

TRADITIONAL AND MODERN MANUFACTURING IN MEXICO, 1821-1850

Guy P. C. Thomson

I. INTRODUCTION

An apparent paradox in the history of manufacturing in Mexico is that it often seems to have undergone phases of rapid growth over periods of civil or foreign war. An explanation of this phenomenon was offered to a British traveller by a Puebla mill owner during the early years of the Revolution of 1910-17, when the city's textile industry was, on all accounts, booming.

In time of peace, when things go along smoothly, two or three people at the top manage to amass millions, and then slip off to Paris and spend them there, while their own country does not benefit to the value of a penny. On the other hand, when a Revolution is going on, money must be lavished on the fighting men, and many other things as well by both sides. The result is that the revenues of the country are spent at home [...] there is a bigger circulation of cash, a better home trade, and everybody, except the politicians and soldiers, is quite contented.¹

A century earlier, Alexander von Humboldt, somewhat more subtly, reached similar conclusions regarding the impact upon Mexico of the international commercial crisis accompanying the Napoleonic Wars:

Cuando sucede estar así estancado el comercio exterior, se despierta por un momento la industria mexicana; y entonces se empieza a fabricar acero y a hacer uso de los minerales de hierro y mercurio que encierran las montañas de América; y entonces es cuando ilustrada la nación acerca de sus propios intereses, conoce que la verdadera riqueza consiste en la abundancia de los objetos de consumo; esto es, en la de las *cosas* y no en amontonar un *signo* que las representa (Humboldt 1966b: 320).

1 McHugh (1914: 213-215) reported: "Every spindle and loom in the whole district was running overtime, new factories and mills were being built faster than the Puebla Light and Power Company could provide electric energy to drive them, and the only apparent limit to expansion was the difficulty of procuring enough raw cotton."

Turning to the textile industry Humboldt observed how “en este último período (1795-1802) las fábricas indígenas han prosperado notablemente”, although, he added, the trade with neutral powers had robbed Mexican factories of the full benefit of wartime protection.² Despite this, these years were remembered later as the golden age of Mexican manufacturing. As one artisan put it in 1835: “¡Oh cuando la cosa estaba buena por la guerra en el año 1797, los tejedores estaban vestidos de terciopelo y rasos, y tachonados de hebilla y botones de oro y plata, y las hilanderas con enaguas de muselina de cinco pesos vara!”³

Over the period discussed in this paper, three important watersheds in the development of the modern manufacturing sector, and in economic policy, coincided with — one hesitates to say were caused by — crisis in the external sector, often accompanied by heightened international tension or war.

The first of these was in 1829, a year of war with Spain, armed conflict between radical Liberals and Conservatives, after three years of commercial recession during which most of the post-revolutionary hopes for economic recovery had been shattered. Under the Conservative Bustamante government, the basic protectionist guidelines to serve for the next quarter century were laid down and favourable, neo-mercantilist attitudes of the state towards manufacturing were clarified. The essence of the 1829 plan, which led to the establishment of a government loan bank for industry (El Banco de Avío) in the following year, was that customs revenues paid on the importation of ordinary cotton cloth, used everywhere in rural Mexico for work clothes, would provide a fund to be used for the defence of the patria against possible future foreign invasions, and, for encouraging the establishment of modern industry, particularly cotton textiles. From the beginning, militant patriotism and the introduction and protection of modern machine industry were seen as indivisible.⁴ The second watershed, responsible for permitting the new industry to become established, occurred a decade later. The 1837 international com-

2 See Humboldt (1966b: 503). The textile industry elsewhere in Latin America was booming at this time, with Cochabamba's cotton cloth supplying even the Buenos Aires market (Larson 1986).

3 Manso (1957: 202). A Puebla state deputy recalled in 1824: “Jamás se vio el Estado mas floreciente que cuando faltó por la guerra la concurrencia de los efectos extranjeros; ...,” *El Caduceo*, vol. 2, no. 5 (Puebla, 1824), p. 17.

4 “Dictamen de la Comisión especial sobre integridad del territorio de la República,” Feb. 25, 1830, *Registro Oficial*, vol. 1 (Mexico, Mar. 3, 1830), p. 170. For the history of the Banco de Avío, as for economic policy and manufacturing generally over the first half of the nineteenth century, Potash (1959).

mercial crisis, followed by the French blockade of Mexican ports (1838-39), gave protectionist policies a legitimacy and popularity they hitherto had lacked, and served to channel more capital and enterprise into the still largely untried modern industrial sector than it might have received under more peaceful circumstances.⁵ Over these years, 1837-40, the wave of investment in machine industry acquired the appearance of a patriotic crusade. These were years of optimistic belief in the possibility of economic and social transformation through industrialisation.

The third watershed resulted from the American War of 1847-48 and the wave of financial and commercial speculation accompanying the California "gold rush", culminating in a severe commercial crisis and the collapse of several important merchant houses in Mexico in 1852.⁶ Over these years, the future of protectionist legislation and "national industry" was a principal bone of contention between Conservatives and Liberals. The impact of the commercial crisis was, however, most deeply felt in the external sector, particularly among the great import houses of central Mexico whose stocks went unsold as cheap imports flooded down from the north. To everyone's surprise, the much maligned "hot house" industry miraculously weathered the storm. Although several factories had closed down over the American War, the 1852 crisis seems to have damaged the industrial sector far less than it harmed the import trade. This crisis demonstrated to industrialists that industry could survive without import prohibitions and this seemed to be confirmed by the continuation of factory construction and successful operation through-

5 The impact of the 1837 commercial crisis upon Latin America has yet to be explored. Safford (1965: 515) has observed that a short burst of entrepreneurial activity in Colombia coincided with the crisis. "It was in this period of acute depression, just as the interest of foreign capitalists was flagging, that the Colombian upper classes took up the burden of entrepreneurial leadership." For the impact of the crisis and the French blockade in Puebla see Antuñano (1838a, 1838b). For an Oaxaqueño's recollections of the blockade's favourable impact upon domestic manufacturing see *El Regenerador* (Oaxaca, Apr. 29, 1844):

"Con satisfacción recordamos la época, en que bloqueadas las costas de Veracruz, nuestros artesanos despertaron del letargo en que yacían, cuando advirtieron la falta de efectos extranjeros, y se dedicaron con buen éxito al laborio de nacionales, que vimos consumirse por multitud de personas decentes, que tuvieron la mayor gloria de presentarse al público con un vestido nacional, y que no dudamos hoy la tendrán mayor, haciendo uso de ese mismo vestido, mejorado con el transcurso de algunos años y los pequeños adelantos que ya se advierten en las artes, principalmente en los tejidos."

6 For the 1851-52 commercial crisis see Macedo (1905: 184) and *El Comercio*, vol. 1, no. 1 (Mexico, Mar. 11, 1852) and vol. 1, no. 2 (Mar. 18, 1852). See also González Navarro (1977: 173-174).

out the crisis and beyond the Liberal Revolution of 1854, when import prohibitions were finally abolished.⁷

These three watersheds, accompanying periods of political and economic crisis, were critical to the establishment and development of modern industry. The crisis of 1829 provided the context for the political economy of industrialisation to be assembled. The 1837-39 crisis so debilitated and demoralised the external sector that, for a period, the transfer of mercantile capital into industrial plant seemed to be the only option. And the 1847-52 crisis tested the resilience of the modern industrial sector which emerged from it relatively unscathed.

So far in this paper, as indeed in the historiography on Mexican manufacturing generally, "modern industry" is synonymous with the textile industry. Modern enterprises were also established, however, in iron, paper, porcelain and glass. And areas of industry commonly designated as "traditional", such as soap manufacture (*tocinería*), tailoring, dyeing, brick manufacture, baking and food manufacture, distilling, and hat making, underwent either important technological development or organisational change — generally from small to larger units of production over this period. Despite the unprecedented pace of organisational and technological change affecting Mexican manufacturing most industries nevertheless maintained an overwhelmingly traditional organisation and technology.⁸ The intention of this paper is to first of all uncover the still largely unexplored structure of the manufacturing sector of Mexico before the introduction of modern factory production in the early 1830s.

7 The Liberal Minister of Finance, Manuel Payno, argued in 1850 that the survival of national industry, three years after the prohibitions had been lifted, was proof that prohibitions had not been necessary. Industrialists replied that many businesses were on the verge of bankruptcy and that prohibitions were essential if industry was to develop further (Cordova 1976: 177 and 256). The Dirección de Colonización de Industria reported, however, in 1851 that substantial improvements to factories were continuing despite increased contraband, *Memoria de Colonización* (1851) in Chávez Orozco (1962: 470). That factory construction continued into the mid-1850s, can be seen from "Estado de las fábricas de hilados y tejidos de algodón existentes en la República Mexicana," *Anales del Ministerio de Fomento, Mexico* (1854, I: fig. 2).

8 Ciro Cardoso has observed from the 1862 statistical survey of the republic drawn up by José María Pérez Hernández "un panorama industrial bien característico de una etapa 'anterior' a una considerable industrialización de tipo moderno, con un puñado de fábricas o manufacturas más o menos importantes, frente a la gran multitud de talleres artesanales ínfimos" (Cardoso 1980: 155-156). For the organisation of industry in Mexico City in the 1840s see Shaw (Ms. 1975: 359-385). A good sense of the variety, organisation and size of industries in Puebla in the early 1850s may be gained from Juan del Valle (1852).

The second purpose is to reach some tentative conclusions about the relative performance of modern and traditional enterprise over the 1830s and 1840s, ("modern" here meaning businesses adopting production processes which were entirely new to Mexico and "traditional", those industries which, while not necessarily rejecting technological or organisational change, had existed in Mexico, often for centuries, before the new technologies were introduced).

II. MANUFACTURING AT THE TURN OF THE NINETEENTH CENTURY

Had the *comercio libre* reforms achieved their desired objective, Mexico by 1800 should have possessed only the most rudimentary manufactures: tanning, rough woollens, and to satisfy the Catalans, no cottons at all. All else would have been provided from the factories of the Iberian Peninsula. Geography and war, however, conspired to prolong the life of Mexican manufacturing and to encourage industrial development beyond industry's heartland in central and south-eastern Mexico, with the growth of cottons in the Guadalajara region and woollens in the North.⁹ On the eve of the 1810 Revolution, José María Quiróz, secretary to the Consulado of Veracruz, in calculating the total annual production of the economy of New Spain, estimated that manufacturing represented 38%, valued at 72,386,000 pesos, of the total, to agriculture's 47% (89,285,000 pesos) and mining's 15% (28,451,000 pesos). However rough was this

9 By 1803 the province of Guadalajara produced more cotton manta than Puebla, although the latter province still led the production of cotton-silk shawls (*rebozos*). In 1803 Guadalajara produced 240,125 pieces of manta (of 30 yards) valued at 1,320,687 pesos to Puebla's combined total of 1,600,000 pesos in 1802, which included both mantas and *rebozos*. In 1802, Guadalajara had produced 1,601,200 pesos worth of cottons (BM, Ms. 20896 Add. 171557, fol. 41; and Humboldt 1966b: 451). On the growth of woollen cloth production in the north, a development which accelerated after 1810, little is yet known. A report on the diminished state of the Querétaro textile industry in 1831 saw northern self-sufficiency as its principal cause: "se interceptaron los caminos, y la necesidad obligó á los hacenderos á poner trapiches para suplir con sayales y sabanillas la falta de paño y de la jergueta: vieron que las tenia gran cuenta; procuraron mejorar los tejidos, y en el dia no tienen ya necesidad de pedirnos ropa, porque ellos la trabajan en utilidad propia y de los sirvientes que la consumen á menos precio [...] jamás volveremos a ver nuestros obrages como estaban antes de la insurrección." *Registro Oficial*, vol. 5 (Mexico, May 24, 1831), p. 93. Mention of the Saltillo blanket industry: Harris (1975: 88 and 239).

estimate, the figure for manufacturing is exaggerated since it includes raw material values which properly should belong to agriculture. Fernando Rosenzweig has therefore deflated the value of manufacturing to 55½ million pesos or 29% of the total product and increased the value of New Spain's agriculture to 106 million pesos or 56% of the product (Rosenzweig Hernández 1963: 492). Bearing in mind that Quirós defined manufacturing very broadly, to include even bread-baking, it is nevertheless clear that this sector held a very important place within the late colonial economy.¹⁰

The structure and performance of Mexican manufacturing before independence were conditioned by two broad areas of restraint and opportunity. The first was the changing external context of New Spain within

10 The following table shows manufacturing by sector and is taken from Rosenzweig Hernández (1963: 480). It is based on the estimates of Quirós (1817):

Concepto	Valor de la producción (miles de pesos)	Concepto	Valor de la producción (miles de pesos)
Total:	72 386	<i>Industria del cuero</i>	7 063
<i>Alimentos y Bebidas</i>	21 564	Badanas, gamuzas y cordo- banes	6 563
Azúcar, panela y mieles	9 534	Talabartería	500
Manufactura de pan	9 000		
Chinguirito y mezcal	1 800	<i>Vestido y calzado</i>	4 500
Labranza de chocolate	830	Zapatos	4 000
Nieve	400	Sombreros	500
<i>Química</i>	15 998	<i>Minerales no metálicos</i>	1 850
Velas de sebo	11 403	Cal	850
Jabón	3 395	Ladrillos	500
Pólvora	700	Loza y alfarería	500
Aceites vegetales	500		
<i>Textil</i>	10 851	<i>Fierro y acero</i>	883
Tejidos de lana	7 401	<i>Madera</i>	850
Tejidos de algodón	3 000	<i>Diversos</i>	1 140
Tejidos de palma y pita	350	Platería	300
Teñido de sedas	100	Carrocería	200
<i>Tabacos labrados</i>	7 687	Juguetes e instrumentos musicales	350
		Pasamanería	150
		Batihoja	50
		Cerería	90

an Atlantic economy. The second was the entrenched pattern of internal exchange, and the regional division of labour and economic specialisation which this had encouraged over the three hundred years of colonial rule.

The changing external context over the eighteenth century, brought a declining degree of effective protection for Mexican industry. This was a result of the liberalising of Spanish Atlantic trade, the cheapening of European and Asian manufactures and an inflation in value of the Mexican peso, placing home produced goods at an increasing disadvantage against imported manufactures.¹¹ An import trade which until the middle of the eighteenth century had been largely confined to Mediterranean goods, luxury manufactures and a few raw materials such as iron ingots and beeswax, by the 1780s, had grown to include the most basic items such as soap, cheap hats, ordinary pottery and, most threatening of all, ordinary cotton cloth. Although the Napoleonic Wars prolonged the protection of the Mexican market and forestalled the recovery of Spanish industry, the sudden massive introduction of cheap Asian textiles through the *comercio de neutrales*, demonstrated to merchants engaged in financing domestic manufactures the vulnerability of the domestic market, and discouraged technological innovation or consideration of long term capital investment.¹² Such was the over-valuation of the Mexican peso and the thirst of the world for silver that it was realized, even before Independence, that only protective tariffs could preserve Mexican industry from decay.¹³

The second factor of importance, particularly for understanding the "inertia" of Mexican manufacturing and the nature of its responses to the kinds of external changes just mentioned, was the existence throughout the colonial period of extensive networks of long distance exchange linking temperate highlands with tropical lowlands, and, the more densely populated, agricultural and industrial south-east of the country with the sparsely populated, yet highly productive, mining and pastoral north. These networks were maintained by a massive mobilisation of mule transport facilitating two principal patterns of exchange. From the temperate highlands, wheat flour, maize, pottery, soap and cotton cloth

11 The changing external context of New Spain's economy over the last fifty years of the colonial period is examined by Ortiz de la Tabla Ducasse (1978).

12 For a full analysis of this predicament see Potash (1959: 11-26); and for a detailed examination of the Puebla cotton textile industry Bazant (1964a) and Thomson (1986).

13 For early protectionist arguments see Chávez Orozco (1959) and Córdova (1971).

were exchanged with sub-tropical and tropical goods such as cotton, coffee, cocoa, tobacco, fruit, dyes and beeswax. And from the centre and south-east, imported and domestic manufactures and arable products were exchanged with the north's silver, cattle and sheep. Of the two networks, undoubtedly the most dynamic throughout the colonial period was the north-south pattern since silver mining and the movement of ingot and coined silver were undoubtedly the principal elements in northern exploration and colonisation, as well as regional and inter-regional trade, endowing the Mexican market with a depth and geographical range unmatched anywhere else on the continent. The north-south network was further reinforced by the existence of various institutional arrangements, such as meat supply monopolies (*abastos*) of the large central Mexican cities which provided security to long distance trade and underwrote much of the north's pastoral farming. By the eighteenth century a clear division of labour had developed between an agricultural and "proto-industrial" centre and south and a pastoral and extractive north (Harris 1975: chaps. 5 and 11).

The highland-lowland network of exchange, of such crucial importance to the pre-Conquest economy of central Mexico (contrasting with the insignificance of centre-north exchange), was only of slight commercial importance until the late colonial period. One of the objectives of the late Bourbon reforms was to revive tropical production and encourage enterprise in Mexico's depopulated and lethargic tropical lowlands. The purpose was not so much to restore highland-lowland exchange but to direct tropical production, particularly cotton, to the international market, more specifically towards Catalonia's factories. Atlantic war interfered with this aim, redirecting trade inland, the short term benefits of improvements to tropical cotton agriculture redounding to highland merchants and weavers in the busy years before the outbreak of the Revolution of 1810.¹⁴ Not for perhaps centuries had highland-lowland trade been so brisk, a fact that was not forgotten by Veracruzano and Poblano merchants and entrepreneurs in the 1830s when they chose to attempt to restore highland-lowland trade through the mechanisation of cotton agriculture and manufacture.

The structure of late-colonial industry was a complex one and is perhaps best briefly described by drawing out the principal categories of entrepreneur/artisan, rather than attempting to define the "stage of develop-

14 Thomson (1986: 180-182) and for Bourbon measures to encourage lowland production: AGNM, Reales Cédulas, t. 89, fol. 224; t. 102, fol. 114; t. 159, fol. 330.

ment". Although there is no agreement about this last point, it will become clear from the forthcoming discussion that several different "stages" of technological, organisational and commercial development existed side by side.¹⁵

Risking very great over-simplification, three categories of entrepreneur/artisan can be discerned. At the core of Mexican manufacturing was a class of owner-managers of medium sized to large workshops and factories who occupied an economic position akin to that of retail merchants and hacendados. Concentrated in the larger towns and provincial capitals of central Mexico, they operated woollen *obrajes*, hat factories, *tocinerías*, bakeries, tanneries, iron foundries, glass and pottery factories. Many of these owner-managers extended their businesses into estate ownership linked to their industrial enterprises, this was particularly common among *obrajeros*, *tocineros* and bakers. Although closely supervised by municipal authorities, these owner managers did not participate actively in guild affairs, the principal feature of these enterprises being the relatively high level of capital investment, itself an adequate barrier to entry. They did however face competition from smaller producers (known as *trapicheros* in woollens and *tocinería*) whom they attempted to control through the practice of municipal inspections (they were often well represented on municipal councils), or, to render economically dependent by controlling their raw materials.¹⁶

They also faced competition from imports, increasingly as the 18th century proceeded, only relieved in periods of Atlantic war. Occasionally they benefitted not only from this artificial protection of the domestic market but from the appearance of overseas markets as well. During the War of American Independence, and especially during the Napoleonic Wars, Mexican exports of flour, soap, pottery, glass, hats and textiles expanded impressively¹⁷. As would be expected in businesses facing such uncertain market conditions, turnover of ownership tended to be high, particularly in woollen *obrajes* (Super 1976: 201-202), bankruptcies were common and the size of each industry consequently fluctuated, although,

15 The problem of definition is discussed in González Angulo and Sandoval Zarauz (1980: 173-238).

16 For woollen *obrajes* see Super (1976: 198-202); Greenleaf (1967); and Carrera Stampa (1961). For bakeries see Castilleja (1978). For Puebla *tocineros* versus *trapicheros*, AAP, *Tocinerías*, t. 232 and t. 233.

17 See "Balanzas del Comercio de Veracruz, 1802-1828" in Lerdo de Tejada (1967). Humboldt (1966b: 485) mentions exports of Querétaro cloth to South America. See also Arcila Farías (1950: 96-103).

in Puebla at least, a solid core of families may be observed in each industry – pottery, glass, tanning, shawl (*rebozo*) making and hats – weathering the vagaries of demand, often remaining in business for several generations, a record hardly matched by the agricultural sector.¹⁸

A second class of manufacturer can be distinguished: owners of smaller workshops than the “patrician” group mentioned above, and possessing considerably less capital. Often highly skilled, clinging staunchly to declining and officially disfavoured guild institutions, this class of respectable artisans engaged in every art from shoe-making to silverwork and bell-making. These artisans had only their skill to confront competition from the unexamined working beyond the guild and from imports. Little is known of this numerous, literate and, after independence, politically articulate class. The nature of their work drew them into close association with the wealthier members of society and with the Church, upon whose patronage they depended for their livelihood. They faced market conditions that were quite as unstable as the previous group with the added problem that, by the beginning of the nineteenth century, changes in taste were combining with cheapening of imports to undermine the stylistically traditional creole artisanal manufactures. The decline of the Puebla mayolica industry in the face of porcelain imports is an example of this trend.¹⁹ Skilled craftsmen were to be found in greatest numbers in

18 Thomson (Ms. 1978: 86-104) for bakeries and *tocinerías*, and, for other industries (Ms.: 339-340).

19 Church patronage of the artesanate appears to have been severely affected by the Crown’s *consolidación* decree of 1804. This combined with forced loans during the Wars of Independence and a general decline of revenues as a result of the economic depression, almost annihilated the Church and religious orders as sources of patronage. Ildefonso Maniau, secretary of the Ministry of Finance in 1830, commented on this:

“Las comunidades piadosas, unas atemorizadas de que fuese arrebatada la plata de los templos dedicada justamente al culto, y que era como un deposito de riqueza, que no habia de extraerse de nuestro suelo; y otras empobrecidas, fueron deshaciéndose de sus adornos metálicos, ya para evitar el que fuesen pasto de la rapacidad, ó ya para invertirlos en sus necesidades, y por consecuencia cesaron de emprender nuevas y cesó la ocupación que ellos daban á diversos artes.

La misma pobreza de las comunidades las hizo retraer de propagar la fabricación de fincas que hubieran hermoñado las ciudades. Faltaron también en gran partes los adornos de los templos con los que el artifice y el artesano hallaban ejercicio en sus profesiones, á las que proveian la industria, agricultura y comercio. El arquitecto, el escultor y el pintor lograban muchos dias de subsistencia. El albañil, el hojalatero, el dorador etc., se encontraban en el mismo caso. Si no fuera por los templos bien podrian los que se dedican al laborio de colmenas renunciar á la idea de hacer progresos, los que serian mayores si no hubiese la pobreza referida” (Maniau 1830). For Puebla’s mayolica industry see Thomson (Ms. 1978: 381).

Puebla and Mexico City, with substantial corps in the other provincial capitals and larger towns of central and southern Mexico.

The third class of artisan/entrepreneur, and the most numerous, can best be divided into two categories, both generally propertyless, but one more independent than the other. The more independent group has already been mentioned: they produced, in small workshops, similar and competing goods to the group of owner-managers. Occasionally they might be dependent upon them for the provision of partly processed materials which they then finished. For instance a *tocinería*, wanting to increase production, might provide smaller workshops (*trapiches*) with tallow which the *trapichero* would convert into candles and soap. More often, however, the relationship between the larger and smaller concerns was a hostile one. Council and guild proceedings over the eighteenth and early nineteenth century, before the freedom granted to manufacture by the Cortes in 1813, reveal a constant tug of war between guildbound or politically influential owner-managers and the smaller concerns who, however often they were suppressed, reemerged after a few years, sometimes only months, with indomitable energy (Thomson Ms. 1978: 107-113).

The final group of artisan, less independent than the former, worked beyond the reach of both guild and municipal restrictions, in town and countryside. Their particular character rested on their close dependence upon merchants and manufacturers who provided their raw materials, usually through a cash rather than a putting out arrangement, and bought their finished products: spun wool, cotton or silk, woven cloth, hats, stitched shoes, stitched, finished and embroidered clothes for tailors, etc., cotton spinners and weavers being the most numerous within this class, throughout central Mexico, by the end of the colonial period.²⁰

Such was the social composition of the manufacturing sector in Mexico at the turn of the nineteenth century. Over the thirty years following the Revolution of 1810, manufacturers within all three groups were adversely affected by swiftly changing conditions in the external sector and in the pattern of internal exchange.

20 Thomson (1986: 173-177) for the economic and demographic conditions accounting for the increase of this type of producer.

Table 1
Woolen and Cotton Production in Querétaro 1793-1854

	1793	1803	1805	1808	1810	1826	1830	1831	1837	1844	1845	1854
Woolens-Obraje												
No. of Broadlooms	215	-	-	250	-	-	-	40	-	-	-	-
No. of Obrajes	-	18	20	20	-	-	-	-	-	9	-	-
Pieces of Paño (42 yd)	6,697	-	6,641	-	-	-	-	1,200	1,212	3,500	7,007	-
Value of Cloth (pesos)	421,911	-	-	-	-	-	-	-	-	264,000	-	-
No. of Employees	1,800	2,000	-	-	-	-	-	-	-	1,007	-	-
Woolens-Trapiche												
No. of Shortlooms	-	327	-	350	-	-	-	140	-	-	-	-
No. of Trapiches	-	-	-	-	-	-	-	-	-	671	-	674
Value of Cloth (pesos)	173,800	-	-	-	-	-	-	-	-	224,744	-	-
No. of Employees	1,200	-	-	-	-	-	-	-	-	-	-	-
Wool Consumption (arrobas à												
Total Woolen Looms	-	-	-	-	-	-	-	-	-	371	-	-
Total No. Employed	3,000	9,000	-	6,000	12,500	3,300	-	1,000	-	-	-	-
Total Value of Woolens (pesos)	-	600,000	-	-	-	-	-	100,000	-	488,744	-	-
Cottons												
Pieces of Cloth	20,000	20,000	-	-	-	-	-	-	-	74,693	-	-
Cotton Consumption (lbs)	-	200,000	200,000	-	-	-	21,000	-	-	691,500	-	-
Value of Cloth (pesos)	260,000	140,000	-	-	-	-	50,000	-	-	542,678	-	-
Tanning												
Value of Tanning (pesos)	150,000	-	-	-	-	-	-	-	-	70,530	-	-
Total Value of Textiles and Tanning (pesos)	1,005,711	-	-	-	-	-	-	-	-	1,101,952	-	-

Source: 1793, 1803, 1810, 1830, 1844: "Notas estadísticas del departamento de Querétaro" (1844), BSMGE, 1st series, vol. 3 (Mexico, 1852), pp. 169-215; 1805: "Noticias de Nueva España 1808, 1831: *Registro Oficial*, vol. 4 (Mexico, May 24, 1831), p. 93; 1826: Ward (1828, II: 183); 1844, 1845: *Memorias de Industria* (1844, 1845) in Chavez Orozco (1962); 1854: "Notas formadas para la geografía y estadística del Departamento de Querétaro," BSMGE, 1st series, vol. 7 (Mexico, 1859), p. 518. *Trapiches* were single loom cotton or woolen weaving establishments.

III. THE IMPACT OF INDEPENDENCE AND THE CRISIS OF THE 1820s

Quite as harmful to Mexican manufacturing after independence as the increased importation of cheaper European manufactures was the dissolution of the national market. The great north-south pattern of trade had depended, above all, upon a buoyant mining sector and a commercially dominant Mexico City acting as a dynamic intermediary. During the 1810s and 1820s Mexico City's commercial centrality collapsed as a result of the flight of Spanish merchant capital, the decline of silver mining and the establishment of regional mints, and the decision taken by many of the new generation of import merchants to reside in provincial locations, closer to the mints and the markets. As one British merchant put it in 1830: "San Luis and Aguascalientes are the best places for business and the city of Mexico has become the worst."²¹

The abolition of the meat monopolies of the provincial capitals of central Mexico further weakened the north-south commercial axis²². By the early 1830s, the Mexican market had become compartmentalised into two great wedges. The first spread from Tampico and the northern Gulf coast west through the now prosperous commercial centres of San Luis Potosí and Aguascalientes taking in the principal mining regions, the Guadalajara basin and the entire north. The other contained the old centre and south, temporarily sunk in a profound economic depression. The northern wedge, on the whole, favoured an unrestricted access to the exterior while the centre and south veered towards protectionism. The impact of the dislocation of the national market upon manufacturing was very considerable. Regions such as Guadalajara (Jalisco), whose relative isolation during the colonial period had encouraged the development of a degree of autarky, acquiring an important cotton textile industry over the eighteenth century, found themselves more directly exposed to the international market than ever before. Guadalajara's cotton textile industry was shattered by the mid-1820s, accounting for the retarded recovery of manufacturing in this area relative to other regions of central Mexico.²³ Puebla's cotton textile industry, which had relied

21 UGMC, Wylie Papers, vol. 1, June 1, 1830, John Wylie, San Luis Potosí, to Thomas Cooke, Manchester.

22 For the impact of the Wars of Independence and the abolition of the city *abastos* see Harris (1975: 91-93).

23 For the collapse of Guadalajara's cottons: *Nota estadística* (1826); *Clamor de los artesanos* (1827); and *Representación* (1828). By 1826, only rebozo and rough woollen

upon the northern market before independence, also suffered from the disintegration of the national market, although a sturdy protectionism from the early 1820s and the lack of interest in this region among foreign merchants (since it lacked mines or a mint) left it less exposed than was Guadalajara to the international market.²⁴ The major woollen centre, Querétaro, also suffered. The meat monopolies had drawn thousands of sheep past the city on their journey south each year and Querétaro's *obrajeros* had been able to benefit from cheaper wool than elsewhere in Central Mexico.²⁵ Apart from being harmed by the abolition of the meat *abastos*, Querétaro saw its market in the north decline in the face of imports

manufacture survived in Jalisco: The cotton print industry, which had been the main branch of manufacturing before independence, for a short period adapted from native to imported cotton cloth, but even Guadalajara's *estampas de zaraza* were unable to compete with imported English *indianas*, and finally "decayeron del todo, tanto los talleres de tejidos, como los de estampa." Printed cottons were very popular among the mestizo population of the west-centre and north, a fact not lost upon the San Luis Potosí British merchant, John Wylie, whose business supplied much of this area with prints and other manufactures during the 1830s; "prints which take the taste of the people here immediately on arrival, are sure to command an immediate sale and good prices, whatever the state of the market may be in, and the ladies here, when they see a new print which they like, must have a gown of it if they should starve for a month afterwards." UGCM, vol. 1, fol. 36-37, Apr. 4, 1831, John Wylie, San Luis Potosí, to Thomas Cooke, Manchester.

24 Puebla's cotton manta industry, although depressed, was far from destroyed by the late 1820s, saved, more than anything else, by the decision of cotton weavers to turn to imported yarn. It could still be said of the district of Tepeaca in 1831 that "la mayor parte de los habitantes que compone sus pueblos son tejedores de profesión...", *Registro Oficial*, vol. 3 (México, Feb. 1, 1831), p. 177. Cotton weaving survived in several Guanajuato towns, "a pesar de la baratura de los generos de fuera." The woollen textile industry, which had been big business in such towns as San Miguel el Grande, León, Acámbaro and Irapuato before independence, fared considerably worse than cottons in Guanajuato. By 1831 finer woollens had been completely destroyed and weavers were limited to producing inferior "mangas, jorongos, frazadas, sergas y sabanillas." *Registro Oficial*, vol. 5 (México, 1831), p. 147. For Guanajuato see also Ward (1828, II: 218). In contrast to the depressed state of the woollen industry in Guanajuato and Querétaro, further north, especially in the states of Aguascalientes and San Luis Potosí, the woollen industry during the 1820s appears to have been booming. For Ward's description of the "obraje de Pimentel" in Aguascalientes, "the largest manufactory of coarse cloth that I have met with in Mexico," see Ward (1828, II: 349); and for San Luis: Ward (1828, II: 227).

25 The price history of early nineteenth century Mexico has still to be written. The following wool prices in the appendix substantiate, however, some of the points made in this article, particularly the greater viability of woollen textile production further north, once the colonial system of long distance internal exchange had begun to dissolve.

and, possibly more important, once substantial textile manufacturing became established in the north for the first time.²⁶

Apart from the relatively free trade that prevailed during the 1820s in Mexico, other liberal economic reforms damaged manufacturing and artisanal interests. The abolition of the guilds and the freedom granted to all to manufacture or sell affected adversely those artisanal interests which had hitherto been protected by their ability to exercise discriminatory guild legislation, if not over production, at least over retailing.²⁷ The free-for-all which resulted in certain trades such as shoe-making, combined with the cheapening of imports caused many artisans in Puebla to go out of business, join the army or migrate.²⁸ The freedom granted to

26 As in Guanajuato it was the finer woollen cloth produced in labour intensive *obrajes* which underwent more of a decline as a result of the wars and the commercial dislocation that followed. Table 1 shows that *obraje* broadcloth production declined by nearly 5/6 between 1805 and 1831. *Trapiche* production, if the number of looms being worked is a fair index of production, only halved over this period. Querétaro weavers felt in 1831 that, with the introduction of modern woollen spinning machinery, they would be able to compete with foreign cloth, calculating that with modern machinery a piece of *pañó de primera* could be produced at the cost of 38 pesos. British *pañó de primera* was worth 252 pesos the piece at Veracruz in 1823, and only 210 pesos the piece in Mexico City twenty years later. It seems therefore that Querétaro *pañó de primera* was considerably inferior to its European counterpart which was imported for the needs of only the very rich. Querétaro *pañó* was used customarily for military uniforms and before the Wars of Independence sold for as much as 63 pesos the piece. It was this price that manufacturers wanted to get down to a competitive level, with the help of modern machinery. For British cloth prices: "Balanza del comercio marítimo hecho por el puerto de Veracruz en el año de 1823,..." and "Noticia de las mercancías extranjeras introducidas legalmente en la ciudad de México en los tres años de 1843, 44 y 45,..." in Lerdo de Tejada (1967: nos. 30 and 45).

27 The authority of the guilds within respective arts has declined steadily over the eighteenth century. It is impossible to know what contributed more to the plight of artisanate; the loss of their corporate privileges or the economic dislocation brought on by war, the flight of merchant capital and exposure to the international market (Thomson Ms. 1978: 189-197 and 367-392).

28 The population of most provincial capitals of central Mexico, apart from Mexico City itself, declined dramatically over the 1810s and 1820s. It is known that many migrants went to the capital of the republic and it is suspected, although impossible to prove, that even more migrants, fleeing the depressed cities of central Mexico, went north. These would have been skilled men and this movement may have more than a little to do with the rapid development of the crafts and artisanal manufactures in places like Aguascalientes, San Luis Potosí and Durango. The population of Querétaro fell from an estimated 70,000 in 1810 to 25,000 in 1826; Puebla's population declined more gently from around 60,000 in 1810 to about 49,000 in 1822. *BSMGE*, 1st. series, vol. 2 (Mexico, 1851), pp. 200-201; and Thomson (Ms. 1978: 482-483).

manufacturing which might, under more expansive economic circumstances, have benefitted the smaller, hitherto clandestine, producers, seems, in the depressed conditions of the 1810s and 1820s, not to have had this effect. Instead, a small number of owner-managers – *tocineros*, bakers, hatters, and tanners – in each craft, appears to have acquired a preponderance in these respective trades through the practice of raw material speculation, price fixing agreements and the illegal continuation of the practice of punitive municipal inspections and workshop closures, made easier by the fact that ayuntamientos were now sometimes controlled by people from the owner-manager group.²⁹

Had the efforts to bring about the recovery of silver mining succeeded or had Mexico possessed another commodity which enjoyed as great an international demand as silver, then, almost certainly, the manufacturing sector would have continued to decay into the 1830s. By the late 1820s, however, it had become evident that the slump in silver production was not to be easily remedied, nor was any other exportable product coming to the rescue. The import trade, after an optimistic beginning over the mid-1820s, entered a prolonged secular decline lasting until the early 1840s, chiefly, it seems, as a result of the shortage of specie and the reduction in the quantity of silver in circulation, necessitating the issue of copper currency during the 1830s.³⁰ The conditions which now deterred importers proved favourable to manufacturers and artisans. Merchants, disenchanted with the external sector, turned their attention to the commercial potential of domestic manufacturing. The possibility of introducing modern machinery and transforming the traditional methods and organisation of production provided for many merchants an additional incentive.³¹

The official response to failure of the British silver mining ventures, to the flight of specie and the imbalance of payments was to strengthen the protectionist element that had existed in Mexican tariff policy since independence. Only in 1838, however, were tariffs made sufficiently protectionist to satisfy the growing manufacturer's lobby, some six years after the first modern enterprises were established. It would seem, therefore, that in spite of the official state encouragement to industry through the

29 The argument here is, again, based upon the experience of Puebla (Thomson Ms. 1978: 97, bakeries; 113, *tocinerias*; and 427, hats).

30 For the trade slump and currency crisis, see Thomson (Ms. 1978: 238-294).

31 For entrepreneurial initiative in Puebla over this period see Müller (1978, Ms. 1977) and also Aguirre Anaya and Cavabarín Gracia (Ms. 1979); for entrepreneurship elsewhere: Cardoso (1978) and Keremitsis (1973).

Banco de Avío (Potash 1959: 193-197), the principal explanation for the limited process of industrialisation that took place between 1830 and the early 1850s lies in the pragmatic responses of merchants, farmers, shopkeepers, manufacturers and artisans to a prolonged depression, at intervals verging on crisis, in the external sector (Thomson Ms. 1978: 317-338).

IV. TRADITIONAL AND MODERN MANUFACTURING, 1830-1854

During the 1830s and 1840s modern technology and factory production were introduced to Mexico across a broad front, rather thinly in places (porcelain, glass, paper, cotton printing) but in some considerable depth in woollen and cotton textiles and iron founding. Certain Liberal contemporaries criticised this limited industrialisation as an attempt by "monopoly" interests from the capital, in collusion with their counterparts in Puebla and Querétaro, to restore the economic dominance of the centre of the republic at the expense of the consumers of more distant provinces, obliged to buy expensive national manufactures.³² If one looks, however, at the map of industrial establishments by the mid-1850s, it is clear that although the provinces of Mexico, Puebla and Querétaro possessed the bulk of modern enterprise, the northern states of Durango, Chihuahua and Coahuila and the coastal states of Colima, Sinaloa, Guerrero and Veracruz had also acquired modern textile industries.³³ By the 1870s, few states lacked a textile mill.³⁴

Over the same period that modern factory production was introduced in Mexico, certain areas of manufacturing using a traditional technology — pottery, iron, hats, glass and soap — recovered substantially after the decline they had undergone during the 1820s. In this final part of the paper, some answers to the following questions will be given. How successfully were the new technologies established? What impact did modern industrial technology have upon businesses using a more traditional technology? How did the performance of the modern and traditional manufacturing sectors compare? Did the introduction of modern industrial tech-

32 The ideological debate over tariffs and industrialisation is examined by Hale (1968: 248-289).

33 See "Estado de las fábricas ...," *Anales del Ministerio de Fomento, Mexico* (1854, I: fig. 2).

34 "Cuadro Estadístico de la Industria de Tejidos de Lana y Algodón de la República Mexicana," Cuadro no. 2 in Busto (1880, I).

nology significantly alter the structure of Mexican manufacturing or the overall character of the Mexican economy? Was the Mexican economy any less vulnerable to often unfavourable changes in the external sector and was it more autonomous as a result of the limited industrialisation which took place during these decades?

By far the greatest proportion of investment in modern manufacturing went into cotton spinning factories (Potash 1959: 219-242). Although there were many bankruptcies and a high rate of turnover of enterprises, this sector must be judged a success since all but very few of the larger factories survived into this century. The criterion for "success" must, fairly, be survival since, even by the early 1850s, it had become evident that, not only was the mechanisation of the cotton textile industry failing to lead to any broader transformation of the Mexican economy, but also, even with cotton textile manufacturing, Mexico was failing to keep pace with the rapid march of technological advance.³⁵

The durability of enterprises must partly have been a result of judicious and realistic location. The mills established in Puebla, Mexico, Querétaro and Guadalajara were close to the weaving artisanate, the principal market (the rural labouring population) and sources of mercantile as well as Church credit. Mills established in Veracruz, Colima, Sinaloa and Guerrero were close to bulky cotton supply and more ample water power, the shortage of which was always a problem for the factories of the *altiplano*, compensating the lowland factories for their greater distance from markets and the larger urban centres. The growth in number of northern mills, in the states of Sonora, Chihuahua, Coahuila, Durango and Nuevo León was a result of the development of raw cotton production in the north and a reflection of the fragmentation of the national market, the great obstacles to inter-regional communication before the railway age, and represented a failure on the part of the manufacturers of the old industrial core of central Mexico, more especially the city of Puebla, to recapture the northern market, lost since the Wars of Independence. In

35 This point was emphasised by Puebla industrialists in 1850 in their petition against the lifting of import prohibitions. They argued that because of contraband imports, they had been forced to cut costs (laying off foreign technicians, cancelling orders for machinery, etc.) with the result that "Los artefactos [...], no solo están muy distantes de llegar á la perfección de los extranjeros, sino que en vez de seguir la mejora progresiva con que caminaban hasta el año de 47; desde aquella época, si no desmejoran, permanecen estacionarios." "Representación que la Junta de Industria de Puebla eleva al Honorable Congreso del Estado [...] para que no se deroguen las leyes prohibitivas [...], en favor de la industria del país," Puebla, 1850 in Córdova (1971: 253-254).

general, it could be said that the dispersed location of modern manufacturing enterprise, not only textiles, but glass, pottery, paper and iron, was a recognition of the state of backwardness of the post-colonial Mexican economy rather than a signpost towards any future transformation. Although survival, under the hostile circumstances which modern industry faced, might be judged as success, several enterprises, under skilled management, were notable commercial successes on any scale of reckoning.

Puebla, with the largest corps of textile industrialists in the country, had also one of Mexico's most successful entrepreneurs: José Dionisio Velasco. A Spaniard and import merchant based in the port of Veracruz, Velasco, in company with Andrés Vallarino, a Puebla wholesaler, and Ciriaco Marrón, a Puebla raw cotton dealer, built up a vertically integrated cotton empire around Puebla's largest mill: *El Patriotismo Mexicano*. Through judicious marriages, astute business practices and hard municipal and state politics, the company by 1842 had succeeded in monopolising scarce raw cotton from Tlacotalpan, the commercial hub of the cotton growing region of Veracruz.³⁶ This year of currency and credit crisis was also one of severe cotton scarcity throughout the republic and great discord among industrialists and between industrialists, seeking permission for cotton imports, and cotton growers, pressuring for the maintenance of import prohibitions. Velasco and Company's hold over Tlacotalpan cotton supply enabled their mill, and others supplied by the company, to maintain production while most other mills were obliged to shut down.³⁷

Velasco retained his interests in the import trade over the 1840s using trading connections throughout the republic, first established through the distribution of imported cocoa and beeswax, to market *Patriotismo's* cotton yarn and cloth in markets as far distant as Chihuahua and Jalisco. Velasco and Company were among the very few businesses that, having established mills during the 1830s, remained solvent and even profitable well into the 1850s. The fact that Velascos and Marróns were still important in Veracruzano raw cotton production and ginning in the 1870s demonstrates how important control at the primary stage was to success or failure in the cotton industry (Chávez Orozco and Florescano 1965: 267-268).

36 For a profile of José Dionisio Velasco y Cía, see Aguirre Anaya and Cavabarrín García (Ms. 1979).

37 The 1840-42 crisis is examined in Thomson (1985).

An example of business failure in Puebla will serve to illustrate the hazards and pitfalls of the industry. The city's most famous industrialist, "founder of the modern Mexican textile industry," was another Veracruzano of Spanish descent, Estevan de Antuñano. In 1831, when he laid the first stone of the *Constancia Mexicana*, he was a merchant specialising in inter-regional trade between Puebla and Veracruz : highland wheat for lowland cotton and tobacco. He also acted as a wholesaler of European manufactured goods, possessed extensive interests in wheat land and flour mills as well as in cotton agriculture and ginning near Tlacotalpan (Thomson Ms. 1978: 92A). Antuñano enjoyed the kind of commercial and agricultural interests which should have assured him business success; they were almost identical, indeed, to those of Velasco and Company. How then, by the early 1840s, had Antuñano and Company been reduced almost to insolvency?

First of all, Antuñano paid the price of being a pioneer over a period of acute political instability with Puebla, under siege four times in three years, as its epicentre. Two batches of machinery were lost in shipwrecks, another held up and damaged in civil war while highly paid European and American technicians remained idle, awaiting the start of production, three and half years late. Prohibitions upon cotton yarn and cloth imports were not granted until 1838 by which time Antuñano had sunk his entire liquid capital in the enterprise. The credit crisis accompanying the withdrawal of copper money and the illegal importation of great quantities of cotton yarn and cloth (enough to supply the Mexican market for a year) in 1841-42, finally brought Antuñano and Company to its knees. He was obliged to withdraw from the import trade, from the cotton trade and from partnerships in other industrial ventures in porcelain and glass. Over the remaining four years of his life he confined his activities to operating his two cotton mills, his company becoming indebted to the amount of 200,000 pesos, owed to raw cotton dealers, by the time of his death. Ironically, this was precisely the amount Antuñano and his partner, Gumersindo Saviñón, had invested in the company when it was first established in 1830 (Thomson Ms. 1978: 329).

From these and other case studies, it is evident that, crucial to business success in cotton textiles, was the ability to achieve one of three things. One was to be able to maintain a high level of liquidity, in fact, to remain a merchant. This was very hard to achieve over periods of critical shortage of specie and when raw cotton was scarce and subject to monopoly, and also when the foreign trade sector was in crisis (often the cause of merchants investing in industry). Only very powerful import houses, such as

Velasco y Cía., were able to prevent the industrial tail from wagging the mercantile dog. Many of the smaller merchants, who became industrialists, abandoned in doing so the liquidity so necessary for the merchant profession. A second prerequisite for success or survival as an industrialist, a consequence of the difficulty of achieving the first condition, was the ability to establish formal ties with a reliable and powerful raw cotton supplier. This was decisive between 1841 and 1845 when successive cotton harvest proved inadequate for satisfying demand from factories. The third condition for success was the ability to establish a vertically integrated enterprise from cotton field to the markets in the interior. This "Velasco" solution was beyond the reach of most industrialists for obvious reasons. Most, therefore, if they sought to avoid the dependency and lower profits which resulted from the second option, strove to maintain their interests in wholesale and retail trade, their commercial influence upon handloom weavers and interests in other lines of business. Several Puebla textile industrialists also possessed *tocinerías* and bakeries and invested in other industrial ventures such as glass, paper and porcelain. And after 1847, land and mining became once more attractive investments (Thomson Ms. 1978: 392-430).

An overview of investment and enterprise in modern cotton spinning technology, from the early 1830s to the early 1850s, reveals the following pattern. Many of the entrepreneurs who established the first factories saw their liquidity vanish after having to disburse large quantities of capital in setting up their enterprises over a period of unprecedented political instability. The French blockade and the protection it afforded probably saved these men from bankruptcy. The bulk of investment in spinning plant occurred between 1839 and 1842 under conditions which favoured the consolidation of a monopoly of cotton supply among a small number of strong businesses with agricultural links, in the case of Puebla, or political *agio* links, in the case of Mexico City industry. Over the 1841-45 period — one of continual crisis in cotton supply, illegal imports of prohibited goods and currency shortage — many of the original industrialists became insolvent, permitting the emergence of a new generation of factory owners who, having acquired their businesses cheaply, tended to regard their factories more as sources of rent or short-term speculation than as harbingers of the great industrial transformation, the vision of people like Antuñano in the early 1830s.³⁸

38 A good example of such an industrialist is that of the French import merchant, turned rentier-manufacturer, Pedro Berges de Zúñiga, examined by Aguirre Anaya

The establishment of cotton spinning factories involved, until the introduction of machine weaving on a large scale during the 1890s, the successful blending of “modern” and “traditional” industry. The mechanisation of cotton spinning and the prohibition upon the importation of ordinary cotton cloth, ensured the recovery of home handloom weaving although, in Puebla at least, it became increasingly common to bring as many as one hundred handlooms under one roof (Thomson Ms. 1978: 489-490). As early as the mid-1840s it had become evident that production was sufficient to supply the domestic market and that overproduction had become a problem. The solution, it was believed, lay in improving the quality and range of production, particularly to enter those areas of production made possible by recent advances in industrial chemistry: bleaching, dyeing and printing. Although advances were made in this direction, with several small bleaching and printing factories established, Mexico was at a severe disadvantage. Not possessing an indigenous chemical industry, Mexican manufacturers had to import dyes and chemicals, as well as patterns, increasing costs and curtailing competitiveness. The commercial success of cotton printing depended upon the provision of the market with a wide and ever changing choice of product. Mexican manufacturers were able to produce a small range of prints very well, albeit expensively, (some of the first samples are kept in the State Museum in Puebla), but they were unable to compete with the greater choice from Europe’s specialised cotton printing industry (Thomson Ms. 1978: 333). An irony was that Mexico remained one of the world’s principal producers of natural dyes – dyewood, indigo and cochineal – which were used for the rebozo weaving industry while the dyes for the “new industry”, being chemical based, were imported.

An entry into the second stage in the development of a modern cotton textile industry was therefore not achieved and, even at the end of the nineteenth century, the specialisation of the industry remained rough cotton manta. Although large scale textile printing proved unattainable, traditional skilled handloom weaving of fine cotton and silk textiles did undergo a remarkable recovery during the 1840s. The manufacture of rebozos, once confined to Puebla and a few specialised southern towns such as Temascaltepec and Sultepec, had extended throughout the republic by the 1850s, once it was no longer tied to geographically limited

and Cavabarín Gracia (Ms. 1979). See also the report on the Berges house by the French Consul to Veracruz, Francis La Vallé, Febr. 25, 1851, in Díaz 1974, I: 27. Berges took over Antuñano’s factories in the early 1850s.

areas of hand spinning.³⁹ From Revillagigedo's secret reports to the Spanish Crown in the 1790s to French consular reports of the 1860s, the substitution of the Mexican manufactured rebozo — worn by rich and poor alike — by a European equivalent, was seen as one of the ripest potential plumbs for importers.⁴⁰ The traditional domestic rebozo manufacture, however, survived and, indeed, was extended.

The principal casualty to the traditional textile manufacturing structure was, of course, the thousands of cotton spinners. The undoing of an entire commercial and social complex, as a result at first of the importation of yarn, then of machine manufacture, has yet to be studied. It is vital to appreciate when seeking to explain merchants' behaviour with modern industry, as well as the position — the relative independence — of the handloom weaver under the new regime of production.

From the start of the government's active interest in industrial development in the early 1830s, modernisation was envisaged across a broad front to include woollens, linen, hemp and silk, apart from the other industries shortly to be examined. How did non-cotton textiles fare over this period? Mexican woollens had a much longer history of direct mercantile involvement and large production units than cottons, the bulk of fine, *entrefino* and ordinary cloth having been produced in *obrajes* during the colonial period. The principal purpose of the *obraje* system was the control and discipline of labour for the multifarious tasks of cloth production, a condition that was no longer so urgent once wool spinning had been mechanised.

From the early 1820s the bulk of woollen production devolved to smaller workshops which became much more evenly distributed throughout the centre and north of the republic. This trend towards dispersal appears to have been halted, indeed reversed, with the establishment of modern woollen spinning and weaving factories in the old centres of production: Querétaro, Mexico, Puebla and Tlaxcala. The failure of either Aguascalientes or San Luis Potosí, where woollen production had expanded impressively during the 1810s and 1820s, to establish factories, despite their locational advantages, appears to have been the result of the unwillingness of the principal merchants in these cities to relinquish their prime interest in the import trade. Neither city contained a body of men

39 *Memoria de Industria* (1845) in Chávez Orozco (1962: 368).

40 BAGNM, 1st. series, vol. 1 (Mexico, 1930), p. 202, for Revillagigedo's secret correspondence with the Crown upon colonial manufactures and other matters. For a full consular report on the state of Mexican manufactures in 1864 see Díaz (19/4, I: 274-282).

interested in modern industry or willing to invest large sums in mechanised plant.⁴¹ The Querétaro, Mexico and Tlaxcala factories were all reported to be doing well in the early 1850s (*Memoria de Colonización, México* 1850; Chávez Orozco 1963: 73). It was pointed out in Querétaro, however, that mechanisation of woollens had contributed to the problem of vagabondage and banditry and, overall, the transformation of woollens appears to have had a more disrupting effect upon the established pattern of production than the mechanisation of cotton spinning which left the large weaving artisanate intact (González Navarro 1977: 175). Despite numerous attempts, linen and hemp failed to gain a foothold over this period, probably for the same reasons that they had failed under late Bourbon *fomento* during the late eighteenth century (Serrera Contreras 1974). There were two principal attractions of these industries. Firstly, flax and hemp agriculture would permit altiplano farmers to diversify from food staples for which prices over the three decades following independence were often unacceptably low. Linen and hemp manufacture would also create employment in the depressed cities of central Mexico. Experiments with flax and hemp agriculture were generally successful: they could be grown everywhere where there was wheat and required less supervision and tending than food crops. The problem lay at the manufacturing stage.⁴² Here it was necessary for the entrepreneur to take

41 In 1837 woollen manufactures in Aguascalientes were reported to be in decline although an intention to establish modern machinery and a loan bank was expressed. By 1844, although Aguascalientes reputedly produced the best military uniforms in the republic, the textile industry and the arts generally remained in a depressed state, the absence of machinery, again, seen as the state's principal handicap: "Si hubiese capitalistas que emprendiesen por maquinas movidas por bestias, como hoy estan las de Querétaro, sacaría grandes ventajas, por lo mucho que se proporcionan en sus jornales los artesanos y mujeres laboriosas ..." A report from San Luis Potosí in 1853 valued the import-export trade at over four million pesos while the value of industry was reduced to only 500,000 pesos "que se reparten en las fabricas de lana y algodón, de colambres, de aguardiente, ocupando poco mas o menos, diez mil individuos, la mayor parte hombres. Todas las fabricas estan en poder de la clase media [...]. Los capitalistas no se dieran á emprender nada de industria por la dificultad de competir con el extranjero, y se limitan á lo que les producen sus fincas o jiros [...] sin meterse á especulaciones nuevas." "Noticias estadísticas del Departamento de Aguascalientes," *BSMGE*, 1st. series, vol. 1 (México, 1850), p. 253; *Memoria de Industria* (1844) in Chávez Orozco (1962: 287-288); and Iturribarria (1859: 315).

42 For successful linen and hemp growing during the 1830s and 1840s see Cal (1832). In Nuevo León: Report from José Francisco Arroyo pointing out that linen required more labour in its elaboration than cotton, however, simple flax was to grow, *Registro Oficial*, vol. 5 (Mexico, Febr. 28, 1831), p. 110; *Memorias de Industria* (1843, 1844, 1845) in Chávez Orozco (1962: 152-153, 270-274 and 342-344).

on a large labour force for a short time after the harvest to prepare the flax or hemp for weaving, to possess large buildings for storage apart from having to take on and train a regular labour force of weavers. With the simple machines at their disposal in the 1830s, labour costs proved too high for production to be commercially viable.⁴³ Too few farmers and merchants were, consequently, prepared to invest enough to ensure a scale of production necessary to merit an import prohibition, the *sine qua non* of all new industrial ventures over this period.

Silk production had a troubled history over the thirty years following independence, illustrating many of the problems facing Mexican manufacturing generally over this period of great technological and economic change. The silk industry seemed a viable area of investment for several reasons: the existence of an ancient silk producing tradition, the extensive mulberry plantations in certain areas, the availability of relatively inexpensive modern technology – particularly the Jacquard loom –, the willingness of Frenchmen to supervise production and the large scale of silk importation from Asia and Europe, second only to cottons in value (Lerdo de Tejada 1967: *Balanzas del Comercio*). Silk production over this period went through three overlapping stages, each encountering failure. The first efforts were directed at reestablishing raw silk production in its traditional stronghold: the Indian villages of the Mixteca mountains of Puebla and Oaxaca. Alejandro Bozán, an entrepreneur based in Tehuacán, found in 1832 that the local Indian population proved too elusive and unreliable a labour force for supplying the regular working of the machines he had brought from Europe. Had he concentrated exclusively upon the organisation of raw silk production and left the twisting and weaving of silk to the existing, albeit depressed, silk weaving industry in Puebla, then he might have met with greater success. The desire of entrepreneurs to control all stages of production through their possession of what they regarded as the key to success, the machine, caused them to ignore the possibility of resuscitating the old regime of production, since it would afford them less control than they would have liked. Bozán abandoned silk, purchasing a cotton gin, hoping to gain a stake in that increasingly lucrative trade.⁴⁴

43 For problems with manufacturing linen and hemp in Zamora, Toluca and Puebla: "Apuntes para la corografía y estadística del Estado de Michoacán," *BSMGE*, 1st. series, vol. 1 (México, 1850), p. 183; and *Memorias de Industria* (1843, 1845) in Chávez Orozco (1962: 152 and 342-343).

44 For Alejandro Bozán's disappointments in Tehuacán, AGN, Banco de Avío, caja 3, exp. 34; and *Registro Oficial*, vol. 3 (Mexico, Nov. 28, 1830), p. 297.

The next stage was the attempt by entrepreneurs, funded by the Banco de Avío and groups of shareholders, to establish silk raising and manufacture in areas lacking a previous tradition. In Michoacán a company under a French manager, Estevan Guénot, went ahead in the early 1840s with a project to establish an ambitious, fully integrated industry equipped with the most modern machinery, operated by a large corps of French technicians from Lyon. By 1844 the company was on the verge of bankruptcy and the Department of Industry and Agriculture, to whom it turned for help, made the following analysis of its defects:

La demasiada certidumbre con que contó con el buen éxito, sin prever las graves dificultades y contrastes que se presentan en qualquiera empresa nueva, acometiendo á un tiempo al cultivo de las moreras, el hilado, torcido, tintura y tejido de la seda, empleando en máquinas y otras cosas gran parte del capital, que habria sido suficiente si se hubiera reducido á solo los plantíos de moreras, á la cria de gusanos, devanado, torcido é hilado de la seda, y no á la compra de máquinas [...] las esperanzas á que dió lugar esa empresa han sido frustradas casi enteramente, y acaso no existe hoy otra esperanza que la de que fructifiquen por esfuerzos de particulares oscuros, las preciosas semillas que sembró con poca fortuna la gran compañía michoacana y su estimable director M. Guénot.⁴⁵

A less ambitious and more prudently managed business, established by Santiago Aldasoro in Coyoacán, near Mexico City, proved no more successful in the long run.⁴⁶ No one in Mexico over this period succeeded in producing a sufficient quantity of raw silk to satisfy demand and justify a prohibition upon imports.

The third phase in the history of silk production over this period was the recognition of the failure of domestic raw silk production, the liberalisation of import restrictions upon raw silk and the introduction of processing and finishing machinery by merchants, shopkeepers and artisans of more modest means.⁴⁷ By 1850 there were 21 workshops in the republic spinning, dyeing and weaving imported raw silk (17 in Mexico City, 1 in Puebla, 2 in Guadalajara and 1 in Zamora) employing 4,000 workers, with

45 "Noticias Estadísticas [...] de Michoacán," 1845, *BSMGE*, 1st series, vol. 1 (México, 1850), pp. 183-184, and *Memoria de Industria* (1844) in Chávez Orozco (1962: 334-341).

46 *Registro Oficial*, vol. 5 (Mexico, June 1, 1831), p. 128. Coyoacán factory not mentioned in *Memorias de Industria* of the mid-1840s in Chávez Orozco (1962).

47 The Dirección General de Industria recognised in 1844 the inability of Mexican raw silk producers to compete with their Chinese or European counterparts, recommending that the prohibition upon raw silk imports be removed, with the prohibition on processed silk being retained, to encourage this branch of industry. *Memoria de Industria* (1845) in Chávez Orozco (1962: 269).

a potential for producing 100,000 lbs of finished silk annually. A further 4,000 were employed in weaving silk-cotton rebozos. In this year all these workshops were reported to be closed as a result of illegal importation of silk since the American War. The silk manufacturers claimed that imported raw silk was selling at more than imported finished silk at the Lagos fair of 1850 and “esto ha causado la completa y lastimosa ruina de los talleres de torcer y teñir en el país [...] y en este momento están sus numerosos trabajadores llorando y mendigando.”⁴⁸

I turn finally to innovation in other industries: paper, glass, iron and porcelain. The same geographical dispersal is evident with the new establishments in these industries as with modern cotton spinning: sheet glass and crystal factories in Puebla, Mexico and Jalapa, paper factories in Guadalupe, Mexico and Puebla and iron foundries in Durango, Michoacán, Hidalgo, Mexico, Morelos, Puebla and Oaxaca. Although all of these industries had existed in Mexico for much of the colonial period, these new enterprises were introduced by people with no connection with the traditional industries. While with paper and iron this was understandable for the new technology brought with it entirely novel raw material demands and managerial requirements, the glass and porcelain enterprises might have been more successful had more heed been paid to established and resilient traditional manufactures. In all of these industries the commercial calculation of the entrepreneurs involved was not of updating or renovating traditional industries but of introducing machines that would enable them to substitute imports with the effect also, perhaps, of undermining the traditional industries along the way.

The paper, glass and porcelain enterprises faced a major contradiction from the start. Their directors, representing companies of shareholders made up of professional men, clerics, members of notable families with little mercantile and no industrial experience, anticipated, or had been promised, that the commencement of production would be accompanied by import prohibitions upon competing manufactures. They set out to produce goods for a luxury market that had been accustomed to an ever wider consumer choice since the liberalisation of colonial trade in

48 *Memoria de Colonización* (1851) in Chávez Orozco (1962: 473-474). Silk production was by no means extinguished as a result of the entrepreneurial failures of the 1830s and 1840s. The French Consul in Tampico reported in 1864 that high quality silk was still produced in Michoacán and the Mixteca and used in the more expensive rebozos, the cheaper ones using imported silk from France. He added: “Si las camaras de seda establecidas en estados donde la morera se da muy bien estuvieran mejor instaladas, se obtendrían magníficas cosechas” (Díaz 1974, I: 278).

the 18th century. While none of these enterprises could have been expected to have developed a sufficient variety of production to have matched imports, as few as one of these enterprises in any industry, with its new machinery, could produce, on its own, at a sufficient scale to satisfy the entire domestic demand. Quite apart from the technical problems which all of these industries faced — a shortage of rages and raw material for paper, problems with ovens in glass and pottery, problems with hardening the stone lining of high furnaces in iron⁴⁹ — all these industries, except iron, were faced with the problem of inadequate demand and overwhelming foreign competition despite import prohibitions, once these technical problems had been overcome.

For these reasons, failure in these industries was common. Jalapa's crystal factory and Puebla's porcelain, sheet glass and crystal factories remained closed for much of the 1840s when it was found that they were unable to compete even with imports burdened with tariffs and hampered by prohibitions. Prohibitions on particular items which these enterprises succeeded in producing merely caused importers to shift to slightly different but competitive (and always cheaper) European goods.⁵⁰ Any blanket prohibition upon, say, "European porcelain", "European paper" or "European crystal", while it would undoubtedly have helped these enterprises, was politically unacceptable, however patriotic certain groups of consumers, who agreed only to consume "national manufactures", pretended to be.

The failure of many of these modern enterprises (the closure of the republic's largest paper mill, La Beneficencia, with over one million pesos of wasted investment, being the most notable example — Thomson Ms. 1978: 417-425), contrasts strongly with the stolid recovery of many industries using a traditional technology, part of a general urban demographic and economic recovery from the late 1830s. Puebla's ordinary tumbler and bottle factories, mayolica potteries, iron foundries, hat and soap factories, prospered over the 1840s (Thomson Ms. 1978: 426-430). Established for centuries in Mexico, these industries produced basic goods of popular consumption which customarily had complemented rather than competed with European imports.

The conditions that permitted the survival, indeed revival, of much of

49 *Memorias de Industria* (1843-52) in Chávez Orozco (1962), on glass, pp. 187, 381-382 and 411; porcelain, p. 410; iron, pp. 182-183, 276 and 379-380; paper, pp. 178, 209, 372-375, 410 and 477.

50 For the Jalapa glass factory: *Informe Veracruz* (1845: 44-45). For glass in Puebla: Thomson (Ms. 1978: 392-404).

Mexican small-scale traditional manufacturing, proved uncondusive to the success of non-textile modern enterprise. While the fragmentation of the national market and the unrelieved obstacles to inter-regional trade might offer a measure of protection to a woollen cloth weaver or soap manufacturer, making importation of such cheap and bulky items uneconomic, they greatly reduced the market range for business that required an extra-regional market to operate efficiently. This accounts for why the smaller Guadalajara paper mills, much closer to the markets of the interior and the north, survived, while the Puebla mill was forced to close. The founders of the modern glass, porcelain and paper factories in Puebla optimistically proclaimed that their enterprises would be able to satisfy the entire Mexican demand for their products. Once initial technical, raw material and labour problems had been overcome, these factories probably could have satisfactorily supplied the domestic market. But contraband, political, fiscal and geographical obstacles barring access to extra-regional markets, competition from legal imports as well as from manufacturers in other regions (Mexico City-Puebla rivalry in glass, paper and porcelain) all combined to reduce demand and profits, making it harder for these enterprises to survive periods of crisis. The importer of these goods was in a much better position to adjust supply to the vagaries of the Mexican market. The lull in entrepreneurial activity from the mid-1840s to the early 1870s was a recognition that the process of industrialisation under the prevailing market circumstances had reached its limit.

V. CONCLUSION

Mexican manufacturing in 1850, when compared with its state in 1800, presents certain marked differences. Modern industrial technology had transformed certain industries — cotton and wool spinning, wool weaving — and had brought industrial processes hitherto absent from Mexico; the manufacture of paper, the smelting of iron in high furnaces for making machinery, the rolling of sheet glass, the printing and bleaching of cloth through chemical processes and the manufacture and decoration of porcelain. Certain industries were in decline: hand spinning, *obraje* woollen manufacture, tanning of goat hides for workmen's breeches, now replaced by textiles. Industry, modern and traditional, now existed in areas where, before 1810, it was scarcely known: the north and the tropical coastal regions. Looking more closely at the organisation

of industry, it was now much less common for artisans and factory operatives to reside at their place of work.

In spite of these differences, it must be concluded that when the overall character of Mexican manufacturing and its place within the economy as a whole is observed, continuity is much more evident than change over these fifty years. The scattered siting of modern industrial enterprise as well as the centrifugal scattering of artisanal manufactures, demonstrates, not the development of the national market, but the continuation of a pattern of economic parochialism evident throughout the colonial period but accentuated after 1810 as a result of the decline of silver mining, the loss of Mexico City's commercial centrality and the disintegration of a once centralised and monopolistic merchant body into numerous provincial and local aggroupations, some wedded to the idea of industrial development, others to the recovery of mining production and the opening of Mexico to foreign trade. The scattered geographical distribution of enterprise in modern manufacturing brought about a duplication of industrial capacity which disappointed the hopes of industrialists in the old manufacturing cities of the central altiplano — Querétaro, Mexico and Puebla — who were denied a national market. These cities, however, were at least able to emerge from the depressed state which they were in during the 1810s, partly, it must be recognised, as a result of the limited industrialisation that took place in the subsequent two decades. Neither Antequera (Oaxaca) nor Morelia (Michoacán) shared in this process, their recovery from the crisis of Independence being correspondingly much slower.

A final feature of continuity was the importance of merchant capital, merchant practices and merchant values over industrial capital, a reflection of the pre-eminence of the external sector, based upon silver exports and imports of European manufactures, over any other sector of the Mexican economy. This was in spite of instability of this sector mentioned at the beginning of this paper. It has been shown that the most successful industrialists were those who retained their liquidity and did not become too deeply involved in industry to the exclusion of trade or other financial operations (such as financing governments or cotton agriculture). Mercantile skills were the most useful ones for industrial success. As a result of the very considerable investment in modern industrial processes between 1830 and 1850, a new class of industrial entrepreneurs, able to establish new institutions such as banks and modify existing economic structures such as interstate taxes, did not emerge. Rather, the traditional arbiters of Mexican economic life, the merchants, initiated and

Table 2
Some Wool Prices 1786-1844 (in Reales/Arroba or 25 English Pounds)

Date	Puebla	Other Centres	Source
1786		22 (Saltillo)	Harris (1975: 89).
1792		25 (Saltillo)	Harris (1975: 89).
1793		28 (Querétaro)	Humboldt (1966b: 452).
1800	40		
1801	32		ANPP, no. 5, fol. 503-504.
1801		20-24 (Saltillo)	Harris (1975: 89).
1802, Feb.		20 (Saltillo)	Harris (1975: 89).
1802, May		14-21 (Saltillo)	Harris (1975: 89).
1802, Aug.		16-21 (Saltillo)	Harris (1975: 89).
1803		19-24 (Saltillo)	Harris (1975: 89).
1803		20 (Guadalajara)	BM, Ms. 20896 Add. 171557.
1804	27		RPP, t. 38, fol. 282.
1806	31		AAP, Libros de Abastos.
1807	34		AAP, Libros de Abastos.
1808	47		AAP, Libros de Abastos.
1809	52½		AAP, Libros de Abastos.
1810	60¾		AAP, Libros de Abastos.
1811	66		AAP, Libros de Abastos.
1812	73½		AAP, Libros de Abastos.
1821	56		RPP, t. 41, fol. 411.
1822	42		RPP, t. 42, fol. 37.
1826		16-24 (Querétaro: wool from "tierradentro")	Ward (1828, II: 183, 349).
1826		28-30 (Querétaro: local "chinchorro" wool)	Ward (1828, II: 183, 349).
1826		14 (San Luis Potosí)	Ward (1828, II: 183, 349).
1826		7-12 (Aguascalientes)	Ward (1828, II: 183, 349).
1844		32 (Querétaro)	<i>BSMGE</i> , 1st series, vol. 2. (Mexico, 1851), p. 202.

decided the extent of the industrial changes which took place. How "dependent" this makes the process of industrialisation which took place in Mexico over these years is a question that will remain unanswered until the merchants themselves receive closer attention from historians.