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DEPRESSION**

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Some Issues on Mexico's Nineteenth
Century Depression

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ASPECTOS RELEVANTES DE LA DEPRESION
MEXICANA DEL SIGLO XIX

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La sabiduría convencional sostiene que la primera mitad del siglo XIX en México se caracterizó por luchas políticas internas causando un caos de tal magnitud, que el país cayó en una profunda depresión económica de la cual podría salir hasta la llamada Paz Porfiriana en la década de 1870. La hipótesis central del trabajo sostiene que este no fue el caso sino que hay otros elementos, de tipo tanto estructural como de sucesión de cortos plazos, que permiten una explicación alternativa de la depresión del siglo XIX. Entre estos elementos destacan los problemas de transporte, de carencia de recursos e instituciones crediticias, de cambios en la política económica, además de los problemas políticos. Por otra parte, se exploran las posibles fuentes del subdesarrollo mexicano centrando la atención en las tasas diferenciales de cambio tecnológico entre México y los países más desarrollados, en el impacto negativo que tuvo la extracción de recursos por parte de la corona hacia el final del período colonial y la importancia fundamental del momento en que ocurrió y la destructividad de la guerra de independencia sobre la economía del país.

SOME ISSUES ON MEXICO'S NINETEENTH
CENTURY DEPRESSION

Enrique Cárdenas

In relation to Mexico's economy during the first half of the nineteenth century, the conventional wisdom hold that the country fell into a continued struggle for power, so that the economic system was unable to work properly until the so-called Porfirian Peace in the 1870s. The central hypothesis of this paper sustains that, in addition to political factors, there were other elements both structural and short termed which provide an alternative explanation for such outcome. Difficult transportation facilities, lack of credit institutions and resources, and sudden changes in economic policy are among these factors. Moreover, this paper explores possible sources of backwardness in the mexican economy. The emphasis is placed on the differential rates of technological change between Mexico and the more developed countries; on the negative impact that royal extraction of resources had on the economy towards the end of the colonial period; and on the timing and destructive character of the war of Independence.

INTRODUCTION

There is the common belief that Mexico was born backward and was to remain so, despite the encouraging forecasts and descriptions of Alexander Von Humboldt in the late colonial period. The conventional wisdom is, in succinct terms, that once Independence was attained in 1821, the country fell into complete political chaos reflected by constant violent struggle for power and foreign intervention, factors that prevented any economic development from taking place. This era could only end in the 1870's with the so-called Porfirian Peace, when political stability allowed the country to engage once again in economic activities.

Although this general statement does not include all the details, it is held to be essentially true. The assertion here, however, is that this is not the whole story and that there are a number of important questions, seldom asked, which deserve considerably more attention. Among them one could ask the following: To what extent was the Novohispanic economy backward with respect to the more developed economies by the end of the 18th century? Which were the sources of backwardness of this economy? To what extent and in what ways were obstacles to economic growth removed by the War of Independence? What prevented the economy from taking advantage of innovations of the Industrial Revolution?

To provide tentative answers to these questions is the goal of this paper. In principle, I wish to shed some light on the origins of Mexican underdevelopment, looking at the economy since the late colonial period until the mid 1800s.

If one could accept the hypothesis that, just before the first innovations of the Industrial Revolution began to take place in the 1760s most western countries had essentially the same technology, and that differences in economic performance reflected differences in resource endowments, economic organization, and institutional property rights arrangements, then the origins of a country's backwardness vis a vis others could be traceable back to those dates. Put differently, despite the risk of oversimplification, one could argue that if two economies were technologically similar but with different characteristics such as the ones mentioned above, a widening gap in their respective growth paths could be partially explained by changes of these characteristics and by differences in their rates of technical change. This last consideration is particularly relevant in a period of rapid innovation, such as during the Industrial Revolution.

It is interesting to consider the question of innovation with other hypothesis advanced in relation to the origins of Mexico's economic backwardness. In a provocative article, John H. Coatsworth outlined what he considered the main obstacles faced by the Mexican economy during the 19th

century: High transportation costs and inefficient economic organization, meaning by this an "ensemble of policies, laws and institutions that magnified, instead of reduced, the gap between the social and private benefits of economic activity".^{1/} Although I agree with him in many respects, a few issues deserve further comment.

Coatsworth also made some estimates of Mexico's national income for the nineteenth century and compares them with those of Great Britain, the United States, and Brazil. Another purpose of this paper is to corroborate, though in a rather rough manner, the trends in national income figures that he showed. I attempt this by looking at the structure of the Mexican economy during this period and draw some conclusions in this regard.

Political instability, which has traditionally been thought to be the underlying factor behind the economy's stagnation in the first part of the nineteenth century, is a very vague term. The important question is whether such instability retarded growth and, if so, how. I attempt to shed some light on this by considering some specific forms which this political disorder took, and thus determining more accurately to what extent this factor actually hampered economic growth in the first half of the 1800s. Naturally enough the scope of this paper does not allow for a detailed study; however, I hope that the ideas shown are in the right direction.

The first section of the paper considers the most important economic sectors at the end of the colonial period (1760s-1810), emphasizing their relative productivity as well as the elements which restricted their development. A superficial yet probably meaningful comparison with some other more advanced countries is also made.

The next section includes a brief discussion of the devastating effects of the War of Independence (1810-1821) with regard to the economic structure. Special emphasis is placed on the destruction of the capital stock as well as on the financial capital outflows.

Finally, some modernizing efforts undertaken during the first twenty five years of independent political life are considered. In that section, the emphasis is placed on the mining, manufacturing and financial sectors, and on the railroads. The aim is to isolate some of the major factors that prevented the economy from coming out of the stagnation and that significantly contributed to Mexico's relative backwardness.

THE LATE COLONIAL PERIOD

Agriculture.

Towards the beginning of the nineteenth century the primary sector had a dualistic nature, usual characteristic of a subsistence economy with an inflow of a more modern, perhaps even market oriented subsector. Although regional differences were important, it is possible to argue, in general terms, that the more traditional sector was mainly composed of small tenant peasants who either worked their own lands or else belonged to a village that assigned them a plot. This plot was not the peasant's own property so that he could have only its usufruct. These peasants produced only for selfconsumption and should there be any surplus or deficiency, they would dispose of or remedy it in the market.^{2/} On the other hand, there was a rather market oriented component of the agricultural sector constituted by hacendados, sharecropper, renters or lessees and rancheros. In the case where the owner of the land was the hacendado, he, in turn, had some overhead labor and hired the remaining lands on a daily basis. The hacendado not usually cultivate all his land and would dispose of the remaining 64 renting it out directly to a lessee or a sharecropper. Why did the hacendado rent part or all of his land instead of working it himself?^{3/}

There were three main reasons behind his decisions. First, agricultural activity was fairly risky because of weather fluctuations. By renting part of his land out, the owner was sharing risks with others and thus his expected revenues would increase. Second, the scale of production seems to have been near optimal and further extensions of output, given the size of the market available, would have implied a reduction on profits due to the relatively low elasticity of demand for food crops beyond the profit maximizing point. Third, by renting out these marginal lands the hacendado had a sure source of liquid funds to face any unexpected financial difficulties. This scheme of behaviour is consistent with the observed fact that hacendados tended to enlarge their estates, apparently seeking prestige and social status. Enrique Florescano has argued.^{4/} rather forcefully, that the economic justification for this behaviour resides on the relative small market size that the hacienda supplied. To the extent that haciendas acquired monopoly power on production, they were able to set prices at the optimal level and, at the same time, the size of the market was enlarged by the Indians that became landless.

The other market oriented group of producers were the small and medium size tenants called rancheros. This group developed mainly in the central plateau which was fertile,

quite urbanized, and some important mining centers were established there. Usually rancheros owned their land and tilled it with family labor and sometimes with hired workers; they would specialize, after providing for their own grain consumption, on horticultural and other labor intensive food-stuffs, including poultry, pigs and the like.

It is hard to accurately gauge the relative importance of both sectors on the level of agricultural output, and thus to see how modern the structure of the sector was. However, it may be useful to note that in addition to the urban centers, the mining population had to be supplied by the modern agricultural sector which in turn would also feed itself. Despite the considerable scepticism among social historians today about the ethnic structure of the population in the late colonial period, and in order to measure the degree of "modernity" in the agriculture sector, one could use some rough estimates to explore such a question. According to a well known historian, whites accounted for 20%, indians 60% and castas or mestizos another 20% approximately. Both whites and mestizos lived either in the urban sector or worked either on mining or in the modern sector of agriculture. Assuming that from 40% to 60% of the indian population were in the traditional sector of agriculture, then the size of this modern sector in terms of agricultural supply must have ranged between 64% and 76%, considering of course that foreign trade of those goods was zero.^{5/}

This, in turn, leads one to the question of expansion potentiality. It has already been said that the level of output was very much restricted by the size of the market, partly because of legal prohibitions to trade abroad. Should these obstacles be removed, haciendas and the modern sector in general would be able to increase production by simply enlarging the use of productive factors. At the beginning of the 19th century, New Spain's population was around 6 millions, a figure greater than that of the United States and over half of Great Britain's.

Land was plentiful and technology was sufficiently advanced. However important differences in regions and problems in measurement may be, wheat yields in the fertile central plateau of New Spain seem to have been similar to corresponding English returns of the period.^{6/} Nevertheless, it must be mentioned that only a relatively small segment of the Mexican population consumed wheat products, while in England wheat constituted the basic food crop. With regard to maize, the basic foodcrop in New Spain, comparisons are more difficult to make because it was not introduced in Europe until later in the century. Although the actual crop depended very much on the weather, seed ratios were on average of order of 80 to one.^{7/} which is quite large. However, it is improbable that these yields were significantly higher than those obtained in preconquest times. Actually, the relatively high productivity of maize growing, especially that based on hydraulic

or Chinampa agriculture, had enabled the precolumbian culture to achieve an advanced stage of development, because a share of the population could devote itself to non-agricultural activities.

Although it is difficult to say that the traditional sector would respond to market growth and other signals, it is certain that haciendas and the modern sector in general were in position to increase and diversify output if there were a buyer around. Therefore, there was a source of potential saving in agriculture provided transportation costs were low enough to make domestic or foreign trading of crops sufficiently profitable. This was in fact the case later in the nineteenth century when the agricultural sector experienced a boom, despite no significant change of growing techniques, but as a result of the development of railroads. Consequently, this source of potential saving remained closed until the 1870s in spite of the fact that the original railway technology was developed in Europe since the 1830s.

This, the traditional view of the agricultural organization and behaviour of the haciendas has dramatically changed in recent years. John H. Coatsworth compares this shift of attitude to that occurred in the United States with regard to slave agriculture in the southern states.^{8/} Indeed, the last ten years have witnessed a number of regional studies, from Oaxaca to San Luis Potosí, on the organization of ha-

ciendas and ranchos managed by both private and church members. These studies have shown that hacendados were more market oriented than has usually been assumed, sought profit maximization, and were quite flexible towards fluctuating conditions in the market.^{9/}

Mining.

Throughout the 18th century, but mainly from the 1770s on, silver production in New Spain increased very rapidly. In the 1760-1769 period, minted gold and silver amounted to a yearly average of 11.2 million pesos. By 1790-1799 this value of production had reached a record of 23.1 millions and slightly dropped to 22.3 million pesos the following decade. In terms of metric tons, New Spain extracted 7 328 tons of silver between 1761-1780, 11 249 tons in 1781-1800 and 5 538 in 1801-1810. New Spain was producing from 65% to 70% of America's total silver output.^{10/} Among the reasons for this spurt were the recent discoveries of some rich mines--La Valenciana in Guanajuato (1770) and Catorce in San Luis Potosí (1778)-- and Bourbon reforms directed to the promotion of the industry, such as the decrease in the royal monopoly price of mercury and gunpowder,^{11/} exemption of taxes on risky mines and draining works, and exemption of the alcabala for mining workers.

Technology improved considerably in the second third of the 18th century with the introduction of gunpowder to

extract the ore from the lode, whims to haul the ore up the shaft, and also in drainage works. These innovations accelerated the whole extraction process, thus making mining much cheaper and more efficient. Diffusion of gunpowder technology was spread out, but the refining process did not experience any major innovation in this period.^{12/}

Labor in the mining sector was free, mobile and the best paid in New Spain. A mining worker would receive more than double than a peón of hacienda and also a share of the ore extracted, partido, which ranged from a twelfth to a half.^{13/} Fixed investment financing was accomplished by reinvesting earnings or by a prosperous merchant who might acquire a mine. Large amounts of working capital were required. It was mainly obtained from merchants and very few miners were able to integrate their business vertically. Although working capital seems to have been relatively expensive, its availability was not a serious obstacle for the industry. As I will argue later, the net outflow of silver by means of taxes constituted a considerable drain of financial capital which, if invested within the country, might have modified considerably the pattern of Mexico's growth.

A second question would be of course to what extent these moneys, if retained by the mine owners, would in fact have been reinvested or at least spent within the country. There are reasons to believe that a considerable share would have been spent on imports because of the scarcity of luxury

goods in the country. Nevertheless, these resources constituted the only available source of savings in the economy. Should there have been other profitable opportunities available, it is possible that the mineowners would have invested on them.

Manufactures.

Textile manufacturing was a well known industry since precolumbian times, when a share of the tribute was paid in spun or woven cotton. Indeed, there is evidence that cotton output before the conquest was similar to that of the beginning of the 1800s, though it must be remembered that the population was much lower in 1800 than when the Spanish arrived.^{14/} Early in the colonial era, an incipient type of factory system emerged and was to last until the 19th century. The so called obrajes^{15/} were textile workshops where mainly wool and some cotton manufactures were produced and sometimes actual slaves and prisoners would work in these incipient factories. Labor conditions are said to have been similar to those observed in England during the Industrial Revolution in spite of royal efforts to improve their situation. In addition to this system, a domestic industry organization reminiscent of the European "putting out" system was also present in the colonial period, particularly in the urban centers of Puebla, Mexico City, Querétaro and Oaxaca.^{16/}

Technology seems to have been very similar to that observed in Europe in the 18th century before the major innovations of the Industrial Revolution took place. Around 80% of the labor force in the industry were engaged in the cleaning and spinning of the raw material. Towards the end of the colonial period, employment in textile manufacturing was of at least 60 000 workers and total output amounted to about 7 or 8 million pesos, a rough 4% of total GNP.^{17/}

In many instances, high costs of transportation made the industry relatively inefficient because the raw material production areas were far away from the manufacturing centers. Actually, the price of raw cotton placed in Puebla was 60% more expensive than in Veracruz, where it was produced, because it had to be transported uncleaned and thus weighted 3 times as much; labor scarcity in the Veracruz region prevented cotton cleaning in the area.^{18/} This was the reason why Veracruz was one of the two main regions where black slaves were brought in. On the other hand, these same transportation costs constituted natural barriers to trade which enabled the industry to compete at least in the less expensive types of cloth. Though with the aim of increasing tax revenues, the Bourbon reforms gave incentives to the industry through fiscal measures, such as the standardization of the tax structure as well as the abolition of all charges on looms.^{19/}

Similarly, European warfare in the late 18th century and

the subsequent naval interruptions made it difficult both to import textile goods as well as to send silver abroad, thus providing an incentive to domestic industrial production. These two factors worked together to produce a textile boom. However, traditional economic groups in the peninsula were opposed to the expansion of obrajes and further industrialization. By 1800, domestic production had reached a competitive level with luxury Spanish textiles, and caused great consternation in the councils of state. Viceroy Azanza taking charge in 1800 had express orders to investigate the matter in depth and to propose reforms to curtail the textile industry's potential. By the time of the Hidalgo revolt in 1810 no effective measure had been taken. The boom, however, was to slow down just before the War of Independence broke out the neutral powers, the United States among them, were allowed to supply the Spanish American Market.^{20/}

But England had achieved great technological innovations that changed the organization of the textile industry by 1770. Hargreaves' spinning-jenny and Arkwright's waterframe, invented in 1764 and 1769 respectively, constituted a labor saving technique which increased productivity substantially; by 1812, "one spinner could produce as much in a given time as 200 could have produced before the (jenny innovation)".^{21/} These two new machines were common in the British industry since the 1780s and were complemented by Whitney's cotton ginning machine invented in the United States in the 1790s. Steam

engines were applied to the textile industry as soon as 1785, and the United States quickly followed Britain in the introduction of these new techniques: The jenny was introduced in 1775 and the water frame in 1790.^{22/} These comments are just meant to note the timing of the first Industrial Revolution, and to stress the role of the metropolitan power in hampering New Spain's industrialization process. Although machinery imports may have been physically difficult at this stage, it is doubtful that, even if possible, the royal government would have permitted them because of fear of competition for Spanish products.^{23/}

By the 1800's the gap in textile output of Great Britain and United States and that of Mexico was considerable. In 1801 Great Britain was producing over 12 million pound sterling or around 60 million pesos of cotton textiles alone, while the United States in 1810 was producing over \$41 million in the whole textile industry. Meanwhile, Mexico produced around 11 million pesos in the whole industry.^{24/} If one considers that unit prices were significantly lower in these countries, then their real output was a substantial multiple of that of New Spain.

Transportation and Communications.

I have already mentioned that transportation costs were very high indeed, reflecting the mountainous landscape of

the country and the far away location of important urban centers from the sea coast. Most of the roads were left unattended since the 17th century, probably because of the depression in mining that started around 1630, and by the beginning of the 19th century some of them were passable only by mules. This was worsened by the lack of navigable rivers and the difficulty of constructing canals or even in filling them with water: Only local transportation in the surroundings of Mexico City was possible by waterways inherited from the Aztecs.

The importance of transport difficulties can hardly be overestimated. John H. Coatsworth gives an impressive example: If canal transportation facilities similar to those in Mexico City had been available in Guanajuato, a major mining center, its radius of trade for maize would have been enlarged from 55 to over 485 kilometers.^{25/}

The effects of reasonable transportation costs on the level and potential growth of income are very large since they influence the economy through various means: integration of the market, factor mobility, exploitation of up to now inaccessible resources, external economies when reducing costs of inputs for other industries, and the like. John H. Coatsworth, based on the results of an analysis of the introduction of the railway late in the 19th century, found that productivity differences between the United States and Mexico

by the 1800's would have been reduced, other things equal, by at least one third.^{26/} Although this figure may be an over-estimation, it is certain that substantial productivity gains could have been realized with more efficient transportation during the colonial period than the one actually available.

Indeed, Mexico was less fortunate with respect to its geography than many other countries: Britain, the United States, and France had several important cities either on the coast or at least connected by rivers, and were able to construct canals and roads at reasonable costs. In fact, by 1750 Britain had over one thousand miles of navigable streams, and the following three decades witnessed the construction of canals and roads: "the major industrial centers of the North were linked to those of the Midlands, the Midlands to London and London to the Severn basin in the Atlantic."^{27/} Mexico's transport by water was confined to the already mentioned waterways in Mexico City.

In 1803 two different roads connecting Veracruz and the capital were initiated by the Merchant Consulados of both cities, but were eventually interrupted by the outbreak of the War of Independence in 1810.^{28/}

Given the huge costs of transportation and thus the high expected returns of a cheaper alternative means of communication, it would be reasonable to think that once the railway technology was developed, the railroads would have been

introduced in Mexico very soon. However, this was not the case and the first railroad was completed until 1874.

Trade and Finance.

The trading sector was essentially oligopolistic and constituted one of the most profitable enterprises throughout the colonial period. The fact that just one or two annual shipments were sent from Spain, required the accumulation of substantial resources in order to finance one whole year's trading activities. The system was controlled in New Spain by the Mexico City Merchant Guild. Its members had both wholesale and retail shops and supplied the alcaldes mayores who, in turn, were in charge of the repartimientos of trade in which Indians had to buy animals and merchandise at usually very high prices.

With the Bourbon government of Charles III came a number of reforms that directly affected the merchant class and considerably improved the efficiency of the system. The decree of Libre Comercio in 1778 abolished the convoy system and the Cádiz monopoly. By 1789 any Spanish port was allowed to trade with New Spain without restriction. An unprecedented inflow of merchandise flooded the market of New Spain since the 1780's, prices and profits tumbled, and Guadalajara and Veracruz emerged as important trading entrepôts, thus avoiding Mexico City as intermediary for the North Provinces. Further-

more, a new group of mobile merchants appeared and the alcaldes mayores were forbidden to engage in commerce, thus diminishing barriers to trade and providing an incentive for competition.^{29/} Finally, Spanish merchants opened credit lines to their Mexican customers allowing a greater number of possible clients, and in this way a source of monopoly power was eventually eliminated. Thus, the first decade of the 19th century witnessed a quite different mercantile system than the one prevailing 40 or 50 years before. However, trade was still fairly oligopolistic, and merchants continued to enjoy some of the best returns on capital.

In addition to the trading activities, merchants constituted one of the most important sources of funds for other economic activities, mainly mining and agriculture. Local merchants, either sponsored by the Mexico City Consulado or on their own, became aviadores or financial agents providing working capital for the refining and minting stages of silver production. Important mercantile capital was also introduced into the agricultural sector late in the 18th century, as a consequence of the drop in the relative profitability of commerce which came about with the Bourbon reforms.^{30/} Finally, merchants also financed industry, both urban and rural, in a similar way to the putting-out system which existed in Britain. Merchants engaged in the textile industry of Puebla were to play a significant role in the industrialisation process after Independence.

Another important source of funds was the Church. It can be said that the Church was the only financial institution operating throughout the colonial period and during the first 40 years of independence. Church sources of funds were the tithes charged on agricultural production, rents from urban and rural properties, and capellanías, pious works and legacies. M. Costeloe concisely describes the organization and procedures of this institution:

"By the 18th century the ecclesiastical corporations were investing their funds by giving loans at interest to any person who required them, provided that the borrower could furnish an adequate security (usually real estate). Any person could request the loan of a sum of money for a term of 5 to 9 years during which he would pay 5% interest on the debt, and at the end of which he in theory was obliged to redeem the capital. In practice an extension... was almost always given. There was no restriction placed on the borrower as to the use which he made of the money, and the size of the loan depended entirely on the amount of funds which were available at the time."^{31/}

By the end of colonial times, an unknown but seemingly considerable amount of rural properties were burdened with mortgages, many of which were never redeemed.

Finally, the third and probably the most important

source of funds for economic growth was reinvestment of earnings. This was especially true in the mining sector which required heavy fixed investments. The relative importance of each source of financing in the economy is difficult to gauge, but a rough idea may be given by looking at the different activities: agriculture was mainly financed by the church and reinvestment of earnings while mercantile funds only played a role after 1778. Mining fixed investments were financed by the reinvestment of profits, while working capital was provided by mercantile funds. Finally, industry and trade were financed with mercantile capital.

But there was no banking system, and not even local banks existed. Comparatively, Britain had a long tradition in banking and one of the great advantages with which she entered the Industrial Revolution was a developed system of money and banking. The Bank of England had been founded as early as 1694 and by the 1770s there were a number of private note-issue banks throughout the country. Although this is not the place to trace the development of the British banking system and its role in the Industrial Revolution, there is no doubt that its existence facilitated the process of economic growth by increasing the means of payments and by serving, later on, as a financial intermediary.

Some additional remarks

According to John H. Coatsworth, by 1800 the existing

gap in GNP between Mexico and Great Britain, and Mexico and the United States, was of order of 37% and 44% respectively.^{32/} The gap is measured as the percentage of Mexico's per capita income to that of Great Britain's or the United States'. The preceding section tried to corroborate these figures from a more structural perspective. Let us review this point. In regard to agriculture, although productivity in the modern sector was well in line with that of the other countries, a considerable share of the more traditional agricultural population was practically isolated from the money economy and hardly in contact with other economic activities. This implies that the agricultural sector as a whole must have been less productive and less integrated in the market, thus introducing a downward bias in GNP relative to that of Great Britain or the United States.

Mining constituted one of the most modern sectors in the economy, even though the recent innovations for pumping water by the use of the steam engine were not yet applied. Mining also constituted an important source of derived demand for all sorts of goods from other sectors. It was taxed most heavily and those taxes would not reenter the economy, thus transferring domestic savings abroad even though they were needed at home.

Surely the most backward activity relative to those of the more developed nations considered was the textile industry. By the first years of the 19th century the gap

in productivity was enormous: New Spain had not incorporated any recent innovation and therefore lagged behind at least 20 years particularly important since fundamental changes had taken place in this period. The first stages of the Industrial Revolution were being reached at the time when in Mexico nothing was being done.

Although a shortage of financial capital was not evident in the last years of the colonial period, New Spain lacked a financial infrastructure which later proved to be of some significance.

Of course it is impossible to give a definite answer in regard to the numerical income gap suggested by Coatsworth. However, it is possible to say that his figures seem very plausible according to the evidence. As I mentioned in the introductory section, Coatsworth suggests that the causes of such differential are "geography", or high transport costs, and colonial "feudalism" or inefficient economic organization. In principle I agree that these two elements actually played a significant role in Novo Hispanic development, but one wonders whether this was all. Although it is not possible to measure the impact on economic growth of such factors, there is no doubt that they had a depressing effect.

However, Coatsworth misses a very important point. He does not pay attention to the colonial burden imposed to New Spain, and in reality he explicitly neglects it. Ac-

According to his own figures, the average burden from 1797 to 1820 on Mexico was of 17.3 million pesos a year, which corresponds to approximately 7.2% of its GNP. This burden is divided into a fiscal burden which is the "uncompensated export of gold and silver extracted by the colonial government as net fiscal revenues", amounting to 10.1 million pesos a year, and a trade burden, the "mercantilist restrictions on direct trade with foreign countries" that amounted to 7.2 million pesos a year. Coatsworth says that it only amounts to an increase of three pesos per capita a year which cannot eliminate the gap with the United States and Great Britain. According to his figures, British per capita income was 196 pesos in 1800, while that of the United States was 165 and Mexico's 73 pesos.^{33/} This issue deserves more attention. First and only by way of comparison, the 13 American colonies suffered a colonial burden in 1775 of 0.5 million pesos a year, which is 35 times smaller than the one suffered by New Spain, and only constituted the 0.3% of their GNP.^{34/}

Second, and more important, a net drain of 7.2% of GNP implies a net loss of saving of that same magnitude which is incredibly high. "W. A. Lewis has suggested that a significant difference between an underdeveloped and developed country is that the former normally saves 6% of its national income and the latter 12% or more; and Professor Rostow has made a change in the national rate of investment from about

5% of national income to about 10% a condition of the take-off into sustained growth. ^{35/} In fact, Britain was investing about 5% of her GNP in the late seventeenth century and had increased this share to 10% by the late 1850's.

These figures amply show the real magnitude of the colonial burden imposed to New Spain by the government of Spain. If some of the taxes sent to the metropoli, which actually constituted Novo Hispanic net savings, had been used in some productive projects such as transportation facilities, the pattern of Mexican economic growth would have probably been different to the one actually experienced. One point is clear: the economy was producing a net surplus subject to be invested or consumed, at least partially, in domestic products as there was a large source of savings available. Although the multiplier effect of this additional spending can only be imagined, such surplus was indeed very considerable. That is, the amount of income forgone was potentially much higher than 3 pesos per capita a year.

Finally and to stress this point, the fact that the economy lacked of any other source of savings makes the colonial burden all the more important in explaining the late development of the economy.

THE WAR OF INDEPENDENCE: 1810-1821

Having considered the economic structure of New Spain

at the beginning of 19th century, it is convenient to consider how devastating the War of Independence actually was. During the eleven years that this war lasted, the agricultural sector witnessed a net loss in some of its infrastructure, mainly in the central plateau where most of the battles were held. "Many haciendas were virtually abandoned, their casco building burnt or left in ruins, the dams broken, and their livestock either slaughtered or stolen".^{36/} Financial difficulties were reflected in the division of haciendas or at least in the more intensive use of sharecropping and direct leasing activities, and also in the significant reduction of landlords' payments of interest on their church mortgages. Some of the most productive mines were in the central plateau, too, and during the war those great mines slowly flooded; even the surface installations of La Valenciana and other mines were burnt to the ground by insurgent raids. In 1819 the mine of Real del Monte was closed and its state was dreadful when the British arrived in 1824.^{37/} Silver production plunged after 1810.

A crisis in the textile industry had already begun in 1804 as a consequence of the British blockade; in that year the Crown had allowed neutral powers to introduce all kinds of textiles, including cheap cotton, which favourably competed with the Novo Hispánico production. This measure, which was to end in 1809, continued for at least 12 more years with

the war of Independence. Not only American but also British merchandise was imported or smuggled, and significantly damaged the domestic textile industry as the market was flooded with those foreign goods. Besides, the war had interrupted the northern wool trade and the obrajes of Querétaro and other textile centers came to a standstill.

The military turmoil was also responsible for a workers' exodus from the towns, where food became scarce, to the country, thus shrinking the labor supply and contributing to the downward trend in industrial production. Moreover, communications and trade in general became very difficult.^{38/} For instance, merchandise traveling from México City to Querétaro, only 220 kilometers away, had to be transported in convoy. Also, it has been said that the construction of two new roads to Veracruz were interrupted by the war; when the British came to Real del Monte, they found the Veracruz road in such a bad shape that they themselves had to repair it in order to introduce their heavy cargo.

One of the most important consequences of the War of Independence was the capital outflow. Different estimates place this figure from 36 to 140 million pesos, which represents from an 8% to 32% of national income.^{39/} But before the War of Independence had even started, the capital drain had already begun by means of loans granted to the Metropolis to finance the Napoleonic wars; the outflow had begun since 1804 with the Consolidación de Vales Reales

which, by 1809, amounted to around 10 million pesos. Another 8 millions were granted as emergency loans to the government in Spain from 1809 to the beginning of 1811. Although some of these funds must have been drawn from hoarding, this real transfer of monetary resources designed to finance the royal government meant a substantial decrease in the means of payment within New Spain. Even though the exact size of the money supply by 1810 is unknown, the drain of 18 million pesos by 1811 was over 4% of national income, thus implying a substantial decrease in the means of payment. This of course had a restrictive effect on the economy by rising interest rates and, as barter transactions replaced monetary ones, the efficiency of the economic system must have declined too. Such a restrictive effect may have been partly compensated by a wider use of a money substitute such as libranzas or bills of exchange, which were used mainly by merchants in those years. On the other hand, during the War of Independence the viceregal government had to increase taxes, demanded forced loans, and even silver articles to finance the war. By 1814 the official public debt had more than tripled in 6 years to the figure of 68.5 million pesos.^{40/} Similarly, the Insurgents confiscated public funds and when possible even private ones, mainly from the Church. According to José María Luis Mora, the War of Independence depleted half of the national fixed and current capital.^{41/} Although this assertion could easily be an exaggeration, there is no doubt

regarding the capital depletion during those years. As I will consider later, the lack of financial capital was to play a very significant role in the further development of the economy as a whole, and particularly in industry. The scarcity of current capital, together with a lack of financial institutions, leaving aside the Church, constituted a serious constraint on entrepreneurial possibilities.

Even if a precise measure of the devastation caused by the war is impossible, it is certain that the event significantly contributed to a weakening of the economy. Finally, it should be emphasized that both political and economic circumstances prevented any introduction of innovations during this period.

EFFORTS TOWARDS MODERNIZATION

The Setting.

The War of Independence brought with it a radical change in the rules of the game. The absolutist royal government was replaced by a rather republican state which proved to be politically unstable in the following 50 years. These were essentially two different groups with their corresponding ideologies. On the one hand, there were the conservatives who saw the Independence War as just a change of individuals in power, but following the same Spanish

tradition in many ways. On the other hand, the liberals regarded Independence as a complete shift of the country, from being a colony to becoming a truly independent modern nation. Instability then, was the effect of an ideological struggle reflected not only on political institutions but also in the economic sphere. That is to say, it was not just a struggle for power in the general sense; in fact, every change in government brought with it a change in the economic policy measures toward industry and trade. A different model of development was attached to each school of thought. There was a clear distinction between those who advocated laissez-faire and those who wanted state intervention.^{42/} The first were rather doctrinaire and constituted the liberal ideology, basically personalized by José María Luis Mora, while the second were more pragmatic and were constituted by the conservative party, whose main ideologist was Lucas Alamán.

Another important issue present in 1821 was a general determination to break with anything that sounded Spanish, and the sole idea of independence implied the abolition of any trading restriction. Therefore, before the end of 1821, the new government opened the doors of the country to both foreign goods and financial capital. However, as soon as 1824 the government introduced a new import duty code which reversed this free trade policy.

Finally, it must be mentioned that government domestic revenues were fairly weak and almost completely dependent on import duties, as the mining activities had been seriously damaged by the war. This would restrict economic policy in the future.

The Mining Sector.

One of the great government hopes after Independence was mining, the most important revenue source of the previous colonial rulers. In order to promote the activity, production taxes were reduced to only 3%, mint charges were also decreased and mercury was exempt of taxes; the government was to supply gunpowder at cost. Foreign participation was allowed though with some qualifications. However, all articles except mercury were to pay the alcabala.

It has already been mentioned that domestic capital was very scarce to engage in mining activities. Most of the colonial mines needed large fixed investments to reassume operations. Thus, capital from abroad was sought by private individuals, sometimes with official sponsorship. Furthermore foreigners, particularly the British, were eager to participate in American mining after so many years of Spanish monopoly. They were also interested in applying new mining technology, mainly steam power, and would also take advantage of the joint-stock company institution. By the end of 1825,

seven companies were formed but only one survived the 1850's.^{43/} The level of silver production in 1810 was not to be reached again until the 1870's.

Why did it take so long the industry to recover in spite of official and private efforts? Although there is limited information on the subject, some light may be shed by considering the history of an important mining complex. Robert W. Randall has done a study on the Real del Monte mines run by the British from 1826 to 1848, when the company was dissolved.^{44/} From that research, as well as from other sources, it seems clear that there were some general difficulties regarding the development of the industry. On the one hand, roads and vehicles were not suited for heavy cargos and sea-ports did not have enough unloading and storage facilities. To give an idea, it took the Real del Monte company almost a year to transport the equipment from Veracruz to Pachuca, (about 500 kilometers away), mainly because of these difficulties. On the other hand, foreign entrepreneurs overestimated the new technology's capabilities while at the same time underestimated the engineering problems that the industry faced. Indeed, although steam powered pumps were much more efficient than the previous animal powered whims, drainage problems had become so huge, mainly because of the war, that it took several engines and a few years to drain old mines at Real del Monte,^{45/} and probably in other places too.

A problem of authority between the shareholders in London and the actual managers of the company in Mexico arose soon after its establishment. Slow communications and a lack of confidence in the manager made decision making difficult and inefficient. Antagonism between the professional miners and the businessmen of the company created a dichotomy in the formulation of policy. which proved to be disastrous in the Real del Monte experience. Doubtless, some sort of directive and administrative difficulties must have arisen in other mining companies as well. Although political instability may have played a role in the development of mining activities in other sites, Real del Monte did not suffer from it, except for the naval blockades in Veracruz during the Spanish occupation of San Juan de Ulúa, and the American Blockade in the 1840's. Finally, and this may apply only to the Real del Monte experience, were an incorrect strategy in the exploitation procedure proved to be disastrous. The British miners busied themselves in draining the Veta Vizcaína mine, and did not explore other virgin sites. Besides, the shareholders never accepted the fact that these mines were yielding only low-grade ore and thus never worked it; they always waited for high-grade ore that would only be obtained in new sites.^{46/} This can be called stubbornness and bad luck. The fact is that mining output, despite lower taxes and renewed financial capital and technological innovations, did not regain pre-

independence levels until the 1870's. It seems improbable that the political element was responsible for this outcome.

Manufacturing Sector.

With respect to the textile industry, general policy during the 1820's was of so-called free trade, though there were tariffs on several items which would range from 40% to around 60% ad valorem, plus transit taxes. Although apparently high, these tariffs would not prevent the more efficient foreign producers from remaining competitive in the domestic market because of the high rates of technical change, fruits of the first stages of the Industrial Revolution, and the drop on ocean freight costs. By the end of General Victoria's government in 1828, the structure of the industry remained almost the same than 20 years before. There were just a few ginning machines and some spinning jennys around.^{47/}

With the presidency of Vicente Guerrero in 1829 and the intellectual leadership of Lucas Alamán, a new era in the country's manufacturing industry began. As opposed to the previous government, the new administration committed itself to play a role, at least indirectly, in economic activity and protectionist measures were taken immediately, although somewhat indiscriminately. A first project for the mechanization of the textile industry was proposed by J. I. Godoy, but rejected by Congress under pressure of the Puebla manufac-

turers.^{48/} Under the government of A. Bustamante, a slight but important change in policy took place. While the Guerrero administration encouraged the industry through tariffs and prohibitions, Bustamante would directly back the industry with the help of a development bank, and at the same time would reduce prohibitions, but tariffs were to be increased.

The first development bank called Banco de Avío was founded in 1830 by Lucas Alamán, and was to have one million pesos of capital to be raised from the 20% of the custom duties on cotton imports. The bank's function consisted on making loans to private entrepreneurs interested in acquiring machinery for the manufacturing industry. Loans were to pay 5% annual interest.

Historically the Banco de Avío has received rather harsh criticism which seems neither appropriate nor fair. In its 12 years of activities, the bank gave loans for just over one million pesos, mainly to the cotton industry. Out of the 31 projects begun, 10 were a complete failure; however, they only represented 18% of the funds granted. All other projects started operations and seven had to close their doors before 1845. The other 14 enterprises were still producing in 1845 and represented 57% of the funds invested.^{49/}

There were different types of adventures; agricultural projects were a complete failure, while paper factories and a foundry failed for engineering difficulties. The most successful were the textile projects were 9 out of 12 enter-

prises started operations and 8 paid back at least part of their debt.

Apparently these figures do not show success but perhaps failure. However, one must take into account that the government through Banco de Avío had committed itself to a quite difficult task. The introduction of a new technology, and one may add, of a new production system is always difficult. The first American efforts to mechanize the industry were not very successful either.

Perhaps the most important function that Banco de Avío performed was that of path-breaker. Indeed, the bank played the role of predecessor and opened the way to their entrepreneurs. The number of factories quickly increased from 17 in 1840 to 54 in the peak year of 1845. Mechanical looms multiplied 9 times in these years.^{50/} Nevertheless, it seems clear that if only 14 projects out of 31 were operating after 1845, the bank could have done a better job.

It is interesting to point out some of the difficulties the bank faced which eventually prevented it from performing more successfully. Potash's study clearly shows that insufficient financial capital was the most difficult problem encountered by the bank. Since custom duty revenues were its sole source of income, every time that the government substituted prohibitions for tariffs, the bank would not receive any funds. Furthermore, political instability was reflected in rebellions and thus placed the central govern-

ment in urgent need of funds; the President would not hesitate in taking the banks' resources for military or other purposes. This was true in 1832, 1835 and 1839-1842. Political instability was also responsible for delay of shipments from Veracruz, and even the loss of machinery in that port. Transportation problems were also important. During the (better) dry season it would take four months to transport machinery from Veracruz to Mexico City, just 450 kilometers away. Besides, in 1832 there was only one contractor willing to do this job because suitable vehicles for heavy cargos were practically unavailable. Finally, the Banco de Avío has been criticized of granting loans under non economic criteria. Although political pressure sometimes was exercised to determine the grantee, this element does not seem to have played a significant role in its performance.^{51/} All in all, it is possible to assert that scarcity of financial resources was the main cause of the bank's relative failure.

The dissolution of Banco de Avío ends the first era of government intervention to encourage industrial projects. This effort was partly successful but certainly insufficient. Toward the 1850's British and Northamerican textile industries had continued their rapid growth and attained a high level of development. Therefore, the gap between them and their Mexican counterpart had widened even more.

The Railroad.

It has repeatedly been argued that transportation procedures and costs significantly restricted economic activity. People began to consider the railroad as a viable option quite early, because the expected social and private profits for an alternative means¹ of transportation to the one currently used were high. Just a few years after railroad technology had been developed in England, the first concession to build a line from Veracruz to Mexico City was granted in 1837. Nevertheless it took almost 40 years before these two cities were actually linked by the track. Why did the railroad take so long to become a reality? According to the available information, during the period considered there seem to be three main reasons for failure of the initial efforts. First, the government did not give enough support to the project. A quick glance to the concession clauses will shed light on the subject. The monopoly for the Veracruz-México City route was to last 30 years but the company had to pay one million pesos at the end of the concession, and 50 000 annually after the 10th year. Land for the railroad would have to be paid by the company to the land's owner. Only a few item would be exempt from custom duties. No charge would be made for mail transportation. Fees would be government fixed. And no easy way to send abroad interest payments on foreign debt would be available.^{52/} The second

concession granted in 1842 was, in essence, not very different than the first one. For some unclear reason, the government did not show, at least until the 1850's, much interest in the whole project.

A second major reason for the failure of these efforts was the lack of ready capital. A call for investors to join the project in 1837 yielded no response.^{53/} Of course, one may ask why foreign investors would not be interested on the railroads. A possible answer may be that the expected volume of goods and merchandise to be transported did not justify the investment. That is to say, the Mexican economy was still too small.

Finally, an extremely difficult topography, together with inexperience in calculating costs and dishonest management of funds, were responsible for the delayed construction of the Ferrocarril Mexicano.^{54/} The engineering requirements for both the locomotive and the design of the line track were much larger in the Mexican case than in many other instances. Indeed the point which deserves further study is the extent to which engineering technology was sufficiently advanced in the late 1830's so as to build the Mexico City-Veracruz line: that route not only was the most important and profitable one, but it also was one of the most difficult from an engineering view point since it had to pass through very mountainous terrain.

Financial Sector.

Let us finally consider the financial sector. During the period after Independence, the availability of funds continued its downward trend. Several Spaniards left the country and took their capital out for fear toward the new regime. Later in 1829, the government-decreed expulsion of Spaniards implied another outflow of 12 million pesos plus skilled labor. It was mainly mercantile and mining capital that left the country. Also, another important source of domestic funds was highly discouraged during those years. The Church continued granting loans and receiving fierce attacks from liberals, and eventually agricultural producers were legally exempt from paying the tithe in 1833. Therefore, church revenues declined drastically and consequently their lending funds diminished. The loss of faith in the Church and the emergence of more liberal ideas also worked in this direction. Nevertheless it must be emphasized that the Church provided some of the working capital to factories and other enterprises;^{56/} as long as the loan was suitably secured, church officials did not care about the use given to the funds.

Besides the establishment of Banco de Avío and later the foreign managed joint stock companies, the government did not provide incentives for the establishment of financial institutions. Actually, the first commercial, note-issuing bank was not to be founded until 1864 under the so-called Second

Empire.^{57/}

However, in the early years of independence, the government did engage in an alternative source of funds: foreign debt. Naturally enough, the lending country was England and the political condition in Mexico, worsened by the threat of the Holy Alliance, made the first two loans highly onerous. Indeed, out of a nominal value of 16 million pesos, the net product of the first loan after commissions, fees, interest on money not even granted, etc. was of 6 419 780 pesos, and the actual amount received by Mexico was of only 5 686 157 pesos. Somewhat more favourable conditions were obtained for a second loan in the same year of 1824, when the nominal value was of 16 million and the actual amount received was of 8 339 134 pesos. Oddly enough, these discounts were not very different to those experienced by other countries in Europe and Latin America at the time, probably reflecting similar credit and risk conditions.^{58/} Besides, the burden of the debt became actually much heavier because the use of these funds were for current and military expenditures. Political instability and the low level of fiscal revenues, due in turn to a depressed economy and reduced volume of trade, prevented the government from remitting payments on time. Consequently interests accumulated and the debt grew continuously. Therefore negotiations had to be made in several instances until the issue was finally settled under the Porfiriato regime. But of course no further loans were received in the first

half of the nineteenth century.^{59/}

It is clear then that capital markets were very tight, partly as a consequence of the prevailing risky conditions, but mainly because the production of money was fairly low since the mining industry was in a deep depression, and because commercial banks were non-existent. Therefore, the means of payment were not growing much. These market conditions were reflected on the monthly rate of interest for domestic loans which according to Jan Bazant, ranged from 12 to 50%. Government debt, in turn, was discounted at 30 to 50% by local merchants.^{60/} The only sources of cheap credit were the Church and Banco de Avío.

Finally, the extent to which the economy suffered from restricted means of payment can be inferred from the fact that, during the Porfiriato, while the money supply increased eleven times prices only rose twice.^{61/}

Some Final Remarks.

From the above discussion it is possible to isolate some of the major factors which prevented modernization efforts from being successful. Political instability, and all its consequences, undoubtedly played a major role. Changes in governments implied changes of ideologists with different models of development for the country and thus implied modifications in policies which basically responded to an urgent

need for funds. This in turn increased uncertainty and desperately sought funds harmed credit conditions at home and abroad with an imminent detrimental effect on economic activity.

Scarcity of investable funds and a restricted money supply, caused not only by political instability, have been shown to be important and perhaps decisive elements in the development process of the economy. Toward 1838 Banco de Avío received numerous loan demands to construct textile mills, foundries, mechanic workshops and even machinery for textile and agricultural purposes. Most of these applications had to be dismissed for lack of funds. On the other hand, interest rates were so high that many projects could not afford such cost of financing, thus becoming unprofitable given foreign competition. With neither financial intermediaries nor confidence in paper money, an economy's function is constrained by the availability of current capital.

High transportation costs due to the difficult topography continued to be a handicap for the economy. For example, some machinery placed in Mexico City was 100% more expensive than in Veracruz. This problem was partially solved when the railroads were finally completed in the last quarter of the century. As expected, the economy realized considerable productivity gains with the transport net work.

Finally, influential conservative groups sometimes

exercised opposition to changes, as in the case of the Puebla manufacturers in the late 1820's, mentioned above. Just how decisive this element was, it is difficult to say.

Once having considered some of the major elements restricting the growth of the economy, it is interesting to make a brief overview of its structure by the middle of the nineteenth century. These ideas are intended to corroborate the estimates on the existing income gap between Mexico and other more developed nations, as suggested by Coatsworth.

The agricultural sector witnessed a systematic division of large estates throughout the period, giving rise to a greater number of rancheros or at least sharecroppers. This trend was to end a few years later with the construction of the railroad.^{62/} By midcentury there were undoubtedly slack resources and output was severely restricted by the size of the market. The introduction of the railway a few decades later allowed a more efficient division of labor and regional specialization, transforming the agricultural sector into an important exporting agent.

The mining industry experienced during these years failure after failure. However, these facts helped to build the bases of future development. For instance, the company which brought Real del Monte in 1848 inherited skilled labor, and paid for steam pumps, refining mills and general infrastructure a very low price. Consequently, relatively rich

lode was found, the new enterprise became more profitable than it would otherwise have done. However, the new mining boom was to come until a few years later.

Manufacturing industry was definitely rather backward and just a few factories were running. Although equipment growth had been very rapid from 1838 on, the initial point was so low that incremental rates are misleading. The first steps had been given but the lag with the more developed nations had widened so much that their productivity levels were unreachable.

With regard to transportation, Mexico still remained at its preindependence level. By 1851 only 11 kilometers of railway existed and 23 years were to pass before Veracruz and Mexico City could be linked by the railroad. Comparatively, by midcentury the industrial powers had a quite complete railway and maritime transport network.

The Church, as a financial institution, had been weakened throughout the independence period and all her properties were expropriated a few years later. Therefore, the financial sector as a whole became weaker than ever. Banks did not appear until the 1860's, and then with very limited scope. No effort was made to improve human capital. The educational level seems to have compared very disfavouredly with those of the United States or most European countries, and has proven to be a significant limiting factor of production even to this day.

CONCLUSIONS

The preceding argument has clear that the sources of Mexico's relative economic backwardness can be traced at least to the eighteenth century, and perhaps not much further back. Although considerable research is needed in order to precisely characterize the sources of such a situation, one could now argue that there are three basic factors which help explain the relative backwardness of the Mexican economy. On the one hand, the set of policy decisions taken by the Crown towards New Spain were not particularly conducive for economic growth. Specifically, the drain of resources in the form of taxes produced by the mining industry was very significant. If one considers that Banco de Avío, with only a little above one million pesos of capital, was able to launch a number of productive manufacturing projects in its twelve years of existence, then the 10.1 million pesos drain taken out in specie every year was really enormous. Other things being equal, twelve years of investing those funds in the economy instead of shipping them abroad would have produced 1680 productive manufacturing projects, 120 times more than the ones produced by Banco de Avío. Another Spanish policy which contributed to retard Mexico's economic growth was that of protectionism. The Crown was not willing to let the Novo Hispanic manufacturing industry flourish because

of fears regarding the loss of markets for Spanish products.

A second source of Mexico's relative backwardness was its specific geographical characteristics. The lack of navigable rivers and the impossibility to build canals prevented the economy from having an adequate transportation network. Consequently, markets were segmented and the realization of economics of scale was very difficult. Although this same fact provided natural protection and a real barrier to entry, foreign products were still competitive since they were manufactured with machinery that had already taken advantage of innovations developed during the Industrial Revolution.

This fact brings us to the third element: The first applications of new technologies, brought about by inventions and innovations of the Industrial Revolution, were ill-timed. Indeed, when Great Britain and other countries were innovating new forms and means of production, Mexico was unable to introduce in a large scale the new technologies mainly because of Spanish policies, the lack of capital, and poor entrepreneurship.

When the War of Independence removed the colonial obstacles, mining was no longer producing a surplus mainly because of the war itself. The country found itself too impoverished to invest and grow and within such political chaos that it could not even borrow enough funds to promote industrialization or build a railway, and therefore to realize all the expected productivity gains.

Why did the country become so poor after Independence? The answer to this question lies on the characteristics of the war itself, and on the type of political struggle that emerged after it. The outflow of financial capital since the beginning of the 1800's, reflected in part in decrease in money supply, which meant scarce and expensive investable resources. This and the very destructive nature of the war had a considerably depressing effect on the economy. On the other hand, the search for a national identity reflected in the political struggle that followed the war contributed to the slowdown of the economy. Political instability, besides introducing the usual uncertainty, meant persistent changes in economic policy which hampered even short term planning.

Moreover, the War of Independence had a very wrong timing and a long duration, particularly if one compares it to the United States experience; while Mexico was struggling for political independence and later for a national identity, Great Britain and the United States were achieving great productivity success because The Industrial Revolution was at its summit.

In the early years of independent life, Mexico continued to suffer from old problems. First of all, high transportation costs implied economic desintegration and inefficiency. The lack of domestic savings and the unwillingness of foreign capital to invest in the construction of a railway made this situation last for over thirty years. Consequently, the eco-

nomy was unable to realize important productivity gains as a result of a more efficient means of transportation.

Secondly, the crisis in the mining industry, in spite of efforts to restore its colonial preponderance, had a wide multiplier effect in consumption and investment. On the one hand, with the drop in the production of silver the supply of money also diminished, given the poor development of other means of payment, and so interest rates soared. On the other hand, the fall in production also meant a reduction in exports and the volume of foreign trade. In turn, this implied a diminishing volume of domestic commerce depressing the level of economic activity still further.

In the mean time, however, the more developed economies were achieving very high rates of growth. Indeed, the actual income gap between Mexico and Great Britain and the United States widened abruptly in the first half of the nineteenth century. By 1845, Mexico only produced 17% of Britain's per capita income (compared to 37% in 1800) and 20% of the United States' (compared to 44% in the same year), according to the Coatsworth estimates.^{63/} In order to close this gap by 1910, Mexico would have needed to increase per capita income at an annual rate of 4.2% and 4.6% respectively, rates that were not attained even during the so called Mexican Miracle of 1940-1960's. Thus, the production gap between Mexico and the United States and Britain was actually unclosable from at least 1845 on.

NOTES

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2. Florescano, Enrique. Origen y Desarrollo de los problemas agrarios de México. 1500-1821 Ediciones Era, México, 1976 pp. 36-7.
3. David Brading specifically studies this group and that of rancheros in the central plateau in Haciendas and Ranchos in the Mexican Bajío 1700-1860. Cambridge University Press, Cambridge, G.B., 1978.
4. Florescano, Enrique. Origen y Desarrollo... pp. 85-90 and from the same author Precios del Maíz y Crisis Agrícolas en México (1708-1810). El Colegio de México, México, 1969 pp. 91-2.
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7. Ibid. p. 65-6
8. Coatsworth, J. H. "Obstacles to Economic Growth..." op. cit. p. 87.

9. See for instance Bazant, Jan, Cinco Haciendas Mexicanas. Tres Siglos de Vida Rural en San Luis Potosí (1600-1910) El Colegio de México, México 1975; there are seven studies in Haciendas, Latifundios y Plantaciones en América Latina, Enrique Florescano, ed. Siglo XXI, México; 3 haciendas and Ranchos... op. cit.; several other studies appear in Enrique Semo, editor Siete ensayos sobre la hacienda mexicana 1780-1880, Instituto Nacional de Antropología e Historia, México, 1977.

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12. Ibid pp. 133-5

13. Ibid pp. 146-7

14. Bazant, Jan, "Evolución de la industria textil poblana (1544-1845)" Historia Mexicana, Vol VIII. No. 4 pp. 494-5.

15. For the origin and development of the obrajes, see Greenleaf, Richard E. "The Obraje in the late Mexican Colony", The Americas, Vol. XXIII, No. 3 pp. 227-250;

- also see Gibson, Charles The Aztecs under Spanish rule. A History of the Indians of the Valley of Mexico, 1519-1810 Stanford University Press, 1964 pp. 243-253.
- Salvucci, Richard J. "Workers in the Obrajes of the Valley of Mexico in the eighteen century" University of California, Berkeley, 1981 (mimeographed).
16. As opposed to the European system which was usually rural. See Potash, Robert A. El Banco de Avío de México. El Fomento de la Industria 1821-1846, Fondo de Cultura Económica, México, 1959 pp. 20-3 and Bazant, J. "Evolución de la industria textil..." pp. 501-5.
 17. Rosenzweig, F. "La Economía Novohispana..." p. 491 and Potash, R.A. El Banco de Avío... pp. 19-21
 18. Potash, R.A. El Banco de Avío... p. 20.
 19. Greenleaf, R.E. "The Obraje..." p. 237.
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30. Ibid, pp. 164-5, 115-6.
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37. Randall, R.W. Real del Monte. A British Mining Venture in Mexico University of Texas Press, Austin, 1972 pp. 17-8 and 38-9.
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44. Randall, R.W. Real del Monte...

45. Ibid. pp. 101-8
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47. Potash, R. El Banco de Avío... op. cit. p. 50
48. R. Potash asserts that it was not just a conflict between men and machines as suggested by the Puebla opposition group, but rather it involved other economic agents such as local merchants, spinners, muleteers and even the State Treasury, which were interested in maintaining the preponderant place of Puebla within the industry. El Banco de Avío... pp. 58-63.
49. Ibid. p. 183
50. Ibid. pp. 220-1
51. Ibid. pp. 112-21, 139-47 and 170-7.
52. Chapman, J. La construcción del Ferrocarril Mexicano (1837-1880) Sepsetentas No. 209, México, 1975. p. 23.
53. Pletcher, D.M. "The Building of the Mexican Railway" Hispanic American Historical Review Vol. 30, 1950. pp. 29-31. and Chapman, J. La Construcción... pp. 24-41.
54. The originally estimated cost was of 5 million pesos while the actual cost amounted to about 60 million.
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56. Just in the Mexico City Diocese, the Juzgado de Capellanías' current active capital invested was a little over four million pesos at the beginning of the independent period. Costeloe, M.P. Church Wealth in Mexico... pp.87-8 and 129-31.
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