

# A Half-century monopoly (1880-1930s): the *black diamonds* (carbonados) of Bahia and Jewish Merchants

*Monopólio de meio século (1880 – 1930s):  
Os diamantes negros (carbonados) da Bahia e os  
Comerciantes Judeus*

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## **Abstract**

*Bahia's black diamond (carbonado) production and trade is rarely mentioned in the academic literature though reports were made in popular magazines, in U.S and British consular reports and in trade journals. This diamond trade was mostly carried out by foreigners having few connections with the local Bahia elite and the small physical volume of diamonds made transportation easy (or invisible through smuggling). Carbonados began figuring importantly in Bahia's exports after the invention of the Leschot diamond head drill in 1862. Important European Jewish diamond merchants set up agencies in Salvador and soon Bahia's carbonados were being shipped to Paris and London and thence to the "carbon kings" of New York City. Bahia's diamond trade never fell into the hands of the De Beers cartel. In the first decade of the twentieth century diamonds (both white and black) accounted for at least 11% of Bahia's exports and employed some 5,000 persons. Substantial amounts of the commodity value chain remained in Bahia. Carbonado exports were estimated to be worth about \$5 million in 1909. In the 1920's, a little-known American capitalist, Arthur S. Bandler, made large direct investments in Bahia's Chapada Mountains seeking to introduce mechanized mining of black diamonds. This effort represents a powerful example of U.S. interest in post-World War I Brazil.*

**Keywords:** *Black (industrial) diamond cycle. Bahia's Chapada Diamantina mining. Leschot drill. Paris diamond market. Jewish merchants.*

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## Resumo

A produção e o comércio do diamante preto (Carbonado) da Bahia são raramente mencionados na literatura acadêmica, embora relatórios fossem feitos em periódicos populares nos Estados Unidos e em relatórios consulares britânicos e em jornais de comércio. Este comércio do diamante foi feito basicamente por estrangeiros, tendo poucas conexões com a elite local da Bahia e o volume físico pequeno de diamantes fez o transporte fácil (ou invisível por contrabando). Os carbonados começaram a aparecer como importantes em exportações da Bahia após a invenção da broca Leschot, de cabeça de diamante, em 1862. Importantes comerciantes de diamante judeus-europeus abriram agências em Salvador e logo após para os reis do diamante negro em Nova Iorque. O comércio de diamante da Bahia nunca caiu nas mãos do cartel de De Beers. Na primeira década do século XX os diamantes (brancos e negros) responderam, pelo menos, por 11% das exportações de Bahia, e empregaram umas 5.000 pessoas. As quantidades substanciais da cadeia de valores da *commodity* permaneceram na Bahia. As exportações de Carbonados foram estimadas em aproximadamente \$5 milhões em 1909. Nos anos 20, um capitalista americano pouco conhecido, Arthur S. Bandler, fez grande investimento direto na Chapada Diamantina na Bahia procurando introduzir a mineração mecanizada do diamante preto. Este esforço representa um exemplo substancial do interesse dos Estados Unidos no Brasil após a 1ª. Guerra Mundial.

**Palavras-chave:** Ciclo do diamante negro (industrial). Minas da Chapada da Diamantina na Bahia. Broca Leschot. Mercado de diamante de Paris. Comerciantes Judeus.

## Introduction: the world context for a derived demand

*The term 'carbonado' is believed to date to 1842-43 used by Brazilian miners to designate an opaque, black or dark grey, polycrystalline diamond found in the Chapada highlands of Brazil. Members of the new local diamond aristocracy included Coronel Jose Martins da Rocha on whose lands black diamonds were first found*

Two singular events provide the context to the story of Brazil's black diamonds: the second industrial revolution and World War I (the Great War). The second industrial revolution (1870-1914) coincided almost exactly with Brazil's carbon boom. With its new core industries like

steel and petroleum, it generated a huge derived demand for industrial diamonds used in shaping steel, drilling for oil and other minerals, etc. Powerful demand-pull forces emanating from the United States and Western Europe - from their burgeoning auto industries, underground transportation systems (tunnels, metros), skyscrapers, the drilling for petroleum and iron ore - during 1880-1930 fed back upon Bahia leading to the region's black diamond (or carbonado) cycle. The Great War opened up Brazil to American investments by severing Brazil's ties with Britain, Germany and France. In the words of Dunn, "the war emergency turned the investment tide...stimulating a demand for American goods and particularly for American credit."<sup>1</sup> Though crucial to many industrial and civil construction activities at the time, Bahia's black diamond has received scant mention in the academic literature. Bahia's most famous economist, Romulo Barreto de Almeida, makes only brief mention of carbonados in his historical survey of the Bahian economy as does Katia M. de Queiros Mattoso.<sup>2</sup> Noelio Dantasle Spinola devoted one paragraph to Bahia's diamond trade.<sup>3</sup>

Traditional Brazilian exports like coffee, tobacco, and hides & skins continued to figure importantly at the turn of the twentieth century. But, Brazil developed a monopoly of the black diamond trade known as "carbonado." Carneiro presented data indicating that an annual average of 228,138 carats (or 46,942 grams) of diamonds during 1855-65 were exported from Bahia; and another source gives data for 1859-66 which shows that annual exports to Europe averaged 178,326 carats.<sup>4</sup> The peak year was 1856, when 320,000 diamond carats were exported from Bahia to Liverpool and thence on to Amsterdam's Jewish diamond firms.<sup>5</sup> Bauer estimated Chapada diamond out during 1850-85 at 1.5 million carats, or about 43,000 carats on average per year.<sup>6</sup> Exports of diamonds had resumed an upward trend in the 1880's when the Brazilian carbonado cycle began as the demand then for diamond-headed rock drills grew rapidly. The share of diamonds in Bahia's exports rose from 4.2% in 1880/81 to 11.8% in 1911, making the activity the fourth largest export commodity of Bahia (Table 1).

**Table 1 – The Mix of Bahia’s Exports by Value, 1846 – 1911**

Commodity	1846	1864	1877	1880/81	1888	1900	1906	1911
sugar	64.7%	41.2%	34.9%	41.8%	21.4%	2.3 %	~0%	~0 %
coffee	3.5	9.2	19.2	12.3	15.6	13.1	11.3	15.0
cotton	3.5	8.1	0.2	0	-	0	0	0
cocoa	~0	1.3	3.2	5.0	6.6	27.3	33.9	34.4
hides & skins	7.5	2.3	3.1	4.9	2.8	4.4	8.0	5.8
rum	4.1	2.3	0.8	0.3	0.1	0	0	0
tobacco	7.8	21.3	29.2	21.1**	40.3	46.8	24.0	17.0
diamonds	~0	11.3****	2.1	4.2	3.2	***	4.7(1907)	11.8
Brazil wood	0.4	1.6*	0.7	0.5	*	0.2*	0.*1	0.2*
Rose wood	?	*	2.3	1.8	0.8*	*	*	*
piassava	?	0.8	2.9	8.0	9.0	1.3	1.0	0.8
India rubber	0	0	0.2	-	-	0.7	14.4	8.8
Others	-	0.6	1.2	-	0.1	4.4	4.5	6.2
Total...	100%	100%	100%	100%	100%	100%	100%	100%

\*these items are grouped together.

\*\*Consul Stevens (1885: 1656) noted that in 1883/4 the quantity of tobacco exported was 15,644,010 kilos valued at 341,840 pounds which accounted for about 30% of Bahia's exports in that year.

\*\*\*production in 1900 was estimated at 40,000 carats for both Bahia and Minas Gerais.

\*\*\*\*Bahian diamond exports were valued in 1864 at 1,476,900\$ or \$770,000, accounting for 11.3% of the state's exports (Consul Edes, 1868: 796).

## The birth of Brazil’s natural monopoly

Bahia developed a monopoly in the production of so-called black diamonds (*carbonados*) or industrial diamonds used in drills and for abrasive purposes.<sup>7</sup> Up until around 1850, the black diamonds were tossed away as a waste. The origin of extracting black diamonds remains disputed, though it dates from during the 1840s. Alfred des Cloizeau reported that black diamonds were first gathered in the mines of Baranco, Grupiara, Gruna de Mosquitos and Surua in the Sincora mountain range since 1845-46.<sup>8</sup> Another source mentioned *carbonados* being first found in diamond placers of the San Jose district of Sincora in 1843, but were not collected until 1846.<sup>9</sup> Thereafter, they were initially

shipped to Holland. U.S. Consul Furniss in Bahia reported that the black or carbon diamond seemed to date back to 1848, when a Frenchman traveling through Bahia bought some for 27 cents a carat under the name of “ferragens” (or iron stones).<sup>10</sup> An early purchaser of black diamonds was by the Frenchman, one A. Chibaribere, who bought the stones in Andarahy for 160 reis per eighth (or a pittance of 9 reis per carat).<sup>11</sup> In March 1856, a Domingo Gomes from Roncador sold 6,475 carats in London which he had bought for 60 cents per carat and sold for \$1.26 a carat.<sup>12</sup> The stones were pounded into dust and used in diamond polishing<sup>13</sup> but also in grinding wheels.

Black diamonds were found along with white diamonds in the gravel beds of the Rio Paraguassu and its tributaries (Rio San Antonio, Rio Mucuge). They were lodged in gravel known locally as *cascalho*.<sup>14</sup> Owners and leasers of diamond lands allowed miners to work their properties who then received from one-fifth to one-fourth of the value of their finds<sup>15</sup> which could be used to offset debt accumulated by purchasing provisions from the mine claim owner. Diamonds were



Mine claims owners visiting a diamond washing site in the late nineteenth century  
(Source: Wilson Teixeira et. al. (2005): 106 citing archive of mestre Oswaldo, Lençóis).

also mined by claims owners employing slave labor.<sup>16</sup> Calvert reported that in the Bahia diamond fields, better-off persons bought the placer claims and

...secure perhaps 25 per cent, for allowing more impecunious miners to do the rough work. They take good care, however, to wash the pay dirt themselves, or to entrust this task to those whose good faith they have confidence.<sup>17</sup>

Slave labor was extensively employed in the mines of the Chapada.<sup>18</sup> The number of miners involved in Bahia's diamond activity fell from 20,000 in 1845 to about 5,000 in 1901. The riverbed gravel was removed by native divers, lifted to canoes, brought to the river banks, washed and sorted.

Early "diamond towns" included Santa Isabel, Chique-Chique, Andarahy and Lencoes.<sup>19</sup> The riverbed gravel (*cascalho*) was removed by native divers, brought to the river banks, washed and sorted. The mining methods employed during the nineteenth-century were very simple and the hard work done by native miners (called *garimperos*). Most laborers engaged in the mining of diamonds in Bahia (unlike in Minas Gerais) was free labor, not slaves.<sup>20</sup> *Garimperos* flocked to the region on their own will hoping to strike it rich. A report dated 1857 described the labor process in the Chapada

The labor expended in collecting that small bag of dull glassy stones is immense. One can easily lift with the hand the product of a year's digging and washing; yet to bring them together, much sweat has flowed while the steaming negroes dug the clay under a burning tropical sun. The whip has many a time roused the flagging energies, or sharpened the search among the gravel in the washing-trough.<sup>21</sup>

An 1898 report noted

The small supply is due to the crude methods. Frequently two men obtain only three or four carbons in six months' work. The carbons are bought by agents of the exporters in Bahia.<sup>22</sup>

During the sixty years of Bahia's carbonado cycle, the nature of the commodity chain evolved:

	1860s	1920s
Labor organization	Slave labor or share contracts	Share contracts or wage labor
transportation	Mule trains and steamships	Railway and steamships
Primary destinations	Paris, London (Amsterdam)	New York City
Predominant diamond type	Gemstones for jewelry/fashion	Carboados for industry

The mining was all done by black or mixed race, native miners who either worked independently or on a share basis with the claim owner. The work was physically draining, dangerous, and the *garimpeiro* survived barely at or below a subsistence level, often in debt servitude to the claims owner who provided simple tools, clothing and food, driven by hope of a richer tomorrow. The mining methods employed in Bahia during the nineteenth-century were very rudimentary and the work done by native miners (called *garimperos*). A report in 1898 explained the existing carbons mining methods:

To obtain those in the river bed, a place is selected not more than 20 feet in depth and with a slow current. In this place a pole is planted, down which naked native divers descend, taking with them a sack which is kept open at the top with a ring. They first scrape away the silt and then fill the sack with the underlying gravel, removing it entirely down to the clay (bedrock). As soon as the sack is full, a signal is sent up to a man who is waiting in one of the native boats or canoes which are chiseled out of a tree. The bag is raised to the surface, taken to the shore, and dumped at a sufficient distance to prevent its being washed away by any sudden rise of the river. This operation is repeated day by day during the six months which constitute the dry season, after which diving has to be suspended...the divers are quite skillful,

and many of them remain below for a minute at a time, some even remaining as long as a minute and a half.... the other method of mining consists of drilling through the rock of the mountain side, and removing the diamond and carbon bearing gravel through a series of tunnels. This gravel is piled up on the side of the mountain during the dry season and is then washed during the rainy season by means of sluices through which the water is conveyed down the mountain side.<sup>23</sup>

Prices offered to miners in the Chapada were determined by telegraph cable from abroad (regulated by the forces of supply and demand). These firms send out buyers into the diamond areas with purchases by one firm often amounting to over 300,000 milreis (\$100,000) in one month. U.S. Consul Albert Morawetz of Bahia noted that the purchasing firms were either branches of French merchant houses or they shipped to firms in London and Paris on joint account. Carbons were not brought to Salvador for sale, but were purchased in the interior by agents and dealers. No companies were engaged in mining or searching for carbons, that work being done by the natives, individuals or in small parties working together. Purchase prices were not controlled by a trust but instead governed by the forces of supply and demand.<sup>24</sup>

Mine claims owners were local landlords, emigrant men of property, merchants, storekeepers, politicians, and military officers. The diamond land owners then sold the diamonds to buyers from Salvador da Bahia who shipped the stones to London or Paris. A similar commodity chain existed with diamonds from Minas Gerais which went to Rio and thence to Paris and London.<sup>25</sup> The post-colonial Brazilian Imperial government allowed diamond mining by private enterprise. But after expiration of the Anglo-Brazilian trade treaty in 1844 which mandated all Brazilian diamonds be shipped to London, Brazil's diamonds increasingly were purchased by French houses and placed on the Paris market. The Chapada alluvial mines existed entirely outside the later control of the De Beers syndicate because they were small-scale placer alluvial mining defying central control and because the Brazilian output was marginal compared to De Beer's South African output.





Garimpos concentrating cascalho with hoes in ditches of water (**Source:** Photograph taken by H.W. Furniss printed in Orville A. Derby (John Casper Branner tr), "The Geology of the Diamond and Carbonado Washings of Bahia, Brazil," *Annual Report of the Smithsonian Institution for the Year Ending June 30, 1906* (Washington D.C.; Government Printing Office, 1907): insert p. 218).

Two kinds of diamonds – carbonados and borts – were used for diamond drill work. The carbonado was only found in Bahia, Brazil. The bort is a semitransparent stone, less tough and with a different crystallization than the carbonado. The much cheaper borts can be used for softer rocks. The carbonado is opaque and black on the outside and of irregular shape. It has no cleavage planes which differentiates it from gemstone diamonds. It is very hard and ideally suited for drilling into hard rock.<sup>26</sup>

## Appearance of the Leschot diamond head drill

Up until the 18<sup>th</sup> century, the non-jewelry uses of diamonds were as splinters for engraving, boring, and cutting of gems, glass and other hard metals, and as crushed bort powder on rotating iron laps for shaping

gems, engraving, etc. Modern abrasive and cutting applications came to include drilling, truing and grinding.<sup>27</sup> Diamond rock drills of a rudimentary nature were employed in the early 18<sup>th</sup> century. Large diamond drills for the mining industry were being used extensively in the latter nineteenth century and go back to Leschot of Geneva in 1862. His diamond core drill was patented in 1863.<sup>28</sup> The Brazilian black diamond was first used to cut millstones in North America reportedly by the firm of Samuel Dessau & Co., (established in New York City in 1841).<sup>29</sup> *The Engineering and Mining Journal* reported in 1882 that S. Dessau of NYC was importing Bahia black diamonds for use in diamond drills.<sup>30</sup>

The carbons' value as an abrasive was increasingly recognized in the mid-nineteenth century. Until the invention of the Leschot diamond-headed rock drill in a famous watch factory in Geneva (Vacheron & Constantin) by the Swiss engineer, George-Auguste Leschot and his son, Rodoplhe, carbonados were of little value. But the intense hardness of the carbonado was recognized. Carbons were first brought to the London diamond market in 1867.<sup>31</sup> The diamond tipped core drill was used first for drilling blast holes for transalpine tunneling the Mount Cenis and later the St. Gothard on the French-Italian border, the Suez and Panama canals, the two major Trans-Andean railways in South America (the Oroya in Peru and the Chilo-Argentine), the London Underground, oil wells in Pennsylvania, the 75-foot deep holes in which support structures for the world's largest building in 1913, the Equitable in NYC, etc.<sup>32</sup> The first diamond-drill hole in the United States was put down in northeastern Pennsylvania for the purpose of prospecting for anthracite coal.<sup>33</sup>

Leschot mounted four carbons in the crown of his drill which was then rotated at 250-300 rpm's. In an early experiment carried out in Rheinfelden, Switzerland, the Leschot drill took 60 days to perforate 475 meters, a task which before the invention would've taken 2-3 years.<sup>34</sup> Soon afterwards when the commercial value of black diamonds became recognized, an enterprise in London, Diamond Rock Boring, and in the United States, the Bullock Machinery Co. and Sullivan Machinery Co., also joined in the exploitation of the Leschot patented drill.

Uses of diamonds in steel machinery multiplied. By the 1920's, diamonds were being used to help build bridges, skyscrapers, appliances, etc.<sup>35</sup>

The price of carbons in London during 1870-72 when they were being used mostly for polishing white diamonds or as an abrasive for cutting, was 2 shillings a carat. This rose to 8-16 shillings a carat in 1875, to 40 shillings a carat in 1895 and to 100 shillings a carat in 1909. Between 1895 and 1909, the market value of a carbonado fluctuated between \$25 and \$85 a carat. In other words, over the period 1870-1906, the price of carbons rose some fifty-fold.<sup>36</sup> Consul Furniss reported upon the demand-induced price rise of carbons from \$17 a carat in 1892 to \$60 in New York City in 1906.<sup>37</sup> By the mid-1920 the price in New York was over \$100 per carat. A revival of outside interest in Brazilian diamond fields took place in the later 1890's as the world price of rough diamonds controlled by the De Beers London Diamond Syndicate doubled.<sup>38</sup>

During the 1880's, Bahia began its carbonado cycle. Bahia dominated black diamond production with smaller amounts being mined in neighboring Minas Gerais and Landak in Borneo. World market prices for black diamonds soared during 1860-1900: in 1860, the price was 2\$000 per kilo, by 1896 it was 80\$000 per kilo and by 1930, an incredible 1:200\$000 per kilo.<sup>39</sup> Annual output during 1850-70 had been 70,000 carats.<sup>40</sup> The New York price for carbons was \$17 a carat in 1892 and \$75 in 1906. In 1912, a black diamond sold by a miner cost \$5 per carat; a brilliant diamond of good color and shape earned the miner \$11.25 per carat.<sup>41</sup> During 1845-1907, the estimated diamond output of Bahia was 2,642 kilograms.<sup>42</sup> The largest carbonado was discovered in 1895 in Lencois and weighed 3,148 carats (photo below). Other gemstones were also found, e.g., tourmalines, quartz, rutile, etc. The diamond wealth generated there formed the material basis for the "coroneis de pedra."<sup>43</sup> The boom lasted for about 25 years; manual washing of diamonds began to decline from 1871 onwards. In 1880, the engineer Theodoro Sampaio visited the town of Santa Isabel do Paraguassu (now Mucuge) located in the Sincora range and still observed garimpero washing in the

Paraguassu River.<sup>44</sup> The first attempts to mechanize diamond washing took place in the early 20<sup>th</sup> century.<sup>45</sup>

Carbons were found in all sizes, varying from that of a grain of sand to one of 975 carats in 1894. Other large carbonados found in Bahia were a stone weighing 3,078 carats in 1895 and one of 750.5 in 1901.<sup>46</sup> The most valuable were those in the 1-3 carats range because larger ones needed to be broken apart at a great volume loss. A black diamond of 3,148 carats was found in Lencois in 1895 found by the miner, Sergio Borges de Carvalho. It was first sold for \$16,000, later for \$25,000, taken to Joalheria Kahn & Co. of Bahia which in turn shipped it to G. Kahn in Paris who sold it to I.K. Gulland of London in September 1895 for 6,400 pounds. The stone was broken up into small pieces of 3-6 carats each to be used in industrial diamond drills.<sup>47</sup> Another large carbon weighing 577 carats was found close to the same place near Lencois in 1901 and was sold by the miner for 79,000 milreis (or \$17,380), one-fourth going to the lessee.<sup>48</sup> A large carbon weighing 52 carats was also found in Lencois and was held by its owner for two years while waiting for a good price. The stone was sold in early 1906 for 90 contos de reis (\$30,000) and was shipped to Paris.<sup>49</sup>

In each town of the diamond mining district, agent buyers representing the larger Bahia City export firms in the carbon and diamond business were active.<sup>50</sup> Ever since the discovery of these diamonds in Brazil, this commerce had been a monopoly in the hands of native firms, who had associated themselves with French and German Jewish firms in Paris and London. Before the Great War, most diamonds went to London or Paris and thence to Amsterdam and Antwerp for cutting.<sup>51</sup> Jewish dominance was to be expected as Jews “practically monopolized trade in articles of luxury...jewelry, precious stones, pearls and silks” as demonstrated by Werner Sombart a century ago.<sup>52</sup> Five to six such firms dominated the diamond exporting trade of Bahia according to the U.S vice-consul in Bahia, J.P.W. Rowe<sup>53</sup> – my research indicates these included M. Ulmann & Cia (Paris), Maison Levy Freres (founded in Paris in 1885), Lodin (Paris), Joalheria C. Kahn & Co. of Bahia, **J. Sanders**, Theophilio Gomes de Mattos and Francisco de Mello & Co.<sup>54</sup> The first

five maintained offices in Bahia and Paris. German publications for 1904-5 list the following diamond export merchants in Bahia: C. Kahn, Theophilio Gomes de Mattos, the capitalist Coronel Francisco de Mello, Louis Leib, Ulmann & Co., Melchiades de Silva Veiga, and the prominent industrialist Joao Baptista Machado.<sup>55</sup> Jewish interests dominated the export diamond trade (Ulmann, Kahn, Levy, Lodin, and Leib).



The largest carbonado ever found, the 3,148 carats Sergio (source: Furniss, 1906: 274). The Sergio was smashed into small pieces in New York City and used in drills at the Mesabi Range, the vast iron deposit in Minnesota.

## How earnings were distributed along Bahia's black diamond commodity chain

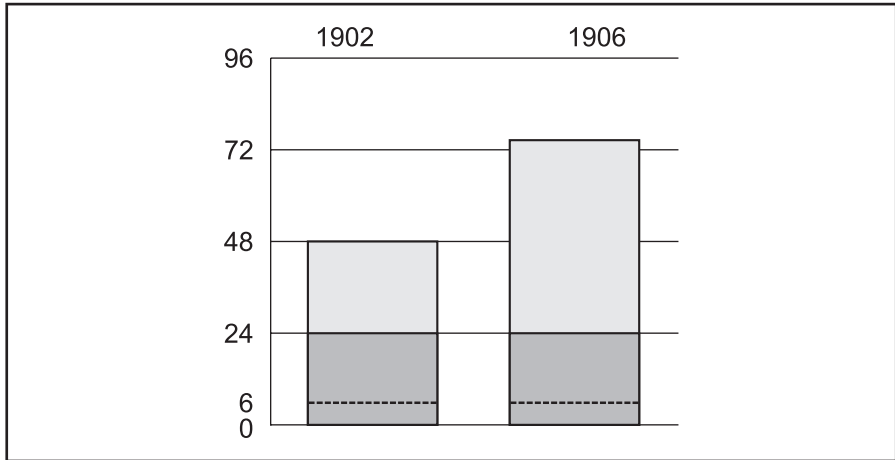
Before the Brazilian Imperial Central Bahia Railway' line reached Bandeira de Mello in 1887<sup>56</sup>, it was an 8-10 days journey from Sao Joao do Paraguassu to Sao Felix. The diamond region of Bahia was located about 267 miles from Salvador. It could be reached in four days of travel: Bahia to Cachoeira, 45 miles by water, one day; Cachoeira to Bandeira de Mello, 158 miles by rail, one day; and thence on to Andarahy, 64 miles on mule back, two days.

Given the widespread prevalence of diamond smuggling – as traders sought to evade the Bahia export tax – in Bahia, data on diamond exports is hard to come by. As much as 30% of total Brazilian output may have been smuggled out.<sup>57</sup> In 1876, diamond exports amounted to 2.0% of total Bahian exports valued at @ \$212,457; in 1878/9 \$319,195 or 4.4% of total exports (with 89% going to France and 19% to Britain); \$319,720 in 1880/81 or 4.1% of total export; and 4.7% of total exports in 1907 valued at \$590,459. In 1880/81, over 95% of exported Bahian rough diamonds went to France (with the remainder destined for Britain).<sup>58</sup> The trade routes were complex. In turn, the rough diamonds were shipped to Amsterdam for finishing, though cutting and polishing was carried out increasingly in Paris, London and Antwerp and soon New York City.<sup>59</sup> For example, an 1885 report by the U.S consul in Amsterdam stated that American diamond buyers regularly visited Amsterdam which was still then a center for the cutting and polishing of rough diamonds. They made large purchases which they then either shipped or carried on their persons to Paris or London where several New York City diamond importers maintained offices. They would sell the diamonds at a profit, some to the NYC importers who then finally shipped the diamonds to the United States.<sup>60</sup> But carbonados which required neither cutting nor polishing were shipped directly to NYC.

In the early 1900s, it was estimated that \$ 4.5 million worth of black diamonds flowed out of the port of Salvador annually.<sup>61</sup> A German source reported that exports of carbonados from Bahia were: in 1904, 573,503 milreis (\$183,521), in 1905 356,784 milreis (\$114,701), and in 1906 992,164 milreis (\$317,492).<sup>62</sup> According to British sources, the *official* value of diamonds and carbons exported from Bahia in 1906 upon which an export tax was levied was only \$321,678, but these official figures represented an underestimate insofar “as it is well-known that most of the diamonds and carbonatos exported from Bahia year by year are smuggled out of the country in order to avoid the five per cent export duty.”



carbonado export figure from Bahia in 1909 at 1 million pounds,<sup>66</sup> and a U.S government publication in 1909 estimated that \$4-4,600,000 worth of black diamonds was shipped annually out of the port of Salvador.<sup>67</sup>



**Figure 1** – Distribution of Earnings in the Black Diamond Chain (green = value staying in Bahia; yellow = value accruing in New York City).

The Figure 1 above computes a gross estimate of the revenues in the black diamond commodity chain for early years of the twentieth century. The chain starts with the miner and lease in the mining area. In 1902, the purchase price of a good quality carbon from a miner was 5 pounds sterling/carats (or \$ 24), of which the miner kept one-fourth (or \$6). In U.S dollar terms, the miner kept \$6 and the claim owner \$18. The Bahia purchaser then shipped the carbon to New York City, London or Paris. The New York City price for a good 2-3 carats carbon stone in 1902 was \$48/carats (which had risen to \$75/carats by 1906).<sup>68</sup> The annual output of Bahia carbons was 2,500 carats/month or 30,000 carats/year. The intermediary traders based in Salvador and the New York City carbon importer collected \$24/carats in 1902 and \$53 in 1906 (yellow shaded area in following graph). Assuming Bahia’s carbon output in 1902 amounted to 30,000 carbons, then some \$720,000 a year remained in



Bahia (if the carbon price were \$75/carat as in 1906 and 1915, then that amount would be over \$1.5 millions). The prominent trade journal, *Machinery* (NYC), reported that the 1915 price of bort was \$15/carat and \$75/carat for carbonados.<sup>69</sup>

A U.S. Government report in 1907 noted that nearly all the diamonds found in Bahia, as well as the carbons, were sent to Paris. Yearly exports had risen steadily during 1890-1902, but then fallen off. In 1902, some 2,500 carats a month (or, 30,000 a year) of carbons was being produced in Bahia.<sup>70</sup> Vice-consul Rowe, noted that the carbonado business

...has been a monopoly in the hands of native firms, who have associated themselves with French and German Jewish firms in Paris and London.<sup>71</sup>

Yearly output of carbons from Brazil was estimated in 1906 at 30,000 carats, all of which went to Paris and thence to Amsterdam, other European cities and New York (about 10,000 carats being taken by New York).<sup>72</sup> Oakenfull presented a rare estimate based upon Brazilian sources of Brazil's diamond exports in 1908-9 (**Table 2**).<sup>73</sup> In value terms, carbons went mostly to the United States and brilliant diamonds to France and Britain:

**Table 2 - Exports of Brazilian Diamonds by Destination, 1908-9 (in %)**

To	Carbons, 1908	Diamonds 1908	Carbons, 1909	Diamonds, 1909	1909, all Diamonds
Britain	17.6	48.4	51.9	32.9	39.1
France	22.2	50.8	27.6	66.5	35.1
USA	60.1	~0	20.5	0.6	13.0
Belgium	-	0.6	-	-	0.1
Germany					12.2
Total	100.0%	100.0%	100.0%	100.0%	100%

**Sources:** Oakenfull (1913): 880 and data for all diamonds exported in 1909 from ports of Bahia and Rio from "Brazil," *Bulletin of the Pan American Union* 31, 1 (July-Dec. 1910): 55.

Attempts by foreign companies to introduce large-scale methods of diamond recovery before 1925 had largely failed, with output still coming chiefly from small-scale hand workings.<sup>74</sup> Most of the attempts were made in the Minas Gerais region. The Boa Vista Diamond Mine Co, Cascalho & Co, and Sopa Diamond Mine Ltd were producing black diamonds.<sup>75</sup> The French company, Companhia da Boa Vista is considered the first attempt to use modern methods to mine diamonds in Brazil.<sup>76</sup> The Boa Vista Co. was established in Paris in 1899, capitalized at 2mn francs then, to engage in diamond mining on claims it had acquired about eight miles from Diamantina. The operation was directed by the Cuban-American engineer, Antonio de Lavendeyra with prior experience working on the Panama Canal.<sup>77</sup> The French firm built a water reservoir on a conglomerate-bearing plateau from which it piped out water needed for washing. It installed a power station whose dynamo was operated by a 500 horsepower Pelton wheel and electrical machinery was imported from the General Electric Co. (NY).<sup>78</sup> Though it used modern electric dredging equipment, it failed as the price of diamonds was too low and the system of utilizing water pumped up from the stream was unsound.<sup>79</sup> Companhia da Boa Vista left the region prior to 1907.<sup>80</sup> In 1911, British capital involving base metals tycoon (e.g., Rhodesian copper and chrome), financier called at the time “the Napoleon of finance”, promoter, major investor abroad with holdings spanning the globe, Sir Edmund Gabriel Davis<sup>81</sup> was involved financially and served as chairman of the Sopa Diamond Co. The enterprise worked a mine in the small village of Sopa, some 15 kilometers from the famed diamond mining town of Diamantina. Sir Davis was a prominent capitalist promoter involved in Africa with ties to another prominent Jewish mining pioneer, Sir Ernest Oppenheimer of the De Beers diamond cartel.<sup>82</sup> They cooperated in mining activities in West and South African, Angolan and Congolese diamonds. Due to an inability to produce a profit, the Sopa Company was liquidated in October 1915.<sup>83</sup> The company had spent 250,000 pounds trying to introduce mechanized mining. It failed and the expensive machinery was sold in 1915 at a great loss. Later, British interests provided \$1,000,000 to further modernize methods in the Boa Vista mine (sometime during 1900-1915) and French

money was invested in Sopa.<sup>84</sup> But by 1922 Boa Vista Diamond Mine Co. and Sopa were both owned primarily by Brazilian capital.<sup>85</sup> The British controlled the Cascalho Syndicate,<sup>86</sup> whose purpose appeared to have been mechanized dredging for diamonds.<sup>87</sup> In 1922, *three mines (not companies)*, Boa Vista, Cascalho and Sopa, were under negotiation for purchase by American capital, but it does not appear these efforts were successful.<sup>88</sup>

At the turn of the century, a German publication noted the following enterprises involved in exploring and/or extracting diamonds in Minas Gerais: the Companhia Boa Vista with French, Belgian and Brazilian capital operating fifteen kilometers from the township of Diamantina and using electrical machinery; Victor Nothman & Co mining the Rio Abaete; the Agua Suja Mining Co with British and German capital in the amount of 210,000 pounds operating in the Bagagem region; the Brazilian Diamond and Gold Explorations Company Ltd (London) established in 1902 with a capital of 225,000 pounds; and the Brazilian Diamond, Gold and Developing Company (Chicago) with American capital. The German Jewish businessman of Sao Paulo (with interests in a brewery and luxury-class housing development in Sao Paulo), Victor Nothman, had obtained the diamond concession on the Rio Abaete in 1903. The Abaete region had been heavily worked during 1785-1807.<sup>89</sup>

In Bahia, a little machinery was in use in 1906, consisting of a few pumps, a gravel sorter and a so-called automatic separator at the Salobro mines. Miguel de Teive e Argollo had brought in some electrical equipment around 1898 for diamond mining in Andarahy. The only other machinery consisted of a few pumps operated by an English company on the Sao Jose do Paraguassu River.<sup>90</sup> In 1902, the Brazilian Diamond Field Corporation Ltd had been formed to explore for diamonds in Bahia. A British syndicate bought lands where the large Sergio carbon diamond had been found in 1895. The venture was called the S. Jose Diamond and Carbon C. Ltd and it was managed by a British engineer, Jayme Thomas Richards.<sup>91</sup> Peireira reported in 1905-7 that two foreign companies were exploring for carbons in the riverbed of the Paraguassu employing modern machinery.<sup>92</sup> But, the American consul in Rio, George Anderson

was warning potential investors in the United States in 1906, that ignorant promoters were attempting to sell stocks in gold and diamond mining companies in Brazil.<sup>93</sup> Around 1909, a very large riverboat dredge was operating.<sup>94</sup> The French Sao Jose [Brazil] Diamonds and Carbons Ltd. was formed in 1903, chaired by the Frenchman Arthur Lodin, to acquire nine concessions from the Anglo-Brazilian Diamond Syndicate, around the Sao Jose River (near Lençóis) in Bahia and lease lands elsewhere for one half a million dollars.<sup>95</sup> A hydroelectric unit was built, but in 1911 the company was liquidated. Subsequently, two Brazilian companies - the old Boa Vista firm and the Sopa enterprise - operated in the area with some success. In 1910, the Paris-based firm of M. Ulmann e Cia, located in the Lower City at rua das Princesas 12, capitalized at 1 mn French francs, was registered by the Ulmann interests with the Junta Comercial to deal in diamonds, carbonados and rare stones.<sup>96</sup>

## **The Great War and entry of American monopoly capital**

For the last two decades of the nineteenth century, Bahia's black diamond exports to the United States were in the hands of the Simon Dessau enterprise. Dessau was a German Jewish immigrant born in St. Louis in 1852 who arrived in New York in 1870, going to work for a diamond dealer.<sup>97</sup> He soon started his own importing enterprise specializing in industrial diamonds (carbonado and bort). Dessau had secured a contract with the Brazilian government in the late 1870's which covered the entire output of South America's largest carbon mines located in Bahia.<sup>98</sup> He earned the label, "Carbon King." His specialty was selling imported black diamonds for use in drilling, making diamond tools, though he also dealt in borts and even in white diamonds. An advertisement in 1880 by the Dessau Co (NYC) promoted its black diamonds for cutting cemetery millstones, grinding stones of emery as well as use in diamond lathe tools. In 1884, the largest diamond ever cut in the United States was purchased by Simon Dessau. The stone had been mined in South Africa in 1873 and immediately acquired by the London De Beers syndicate.<sup>99</sup> Eleven years later, the syndicate sold the stone to Dessau. It weighed

78 carats uncut. Mr. Dessau cut the stone into 128 facets and showed it at the 1884 New Orleans Exposition. Shortly afterwards it was bought by the British actress, Miene Schönberg Marx (alias Minnie Palmer) of Marx Brothers' fame, for \$40,000.<sup>100</sup> The stone came to be known as the "Cleveland Gem" after the U.S. President. After twenty years in the diamond business, in 1894 the Simon Dessau enterprise came upon hard times even though Mr. Dessau was reputedly worth \$350,000 in 1893 dollars (or \$8.6 million in 2009). Dessau had diversified into iron mining in Michigan and held large blocks of New York City real estate on Broadway etc. Dessau was well-known in New York City high society where he entertained and attended horse racing (in which he admitted he had lost hundreds and thousands of dollars betting). After some years of lean times, the Dessau firm revived under the leadership of Maurice S. Dessau with a focus upon diamond tools and was active in the New York carbons trade during the 1920's.<sup>101</sup>

Brazil had a near monopoly on the world's supply of the black (industrial) diamond, with the United States being its largest buyer. Black diamonds<sup>102</sup>, which were used entirely for industrial pursuits, e.g., diamond drills, were found in La Chapada and the Lavras districts of Bahia.<sup>103</sup> Up until World War I, the English diamond merchants (De Beers syndicate) controlled the world market for these stone. Around 1900, an American firm owned by the Austrian Jewish Bandlerers set up a buying branch in New York City and twenty years later established a large mining enterprise in Bahia.<sup>104</sup>

The First World War severed connections between the diamond fields of Bahia and Europe. During the war and after, American firms sent agents to Bahia to explore purchasing diamonds.<sup>105</sup> Bahia exported 11,803 carats of rough gemstone diamonds and 3,714 carats of carbonados to the United States in 1915. Most of these diamonds were ½ carat or less and the average price at which they were invoiced at the Bahia U.S. consulate was \$18 per carat for a gemstone and \$32 for carbonados.<sup>106</sup> The Diamond Drill Carbon Co. (set up in New York City in 1888) was importing Brazilian carbons using the Brazilian Lloyd steamship service. During 1913-18, the annual value of uncut diamonds imported into the

United States remained in the \$12-14 million range with Britain being the major supplier (70% - 87%)<sup>107</sup>; but Brazil's share rose from a paltry @20,000 in 1913 to \$1,194,000 in 1918.<sup>108</sup> U.S. diamond imports from Brazil increased five-fold during the war and amounted to 85% of Brazil's mine output.<sup>109</sup> About two-thirds of the imported diamonds came in rough form to NYC, which propelled the city to overtake Amsterdam and Antwerp as cutting centers.

In 1919, over 50% of all diamonds and carbons exported from Bahia went to the United States, 40% to England and the remainder to the Netherlands.<sup>110</sup> Official export values of Bahian carbonados were put at 2,423 contos (\$329,528) in 1919; 3,017 contos (\$410,312) in 1920; and 2,616 contos in 1921 (\$355,776).<sup>111</sup> Diamond exports including brilliant and black stones from Bahia in 1920 as recorded by the Salvador custom house however totaled \$1,360,571 of which about 65% went to the United States.<sup>112</sup> In 1927, Bahia exported 24,578 carats of black diamonds valued at over \$1.5 million.<sup>113</sup> In 1928, a troy ounce of gold was worth \$20.67, a troy ounce of platinum was \$70, and a troy ounce of black diamonds brought from \$3,800 to \$22,275.<sup>114</sup> Bandler reported in 1928 that the best grade of black diamonds was bringing \$165 a carat.<sup>115</sup>

During the 1920's, Bahia's black diamond trade fell into the hands of the Bandlers, an Austrian-Jewish family which had immigrated to New York City in the 1870's. In 1924, Arthur Bandler (1873 - 1932) of New York showed up in Bahia, pockets full of cash and determined to break European control of the world trade in black diamonds.<sup>116</sup> The Bahia Corporation, a holding company, had been formed by the Austrian Jewish Bandler family in June 1927, with an issuance of 60'000 shares of \$25 each as a holding company for Bernard Bandler & Sons Inc. (a New York City dealer of black diamonds founded by Bernard Bandler (1844 - 1919, the father of Arthur S. Bandler) and the Cia. Brasileira de Exploracao Diamantina.<sup>117</sup> This move was part of a larger-scale entry of American capital into Bahia during the interwar years.<sup>118</sup> His firm - Bahia Corp. - secured a virtual monopoly on the black diamond fields of Bahia, having in 1927

... obtained a thirty-year concession from the Bahia Government, transported mining equipment by burro and canoe, built a hospital, school, and modern road, engaged 1,400 natives. ...<sup>119</sup>

Bandler's firm owned and operated mine properties in Piranhas district of Andaraí, Bahia under a 30 year concession [1927-57], valued in engineers' reports at \$50,000,000.<sup>120</sup> His company held 14 1/2 square miles of proven territory along the Paraguassu River.<sup>121</sup> Bandler hired the experienced American mining engineer, A.D. Hughes to serve as general operations manager in Bahia. He also employed two other mining engineers, Alexander P. Roger of New York City, and in Bahia, Maximo Macambira Monte-Flores who had extensive experience in the geology of Bahia. Heavy equipment was shipped over including slack line cableways, a trammel, concentrating tables, Worthington pumps, a steam boiler, a Westinghouse turbo-generator, and Allis-Chalmers' ball mills.<sup>122</sup> The Bahia mining operation employed 1,400 workers.

In 1930, Bahia's black diamonds were being used to bore for iron in the Mesabi Range, in exploration work for the Chicago subway system, to test drill at the Hoover dam, exploring for copper in Russia's Ural Mountains, and in Nevada gold prospecting.<sup>123</sup> Bahia supplied almost all of the world's black or industrial diamonds used in industrial grinding, cutting and polishing.<sup>124</sup> The largest US consumer of industrial diamonds, about 30% of the demand, was the auto industry because of the extensive use of emery wheels in the production process. Emery was used to finish and smooth the auto bodies along with other tasks.<sup>125</sup> Eight cents worth of diamonds were used to produce the average auto. Aside from 20% being used for drilling, another 20% were used in drawing copper wire; 20% for the production of billiard balls, telephones, and pens; and a few diamonds were used in high-pressure furnaces.<sup>126</sup> Bandler's customers read like a Who's Who of the American mining industry. Bandler had earned the title, "the King of the Black Diamonds."<sup>127</sup>

Bandler was not without competitors in the New York market of imported carbons. Competition came from the Jewish firms of J. Baszanger & Co, S. Dessau's Sons of Simon Dessau and the Dessau Diamond Tool Co., Theodore Lexow, and Henry Demmert & Company (of Henry Demmert who originally worked for S. Dessau), I.C. Yawger all of whom operated out of New York importing black diamonds.<sup>128</sup> Demmert later became a director of Lexow's company along with running his own.<sup>129</sup> The Baszanger enterprise owned by the Amsterdam Jew, Jacques Baszanger (born in Amsterdam, 1870, who then moved to Paris to become a diamond merchant), bought the famous Sergio black diamond weighing 3,078 carats (or ~630 grams) from Bahia and had it broken up into pieces used for diamond drills. Baszanger maintained offices in the world's three largest diamond centers: London, New York and Paris. It appears all, except Bandler after his Bahia purchase, only engaged in the selling of the imported stones in a wholesale fashion.

In 1928, the US market for carbonados was strong enough that despite the Bandler mining operation in Bahia being not yet in full operation, the company's retail branch in New York City generated sufficient cash flow to pay dividends on Bahia Corporation's equity.<sup>130</sup> Although Bandler's concession gave him a virtual monopoly on the black diamond fields of Bahia, shares of Bahia Corporation were delisted on September 1<sup>st</sup> of 1931.<sup>131</sup> Bahia Corporation's stock price fell as low as \$1.33 in 1931, and the price when it was delisted was \$3.50. Bandler suggested enigmatically in the *New York Times* a day later that it was "Western concern" involved in the sale of Bahia's stock that caused it to be delisted.<sup>132</sup> Bahia Corporation was not mentioned again in the *New York Times* until the death of Arthur Bandler in 1932.<sup>133</sup> Bandler's operations on the Paraguassu continued into 1933.<sup>134</sup> Thereafter, carbonados were still mined in the Piranhas region but not in any organized manner. Nonetheless, output was significant, e.g. in 1941, Brazil exported 330,000 carats of diamonds of which 70% were industrial ones.<sup>135</sup>

By 1934, the high price of black diamonds had pushed drillers to experiment with cheaper diamonds and other substitutes.<sup>136</sup> As late



as 1921, the only other country with any known carbon deposits of consequence was Borneo.<sup>137</sup> Black diamonds were also discovered in North Carolina, but not in a significant quantity.<sup>138</sup> Metallic competitors became available and challenged the drilling dominance of black diamonds. For instance, already in 1921 tungsten carbide was thought to be able to "...replace the diamond entirely for all industrial purposes where the variety of this precious stone, known as bort, is used."<sup>139</sup> In the early 1930's, a scientist at Columbia University had artificially created diamonds using the new electrical furnace and the tremendous pressure it allowed. These factors led to the demise of Bandler and others in the pre-WW II years.

The production of carbonados in Brazil approximated the exports of the state of Bahia as it was the only producing zone in Brazil. The increased role of Rio after 1937 was no doubt due to the Axis powers – Germany and Italy – smuggling such strategic valuable industrial inputs out on the Italian LATI airline's bi-monthly flights beginning in December 1939 (-December 1941) serving Rio from Rome.<sup>140</sup> Fiction has it that by 1943, the Axis powers had worn out the smuggled Brazilian industrial diamonds and were converting diamond gemstones into tool parts.<sup>141</sup> Germany continued to receive, courtesy of De Beers, industrial diamonds from its Forminier mine (Belgian Congo) smuggled via Tangier and Cairo in Belgian Red Cross parcels to Switzerland and then on into German-occupied Belgium.<sup>142</sup> Wartime leads to a surge in use of industrial diamonds in steel industries.<sup>143</sup>

U.S consumption of black diamonds increased dramatically during the Second World War spurred by the demand for metal-cutting with imports nearly quadrupling from 3,568,730 carats in 1939 to 12,172,679 carats in 1943. Over 90% of industrial diamond consumption in 1944 went to grinding wheels and drilling applications.<sup>144</sup> In 1942, the output of diamond tools in the United States required more than a ton of industrial diamonds, equal to the cost of several battleships.<sup>145</sup>

## Conclusion

This research complements a small body of existing literature which examines commodities in Bahia as complex chains of interfaces: Bert Barickman's classic study explored sugar, tobacco, cassava and slavery in the Bahian Reconcavo during 1760-1860; Jane Collins examination of the more recent grape commodity chain; and Mary Ann Mahoney analyzed the global and local factors in the emergence of Bahia's cacao export sector. I have assessed the sugar machinery chain in the context of Bahia's sugar crisis (1875-1914).<sup>146</sup> But, the *diamond trade of Bahia* has been largely ignored in the academic literature especially when compared to the extensive writings devoted to tobacco, cocoa, coffee and sugar in the Bahian economy.<sup>147</sup> Only recently has commodity chain analysis been applied to diamonds, in relation to African "resource wars."<sup>148</sup>

The emergence of a new engineering technology (the Leschot rock drill) had powerful feedback effects upon Bahia's diamond industry at precisely the time when its traditional white diamond exports were dwindling. Carbonados (black diamonds) gave Bahia's diamond industry another half-century of life. At the base of the wealth pyramid, the garimpero toiled – diving in rivers, panning in streams, cracking mountainside walls with rudimentary hand tools, living a hard life whose fate was determined by the lottery of stones.<sup>149</sup> European capital could not establish a long-term successful diamond-mining venture in Minas, and later American capital could not operate a flourishing source of black diamonds in Bahia. Contrary to assertions in much of dependency theorizing, one-half to two-thirds of the market value of the carbonado commodity chain remained in Bahia. The locally-retained value of the diamond commodity chain was far greater than has generally been assumed or proclaimed,<sup>150</sup> which is not to say that the monetary surpluses were productively employed. Vilmar Faria attributed Salvador's spasms of industrialization to the availability of local resources, which I argue was less the issue than how the available local resources were employed, i.e.

to further capital accumulation or to sustain a consumption boom.<sup>151</sup> A half century ago, economists like Paul Baran and Celso Furtado had emphasized that the form of utilization of a country's economic surplus was key to understanding development.<sup>152</sup> In Bahia, the surplus was spent on lavish consumption and real estate. Lastly, the study uncovers and demonstrates another example of the role of Jewish traders in the international commerce of Brazil during the late nineteenth-century, or in commodity chains<sup>153</sup>: the Jewish diamond merchants of Bahia paralleled the strong presence of Jewish traders in the Amazon rubber export boom and the Jewish traffickers of Polish-Jewish prostitutes (*polacas*) from Europe to South America during 1867-1939.<sup>154</sup>

## Notes

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- <sup>1</sup> Robert William Dunn, *American Foreign Investments* (New York: The Viking Press, 1926): 4. The result was a huge inflow during 1913-1929 of U.S. investments into government, state and municipal bonds, mining (manganese), meat packing, public utilities, banking, and all types of manufacturing (like cars, radios, Victor talking machines, etc.). The U.S share of total foreign private direct investment in Brazil went from 4.2% in 1914 to 13.9% in 1930, whereas that of Britain declined from 50.8% to 42.1% and France's share fell from 32.6% to 9.9% (Derived from Eric N. Baklanoff, "External Factors in the Economic Development of Brazil's Heartland: The Center-South, 1850-1930," in Baklanoff (ed), *The Shaping of Modern Brazil* (Baton Rouge: Louisiana State University Press, 1969): 26-29).
  - <sup>2</sup> in his "Tracos da Historia Economica da Bahia no Ultimo Seculo e Meio," *Revista de Economia e Finances* 4, 4 (1952) reprinted in <http://www.revistas.unifacs.br/index.php/rde/article/view/1056/834> and Katia M. de Queiros Mattoso, *Bahia: A Cidade do Salvador e Seu Mercado no Seculo XIX* (Salvador: Editora Hucitec Ltda., 1978): 241
  - <sup>3</sup> Noelio Dantasle Spinola, *A Trilha Perdida Caminhos e Descaminhos do Desenvolvimento Baiano no Seculo XX* (Salvador: UNIFACS, 2009): 57
  - <sup>4</sup> Carneiro (1908), op. cit.: 26 and "On Diamonds," *New York Times* (July 19, 1867): 2
  - <sup>5</sup> From *Westerman's Jahrbuch der Illustrierten Deutschen Monatshefte: Band 16* (Braunschweig: Druck und Verlag George Westerman, 1864): 511
  - <sup>6</sup> Max Bauer, *Precious Stones* (New York: Dover Publications Inc. originally published in 1904, 1968): 179
  - <sup>7</sup> A rare early text examining black diamonds in Bahia is Antonio Joaquim de Souza Carneiro, *Riquezas Mineræas do Estado da Bahia* (Bahia: Litho-Typ Encadernacao Reis & C., 1908). A valuable account of the diamond region around Lençóis has been provided Nadir Ganem, *Lençóis de Outras Eras II* (Brasília: Thesaurues, 2001), 140 pp., and also Walfrido Moraes, *Jaguncos e Herois: A Civilizacao do Diamante nas Lavras da Bahia* (Rio de Janeiro: Editora Civilizacao Brasileira, S.A., 1963), 212 pp.

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- <sup>8</sup> Alfred des Cloizeau, *Manuel de Mineralogie, Volume II* (Paris: Vve. Ch. Dunod Editeur, 1893): 22
- <sup>9</sup> "Recorded Occurrences of Carbonado," *The American Mineralogist* Vol. 33 (1948): 252
- <sup>10</sup> diamond measurements are an eighth = 17.5 carats = 70 grains (one carat = 4 grains); 1 gram = 4.88 carats
- <sup>11</sup> Moraes, op.cit.: 19
- <sup>12</sup> H.W. Furniss, "Diamonds and Carbons in Brazil," *Popular Science Monthly* vol. 69 (July-December 1906): 273
- <sup>13</sup> Furniss, op. cit.: 273
- <sup>14</sup> "Brazil's Black Diamond Traffic," *New York Times* (February 9, 1908): SM9 and especially A.P.W. Betim, "Considerations sur les gisements de diamants du Bresil," *Bulletin de la Societe Francaise de Mineralogie* 52 (1929): 51-55.
- <sup>15</sup> J.P.W. Rowe, "Carbonado," in in Walter Renton Ingalls (ed), *The Mineral Industry Its Statistics, Technology and Trade during 1907* (New York: Hill Publishing Company, 1908): 146.
- <sup>16</sup> Explored in Maria Cristina Dantas Pina, "*Santa Isabel do Paraguassu: Cidade, Garimpo e Escravidao nas Lavras Diamantinas, Seculo XIX*" (Bahia: mestrado em historia, faculdade de filosofia e ciencias humanas, Universidade Federal da Bahia, April 2000), 122 pp. at [http://www.ppgh.ufba.br/IMG/pdf/Santa\\_Isabel\\_do\\_Paraguassu.pdf](http://www.ppgh.ufba.br/IMG/pdf/Santa_Isabel_do_Paraguassu.pdf)
- <sup>17</sup> Albert F. Calvert, "The Bahia Diamond Fields," in his *Mineral Resources of Minas Geraes (Brazil)* (London: E. & F.N. Spon Ltd., 1915): 81
- <sup>18</sup> An excellent social history providing rich detail of this era is Nadir Ganem, *Lençois de Outras Eras, II* (Brasilia: Thesaurus Editora, 2001) who mentions slave labor used in Bahia diamond placer mining.
- <sup>19</sup> The most authoritative report on diamonds in Bahia at the time was written by H.W. Furniss, U.S. Consul in Bahia, and reproduced in *The Jewelers' Circular Weekly* issues of August 27, 1902, September 3, 1902, and September 10, 1902.
- <sup>20</sup> Further details provided in Maria Cristina Dantas Pino, "Os Negros do Diamante": Escravidao no Sertao das Lavras Diamantinas – Seculo XIX," *Politeia – Historia e Sociedade (Victoria da Conquista)* 1, 1 (2001): 179-200 at [http://www.uesb.br/POLITEIA/v1/artigo\\_09.pdf](http://www.uesb.br/POLITEIA/v1/artigo_09.pdf) and the case of Santa Isabel do Paraguassu is explored in Maria Cristina Dantas Pina, "Santa Isabel do Paraguassu: Cidade, Garimpo e Escravidao nas Lavras Diamantinas" (Bahia: mestrado em historia, Faculdade de Filosofia e Ciencias Humanas, Universidade Federal da Bahia, April 2000), 108 pp + annexes at [http://www.ppgh.ufba.br/IMG/pdf/Santa\\_Isabel\\_do\\_Paraguassu.pdf](http://www.ppgh.ufba.br/IMG/pdf/Santa_Isabel_do_Paraguassu.pdf)
- <sup>21</sup> "Diamond Washing and Cutting," *The Eclectic Magazine of Foreign Literature, Science, and Art* 40, 1 (January 1857): 139
- <sup>22</sup> Richard P. Rothwell, "Gems and Precious Stones," in his *The Mineral Industry, Its Statistics, Technology and Trade, in the United States and Other Countries to the End of 1898* (New York and London; The Scientific Publishing Company, 1898): 276
- <sup>23</sup> "Carbon Industry of Brazil Interesting Report from Consul Furniss Regarding the Carbon Fields of Bahia," *The Jewelers' Circular* (October 26, 1898): 7
- <sup>24</sup> taken from the semi-monthly journal published in Denver, "Brazilian Carbon Shipments," *Ores and Metals* (June 20, 1907): 237
- <sup>25</sup> "Diamond Mining in Brazil," *The Jewelers' Circular* 38, 16 (May 17, 1899): 15
- <sup>26</sup> The above is taken from "Boring with Diamond Drill," op. cit.: 38

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- <sup>27</sup> The history of these applications is examined in Samuel Tolansky, *The History and Use of the Diamond* (London: Methuen, 1962), 166 pp. See also Douglas T. Hamilton, "Grinding Wheel Truing Devices," *Machinery* Vol. 22 (November 1915): 220-228
- <sup>28</sup> Samuel T. Pees, "Inventor and History," in his *Oil History* (no date) at <http://www.petroleumhistory.org/OilHistory/pages/Diamond/inventor.html>
- <sup>29</sup> from Karl E. Spear and John P. Dismuke (eds), *Synthetic Diamonds: Emerging CVD Science and Technology* (New York: John Wiley & Sons Inc., 1994): 509
- <sup>30</sup> "Brazilian Diamonds and Carbons," *The Engineering and Mining Journal* Vol. 33 (March 11, 1882): 132
- <sup>31</sup> "Brazilian Diamonds and Carbons," op. cit.: 132
- <sup>32</sup> In 1869, a Leschot diamond drill was shipped to the United States for use in a marble quarry in Vermont.
- <sup>33</sup> "Boring with Diamond Drill," in *International Library of Technology* (Scranton: International Textbook Company, 1907): 47
- <sup>34</sup> M. Jacobs and N. Chatrian, "Sur la taille du diamante et l'emploi industriel du carbonado," *Bulletin Hebdomadaire de l'Association Scientifique de France* 8, 204-205 (24 fevrier – 2 mars 1884): 337-342
- <sup>35</sup> "Diamonds Help in Building Bridges and Skyscrapers," *New York Times* (December 24, 1924): XX2
- <sup>36</sup> Above data collected from "Carbons (Black Diamonds) for Diamond Drills," *Mining Science* (October 21, 1909): 366
- <sup>37</sup> Mantell presents data on retail prices of carbonado per carat for 1879-1926 (in C.L. Mantell, *Industrial Carbon* (New York: D. Van Nostrand Co. Inc., 1928): 15).
- <sup>38</sup> Wallis Richard Cattelle, *The Diamond* (London and New York: John Lane, 1911): 204
- <sup>39</sup> Julio Guedes, "O carbonato, historico e decadencia do seo comercio," *Revista da Bahia* 1, 5 (March 1936): 107
- <sup>40</sup> Darcy P. Svisero, "Distribution and Origin of Diamonds in Brazil: An Overview," *Journal of Geodynamics* 20, 4 (1955): 499
- <sup>41</sup> From *Mining and Scientific Press* vol. 105 (August 12, 1912): 272
- <sup>42</sup> A.J., de Souza Carneiro, *Riquezas Mineræes do Estado da Bahia* (Salvador: Lintho-Typ. E. Encaderacao Reis & C., 1908): 26-27.
- <sup>43</sup> see "Coroneis de Pedra," *Correio da Bahia* (December 22, 2004), at <http://www.correiodabahia.com.br/2004/12/22/noticia.asp?link=not000103073.xml>
- <sup>44</sup> Theodoro Sampaio, *O Rio Sao Francisco e a Chapada Diamantina* (Salvador: Livraria Progresso Editora, 1955)
- <sup>45</sup> J.M. Catarino, *Garimpo-Garimpeiro-Garimpagem, Chapada Diamantina, Bahia* (Rio de Janeiro: Philobiblion/Banco Economico, 1986): 270
- <sup>46</sup> *American Journal of Science* Vol. 16 (November 1903): 399
- <sup>47</sup> Aguiar, op. cit.: 30
- <sup>48</sup> "Diamonds and Carbons in Bahia," 1902: 11-12
- <sup>49</sup> *Mines and Minerals*, op. cit.: 129
- <sup>50</sup> "Diamonds and Carbon in Bahia," *Jewelers' Circular – Weekly* (September 10, 1902): 11
- <sup>51</sup> Herbert Johnson, "Was Your Diamond Cut in This Country?" *Illustrated World* 31, 1 (March 1919): 39

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- <sup>52</sup> In his classic study, Werner Sombart, *The Jews and Modern Capitalism*, translated by M. Epstein (New York: E.P. Dutton & Company, 1913): 25. The role of Jews in the world diamond industry is examined in Edward Jay Epstein, "The Jewish Connection," in his *The Rise and Fall of Diamonds. The Shattering of a Brilliant Illusion* (New York: Simon and Shuster, 1982): 76-87 and in Salo Wittmayer, Arcadius Kahan and Nachum Gross, *Economic History of the Jews* (New York: Schocken Books, 1975), especially chapter 3, "Diamond Trade and Industry."
- <sup>53</sup> Mentioned in "Mines and Minerals The World's Output, Brazil," *Monthly Consular and Trade Reports* No. 329 (February 1908): 127
- <sup>54</sup> These latter two maintained offices on Salvador's rua Conselheiro Dantas at the turn of the century ("Production of Carbons," *Monthly Bulletin of the American Republics* Vol. 6 (1898): 788). Others are cited in Paul Serre, "Au Pays du Carbone Amorphe," *Bulletin du Museum Nationale d'Histoire Naturelle* (Paris: Imprimerie Nationale, 1913): 136
- <sup>55</sup> "Bahia Handelsbericht des Kaiserliches Konsulats fur das Jahr 1902," *Deutsches Handels-Archiv. Zeitschrift fur Handel und Gewerbe, Zweiter Teil Jahrgang 1904* (Berlin: Verlag von Ernst Siegfried Mittler und Sohn, 1904): 63, and in "Das Geschäft mit Diamanten im Staate Bahia," *Berichte über Handel und Industrie Siebenter Band* (Berlin: Karl Hermanns Verlag, 1905): 693. The Portuguese Machado family's patriarch in Bahia was the prominent merchant, Manoel Jose Machado, in the early to middle nineteenth century. The Machados became involved in commerce, diamond trading, estaleiros, textiles and sugar. Coronel Joao Baptista Machado joined Alvarao Catharino in founding the Usina Cinco Rios which operated during 1912-30 when it was closed down and sold. Joao Baptista also shared ownership in textile factories with the prominent Bernardo Martins Catharino family: as in the two textile factories in the Largo de Papagaio neighborhood of Salvador.
- <sup>56</sup> Francisco Antonio Zorzo, "A Movimento de Trafego da Empresa da Estrada de Ferro Central da Bahia e Seu Impacto Commercial," *Sitienibus* (Feira de Santana) no. 26 (jan/jun. 2002): 63-77
- <sup>57</sup> V. A. Milashev, *Kimberlity Glubinnaia Geologiia* (Leningrad: Nedra, 1990), 166 pp.
- <sup>58</sup> According to U.S. Consul Prindle in Bahia, "Bahia," *Report upon the Commercial Relations of the United States with Foreign Countries for the Years 1880 and 1881* (Washington D.C.: Government Printing Office, 1863): 625
- <sup>59</sup> I have added New York City. George Kunz, "Geography of Precious Stones," *Journal of the Franklin Institute* Vol. 145 (January 1898): 32
- <sup>60</sup> D. Eckstein, U.S Consul in Amsterdam, "Report by Consul Eckstein on the Trade and Commerce in Amsterdam in 1884," in *Reports from the Consuls of the United States on the Commerce, Manufactures, Etc., of Their Districts* Vol. 18, No. 60 (January 1886): 107
- <sup>61</sup> Diamonds and Their Bearing (1909): 240, including a photo on p. 254 of Black women cutting diamonds.
- <sup>62</sup> From Eduard Johann Karl Dettman, "Diamanten und Edelsteine," in his *Brasiliens Aufschwung in Deutscher Beleuchtung* (Berlin: Hermann Paetel, 1908): 161
- <sup>63</sup> Mentioned in "Mines and Minerals The World's Output, Brazil," *Monthly Consular and Trade Reports* No. 329 (February 1908): 127
- <sup>64</sup> "Mines and Minerals," op cit.: 127
- <sup>65</sup> "Diamonds and Their Bearing," op. cit.: 252
- <sup>66</sup> "Brazilian Diamond Industry," *The Times* (December 28, 1909): 58

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- <sup>67</sup> "Diamonds and Their Bearing upon the Future of Brazil," *Bulletin of the International Bureau of the American Republics* (February 1909): 240
- <sup>68</sup> from Halbert Fowle Gillette, *Handbook of Rock Excavation Methods and Cost* (New York: Clark Book Company Inc., 1916): 329 but also in Mantell, op. cit.: 15.
- <sup>69</sup> Douglas T. Hamilton, "Grinding Wheel Truing Devices," *Machinery* Vol. 22 (November 1915): 221
- <sup>70</sup> "Diamonds and Carbons in Bahia," *The Jewelers' Circular Newsletter* (September 10, 1902): 11
- <sup>71</sup> J.P.W. Rowe, "Carbonados," in Walter Renton Ingalls (ed), *The Mineral Industry Its Statistics, Technology and Trade during 1907* (New York: Hill Publishing Company, 1908):146. Serre (1913: 134) noted that carbon diamond markets were located in Paris and London.
- <sup>72</sup> U.S. Department of the Interior, *Mineral Resources of the United States. Calendar Year 1906* (Washington D.C.: Government Printing Office, 1907): 1222 and especially Goncalo de Athayde de Pereira, "Memoria Historica e Descritiva de Sao Joao do Paraguassu," *Revista do Instituto Geographico e Historico da Bahia* 9, 30 (1904): 132
- <sup>73</sup> J.C. Oakenfull, *Brazil in 1912* (London: Robert Atkinson (London) Limited, 1913): 880
- <sup>74</sup> H. Foster Bain and T.H. Read. *Ores and Industry in South America* (New York: Council on Foreign Relations and Harper & Row, (1934): 111
- <sup>75</sup> George H. Kanz, "Brazi," *The Mineral Industry*. Vol. 30 (1922): 595
- <sup>76</sup> C, P. Bryan "Diamond and Gold Mining in Minas Geraes." *Monthly Consular and Trade Reports* Vol. 60 (1899): 542.
- <sup>77</sup> It is described in "Diamond Mining in Brazil," op. cit.: 15
- <sup>78</sup> "Diamond and gold Mining in Minas Geraes," *Consular Reports. Commerce, Manufactures, Etc.* Vol. LX (Washington D.C.: Government Printing Office, 1899): 541-42
- <sup>79</sup> "Diamonds and Their Bearing upon the Future of Brazil," *Bulletin of the International Bureau of the American Republics* 27, 2 [February 1909]: 252.
- <sup>80</sup> Douglas B. Sterrett, "Precious Stones: Brazil," *Mineral Resources of the United States*. The Department of the Interior (1907): 1221.
- <sup>81</sup> Richard Peter Treadwell, Davenport-Hine and Judy Slinn, *Glaxo: A History to 1962* (Cambridge: Cambridge University Press, 1992): 14.
- <sup>82</sup> M. Avrum Ehrlich, *Encyclopedia of the Jewish Diaspora: Origins, Experiences and Culture* (Santa Barbara and London: ABC-CLIO LLC, 2009): 517
- <sup>83</sup> Thomas Arthur Rickard. *The Mining Magazine* Vol 10 (1914): 398 and *The London Gazette* (October 8, 1915)
- <sup>84</sup> Benjamin LeRoy Miller and Joseph Theophilus Singewald. *The Mineral Deposits of South America* (New York: The McGraw-Hill Book Company Inc. ,1919): 208-10
- <sup>85</sup> With Boa Vista having a 20% British investment, *ibid.*
- <sup>86</sup> Miller and Singewald, op. cit.: 208-10
- <sup>87</sup> E. A. Foster. "Cascalho Syndicate Limited." *The Times* (April 27, 1920): 25
- <sup>88</sup> Kanz, op. cit.: 595
- <sup>89</sup> Julio Pompeu, *Vier Staaten Brasiliens* (Rio de Janeiro: Typographia Leuzinger, 1910): 24
- <sup>90</sup> Furniss (1906), op. cit.: 280

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- <sup>91</sup> Goncalo de Athayde Pereira, *Memoria historica e descriptiva do Municipio does Lencoes (Lavras Diamantinas)* (Salvador: Oficinas da Empresa' A Bahia,' 1910): 20 and Goncalo de Athayde Pereira, *Memoria historica e descriptiva de Sao Joao do Paraguassu* (Salvador: Litho-typ e encadernacao Reis & C, 1907): 24
- <sup>92</sup> Pereira (1907), op. cit.: 29-30 and Goncalo de Athayde Pereira, "Memoria Historica e Descriptiva do Municipio do S. Joao do Paraguassu," *Revista do Instituto Geographico e Historico da Bahia* 12, 31 (1905): 140
- <sup>93</sup> "Consul Warns Investors of Brazilian Mines," *New York Times* (July 16, 1906): 4.
- <sup>94</sup> photo in "Diamonds and Their Bearing Upon the Future of Brazil," op. cit.: 253
- <sup>95</sup> Wileman, J.P., *The Brazilian Year Book second issue – 1909* (Rio de Janeiro and London: Messrs. McCorquodale & Co. Ltd., 1909)
- <sup>96</sup> Owned by Mathias Ulmann, Charles Ulmann, and Isidore Ulmann (from CPE, *A Insercao da Bahia na Evolucao Nacional 2a Etapa: 1890-1930* (1980): 75. The Ulmann firm is listed in J.C. Oakenfull, *Brazil in 1911* (London: Butler & Tanner, 1912): 878.
- <sup>97</sup> Daniel E. Russell, "The Cleveland Diamond: Mugwumps, Madness, Marital Mayhem and Mystery," *Mindat.org* (November 20, 2008 last updated) at <http://www.mindat.org/article.php/465/The+Mystery+of+the+Cleveland+Diamond>
- <sup>98</sup> "Failure of the 'Carbon King'," *New York Times* (February 6, 1894): 12
- <sup>99</sup> "The Cleveland Gem The Largest Ever Cut in the Country," *New York Times* (November 23, 1884): 3
- <sup>100</sup> The tumultuous tale of the "Cleveland Diamond" is told in Russell, op. cit.
- <sup>101</sup> "Diamond Merchants Assign," *New York Times* (February 7, 1894): 12 and "He Called up Mark Hanna," *New York Times* (May 20, 1896): 2
- <sup>102</sup> The carbonado was first successfully used by the French engineer Leschot, in the drills for boring holes for blasting in the Mount Cenis and St. Gothard tunnels through the Alps.
- <sup>103</sup> The black diamond is found only in Brazil and the Central African Republic. Such carbonados were used in the Suez Canal construction to break up other rocks. Unlike white diamonds, carbonados are porous and agglutinated, meaning they are comprised of clusters of crystals lurching every which was as opposed to the uniformity of their clear counterparts. The largest carbonado ever found measures 3,167 carats, 60 times larger than the biggest clear diamond found in Brazil where it was named Sergio, the crystal weights 1.4 pounds (from Susan Seligson, "Black Diamonds," at SYNERGY <http://www.unmas.edu/synergy/diamond.html>).
- <sup>104</sup> The firm of Bernard Bandler & Sons, founded by Arthur Bandler's father, had dealt in black diamonds since 1896. Bernard Bandler had once said that he had crushed more than \$15,000,000 worth of them with a machine in his Fortieth Street Office in New York City.
- <sup>105</sup> W.N.P. Reed, "Brazil's Natural Monopoly: The Carbonado," *Engineering and Mining Journal*. Vol. 130, 6 (September 25, 1930): 289-293 for a thorough account of the Bandler operations in Bahia with illustrations
- <sup>106</sup> From G.A. Roush (ed), "Brazil," in *Mineral Industry Its Statistics, Technology and Trade During 1915* Vol. 24 (New York: McGraw Hill, 1916): 606 based upon Consul Robert Fraser jr, "Bahia's Trade in Diamonds and Carbonados," in Bureau of Foreign and Domestic Commerce, U.S. Department of Commerce, *Commerce Reports* Vol. 1, no. 41 (1916): 675
- <sup>107</sup> Data on uncut diamond imports into the U.S for 1915-20 in "The Diamond Trade," op. cit.: Table c, p. 24



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- <sup>108</sup> From *The Jewelers' Circular* 79, 1 (August 6, 1919): 63
- <sup>109</sup> Jackson, op. cit.: 140
- <sup>110</sup> Consul Thomas H. Bevan, "Brazil. Bahia," *Supplements to Commerce Reports. Review of Industrial and Trade Conditions in Foreign Countries in 1919 by American Consular Officers* (Washington D.C.: Bureau of Foreign and Domestic Commerce, Department of Commerce, 1921): 5
- <sup>111</sup> From "Precious Stones," in G.A. Roush (ed), *The Mineral Industry Its Statistics, Technology and Trade* during 1921 vol. XXX (New York: McGraw-Hill Book Company, 1922): 595
- <sup>112</sup> Thomas H. Bevan, US consul in Bahia, "Review of Bahia Export Trade for 1920," *Commerce Reports* (US Bureau of Foreign and Domestic Commerce) Vol. 3 (1921): 408-9
- <sup>113</sup> If the sales price in New York was \$100 per carat and the freight, insurance and markup in New York City accounted for \$25. Consul Bevan had reported that in 1920 the price of a superior carbon was \$55-60 per carat (Bevan, op. cit.: 409).
- <sup>114</sup> Orville H. Kneen, "Gems That Work for a Living: Black Diamonds, the Most Precious Stones on Earth, Put to Industrial Uses," *Popular Science Monthly* 112, 1 (January 1928): 133
- <sup>115</sup> "Black Diamonds in Demand Best Grades Bring \$165 a Karat, Arthur S. Bandler Reports," *New York Times* (May 2, 1928): 30
- <sup>116</sup> "The King of the Black Diamonds," *Popular Mechanics Magazine* Vol. 56, 6 (December 1931): 984-987.
- <sup>117</sup> "Funds for Diamond Mining," *New York Times* (June 3, 1927): 30
- <sup>118</sup> see Marc W. Herold, "Entre o Acucar e o Petroleo: Bahia e Salvador, 1920-1960," *Revista Espaco Academico* No. 42 (Novembro de 2004), at: <http://www.espacoacademico.com.br/042/42cherold.htm>
- <sup>119</sup> "A.S. Bandler Dies; Long an Importer," *New York Times* (December 29, 1932): 19
- <sup>120</sup> "Bandler Get Rights to Black Diamonds. \$50,000,000 Concession in Brazil to be Worked with Modern Machinery," *New York Times* (May 18, 1927): 35
- <sup>121</sup> From *Moody's Industrials Manual 1935*: 2368. The Bandler mining venture is described in W.N.P. Reed, "Brazil's Natural Monopoly: The Carbonado," *Engineering and Mining Journal* 130, 6 (September 25, 1930): 289-293.
- <sup>122</sup> Reed, op. cit.: 292.
- <sup>123</sup> From "The King of the Black Diamonds," op. cit.: 985-6
- <sup>124</sup> "Americans in Brazil," *Fortune* (November 1931): 92
- <sup>125</sup> Joyce Shaw Peterson. *American automobile workers, 1900-1933* (Albany: SUNY Press, 1987): 37
- <sup>126</sup> "Diamonds Help Make Your Car and Fire Your Furnace" *Popular Mechanics* (December 1935): 140A
- <sup>127</sup> "The King of the Black Diamonds," op. cit.: 984-987
- <sup>128</sup> Ads of carbon importing companies in *Mines and Minerals* 21, 12 (July 1901): 48 and in "Companies and Advertisements," *The Mining World* 32, 1 (January 1, 1910):1 includes an ad by Jacques Baszanger displaying the famous Sergio black diamond.
- <sup>129</sup> "Trade Notices," *Colliery Engineer* Vol. 22 (February 1902): 312
- <sup>130</sup> "Bahia Corporation," *The Pittsburgh Press* (May 10, 1928): 36
- <sup>131</sup> "Stock Dropped by the Curb; Shares of Bahia Corporation Suspended From Trading." *New York Times* (September 1, 1931): 36.

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- <sup>132</sup> "Sees Stock Back on Curb," *New York Times* (September 2, 1931): 32
- <sup>133</sup> "A.S. Bandler Dies; Long an Importer," *New York Times* (December 29, 1932): 19. Bernard Bandler had died 13 years before in 1919. See the *New York Times* Obituaries for Friday, June 13, 1919. Arthur Bandler was only 59 years old.
- <sup>134</sup> An excellent description with numerous photos is provided in D. M. Anderson, "Mining Black Diamonds in Brazil," *Compressed Air Magazine* (August 1933): 4195-4198
- <sup>135</sup> Ministerio das Relacoes Exteriores, *Brazil 1943* (Rio de Janeiro: Ministerio das Relacoes Exteriores, 1944): 118
- <sup>136</sup> Bain and Read, op. cit.: 110-11
- <sup>137</sup> "The Diamond Trade," *Commerce Monthly: a Journal of Commerce and Finance* 3, 8 (1921): 22
- <sup>138</sup> "Diamond Mines in Arkansas Produce Rare Gems," *Popular Science* Vol. 51(May 1929): 711
- <sup>139</sup> Hugo Lohmann. "Molten Tungsten: New Developments in the Manufacture of Tungsten and Its Compounds." *Scientific American Monthly* (1921):4
- <sup>140</sup> Mentioned in amongst other places, Donald H. Dunn, *Ponzi: the Incredible True Story of the King of Financial Cons* (New York: Random House, 1975): 346. A thorough analysis of the LATI flights to South America is provided by Dr. Roberto Gentilli, "Pioneering on the South Atlantic, Italian Style," *Putnam Aeronautical Review* no. 8 (December 1990): 232-243.
- <sup>141</sup> "Diamonds in Overalls," *Popular Mechanics* 80, 4 (October 1943): 34-38.
- <sup>142</sup> Laurie Flynn, "Frontline: The Diamond Empire," *PBS.org* (February 1, 1994) at <http://www.pbs.org/wgbh/pages/frontline/programs/transcripts/1209.html> : 10
- <sup>143</sup> The general matter of war and strategic minerals is examined in C.W. Wright, "South America as a Source of Strategic Minerals," *Mining and Metallurgy* 21 [1940]: 283-86
- <sup>144</sup> Ruth C. Leslie, "Diamonds as Tools Speed Up Victory" (Washington, D. C: Bureau of Foreign and Domestic Commerce, October 1945): 513
- <sup>145</sup> From Robert F. Smith, "Diamonds by the Ton, Make Tools to Grind the Axis," *Popular Science Monthly* 143, 2 (August 1943): 106-7
- <sup>146</sup> B.J. Barickman, *A Bahian Counterpoint. Sugar, Tobacco, Cassava, and Slavery in the Reconcavo, 1780-1860* (Stanford: Stanford University Press, 1998), Jane L. Collins, "Tracing Social Relations in Commodity Chains: The Case of Grapes in Brazil," in Angelique Haugerud et. al. (eds), *Commodities and Globalization. Anthropological Perspectives* (Oxford: Rowman & Littlefield, 2000): 97-112, Mary Ann Mahoney, "The Local and the Global: Internal and External Factors in the Development of Bahia's Cacao Sector," in Steven Topik, Carlos Marichal and Zephyr Frank (eds), *Commodity Chains and the Building of the World Economy, 1500-2000* (Chapel Hill: Duke University Press, 2007): 204-227, and Marc W. Herold, "The Import of European Sugar Machinery to Offset the Sugar Crisis in Bahia, 1875-1914," *Revista Ciencias Administrativas* 15, 1 (Janeiro/junho 2009): 11-37.

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- <sup>147</sup> For example, diamonds earn only brief mention in a footnote in the only attempt to assess Bahia's exports during the Old Republic, in Istvan Jansco, "As exportacoes da Bahia durante a Republica Velha 1889-1930," in "L'histoire quantitative du Bresil de 1800 a 1930," *Colloques Internationaux du C.R.N.S* No. 543 (1973): 335-359. In his history of the diamond, Crider makes no mention of Bahia, see H.D. Crider, "The Story of the Diamond," *American Midland Naturalist* 9, 4 (July 1924): 176-191. A rare exception is Antonio Joaquim de Souza Carneiro, *Riquezas Mineradas do Estado da Bahia* (Bahia: Litho-Typ Encadernacao Reis & C., 1908). Very brief mention of Bahia's diamonds is made in Dr. Godehard Lenzen, *The History of Diamond Production and the Diamond Trade* (New York: Praeger Publishers, 1970): 131. The Brazilian diamond during 1750-1830 with a focus upon the role of diamonds in banking is examined in Harry Bernstein, *The Brazilian Diamond in Contracts, Contraband and Capital* (Lanham: University Press of America, 1986)
- <sup>148</sup> See Philippe Le Billon, "Scales, Chains and Commodities: Mapping Out 'Resource Wars'," *Geopolitics* 12, 1 (February 2007): 200-205 and Philippe Le Billon, "Diamond Wars? Conflict Diamonds and Geographies of Resource Wars," *Annals of the Association of American Geographers* 98, 2 (2008): 345-372
- <sup>149</sup> This material reality in which luck played such a role had important cultural dimensions, explored for example in Ronaldo de Salles Senna and Itamar Aguiar, "Jare: Instalacao Africana na Chapada Diamantina," *Afro-Asia* No. 13 (1980): 76-85 at [http://www.afroasia.ufba.br/pdf/afroasia\\_n13\\_p75.pdf](http://www.afroasia.ufba.br/pdf/afroasia_n13_p75.pdf)
- <sup>150</sup> As in Sampaio (1979), op. cit.: 6-7 and in Vilmar E. Faria, "Divisao Inter-Regional do Trabalho e Pobreza Urbana: A Caso de Salvador," in Guaraci Adeodato, A. de Souza and Vilmar Farias (eds), *Bahia de Todos os Pobres* (Petropolis: Vozes e Caderno CEBRAP no. 34, 1980): 32.
- <sup>151</sup> Faria, op. cit.: 32
- <sup>152</sup> For example in Paul Baran, *The Political Economy of Growth* (New York: Monthly Review Press, 1957) and Celso Furtado, *A Fantasia Organizada* (Rio de Janeiro: Paz e Terra, 1985)
- <sup>153</sup> A fascinating case study of Jewish dominance in another luxury commodity chain, ostrich feathers, is analyzed in Sarah Abrevaya Stein, "Falling into Feathers': Jews and the Trans-Atlantic Feather Trade," *Journal of Modern History* 79 (December 2007): 772-812
- <sup>154</sup> On the latter, see Edward Bristow, *Prostitution and Prejudice The Jewish Fight against White Slavery 1870-1939* (New York: Schocken Books, 1983). The former is analyzed in my conference paper, "Consumer Society in the Baroque Pearl of the Jungle: Manaos, 1890-1912," (Storrs: New England Council for Latin American Studies (NECLAS) 2010 conference paper, University of Connecticut at Storrs, November 6, 2010)

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