(Pérez)	Pérez, Manuel María	Peruvian	Pr. Owner.	CD.	Nof.	(5)
Sacramento(Délano)	Folsch and Martin	German	Pr. PC. Rented.	Wk.	Nof.	(5)
Salar de la Noria	Ugarte, Cevallos y Cia.	Peruvian	St. PC. Owner.	CD. DE. Gd.	Us.	(6)(16)(17)
San Agustín	State	Chilean St.	St.	CD. Gd.	Us.	(6)(16)
San Andrés	Pérez, M. María	Peruvian	Pr.	CD.	Nof.	(as)
San Antonio(Campbell)	Campbell, John D.	British	Pr. Owner. Rp.	Wk.	Nof.	(5)(6)(10)
San Antonio(Penaranda)	Penaranda, Eusebio	Peruvian	St. PC. Owner.	CD. Gd. DE.	Us.	(6)(16)(17)
San Carlos	Folsch and Martin	German	Pr. PC. Owner.	Wk.	Nof.	(5)(28)
San Francisco(Bramez)	Gibbs & Co.	British	Pr. Ps. Owner. GR.	Wk.	Nof.	(5)(10)

Plants	Operator 1882	Nationality 1882	Title 1882	Status 1882	Results 1882	Notes 1882
San José(Aguirre)	Herrmann,Otto	German	Pr.PC.Rented.	Wk.	Nof.	(17)
San José de la Noria	Fasola,Pfo	Peruvian	St.PC.Owner.	CD.Bd.	Us.	(5)(6)(16)(20)
San José(Yungay)	Folsch and Martin	German	Pr.PC.Owner.	Dst.PDp.	Au.	(5)(16)(17)(25)
San Juan(Gildemeister)	Gildemeister,J.	German	Pr.Owner.	Wk.WO.	Nof.	(7)(10)
San Juan de Soledad	State	Chilean St.	St.	Un.	Us.	(5)(16)(17)
San Lorenzo(Ugarte)	Ugarte y Cevallos y Cfa.	Peruvian	Pr.PC.Owner.Rp.	Wk.	Nof.	(5)(10)
San Pablo	Barreda,E./Schroder,W.	Chilean/German	Pr.Ps.Owner.Rp.	Wk.	Nof.	(5)(10)
San Pedro	Gildemeister,J.	German	Pr.Owner.	Wk.	Nof.	(7)(10)
San Vicente	State	Chilean St.	St.Cst.	CD.Gd.	Us.	(6)(16)
Santa Adela	Devescovi,J.	Peruvian(?)	St.PC.Owner.	Wk.	Nof.	(28)
Santa Ana	State	Chilean St.	St.Cst.	CD.Gd.	Us.	(6)(16)
Santa Catalina	Harnecker,Otto	German	St.PC.Rented.	Wk.	Us.	(6)(16)
Santa Isabel	State	Chilean St.	St.	Dst.PDp.	Us.	(6)(16)
Santa Laura(Barra)	State	Chilean St.	St.	CD.Bd.	Us.	(6)(16)
Santa Laura(Wendell)	State	Peruvian St.	St.	Un.Inc.	Us.	(6)(16)
Santa Rita	Brooking,Jorge	British	Pr.Owner.	Dst.DGd.	Au.	(6)(16)
Santiago(Camina)	Perfetti,Pedro	Italian	St.PC.Rented.	Wk.	Us.	(6)(10)(16)
Solferino	Goich and Zayes	Chilean	Pr.Ps.PC.Owner.	Wk.	Au.	(6)(16)
Tarapacá	Oviedo y Trillo	Peruvian	St.PC.Rented.	Wk.	Us.	(10)(16)
Trinidad	State	Chilean St.	St.	CD.Bd.	Us.	(6)(16)
Valparaiso	State	Chilean St.	St.	Un.	Us.	(6)(16)
Victoria	State	Chilean St.	St.	Dst.	Us.	(6)(16)
Paradas						
Abra de Quiroga	Loayza y Pascal	Peruvian	Pr.Owner.	CD.	Au.	(6)(16)
Abra de Ugarte	State	Chilean St.	St.	CD.	Us.	(6)(16)
Aguada	Dawson,Juan	British	Pr.Owner.	CD.Ul.	Nof.	(as)
Andacollo	Folsch and Martin	German	Pr.Owner.	CD.Ul.	Nof.	(as)
Ascención de Capetillo	State	Chilean St.	St.	Cu.	Us.	(6)(16)
Ascención de Loayza	State	Chilean St.	St.	CD.	Us.	(6)(16)
Asunta	State	Chilean St.	St.	CD.	Us.	(6)(16)
Banda	State	Chilean St.	St.	CD.	Us.	(6)(16)
Buena Esperanza	Gárate,Vicente Jorge	Peruvian	Pr.Owner.	CD.Ul.	Nof.	(as)
Buenaventura	Barril,Manuel	Peruvian	Pr.Owner.	CD.	Au.	(6)(16)(17)
Candelaria(de Carpio)	State	Chilean St.	St.Cst.Abd.	CD.Ul.	Nof.	(17)
Candelaria(de Osorio)	Osorio,Pedro José	Peruvian	Pr.Owner.	Ul.	Nof.	(17)
Candelaria(de Perfetti)	State	Chilean St.	St.	CD.	Us.	(6)(16)
Candelaria(Zavala y Bilbao)	Loayza y Pascal	Peruvian	Pr.Ps.Owner.Rp.	CD.	Nof.	(5)
Carmen(Morales)	State	Chilean St.	St.	CD.	Us.	(6)(16)
Carmen(Oviedo)	State	Chilean St.	St.	CD.	Us.	(6)(16)
Carmen(Scheel)	State	Chilean St.	St.Cst.Abd.	CD.Md.	Us.	(6)(16)(17)
Chilena	Peyne y Riss	Chilean	St.PC.Rented.	Wk.	Us.	(6)(10)(16)
Chinquiquiray(Zavala)	State	Chilean St.	St.	CD.	Us.	(6)(16)
Compañía(de Tarapacá)	Ramírez,Juan	Peruvian	St.PC.Owner.	Wk.	Us.	(6)(10)(16)
Concepción(Gárate)	Labernadie,E.	French	Pr.Rented.	Wk.NM.	Nof.	(10)(17)(19)(25)
Cordillera	State	Chilean St.	St.	Ul	Nof.	(as)

Plants	Operator 1882	Nationality 1882	Title 1882	Status 1882	Results 1882	Notes 1882
Cruz de Zapiga	State	Chilean St.	St.	CD.	Us.	(6)(16)
Dolores(Compañía América)	State	Chilean St.	St.	CD.	Us.	(6)(16)
Encarnación	State	Chilean St.	St.	CD.	Us.	(6)(16)
Fortuna	State	Chilean St.	St.	CD.	Us.	(6)(16)
Jazpampa(Zavala)	Gibbs & Co.	British	Pr.Owner.Rp.	Wk.	Nof.	(3)(5)(10)
Matamunqui	Baluart, Rosa Lecaros de	Peruvian	Pr.Owner.PNA.PV.	Wk.	Nof.	(32)
Mercedes de Negreiros	Vernal, Manuel	Peruvian	St.Owner.	Ul.	Nof.	(as)
Negreiros	Vernal, Manuel	Peruvian	Pr.Owner.Ud.	CD.Ul.	Nof.	(as)
Negreiros(Vernal)	State	Chilean St.	St.	CD.	Us.	(6)(16)
Normandía(San Antonio)	State	Chilean St.	St.	CD.Ul.	Nof.	(as)
Nueva Rosario	Gibbs & Co.	British	Pr.Ps.Owner.GR.Rp.	CD.Ul.	Nof.	(5)
Paccha	State	Chilean St.	St.	CD.	Us.	(6)(16)
Paccha(Bramez)	Gibbs & Co.	British	Pr.Ps.Owner.GR.Rp.	CD.Ul.	Nof.	(5)
Pampa Negra	State	Chilean St.	St.	CD.	Us.	(6)(16)
Paposo(parada)	State	Chilean St.	St.	CD.Ul.	Nof.	(as)
Pasto	State	Chilean St.	St.	CD.	Us.	(6)(16)
Primitiva	Dawson, Juan	British	Pr.Owner.	CD.Ul.	Nof.	(as)
Progreso	Quiroga, Evaristo and bros.	Peruvian	Pr.Owner.	Wk.NM.	Nof.	(2)(32)
Ramírez	Dawson, Juan	British	Pr.Owner.	CD.Ul.	Nof.	(as)
Reducto	Cevallos, Manuela	Peruvian	St.Owner.CR.	CD.Cst.	Nof.	(as)
Rincón(Aguirre)	Folsch and Martin	German	Pr.Rented.	Neq.UOp.	Nof.	(5)
Rincón(Benavides)	State	Chilean St.	St.Cst.Abd.	CD.	Us.	(6)(16)
Rincón(Soruco)	State	Chilean St.	St.	CD.	Us.	(6)(16)
Rosario(Beas)	Rodolfo Bolvin	French(?)	Pr.PC.Ps.Owner.Rp.	Wk.	Nof.	(5)(10)
Rosario(Luza)	Vernal y Castro, Juan	Peruvian	Pr.PC.Ps.Owner.Rp.	Ul.	Nof.	(5)(22)
Rosario(Ríos)	State	Chilean St.	St.	CD.	Us.	(6)(16)
Sacramento(Baluart)	Baluart, Rosa Lecaros de	Peruvian	Pr.Owner.GR.	Wk.	Nof.	(5)(10)
Sacramento(Castilla)	Granja, Matías	Chilean	Pr.Ps.Owner.Rp.	Wk.	Nof.	(5)(7)(10)
Sacramento(Loayza y Pascal)	Labernadie, E.	French	Pr.PC.Rented.	Ul.	Nof.	(5)
Sacramento(Soto Flores)	Peyne, Ernesto/Riss, Alfredo	Chilean	St.PC.Rented.	Wk.	Us.	(6)(16)
Salar del Carmen	State	Chilean St.	St.	CD.	Us.	(6)(16)
San Antonio(Luza)	Loayza, Juan	Peruvian	Pr.Ps.Owner.	CD.	Au.	(6)(16)
San Antonio de Méjico	State	Chilean St.	St.	CD.	Us.	(6)(16)
San Antonio(Soto Flores)	Peyne, Ernesto/Riss, Alfredo	Chilean	St.PC.Rented.	Wk.	Us.	(6)(16)
San Antonio(Viejo)	State	Chilean St.	St.	CD.	Us.	(6)(16)
San Benigno	State	Chilean St.	St.	CD.	Us.	(6)(16)
San Cristóbal	State	Chilean St.	St.	CD.	Us.	(6)(16)
San Fernando	Cenelo, Jenaro	Chilean	Pr.Owner.	Wk.	Nof.	(5)(10)(22)(28)
San Francisco(Campodónico)	State	Chilean St.	St.	CD.	Us.	(6)(16)
San Francisco(Marquezado)	State	Chilean St.	St.	CD.	Us.	(6)(16)
San Francisco(Zegarra)	State	Chilean St.	St.	CD.	Us.	(6)(16)
San Jorge	Gibbs & Co.	British	Pr.Ps.Owner.	CD.	Au.	(6)(16)
San José de Alva	Cevallos, Nicolás	Peruvian	Pr.Owner.	Wk.	Au.	(10)(16)
San José (Devescovi)	State	Chilean St.	St.	CD.	Us.	(6)(16)
San José de Putunchara	Sanguinetti, Juan	Chilean(?)	Pr.Owner.	CD.Ul.	Nof.	(as)
San Lorenzo(Granadino)	Granadino, M.	Peruvian	Pr.Owner.	CD.	Ud.	(6)
San Lorenzo(Ramírez)	Marincovic, Juan	Chilean	Pr.Owner.	Wk.NCh.	Nof.	(10)(59)
San Lorenzo(Zavala)	State	Chilean St.	St.	CD.	Us.	(6)(16)

Plants	Operator 1882	Nationality 1882	Title 1882	Status 1882	Results 1882	Notes 1882
San Miguel (Cauvi)	State	Chilean St.	St.	CD.	Us.	(6)(16)
San Miguel (Palacios)	State	Chilean St.	St.	CD.	Us.	(6)(16)
San Nicolás	Oviedo y Trillo	Peruvian	Pr.PC.Rented.	Wk.	Au.	(5)(6)(22)
San Pascual	State	Chilean St.	St.	CD.	Us.	(6)(16)
San Pedro (Ramírez)	State	Chilean St.	St.	CD.	Us.	(6)(16)
San Rafael	Granja and Astoreca	Chilean	Pr.Ps.Owner.	CD.	Nof.	(17)
San Sebastián	Jewell, Maurice	British	Pr.Ps.Owner.	CD.	Au.	(6)(16)
Santa Beatriz	Herrmann, Otto	German	Pr.Rented.GR.	Wk.	Nof.	(5)(10)(32)
Santa Clara y Challacollito	State	Chilean St.	St.	CD.Gd.	Us.	(6)(16)
Santa Emilia	State	Chilean St.	St.	CD.	Us.	(6)(16)
Santa Lucía	Herrmann, Otto	German	Pr.Ps.Owner.PC.	Wk.	Nof.	(22)(25)(28)
Santa Luisa	Gildemeister, J.	German	Pr.Owner.	CD.Ul.	Nof.	(as)
Santa María	Jewell, Maurice	British	Pr.Ps.Owner.	CD.	Au.	(6)(16)
Santa Rosa	Peragallo, Gregorio	Chilean(?)	St.Rented.PC.	CD.	Us.	(5)(16)(22)(28)
Santa Rosita	Contreras, Escipión	Peruvian	St.Rented.PC.	Wk.	Us.	(5)(10)(16)(22)(28)
Santo Domingo	State	Chilean St.	St.	CD.	Us.	(as)
Santo Domingo (Vidoliche)	State	Chilean St.	St.	CD.Ul.	Nof.	(as)
Silencio	Watters Bros. (Watters, Alfonso)	British	Pr.Ps.Owner.	CD.	Au.	(6)(16)
Tordoya	Pérez, Manuel María	Peruvian	Pr.Owner.	CD.Ul.	Ud.	(as)
Tránsito	Sanguinetti, Juan	Chilean(?)	Pr.Ps.Owner.	CD.Mgr(?)	Au.	(6)(16)(63)
Tres Marías	Perfetti, Pedro	Italian	Pr.Ps.Owner.	Wk.	Nof.	(10)(32)
Unión	State	Chilean St.	St.	CD.	Us.	(6)(16)
Virginia	Folsch and Martin	German	Pr.Ps.Owner.Rp.	Wk.NM.	Nof.	(10)(17)(19)(64)
Yungay (Albarracín)	Albarracín, Idelfonsa	Peruvian	Pr.Owner.Rp.	CD.	Nof.	(5)(17)(25)
Yungay Bajo	Folsch and Martin	German	Pr.Ps.Owner.	Wk.	Nof.	(6)(10)(16)
Yungay (Jentilar)	Bustos, Héctor	Peruvian	Pr.Owner.	CD.Ul.	Nof.	(as)

Plants	Owner 1883	Nationality 1883	Operator 1883	Nationality 1883	Title 1883
Máquinas					
Agua Santa	Campbell, Outram & Co.	British	Campbell, Outram & Co.	British	Pr. Owner.
Alianza	Gibbs & Co.	British	Gibbs & Co.	British	Pr. Owner.
Angela	Loayza y Pascal	Peruvian	Loayza y Pascal	Peruvian	Pr. Owner.
Angeles	State	Chilean St.	State	Chilean St.	St.
Argentina	Gildemeister, J.	German	Gildemeister, J.	German	Pr. Owner.
Barrenechea	Freraut, Carlos	French	Freraut, Carlos	French	St.
Bearnes	Deves Freres	French	Deves Freres	French	Pr. Owner.
Buen Retiro	Cia. Colorada	British	Cia. Colorada	British	Pr. Owner.
Calacala	Herrmann, Otto	German	Herrmann, Otto	German	Pr. Rented.
California	State	Chilean St.	State	Chilean St.	St.
Candelaria	State	Chilean St.	State	Chilean St.	St.
Carmelitana	State	Chilean St.	State	Chilean St.	St.
Carmen Alto	State	Chilean St.	State	Chilean St.	St.
Carmen Bajo	State	Chilean St.	State	Chilean St.	St.
Carolina	Gibbs & Co.	British	Gibbs & Co.	British	Pr. Owner.
Católica, La	State	Chilean St.	State	Chilean St.	St.
China	State	Chilean St.	State	Chilean St.	St.
Chinquiquiray (Ovieco y Trillo)	Oviedo y Trillo	Peruvian	Oviedo y Trillo	Peruvian	Pr. PC. Owner.
Concepción (Palacio Industrial)	State	Chilean St.	State	Chilean St.	St.
Dolores (Cobo)	State	Chilean St.	State	Chilean St.	St.
Esmeralda	Eck, Trevor & Co.	British	Eck, Trevor & Co.	British	Pr. PC. Owner. Rp.
Esperanza (Lagunas)	North, J. T.	British	North, J. T.	British	Pr. Owner.
Hanza (S. Antonio-Gildemeister)	Gildemeister, J.	German	Gildemeister, J.	German	Pr. Owner.
Limena	Gibbs & Co.	British	Gibbs & Co.	British	Pr. Owner.
Magdalena	State	Chilean St.	State	Chilean St.	St.
Matillana	State	Chilean St.	State	Chilean St.	St.
Negreiros	State	Chilean St.	State	Chilean St.	St.
Nueva Carolina (y Pozo Almonte)	Harvey, Robert	British	Harvey, Robert	British	Pr. Owner. Rp.
Nueva Soledad	State	Chilean St.	State	Chilean St.	St.
Palma	Gibbs & Co. (Gmo. Gibson)	British	Gibbs & Co. (Gmo. Gibson)	British	Pr. Owner. Rp.
Paposo (máquina)	Folsch and Martin	German	Folsch and Martin	German	Pr. Owner.
Pena Chica	Aguirre, José de	Peruvian	Folsch and Martin	German	Pr. Rented.
Pena Grande	State	Chilean St.	State	Chilean St.	St.
Perla	State	Chilean St.	State	Chilean St.	St.
Peruana	North/Harvey (C. Colorado)	British	North/Harvey (C. Colorado)	British	Pr. PC. Owner.
Porvenir	State	Chilean St.	Brooking, Jorge	British	St.
Providencia	State	Chilean St.	State	Chilean St.	St.
Resurrección (y Q. de Pazos)	State	Chilean St.	State	Chilean St.	St.
Rosario (Pérez)	Pérez, Manuel María	Peruvian	State	Chilean St.	St. Cst. Abd.
Sacramento (Délano)	Subercaseaux, Francisco	Chilean	Folsch and Martin	German	Pr. Ps. CR. PC. Rented.
Salar de la Noria	State	Chilean St.	State	Chilean St.	St.
San Agustín	State	Chilean St.	State	Chilean St.	St.
San Andrés	State	Chilean St.	State	Chilean St.	St. Cst. Abd.
San Antonio (Campbell)	Campbell, Outram & Co.	British	Campbell, Outram & Co.	British	Pr. Owner.
San Antonio (Penaranda)	State	Chilean St.	Penaranda, Eusebio	Peruvian	St. PC. Owner.
San Carlos	Folsch and Martin	German	Folsch and Martin	German	Pr. PC. Owner.
San Francisco (Brazes)	Gibbs & Co.	British	Gibbs & Co.	British	Pr. Owner.

Plants	Owner 1883	Nationality 1883	Operator 1883	Nationality 1883	Title 1883
San José(Aguirre)	Aguirre,Mariano	Peruvian	Herrmann,Otto	German	Pr.Rented.
San José de la Noria	State	Chilean St.	State	Chilean St.	St.
San José(Yungay)	Folsch and Martin	German	Folsch and Martin	German	Pr.Owner.
San Juan(Gildemeister)	Gildemeister,J.	German	Gildemeister,J.	German	Pr.Owner.
San Juan de Soledad	State	Chilean St.	State	Chilean St.	St.
San Lorenzo(Ugarte)	Ugarte y Cevallos y Cía.	Peruvian	Ugarte y Cevallos y Cía.	Peruvian	Pr.PC.Owner.
San Pablo	Barreda,E./Schroder,W.	Chilean/German	Barreda,E./Schroder,W.	Chilean/German	Pr.Owner.
San Pedro	Gildemeister,J.	German	Gildemeister,J.	German	Pr.Owner.
San Vicente	State	Chilean St.	State	Chilean St.	St.Cst.
Santa Adela	State	Chilean St.	Devescovi,J.	Peruvian(?)	St.PC.Owner.
Santa Ana	State	Chilean St.	State	Chilean St.	St.Cst.
Santa Catalina	State	Chilean St.	Harnecker,Otto	German	St.PC.Rented.
Santa Isabel	State	Chilean St.	State	Chilean St.	St.
Santa Laura(Barra)	State	Chilean St.	State	Chilean St.	St.
Santa Laura(Wendell)	State	Chilean St.	State	Chilean St.	St.
Santa Rita	Brooking,Jorge	British	Brooking,Jorge	British	Pr.Owner.
Santiago(Camina)	Perfetti,Pedro	Italian	Perfetti,Pedro	Italian	Pr.Ps.PC.Owner.Rp.
Solferino	Goich and Zayes	Chilean	Goich and Zayes	Chilean	Pr.PC.Owner.
Tarapacá	State	Chilean St.	Oviedo y Trillo	Peruvian	St.PC.Rented.
Trinidad	State	Chilean St.	State	Chilean St.	St.
Valparaiso	State	Chilean St.	State	Chilean St.	St.
Victoria	State	Chilean St.	State	Chilean St.	St.
Paradas					
Abra de Quiroga	Loayza y Pascal	Peruvian	Loayza y Pascal	Peruvian	Pr.Owner.
Abra de Ugarte	State	Chilean St.	State	Chilean St.	St.
Aguada	Dawson,Juan	British	Dawson,Juan	British	Pr.Owner.
Andacollo	Folsch and Martin	German	Folsch and Martin	German	Pr.Owner.
Ascención de Capetillo	State	Chilean St.	State	Chilean St.	St.
Ascención de Loayza	State	Chilean St.	State	Chilean St.	St.
Asunta	State	Chilean St.	State	Chilean St.	St.
Banda	State	Chilean St.	State	Chilean St.	St.
Buena Esperanza	State	Chilean St.	State	Chilean St.	St.Cst.Abd.
Buenaventura	Barril,Manuel	Peruvian	Barril,Manuel	Peruvian	Pr.Owner.
Candelaria(de Carpio)	State	Chilean St.	State	Chilean St.	St.Cst.Abd.
Candelaria(de Osorio)	Devescovi,J.	Peruvian(?)	Devescovi,J.	Peruvian(?)	Pr.Owner.
Candelaria(de Perfetti)	State	Chilean St.	State	Chilean St.	St.
Candelaria(Zavala y Bilbao)	Loayza y Pascal	Peruvian	Loayza y Pascal	Peruvian	Pr.Owner.
Carmen(Morales)	n.a.	n.a.	State	Chilean St.	St.
Carmen(Oviedo)	State	Chilean St.	State	Chilean St.	St.
Carmen(Scheel)	State	Chilean St.	State	Chilean St.	St.
Chilena	State	Chilean St.	Peyme y Riss	Chilean	St.PC.Rented.
Chinquiquiray(Zavala)	State	Chilean St.	State	Chilean St.	St.
Compañía(de Tarapacá)	State	Chilean St.	Ramfrez,Juan	Peruvian	St.PC.Owner.
Concepción(Gárate)	Gárate,Vicente Jorge	Peruvian	Labernadie,E[Eugenio]	French	Pr.Rented.
Cordillera	Labernadie,Eugenio	French	Labernadie,Eugenio	French	Pr.Ps.Owner.Rp.

Plants	Owner 1883	Nationality 1883	Operator 1883	Nationality 1883	Title 1883
Cruz de Zapiga	State	Chilean St.	State	Chilean St.	St.
Dolores(Compañía América)	State	Chilean St.	State	Chilean St.	St.
Encarnación	State	Chilean St.	State	Chilean St.	St.
Fortuna	State	Chilean St.	State	Chilean St.	St.
Jazpampa(Zavala)	North, J.T./Gibbs & Co.	British	Gibbs & Co.	British	Pr.Owner.
Matamunqui	Charne, Eduardo	Chilean	Charne, Eduardo	Chilean	Pr.Ps.Owner.
Mercedes de Negreiros	Vernal, Manuel	Peruvian	Vernal, Manuel	Peruvian	Pr.Owner.Rp.
Negreiros	Vernal, Manuel	Peruvian	Vernal, Manuel	Peruvian	Pr.Owner.Ud.
Negreiros(Vernal)	State	Chilean St.	State	Chilean St.	St.
Normandía(San Antonio)	State	Chilean St.	State	Chilean St.	St.
Nueva Rosario	Gibbs & Co.	British	Gibbs & Co.	British	Pr.Owner.
Paccha	State	Chilean St.	State	Chilean St.	St.
Paccha(Bramez)	Gibbs & Co.	British	Gibbs & Co.	British	Pr.Owner.
Pampa Negra	State	Chilean St.	State	Chilean St.	St.
Paposo(parada)	Folsch and Martin	German	Folsch and Martin	German	Pr.Ps.Owner.Rp.
Pasto	State	Chilean St.	State	Chilean St.	St.
Primitiva	Dawson, Juan	British	Dawson, Juan	British	Pr.Owner.
Progreso	Cfa. Salitrera Progreso	Peruvian	Cfa. Salitrera Progreso	Peruvian	Pr.Ps.Owner.
Ramírez	Dawson, Juan	British	Dawson, Juan	British	Pr.Owner.
Reducto	Cevallos, Manuela	Peruvian	Cevallos, Manuela	Peruvian	Pr.Owner.Rp.
Rincón(Aguirre)	Aguirre, Mariano	Peruvian	Folsch and Martin	German	Pr.Rented.
Rincón(Benavides)	State	Chilean St.	State	Chilean St.	St.Cst.Abd.
Rincón(Soruco)	Brooking, George] E.	British	Brooking, George] E.	British	Pr.Ps.Owner.Rp.
Rosario(Beas)	Rodolfo Boivin	French(?)	Rodolfo Boivin	French(?)	Pr.PC.Owner.
Rosario(Luza)	Vernal y Castro, Juan	Peruvian	Vernal y Castro, Juan	Peruvian	Pr.Owner.
Rosario(Rfos)	State	Chilean St.	State	Chilean St.	St.
Sacramento(Baluart)	Baluart, Rosa Lecaros de	Peruvian	Baluart, Rosa Lecaros de	Peruvian	Pr.Owner.
Sacramento(Castilla)	Granja, Matías	Chilean	Granja, Matías	Chilean	Pr.Owner.
Sacramento(Loayza y Pascal)	State	Chilean St.	State	Chilean St.	St.Cst.Abd.
Sacramento(Soto Flores)	Charne, Eduardo/Reztlaff, W.	Chilean	Charne, Eduardo/Reztlaff, W.	Chilean	Pr.Ps.PC.Owner.Rp.
Salá del Carmen	State	Chilean St.	State	Chilean St.	St.
San Antonio(Luza)	Loayza y Pascal	Peruvian	Loayza y Pascal	Peruvian	Pr.Owner.
San Antonio de Méjico	State	Chilean St.	State	Chilean St.	St.
San Antonio(Soto Flores)	State	Chilean St.	State	Chilean St.	St.
San Antonio(Viejo)	State	Chilean St.	State	Chilean St.	St.
San Benigno	State	Chilean St.	State	Chilean St.	St.
San Cristóbal	State	Chilean St.	State	Chilean St.	St.
San Fernando	Canelo, Jenaro	Chilean	Canelo, Jenaro	Chilean	Pr.Owner.
San Francisco(Campodónico)	State	Chilean St.	State	Chilean St.	St.
San Francisco(Marquezado)	State	Chilean St.	State	Chilean St.	St.
San Francisco(Zegarra)	State	Chilean St.	State	Chilean St.	St.
San Jorge	Gibbs & Co.	British	Gibbs & Co.	British	Pr.Owner.
San José de Alva	Cevallos, Nicolás	Peruvian	Cevallos, Nicolás	Peruvian	Pr.Owner.
San José (Devescovi)	State	Chilean St.	State	Chilean St.	St.
San José de Putunchara	Sanguinetti, Juan	Chilean(?)	Sanguinetti, Juan	Chilean(?)	Pr.Owner.
San Lorenzo (Canadino)	Folsch and Martin	German	Folsch and Martin	German	Pr.Ps.Owner.
San Lorenzo(Ramírez)	Marincovic, Juan	Chilean	Marincovic, Juan	Chilean	Pr.Owner.
San Lorenzo(Zavala)	State	Chilean St.	State	Chilean St.	St.

Plants	Owner 1883	Nationality 1883	Operator 1883	Nationality 1883	Title 1883
San Miguel(Cauvi)	State	Chilean St.	State	Chilean St.	St.
San Miguel(Palacios)	State	Chilean St.	State	Chilean St.	St.
San Nicolás	Loayza y Pascal	Peruvian	Loayza y Pascal	Peruvian	Pr.Owner.
San Pascual	State	Chilean St.	State	Chilean St.	St.
San Pedro(Ramirez)	State	Chilean St.	State	Chilean St.	St.
San Rafael	Granja and Astoreca	Chilean	Granja and Astoreca	Chilean	Pr.Owner.
San Sebastián	Jewell,Maurice	British	Jewell,Maurice	British	Pr.Owner.
Santa Beatriz	Elguera,Pedro	Peruvian	Herrmann,Otto	German	Pr.Rented.
Santa Clara y Challacollito	State	Chilean St.	State	Chilean St.	St.
Santa Emilia	State	Chilean St.	State	Chilean St.	St.
Santa Lucía	Herrmann,Otto	German	Herrmann,Otto	German	Pr.Owner.PC.
Santa Luisa	Gildemeister,J.	German	Gildemeister,J.	German	Pr.Owner.
Santa María	Jewell,Maurice	British	Jewell,Maurice	British	Pr.Ps.Owner.
Santa Rosa	State	Chilean St.	Peragallo,Gregorio	Chilean(?)	St.Rented.PC.
Santa Rosita	State	Chilean St.	Contreras,Escipión	Peruvian	St.Rented.PC.
Santo Domingo	State	Chilean St.	State	Chilean St.	St.
Santo Domingo(Vidoliche)	State	Chilean St.	State	Chilean St.	St.
Silencio	Watters Bros.	British	Watters Bros.	British	Pr.Ps.Owner.
Tordoya	Pérez,Manuel Marfa	Peruvian	State	Chilean St.	St.Cst.
Tránsito	Sanguinetti,Juan	Chilean(?)	Sanguinetti,Juan	Chilean(?)	Pr.Owner.
Tres Marías	Perfetti,Pedro	Italian	Perfetti,Pedro	Italian	Pr.Owner.Rp.
Unión	State	Chilean St.	State	Chilean St.	St.
Virginia	Folsch and Martin	German	Folsch and Martin	German	Pr.Owner.
Yungay(Albarracín)	Albarracín,Idelfonsa	Peruvian	Albarracín,Idelfonsa	Peruvian	Pr.Owner.
Yungay Bajo	Folsch and Martin	German	Folsch and Martin	German	Pr.Owner.
Yungay(Jentilar)	Bustos,Héctor	Peruvian	Bustos,Héctor	Peruvian	Pr.Owner.

Plants	Status 1883	Notes 1883	Owner 1884	Nationality 1884	Operator 1884
Máquinas					
Agua Santa	Wk.	(7)(10)(11)	Campbell, Outram and Co.	British	Campbell, Outram and Co.
Alianza	Un.	(17)	Gibbs and Co.	British	Gibbs and Co.
Angela	Wk.	(10)(11)(17)(18)	Loayza y Pascal	Peruvian	Loayza y Pascal
Angeles	Un.	(17)	State	Chilean St.	State
Argentina	CD.	(10)(11)	Gildemeister, J.	German	Gildemeister, J.
Barreñechea	CD.	(17)(25)	State	Chilean St.	State
Bearnes	Wk.	(10)(11)(17)(19)	Layous, J. & Co.	French	Layous, J. & Co.
Buen Retiro	Wk.	(7)(10)(11)	Harvey/North	British	Harvey/North
Calacala	Wk.	(10)(11)(17)(19)	Banco Mobiliario	Chilean	Banco Mobiliario
California	CD.Md.	(17)(19)	State	Chilean St.	State
Candelaria	Un.	(17)	State	Chilean St.	State
Carmelitana	Un.	(17)	State	Chilean St.	State
Carmen Alto	CD.	(17)	State	Chilean St.	State
Carmen Bajo	CD.	(17)(19)	State	Chilean St.	State
Carolina	Un.MT.	(7)	Gibbs & Co.	British	Gibbs & Co.
Católica, La	CD.Md.	(17)(19)	State	Chilean St.	State
China	CD.Bd.	(17)(25)	State	Chilean St.	State
Chinquiquiray(Oviedo y Trillo)	CD.Ul.	(17)	State	Chilean St.	State
Concepción(Palacio Industrial)	CD.Bd.	(17)(25)	State	Chilean St.	State
Dolores(Cobo)	CD.Bd.	(17)(25)	State	Chilean St.	State
Esmeralda	Wk.	(10)(11)(17)(25)	Cevallos, Jewell, North(Co.)	Peruvian/British	Cevallos, Jewell, North(Co.)
Esperanza(Lagunas)	Dst.	(40)	North, J.T.	British	North, J.T.
Hanza(S. Antonio-Gildemeister)	CD.Bd.OP.	(7)	Gildemeister, J.	German	Gildemeister, J.
Lima	Wk.Gd.	(7)(10)(11)(19)	Gibbs & Co.	British	Gibbs & Co.
Magdalena	Dst.	(6)(17)	State	Chilean St.	State
Matillana	CD.Bd.	(6)(17)	State	Chilean St.	State
Negreiros	Un.	(17)	State	Chilean St.	State
Nueva Carolina(y Pozo Almonte)	CD.Bd.	(17)(25)	Cfa. Colorada	British	Cfa. Colorada
Nueva Soledad	CD.Gd.	(17)(25)	State	Chilean St.	State
Palma	Wk.	(7)(10)(11)(42)	Gibbs & Co.	British	Gibbs & Co.
Paposo(máquina)	Wk.	(7)(19)	Folsch and Martin	German	Folsch and Martin
Pena Chica	Wk.	(10)(11)(17)	Aguirre, José de	Peruvian	Folsch and Martin
Pena Grande	CD.Gd.	(17)(25)	State	Chilean St.	State
Perla	CD.	(17)(25)	State	Chilean St.	State
Peruana	Wk.	(7)(19)	North/Harvey(C. Colorada)	British	North/Harvey(C. Colorada)
Porvenir	CD.	(6)(17)	State	Chilean St.	State
Providencia	CD.	(17)	State	Chilean St.	State
Resurrección(y Q. de Pazos)	CD.	(17)(25)	State	Chilean St.	State
Rosario(Pérez)	CD.	(17)	Pérez, Manuel María	Peruvian	State
Sacramento(Delano)	Wk.	(17)(25)(41)	Subercaseux, Francisco	Chilean	Folsch and Martin
Salar de la Noria	CD.	(25)	State	Chilean St.	State
San Agustín	CD.Gd.	(17)(25)	State	Chilean St.	State
San Andrés	CD.	(7)	State	Chilean St.	State
San Antonio(Campbell)	Wk.	(7)(10)(11)	Campbell, Outram and Co.	British	Campbell, Outram and Co.
San Antonio(Penaranda)	CD.Gd.DE.	(17)	State	Chilean St.	State
San Carlos	CD.	(10)(11)(17)	Folsch and Martin	German	Folsch and Martin
San Francisco(Bramez)	Wk.	(7)(10)(11)(25)	Gibbs & Co.	British	Gibbs & Co.

Plants	Status 1883	Notes 1883	Owner 1884	Nationality 1884	Operator 1884
San José(Aguirre)	CD.	(17)	Aguirre,Mariano	Peruvian	Herrmann,Otto
San José de la Noria	CD.Bd.	(6)(19)(20)	State	Chilean St.	State
San José(Yungay)	CD.OP.	(17)(25)	Folsch and Martin	German	Folsch and Martin
San Juan(Gildemeister)	Wk.	(7)(10)(11)(25)	Gildemeister,J.	German	Gildemeister,J.
San Juan de Soledad	Un.	(5)(17)	State	Chilean St.	State
San Lorenzo(Ugarte)	Wk.	(7)(10)(11)(19)	Ugarte y Cevallos y Cfa.	Peruvian	Ugarte y Cevallos y Cfa.
San Pablo	Wk.	(7)(10)(11)(19)(25)	Barreda,E./Schroder,W.	Chilean/German	Barreda,E./Schroder,W.
San Pedro	Wk.WO.	(7)(10)(11)(25)	Gildemeister,J.	German	Gildemeister,J.
San Vicente	CD.Gd.	(17)(25)	State	Chilean St.	State
Santa Adela	Wk.	(17)(25)	State	Chilean St.	State
Santa Ana	CD.	(25)	State	Chilean St.	State
Santa Catalina	Wk.	(10)(11)(17)(19)	State	Chilean St.	State
Santa Isabel	CD.Dst.	(17)	State	Chilean St.	State
Santa Laura(Barra)	CD.Bd.	(17)	State	Chilean St.	State
Santa Laura(Wendell)	Un.Inc.	(17)	State	Chilean St.	State
Santa Rita	Wk.NM.	(10)(11)(17)(19)(47)	Brooking,Jorge	British	Brooking,Jorge
Santiago(Camina)	Wk.	(10)(11)(17)(19)(25)	Perfetti,Pedro	Italian	Perfetti,Pedro
Solferino	Wk.NM.	(10)(11)(19)(20)	Goich and Zayes	Chilean	Goich and Zayes
Tarapacá	Wk.	(10)(11)	State	Chilean St.	State
Trinidad	CD.Bd.	(17)(25)	State	Chilean St.	State
Valparaiso	Un.Inc.	(17)(25)	State	Chilean St.	State
Victoria	Dst.	(17)(25)	State	Chilean St.	State
Paradas					
Abra de Quiroga	CD.	(17)	Loayza y Pascal	Peruvian	Loayza y Pascal
Abra de Ugarte	CD.	(17)	State	Chilean St.	State
Aguada	CD.	(7)	Dawson,Juan	British	Dawson,Juan
Andacollo	CD.OP.	(7)	Folsch and Martin	German	Folsch and Martin
Ascención de Capetillo	CD.	(17)	State	Chilean St.	State
Ascención de Loayza	CD.	(17)	State	Chilean St.	State
Asunta	CD.	(as)	State	Chilean St.	State
Banda	CD.	(17)	State	Chilean St.	State
Buena Esperanza	CD.	(17)	State	Chilean St.	State
Buenaventura	CD.	(17)	Barril,Manuel	Peruvian	Barril,Manuel
Candelaria(de Carpio)	CD.Ul.	(17)	Carpio,Hercilia de	Peruvian	Carpio,Hercilia de
Candelaria(de Osorio)	Wk.NM.NCh.	(17)(46)	Devescovi,J.	Peruvian(?)	Devescovi,J.
Candelaria(de Perfetti)	CD.	(17)	State	Chilean St.	State
Candelaria(Zavala y Bilbao)	CD.OP.	(7)	Loayza y Pascal	Peruvian	Loayza y Pascal
Carmen(Morales)	CD.	(17)(25)	State	Chilean St.	State
Carmen(Oviedo)	CD.	(17)	State	Chilean St.	State
Carmen(Scheel)	CD.	(17)	State	Chilean St.	State
Chilena	Wk.	(10)(11)(17)(19)	State	Chilean St.	State
Chinquiquiray(Zavala)	CD.	(17)	State	Chilean St.	State
Compañía(de Tarapacá)	Wk.	(17)(25)	n.a.	n.a.	n.a.
Concepción(Garate)	Wk.	(10)(17)(19)(25)	n.a.	n.a.	Labernadie,E.
Cordillera	Wk.	(10)(11)(25)	Labernadie,Eugenio	French	Labernadie,Eugenio

Plants	Status 1883	Notes 1883	Owner 1884	Nationality 1884	Operator 1884
Cruz de Zapiga	CD.	(17)	State	Chilean St.	State
Dolores(Compañía América)	CD.	(17)	State	Chilean St.	State
Encarnación	CD.	(17)	State	Chilean St.	State
Fortuna	CD.	(17)	State	Chilean St.	State
Jazpampa(Zavala)	Wk.NM.	(7)(10)(11)(19)	North,J.T./Gibbs & Co.	British	Gibbs & Co.
Matamunqui	Wk.	(10)(11)(17)(19)	Charne,Eduardo	Chilean	Charne,Eduardo
Mercedes de Negreiros	Wk.NM.	(7)(10)(11)(19)(25)	Kraljevic Brothers	Yugoslavian	Kraljevic Brothers
Negreiros	CD.UL.	(as)	Vernal,Manuel	Peruvian	Vernal,Manuel
Negreiros(Vernal)	CD.	(17)	State	Chilean St.	State
Normandía(San Antonio)	CD.UL.	(as)	State	Chilean St.	State
Nueva Rosario	CD.NCh(?)	(7)	Gibbs & Co.	British	Gibbs & Co.
Paccha	CD.	(17)	State	Chilean St.	State
Paccha(Bramez)	CD.NCh(?)	(7)	Gibbs & Co.	British	Gibbs & Co.
Pampa Negra	CD.	(17)	State	Chilean St.	State
Paposo(parada)	CD.OP.	(7)	Folsch and Martin	German	Folsch and Martin
Pasto	CD.	(17)	State	Chilean St.	State
Primitiva	CD.	(7)(25)	Dawson,Juan	British	Dawson,Juan
Progreso	Wk.	(11)(17)(19)	James H.B. & Co.	British	James H.B. & Co.
Ramírez	CD.Cst.	(7)(25)	Liverpool Nitrate Co.	British	Liverpool Nitrate Co.
Reducto	CD.Cst.	(17)(25)	Cevallos,Manuela	Peruvian	Cevallos,Manuela
Rincón(Aguirre)	Neq.UDP.	(17)	Aguirre,Mariano	Peruvian	Folsch and Martin
Rincón(Benavides)	CD.	(17)	State	Chilean St.	State
Rincón(Soruco)	CD.UL.UDP(?)	(25)(54)	Brooking,G[George] E.	British	Brooking,G[George] E.
Rosario(Beas)	Wk.	(7)(25)	Rodolfo Boivin	French(?)	Rodolfo Boivin
Rosario(Luza)	CD.	(7)(19)	Vernal y Castro,Juan	Peruvian	Vernal y Castro,Juan
Rosario(Ríos)	CD.	(17)	State	Chilean St.	State
Sacramento(Baluarto)	CD.	(17)	Baluarto,Rosa Lecaros de	Peruvian	Baluarto,Rosa Lecaros de
Sacramento(Castilla)	Wk.	(7)	Charne,Eduardo/Retzlaff,W.	Chilean	Charne,Eduardo/Retzlaff,W.
Sacramento(Loayza y Pascal)	Neq.	(17)	State	Chilean St.	State
Sacramento(Soto Flores)	Wk.NCh.	(10)(11)(17)(25)(57)	Charne,Eduardo/Retzlaff,W.	Chilean	Charne,Eduardo/Retzlaff,W.
Salar del Carmen	CD.	(17)(58)	State	Chilean St.	State
San Antonio(Luza)	CD.	(17)	Loayza y Pascal	Peruvian	Loayza y Pascal
San Antonio de Méjico	CD.	(17)	State	Chilean St.	State
San Antonio(Soto Flores)	CD.UL.	(17)(25)	State	Chilean St.	State
San Antonio(Viejo)	CD.	(17)	State	Chilean St.	State
San Benigno	CD.	(17)	State	Chilean St.	State
San Cristóbal	CD.	(17)	State	Chilean St.	State
San Fernando	Wk.	(10)(11)(17)(19)	Canelo,Jenaro	Chilean	Canelo,Jenaro
San Francisco(Campodónico)	CD.	(17)	State	Chilean St.	State
San Francisco(Marquezado)	CD.	(17)	State	Chilean St.	State
San Francisco(Zegarria)	CD.	(17)	State	Chilean St.	State
San Jorge	CD.	(17)	Gibbs & Co.	British	Gibbs & Co.
San José de Alva	Wk.	(10)(11)(17)(19)	Cevallos,Nicolás	Peruvian	Cevallos,Nicolás
San José (Devescovi)	CD.	(17)	State	Chilean St.	State
San José de Putunchara	Wk.NM.	(7)(10)(11)	Sanguinetti,Juan	Chilean(?)	Sanguinetti,Juan
San Lorenzo(Granadino)	CD.OP.	(17)	Folsch and Martin	German	Folsch and Martin
San Lorenzo(Ramírez)	Wk.NM.NCh.	(7)(10)(11)(59)	Marincovic,Juan	Chilean	Marincovic,Juan
San Lorenzo(Zavala)	CD.	(17)	State	Chilean St.	State

Plants	Status 1883	Notes 1883	Owner 1884	Nationality 1884	Operator 1884
San Miguel (Cauvi)	CD.	(17)	State	Chilean St.	State
San Miguel (Palacios)	CD.	(17)	State	Chilean St.	State
San Nicolás	CD.OP.	(17)	Loayza y Pascal	Peruvian	Loayza y Pascal
San Pascual	CD.	(17)	State	Chilean St.	State
San Pedro (Ramírez)	CD.	(17)	State	Chilean St.	State
San Rafael	Wk.NCh.	(10)(11)(17)(60)	Granja, Dominguez y Lacalle	Chilean	Granja, Dominguez y Lacalle
San Sebastián	Wk.	(17)(19)	Harvey, Robert	British	Harvey, Robert
Santa Beatriz	Wk.NM.	(10)(11)(17)	Elguera, Pedro	Peruvian	Herrmann, Otto
Santa Clara y Challacollito	CD.Inc.	(17)(19)	State	Chilean St.	State
Santa Emilia	CD.	(17)	State	Chilean St.	State
Santa Lucía	CD.OP.	(17)	Herrmann, Otto	German	Herrmann, Otto
Santa Luisa	CD.OP.	(7)	Gildemeister, J.	German	Gildemeister, J.
Santa María	CD.	(17)	Jewell, Maurice	British	Jewell, Maurice
Santa Rosa	CD.	(17)	State	Chilean St.	State
Santa Rosita	Wk.	(10)(11)(17)(19)	State	Chilean St.	State
Santo Domingo	CD.	(17)	State	Chilean St.	State
Santo Domingo (Vidoliche)	CD.	(17)	State	Chilean St.	State
Silencio	CD.	(17)	Watters Bros.	British	Watters Bros.
Tordoya	CD.	(17)	Inglis, James and Co.	British	Inglis, James and Co.
Tránsito	CD.Mgr(?)	(17)(63)	Sanguinetti, Juan	Chilean(?)	Sanguinetti, Juan
Tres Marías	Wk.NM.	(7)(10)(11)	Humberstone, James T. & Co.	British	Humberstone, James T. & Co.
Unión	CD.	(17)	State	Chilean St.	State
Virginia	Wk.	(10)(11)(17)(19)	Folsch and Martin	German	Folsch and Martin
Yungay (Albarracín)	CD.	(5)(17)(25)	Albarracín, Idelfonsa	Peruvian	Albarracín, Idelfonsa
Yungay Bajo	Wk.NM(?)	(10)(11)(17)(19)	Banco Mercantil Internacional	Chilean	Banco Mercantil Internacional
Yungay (Jentilar)	CD.Ul.	(17)	Albarracín	Peruvian	Albarracín

Plants	Nationality 1884	Title 1884	Status 1884	No. es 1884	Owner 1885	Nationality 1885
Máquinas						
Agua Santa	British	Pr.Owner.	Wk.	(10)(11)(29)	Campbell, Outram and Co.	British
Alianza	British	Pr.Owner.	Un.	(as)	Gibbs and Co.	British
Angela	Peruvian	Pr.Owner.	Wk.	(10)(11)(29)	Loayza y Pascal	Peruvian
Angeles	Chilean St.	St.	Un.	(as)	State	Chilean St.
Argentina	German	Pr.Owner.	Wk.	(8)(10)(11)(29)	Gildemeister, J.	German
Barreñechea	Chilean St.	St.	CD.	(17)	State	Chilean St.
Bearnes	French	Pr.Owner.	Wk.	(10)(11)(29)	Deves Freres	French
Buen Retiro	British	Pr.Owner.	Wk.	(10)(11)(29)	Harvey/North	British
Calacala	Chilean	Pr.Owner.	Wk.	(10)(11)(29)	Banco Mobiliario	Chilean
California	Chilean St.	St.	CD.Md.	(as)	State	Chilean St.
Candelaria	Chilean St.	St.	Un.	(as)	State	Chilean St.
Carmelitana	Chilean St.	St.	Un.	(as)	State	Chilean St.
Carmen Alto	Chilean St.	St.	CD.	(as)	State	Chilean St.
Carmen Bajo	Chilean St.	St.	CD.	(as)	State	Chilean St.
Carolina	British	Pr.Owner.	Un.	(as)	Gibbs & Co.	British
Católica, La	Chilean St.	St.	CD.Md.	(as)	State	Chilean St.
China	Chilean St.	St.	CD.Bd.	(as)	State	Chilean St.
Chinquiquiray(Oviedo y Trillo)	Chilean St.	St.	CD.Ul.	(10)(11)	State	Chilean St.
Concepción(Palacio Industrial)	Chilean St.	St.	CD.Bd.	(as)	State	Chilean St.
Dolores(Cobo)	Chilean St.	St.	CD.Bd.	(as)	State	Chilean St.
Esmeralda	Peruvian/British	Pr.Owner.	Wk.	(8)(10)(11)(38)	Cevallos, Jewell, North(Co.)	Peruvian/British
Esperanza(Lagunas)	British	Pr.Owner.	Dst.	(as)	North, J.T.	British
Hanza(S. Antonio-Gildemeister)	German	Pr.Owner.	CD.Bd.	(as)	Gildemeister, J.	German
Limena	British	Pr.Owner.	Wk.	(8)(10)(11)	Gibbs & Co.	British
Magdalena	Chilean St.	St.	Dst.	(as)	State	Peruvian St.
Matillana	Chilean St.	St.	CD.Bd.	(as)	State	Peruvian St.
Negreiros	Chilean St.	St.	Un.	(as)	State	Peruvian St.
Nueva Carolina(y Pozo Almonte)	British	Pr.Owner.	Bd.	(4)	Cla. Colorada	British
Nueva Soledad	Chilean St.	St.	CD.	(as)	State	Chilean St.
Palma	British	Pr.Owner.	Wk.	(10)(11)	Gibbs & Co.	British
Paposo(máquina)	German	Pr.Owner.	Wk.	(8)(10)(11)	Folsch and Martin	German
Pena Chica	German	Pr.Rented.	Wk.	(8)(10)(11)	Aguirre, José de	Peruvian
Pena Grande	Chilean St.	St.	CD.	(as)	State	Chilean St.
Perla	Chilean St.	St.	CD.	(as)	State	Chilean St.
Peruana	British	Pr.Owner.	Wk.	(8)(10)(11)	North/Harvey(C. Colorada)	British
Porvenir	Chilean St.	St.	CD.	(as)	State	Chilean St.
Providencia	Chilean St.	St.	CD.	(as)	State	Chilean St.
Resurrección(y Q. de Pazos)	Chilean St.	St.	CD.	(as)	State	Chilean St.
Rosario(Pérez)	Chilean St.	St. Cst. Abd.	CD.	(as)	Pérez, Manuel Mar	Peruvian
Sacramento(Delano)	German	Pr.Rented.	Wk.	(10)(11)(29)	Subercaseux, Francisco	Chilean
Salar de la Noria	Chilean St.	St.	CD.	(as)	State	Chilean St.
San Agustín	Chilean St.	St.	CD.	(as)	State	Chilean St.
San Andrés	Chilean St.	St. Cst. Abd.	CD.	(as)	State	Chilean St.
San Antonio(Campbell)	British	Pr.Owner.	Wk.	(10)(11)(29)	Campbell, Outram and Co.	British
San Antonio(Pemaranda)	Chilean St.	St. Cst.	CD.DE.	(as)	State	Chilean St.
San Carlos	German	Pr. PC. Owner.	Wk.	(10)(11)(29)	Folsch and Martin	German
San Francisco(Branes)	British	Pr.Owner.	Wk.	(10)(11)	Gibbs & Co.	British

Plants	Nationality 1884	Title 1884	Status 1884	Notes 1884	Owner 1885	Nationality 1885
San José(Aguirre)	German	Pr.Rented.	CD.Ul.	(10)(11)	Weingardt and Brandt	German
San José de la Noria	Chilean St.	St.	CD.	(as)	State	Chilean St.
San José(Yungay)	German	Pr.Owner.	CD.OP.	(as)	Folsch and Martin	German
San Juan(Gildemeister)	German	Pr.Owner.	Wk.	(10)(11)	Gildemeister,J.	German
San Juan de Soledad	Chilean St.	St.	Un.	(as)	State	Chilean St.
San Lorenzo(Ugarte)	Peruvian	Pr.Owner.	Wk.	(10)(11)(29)	Ugarte y Cevallos y Cfa.	Peruvian
San Pablo	Chilean/German	Pr.Owner.	Wk.	(10)(11)(29)	Barreda,E./Schroder,W.	Chilean/German
San Pedro	German	Pr.Owner.	Wk.	(10)(11)(29)	Gildemeister,J.	German
San Vicente	Chilean St.	St.Cst.	CD.	(as)	State	Chilean St.
Santa Adela	Chilean St.	St.Cst.	CD.	(as)	State	Chilean St.
Santa Ana	Chilean St.	St.Cst.	CD.	(as)	State	Chilean St.
Santa Catalina	Chilean St.	St.Cst.	CD.	(25)	State	Chilean St.
Santa Isabel	Chilean St.	St.	CD.	(as)	State	Chilean St.
Santa Laura(Barra)	Chilean St.	St.	CD.Bd.	(as)	State	Chilean St.
Santa Laura(Wendell)	Chilean St.	St.	Un.	(as)	State	Chilean St.
Santa Rita	British	Pr.Owner.	Wk.	(10)(11)	Brooking,Jorge	British
Santiago(Camina)	Italian	Pr.Owner.	Wk.	(10)(11)(29)	Perfetti,Pedro	Italian
Solferino	Chilean	Pr.Owner.	Wk.	(10)(11)(29)	Goich and Zayes	Chilean
Tarapacá	Chilean St.	St.	CD.	(19)	State	Chilean St.
Trinidad	Chilean St.	St.	CD.Bd.	(as)	State	Chilean St.
Valparaiso	Chilean St.	St.	Un.	(as)	State	Chilean St.
Victoria	Chilean St.	St.	Dst.	(as)	State	Chilean St.
Paradas						
Abra de Quiroga	Peruvian	Pr.Owner.	CD.	(as)	Loayza y Pascal	Peruvian
Abra de Ugarte	Chilean St.	St.	CD.	(as)	State	Chilean St.
Aguada	British	Pr.Owner.	Wk.NM(?)	(11)	Perfetti,Pedro	Italian
Andacollo	German	Pr.Owner.	CD.OP.	(as)	Folsch and Martin	German
Ascención de Capetillo	Chilean St.	St.	CD.	(as)	State	Chilean St.
Ascención de Loayza	Chilean St.	St.	CD.	(as)	State	Chilean St.
Asunta	Chilean St.	St.	CD.	(as)	State	Chilean St.
Banda	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Buena Esperanza	Chilean St.	St.Cst.Abd.	CD.Ul.	(as)	State	Chilean St.
Buena Ventura	Peruvian	Pr.Owner.	CD.Ul.	(as)	Barril,Manuel	Peruvian
Candelaria(de Carpio)	Peruvian	Rp.	Cnt.	(25)	Granja,Dominguez y Lacalle	Chilean
Candelaria(de Osorio)	Peruvian(?)	Pr.Owner.	Wk.NCh.	(10)(11)(29)	Devescovi,J.	Peruvian(?)
Candelaria(de Perfetti)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Candelaria(Zavala y Bilbao)	Peruvian	Pr.Owner.	CD.OP.	(as)	Loayza y Pascal	Peruvian
Carmen(Morales)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Carmen(Oviedo)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Carmen(Scheel)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Chilena	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Chinquiquiray(Zavala)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Compañía(de Tarapacá)	n.a.	Pr.Ps.Rp.(?)	CD.Ul.	(31)	Hidalgo,J.de Dios	Chilean(?)
Concepción(Garate)	French	Pr.Rented.(?)	Wk.	(10)(11)	Galté,Fourniés y Cfa.	French
Cordillera	French	Pr.Owner.	Wk.NM(?)	(10)(11)	Labernadie,Eugenio	French

Plants	Nationality 1884	Title 1884	Status 1884	Notes 1884	Owner 1885	Nationality 1885
Cruz de Zapiga	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Dolores(Companfa América)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Encarnación	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Fortuna	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Jazpampa(Zavala)	British	Pr.Owner.	Wk.	(9)(10)(11)	North,J.T./Gibbs & Co.	British
Matamunqui	Chilean	Pr.Ps.Owner.	CD.	(10)(11)	Schiammaro,P.	Italian(?)
Mercedes de Negreiros	Yugoslavian	Pr.Ps.Owner.	Wk.	(10)(11)(29)	Kraljevic Brothers	Yugoslavian
Negreiros	Peruvian	Pr.Owner.Ud.	CD.Ul.	(as)	Vernal,Manuel	Peruvian
Negreiros(Vernal)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Normandfa(San Antonio)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Nueva Rosario	British	Pr.Owner.	CD.Ul.NCh(?)	(as)	Gibbs & Co.	British
Paccha	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Paccha(Bramez)	British	Pr.Owner.	CD.Ul.NCh(?)	(as)	Gibbs & Co.	British
Pampa Negra	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Paposo(parada)	German	Pr.Owner.	CD.OP.	(as)	Folsch and Martin	German
Pasto	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Primitiva	British	Pr.Owner.	CD.Ul.	(as)	Dawson,Juan	British
Progreso	British	Pr.Ps.Owner.	Wk.	(10)(11)	Quiroga,E[varisto] and bros.	Peruvian
Ramfrez	British	Pr.Ps.Owner.	Wk.NM.	(10)(11)	Liverpool Nitrate Co.	British
Reducto	Peruvian	Pr.Owner.	CD.Cst.	(as)	Galté,Fourniés y Cia.	French
Rincón(Aguirre)	German	Pr.Rented.	Neq.UDP.	(as)	Aguirre,Mariano	Peruvian
Rincón(Benavides)	Chilean St.	St.Cst.Abd.	CD.Ul.	(as)	State	Chilean St.
Rincón(Soruco)	British	Pr.Ps.Owner.Rp.	CD.Ul.UDP(?)	(54)	Brooking,George] E.	British
Rosario(Beas)	French(?)	Pr.Owner.	Wk.	(10)(11)	Rodolfo Boivin	French(?)
Rosario(Luza)	Peruvian	Pr.Owner.	Wk.	(10)(11)	Vernal y Castro,Juan	Peruvian
Rosario(Rfos)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Sacramento(Baluart)	Peruvian	Pr.Owner.	CD.Ul.	(as)	Baluarte,Rosa Lecaros de	Peruvian
Sacramento(Castilla)	Chilean	Pr.Ps.Owner.	Mrg.	(10)(11)(25)(56)	Charme,Eduardo/Retzlaff,W.	Chilean
Sacramento(Loayza y Pascal)	Chilean St.	St.Cst.Abd.	Neq.	(as)	State	Chilean St.
Sacramento(Soto Flores)	Chilean	Pr.Owner.	Wk.NCh.	(10)(11)(29)(57)	Charme,Eduardo/Retzlaff,W.	Chilean
Salar del Carmen	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Antonio(Luza)	Peruvian	Pr.Owner.	CD.Ul.	(as)	Loayza y Pascal	Peruvian
San Antonio de Méjico	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Antonio(Soto Flores)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Antonio(Viejo)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Benigno	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Cristóbal	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Fernando	Chilean	Pr.Owner.	Wk.	(10)(11)(29)	Cevallos,Sanz y Cia.	Peruvian/Chilean(?)
San Francisco(Campodónico)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Francisco(Marquezado)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Francisco(Zegarra)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Jorge	British	Pr.Owner.	CD.Ul.	(as)	Gibbs & Co.	British
San José de Alva	Peruvian	Pr.Owner.	Wk.	(10)(11)(29)	Cevallos,Micolás	Peruvian
San José (Devescovi)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San José de Putunchara	Chilean(?)	Pr.Owner.	Wk.	(10)(11)(29)	Janguinetti,Juan	Chilean(?)
San Lorenzo(Granadino)	German	Pr.Owner.	CD.OP.	(as)	Folsch and Martin	German
San Lorenzo(Ramfrez)	Chilean	Pr.Owner.	Wk.NCh.	(10)(11)(59)	Marincovic,Juan	Chilean
San Lorenzo(Zavala)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.

Plants	Nationality 1884	Title 1884	Status 1884	Notes 1884	Owner 1885	Nationality 1885
San Miguel(Cauvi)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Miguel(Palacios)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Nicolás	Peruvian	Pr.Owner.	CD.OP.	(as)	Loayza y Pascal	Peruvian
San Pascual	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Pedro(Ramirez)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
San Rafael	Chilean	Pr.Owner.	Wk.NCh.	(9)(10)(11)(60)	Nirich, Juan	Yugoslavian
San Sebastián	British	Pr.Ps.Owner.	Wk.	(41)	Kraljevic and Zvietovich	Yugoslavian
Santa Beatriz	German	Pr.Rented.	Wk.	(10)(11)(29)	Banco Mobiliario	Chilean
Santa Clara y Challacollito	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Santa Emilia	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Santa Lucía	German	Pr.Owner.	CD.OP.	(as)	Herrmann, Otto	German
Santa Luisa	German	Pr.Owner.	CD.OP.	(as)	Gildemeister, J.	German
Santa María	British	Pr.Ps.Owner.	CD.Ul.	(as)	Jewell, Maurice	British
Santa Rosa	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Santa Rosita	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Santo Domingo	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Santo Domingo(Vidoliche)	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Silencio	British	Pr.Owner.	CD.	(10)(11)(62)	Watters Bros./Humphrey	British
Tordoya	British	Pr.Ps.Owner.	CD.Ul.Mrg(?)	(32)	Inglis, James and Co.	British
Tránsito	Chilean(?)	Pr.Owner.	CD.Ul.Mrg(?)	(63)	Sanguinetti, Juan	Chilean(?)
Tres Marías	British	Pr.Ps.Owner.	Wk.	(10)(11)(29)	Humberstone, James T. & Co.	British
Unión	Chilean St.	St.	CD.Ul.	(as)	State	Chilean St.
Virginia	German	Pr.Owner.	Wk.	(10)(11)(29)	Folsch and Martin	German
Yungay(Albarracín)	Peruvian	Pr.Owner.	CD.Ul.	(as)	Albarracín, Idelfonsa	Peruvian
Yungay Bajo	Chilean	Pr.Ps.Owner.	Wk.	(10)(11)(29)	Banco Mercantil Internacional	Chilean
Yungay(Jentilar)	Peruvian	Pr.Ps.Owner.	CD.Ul.	(32)	Albarracín	Peruvian

Plants	Operator 1885	Nationality 1885	Title 1885	Status 1885	Notes 1885
Máquinas					
Agua Santa	Campbell, Outram and Co.	British	Pr.Owner.	Wk.	(9)(10)(11)
Alianza	Gibbs and Co.	British	Pr.Owner.	Un.	(as)
Angela	Loayza y Pascal	Peruvian	Pr.Owner.	Wk.	(9)(10)(11)
Angeles	State	Chilean St.	Pr.Owner.	Un.	(as)
Argentina	Gildemeister, J.	German	Pr.Owner.	Wk.	(9)(10)(11)
Barrenechea	State	Chilean St.	St.	CD.	(as)
Bearnes	Deves Freres	French	Pr.Owner.	Wk.	(9)(10)(11)
Buen Retiro	Harvey/North	British	Pr.Owner.	Wk.	(9)(10)(11)
Calajula	Banco Mobiliario	Chilean	Pr.Owner.	Wk.	(9)(10)(11)
California	State	Chilean St.	St.	CD.Md.	(as)
Candelaria	State	Chilean St.	St.	Un.	(as)
Carmelitana	State	Chilean St.	St.	Un.	(as)
Carmen Alto	State	Chilean St.	St.	CD.	(as)
Carmen Bajo	State	Chilean St.	St.	CD.	(as)
Carolina	Gibbs & Co.	British	Pr.Owner.	Un.	(as)
Católica, La	State	Chilean St.	St.	CD.Md.	(as)
China	State	Chilean St.	St.	CD.Bd.	(as)
Chinquiquiray(Oviedo y Trillo)	State	Chilean St.	St.	CD.Ul.	(as)
Concepción(Palacio Industrial)	State	Chilean St.	St.	CD.Bd.	(as)
Dolores(Cobo)	State	Chilean St.	St.	CD.Bd.	(as)
Esmeralda	Cevallos, Jewell, North(Co.)	Peruvian/British	Pr.Owner.	Wk.	(10)(11)
Esperanza(Lagunas)	North, J.T.	British	Pr.Owner.	Dst.	(as)
Hanza(S. Antonio-Gildemeister)	Gildemeister, J.	German	Pr.Owner.	CD.Bd.	(as)
Lima	Gibbs & Co.	British	Pr.Owner.	Wk.	(8)(10)(11)
Magdalena	State	Peruvian St.	St.	Dst.	(as)
Matillana	State	Peruvian St.	St.	CD.Bd.	(as)
Negreiros	State	Peruvian St.	St.	Un.	(as)
Nueva Carolina(y Pozo Almonte)	Cfa. Colorada	British	Pr.Owner.	Bd.	(as)
Nueva Soledad	State	Chilean St.	St.	CD.	(as)
Palma	Gibbs & Co.	British	Pr.Owner.	Wk.	(10)(11)
Paposo(máquina)	Folsch and Martin	German	Pr.Owner.	CD.	(10)(11)
Pena Chica	Folsch and Martin	German	Pr.Rented.	Wk.	(10)(11)
Pena Grande	State	Chilean St.	St.	CD.	(as)
Perla	State	Chilean St.	St.	CD.	(as)
Peruana	North/Harvey(C. Colorada)	British	Pr.Owner.	Wk.	(10)(11)
Porvenir	State	Chilean St.	St.	CD.	(as)
Providencia	State	Chilean St.	St.	CD.	(as)
Resurrección(y Q.de Pazos)	State	Chilean St.	St.	CD.	(as)
Rosario(Pérez)	State	Chilean St.	St.Cst.Abd.	CD.	(as)
Sacramento(Delano)	Folsch and Martin	German	Pr.Rented.	Wk.	(10)(11)
Salar de la Noria	State	Chilean St.	St.	CD.	(as)
San Agustín	State	Chilean St.	St.	CD.	(as)
San Andrés	State	Chilean St.	St.Cst.Abd.	CD.	(as)
San Antonio(Campbell)	Campbell, Outram and Co.	British	Pr.Owner.	Wk.	(9)(10)(11)
San Antonio(Pemaranda)	State	Chilean St.	St.Cst.	CD.DE.	(as)
San Carlos	Folsch and Martin	German	Pr.PC.Owner.	Wk.	(10)(11)
San Francisco(Bramez)	Gibbs & Co.	British	Pr.Owner.	Wk.	(10)(11)

Plants	Operator 1885	Nationality 1885	Title 1885	Status 1885	Notes 1885
San José(Aguirre)	Herrmann,Otto	German	Pr.Ps.Rented.	Wk.	(9)(10)(11)
San José de la Noria	State	Chilean St.	St.	CD.	(as)
San José(Yungay)	Folsch and Martin	German	Pr.Owner.	CD.OP.	(as)
San Juan(Gildemeister)	Gildemeister,J.	German	Pr.Owner.	Wk.	(10)(11)
San Juan de Soledad	State	Chilean St.	St.	Un.	(as)
San Lorenzo(Ugarte)	Ugarte y Cevallos y Cia.	Peruvian	Pr.Owner.	Wk.	(9)(10)(11)
San Pablo	Barreda,E./Schroder,W.	Chilean/German	Pr.Owner.	Wk.	(9)(10)(11)
San Pedro	Gildemeister,J.	German	Pr.Owner.	Wk.	(10)(11)
San Vicente	State	Chilean St.	St.Cst.	CD.	(as)
Santa Adela	State	Chilean St.	St.Cst.	CD.	(as)(46)
Santa Ana	State	Chilean St.	St.Cst.	CD.	(as)
Santa Catalina	State	Chilean St.	St.Cst.	CD.	(as)
Santa Isabel	State	Chilean St.	St.	CD.	(as)
Santa Laura(Barra)	State	Chilean St.	St.	CD.Bd.	(as)
Santa Laura(Wendell)	State	Chilean St.	St.	Un.	(as)
Santa Rita	Brooking,Jorge	British	Pr.Owner.	Wk.	(10)(11)
Santiago(Camina)	Perfetti,Pedro	Italian	Pr.Owner.	Wk.	(9)(10)(11)
Solferino	Goich and Zayes	Chilean	Pr.Owner.	Wk.	(10)(11)
Tarapacá	State	Chilean St.	St.	CD.	(as)
Trinidad	State	Chilean St.	St.	CD.Bd.	(as)
Valparaiso	State	Chilean St.	St.	Un.	(as)
Victoria	State	Chilean St.	St.	Dst.	(as)
Paradas					
Abra de Quiroga	Loayza y Pascal	Peruvian	Pr.Owner.	CD.	(as)
Abra de Ugarte	State	Chilean St.	St.	CD.	(as)
Aguada	Perfetti,Pedro	Italian	Pr.Ps.Owner.	Wk.	(9)(10)(11)
Andacollo	Folsch and Martin	German	Pr.Owner.	CD.OP.	(as)
Ascención de Capetillo	State	Chilean St.	St.	CD.Ul.	(as)
Ascención de Loayza	State	Chilean St.	St.	CD.Ul.	(as)
Asunta	State	Chilean St.	St.	CD.Ul.	(as)
Banda	State	Chilean St.	St.	CD.Ul.	(as)
Buena Esperanza	State	Chilean St.	St.Cst.Abd.	CD.Ul.	(as)
Buenaventura	Barril,Manuel	Peruvian	Pr.Owner.	CD.Ul.	(as)
Candelaria(de Carpio)	Granja,Dominguez y Lacalle	Chilean	Pr.Ps.Owner.	Wk.NM.NCh.	(9)(10)(11)(50)
Candelaria(de Osorio)	Devescovi,J.	Peruvian(?)	Pr.Owner.	Wk.NCh.	(9)(10)(11)
Candelaria(de Perfetti)	State	Chilean St.	St.	CD.Ul.	(as)
Candelaria(Zavala y Bilbao)	Loayza y Pascal	Peruvian	Pr.Owner.	CD.OP.	(as)
Carmen(Morales)	State	Chilean St.	St.	CD.Ul.	(as)
Carmen(Oviedo)	State	Chilean St.	St.	CD.Ul.	(as)
Carmen(Scheel)	State	Chilean St.	St.	CD.Ul.	(as)
Chilena	State	Chilean St.	St.	CD.Ul.	(as)
Chinquiquiray(Zavala)	State	Chilean St.	St.	CD.Ul.	(as)
Compañia(de Tarapacá)	Hidalgo,J.de Dios	Chilean(?)	Pr.Owner.	CD.Ul.	(9)
Concepción(Gárate)	Galte,Fourniés y Cia.	French	Pr.Ps.Owner.(?)	Wk.	(9)(10)(11)
Cordillera	Labernadie,Eugenio	French	Pr.Owner.	Wk.	(10)(11)

Plants	Operator 1885	Nationality 1885	Title 1885	Status 1885	Notes 1885
Cruz de Zapiga	State	Chilean St.	St.	CD.Ul.	(as)
Dolores(Compañía América)	State	Chilean St.	St.	CD.Ul.	(as)
Encarnación	State	Chilean St.	St.	CD.Ul.	(as)
Fortuna	State	Chilean St.	St.	CD.Ul.	(as)
Jazpampa(Zavala)	Gibbs & Co.	British	Fr.Owner.	Wk.	(10)(11)
Matamunquí	Schiamaro,P.	Italian(?)	Pr.Ps.Owner.	CD.	(9)(10)(11)(32)
Mercedes de Negreiros	Kraljevic Brothers	Yugoslavian	Pr.Ps.Owner.	Wk.	(9)(10)(11)
Negreiros	Vernal,Manuel	Peruvian	Pr.Owner.Ud.	CD.Ul.	(as)
Negreiros(Vernal)	State	Chilean St.	St.	CD.Ul.	(as)
Normandía(San Antonio)	State	Chilean St.	St.	CD.Ul.	(as)
Nueva Rosario	Gibbs & Co.	British	Pr.Owner.	CD.Ul.NCh(?)	(as)
Paccha	State	Chilean St.	St.	CD.Ul.	(as)
Paccha(Bramez)	Gibbs & Co.	British	Pr.Owner.	CD.Ul.NCh(?)	(as)
Pampa Negra	State	Chilean St.	St.	CD.Ul.	(as)
Paposo(parada)	Folsch and Martin	German	Pr.Owner.	CD.OP.	(as)
Pasto	State	Chilean St.	St.	CD.Ul.	(as)
Primitiva	Dawson,Juan	British	Pr.Owner.	CD.Ul.	(as)
Progreso	Quiroga,E[varisto] and bros.	Peruvian	Pr.Ps.Owner.	Wk.	(9)(10)(11)
Ramírez	Liverpool Nitrate Co.	British	Pr.Owner.	Wk.	(10)(11)
Reducto	Galté,Fourniés y Cía.	French	Pr.Ps.Owner.	Wk.NM.	(9)(10)(11)
Rincón(Aguirre)	Folsch and Martin	German	Pr.Rented.	Neq.UDP.	(as)
Rincón(Benavides)	State	Chilean St.	St.Cst.Abd.	CD.Ul.	(as)
Rincón(Soruco)	Brooking,G[George] E.	British	Pr.Ps.Owner.Rp.	CD.Ul.UDP(?)	(54)
Rosario(Beas)	Rodolfo Boivin	French(?)	Pr.Owner.	Wk.NM(?)	(10)(11)
Rosario(Luza)	Vernal y Castro,Juan	Peruvian	Pr.Owner.	Wk.	(9)(10)(11)
Rosario(Ríos)	State	Chilean St.	St.	CD.Ul.	(as)
Sacramento(Baluartte)	Baluartte,Rosa Lecaros de	Peruvian	Pr.Owner.	Wk.	(10)(11)
Sacramento(Castilla)	Charme,Eduardo/Retzlaff,W.	Chilean	Pr.Owner.	Mrg.	(9)(10)(11)(56)
Sacramento(Loayza y Pascal)	State	Chilean St.	St.Cst.Abd.	Neq.	(as)
Sacramento(Soto Flores)	Charme,Eduardo/Retzlaff,W.	Chilean	Pr.Owner.	Wk.NCh.	(9)(10)(11)(57)
Salar del Carmen	State	Chilean St.	St.	CD.Ul.	(as)
San Antonio(Luza)	Loayza y Pascal	Peruvian	Pr.Owner.	CD.Ul.	(as)
San Antonio de Méjico	State	Chilean St.	St.	CD.Ul.	(as)
San Antonio(Soto Flores)	State	Chilean St.	St.	CD.Ul.	(as)
San Antonio(Viejo)	State	Chilean St.	St.	CD.Ul.	(as)
San Benigno	State	Chilean St.	St.	CD.Ul.	(as)
San Cristóbal	State	Chilean St.	St.	CD.Ul.	(as)
San Fernando	Cevallos,Sanz y Cía.	Peruvian/Chilean(?)	Pr.Ps.Owner.	Wk.	(9)(10)(11)
San Francisco(Campodónico)	State	Chilean St.	St.	CD.Ul.	(as)
San Francisco(Marquezado)	State	Chilean St.	St.	CD.Ul.	(as)
San Francisco(Zegarra)	State	Chilean St.	St.	CD.Ul.	(as)
San Jorge	Gibbs & Co.	British	Pr.Owner.	CD.Ul.	(as)
San José de Alva	Cevallos,Nicolás	Peruvian	Pr.Owner.	Wk.	(9)(10)(11)
San José (Devescovi)	State	Chilean St.	St.	CD.Ul.	(as)
San José de Putunchara	Sanguinetti,Juan	Chilean(?)	Pr.Owner.	Wk.	(9)(10)(11)
San Lorenzo(Granadino)	Folsch and Martin	German	Pr.Owner.	CD.OP.	(as)
San Lorenzo(Ramírez)	Marincovic,Juan	Chilean	Pr.Owner.	Wk.NCh.	(9)(10)(11)(59)
San Lorenzo(Zavala)	State	Chilean St.	St.	CD.Ul.	(as)

Plants	Operator 1885	Nationality 1885	Title 1885	Status 1885	Notes 1885
San Miguel(Cauvi)	State	Chilean St.	St.	CD.Ul.	(as)
San Miguel(Palacios)	State	Chilean St.	St.	CD.Ul.	(as)
San Nicolás	Loayza y Pascal	Peruvian	Pr.Owner.	CD.OP.	(as)
San Pascual	State	Chilean St.	St.	CD.Ul.	(as)
San Pedro(Ramirez)	State	Chilean St.	St.	CD.Ul.	(as)
San Rafael	Nirich, Juan	Yugoslavian	Pr.Ps.Owner.	Wk.NCh.NM(?)	(8)(10)(11)(60)
San Sebastián	Kraljevic and Zvietovich	Yugoslavian	Pr.Ps.Owner.	Wk.NCh.NM(?)	(9)(10)(11)(41)(61)
Santa Beatriz	Herrmann, Otto	German	Pr.Ps.Rented.	Wk.	(9)(10)(11)(32)
Santa Clara y Challacollito	State	Chilean St.	St.	CD.Ul.	(as)
Santa Emilia	State	Chilean St.	St.	CD.Ul.	(as)
Santa Lucía	Herrmann, Otto	German	Pr.Owner.	CD.OP.	(as)
Santa Luisa	Gildemeister, J.	German	Pr.Owner.	CD.OP.	(as)
Santa María	Jewell, Maurice	British	Pr.Ps.Owner.	CD.Ul.	(as)
Santa Rosa	State	Chilean St.	St.	CD.Ul.	(as)
Santa Rosita	State	Chilean St.	St.	CD.Ul.	(as)
Santo Domingo	State	Chilean St.	St.	CD.Ul.	(as)
Santo Domingo(Vidoliche)	State	Chilean St.	St.	CD.Ul.	(as)
Silencio	Watters Bros./Humphrey	British	Pr.Owner.NP.	Wk.NCh.NM.	(9)(10)(11)(62)
Tordoya	Inglis, James and Co.	British	Pr.Ps.Owner.	CD.Ul.Mrg(?)	(32)
Tránsito	Sanguinetti, Juan	Chilean(?)	Pr.Owner.	CD.Ul.Mrg(?)	(63)
Tres Marías	Humberstone, James T. & Co.	British	Pr.Owner.	Wk.	(9)(10)(11)
Unión	State	Chilean St.	St.	CD.Ul.	(as)
Virginia	Folsch and Martin	German	Pr.Owner.	Wk.	(9)(10)(11)
Yungay(Albarracín)	Albarracín, Idelfonsa	Peruvian	Pr.Owner.	CD.Ul.	(as)
Yungay Bajo	Banco Mercantil Internacional	Chilean	Pr.Owner.	Wk.	(9)(10)(11)
Yungay(Jentilar)	Albarracín	Peruvian	Pr.Ps.Owner.	CD.Ul.	(as)

Plants	Owner 1886	Nationality 1886	Operator 1886	Nationality 1886	Title 1886
Máquinas					
Agua Santa	Campbell, Outram and Co.	British	Campbell, Outram and Co.	British	Pr. Owner.
Alianza	Gibbs and Co.	British	Gibbs and Co.	British	Pr. Owner.
Angela	Loayza y Pascal	Peruvian	Loayza y Pascal	Peruvian	Pr. Owner.
Angeles	State	Chilean St.	State	Chilean St.	St.
Argentina	Gildemeister, J.	German	Gildemeister, J.	German	Pr. Owner.
Barreñechea	State	Chilean St.	State	Chilean St.	St.
Bearnes	Deves Freres	French	Deves Freres	French	Pr. Owner.
Buen Retiro	Harvey/North	British	Harvey/North	British	Pr. Owner.
Calacala	Banco Mobiliario	Chilean	Banco Mobiliario	Chilean	Pr. Owner.
California	State	Chilean St.	State	Chilean St.	St.
Candelaria	State	Chilean St.	State	Chilean St.	St.
Carmelitana	State	Chilean St.	State	Chilean St.	St.
Carmen Alto	State	Chilean St.	State	Chilean St.	St.
Carmen Bajo	State	Chilean St.	State	Chilean St.	St.
Carolina	Gibbs & Co.	British	Gibbs & Co.	British	Pr. Owner.
Católica, La	State	Chilean St.	State	Chilean St.	St.
China	State	Chilean St.	State	Chilean St.	St.
Chinquiquín (y Oviedo y Trillo)	State	Chilean St.	State	Chilean St.	St.
Concepción (Falacio Industrial)	State	Chilean St.	State	Chilean St.	St.
Dolores (Cobo)	State	Chilean St.	State	Chilean St.	St.
Esmeralda	Cevallos, Jewell, North (Co.)	Peruvian/British	Cevallos, Jewell, North (Co.)	Peruvian/British	Pr. Owner.
Esperanza (Lagunas)	North, J.T.	British	North, J.T.	British	Pr. Owner.
Hanza (S. Antonio-Gildemeister)	Gildemeister, J.	German	Gildemeister, J.	German	Pr. Owner.
Limema	Gibbs & Co.	British	Gibbs & Co.	British	Pr. Owner.
Magdalena	State	Peruvian St.	State	Peruvian St.	St.
Matillana	State	Peruvian St.	State	Peruvian St.	St.
Negreiros	State	Peruvian St.	State	Peruvian St.	St.
Nueva Carolina (y Pozo Almonte)	Cfa. Colorada	British	Cfa. Colorada	British	Pr. Owner.
Nueva Soledad	State	Chilean St.	State	Chilean St.	St.
Palma	Gibbs & Co.	British	Gibbs & Co.	British	Pr. Owner.
Paposo (Máquina)	Folsch and Martin	German	Folsch and Martin	German	Pr. Owner.
Pr. Chica	Aguirre, José de	Peruvian	Folsch and Martin	German	Pr. Rented.
Pema Grande	State	Chilean St.	State	Chilean St.	St.
Perla	State	Chilean St.	State	Chilean St.	St.
Peruana	North/Harvey (C. Colorada)	British	North/Harvey (C. Colorada)	British	Pr. Owner.
Porvenir	State	Chilean St.	State	Chilean St.	St.
Providencia	State	Chilean St.	State	Chilean St.	St.
Resurrección (y Q. de Pazos)	State	Chilean St.	State	Chilean St.	St.
Rosario (Pérez)	Pérez, Manuel María	Peruvian	State	Chilean St.	St. Cst. Abd.
Sacramento (Delano)	Subercaseux, Francisco	Chilean	Folsch and Martin	German	Pr. Rented.
Salar de la Noria	State	Chilean St.	State	Chilean St.	St.
San Agustín	State	Chilean St.	State	Chilean St.	St.
San Andrés	State	Chilean St.	State	Chilean St.	St. Cst. Abd.
San Antonio (Campbell)	Campbell, Outram and Co.	British	Campbell, Outram and Co.	British	Pr. Owner.
San Antonio (Penaranda)	State	Chilean St.	State	Chilean St.	St. Cst.
San Carlos	Folsch and Martin	German	Folsch and Martin	German	Pr. PC. Owner.
San Francisco (Bramez)	Gibbs & Co.	British	Gibbs & Co.	British	Pr. Owner.

Plants	Owner 1886	Nationality 1886	Operator 1886	Nationality 1886	Title 1886
San José(Aguirre)	Weingardt and Brandt	German	Herrmann,Otto	German	Pr.Rented.
San José de la Noria	State	Chilean St.	State	Chilean St.	St.
San José(Yungay)	Folsch and Martin	German	Folsch and Martin	German	Pr.Owner.
San Juan(Gildemeister)	Gildemeister,J.	German	Gildemeister,J.	German	Pr.Owner.
San Juan de Soledad	State	Chilean St.	State	Chilean St.	St.
San Lorenzo(Ugarte)	Ugarte y Cevallos y Cfa.	Peruvian	Ugarte y Cevallos y Cfa.	Peruvian	Pr.Owner.
San Pablo	Barreda,E./Schroder,W.	Chilean/German	Barreda,E./Schroder,W.	Chilean/German	Pr.Owner.
San Pedro	Gildemeister,J.	German	Gildemeister,J.	German	Pr.Owner.
San Vicente	State	Chilean St.	State	Chilean St.	St.Cst.
Santa Adela	State	Chilean St.	State	Chilean St.	St.Cst.
Santa Ana	State	Chilean St.	State	Chilean St.	St.Cst.
Santa Catalina	State	Chilean St.	State	Chilean St.	St.Cst.
Santa Isabel	State	Chilean St.	State	Chilean St.	St.
Santa Laura(Barra)	State	Chilean St.	State	Chilean St.	St.
Santa Laura(Wendell)	State	Chilean St.	State	Chilean St.	St.
Santa Rita	Brooking,Jorge	British	Brooking,Jorge	British	Pr.Owner.
Santiago(Camina)	Perfetti,Pedro	Italian	Perfetti,Pedro	Italian	Pr.Owner.
Solferino	Goich and Zayes	Chilean	Goich and Zayes	Chilean	Pr.Owner.
Tarapacá	State	Chilean St.	State	Chilean St.	St.
Trinidad	State	Chilean St.	State	Chilean St.	St.
Valparaiso	State	Chilean St.	State	Chilean St.	St.
Victoria	State	Chilean St.	State	Chilean St.	St.
Paradas					
Abra de Quiroga	Loayza y Pascal	Peruvian	Loayza y Pascal	Peruvian	Pr.Owner.
Abra de Ugarte	State	Chilean St.	State	Chilean St.	St.
Aguada	Perfetti,Pedro	Italian	Perfetti,Pedro	Italian	Pr.Ps.Owner.
Andacollo	Folsch and Martin	German	Folsch and Martin	German	Pr.Owner.
Ascención de Capetillo	State	Chilean St.	State	Chilean St.	St.
Ascención de Loayza	State	Chilean St.	State	Chilean St.	St.
Asunta	State	Chilean St.	State	Chilean St.	St.
Borca	State	Chilean St.	State	Chilean St.	St.
Buena Esperanza	State	Chilean St.	State	Chilean St.	St.Cst.Abd.
Buenaventura	Barril,Manuel	Peruvian	Barril,Manuel	Peruvian	Pr.Owner.
Candelaria(de Carpio)	Granja,Dominguez y Lacalle	Chilean	Granja,Dominguez y Lacalle	Chilean	Pr.Ps.Owner.
Candelaria(de Osorio)	Devescovi,J.	Peruvian(?)	Devescovi,J.	Peruvian(?)	Pr.Owner.
Candelaria(de Perfetti)	State	Chilean St.	State	Chilean St.	St.
Candelaria(Zavala y Bilbao)	Loayza y Pascal	Peruvian	Loayza y Pascal	Peruvian	Pr.Owner.
Carmen(Morales)	State	Chilean St.	State	Chilean St.	St.
Carmen(Oviedo)	State	Chilean St.	State	Chilean St.	St.
Carmen(Scheel)	State	Chilean St.	State	Chilean St.	St.
Chilena	State	Chilean St.	State	Chilean St.	St.
Chinquiquiray(Zavala)	State	Chilean St.	State	Chilean St.	St.
Compañía(de Tarapacá)	Hidalgo,J.de Dios	Chilean(?)	Hidalgo,J.de Dios	Chilean(?)	Pr.Owner.
Concepción(Gárate)	Galté,Fourniés y Cfa.	French	Galté,Fourniés y Cfa.	French	Pr.Owner.
Cordillera	Labernadie,Eugenio	French	Labernadie,Eugenio	French	Pr.Owner.

Plants	Owner 1886	Nationality 1886	Operator 1886	Nationality 1886	Title 1886
Cruz de Zapiga	State	Chilean St.	State	Chilean St.	St.
Dolores(Compania América)	State	Chilean St.	State	Chilean St.	St.
Encarnación	State	Chilean St.	State	Chilean St.	St.
Fortuna	State	Chilean St.	State	Chilean St.	St.
Jazpampa(Zavala)	North, J.T./Gibbs & Co.	British	Gibbs & Co.	British	Pr.Owner.
Matamunqui	Schiammaro, P.	Italian(?)	Schiammaro, P.	Italian(?)	Pr.Ps.Owner.
Mercedes de Negreiros	Kraljevic Brothers	Yugoslavian	Kraljevic Brothers	Yugoslavian	Pr.Ps.Owner.
Negreiros	Vernal, Manuel	Peruvian	Vernal, Manuel	Peruvian	Pr.Owner.Ud.
Negreiros(Vernal)	State	Chilean St.	State	Chilean St.	St.
Normandía(San Antonio)	State	Chilean St.	State	Chilean St.	St.
Nueva Rosario	Gibbs & Co.	British	Gibbs & Co.	British	Pr.Owner.
Paccha	State	Chilean St.	State	Chilean St.	St.
Paccha(Bramez)	Gibbs & Co.	British	Gibbs & Co.	British	Pr.Owner.
Pampa Negra	State	Chilean St.	State	Chilean St.	St.
Paposo(parada)	Folsch and Martin	German	Folsch and Martin	German	Pr.Owner.
Pasto	State	Chilean St.	State	Chilean St.	St.
Primitiva	Dawson, Juan	British	Dawson, Juan	British	Pr.Owner.
Progreso	Quiroga, E[varisto] and bros.	Peruvian	Quiroga, E[varisto] and bros.	Peruvian	Pr.Ps.Owner.
Ramírez	Liverpool Nitrate Co.	British	Liverpool Nitrate Co.	British	Pr.Owner.
Reducto	Galté, Fourniés y Cía.	French	Galté, Fourniés y Cía.	French	Pr.Owner.
Rincón(Aguirre)	Aguirre, Mariano	Peruvian	Folsch and Martin	German	Pr.Rented.
Rincón(Benavides)	State	Chilean St.	State	Chilean St.	St.Cst.Abd.
Rincón(Soruco)	Brooking, George] E.	British	Brooking, George] E.	British	Pr.Ps.Owner.Rp.
Rosario(Beas)	Vernal, Fermín	Peruvian	Vernal, Fermín	Peruvian	Pr.Ps.Owner.
Rosario(Luza)	Vernal y Castro, Juan	Peruvian	Vernal y Castro, Juan	Peruvian	Pr.Owner.
Rosario(Rfos)	State	Chilean St.	State	Chilean St.	St.
Sacramento(Baluarto)	Baluarto, Rosa Lecaros de	Peruvian	Baluarto, Rosa Lecaros de	Peruvian	Pr.Owner.
Sacramento(Castilla)	Charme, Eduardo/Retzlaff, W.	Chilean	Charme, Eduardo/Retzlaff, W.	Chilean	Pr.Owner.
Sacramento(Loayza y Pascal)	State	Chilean St.	State	Chilean St.	St.Cst.Abd.
Sacramento(Soto Flores)	Charme, Eduardo/Retzlaff, W.	Chilean	Charme, Eduardo/Retzlaff, W.	Chilean	Pr.Owner.
Salar del Carmen	State	Chilean St.	State	Chilean St.	St.
San Antonio(Luza)	Loayza y Pascal	Peruvian	Loayza y Pascal	Peruvian	Pr.Owner.
San Antonio de Méjico	State	Chilean St.	State	Chilean St.	St.
San Antonio(Soto Flores)	State	Chilean St.	State	Chilean St.	St.
San Antonio(Viejo)	State	Chilean St.	State	Chilean St.	St.
San Benigno	State	Chilean St.	State	Chilean St.	St.
San Cristóbal	State	Chilean St.	State	Chilean St.	St.
San Fernando	Bulnes y Cía.	Chilean	Bulnes y Cía.	Chilean	Pr.Ps.Owner.
San Francisco(Campodónico)	State	Chilean St.	State	Chilean St.	St.
San Francisco(Marquezado)	State	Chilean St.	State	Chilean St.	St.
San Francisco(Zegarra)	State	Chilean St.	State	Chilean St.	St.
San Jorge	Gibbs & Co.	British	Gibbs & Co.	British	Pr.Owner.
San José de Alva	Cevallos, Nicolás	Peruvian	Cevallos, Nicolás	Peruvian	Pr.Owner.
San José (Devescovi)	State	Chilean St.	State	Chilean St.	St.
San José de Putunchara	Sanguinetti, Juan	Chilean(?)	Sanguinetti, Juan	Chilean(?)	Pr.Owner.
San Lorenzo(Granadino)	Folsch and Martin	German	Folsch and Martin	German	Pr.Owner.
San Lorenzo(Ramírez)	Marincovic, Juan	Chilean	Marincovic, Juan	Chilean	Pr.Owner.
San Lorenzo(Zavala)	State	Chilean St.	State	Chilean St.	St.

Plants	Owner 1886	Nationality 1886	Operator 1886	Nationality 1886	Title 1886
San Miguel(Cauvi)	State	Chilean St.	State	Chilean St.	St.
San Miguel(Palacios)	State	Chilean St.	State	Chilean St.	St.
San Nicolás	Loayza y Pascal	Peruvian	Loayza y Pascal	Peruvian	Pr.Owner.
San Pascual	State	Chilean St.	State	Chilean St.	St.
San Pedro(Ramírez)	State	Chilean St.	State	Chilean St.	St.
San Rafael	Nirich, Juan	Yugoslavian	Nirich, Juan	Yugoslavian	Pr.Owner.
San Sebastián	Kraljevic and Zvietovich	Yugoslavian	Kraljevic and Zvietovich	Yugoslavian	Pr.Owner.
Santa Beatriz	Banco Mobiliario	Chilean	Herrmann, Otto	German	Pr.Ps.Rented.
Santa Clara y Challacollito	State	Chilean St.	State	Chilean St.	St.
Santa Emilia	State	Chilean St.	State	Chilean St.	St.
Santa Lucía	Herrmann, Otto	German	Herrmann, Otto	German	Pr.Owner.
Santa Luisa	Gildemeister, J.	German	Gildemeister, J.	German	Pr.Owner.
Santa María	Jewell, Maurice	British	Jewell, Maurice	British	Pr.Ps.Owner.
Santa Rosa	State	Chilean St.	State	Chilean St.	St.
Santa Rosita	State	Chilean St.	State	Chilean St.	St.
Santo Domingo	State	Chilean St.	State	Chilean St.	St.
Santo Domingo(Vidoliche)	State	Chilean St.	State	Chilean St.	St.
Silencio	Watters Bros./Humphrey	British	Watters Bros./Humphrey	British	Pr.Owner.NP.
Tordoya	Inglis, James and Co.	British	Inglis, James and Co.	British	Pr.Ps.Owner.
Tránsito	Sanguinetti, Juan	Chilean(?)	Sanguinetti, Juan	Chilean(?)	Pr.Owner.
Tres Marías	Humberstone, James T. & Co.	British	Humberstone, James T. & Co.	British	Pr.Ps.Owner.
Unión	State	Chilean St.	State	Chilean St.	St.
Virginia	Folsch and Martin	German	Folsch and Martin	German	Pr.Owner.
Yungay(Albarracín)	Albarracín, Idelfonsa	Peruvian	Albarracín, Idelfonsa	Peruvian	Pr.Owner.
Yungay Bajo	Banco Mercantil Internacional	Chilean	Banco Mercantil Internacional	Chilean	Pr.Owner.
Yungay(Jentilar)	Albarracín	Peruvian	Albarracín	Peruvian	Pr.Ps.Owner.

Plants	Status 1886	Notes 1886	Owner 1887	Nationality 1887	Operator 1887
Máquinas					
Agua Santa	Wk.	(10)(11)	Campbell, Outram and Co.	British	Campbell, Outram and Co.
Alianza	Un.	(as)	Gibbs and Co.	British	Gibbs and Co.
Angela	Wk.	(10)(11)	Loayza y Pascal	Peruvian	Loayza y Pascal
Angeles	Un.	(as)	State	Chilean St.	State
Argentina	CD.	(10)(11)	Gildemeister, J.	German	Gildemeister, J.
Barrechea	CD.	(as)	State	Chilean St.	State
Bearnes	Wk.	(10)(11)	Deves Freres/Layouts	French	Deves Freres/Layouts
Buen Retiro	Wk.	(10)(11)	Harvey/North	British	Harvey/North
Calacala	Wk.	(10)(11)	Banco Mobiliario	Chilean	Banco Mobiliario
California	CD.Md.	(as)	State	Chilean St.	State
Candelaria	Un.	(as)	State	Chilean St.	State
Carmelitana	Un.	(as)	State	Chilean St.	State
Carmen Alto	CD.	(as)	State	Chilean St.	State
Carmen Bajo	CD.	(as)	State	Chilean St.	State
Carolina	Un.	(as)	Gibbs & Co.	British	Gibbs & Co.
Católica, La	CD.Md.	(as)	State	Chilean St.	State
China	CD.Bd.	(as)	State	Chilean St.	State
Chinquiquiray(Oviedo y Trillo)	CD.Ul.	(as)	State	Chilean St.	State
Concepción(Palacio Industrial)	CD.Bd.	(as)	State	Chilean St.	State
Doiores(Cobo)	CD.Bd.	(as)	State	Chilean St.	State
Esmeralda	Wk.	(10)(11)	Cevallos, Jewell, North(Co.)	Peruvian/British	Cevallos, Jewell, North(Co.)
Esperanza(Lagunas)	Dst.	(as)	North, J.T.	British	North, J.T.
Hanza(S. Antonio-Gildemeister)	CD.Bd.	(as)	Gildemeister, J.	German	Gildemeister, J.
Limena	Wk.	(10)(11)	Gibbs & Co.	British	Gibbs & Co.
Magdalena	Dst.	(as)	State	Peruvian St.	State
Matillana	CD.Bd.	(as)	State	Peruvian St.	State
Negreiros	Un.	(as)	State	Peruvian St.	State
Nueva Carolina(y Pozo Almonte)	Bd.	(as)	Cfa. Colorada	British	Cfa. Colorada
Nueva Soledad	CD.	(as)	State	Chilean St.	State
Palma	Wk.	(10)(11)	Gibbs & Co.	British	Gibbs & Co.
Paposo(máquina)	Wk.	(10)(11)	Folsch and Martin	German	Folsch and Martin
Pena Chica	Wk.	(10)(11)	Aguirre, José de	Peruvian	Folsch and Martin
Pena Grande	CD.	(as)	State	Chilean St.	State
Perla	CD.	(as)	State	Chilean St.	State
Peruana	Wk.	(10)(11)	North/harvey(C. Colorada)	British	North/Harvey(C. Colorada)
Porvenir	CD.	(as)	State	Chilean St.	State
Providencia	CD.	(as)	State	Chilean St.	State
Resurrección(y Q. de Pazos)	CD.	(as)	State	Chilean St.	State
Rosario(Pérez)	CD.	(as)	Pérez, Manuel María	Peruvian	State
Sacramento(Delano)	Wk.	(10)(11)	Subercaseux, Francisco	Chilean	Folsch and Martin
Salar de la Noria	CD.	(as)	State	Chilean St.	State
San Agustín	CD.	(as)	State	Chilean St.	State
San Andrés	CD.	(as)	State	Chilean St.	State
San Antonio(Campbell)	Wk.	(10)(11)	Campbell, Outram and Co.	British	Campbell, Outram and Co.
San Antonio(Pemaranda)	CD.DE.	(as)	State	Chilean St.	State
San Carlos	Wk.	(10)(11)	Folsch and Martin	German	Folsch and Martin
San Francisco(Brarez)	Wk.	(10)(11)	Gibbs & Co.	British	Gibbs & Co.

Plants	Status 1886	Notes 1886	Owner 1887	Nationality 1887	Operator 1887
San José(Aguirre)	Wk.	(10)(11)	Weingardt and Brandt	German	Herrmann, Otto
San José de la Noria	CD.	(as)	State	Chilean St.	State
San José(Yungay)	CD.OP.	(as)	Folsch and Martin	German	Folsch and Martin
San Juan(Gildemeister)	Wk.	(10)(11)	Gildemeister, J.	German	Gildemeister, J.
San Juan de Soledad	Un.	(as)	State	Chilean St.	State
San Lorenzo(Ugarte)	Wk.	(10)(11)	Ugarte y Cevallos y Cía.	Peruvian	Ugarte y Cevallos y Cía.
San Pablo	Wk.	(10)(11)	Barreda, E./Schroder, W.	Chilean/German	Barreda, E./Schroder, W.
San Pedro	Wk.	(10)(11)	Gildemeister, J.	German	Gildemeister, J.
San Vicente	CD.	(as)	State	Chilean St.	State
Santa Adela	CD.	(as)(46)	State	Chilean St.	State
Santa Ana	CD.	(as)	State	Chilean St.	State
Santa Catalina	CD.	(as)	State	Chilean St.	State
Santa Isabel	CD.	(as)	State	Chilean St.	n.a.
Santa Laura(Barra)	CD.Bd.	(as)	State	Chilean St.	State
Santa Laura(Wendell)	Un.	(as)	State	Chilean St.	State
Santa Rita	Wk.	(10)(11)	Brooking, Jorge	British	Brooking, Jorge
Santiago(Camina)	Wk.	(10)(11)	Perfetti, Pedro	Italian	Perfetti, Pedro
Solferino	Wk.	(10)(11)	Goich and Zayes	Chilean	Goich and Zayes
Tarapacá	CD.	(as)	State	Chilean St.	State
Trinidad	CD.Bd.	(as)	State	Chilean St.	State
Valparaíso	Un.	(as)	State	Chilean St.	State
Victoria	Dst.	(as)	State	Chilean St.	State
Paradas					
Abra de Quiroga	CD.	(as)	Loayza y Pascal	Peruvian	Loayza y Pascal
Abra de Ugarte	CD.	(as)	State	Chilean St.	State
Aguada	Wk.	(10)(11)	Perfetti, Pedro	Italian	Perfetti, Pedro
Andacollo	CD.OP.	(as)	Folsch and Martin	German	Folsch and Martin
Ascención de Capetillo	CD.Ul.	(as)	State	Chilean St.	State
Ascención de Loayza	CD.Ul.	(as)	State	Chilean St.	State
Asunta	CD.Ul.	(as)	State	Chilean St.	State
Banda	CD.Ul.	(as)	State	Chilean St.	State
Buena Esperanza	CD.Ul.	(as)	State	Chilean St.	State
Buenaventura	CD.Ul.	(as)	Barril, Manuel	Peruvian	Barril, Manuel
Candelaria(de Carpio)	Wk.NCh.	(10)(11)	Granja, Domínguez y Lacalle	Chilean	Granja, Domínguez y Lacalle
Candelaria(de Osorio)	Wk.NCh.	(10)(11)	Devescovi, J.	Peruvian(?)	Devescovi, J.
Candelaria(de Perfetti)	CD.Ul.	(as)	State	Chilean St.	State
Candelaria(Zavala y Bilbao)	CD.OP.	(as)	Loayza y Pascal	Peruvian	Loayza y Pascal
Carmen(Morales)	CD.Ul.	(as)	n.a.	n.a.	n.a.
Carmen(Oviedo)	CD.Ul.	(as)	State	Chilean St.	State
Carmen(Scheel)	CD.Ul.	(as)	State	Chilean St.	State
Chilena	CD.Ul.	(as)	n.a.	n.a.	n.a.
Chinquiquiray(Zavala)	CD.Ul.	(as)	State	Chilean St.	State
Compañía(de Tarapacá)	CD.Ul.	(as)	Hidalgo, J.de Dios	Chilean(?)	Hidalgo, J.de Dios
Concepción(Gárate)	Wk.	(10)(11)	Galté y Cía.	French	Galté y Cía.
Cordillera	CD.Ul.	(as)	Labernadie, Eugenio	French	Labernadie, Eugenio

Plants	Status 1886	Notes 1886	Owner 1887	Nationality 1887	Operator 1887
Cruz de Zapiga	CD.Ul.	(as)	n.a.	n.a.	n.a.
Dolores(Compañía América)	CD.Ul.	(as)	n.a.	n.a.	n.a.
Encarnación	CD.Ul.	(as)	State	Chilean St.	State
Fortuna	CD.Ul.	(as)	State	Chilean St.	State
Jazpampa(Zavala)	Wk.	(10)(11)	North,J.T./Gibbs & Co.	British	Gibbs & Co.
Matamunqui	Wk.	(10)(11)	Schiammaro,P.	Italian(?)	Schiammaro,P.
Mercedes de Negreiros	Wk.	(10)(11)	Kraljevic Brothers	Yugoslavian	Kraljevic Brothers
Negreiros	CD.Ul.	(as)	Vernal,Manuel	Peruvian	Vernal,Manuel
Negreiros(Vernal)	CD.Ul.	(as)	State	Chilean St.	State
Normandía(San Antonio)	CD.Ul.	(as)	Gibbs & Co.	British	Gibbs & Co.
Nueva Rosario	CD.Ul.NCh(?)	(as)	Gibbs & Co.	British	Gibbs & Co.
Paccha	CD.Ul.	(as)	n.a.	n.a.	n.a.
Paccha(Bramez)	CD.Ul.NCh(?)	(as)	Gibbs & Co.	British	Gibbs & Co.
Pampa Negra	CD.Ul.	(as)	n.a.	n.a.	n.a.
Paposo(parada)	CD.OP.	(as)	Folsch and Martin	German	Folsch and Martin
Pasto	CD.Ul.	(as)	North,J.T.	British	North,J.T.
Primitiva	CD.Ul.	(as)	Dawson,Juan	British	Dawson,Juan
Progreso	Wk.	(10)(11)	Quiroga,E[varisto] and bros.	Peruvian	Quiroga,E[varisto] and bros.
Ramírez	Wk.	(10)(11)	Liverpool Nitrate Co.	British	Liverpool Nitrate Co.
Reducto	CD.Ul.	(as)	Galté,Fourniés y Cía.	French	Galté,Fourniés y Cía.
Rincón(Aguirre)	Neq.UDp.	(as)	Aguirre,Mariano	Peruvian	Folsch and Martin
Rincón(Benavides)	CD.Ul.	(as)	State	Chilean St.	State
Rincón(Soruco)	CD.Ul.UDp(?)	(54)	Brooking,G[George] E.	British	Brooking,G[George] E.
Rosario(Beas)	Wk.	(10)(11)(55)	Vernal,Fermin	Peruvian	Vernal,Fermin
Rosario(Luza)	CD.	(10)(11)	Vernal y Castro,Juan	Peruvian	Vernal y Castro,Juan
Rosario(Rfos)	CD.Ul.	(as)	State	Chilean St.	State
Sacramento(Baluarto)	Wk.	(10)(11)	Baluarto,Rosa Lecaros de	Peruvian	Baluarto,Rosa Lecaros de
Sacramento(Castilla)	Mrg.	(10)(11)(56)	Charne,Eduardo/Retzlaff,W.	Chilean	Charne,Eduardo/Retzlaff,W.
Sacramento(Loayza y Pascal)	Neq.	(as)	State	Chilean St.	State
Sacramento(Soto Flores)	Wk.NCh.	(10)(11)(57)	Charne,Eduardo/Retzlaff,W.	Chilean	Charne,Eduardo/Retzlaff,W.
Salar del Carmen	CD.Ul.	(as)	State	Chilean St.	State
San Antonio(Luza)	CD.Ul.	(as)	Loayza y Pascal	Peruvian	Loayza y Pascal
San Antonio de Méjico	CD.Ul.	(as)	State	Chilean St.	State
San Antonio(Soto Flores)	CD.Ul.	(as)	State	Chilean St.	State
San Antonio(Viejo)	CD.Ul.	(as)	State	Chilean St.	State
San Benigno	CD.Ul.	(as)	State	Chilean St.	State
San Cristóbal	CD.Ul.	(as)	n.a.	n.a.	n.a.
San Fernando	Wk.	(10)(11)(32)	Bulnes y Cía.	Chilean	Bulnes y Cía.
San Francisco(Campodónico)	CD.Ul.	(as)	State	Chilean St.	State
San Francisco(Marquezado)	CD.Ul.	(as)	State	Chilean St.	State
San Francisco(Zegarra)	CD.Ul.	(as)	n.a.	n.a.	n.a.
San Jorge	Wk.NM(?)	(10)(11)	Gibbs & Co.	British	Gibbs & Co.
San José de Alva	Wk.	(10)(11)	Cevallos,Nicolás	Peruvian	Cevallos,Nicolás
San José (Devescovi)	CD.Ul.	(as)	State	Chilean St.	State
San José de Putunchara	Wk.	(10)(11)	Sanguinetti,Juan	Chilean(?)	Sanguinetti,Juan
San Lorenzo(Granadino)	CD.OP.	(as)	Folsch and Martin	German	Folsch and Martin
San Lorenzo(Ramírez)	Wk.NCh.	(10)(11)(59)	Marincovic,Juan	Chilean	Marincovic,Juan
San Lorenzo(Zavala)	CD.Ul.	(as)	n.a.	n.a.	n.a.

Plants	Status 1886	Notes 1886	Owner 1887	Nationality 1887	Operator 1887
San Miguel(Cauvi)	CD.Ul.	(as)	State	Chilean St.	State
San Miguel(Palacios)	CD.Ul.	(as)	State	Chilean St.	State
San Nicolás	CD.OP.	(as)	Loayza y Pascal	Peruvian	Loayza y Pascal
San Pascual	CD.Ul.	(as)	State	Chilean St.	State
San Pedro(Ramirez)	CD.Ul.	(as)	State	Chilean St.	State
San Rafael	Wk.NCh.	(10)(11)(60)	Nirich, Juan	Yugoslavian	Nirich, Juan
San Sebastián	Wk.NCh.	(10)(11)(61)	Kraljevic and Zvietovich	Yugoslavian	Kraljevic and Zvietovich
Santa Beatriz	Wk.	(9)(10)(11)(32)	Banco Mobiliario	Chilean	Herrmann, Otto
Santa Clara y Chalacollito	CD.Ul.	(as)	State	Chilean St.	State
Santa Emilia	CD.Ul.	(as)	State	Chilean St.	State
Santa Lucía	CD.OP.	(as)	Herrmann, Otto	German	Herrmann, Otto
Santa Luisa	CD.OP.	(as)	Gildemeister, J.	German	Gildemeister, J.
Santa María	CD.Ul.	(as)	Jewell, Maurice	British	Jewell, Maurice
Santa Rosa	CD.Ul.	(as)	State	Chilean St.	State
Santa Rosita	CD.Ul.	(as)	State	Chilean St.	State
Santo Domingo	CD.Ul.	(as)	n.a.	n.a.	n.a.
Santo Domingo(Vidoliche)	CD.Ul.	(as)	State	Chilean St.	State
Silencio	Wk.NCh.	(10)(11)(62)	Watters Bros./Humphrey	British	Watters Bros./Humphrey
Tordoya	CD.Ul.Mrg(?)	(32)	Inglis, James and Co.	British	Inglis, James and Co.
Tránsito	CD.Ul.Mrg(?)	(63)	Sanguinetti, Juan	Chilean(?)	Sanguinetti, Juan
Tres Marfas	Wk.	(9)(10)(11)	Humberstone, James T. & Co.	British	Humberstone, James T. & Co.
Unión	CD.Ul.	(as)	n.a.	n.a.	n.a.
Virginia	Wk.	(10)(11)	Folsch and Martin	German	Folsch and Martin
Yungay(Albarracín)	CD.Ul.	(as)	Albarracín, Idelfonsa	Peruvian	Albarracín, Idelfonsa
Yungay Bajo	Wk.	(10)(11)	Banco Mercantil Internacional	Chilean	Banco Mercantil Internacional
Yungay(Jentilar)	CD.Ul.	(as)	Albarracín	Peruvian	Albarracín

Plants	Nationality 1987	Title 1887	Status 1887	Payment 1887	Notes 1887
Máquinas					
Agua Santa	British	Pr.Owner.	Wk.	Rp.	(10)(31)
Alianza	British	Pr.Owner.	Un.	Au.Ps.	(31)
Angela	Peruvian	Pr.Owner.	Wk.	Rp.	(10)(31)
Angeles	Chilean St.	St.	Un.	Pd.	(31)(32)
Argentina	German	Pr.Owner.	Wk.	Rp.	(10)(31)
Barrechea	Chilean St.	St.	CD.	Pd.	(31)(32)
Bearnes	French	Pr.Owner.	Wk.	Au.	(10)(31)
Buen Retiro	British	Pr.Owner.	Wk.	Rp.Ps.	(10)(31)
Calacala	Chilean	Pr.Owner.	Wk.	Ud.	(10)
California	Chilean St.	St.	CD.Md.	Pd.	(31)(32)
Candelaria	Chilean St.	St.	Un.	Pd.	(31)(32)
Carmelitana	Chilean St.	St.	Un.	Pd.	(31)(32)
Carmen Alto	Chilean St.	St.	CD.	Pd.	(31)(32)
Carmen Bajo	Chilean St.	St.	CD.	Pd.	(31)(32)
Carolina	British	Pr.Owner.	Un.	Rp.	(5)(31)
Católica,La	Chilean St.	St.	CD.	Pd.	(31)(32)
China	Chilean St.	St.	CD.	Pd.	(31)(32)
Chinquiquiray(Oviedo y Trillo)	Chilean St.	St.	CD.	Pd.	(31)(32)
Concepción(Palacio Industrial)	Chilean St.	St.	CD.	Pd.	(32)
Dolores(Cobo)	Chilean St.	St.	CD.	Pd.	(31)(32)
Esmeralda	Peruvian/British	Pr.Owner.	Wk.	Rp.	(10)(31)
Esperanza(Lagunas)	British	Pr.Owner.	Dst.	Rp.Ps.	(31)
Hanza(S.Antonio-Gildemeister)	German	Pr.Owner.	CD.Bd.	Rp.	(10)(31)
Limena	British	Pr.Owner.	Wk.	Rp.	(10)(31)
Magdalena	Peruvian St.	St.	Dst.	Pd.	(31)(32)
Matillana	Peruvian St.	St.	CD.Bd.	Pd.	(31)(32)
Negreiros	Peruvian St.	St.	Un.	Pd.	(31)(32)
Nueva Carolina(y Pozo Almonte)	British	Pr.Owner.	Bd.	Rp.Ps.	(31)
Nueva Soledad	Chilean St.	St.	CD.	Pd.	(31)(32)
Palma	British	Pr.Owner.	Wk.	Rp.	(10)(31)
Paposo(máquina)	German	Pr.Owner.	Wk.	Rp.	(10)(31)
Pena Chica	German	Pr.Rented.	Wk.	Ud.	(10)
Pena Grande	Chilean St.	St.	CD.	Pd.	(31)(32)
Perla	Chilean St.	St.	CD.	Pd.	(32)
Peruana	British	Pr.Owner.	CD.	Au.Ps.	(10)(31)
Porvenir	Chilean St.	St.	CD.	Pd.	(31)(32)
Providencia	Chilean St.	St.	CD.	Pd.	(31)(32)
Resurrección(y Q.de Pazos)	Chilean St.	St.	CD.	Pd.	(31)(32)
Rosario(Pérez)	Chilean St.	St.Cst.Abd.	CD.	Ud.Abd.	(as)
Sacramento(Déllano)	German	Pr.PC.Rented.	Wk.	Rp.Ps.	(31)
Salar de la Noria	Chilean St.	St.	CD.	Pd.	(31)
San Agustín	Chilean St.	St.	CD.	Pd.	(31)(32)
San Andrés	Chilean St.	St.Cst.Abd.	CD.	Ud.Abd.	(as)
San Antonio(Campbell)	British	Pr.Owner.	Wk.	Rp.	(10)(31)
San Antonio(Penaranda)	Chilean St.	St.	CD.DE.	Pd.	(31)(32)
San Carlos	German	Pr.PC.Owner.	Wk.	Rp.Ps.	(10)(31)
San Francisco(Branez)	British	Pr.Owner.	Wk.	Rp.Ps.	(10)(11)

Plant*	Nationality 1887	Title 1887	Status 1887	Payment 1887	Notes 1887
San José(Aguirre)	German	Pr.Rented.	Wk.	Ud.Ps.	(9)(10)
San José de la Noria	Chilean St.	St.	CD.	Pd.	(31)(32)
San José(Yungay)	German	Pr.Owner.	CD.OP.	Au.Ps.	(31)
San Juan(Gildemeister)	German	Pr.Owner.	Wk.	Rp.	(10)(31)
San Juan de Soledad	Chilean St.	St.	Un.	Pd.	(31)(32)
San Lorenzo(Ugarte)	Peruvian	Pr.Owner.	Wk.	Rp.	(10)(31)
San Pablo	Chilean/German	Pr.Owner.	Wk.	Rp.Ps.	(10)(31)
San Pedro	German	Pr.Owner.	Wk.	Rp.	(10)(31)
San Vicente	Chilean St.	St.Cst.	CD.	Pd.	(31)(32)
Santa Adela	Chilean St.	St.Cst.	CD.	Pd.	(31)(46)
Santa Ana	Chilean St.	St.Cst.	CD.	Pd.	(31)
Santa Catalina	Chilean St.	St.Cst.	CD.	Pd.	(31)
Santa Isabel	n.a.	Pr.Owner.	CD.	Rp.Ps.(?)	(31)
Santa Laura(Barra)	Chilean St.	St.	CD.	Pd.	(31)
Santa Laura(Wendell)	Chilean St.	St.	Un.	Pd.	(31)
Santa Rita	British	Pr.Owner.	Wk.	Au.Ps.	(10)(31)
Santiago(Camina)	Italian	Pr.Owner.	Wk.	Rp.Ps.	(10)(31)
Solferino	Chilean	Pr.Owner.	Wk.	Au.Ps.	(10)(16)
Tarapacá	Chilean St.	St.	CD.	Pd.	(31)
Trinidad	Chilean St.	St.	CD.	Pd.	(31)
Valparaíso	Chilean St.	St.	Un.	Pd.	(31)
Victoria	Chilean St.	St.	Dst.	Pd.	(31)
Paradas					
Abra de Quiroga	Peruvian	Pr.Owner.	CD.	Au.Ps.	(10)(16)
Abra de Ugarte	Chilean St.	St.	CD.	Pd.	(31)(32)
Aguada	Italian	Pr.Ps.Owner.	Wk.	Rp.Ps.	(22)(31)
Andacollo	German	Pr.Owner.	CD.OP.	Rp.Ps.	(3)(31)
Ascención de Capetillo	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
Ascención de Loayza	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
Asunta	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
Banda	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
Buena Esperanza	Chilean St.	St.Cst.Abd.	CD.Ul.	Ud.Abd.	(32)
Buenaventura	Peruvian	Pr.Owner.	CD.Ul.	Au.	(16)
Candelaria(de Carpio)	Chilean	Pr.Ps.Owner.	Wk.NCh.	Rp.Ps.	(25)
Candelaria(de Osorio)	Peruvian(?)	Pr.Owner.	Wk.NCh.	Ud.	(10)(46)
Candelaria(de Perfetti)	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
Candelaria(Zavala y Bilbao)	Peruvian	Pr.Owner.	CD.OP.	Rp.Ps.	(5)
Carmen(Morales)	n.a.	Pr.	CD.Ul.	Rp.(?)	(31)
Carmen(Oviedo)	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
Carmen(Scheel)	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
Chilena	n.a.	Pr.	CD.Ul.	Rp.(?)	(31)
Chinquiquiray(Zavala)	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
Compañía(de Tarapacá)	Chilean(?)	Pr.Owner.	Wk.NM.	Rp.Ps.(?)	(10)(31)(65)
Concepción(Gárate)	French	Pr.Owner.	Wk.	Ud.Ps.	(10)(32)
Cordillera	French	Pr.Owner.	CD.Ul.	Rp.Ps.	(25)(31)

Plants	Nationality 1887	Title 1887	Status 1887	Payment 1887	Notes 1887
Cruz de Zapiga	n.a.	Pr.	Wk.NM.Cnt.	Rp.	(31)(65)
Dolores(Compañía América)	n.a.	Pr.	CD.Ul.	Rp.(?)	(31)
Encarnación	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
Fortuna	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
Jazpampa(Zavala)	British	Pr.Owner.	Wk.	Rp.Ps.	(10)(31)(65)
Matamunqui	Italian(?)	Pr.Ps.Owner.	Wk.	Ud.Ps.	(9)(10)(17)(65)
Mercedes de Negreiros	Yugoslavian	Pr.Ps.Owner.	Wk.	Rp.Ps.	(10)(31)
Negreiros	Peruvian	Pr.Owner.Ud.	CD.Ul.	Ud.	(51)
Negreiros(Vernal)	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
Normandía(San Antonio)	British	Pr.Owner.(?)	Wk.NM.	Rp.Ps.(?)	(10)(31)(52)
Nueva Rosario	British	Pr.Owner.	CD.Ul.NCh(?)	Rp.Ps.	(5)(31)
Paccha	n.a.	Pr.	CD.Ul.NCh(?)	Rp.(?)	(31)
Paccha(Bramez)	British	Pr.Owner.	CD.Ul.NCh(?)	Rp.Ps.	(5)(31)
Pampa Negra	n.a.	Pr.	CD.Ul.NCh(?)	Rp.(?)	(31)
Paposo(parada)	German	Pr.Owner.	CD.OP.	Rp.Ps.	(7)(31)
Pasto	British	Pr.Ps.Owner.	CD.Ul.NCh(?)	Rp.Ps.(?)	(31)(53)
Primitiva	British	Pr.Owner.	Wk.NM.Cnt.	Rp.Ps.	(27)(31)(65)
Progreso	Peruvian	Pr.Ps.Owner.	Wk.	Ud.	(10)(11)(32)
Ramfrez	British	Pr.Owner.	Wk.	Rp.Ps.	(10)(11)(31)
Reducto	French	Pr.Owner.	Wk.	Rp.Ps.	(31)(65)
Rincón(Aguirre)	German	Pr.Rented.	Neq.UUp.	Ud.	(2)
Rincón(Benavides)	Chilean St.	St.Cst.Aod.	CD.Ul.	Pd.Abd.	(31)(32)
Rincón(Soruco)	British	Pr.Ps.Owner.Rp.	CD.Ul.UUp(?)	Rp.Ps.	(25)(31)
Rosario(Beas)	Peruvian	Pr.Owner.	Wk.	Rp.Ps.	(10)(11)(31)(55)
Rosario(Luza)	Peruvian	Pr.Owner.	CD.	Rp.Ps.	(5)(10)(31)
Rosario(Ríos)	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
Sacramento(Baluart)	Peruvian	Pr.Owner.	Wk.	Ud.	(10)(32)
Sacramento(Castilla)	Chilean	Pr.Owner.	Mrg.	Rp.Ps.	(10)(11)(31)(56)
Sacramento(Loayza y Pascal)	Chilean St.	St.Cst.Abd.	Neq.	Ud.Abd.	(17)(32)
Sacramento(Soto Flores)	Chilean	Pr.Owner.	Wk.NCh.	Rp.Ps.	(10)(25)(31)(57)
Salar del Carmen	Chilean St.	St.	CD.Ul.	Pd.	(31)(58)
San Antonio(Luza)	Peruvian	Pr.Owner.	CD.Ul.	Au.Ps.	(16)(31)
San Antonio de Méjico	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
San Antonio(Soto Flores)	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
San Antonio(Viejo)	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
San Benigno	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
San Cristóbal	n.a.	Pr.	CD.Ul.NCh(?)	Rp.(?)	(31)
San Fernando	Chilean	Pr.Owner.	Wk.	Ud.Ps.	(10)(32)
San Francisco(Campodónico)	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
San Francisco(Marquezado)	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
San Francisco(Zegarra)	n.a.	Pr.	CD.Ul.NCh(?)	Rp.(?)	(31)
San Jorge	British	Pr.Owner.	Wk.	Au.Ps.	(10)(16)(31)
San José de Alva	Peruvian	Pr.Owner.	Wk.	Au.	(10)(16)(31)(65)
San José (Devescovi)	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
San José de Putunchara	Chilean(?)	Pr.Owner.	Wk.	Rp.Ps.	(10)(22)(31)
San Lorenzo (Granadino)	German	Pr.Owner.	CD.OP.	Ud.Ps.	(17)(32)
San Lorenzo(Ramírez)	Chilean	Pr.Owner.	Wk.NCh.	Rp.Ps.	(10)(31)(59)
San Lorenzo(Zavala)	n.a.	Pr.	CD.Ul.NCh(?)	Rp.(?)	(31)

Plants	Nationality 1887	Title 1887	Status 1887	Payment 1887	Notes 1887
San Miguel (Cauvi)	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
San Miguel (Palacios)	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
San Nicolás	Peruvian	Pr.Owner.	CD.OP.	Au.Ps.	(16)(17)(31)
San Pascual	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
San Pedro (Ramirez)	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
San Rafael	Yugoslavian	Pr.Owner.	Wk.NCh.	Ud.Ps.	(10)(32)(60)
San Sebastian	Yugoslavian	Pr.Owner.	Wk.NCh.	Au.Ps.	(10)(16)(31)(61)
Santa Beatriz	German	Pr.Ps.Rented.	Wk.	Ud.Ps.	(10)(32)
Santa Clara y Challacollito	Chilean St.	St.	CD.Ul.Inc.	Pd.	(17)(31)(32)
Santa Emilia	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
Santa Lucía	German	Pr.Owner.	CD.OP.	Rp.Ps.	(17)(28)(31)
Santa Luisa	German	Pr.Owner.	CD.OP.	Rp.Ps.	(7)(22)(31)
Santa María	British	Pr.Ps.Owner.	CD.Ul.	Au.Ps.	(16)(31)
Santa Rosa	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
Santa Rosita	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
Santo Domingo	n.a.	Pr.	CD.Ul.NCh(?)	Rp.(?)	(31)
Santo Domingo (Vidoliche)	Chilean St.	St.	CD.Ul.	Pd.	(31)(32)
Silencio	British	Pr.Owner.	Wk.NCh.	Au.Ps.	(9)(10)(31)(62)
Tordoya	British	Pr.Ps.Owner.	CD.Ul.Mrg(?)	Ud.Ps.	(32)
Tránsito	Chilean(?)	Pr.Owner.	CD.Ul.Mrg(?)	Au.Ps.	(16)(31)(63)
Tres Marias	British	Pr.Owner.	Wk.	Rp.Ps.	(7)(9)(10)(31)
Unión	n.a.	Pr.	Wk.NM	Rp.	(31)(65)
Virginia	German	Pr.Owner.	Wk.	Rp.Ps.	(10)(17)(19)(31)
Yungay (Albarracín)	Peruvian	Pr.Owner.	CD.Ul.	Rp.	(5)(17)(31)
Yungay Bajo	Chilean	Pr.Owner.	Wk.	Au.Ps.	(9)(10)(29)(31)
Yungay (Jentilar)	Peruvian	Pr.Ps.Owner.	CD.Ul.	Ud.Ps.	(32)

CODES

Abd	Abandoned by owner
as	Assumed No data
Au	Bought at the 1882 auctions
Bd	Reported in bad condition
C	Payment in certificados(bonds)
CD	Closed down
Cnt	Plant in construction
CPt	Partial deposit of certificados
CR	Certificados retained
Csh	Plant paid in cash(al contado).
Cst	In custody of State
DE	Deposits exhausted
DGid	Good deposits
Dis	Ownership disputed
Dst	Plant destroyed
Gd	Reported in good condition
GR	Government recognition of property over plant
H	Declared illegal by Peruvian Government.
Imp	Improvements introduced in plant
Inc	Machinery reported incomplete.
Md	Reported in mediocre condition
Mrg	Merged operations with another plant
MT	Machinery transferred to another plant
NCh	Plant's name changed
NE	Not established yet
Neq	No equipment in plant,only grounds left
NM	New maquina established
Nof	Government's decision not to auction plant
NP	New partner joined owner
NT	Non transferrable bonds
OP	Ore processed in another plant
OUp	Offered to Peruvian Government but unpaid.
PA	Price accepted
PC	Production contract with Peruvian Government
Pd	Paid by Chilean State in 1887 by honoring the outstanding bo
PDn	Possession denied by the Chilean Government.
PDp	Poor deposits
PNA	Price not accepted
PP	Provisional possession granted part of bonds deposited
Pr	Privately owned unsold to Peruvian Government.
Ps	Private sale
PTx	Patent tax paid by plant's current holder
PV	Promesa de venta(promise to sell)
Ra	Reassessed
Rp	Repossessed

RpD Repossession requested but denied
St : State-owned
Ud : Unsold to Peruvian Government
UDp Used as mere deposit for another plant
Ul : Unlisted in available records
Un : Reported unassembled
Us : Offered but unsold at auction
VP : Payment in vales provisionales(promissory notes).
Wk : Working
WO : Working ore from another plant

NOTES

- (1) Bermudez *Salitre* 2) pp 61-66, 219
- (2) Chile, *Diario Oficial*, July 3, 1882
- (3) Chile, *DI I* 1881 Oficio 576 Iquique, December 31, 1880 Oficio 771, May 14, 1881, Oficio 719, May 30, 1881; July 6, 1881, July 31, 1881 November 18, 1881 Oficio 162 November 26, 1881
- (4) Billinghamurst *Legislacion* p. 262
- (5) Chile *AN I* Vol 68 Expediente 598 Fojas 451-452 July 28, 1882, November 4, 1882
- (6) Chile *JPI* 1882 Folio 427 July 17, 1882
- (7) Valdes Vergara *Memoria* p 128, 129, 132
- (8) Chile *Diario Oficial* April 8, December 18, 1884 February 26, 1884 July 15, 1885
- (9) *Cuchava Salitre y Guano* pp 198, 200, 294
- (10) *El Veintuno de Mayo* (Iquique) November 1882 June, 1887
- (11) "Informe mensual de establecimientos salitreros 1883-1886" Chile *JPI* 1883-1886, no folio
- (12) Bermudez *Salitre* pp 134, 136, 255, 261, 262, 264, 268, 270, 272, 417-418, 421, 424-425
- (13) Billinghamurst *Capitales* p. 33-34
- (14) Peru Informe especial, Table 2, Table 5, Table 6
- (15) Chile, *DI I* 1879-1881, Vol. 1031 No folio
- (16) Chile *JPI* 1882 "Actas de temate" September 12, 13, 14 October 25, 1882
- (17) Valdes Vergara *Memoria* p 133, 147, 150, 153
- (18) Peru Informe especial p. XI, XII, XIV, XVI, XVIII, II, I, I, III, LIV
- (19) Chile *JPI* 1883 Vols 2, 3
- (20) Valdes Vergara *Memoria* Anexo 2
- (21) Scmper *Industria* p. 275, 277
- (22) Chile *AN I* Vol 54 Expediente 224 September 14, 1880, July 6, 1881
- (23) Prieto, "Explotacion" pp 370-371
- (24) Chile, *SS A* 1882 December 21, 1880
- (25) Chile, *JPI* 1883-1884 Vol I Vol 2 Folio 667, Government decree dated October 30, 1883; folio 659; folio 3967.
- (26) Danquart *Andes*, 17, 71, 74, 87, 84
- (27) Aldunate *Leyes* pp 64-67
- (28) Chile, *AN I* Vol 52 Expediente 330 November, 1880
- (29) *El Veintuno de Mayo* (Iquique) 1- Aug-1884
- (30) Ortega "Cambio" pp 504-515
- (31) Aldunate *Leyes*, pp 103, 121 Government report dated June 1, 1887
- (32) Scmper *Industria* pp 283, 286-89
- (33) Billinghamurst *Capitales*, p 14, 15, 16, 17
- (34) Hernandez *Salitre* p 70
- (35) Aldunate *Leyes* pp 64-67
- (36) Pa. Soldier *Diccionario* s.v. (re under name of plant)
- (37) Chile *SS A* 1879-1884 November 28, 1879, July 25, 1881
- (38) Chile *AN I* Vol 57 Expediente 18 August 30, 1884
- (39) *El Veintuno de Mayo*, (Iquique) 24 Sep 1882
- (40) Chile *DI I* 1882 "Cuadro de oficinas" November 4, 1882
- (41) Chile *AN I* Vol 61 "Indice del registro de hipotecas 1884" Foja 2v. "Indice del Conservador de propiedades de minas 1883" Fojas 23v-24 "Indice del Conservador de propiedades. 1884" Fojas 8v-9, Foja 12.
- (42) Chile *SS A* 1882 No folio no date
- (43) Chile, *AN I* Vol 62, fs. 258

- (44) Chile - VII Vol 59 Expediente 271 April 20 1881 July 13 1881
- (45) Chile, VII 1881 February 1880 December 24 1881
- (46) Renamed "Constancia" circa 1883 Osorio and Devescovi were partners in 1883 Valdes
Vergara *Memoria*, pp 150-3
- (47) *El Continuo de Mayo* (Huaque) 8 Dec 1882
- (48) Chile - VII Vol 51 Expediente 145 April, 1878, Expediente 299
- (49) Chile - *IPI* Anexo 1882 No lolo
- (50) Name changed to "Democracia" circa 1885
- (51) A 'parada' named "Negreiros" appeared in the list furnished by Dancuart (26). It also appeared in Aldunate's list (35). In both lists it is clearly distinguished from the other "Negreiros". However no certificados were issued for the plant and there is no record of output or production contract.
- (52) Plant appeared owned by Gibbs in 1890 (*Semper Industria* pp 300-301). I am assuming that Gibbs repossessed the plant circa 1887.
- (53) J.F. North requested repossession of the plant but it was refused. I assumed he succeeded in 1887.
- (54) Possibly used as deposit for "Santa Rita" (sec) also controlled by G. Brooking.
- (55) Two "Rosario" appeared to have been listed in two different issues of the *Diario Oficial Chile* *Diario Oficial* July 15 1885 p 1052 and April 12 1886 p 623.
- (56) I assumed operations were merged with operations of "Sacramento" (Soto Flores), renamed "Amelia" and "Dibujo" and came under the same ownership after 1884.
- (57) Referred to as "Amelia" or "Dibujo" circa 1883.
- (58) In (25) this plant appears repossessed by Rosa Vernal de Hilliger but this information contradicts all other sources.
- (59) Referred to as "San Donato" circa 1882.
- (60) Name changed to "Salvadora" circa 1882.
- (61) Name changed to "Tegethoff" circa 1885. The plant was actually sold by Harvey in June 1884 (41).
- (62) Referred to as "Autora" circa 1884.
- (63) Possible merger of operations between "Transito" and "San Jose de Putunchara" both owned by Sanginetti.
- (64) *La Industria* 13 Oct 1882.
- (65) Chile - *IPI* "Oficinas que embarcan su salitre por este puerto" (Pisagua) 5 Apr 1887 Vol 1669.
- (66) Peru Bancos Asociados, *Memoria 1877* Anexo 2 pp 15-23 Report of M.S. Lombart Lima 11 Oct 1878
El Comercio (Lima) 16-Sep 1878
- (67) *El Comercio* (Lima) 14 Jul 1876
- (68) *El Comercio* (Lima) 24-May-1878

Table 2

*Deliveries of Nitrate Bonds,
Recipients, Nationality, Plants, Value, and Date
Lima, 1876-1880*

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No.	Plant	Recipients	Nat- ion	Date delivery	Amount (soles)	% bonds
1	Mercedes(N)	Vernal, M.	Per	14 Jan-76	140,000 00	100 00
2	Paposo(Ma)	Folsch/Martin	Ger	16- Apr -76	230,000 00	95 83
3	Dolores(C)	Dañino, A	Per	03 May 76	10,000 00	6 49
4	Carmen Alto	García, J G	Per	19 May -76	154,000 00	51 51
5	Católica	Bacigalupa, J	Per	20-May 76	106,000 00	55 79
6	Carmen Alto	Cichero, J. B	Per	22-May-76	107,000 00	35 79
7	Dolores(C)	Cobo, Juan	Per	07- Jun -76	51,000 00	33 11
8	Barrenechea	Chávez, M G	Per	08 Jun-76	130,000 00	16 78
9	Carmen Alto	Casacuberta, M	Per	10- Jun 76	1,000 00	0 33
10	Carmen Alto	Chiono, J F	Per	10- Jun 76	4,000 00	1 34
11	Primitiva	Vernal, D.	Per	10- Jun 76	40,000 00	100 00
12	Chinq (Z)	Zavala, R A	Per	12-Jun 75	13,000 00	100 00
13	Silencio	Zegarra, C	Per	13-Jun-76	14,000 00	100 00
14	Dolores(C)	Cobo, Juan	Per	23-Jun-76	5,000 00	3 25
15	S Lorenzo(R)	Ramírez, E	Per	26- Jun 76	16 000 00	100 00
16	S Pedro (R)	Dávalos R., P	Per	28-Jun-76	10,000 00	100 00
17	Encarnación	Quiroga, A.	Per	28-Jun-76	15,000 00	100 00
18	Esperanza	Banco de Lima	Per	19- Jul 76	837,000 00	84 55
19	Dolores(C)	Bco Nacional	Per	20-Jul 76	48,000 00	31 16
20	Providencia	Prevost, L. E	Per	21-Jul-76	135,000 00	50 00
21	Católica	Bacigalupa, J.	Per	22-Jul 76	32,000 00	16 84
22	Candelar M	Montero, E.	Per	22-Jul-76	180,000 00	100 00
23	Esperanza	Banco de Lima	Per	26 Jul 76	63,000 00	6 36
23	Total Pardo 1876				2,341,000 00	
1	Alianza	C S Alianza	Per	03-Aug-76	168,000 00	64 62
2	Valparaíso	C S Valparaíso	Chi	03-Aug-76	100,000 00	52 63
3	Alianza	Yowler, Moore	Br	03 Aug 76	21,000 00	8 08
4	S Domingo	Flores, Dgo	Per	04-Aug-76	29,000 00	100.00
5	Bearnes	Layou, F	Fr	04-Aug 76	20,000 00	14 29
6	San Benigno	Paz Soldán, F	Per	04-Aug 76	14,000 00	73 51
7	Abra de Q	Quiroga E	Per	15-Aug 76	30,000 00	100 00
8	Ascenc (L)	Loayza, A	Per	16 Aug-76	30,000 00	100 00
9	S. Clara Ch.	Cauvi, Juan	Per	22 Aug 76	105,000 00	100 00
10	S Clara Ch.	Montel, M	Per	22 Aug 76		
11	Santa Adela	Devescovi, José	Per	29 Aug 76	118,000 00	62 11
12	Santa Adela	Gibbs, G y Cía	Br	05-Sep-76	18,000 00	9 47
13	S Antonio(L)	Luza, Manuel E	Per	07-Sep-76	14,000 00	100 00
14	Candel (P)	Perletti, Pedro	It	14-Sep 76	52,000 00	100 00

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No.	Plant	Recipients	Nat- ion	Date delivery	Amount (soles)	% bonds
15	Rosario(R)	Ríos, Felipa C.	Per	14-Sep-76	30,000.00	100.00
16	Resurrección	Zavala, P.J.	Per	18-Sep-76	250,000.00	100.00
17	S. José de P	Aguirre, Juan D	Per	30-Sep-76	45,000.00	100.00
18	Sacramen. SF	Soto Flores, M.	Per	30-Sep-76	13,000.00	100.00
19	Peña Grande	Chávez, M.G.	Per	02-Oct-76	254,000.00	59.76
20	Santa Emilia	Paz Soldán, F.	Per	02-Oct-76	18,000.00	100.00
21	Ramírez	Castro, Simeón	Per	12-Oct-76	75,000.00	100.00
22	Candelar. ZB	Zavala/Bilbao	Per	12-Oct-76	16,000.00	100.00
23	Ascención(C)	Capetillo, F.	Per	12-Oct-76	11,000.00	100.00
24	Esperanza	Almonte, A.	Per	16-Oct-76	90,000.00	9.09
25	Carmen(Sh)	Scheel, Teodoro	Ger	18-Oct-76	18,000.00	100.00
26	Buenaventura	Torres & C.*	Per	24-Oct-76	44,000.00	100.00
27	Paccha	C.S. América	Chi	26-Oct-76	25,000.00	100.00
28	Virginia	Bermúdez Bros.	Per	30-Oct-76	16,000.00	100.00
29	Negreiros(V)	Vernal C., Juan	Per	01-Nov-76	13,000.00	100.00
30	Carolina	Gibbs, G. & Co.	Br	20-Nov-76	See Limeña	
31	Limeña	Gibbs, G. & Co.	Br	20-Nov-76	1,250,000.00	100.00
32	Católica	Banco Nacional	Per	27-Nov-76	52,000.00	27.37
33	Santa Adela	Banco Nacional	Per	29-Nov-76	54,000.00	28.42
34	Alianza	Fernández P., J.	Per	12-Dec-76	71,000.00	27.31
35	Santa Rosa	Olcay/Loayza	Per	23-Dec-76	12,000.00	100.00
35	Total Prado 1876				3,076,000.00	
1	Tarapacá	Vernal y Castro	Per	01-Jan-77	100,000.00	28.57
2	Palma, La	Gibbs & Co.(Moir)	Br	10-Jan-77	325,000.00	100.00
3	Tarapacá	Banco Nacional	Per	16-Jan-77	250,000.00	71.43
4	Bearnes	Layous, Francisco	Fr	16-Jan-77	120,000.00	85.71
5	San Benigno	Paz Soldán, F.	Per	18-Jan-77	5,000.00	26.25
6	Magdalena	Montero, Manuel	Per	01-Feb-77	125,000.00	100.00
7	Negreiros	Larraín, César	Chi	01-Feb-77	51,000.00	51.00
8	Negreiros	Hernández, H.	Chi(?)	05-Feb-77	34,000.00	34.00
9	Santa Luisa	Hidalgo, Juan	Per	08-Feb-77	55,000.00	100.00
10	Chilena	Olgueda, Isidora	Per(?)	08-Feb-77	12,000.00	100.00
11	Santa Ana	Dibos, Félix	Fr	10-Feb-77	180,000.00	100.00
12	San Juan(S)	Romero, Felipe B.	Per	10-Feb-77	79,000.00	39.50
13	Esmeralda	Bohl, Alfredo	Br	20-Feb-77	291,000.00	100.00
14	Salar d C	García Calderón, F.	Per	20-Feb-77	75,000.00	100.00
15	Carmen(M)	Morales, Salvador	Per	20-Feb-77	21,000.00	100.00
16	Rosario(B)	Beas, Emilio	Per	27-Feb-77	13,400.00	100.00

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No.	Plant	Recipients	Nat- ion	Date delivery	Amount (soles)	% bonds
17	China	Gildemeister, J.	Ger	01-Mar-77	75,000.00	99.21
18	Andacollo	Catalán, José N.	Per(?)	05-Mar-77	30,000.00	100.00
19	Sta Laura B	Luhdorff, Roberto	Ger(?)	09-Mar-77	190,000.00	100.00
20	San Fco (C)	Solarí, Juan	It	12-Mar-77	13,000.00	100.00
21	Compañía	Ramírez, Juan	Per	13-Mar-77	16,925.00	100.00
22	San Pascual	Lecaros, Domingo	Per	05-Apr-77	43,000.00	100.00
23	Victoria	Bruce, Diego	Chi(?)	10-Apr-77	219,000.00	99.82
24	Peruana	Loaiza de Z., V.	Per	12-Apr-77	158,000.00	71.82
25	San José Y	Riveros, Manuel E.	Per	30-Apr-77	4,000.00	10.00
26	San José Y	Arredondo, G.	Per	05-May-77	30,000.00	90.00
27	Nva Soledad	Banco Nacional	Per	08-May-77	596,000.00	91.90
28	Carmen Alto	Banco Nacional	Per	08-May-77	30,000.00	10.03
29	Peña Grande	Chávez, Manuel G.	Per	15-May-77	171,000.00	40.24
30	San Agustín	Chávez, Manuel G.	Per	13-Jun-77	158,000.00	87.78
31	Tres Marías	Coques, Damián	Per	11-Jul-77	65,000.00	100.00
32	Barrenechea	Palacios, Fernando	Per	03-Aug-77	300,000.00	38.72
33	Trinidad	Perfetti, Pedro	It	09-Aug-77	200,000.00	100.00
34	Negreiros	Vernal, José María	Per	18-Aug-77	5,000.00	5.00
35	Santa Rita	Espinosa, José R.	Per(?)	22-Aug-77	80,000.00	100.00
36	San Juan(S)	Romero, Felipe B.	Per	22-Aug-77	4,000.00	2.00
37	Providencia	Prevost y Cía.	Per	25-Aug-77	115,000.00	42.59
38	Negreiros	Serdio, Pedro F.	Chi	25-Aug-77	10,000.00	10.00
39	Barrenechea	Hart Bros. Co.	Br	28-Sep-77	55,000.00	7.10
40	Matillana	Banco de Londres	Br	16-Oct-77	200,000.00	83.33
41	Carmen Alto	García, José G.	Per	22-Oct-77	3,000.00	1.00
42	San José N	Fasola, Pío	Per	24-Oct-77	130,000.00	72.22
43	Matillana	Baltierra, Bustos	Per	26-Oct-77	30,000.00	12.50
44	Dolores CA	C.S. América	Chi	26-Oct-77	20,000.00	100.00
45	Rincón S	Banco Nacional	Per	30-Oct-77	10,000.00	100.00
46	Fortuna	Banco del Perú	Per	30-Oct-77	9,000.00	100.00
47	Carmen O	Banco del Perú	Per	30-Oct-77	9,000.00	100.00
48	Unión	Bco Providencia	Per	30-Oct-77	8,000.00	91.95
49	Pasto	Banco Nacional	Per	30-Oct-77	8,000.00	100.00
50	S Antonio SF	Banco de Lima	Per	30-Oct-77	7,000.00	100.00
51	Pampa Negra	Banco de Lima	Per	30-Oct-77	7,000.00	100.00
52	S Sebastián	Banco del Perú	Per	30-Oct-77	6,000.00	87.46
53	S. Antonio V	Banco Nacional	Per	30-Oct-77	5,000.00	100.00
54	Asunta	Banco Nacional	Per	30-Oct-77	5,000.00	100.00
55	Rincón B	Banco de Lima	Per	30-Oct-77	4,000.00	57.14
56	Rincón Bn	Bco Providencia	Per	30-Oct-77	3,000.00	42.86

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No.	Plant	Recipients	Nat- ion	Date delivery	Amount (soles)	% bonds
57	S.Fco Zeg.	Banco del Perú	Per	30-Oct-77	3,000.00	100.00
58	Tránsito	Banco Nacional	Per	30-Oct-77	2,000.00	80.00
59	S Cristóbal	Banco del Perú	Per	30-Oct-77	2,000.00	100.00
60	Barrenechea	Chávez;Barrenechea	Per	08-Nov-77	86,000.00	11.10
61	S Catalina	C. S. América	Chi	10-Nov-77	400,000.00	100.00
62	Barrenechea	Chávez;Barrenechea	Per	10-Dec-77	14,000.00	1.81
63	San José N	Fasola,Pío	Per	11-Dec-77	50,000.00	27.78
64	S Fco Marq	Zevallos,Ricardo	Per	12-Dec-77	17,000.00	100.00
65	San Vicente	Granadino/Graham	Per/Br	14-Dec-77	250,000.00	87.09
66	Agua Santa	Campbell,J. & Co.	Br	19-Dec-77	908,000.00	95.88
67	Buen Retiro	n.a.	n.a.	19-Dec-77	40,000.00	100.00
68	S. Antonio C	Campbell,J. & Co.	Br	19-Dec-77		
69	San Jorge	Ugarte,Cevallos	Per	19-Dec-77		
69	Total Prado 1877				6,546,325.00	
1	Solferino	Banco de Londres	Br	10-Jan-78	280,000.00	46.67
2	California	Serdio Hermanos	Chi	22-Jan-78	40,000.00	8.74
3	Concepción	Serdio Brothers	Chi(?)	22-Jan-78	18,000.00	98.01
4	Barrenechea	Barrenechea,J.A.	Per	25-Jan-78	112,000.00	14.46
5	Barrenechea	Barrenechea,J.A.	Per	25-Jan-78	30,000.00	3.87
6	Solferino	Forero,Emilio	It (?)	26-Jan-78	20,000.00	3.33
7	Barrenechea	Barrenechea,J.A.	Per	28-Jan-78	10,000.00	1.29
8	San Agustín	Chávez,Manuel	Per	29-Jan-78	13,000.00	7.22
9	San Agustín	Prevost y Cía	Per(?)	29-Jan-78	7,000.00	3.89
10	Solferino	Banco de Londres	Br	31-Jan-78	10,000.00	1.67
11	Rosario L	n.a	n.a.	03-Feb-78	10,000.00	66.67
12	Rosario L	n.a	n.a.	03-Feb-78	5,000.00	33.33
13	San Juan(S)	Romero,Felipe B.	Per	07-Feb-78	30,000.00	15.00
14	Solferino	Banco de Londres	Br	08-Feb-78	50,000.00	8.33
15	S. Lorenzo UC	Ugarte y Cevallos	Per	14-Feb-78	150,000.00	30.00
16	S. Lorenzo UC	Ugarte y Cevallos	Per	23-Feb-78	300,000.00	60.00
17	Yungay bajo	Banco de Lima	Per	09-Mar-78	5,000.00	50.00
18	Yungay bajo	Banco del Perú	Per	09-Mar-78	5,000.00	50.00
19	San Antonio de	Banco Nacional	Per	09-Mar-78	5,000.00	73.42
20	San Nicolás	Banco Nacional	Per	09-Mar-78	4,000.00	84.12
21	Banda	Banco del Perú	Per	09-Mar-78	4,000.00	100.00
22	S. Antonio M	Banco Providencia	Per	09-Mar-78	1,810.00	26.58
23	San Nicolás	Banco Providencia	Per	09-Mar-78	755.00	15.88
24	S Miguel P	Banco Providencia	Per	09-Mar-78	435.00	9.67

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No.	Plant	Recipients	Nat- ion	Date delivery	Amount (soles)	% bonds
25	California	Serdio Hermanos	Chi	11-Mar-78	197,000.00	43.03
26	Solferino	Banco de Londres	Br	12-Mar-78	199,000.00	33.17
27	California	Serdio Hermanos	Chi	15-Mar-78	140,000.00	30.58
28	San Pablo	n.a.	n.a.	20-Mar-78	300,000.00	100.00
29	Agua Santa	Campbell, J. & Co.	Br	29-Mar-78	21,000.00	2.22
30	S. Antonio C	Campbell, J. & Co.	Br	29-Mar-78		
31	Porvenir	Délano, J. O.	Chi	05-Apr-78	150,000.00	100.00
32	Angeles	Mendizábal, Mariano	Per	11-Apr-78	150,000.00	100.00
33	Solferino	Massardo, Félix	It	17-Apr-78	20,000.00	3.33
34	Dolores C	n.a.	n.a.	05-May-78	51.12	0.03
35	Paposo(p)	Modestio, Pacífico M.	Per	14-May-78	19,000.00	100.00
36	Solferino	Raffo, Félix	It (?)	21-May-78	21,000.00	3.50
37	Barrenechea	Barrenechea, J. A.	Per	25-May-78	30,000.00	3.87
38	Peruana	Irigoyen, Miguel	Per	25-May-78	10,000.00	4.55
39	Sta Laura W	Orphan, Fernando	Per(?)	28-May-78	50,000.00	4.10
40	San Carlos	Banco de Londres	Br	04-Jun-78	15,000.00	7.69
41	Nva Soledad	Cárdenas, Domingo	Per	04-Jun-78	10,000.00	1.54
42	Peruana	Irigoyen, Miguel	Per	05-Jun-78	9,000.00	4.09
43	Nva Soledad	Caja de Ahorros	Per	06-Jun-78	40,000.00	6.17
44	California	Serdio Hermanos	Chi	07-Jun-78	38,090.00	8.32
45	California	Banco de Londres	Br	07-Jun-78	16,000.00	3.49
46	Nva Soledad	Garland, A.	Per	07-Jun-78	2,000.00	0.31
47	California	Serdio Hermanos	Chi	07-Jun-78	2,000.00	0.44
48	S. Antonio P	Peñaranda, Eusebio	Per	11-Jun-78	120,000.00	60.00
49	Angela	Loayza y Pascal	Per	11-Jun-78	98,000.00	32.67
50	Angela	Loayza y Pascal	Per	19-Jun-78	202,000.00	67.33
51	Salar d.N.	Ugarte y Cevallos y Cía	Per	22-Jun-78	210,000.00	95.45
52	Abra Ug	Ugarte, Cevallos	Per	22-Jun-78	75,000.00	100.00
53	San Jorge	Ugarte y Cevallos	Per	22-Jun-78	50,000.00	100.00
54	Providencia	Prevost y Cía.	Per	22-Jun-78	20,000.00	7.41
55	Chinq. (OT)	Oviedo y Trillo	Per	01-Jul-78	110,000.00	57.89
56	S. Antonio P	Peñaranda, Eusebio	Per	01-Jul-78	43,000.00	21.50
57	S. Antonio P	Peñaranda, Eusebio	Per	06-Jul-78	37,000.00	18.50
58	N Carolina	n.a.	n.a.	12-Jul-78	6,000.00	1.71
59	Aguada	Flores, Juan	Per	17-Jul-78	11,000.00	100.00
60	Dolores C	n.a.	n.a.	18-Jul-78	10,000.00	5.00
61	Salar d.N.	Ugarte y Cevallos y Cía.	Per	24-Jul-78	10,000.00	4.55
62	Dolores C	Cobo, Juan	Per	25-Jul-78	40,000.00	25.97
63	Chinq. (OT)	Oviedo y Trillo	Per	27-Jul-78	100,000.00	52.63
64	N. Carolina	n.a.	n.a.	05-Aug-78	170,000.00	48.57

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No.	Plant	Recipients	Nat- ion	Date delivery	Amount (soles)	% bonds
65	Chinq. (OT)	n.a.	n.a.	05-Aug-78	10,000.00	5.26
66	San Carlos	n.a.	n.a.	06-Aug-78	180,000.00	92.31
67	California	n.a.	n.a.	06-Aug-78	20,000.00	4.37
68	Concepción	n.a.	n.a.	06-Aug-78	300.00	1.63
69	Concepción	n.a.	n.a.	06-Aug-78	65.00	0.35
70	N. Carolina	n.a.	n.a.	12-Aug-78	50,000.00	14.29
71	N. Carolina	n.a.	n.a.	12-Aug-78	10,000.00	2.86
72	N. Carolina	n.a.	n.a.	21-Aug-78	100,000.00	28.57
73	San Juan S*	n.a.	n.a.	21-Aug-78	87,000.00	43.50
74	Paposo(m)	n.a.	n.a.	21-Aug-78	10,000.00	4.17
75	N. Carolina	n.a.	n.a.	17-Sep-78	8,000.00	2.29
76	Valparaíso	n.a.	n.a.	18-Sep-78	90,000.00	47.37
77	Sta Laura W	n.a.	n.a.	25-Oct-78	20,000.00	25.64
78	Barreñechea	n.a.	n.a.	25-Oct-78	7,000.00	0.90
79	Dolores C	n.a.	n.a.	25-Oct-78	5,000.00	2.50
80	California	n.a.	n.a.	25-Oct-78	4,000.00	0.87
81	N. Carolina	n.a.	n.a.	26-Oct-78	5,000.00	1.43
82	San Vicente	n.a.	n.a.	08-Nov-78	30,000.00	10.45
83	Carmen Bajo	n.a.	n.a.	15-Nov-78	470,000.00	74.60
84	Carmen Bajo	n.a.	n.a.	15-Nov-78	150,000.00	23.81
85	Carmen Bajo	n.a.	n.a.	15-Nov-78	8,000.00	1.27
86	Carmen Bajo	n.a.	n.a.	15-Nov-78	2,000.00	0.32
87	Perla	n.a.	n.a.	15-Nov-78		
88	Perla	n.a.	n.a.	15-Nov-78		
89	S. Lorenzo UC	n.a.	n.a.	20-Nov-78	50,000.00	10.00
90	San Vicente	n.a.	n.a.	20-Nov-78	7,000.00	2.44
91	Agua Santa	Campbell, J. & Co.	Br	23-Nov-78	10,000.00	1.06
92	S. Antonio C	Campbell, J. & Co.	Br	23-Nov-78		
93	Sto Dgo V	n.a.	n.a.	28-Nov-78	12,000.00	100.00
94	S. Fco Brñ.	n.a.	n.a.	30-Nov-78	260,000.00	100.00
95	Paccha Bra.	n.a.	n.a.	30-Nov-78		
96	N. Rosario	n.a.	n.a.	30-Nov-78		
97	Santiago(C)	n.a.	n.a.	05-Dec-78	248,200.00	100.00
98	San José(D)	n.a.	n.a.	13-Dec-78	25,900.00	100.00
99	S. Laura(W)	n.a.	n.a.	16-Dec-78	8,000.00	10.26
99	Total Prado 1878				5,749,606.12	
1	Dolores Co	n.a.	n.a.	04-Jan-79	10,000.00	5.00
2	Sta Rosita	n.a.	n.a.	11-Jan-79	12,391.00	100.00

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No.	Plant	Recipients	Nat- ion	Date delivery	Amount (soles)	% bonds
3	Tránsito	n.a.	n.a.	11-Jan-79	500.00	20 00
4	Carmelitana	n.a.	n.a.	14-Jan-79	134,581.00	100 00
5	Dolores Co.	n.a.	n.a.	14-Jan-79	948 88	0 50
6	San José A	n.a.	n.a.	15-Jan-79	19,000 00	100 00
7	Jazpampa Z	Zavala,P. and M.	Per	11-Feb-79	65,000 00	100.00
8	Peruana	n.a.	n.a.	14-Feb-79	30,000 00	13.64
9	Peruana	n.a.	n.a.	14-Feb-79	6,000.00	2 73
10	Yungay Alb	n.a.	n.a.	14-Feb-79	6,000 00	100 00
11	Cruz de Z	n.a.	n.a.	14-Feb-79	6,000 00	100 00
12	Peruana	n.a.	n.a.	14-Feb-79	5,000 00	2.27
13	S. Miguel P	n.a.	n.a.	14-Feb 79	4,065 00	90.33
14	Peruana	n.a.	n.a.	14-Feb-79	2,000 00	0.91
15	S.Sebastián	n.a.	n.a.	14-Feb-79	860.00	12 54
16	N. Carolina	n.a.	n.a.	14-Feb-79	842 39	0.24
17	Unión	n.a.	n.a.	14-Feb-79	700 00	8 05
18	China	n.a.	n.a.	14-Feb-79	600 00	0 79
19	Victoria	n.a.	n.a.	14-Feb-79	400.00	0 18
20	San Agustín	n.a.	n.a.	14-Feb-79	103 00	0.06
21	N. Carolina	n.a.	n.a.	14-Feb-79	100.00	0.03
22	N. Carolina	n.a.	n.a.	14-Feb-79	57.61	0 02
23	San Vicente	n.a.	n.a.	14-Feb-79	44.98	0.02
24	Sacram.(C)	Cía S.del Perú	Per	19-Feb-79	5,600 00	31.82
25	Matillana	n.a.	n.a.	03-Mar 79	10,000.00	4.17
26	Barrenechea	n.a.	n.a.	03-Mar-79	766 20	0.10
27	California	n.a.	n.a.	03-Mar-79	700.00	0.15
28	N Soledad	n.a.	n.a.	03-Mar-79	500 00	0.08
29	Sacram.(C)	n.a.	n.a.	06-Mar 79	12,000 00	68 18
30	San Benigno	n.a.	n.a.	06-Mar 79	44 36	0 23
31	California	n.a.	n.a.	06 Mar 79	21 00	0 00
32	S Lorenzo Z	n.a.	n.a.	09-Mar-79	10,000.00	100 00
33	Santa María	n.a.	Per	09-Mar-79	9,640.00	100 00
34	S.Miguel C	n.a.	n.a.	17-Mar-79	80,000.00	100 00
35	Santa Lucía	n.a.	n.a.	17-Mar-79	12,000 00	100 00
36	Agua Santa	Campbell,J.& Co.	Br	03-May-79	8,000.00	0 84
37	S. Antonio C	Campbell,J.& Co	Br	03 May-79		
38	Argentina	Gildemeister,J.	Ger	05-May-79	1,250,000 00	100 00
39	Hanza	Gildemeister,J.	Ger	05-May-79		
40	San Pedro	Gildemeister,J.	Ger	05-May-79		
41	San Juan G	Gildemeister,J.	Ger	05-May-79		
42	San Agustín	n.a.	n.a.	19 May-79	897 00	0 50

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No	Plant	Recipients	Nat- ion	Date delivery	Amount (soles)	% bonds
43	San Agustín	Bonilla y Córdova	Per	20-Jul-79	1,000.00	0.56
43	Total Prado 1879				1,706,362.42	
1	San Juan S*	n.a.	n.a.	24-Jan-80		
2	Sacram.(D)	n.a.	n.a.	21-May-80	200,000.00	100.00
3	Sta Isabel	n.a.	n.a.	21-May-80	80,000.00	100.00
4	Cordillera	n.a.	n.a.	21-May-80	12,000.00	100.00
5	Normandía(SA)	n.a.	n.a.	21-May-80	10,000.00	100.00
6	Reducto	n.a.	n.a.	21-May-80	7,000.00	100.00
7	Candelaria(C)	n.a.	n.a.	21-May-80	4,000.00	100.00
7	Total 1880				313,000.00	
275	Total 1876-80				19,732,293.54	

*Payments stretched from 21-Aug-1878 to 24-Jan-1880.

Source: Chile, Diario Oficial, 3-Jul-1882, pp. 1063-1072.

Table 3

*Production Contracts for Tarapaca Nitrate Plants,
Plant, Contractor, Date, Output Quota, Price,
Tarapaca, 1876-1879*

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Plant	Contractor	Date Contract	Max. Output per annum (Sp. Q.)	Price soles (95%)	No. Plants	Ful fill ed	Source
(a)S. Juan	Gildemeister	04-May-76	850,000	1.70	4	Y	(1)
(b)S. Juan	Gildemeister	20-Oct-77	850,000	1.70	4	Y	(1)
Limeña	CST (Gibbs)	28-Apr-76	850,000	1.70	2	Y	(1)
Carmen	M. M. Melgar	26-Sep-76	300,000	1.60	2	Y	(1)(3)
(a)Bearnés	O. Harnecker	27-Feb-77	300,000	1.55	1	N	(1)
(b)Bearnés	O. Harnecker	25-Jul-77	300,000	1.55	1	N	(1)
(a)Barrenechea	C S Barrenechea	24-May-76	500,000	1.70	1	N	(1)
(b)Barrenechea	T Hart & Co	27-Jul-77	500,000	1.35	1	N	(1)
(c)Barrenechea	T. Hart & Co.	06-Sep-77	500,000	1.35	1	N	(1)
(d)Barrenechea	T Hart & Co.	28-Dec-77	800,000	1.50	1	N	(1)
Agua Santa	J. D. Campbell	17-Dec-77	600,000	1.53	2	Y	(1)
Solferino	F Massardo	01-Nov-78	400,000		1	N	(1)(4)
S. José(Noria)	Pío Fasola	07-Feb-78	180,000	1.53	1	Y	(1)(2)(5)
(a)O. Toco	J. G. Meiggs	04-Aug-76	1,500,000	1.70		N	(1)
(b)O. Toco	J. G. Meiggs	29-Aug-77	500,000	1.70		N	(1)
S. Lorenzo	Ugarte y Cevallos	14-Feb-78	500,000	1.50	3	Y	(2)
Esmeralda	Clark, Eck & Co.	19-Feb-78	200,000	1.50	1	Y	(2)(4)(6)
S. Carlos	Folsch & Martin	28-Feb-78	480,000	1.53	3	Y	(2)(3)(4)
Sacramento	Edwards & Co	23-Mar-78	400,000	1.50	1	Y	(2)
Sta. Catalina	Otto Harnecker	24-Apr-78	200,000	1.50	1	Y	(2)(4)(5)
Angela	Loayza y Pascal	26-May-78	250,000	1.50	1	Y	(2)(4)
S. Antonio(P)	E. Peñaranda	08-Jun-78	140,000	1.50	1	Y	(2)(3)(4)
S. Pablo	P Elguera	19-Jun-78	300,000	1.50	2	Y	(2)(3)
Porvenir	Speedie, Brooking	31-Dec-78	200,000		1	Y	(3)(4)
Santiago(Cam)	Pedro Perfetti(?)	01-Jun-78	150,000		1	Y	(3)(5)
San Andrés	M. M. Pérez		200,000		2	N	(3)
S. Fco (Brañez)	E Brañez		150,000		1	N	(3)
Peña Chica	M. Aguirre	01-Jun-78	250,000	1.50	2	Y	(3)(6)
Sta. Adela	J. Devescovi	31-Dec-78	120,000		1	Y	(3)(4)
Chinquiqu (OT)	Oviedo y Trillo	31-Dec-78	150,000	1.50	1	Y	(3)(6)
Sta. Lucía	L. Albarracín	01-Jan-77	14,400	2.00	2	Y	(1)
Rincón(Ben)	C Benavides	01-Oct-76	9,600	2.00	1	Y	(1)
Rosario(Beas)	E Beas	01-Oct-76	18,700	2.00	1	Y	(1)
Yungay(Jentilar)	H. Bustos	01-Oct-76	18,700	2.00	1	Y	(1)
S. Rosita	C Contreras	02-Jan-77	10,700	2.00	1	Y	(1)
Sacramento(SL)	M. S. Flores	02-Oct-76	9,600	2.00	1	Y	(1)
S. Lorenzo(Ra)	C. Ramírez	01-Oct-76	4,700	2.00	1	Y	(1)
S. Francisco(CS)	Camp. y Solarí	02-Oct-76	14,400	2.00	1	Y	(1)
Compañía	J. Ramírez	02-Oct-76	14,400	2.00	1	Y	(1)

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Plant	Contractor	Date Contract	Max. Output per annum (Sp Q.)	Price soles (95%)	No Plants	Fulfilled	Source
Reducto	M.A. Cevallos	02-Oct-76	7,500	2.00	1	Y	(1)
S. Rosa	Olca y Loayza	21-Dec-76	8,000	2.00	1	Y	(1)
Encarnación	A.L. Quiroga	02-Oct-76	9,600	2.00	1	Y	(1)
Carmen(Sh)	T Scheel	02-Oct-76	12,800	2.00	1	Y	(1)
Rosario(Luza)	M Luza	01-Feb-77	6,400	2.00	1	Y	(1)
S. Antonio(Luza)	M. Luza	04-Oct-76	5,900	2.00	1	Y	(1)
Concepción(G)	J Garate	02-Oct-76	16,000	2.00	1	Y	(1)
B. Esperanza	J Gárate	02-Oct-76	7,500	2.00	1	Y	(1)
Negreiros(V)	J V y Castro	02-Nov-76	25,100	2.00	1	Y	(1)
Cordillera	J.V y Cano	04-Oct-76	7,500	2.00	1	Y	(1)
Progreso	E. Quiroga	02-Oct-76	18,700	2.00	1	Y	(1)
Ascención(Cap)	J. Capetillo	02-Oct-76	10,200	2.00	1	Y	(1)
Chilena	J. Olgueda	02-Oct-76	5,300	2.00	1	Y	(1)
Aguada	J. Flores	01-Dec-76	9,600	2.00	1	Y	(1)
S. Nicolás	E.L. Egoaguirre	01-Jan-77	8,000	2.00	1	Y	(1)
S. Antonio(SF)	M Flores	02-Oct-76	8,000	2.00	1	Y	(1)
Sacramento(C)	E. Castilla	02-Jan-77	5,900	2.00	1	Y	(1)
Paposo	E Modestio	02-Jan-77	12,800	2.00	1	Y	(1)

*As of 31-Dec-1877.

- (1) Bancos A., Memoria 1877, Anexo 2, pp. 15-23.
 (2) El Nacional(Lima), 1-Sep-1878,
 El Comercio(Lima), 17-Sep-1878
 (3) Report of M. S. Lombard, Jefe, Sección Aduanas y Sólido,
 Lima, 11-Oct-1878
 El Peruano(Lima), 15-Sep-1878
 El Comercio(Lima), 16-Sep-1878
 (4) Chile, MH, DFT 1881, Oficio 576 31 Dec-1880
 (5) Chile, MH, DFT 1879-1881, Vol. 1037, No folio.
 (6) Dancuart, Anales, 12. 84.

Table 4

*Recipients of Payments for Nitrate Bonds Outstanding,
Names, Nationality, Amount,
Santiago, 1887*

Table 4 - Page 86

Recipient	£	sh	d	Nation
Antony Gibbs & Sons	8,085			Br
Antony Gibbs & Sons	31,815			Br
Antony Gibbs & Sons	33,495			Br
Gibbs	73,395			
George Petrie	4,725			Br
George Petrie	1,995			Br
George Petrie	4,410			Br
George Petrie	11,130			
Grace & Co.	1,050			Br
Grace & Co.	1,050			Br
Grace & Co.	945			Br
Grace & Co.	1,050			Br
Grace & Co.	4,095			
Jorge C. Halliger	21,000			Br
Huth & Co.	14	11		Br
Huth & Co.	32	16	3	Br
Huth & Co.	11	16	3	Br
H. Parkinson Scharp	7,875			Br
Noel West	1,155			Br
Samuel Peake	315			Br
Various British	30,404	0	6	
Total British	119,022	0	6	
Banco de Valparaíso	1,000			Ch
Banco de Valparaíso	6,396	9	8 5	Ch
Banco de Valparaíso	2,306	18	7	Ch
Banco de Valparaíso	9,437	8	9	Ch
Banco de Valparaíso	734		5.5	Ch
Banco de Valparaíso	4,299	5	6 5	Ch
Banco de Valparaíso	2,516	13		Ch
Banco de Valparaíso	3,040	19	0 5	Ch
Banco de Valparaíso	629	3	3	Ch
Banco de Valparaíso	9,122	17	1 5	Ch

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Recipient	£	sh	d	Nation
Banco de Valparaíso	734		5.5	Ch
Banco de Valparaíso	314	11	7.5	Ch
Banco de Valparaíso	1,048	12	1	Ch
Banco de Valparaíso	104	17	2.5	Ch
Banco de Valparaíso	314	11	7.5	Ch
Banco de Valparaíso	1,048	12	1	Ch
Banco de Valparaíso	5,234		5	Ch
Banco de Valparaíso	734		5.5	Ch
Banco de Valparaíso	7,654	16	2.5	Ch
Banco de Valparaíso	209	14	5	Ch
Banco de Valparaíso	314	11	7.5	Ch
Banco de Valparaíso	1,468		11	Ch
Banco de Valparaíso	2,097	4	2	Ch
Banco de Valparaíso	1,258	6	6	Ch
Banco de Valparaíso	1,572	18	1.5	Ch
Banco de Valparaíso	1,782	12	6.5	Ch
Banco de Valparaíso	1,258	6	6	Ch
Banco de Valparaíso	8,179	2	3	Ch
Banco de Valparaíso	104	17	2.5	Ch
Banco de Valparaíso	838	17	8	Ch
Banco de Valparaíso	209	14	5	Ch
Banco de Valparaíso	1,048	12	1	Ch
Banco de Valparaíso	5,557	12	0.5	Ch
Banco de Valparaíso	7,654	16	2.5	Ch
Banco de Valparaíso	4,089	11	1.5	Ch
Banco de Valparaíso	9,542	5	11.5	Ch
Banco de Valparaíso	104	17	2.5	Ch
Banco de Valparaíso	838	17	8	Ch
Banco de Valparaíso	3,879	16	8.5	Ch
Banco de Valparaíso	10,590	18	0.5	Ch
Banco de Valparaíso	524	6	0.5	Ch
Banco de Valparaíso	2,831	4	7.5	Ch
Banco de Valparaíso	10,066	12		Ch
Banco de Valparaíso	2,202	1	4.5	Ch
Banco de Valparaíso	1,468		11	Ch
Banco de Valparaíso	3,565	5	0.5	Ch
Banco de Valparaíso	3,670	2	3.5	Ch
Banco de Valparaíso	524	6	0.5	Ch
Banco de Valparaíso	2,516	13		Ch
Banco de Valparaíso	209	14	5	Ch
Banco de Valparaíso	1,048	12	1	Ch

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Recipient	£	sh	d	Nation
Banco de Valparaíso	2,097	4	2	Ch
Banco de Valparaíso	945			Ch
Banco de Valparaíso	2,097	4	2	Ch
Banco de Valparaíso	1,572	18	15	Ch
Banco de Valparaíso	4,508	19	11 5	Ch
Banco de Valparaíso	334	17	2.5	Ch
Banco de Valparaíso	3,255			Ch
Banco de Valparaíso	419	8	10	Ch
Banco de Valparaíso	5,662	9	3	Ch
Banco de Valparaíso	3,360			Ch
Banco de Valparaíso	1,048	12	1	Ch
Banco de Valparaíso	4,895	19	8	Ch
Banco de Valparaíso	4,404	2	9	Ch
Banco de Valparaíso	3,045			Ch
Banco de Valparaíso	2,306	18	7	Ch
Banco de Valparaíso	6,300			Ch
Banco de Valparaíso	104	17	2 5	Ch
Banco de Valparaíso	1,050			Ch
Banco de Valparaíso	1,468		11	Ch
Banco de Valparaíso	1,468		11	Ch
Banco de Valparaíso	11		6.5	Ch
Banco de Valparaíso	8,400			Ch
Banco de Valparaíso	4,404	2	9	Ch
Banco de Valparaíso	419	8	10	Ch
Banco de Valparaíso	39,846	19	2	Ch
Banco de Valparaíso	2,762	7	5	Ch
Banco de Valparaíso	1,677	15	4	Ch
Banco de Valparaíso	2,097	4	2	Ch
Banco de Valparaíso	2,202	1	4 5	Ch
Banco de Valparaíso	7,864	10	7.5	Ch
Banco de Valparaíso	629	3	3	Ch
Banco de Valparaíso	10,276	6	5	Ch
Banco de Valparaíso	19,399	3	6.5	Ch
Banco de Valparaíso	314	11	7.5	Ch
Banco de Valparaíso	41,210	2	10.5	Ch
Banco de Valparaíso	7,969	7	10	Ch
Banco de Valparaíso	4,718	14	4 5	Ch
Banco de Valparaíso	3,040	19	0 5	Ch
Banco de Valparaíso	2,516	13		Ch
Banco de Valparaíso	2,411	15	9.5	Ch
Banco de Valparaíso	4,089	11	1.5	Ch

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Recipient	£	sh	d	Nation
Banco de Valparaíso	13,212	8	3.5	Ch
Banco de Valparaíso	419	8	10	Ch
Banco de Valparaíso	1,363	3	8.5	Ch
Banco de Valparaíso	3,250	13	5.5	Ch
Banco de Valparaíso	419	8	10	Ch
Banco de Valparaíso	19,399	3	6.5	Ch
Banco de Valparaíso	104	17	2.5	Ch
Banco de Valparaíso	838	17	8	Ch
Banco de Valparaíso	1,000			Ch
Banco de Valparaíso	524	6	0.5	Ch
Banco de Valparaíso	172	4	11	Ch
Banco de Valparaíso	37	10	11.5	Ch
Banco de Valparaíso	4,410			Ch
Banco de Valparaíso	1,050			Ch
Banco de Valparaíso	840			Ch
Banco de Valparaíso	314	11	7.5	Ch
Banco de Valparaíso	524	6	0.5	Ch
Banco de Valparaíso	629	3	3	Ch
Banco de Valparaíso	1,887	9	9	Ch
Banco de Valparaíso	629	3	3	Ch
Banco de Valparaíso	419	8	10	Ch
Banco de Valparaíso	104	17	2.5	Ch
Banco de Valparaíso	209	14	5	Ch
Banco de Valparaíso	734		3.5	Ch
Banco de Valparaíso	9,542	5	11.5	Ch
Banco de Valparaíso	1,048	12	1	Ch
Banco de Valparaíso	209	14	5	Ch
Banco de Valparaíso	524	6	0.5	Ch
Banco de Valparaíso	1,048	12	1	Ch
Banco de Valparaíso	419	8	10	Ch
Banco de Valparaíso	105			Ch
Banco de Valparaíso	7,896	19	9	Ch
Banco de Valparaíso	315			Ch
Banco de Valparaíso	2,097	4	2	Ch
Banco de Valparaíso	734		5.5	Ch
Banco de Valparaíso	1,000			Ch
Banco de Valparaíso	1,365			Ch
Banco de Valparaíso	1,913	2	8.5	Ch
Banco de Valparaíso	1,048	12	1	Ch
Banco de Valparaíso	1,000			Ch
Banco de Valparaíso	6,510			Ch

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Recipient	£	sh	d	Nation
Banco de Valparaíso	1,000			Ch
Banco de Valparaíso	1,048	12	1	Ch
Banco de Valparaíso	1,000			Ch
Banco de Valparaíso	105			Ch
Banco de Valparaíso	1,048	12	1	Ch
Banco de Valparaíso	104	17	2.5	Ch
Banco de Valparaíso	1,000			Ch
Banco de Valparaíso	459,029	0	1	
Banco Mobiliario	1,000			Ch
Banco Mobiliario	1,000			Ch
Banco Mobiliario	1,000			Ch
Banco Mobiliario	1,000			Ch
Banco Mobiliario	1,180			Ch
Banco Mobiliario	1,000			Ch
Banco Mobiliario	5,000			Ch
Banco Mobiliario	1,000			Ch
Banco Mobiliario	5,000			Ch
Banco Mobiliario	1,340			Ch
Banco Mobiliario	105			Ch
Banco Mobiliario	4,820			Ch
Banco Mobiliario	1,000			Ch
Banco Mobiliario	1,000			Ch
Banco Mobiliario	1,000			Ch
Banco Mobiliario	1,000			Ch
Banco Mobiliario	1,000			Ch
Banco Mobiliario	1,000			Ch
Banco Mobiliario	1,000			Ch
Banco Mobiliario	1,000			Ch
Banco Mobiliario	1,000			Ch
Banco Mobiliario	1,000			Ch
Banco Mobiliario	1,000			Ch
Banco Mobiliario	1,000			Ch
Banco Mobiliario	1,000			Ch
Banco Mobiliario	1,000			Ch
Banco Mobiliario	1,000			Ch
Banco Mobiliario	5,000			Ch
Banco Mobiliario	105			Ch
Banco Mobiliario	1,000			Ch
Banco Mobiliario	5,000			Ch
Banco Mobiliario	1,000			Ch

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Recipient	£	sh	d	Nation
Banco Mobiliario	53,550			
Alfredo Riesco	1,050			Ch
Alfredo Riesco	3,465			Ch
A. Edwards & Co.	10,290			Ch
A. Edwards & Co.	1,260			Ch
A. Edwards & Co.	1,050			Ch
Banco Nacional de Chile	1,995			Ch
C. Romero	1,042	13	5	Ch
Eleodoro Vergara F.	210			Ch
Enrique Angulo & Co.	2,625			Ch
Eugenia Oberto	1,995			Ch
Eulogio Díaz	525			Ch
Francisco A. Olivan	420			Ch
Julio Cuadra	2,100			Ch
Roberto Montt	420			Ch
Roberto Montt	105			Ch
Tomás Zarandona	1,260			Ch
Various Chilean(12)	29,812	13	5	
Ventura Marcó del Pont	1,995			Ch
Ventura Marcó del Pont	1,995			Ch
Ventura Marcó del Pont	1,995			Ch
Ventura Marcó del Pont	3,990			Ch
Ventura Marcó del Pont	3,990			Ch
Ventura Marcó del Pont	1,050			Ch
Ventura Marcó del Pont	1,155			Ch
Ventura Marcó del Pont	7,980			Ch
Ventura Marcó del Pont	210			Ch
Ventura Marcó del Pont	1,995			Ch
Ventura Marcó del Pont	1,995			Ch
Ventura Marcó del Pont	28,350	0	0	
Total Chilean	570,741	0	1	
Julián Layous	210			Fr
Julián Layous	2,835			Fr
Julián Layous	420			Fr

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Recipient	£	sh	d	Nation
L. Chevalier Frere, Dujenney & Co.	500			Fr
L. Chevalier Frere, Dujenney & Co.	500			Fr
L. Chevalier Frere, Dujenney & Co.	500			Fr
L. Chevalier Frere, Dujenney & Co.	500			Fr
L. Chevalier Frere, Dujenney & Co.	100			Fr
Total French(2)	5,565			
J. Gildemeister	1,196	1	1.8	Ger
J. Gildemeister	1,050			Ger
J. Gildemeister	2,100			Ger
J. Gildemeister	1,575			Ger
J. Matth Gildemeister	2,940			Ger
J. Matth Gildemeister	3,150			Ger
J. Matth Gildemeister	3,150			Ger
J. Matth Gildemeister	3,150			Ger
J. Matth Gildemeister	5,250			Ger
J. Matth Gildemeister	2,940			Ger
J. Matth Gildemeister	5,250			Ger
J. Matth Gildemeister	2,730			Ger
J. Matth Gildemeister	5,250			Ger
J. Matth Gildemeister	3,465			Ger
J. Matth Gildemeister	1,050			Ger
J. Matth Gildemeister	5,250			Ger
J. Matth Gildemeister	4,200			Ger
J. Matth Gildemeister	3,150			Ger
J. Matth Gildemeister	2,730			Ger
J. Matth Gildemeister	3,150			Ger
J. Matth Gildemeister	3,150			Ger
Gildemeister	65,876	1	2	
Eduardo Lehne	2,730			Ger
H. Folsch & Co.	315			Ger
H. Folsch & Co.	1,000			Ger
H. Folsch & Co.	1,000			Ger
H. Folsch & Co.	1,570			Ger
H. Heinker Schwartz & Co.	4,410			Ger
Jorge Roengswater	18,060			Ger
Vorwerk & Co.	1,000			Ger
Vorwerk & Co.	150			Ger

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Recipient	£	sh	d	Nation
Vorwerk & Co.	1,000			Ger
Vorwerk & Co.	260			Ger
Vorwerk & Co.	1,000			Ger
Vorwerk & Co.	1,000			Ger
Vorwerk & Co.	945			Ger
Weber & Co.	1,050			Ger
Weber & Co.	3,150			Ger
Weber & Co.	2,100			Ger
Weber & Co.	210			Ger
Various German(6)	40,950			
Total German	106,826	1	2	
Casimiro Ragazzone	210			It
Casimiro Ragazzone	210			It
Casimiro Ragazzone	210			It
Casimiro Ragazzone	105			It
Casimiro Ragazzone	210			It
Casimiro Ragazzone	210			It
Casimiro Ragazzone	525			It
Casimiro Ragazzone	525			It
Dante Cipriani	105			It
Félix Massardo	210			It
Félix Massardo	2,100			It
Félix Massardo	1,050			It
José Canevaro & Sons	1,050			It
José Canevaro & Sons	420			It
José Canevaro & Sons	420			It
José Canevaro & Sons	1,050			It
José Canevaro & Sons	420			It
José Canevaro & Sons	1,050			It
José Canevaro & Sons	420			It
José Canevaro & Sons	1,050			It
José Canevaro & Sons	420			It
José Canevaro & Sons	420			It
José Canevaro & Sons	420			It
José Canevaro & Sons	1,050			It
José Canevaro & Sons	1,050			It

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Recipient	£	sh	d	Nation
José Canevaro & Sons	420			It
José Canevaro & Sons	1,050			It
José Canevaro & Sons	420			It
José Canevaro & Sons	420			It
José Canevaro & Sons	420			It
José Canevaro & Sons	420			It
José Canevaro & Sons	420			It
José Canevaro & Sons	525			It
José Canevaro & Sons	420			It
José Canevaro & Sons	420			It
José Canevaro & Sons	420			It
José F. Canevaro	10,920			It
Minister of Italy	210			It
Minister of Italy	2,835			It
P. Pastorino & Co.	1,217	3	9	It
P. Pastorino & Co.	1,147	15	7	It
P. Pastorino & Co.	4,000			It
P. Pastorino & Co.	1,878	3	9	It
Total Italian(6)	43,943	2	1	
D. and G. Balduino	3,780			(?)
D. and G. Balduino	4,620			(?)
Enrique Salkeld	105			(?)
Lass Gulday & Co.	315			(?)
Lass Gulday & Co.	415			(?)
Lass Gulday & Co.	735			(?)
Lass Gulday & Co.	1,000			(?)
Lass Gulday & Co.	1,000			(?)
Total Unknown Nationalty(4)	11,970	0	0	
Total	858,190	0	1	
Adjusted Total*	857,576	1	1	

*Total given in source, after discounting one cancelled dr aft.

Source: Chile, MH, Dirección del Tesoro,
Vol. 1708, 25-Jul-1887 and 10-Aug-1887.

Table 5

*Quotations of Nitrate Bonds, Exchange,
Bonds of the Internal Debt,
Lima, 1876-1879*

Table 5 - Page 96

Date El Comercio (Lima)	1,000 Bonds (1)(2)	10,000 Bonds (1)(2)	Pence per Sol (2)	Soles p. £ (2)	Internal Debt (2)
12-Aug-76	96.00%		29		62.00%
17-Aug-76	96.00%		29		60.00%
19-Aug-76	96.00%		29		60.00%
26-Aug-76	96.00%		29		60.00%
1-Sep-76	96.00%		29		70.00%
2-Sep-76	96.00%		29		70.00%
5-Sep-76	96.00%		29		70.00%
7-Sep-76	96.00%		29		70.00%
9-Sep-76	96.00%		29		70.00%
16-Sep-76	96.00%		29		70.00%
21-Sep-76	94.00%		29		70.00%
23-Sep-76	93.00%		29		70.00%
30-Sep-76	92.00%		28		70.00%
9-Oct-76	92.00%		28		66.00%
14-Oct-76	90.00%		26		66.00%
19-Oct-76	88.00%		26		66.00%
23-Oct-76	88.00%		26		65.00%
28-Oct-76	88.00%		25		65.00%
4-Nov-76	90.00%		25		63.00%
9-Nov-76	95.00%		25		62.00%
11-Nov-76	95.00%		25		62.00%
15-Nov-76	99.00%		26		64.00%
18-Nov-76	102.00%		26		64.00%
22-Nov-76	102.00%		26		64.00%
25-Nov-76	105.00%		26		64.00%
30-Nov-76	105.00%		26		64.00%
2-Dec-76	105.00%		26		64.00%
5-Dec-76	106.00%		26		64.00%
13-Dec-76	106.00%		27		65.00%
20-Dec-76	106.00%		27		65.00%
22-Dec-76	106.00%		27		65.00%
3-Jan-77	106.00%		28		72.00%
9-Jan-77	106.00%		28		72.00%
13-Jan-77	102.00%		28		72.00%
20-Jan-77	102.00%		28		72.00%
27-Jan-77	100.00%		28		72.00%
8-Feb-77	100.00%		28		72.00%
17-Feb-77	100.00%		27		68.00%
24-Feb-77	100.00%		27		67.00%

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Date El Comercio (Lima)	1,000 Bonds (1)(2)	10,000 Bonds (1)(2)	Pence per Sol (2)	Soles p. £ (2)	Internal Debt (2)
3-Mar-77	99.00%		27		69.00%
10-Mar-77	100.00%		26		69.00%
17-Mar-77	100.00%		26		69.00%
24-Mar-77	100.00%		26		69.00%
28-Mar-77	100.00%		25		69.00%
4-Apr-77	99.00%		25		69.00%
5-Apr-77	99.00%		26		68.00%
7-Apr-77	99.00%		25		68.00%
11-Apr-77	99.00%	98.00%	25		68.00%
14-Apr-77	99.00%	98.00%	25		67.00%
18-Apr-77	98.00%	97.00%	25		67.00%
21-Apr-77	98.00%	97.00%	25		67.00%
25-Apr-77	97.00%	96.00%	25		67.00%
5-May-77	95.00%	93.00%	25		64.00%
12-May-77	95.00%	93.00%	25		64.00%
16-May-77	93.00%	91.00%	25		64.00%
20-May-77	93.00%	91.00%	25		61.00%
24-May-77	93.00%	91.00%	24		61.00%
26-May-77	93.00%	91.00%	23		61.00%
31-May-77	93.00%	91.00%	23		61.00%
2-Jun-77	93.00%	91.00%	23		64.00%
6-Jun-77	91.00%	90.00%	22		64.00%
9-Jun-77	92.00%	91.00%	22		64.00%
16-Jun-77	93.00%	92.00%	21		65.00%
20-Jun-77	97.00%	96.00%	20		66.00%
23-Jun-77	99.00%	98.00%	20		66.00%
27-Jun-77	100.00%	99.00%	20		68.00%
7-Jul-77	98.00%	99.00%	23		68.00%
11-Jul-77	97.00%	97.00%	22		68.00%
14-Jul-77	97.00%	96.00%	22		68.00%
18-Jul-77	97.00%	96.00%	22		68.00%
21-Jul-77	96.00%	95.00%	22.5		67.00%
25-Jul-77	96.00%	95.00%	22.5		67.00%
27-Jul-77	96.00%	95.00%	22.5		67.00%
1-Aug-77	96.00%	95.00%	22.5		67.00%
4-Aug-77	95.50%	95.00%	22.5		67.00%
8-Aug-77	95.50%	95.00%	22.5		67.00%
11-Aug-77	96.00%	95.00%	22.5		64.00%
14-Aug-77	96.00%	95.00%	22.5		64.00%

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Date El Comercio (Lima)	1,000 Bonds (1)(2)	10,000 Bonds (1)(2)	Pence per Sol (2)	Soles p. £ (2)	Internal Debt (2)
21-Aug-77	98.00%	97.00%	20		63.00%
23-Aug-77	98.00%	97.00%	20		63.00%
25-Aug-77	98.00%	97.00%	20		63.00%
27-Aug-77	99.00%	97.00%	20		63.00%
29-Aug-77	100.00%	99.50%	20		64.00%
1-Sep-77	100.00%	99.50%	20		64.00%
5-Sep-77	100.00%	99.50%	21		60.00%
7-Sep-77	100.00%	99.50%	20.5		60.00%
12-Sep-77	100.00%	99.50%	21		55.00%
14-Sep-77	100.00%	99.50%	21		55.00%
15-Sep-77	100.00%	99.50%	21		51.00%
22-Sep-77	100.00%	99.50%	21.5		50.00%
26-Sep-77	99.00%	98.50%	21		50.00%
29-Sep-77	100.00%	99.50%	21		50.00%
3-Oct-77	100.00%	99.50%	21		50.00%
6-Oct-77	96.00%	95.50%	20.5		48.00%
10-Oct-77	96.00%	95.50%	20		46.00%
11-Oct-77	96.00%	95.50%	20.5		46.00%
13-Oct-77	96.00%	95.50%	20.5		46.00%
30-Oct-77	96.00%	95.50%	21		45.00%
2-Nov-77	96.00%	96.00%	21		45.00%
3-Nov-77	98.00%	98.00%	21		44.00%
10-Nov-77	99.50%	99.00%	21		48.00%
13-Nov-77	99.50%	99.00%	21.5		48.00%
15-Nov-77	99.00%	98.00%	21.5		48.50%
17-Nov-77	99.00%	98.00%	21.5		48.50%
21-Nov-77	99.00%	98.00%	21.5		49.00%
23-Nov-77	99.00%	98.00%	21.5		49.00%
24-Nov-77	99.00%	98.00%	21.5		50.00%
27-Nov-77	99.00%	98.00%	21.5		51.50%
29-Nov-77	99.00%	98.00%	21.5		51.00%
30-Nov-77	99.00%	98.00%	21.5		52.50%
1-Dec-77	99.00%	98.00%	21.5		53.00%
4-Dec-77	98.50%	98.00%	21.5	11.00	53.00%
6-Dec-77	98.50%	98.00%	21.5	11.00	53.00%
11-Dec-77	98.50%	98.00%	21.5	11.00	55.00%
13-Dec-77	98.50%	98.00%	21.5	11.00	55.00%
14-Dec-77	99.50%	98.50%	22	11.00	52.50%
18-Dec-77	99.50%	99.00%	22	11.00	52.50%

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Date El Comercio (Lima)	1,000 Bonds (1)(2)	10,000 Bonds (1)(2)	Pence per Sol (2)	Soles p. £ (2)	Internal Debt (2)
19-Dic-77	99.50%	99.00%	22	11.00	50.00%
22-Dic-77	99.50%	99.00%	22	11.00	50.00%
24-Dic-77	99.50%	99.00%	22	11.00	50.00%
29-Dic-77	99.50%	99.00%	22.5	11.00	50.00%
2-Jan-78	99.50%	99.00%	22.5	11.00	47.00%
5-Jan-78	99.50%	99.00%	22.5	11.00	48.50%
9-Jan-78	95.50%	95.00%	22.5	11.00	48.50%
11-Jan-78	95.50%	95.00%	23	11.00	48.50%
15-Jan-78	95.50%	95.00%	23	10.40	48.50%
19-Jan-78	95.50%	95.00%	23	10.40	48.50%
23-Jan-78	95.00%	94.00%	23	10.40	47.00%
24-Jan-78	95.00%	94.00%	23	10.40	48.50%
26-Jan-78	95.00%	94.00%	23	10.60	50.00%
30-Jan-78	95.00%	94.00%	23	10.40	51.00%
1-Feb-78	94.50%	93.50%	23	10.40	55.00%
6-Feb-78	93.00%	92.50%	23	10.40	55.00%
9-Feb-78	93.00%	92.50%	23	10.40	55.00%
16-Feb-78	94.00%	93.00%	23	10.40	54.00%
22-Feb-78	96.00%	95.00%	23	10.40	55.00%
23-Feb-78	99.50%	99.00%	23	10.40	55.00%
7-Mar-78	99.50%	99.00%	23	10.40	55.00%
11-Mar-78	100.00%	99.50%	23	10.40	54.00%
13-Mar-78	108.00%	108.00%	23.5	10.40	54.00%
16-Mar-78	107.00%	107.00%	23.5	10.40	53.50%
20-Mar-78	107.00%	106.50%	23.5	10.40	53.50%
26-Mar-78	106.00%	105.50%	23.5	10.40	54.50%
28-Mar-78	105.50%	105.00%	23.5	10.40	54.50%
29-Mar-78	105.50%	105.00%	24.5	10.40	54.50%
6-Apr-78	105.00%	104.50%	25	10.00	57.00%
12-Apr-78	105.50%	105.00%	27	9.00	58.00%
23-Apr-78	105.00%	104.50%	27	8.50	59.00%
4-May-78	99.00%	99.00%	29	8.50	58.00%
8-May-78	98.00%	98.00%	29	8.50	58.00%
10-May-78	97.50%	97.00%	29	8.50	57.00%
11-May-78	97.00%	96.50%	29	8.50	58.00%
15-May-78	97.00%	96.50%	28	8.50	58.00%
18-May-78	100.00%	100.00%	28	9.00	56.00%
22-May-78	102.00%	101.50%	27	9.00	55.50%
25-May-78	102.50%	102.00%	26.5	9.00	55.50%

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Date El Comercio (Lima)	1,000 Bonds (1)(2)	10,000 Bonds (1)(2)	Pence per Sol (2)	Soles p £ (2)	Internal Debt (2)
27-May-78	103 00%	103.00%	26.5	9.00	55 50%
1-Jun-78	103 00%	102 50%	26 5	9 00	52 50%
5-Jun-78	103.00%	102 50%	26	9.00	54 00%
11-Jun-78	101 50%	101.00%	25	9.00	54 50%
19-Jun-78	101 00%	100 00%	25	9 00	55 50%
22-Jun-78	100 50%	100 00%	25.5	9.00	55 00%
26-Jun-78	100 00%	100 00%	26.5	9.00	55 00%
28-Jun-78	100 00%	99 00%	26 5	9 00	55 00%
3-Jul-78	98 50%	98.00%	28	8 50	54.50%
6-Jul-78	98 00%	97 50%	28.5	8.50	54.00%
10-Jul-78	94 50%	94.00%	28	9.00	54.00%
11-Jul-78	94 50%	94 00%	27	9.00	54 00%
13-Jul-78	95 00%	94 00%	27	9 00	53 50%
19-Jul-78	93 00%	93 00%	27	9 00	53 00%
20-Jul-78	94 00%	93 00%	27	9 00	53 00%
22-Jul-78	93.00%	92.00%	27	9 00	53 00%
23-Jul-78	93.00%	92.00%	26.5	9 00	53 00%
26-Jul-78	93.00%	92.00%	26 5	9.00	53 00%
27-Jul-78	93 00%	92 50%	27.5	9 00	52 00%
2-Aug-78	94 00%	93 00%	27 5	9 00	51.00%
3-Aug-78	94.00%	93 50%	27.5	9 00	51 00%
5-Aug-78	94 50%	93.50%	27.5	9 00	51 00%
6-Aug-78	94 50%	93 50%	27.5	9.00	51 00%
8-Aug-78	93 50%	93.00%	27 5	9 00	51 00%
9-Aug-78	93.50%	93 00%	27.5	9 00	51 00%
12-Aug-78	93 50%	93 00%	27	9 00	50 00%
13-Aug-78	93.50%	93 00%	26.5	9 00	50 50%
14-Aug-78	93 00%	92 50%	26.5	9 00	50 00%
17-Aug-78	93 00%	92 00%	26 5	9.00	50 00%
19-Aug-78	93 00%	92.00%	26 5	9 00	50 00%
20-Aug-78	93 00%	92 00%	26.5	9.00	50 00%
21-Aug-78	93 00%	92 00%	26 5	9 00	50 00%
22-Aug-78	93 00%	92 00%	26 5	9 00	50 00%
23-Aug-78	93 00%	92 00%	26 5	9 00	50 00%
24-Aug-78	92 00%	91 50%	26 5	9 00	50 00%
3-Sep-78	92 00%	91 50%	26 5	9 00	50 00%
4-Sep-78	92 00%	91 50%	26 5	9 00	50 50%
5-Sep-78	94.00%	93 50%	26 5	9 00	50 00%
7-Sep-78	97 00%	96 50%	26 5	9 00	52 00%

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Date El Comercio (Lima)	1,000 Bonds (1)(2)	10,000 Bonds (1)(2)	Pence per Sol (2)	Soles p. £ (2)	Internal Debt (2)
9-Sep-78	97.00%	96.50%	26.5	9.00	51.50%
10-Sep-78	96.50%	96.00%	26.5	9.00	52.00%
11-Sep-78	95.50%	95.00%	27	9.00	51.50%
13-Sep-78	95.00%	94.50%	27	9.00	52.00%
14-Sep-78	95.00%	94.00%	27	9.00	52.00%
17-Sep-78	95.50%	94.50%	27	9.00	52.00%
18-Sep-78	95.50%	94.50%	27	9.00	52.00%
19-Sep-78	95.50%	95.00%	27	9.00	52.00%
25-Sep-78	96.00%	95.00%	27	9.00	53.00%
27-Sep-78	95.00%	94.00%	27	9.00	53.00%
28-Sep-78	95.00%	94.00%	27	9.00	50.00%
30-Sep-78	95.50%	94.50%	27	9.00	52.50%
1-Oct-78	95.50%	94.50%	27	9.00	51.00%
2-Oct-78	92.50%	92.00%	27.5	9.00	51.00%
3-Oct-78	92.50%	92.00%	27.5	9.00	50.00%
4-Oct-78	92.50%	92.00%	27.5	9.00	50.00%
5-Oct-78	92.50%	92.00%	27	9.00	50.00%
7-Oct-78	92.50%	92.00%	27	9.00	50.00%
8-Oct-78	92.00%	91.50%	26.5	9.00	50.00%
9-Oct-78	91.50%	91.00%	26	10.00	50.00%
10-Oct-78	91.50%	91.00%	26	10.00	50.00%
12-Oct-78	91.00%	90.00%	26.5	10.00	50.00%
14-Oct-78	91.00%	90.00%	26	10.00	50.00%
15-Oct-78	91.00%	90.50%	26	10.00	50.00%
16-Oct-78	91.00%	90.00%	25	10.00	50.00%
17-Oct-78	91.00%	90.50%	24	10.00	50.00%
18-Oct-78	91.00%	90.50%	24	10.00	50.00%
19-Oct-78	91.50%	91.00%	24.5	10.00	50.00%
22-Oct-78	91.00%	90.00%	23	11.00	50.00%
23-Oct-78	92.50%	92.00%	23.5	10.80	50.00%
24-Oct-78	92.50%	92.00%	23.5	10.80	50.00%
25-Oct-78	92.50%	92.00%	23.5	10.80	50.00%
26-Oct-78	93.00%	92.00%	23	10.80	50.00%
28-Oct-78	93.00%	92.00%	23	10.80	50.00%
29-Oct-78	94.00%	93.50%	23	10.50	50.00%
30-Oct-78	94.50%	94.00%	23	10.50	50.00%
31-Oct-78	95.00%	94.00%	24	10.00	50.00%
2-Nov-78	96.00%	95.50%	24	10.00	50.00%
4-Nov-78	96.50%	96.00%	24	10.00	50.00%

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Date El Comercio (Lima)	1,000 Bonds (1)(2)	10,000 Bonds (1)(2)	Pence per Sol (2)	Soles p. £ (2)	Internal Debt (2)
5-Nov-78	96.50%	96.00%	24	9.70	50.00%
6-Nov-78	97.00%	96.50%	24	9.70	50.00%
7-Nov-78	97.00%	96.50%	24	9.70	49.50%
8-Nov-78	97.00%	96.50%	24	9.70	49.50%
9-Nov-78	97.00%	96.50%	24.5	9.70	50.00%
11-Nov-78	97.00%	96.50%	24	9.70	50.00%
12-Nov-78	97.00%	96.50%	24.5	9.70	50.00%
13-Nov-78	97.00%	96.50%	24.5	9.70	50.00%
14-Nov-78	96.50%	96.00%	24.5	9.70	50.00%
15-Nov-78	96.00%	95.50%	24.5	9.70	50.00%
22-Nov-78	94.00%	93.00%	24.5	9.80	50.00%
23-Nov-78	96.00%	95.50%	24.5	9.70	50.00%
27-Nov-78	96.00%	96.00%	24.5	9.60	50.00%
28-Nov-78	96.50%	96.00%	24.5	9.60	50.00%
29-Nov-78	96.00%	95.50%	25	9.60	50.00%
30-Nov-78	96.00%	95.50%	25	9.50	50.00%
31-Nov-78	96.00%	95.50%	25	9.50	50.00%
4-Dec-78	96.00%	95.50%	25	9.50	50.00%
5-Dec-78	96.00%	95.50%	25	9.50	50.00%
6-Dec-78	95.00%	94.50%	25	9.50	50.00%
7-Dec-78	95.00%	94.50%	25	9.50	50.00%
10-Dec-78	95.00%	94.50%	25.5	9.50	50.50%
12-Dec-78	95.00%	94.50%	25.5	9.30	50.50%
14-Dec-78	95.00%	94.50%	25.5	9.30	50.50%
16-Dec-78	95.00%	94.50%	25.75	9.30	50.75%
18-Dec-78	95.50%	95.00%	26	9.30	50.75%
19-Dec-78	96.00%	95.50%	26	9.30	50.75%
20-Dec-78	96.50%	96.00%	26	9.30	50.75%
21-Dec-78	96.50%	96.00%	26	9.30	50.50%
23-Dec-78	96.50%	96.00%	26	9.30	50.50%
24-Dec-78	96.00%	95.50%	26	9.30	50.50%
27-Dec-78	95.00%	94.50%	26	9.30	50.50%
28-Dec-78	95.00%	94.50%	26	9.40	50.50%
30-Dec-78	94.50%	94.00%	25.75	9.60	50.50%
31-Dec-78	94.50%	94.00%	25.75	9.60	50.50%
2-Jan-79	94.50%	94.00%	25.50	9.60	48.50%
3-Jan-79	91.00%	90.00%	25.50	9.60	48.50%
4-Jan-79	90.00%	89.00%	25.50	9.60	48.50%
7-Jan-79	90.00%	89.00%	25.00	9.70	48.50%

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Date El Comercio (Lima)	1,000 Bonds (1)(2)	10,000 Bonds (1)(2)	Pence per Sol (2)	Soles p. £ (2)	Internal Debt (2)
8-Jan-79	87.00%	86.50%	25.00	9.70	48.50%
10-Jan-79	87.00%	86.50%	25.00	9.70	48.50%
11-Jan-79	87.50%	87.50%	25.00	9.70	48.50%
13-Jan-79	88.00%	87.50%	24.00	9.70	48.50%
14-Jan-79	88.00%	87.50%	24.00	9.70	48.50%
15-Jan-79	90.00%	89.00%	24.00	9.90	48.50%
16-Jan-79	91.00%	90.00%	24.00	9.90	48.50%
17-Jan-79	91.00%	90.00%	24.00	9.90	49.00%
18-Jan-79	91.00%	90.00%	24.00	9.90	49.00%
19-Jan-79	90.00%	89.50%	24.00	9.90	49.00%
21-Jan-79	90.00%	89.00%	24.00	9.90	49.00%
22-Jan-79	90.00%	89.50%	24.00	9.90	48.75%
23-Jan-79	89.00%	88.00%	24.00	9.90	48.75%
24-Jan-79	88.00%	87.00%	23.50	10.00	48.75%
25-Jan-79	88.00%	87.00%	23.50	10.00	48.75%
27-Jan-79	85.50%	85.00%	22.00	10.30	48.75%
28-Jan-79	85.50%	85.00%	22.00	10.50	48.75%
29-Jan-79	85.50%	85.00%	22.00	10.50	48.75%
30-Jan-79	87.00%	86.50%	22.00	10.50	48.75%
1-Feb-79	87.00%	86.50%	22.00	10.50	49.00%
3-Feb-79	87.50%	86.50%	22.00	10.50	49.00%
4-Feb-79	87.00%	86.50%	22.00	10.50	49.00%
5-Feb-79	87.50%	86.50%	22.00	10.50	49.00%
6-Feb-79	87.00%	86.50%	22.00	10.50	49.00%
7-Feb-79	87.00%	86.50%	22.00	10.50	48.75%
8-Feb-79	87.00%	86.50%	22.00	10.50	49.00%
10-Feb-79	87.00%	86.50%	22.00	10.50	49.00%
11-Feb-79	87.00%	86.50%	22.00	10.50	49.00%
12-Feb-79	87.00%	86.50%	22.00	10.50	49.00%
13-Feb-79	87.50%	87.00%	22.00	10.40	50.00%
14-Feb-79	87.50%	87.00%	22.00	10.40	50.50%
15-Feb-79	87.50%	87.00%	22.00	10.40	50.50%
17-Feb-79	87.50%	87.00%	22.00	10.40	50.50%
18-Feb-79	87.00%	86.50%	22.00	10.40	50.50%
19-Feb-79	87.00%	86.75%	22.00	10.40	50.50%
20-Feb-79	87.00%	86.75%	22.00	10.40	50.50%
21-Feb-79	87.00%	86.75%	22.00	10.40	50.00%
22-Feb-79	87.00%	86.00%	22.00	10.60	50.00%
26-Feb-79	87.00%	86.75%	22.00	10.40	50.00%

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Date El Comercio (Lima)	1,000 Bonds (1)(2)	10,000 Bonds (1)(2)	Pence per Sol (2)	Soles p. £ (2)	Internal Debt (2)
27-Feb-79	86.50%	86.00%	22.00	10.70	50.00%
1-Mar-79	84.50%	84.00%	22.00	10.60	49.00%
3-Mar-79	80.50%	80.00%	21.00	10.70	48.50%
4-Mar-79	80.50%	80.00%	21.00	10.80	42.00%
5-Mar-79	76.00%	75.00%	20.00	11.00	48.00%
6-Mar-79	76.00%	75.00%	20.00	11.00	48.00%
7-Mar-79	76.00%	75.00%	20.00	12.50	48.00%
8-Mar-79	74.00%	73.00%	19.00	13.00	46.00%
11-Mar-79	76.00%	75.00%	19.00	13.00	46.00%
12-Mar-79	77.00%	76.00%	20.00	12.00	46.00%
13-Mar-79	80.00%	79.00%	20.00	11.80	46.00%
14-Mar-79	80.00%	79.00%	20.50	11.50	46.00%
15-Mar-79	79.50%	79.00%	20.50	11.50	46.00%
17-Mar-79	79.00%	78.00%	20.50	11.50	46.00%
18-Mar-79	78.00%	77.00%	20.50	11.50	46.00%
20-Mar-79	78.50%	78.00%	21.00	11.50	46.00%
21-Mar-79	77.50%	76.50%	21.00	11.50	46.00%
22-Mar-79	79.00%	78.00%	20.50	12.00	46.00%
24-Mar-79	77.00%	76.00%	20.00	12.50	46.00%
26-Mar-79	77.00%	76.00%	20.00	12.50	46.00%
27-Mar-79	75.00%	74.00%	20.00	12.50	45.00%
28-Mar-79	73.50%	73.00%	20.00	12.50	45.00%
29-Mar-79	73.00%	72.00%	20.00	12.50	45.00%
31-Mar-79	73.00%	72.00%	20.00	12.50	45.00%
1-Apr-79	73.00%	72.00%	20.00	12.50	43.00%
2-Apr-79	73.00%	72.00%	20.00	12.50	42.50%
3-Apr-79	72.00%	71.50%	20.00	13.00	42.00%
5-Apr-79	69.00%	68.00%	19.00	13.00	42.00%
7-Apr-79	69.00%	68.00%	19.00	13.00	42.50%
8-Apr-79	65.00%	64.00%	19.00	13.20	42.00%
9-Apr-79	64.00%	63.00%	20.00	13.50	40.00%
15-Apr-79	60.00%	60.00%	20.00	13.00	40.00%
17-Apr-79	60.00%	60.00%	19.00	13.20	42.00%
18-Apr-79	60.00%	60.00%	19.00	13.00	40.00%
19-Apr-79	60.00%	60.00%	19.00	13.00	42.00%
21-Apr-79	60.00%	60.00%	19.00	13.00	42.00%
22-Apr-79	60.00%	60.00%	19.00	13.00	42.00%
23-Apr-79	60.00%	60.00%	19.00	13.20	42.00%
24-Apr-79	60.00%	60.00%	19.00	13.20	42.00%

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Date El Comercio (Lima)	1,000 Bonds (1)(2)	10,000 Bonds (1)(2)	Pence per Sol (2)	Soles p. £ (2)	Internal Debt (2)
25-Apr-79	60.00%	60.00%	19.00	13.20	42.00%
28 Apr -79	60.00%	60.00%	19.00	13.20	42.00%
29 Apr -79	60.00%	60.00%	19.00	13.00	41.00%
30-Apr-79	60.00%	60.00%	18.75	13.00	41.00%
1-May-79	60.00%	60.00%	18.50	13.00	41.00%
3-May-79	60.00%	60.00%	18.00	13.20	40.00%
5-May-79	60.00%	60.00%	18.00	13.50	41.00%
6-May-79	60.00%	60.00%	17.50	14.00	41.00%
7-May-79	60.00%	60.00%	17.00	14.00	41.00%
8-May-79	60.00%	60.00%	17.00	14.00	41.00%
9-May-79	60.00%	60.00%	17.00	14.00	41.00%
10-May-79	60.00%	59.50%	17.00	15.00	41.00%
12-May-79	60.00%	60.00%	16.00	15.00	41.00%
13-May-79	60.00%	59.50%	16.50	15.00	41.00%
14-May-79	60.00%	60.00%	17.00	15.50	42.00%
15 May -79	60.00%	59.00%	17.00	15.50	42.00%
16-May-79	60.00%	59.00%	17.00	15.50	42.00%
17-May-79	60.00%	59.00%	17.00	15.00	41.00%
20-May-79	59.00%	58.50%	16.00	15.00	41.00%
21-May-79	59.00%	58.50%	16.00	15.00	42.00%
23-May-79	59.00%	58.00%	16.00	15.00	42.00%
24-May-79	59.00%	58.50%	16.00	15.00	41.00%
26-May-79	59.00%	58.00%	16.00	15.50	42.00%
27-May-79	59.00%	58.00%	16.00	15.50	42.00%
28-May-79	59.00%	58.00%	16.50	15.50	42.00%
29-May-79	59.00%	58.00%	16.00	15.50	42.00%
30-May-79	59.00%	58.00%	16.00	16.00	42.00%
31-May-79	59.00%	58.00%	16.00	15.50	42.00%
3-Jun-79	59.00%	58.00%	16.00	15.50	42.00%
4-Jun-79	59.00%	58.00%	16.00	15.50	42.00%
6-Jun-79	59.00%	58.00%	16.50	16.00	42.00%
7-Jun-79	59.00%	58.00%	16.50	16.00	42.00%
9-Jun-79	59.00%	58.00%	16.50	16.00	42.00%
10 Jun-79	59.00%	58.00%	16.50	16.00	42.00%
11-Jun-79	59.00%	58.00%	16.00	16.00	42.50%
13-Jun-79	59.00%	58.00%	16.00	16.00	42.50%
14-Jun-79	59.50%	58.50%	16.00	16.00	42.50%
16-Jun-79	59.00%	58.00%	16.00	16.00	42.50%
18 Jun-79	58.50%	58.00%	15.50	16.00	42.50%

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Date El Comercio (Lima)	1,000 Bonds (1)(2)	10,000 Bonds (1)(2)	Pence per Sol (2)	Soles p. £ (2)	Internal Debt (2)
19-Jun-79	59.00%	58.00%	15.75	16.00	42.50%
20-Jun-79	59.00%	58.00%	15.75	16.00	42.50%
21-Jun-79	59.00%	58.00%	15.00	16.00	42.00%
23-Jun-79	59.00%	58.00%	15.00	16.00	42.00%
25-Jun-79	58.00%	57.00%	15.50	16.00	41.00%
26-Jun-79	59.00%	58.00%	15.75	16.00	42.50%
27-Jun-79	58.00%	57.00%	15.75	16.00	41.00%
28-Jun-79	58.00%	57.00%	15.75	16.00	41.00%
30-Jun-79	58.00%	57.00%	15.75	16.00	41.00%

(1) On 13-Mar-78, total official value of certificados issued rose from 7,692,000 to 13,423,042 soles; on 8-Mar-79, it was placed at 18,077,235.

(2) Lower price chosen in case of two prices given; sporadic information given about offers to sell, to buy, or actual transaction.