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THE INDUSTRIAL DEVELOPMENT OF CUBA

prepared by the  
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Economic Commission for Latin America

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## EXPLANATORY NOTE

Resolution 250 (XI) of 14 May 1965, adopted by the Economic Commission for Latin America (ECLA) at its eleventh session, requested the Latin American Governments "to prepare national studies on the present status of their respective industrialization processes for presentation at the regional symposium". With a view to facilitating the task of the officials responsible for the national studies, the ECLA secretariat prepared a guide, which was also intended to ensure a certain amount of uniformity in the presentation of the studies with due regard for the specific conditions obtaining in each country.

Studies of the industrial development of fourteen countries were submitted to the Latin American Symposium on Industrial Development, held in Santiago, Chile, from 14 to 25 March 1966, under the joint sponsorship of ECLA and the Centre for Industrial Development, and the Symposium requested ECLA to ask the Latin American Governments "to revise, complete and bring up to date the papers presented to the Symposium".

The work of editing, revising and expanding the national monographs was completed by the end of 1966 and furthermore, two new studies were prepared. The ECLA secretariat attempted, as far as possible, to standardize the presentation of the reports, in order to permit comparison of the experience of the different countries with regard to specific problems, particularly in the field of industrial policy.

The national studies on industrial development, to be presented to the International Symposium relate, in alphabetical order, to the following countries: Argentina, Bolivia, Brazil, Central America, Chile, Colombia, Cuba, Ecuador, Guyana, Mexico, Panama, Paraguay, Peru, Trinidad and Tobago, Uruguay and Venezuela.

# THE HISTORY OF THE UNITED STATES

The history of the United States is a complex and multifaceted story that spans centuries. It begins with the early Native American civilizations, such as the Mayans, Aztecs, and Incas, who built sophisticated societies in the Americas. The arrival of European explorers in the late 15th and early 16th centuries marked the beginning of a new era of discovery and colonization. The Spanish, French, and British established colonies across the continent, each with its own unique culture and traditions.

The American Revolution (1775-1783) was a pivotal moment in the nation's history, as the thirteen original colonies declared their independence from Great Britain. This led to the signing of the Declaration of Independence in 1776 and the adoption of the U.S. Constitution in 1787. The Constitution established a federal government with three branches: the executive, legislative, and judicial.

The 19th century was a period of rapid growth and expansion for the United States. The westward movement, known as Manifest Destiny, led to the acquisition of vast territories, including the Louisiana Purchase and the Mexican-American War. The Civil War (1861-1865) was a defining moment in the nation's history, as it resolved the issue of slavery and preserved the Union. The war resulted in the Emancipation Proclamation and the 13th and 14th Amendments to the Constitution.

The 20th century was a time of significant social and political change. The Progressive Era (1890s-1920s) saw the rise of reform movements that sought to address social inequalities and improve government efficiency. The Great Depression (1930s) led to the New Deal, a series of programs and policies that provided relief, recovery, and reform. World War II (1941-1945) was a global conflict that tested the nation's resolve and led to the emergence of the United States as a superpower.

The latter half of the 20th century was characterized by the Cold War (1947-1991), a period of tension and rivalry between the United States and the Soviet Union. The Vietnam War (1955-1975) was a controversial conflict that tested the nation's military and political leadership. The Civil Rights Movement (1950s-1960s) led to the passage of landmark legislation, such as the Civil Rights Act of 1964 and the Voting Rights Act of 1965, which sought to end racial discrimination and promote equality.

The 21st century has seen the United States continue to evolve and adapt to a rapidly changing world. The September 11 attacks (2001) led to a period of heightened security and military intervention. The 2008 financial crisis and the subsequent Great Recession (2008-2009) tested the nation's economic resilience. The 2016 presidential election and the rise of populism have led to a period of political uncertainty and debate.

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## INTRODUCTION

Historical necessity has made the problems of development the central concern of the international economic organizations created in the post-war period. This necessity springs from the now uncontrollable drive of the peoples who for decades have lived in colonial or neo-colonial conditions to obtain not only political sovereignty, but economic independence and living conditions progressively more comparable to those of the former colonial and economic metropolises.

Economic development theory, which since the time of the classics of political economy had been neglected in favour of ideas centering on analysis of the problems of developed capitalism, have again in the last two decades come to occupy a favoured position in economic science. Industrialization has been recognized as the sine qua non for a complete achievement of development.

The urgent need to overcome under-development has arisen in Latin America, as in other regions, not because it is supported by economic theory, but as a practical necessity imposed by the unwillingness of the peoples to accept present conditions and their decision to struggle for a better life.

For many years there has prevailed in Latin American official economic science a tendency to avoid a profound confrontation of the problem by means of the techniques of neo-classicism and the tools of Keynesianism, as if these corresponded to the structural relations obtaining in the countries of the region.

The official economics was thus expressed, in supposedly scientific terms, the class interests of both the oligarchic groups which profit from the maintenance of the old structure and the bourgeois reformists whose claim has been to achieve by simple and unsubstantial structural modifications what can only be obtained by authentic revolution.

This explains why the revolutionary economists, who for thirty years have urged a fundamental analysis, have almost never been given the opportunity of making their voices heard in official debates and the most audacious voices in the officially representative organisms have remained a small minority in ECLA circles, unable to obtain a satisfactory presentation of the true solutions to the problem of Latin American under-development.

/Recently, however,

Recently, however, it has begun to be recognized that without structural changes - euphemistically called "institutional" changes - there is no hope of bringing about the development of the Asian, African and Latin American countries.

ECLA, in its Economic Survey of Latin America - 1963 declared that it is necessary when considering the economic problems of the Latin American countries to take into account that:

(a) Under-development constitutes the greatest of the problems faced by the present generation, one whose solution is not only possible in itself but is essential to the preservation of world peace;

(b) Development is both an economic and a social problem, in the widest sense of these words, and the problems that up till now have been considered to fall into one or the other of these two categories, cannot be solved separately;

(c) In order to solve the problem of under-development there must be a planned policy of integrated and efficient action in the shortest possible time, which policy entails the implementation of institutional reforms in the fields of economic and social organization, such as agrarian reform, the restructuring of taxation systems, changes in income distribution and real access to education and equality of opportunity for all; these reforms in turn demand measures more far-reaching than use of the traditional instruments of political economy can allow;

(d) It is essential to build up a commercial structure and secure trade terms with the rest of the world that will make international trade a dynamic growth-promoting factor.

Any study that begins from such principles will inevitably arrive at conclusions which, in however restrained a manner, affirm the need for changes of a revolutionary character.

Thus, ECLA itself, in examining the structure of income in Latin America, has pointed out that 5 per cent of the population, consisting of the upper bourgeoisie and the landowners, accounts for 30 per cent of the total consumption of the region. This gives these privileged classes a per capita consumption 15 times greater than that of the 50 per cent of the population who compose the lowest income strata.

/From this

From this point ECLA's analysis moves on to a reformist projection of development in Latin America, postulating that, simply by reducing this relation of 15 to 1 to a modest - but no less monstrous - 11 to 1 by restricting the consumption of the privileged classes, and by at the same time encouraging an increase in capital formation, the growth of per capita income could be increased from 1 per cent to 3 per cent a year. If the relation were further reduced to 9 to 1, the growth rate could rise to 4 per cent.

It has not escaped the notice of the ECLA economists that this reformist approach, timid as it is, is confronted by insuperable difficulties.

The survey, therefore, recognizes that: "As far as economic and social reforms are concerned, it would be ingenuous to suppose that they can be carried out in our continent without arousing the opposition habitually met with in all parts of the world from the sectors adversely affected by such changes, or without the necessity of facing the difficulties, and even temporary anomalies that any radical reform of economic structures brings in its train. The resistance put up by groups of interests has been and will continue to be manifested in our countries in open and systematic opposition to reforms, or, more commonly, in both pressure inside and outside official circles, exerted by means of political, economic, and financial expedients, to reduce the reforms in question to weak and inoffensive instruments that will vitiate and even discredit the objective pursued".<sup>1/</sup>

In recent years, therefore, there has been in official circles like ECLA an express, although cautious recognition that the problem of development cannot be approached on the basis of false boundaries between the social, political, and economic spheres of action, and that there is a manifest contradiction, due to the prevailing social structure of Latin America between possibilities of capital formation and the excessive consumption of the high-income groups, which are struggling by every means at their disposal to prevent the destruction of the fossilized structures that serve their interests as much as they impede those of the Latin American peoples.

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<sup>1/</sup> United Nations, Economic Survey of Latin America, 1963, Sales No.: 65.II.G.I., pages 1 and 2 (our underlining).

As far as Cuba is concerned this Gordian knot was broken at the beginning of 1959 by the Revolution, which once and for all eliminated the institutional obstacles to development. The struggle for independence then gave way to the profound changes that necessarily follow a revolution with a socialist content, the first of its kind in Latin America.

Thus, the institutional framework in which the Cuban economy has been developing in the most recent period just completed and which will govern its future industrialization bears little resemblance to the previous institutional structure. As yet, however, in the brief period involved, it has not been possible to eliminate the imbalances inherited from that structure.

If there is any conclusion to be drawn from the history of the industrial development of Cuba - of which the present study gives an outline - it is of the unquestionable necessity of revolutionary change before any progress could be made in economic development.

But for the agrarian reform that put an end to the monopolization of land by a small group of foreign companies and Cuban landowners and enabled the mass of agricultural workers to become a true domestic market for Cuban industry, the policy (which will be described below) of basing the diversified development that is vital to stable and efficient industrialization on rapid agricultural growth would have been unconceivable.

And, as is clear from what occurs in the rest of Latin America, economic planning could never have become a more or less scientific formulation of desirable goals unless the State, as a result of the revolution had taken over control of the basic resources of the economy, thus enabling investment funds to be transferred from one branch of the economy to another, resources to be allocated in accordance with national interests, sectoral growth to be projected according to strategic priorities and comparative efficiency, etc.

The Revolution is thus not just a great act of historical and social justice, but the beginning of an economic transformation that will permit the optimum use of national resources.

The Cuban delegation feels, in all modesty, that in submitting their report to the World Symposium, it is to this example they most wish to draw attention.

/The revolution



The revolution in Cuba, at the same time as encouraging the peoples of Latin America to undertake a struggle that previously had seemed more difficult to crown with success, induced certain reformist groups in both the United States and in Latin America, to take steps to prevent its repetition elsewhere by carrying through reforms that slightly alleviate the utter destitution of the masses of workers, peasants, and indigenous populations of the continent. Thus arose the Alliance for Progress.

It is not necessary to show how, even with the economic and political influence of a United States President behind it, this tactic was soon blocked by the oligarchic groups of Latin America in league with North American monopolistic capital, demonstrating once again that the path of reform leads nowhere.

While the Cuban economy continues to advance in the midst of difficulties that formerly appeared insuperable, remains unshaken by the blockade designed to suffocate it and overcomes the effects of its technical backwardness and lack of trained personnel and experience, the progress of the Alliance for Progress has been towards ever more complete bankruptcy.

Its failure has already become evident from the two simultaneous meetings in Uruguay during the last days of 1966: the FAO Regional Conference for Latin America, and the meeting of the Latin American Free-Trade Association (ALALC), attended by the Foreign Ministers of the member countries. The more recent Conference of Heads of State of the member countries of the OAS at Punta del Este has established it definitely as a fact.

## Chapter I

### HISTORICAL DEVELOPMENT OF THE INDUSTRIAL SECTOR

#### 1. Initial characteristics of its evolution

Every history of the industrial sector of the Cuban economy must necessarily go back to the processes that took place after the emancipation of Cuba from metropolitan Spain, at a time when the Cuban economy was being progressively taken over by the nascent force of monopolistic North American capital.

Even though Cuba had a developed sugar industry -- as well as a relatively large tobacco output -- before the end of the war of independence its bases were disrupted in the conflicts and only restored in 1920-22.

The main element in Cuban industrial development in the period following formal political independence, which gave Cuba apparent sovereignty, was the structural distortion that resulted from the penetration of monopolistic United States capital, under which it was converted into a monoproduct and monoexport sugar economy. As a result, the United States investment interests were now masters of a permanent supply of cheap labour, that lived near to, and at times of crisis in, conditions of starvation.

These investment interests were backed by the United States export sector. With the support of the United States Government, now not averse to imperialist policies, they devoted much effort to preventing any industrial diversification in Cuba, since this would both reduce the volume of imports of United States manufactures and create new sources of employment that might tap the reserves of labour whose existence, for almost four decades, kept wages in the sugar industry low.

In order to carry out this policy, the United States capital interests did not rely solely on their capacity to crush the efforts of the incipient Cuban bourgeoisie towards industrial development through the competition of industries technically and economically greatly superior to their feeble Cuban counterparts. In order to protect themselves in advance against the

/economic nationalism

economic nationalism that they themselves had created in their own country a century before as a defense against European competition, they took advantage of the political power given them by the Platt Amendment - imposed on the Cuban people by the presence of North American troops - to force Cuba into a commercial treaty of so-called "reciprocity" (1903). In practice this was a charter guaranteeing the export of United States manufactures to Cuba without any competition whatsoever.

In exchange for preferential treatment of Cuban sugar on the United States market - a privilege which primarily benefited the new United States sugar interests - the treaty established preferential tariffs for United States products imported to Cuba, thus protecting them against European competition. These tariffs were also so low as to be incapable of protecting aspiring Cuban competitors against the greater efficiency of United States industry.

This policy, the first manifestation of what was to become contemporary neo-colonialism, completely distorted the structure of the Cuban economy. The sugar industry, a rudimentary activity involving only simple processing, became the centre of the Cuban economy, generating as much as 30 per cent of the national income and providing 80 per cent of the capacity to import. Moreover, the United States now absorbed as much as 80 per cent of the country's exports.

Apart from sugar, Cuban industry comprised only the traditional production of tobacco and cigarettes and other ineffectual consumer good industries.

The United States monopolists at the beginning of this period gained control over the basic mineral resources of Cuba, but kept them in reserve of their exploited properties in United States territory and other Latin American countries, whose rates of return were higher. The recently created United States empire thus initiated the new form of division of labour which it was to impose on Latin America, that of developing in each area a single basis production, the one which was most profitable.

Between 1900 and 1920 sugar output increased from 1.5 million tons to 5 million tons.

At the same time Cuba became to an unusual degree an open, foreign-trade-dependent economy. It imported practically all its manufactured consumer goods, both light and heavy, an essential portion of its food - about 150 million dollars in some years -, all its industrial equipment, and all the non-agricultural raw materials that its industries needed.

The sugar shortage caused by the First World War gave this economic structure a climax of success in 1920, when Cuba had an export level of around 250 dollars per capita, one of the highest in the world.<sup>2/</sup>

In 1920, as a result of the regularization of sugar supplies dislocated by the war, a fall in the growth rate of demand for Cuban sugar, and the rapid and severe decline in sugar prices, Cuba lost what until then had been a dynamic, although distorting factor in her economic growth.<sup>3/</sup> The per capita income levels then entered a period of stagnation that lasted until the forties, when the second World War revitalized the sugar industry.

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<sup>2/</sup> The large exports resulted in a per capita income level that was certainly higher than that of some Western European countries which was about the same as Argentina's. However, this level went hand in hand with a tremendously unequal distribution. Moreover, the development of a seasonal crop like sugar without a structural counterweight that would permit the use of the labour force during slack periods, generated a chronic problem of unemployment which was to become one of the characteristics of the Cuban economy during the whole of the succeeding period.

<sup>3/</sup> The collapse of sugar prices destroyed an important sector of the industry and in consequence changed the property structure of the industry in a manner unfavourable to the development of a Cuban entrepreneurial class. A considerable proportion of the sugar mills passed from the hands of Cuban owners to those of their creditors, who normally were large United States banks. The crisis of 1920 also ruined Cuban private banking. Thus, in 1920 approximately 70 and 80 per cent respectively of total loans and deposits were made by or were in Cuban banks, as against approximately 18 and 30 per cent in 1921. See: Wallich H.C., Problemas Monetarios de una Economía de Exportación, Havana, 1953.

The crisis of the sugar industry and the inability of sugar to continue being a source of economic growth induced certain sectors of the Cuban bourgeoisie, who had become rich on sugar, to carry out a timid and limited process in industrial investment. To do this they had to defend themselves against United States competition by establishing tariffs higher than those permitted by the Reciprocity Treaty.

This protectionist movement gave rise in 1927 to an amendment of the tariff that was resolutely opposed by the United States Government in its capacity as representative of the economic interest of the monopolists.

The major promoters of the movement were certain influential figures in the government of Gerardo Machado who began to invest in paint, cement, textiles, etc. Since this government had otherwise faithfully served United States policy, the contradictions stemming from its customs policy did not at first create any critical difficulties for it. But when its antipopulist policies and the crisis of the entire Cuban economic structure endangered it internally the United States ambassador Sumner Welles received instructions from Secretary of State Cordell Hull to offer President Machado the help of the United States in negotiating an understanding with the political opposition that would permit him to remain in power, in exchange for his acceptance of a new commercial treaty that would abolish the defensive tariffs of 1927 and provide even greater guarantees for United States exports.

When it became impossible for the United States Government to keep Machado in power, it devoted its diplomatic efforts to obtaining the same agreement from his political successors. In 1934, in exchange for assigning Cuba a quota in the United States sugar market and granting a tariff reduction, the Mendieta government accepted the new Reciprocity Treaty. <sup>u</sup>

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<sup>u</sup> This was a commercial agreement between Cuba and the United States, in which a larger preferential margin was conceded by Cuba to United States products and the list of products eligible for preferential treatment was increased. In exchange Cuban sugar received tariff reductions, but since the Costigan-Jones Act, which fixed a quota for imports of Cuban sugar, had just then reduced Cuba's share in the United States sugar market, these were of little benefit.

/This accounts

This accounts for the difference between Cuba's economic evolution and that of most of the other Latin American countries. The years of the great crisis of the capitalist world system, by producing a collapse in demand for raw materials, isolated the economies of the Latin American countries in which the growth of exports had constituted until then the driving force in development. Once external demand ceased to be a dynamic factor, the only means of ensuring continued development seemed to be production for domestic consumption.

It was in this epoch, as is well known, that exchange controls, monetary devaluation and general increases in protective tariffs became normal practice and specific measures began to be adopted for the development of domestic industries, one consequence of which was the creation of special institutions for the promotion and financing of industry.

Cuba, as has been shown, suffered quite another sort of blow to its industrialization prospects.

## 2. Trends in economic development after the Second World War

During the Second World War, Cuba's gold and exchange reserves, like those of most of the Latin American countries, considerably increased. The rise in most prices and the favourable situation for exports, together with the extraordinary difficulty of obtaining intermediate goods, equipment and even certain foods, led to an accumulation of reserves, that in fact represented a forced loan to the more developed countries.

Because of the difficulties of obtaining many products by foreign trade, in spite of the availability of means of payment, during the war a number of manufacturing industries grew up, which, in spite of high production costs, could operate in the prevailing seller's market. In spite of the war and the cutting off of United States exports to Cuba, the United States Government strongly opposed new commercial activities whenever these would be a threat to the producers of that country once peace was re-established. For instance, Cuba tried to establish a fleet of small tonnage ships which, operating from the ports of the Gulf of Mexico and the southern states, would facilitate the shipment of Cuban

/sugar, only

sugar, only to be turned down by the United States. There was also considerable development in mining during the war as a result of heavy investments and the exploitation of deposits discovered earlier but which until this time had been kept as reserves for the mining and metallurgical corporations of the United States. The most important development in this field was the installation and opening of the Nicaro nickel plant on the north coast of the Oriente province. When the war ended and international trade returned to normal it was only a matter of time before the small industries that had been born of scarcity disappeared and at this time a few feeble protectionist measures were passed, chiefly to prevent this from happening.

It is worth pausing to examine the situation and events of the immediate post-war period, because of their effects on the present structure of the industries outside the sugar sector.

The domestic market was increasingly saturated by United States exports, which low customs duties allowed to be supplied at low prices; this made it difficult for investment in production to be profitable, or, at least, more profitable than other commercial activities, such as finance, etc. Moreover, the absence of a domestic raw material and intermediate product basis meant that new industries, producing consumer goods for example, had to depend largely on foreign raw materials, which were often supplied by the same persons who exported the finished product. The great concentration of agricultural and industrial property and of financial and commercial activity in turn gave rise to a regressive distribution of income. It is estimated that in 1950-55 not less than 45 per cent of total income was income derived from property. The facts just mentioned, combined with the ease with which imported luxury and semi-luxury goods could be acquired, resulted in a low investment coefficient and decreased the capacity to import basic tools and equipment.<sup>5/</sup>

<sup>5/</sup> Here one sees a clear example of a situation in which, there being a potential surplus of a considerable magnitude, the real surplus that the society actually accumulated was small. In the Cuban case, the possibilities of investment - given the large incomes derived from property - were enormous, but luxury consumption and the export of capital resulted in a merely modest rate of investment.

On the other hand, Cuba supplied all the right conditions for the penetration of United States capital in pursuit of new developments and rates of return higher than those obtainable in its country of origin.

It might have been expected that investments in enterprises organized during the last decade, both domestic and foreign, would be based on techniques of high labour intensity, with the purpose of taking advantage of conditions in a poor country with low labour costs. This would certainly have been the case had it not been for the extreme social and economic anomalies that had resulted from extreme specialization in a single product under conditions similar to those in which specialization in primary production took place in the world capitalist system.

The development of the sugar and tobacco industries and the disastrous effects of the crisis of the thirties permitted the creation, and later the consolidation, of a labour movement of considerable strength among the urban workers. With the creation of a central labour organization, the position of the working class was strengthened still further and it was placed in a more favourable position for winning concessions from the capitalist class. Moreover, the weak tariff barriers and, low transport costs obliged the new industries to leave only a relatively small margin for inefficiency, if they were to compete with imported products. The conjunction of both factors produced what appeared to be an inevitable trend: high capital low labour intensity investments.

This set of circumstances resulted towards the end of the forties and during the fifties in the following situation:

(a) The capitalist class, both national and foreign, had a manifest fear of making investments in projects that required substantial labour power, preferring to use techniques of high capital intensity;

(b) A part of the industrial working class was organized, maintaining an advantageous position with respect to wages. These workers forcefully opposed the introduction of technological innovations that permitted reductions in cost based on reductions in labour, since displacement led only to one result: permanent unemployment for years and years. Consequently, when a new plant was planned it was fitted with many of the latest technical innovations, in order to minimize the number of workers and thus prevent problems of this type arising in future.



(c) A part of the industrial working class worked in small- and medium-scale enterprises, uncompetitive and technologically obsolete, which subsisted thanks to extremely low wages;

(d) Agricultural workers were greatly exploited, their lack of organization making them too weak to demand higher incomes;

(e) There was high level of unemployment, both urban and rural. It is calculated that during eight months of the year total unemployment reached the level of about 550,000 workers, that is to say, between a third and a fourth of the total available labour force.

Given these conditions, management policy was focussed on seeking tariff and financial protection from the government and on maintaining high prices with low production. The domestic enterprise was typically extraordinarily reluctant to engage in applied research. In this context, engineers and technicians gravitated toward the tasks of direction of production operations, and the few with interest in research usually moved to the United States - the world's greatest net importer of scientists and research workers. All of this aggravated the position of domestic industry and braked its prospects for development by introduction of technical innovations.

An even more serious obstacle to the development of Cuban industry was that credit facilities were in the hands of foreign banking firms, mainly United States, which, in their loans, followed an economic line designed to keep the Cuban economic structure created by the penetration of United States capital unchanged.

As already mentioned, the crisis of 1920 practically wiped out Cuban and Spanish banks. From then onwards, United States and Canadian financing policies were directed mainly to the sugar industry. In fact, there were no loans for industrial investments outside the sugar industry. This led to the discovery, towards the end of the forties, by the weak Cuban bourgeoisie which was then attempting to develop itself through non-sugar investments, of the urgent need to organize a Central Bank in Cuba. The project was resisted by the dominant groups, particularly the big sugar firms and their representatives in the political spheres of Government and Parliament. The struggle was intense, and after several unsuccessful

/projects, in

projects, in 1950, a law was passed founding the National Bank of Cuba as an organization charged with centralizing both paper money issues and loans and rediscounts for trade investments and activities.

The National Bank of Cuba provided the possibility of using a national credit institution as a means of furthering the economic policy of the bourgeois groups in industry. At the beginning of the fifties, a series of other financial institutions were created which were authorized to promote industries and provide capital to potential investors. The overall purpose of these institutions was to raise the supply of credit and reduce the rate of interest on loans, in order to create conditions suitable for starting a process of industrial development.

Yet these credit institutions, far from being substantial steps toward Cuban industrial development, were used for short-term ends, which though allowing many industrial investments involved them in conditions that gave them a net negative effect on the economy.

At the beginning of 1952, when Batista's coup d'état occurred, the rightist group that took power found already in existence an institutional base through which it could act on the economy much more directly than had previously been possible. There began a period that may be called - from the point of view of the economic instruments used - that of compensatory policy.<sup>6/</sup> Since the sugar crop of 1952 had been especially large and it had not been possible to sell all of it, it was decided that the National Bank would direct the financing of a stabilizing reserve of the order of 1.75 million tons of sugar, offering the commercial banks advances and rediscounts, and guaranteeing credit operations made to hacendados and colonos<sup>7/</sup> by their respective banks. This measure, due to its comprehensiveness and the lack of historical precedents for it in the country, marked the first Cuban experience in the use of internal credit as a compensatory factor.

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<sup>6/</sup> The compensatory policy was designed to use public expenditures as a dynamic variable in the economic process, in order to compensate for the stagnation in the sugar industry produced by the slow growth of demand and the enormous reserves accumulated during the harvest of 1952.

<sup>7/</sup> In Cuba the term hacendados is applied to the owners of sugar mills. The colonos are private persons who provide the mills with cane.

/The compensatory

The compensatory policy had decisive importance only in the years 1953-56, for in the year 1957 it became irrelevant as a result of the unexpected recovery of sugar prices and production, consequent on the Suez Canal crisis and the small European sugar beet harvest. The great volume of credit generated by this policy had two principal destinations:

(a) The scarce domestic resources for capital formation were partly used to grant loans to powerful United States monopolies, such as Standard Oil, Owens-Illinois, Electric Bond and Share, and others;

(b) Since the credit policy was directed by a government characterized by its fraudulent activities, the policy served to cover operations of no value to the country, which only benefited the capitalist and political groups that took part in them. For the capitalist class, a greater stimulus than the low rate of interest was the power it now had to enter into negotiations with influential politicians, from whom it would obtain substantial loans for a new industry, with which it would then acquire stocks of obsolete and inefficient machinery, overvalue them, and finally extract, in commissions and installation charges, most of the funds provided by the state. The plants thus created operated at a loss for a number of years and then became state property, when the capitalists declared themselves unable to amortize them. From then on they had to be subsidized by the national budget.

The results of the compensatory policy, measured in terms of its effects on two variables as significant as the public debt and the gold and exchange reserves, can be summarized as follows: the public debt, which in 1952 was of the order of 250 million pesos, reached at the end of 1958 the figure of 800 million pesos, that is, it tripled. 90 per cent of the gold and foreign exchange reserves, which in 1952 were about 550 million pesos, had been spent by 1958.

As a measure of the effectiveness of the industrial development of the last decade, its effect on the balance of payments should be considered, since this is a normal bottleneck in most under-developed countries. From the figures quoted in the previous paragraph it is obvious that the process was hopelessly unstable, that is, it was doomed to break down in one or two years. On the other hand, it is difficult to imagine a more modest achievement

/relative to

relative to the amount of the resources consumed, especially if the conditions in which the process took place are compared with those obtaining in most under-developed countries, where external financing is an indispensable condition for a minimum investment programme.

With all the assistance provided by the so-called compensatory policy, industrial investments outside the sugar industry increased considerably, especially during the period 1954-58. Thus, it is estimated that 460 million pesos were invested in new capacity during this period (see table 1).

Table 1

CUBA: INDUSTRIAL INVESTMENT IN NEW CAPACITY, 1954-58

Branch of industry	Millions of pesos
Mining <sup>a/</sup>	120.2
Metallurgy	21.8
Construction materials	9.8
Petroleum derivatives	68.0
Chemicals	17.2
Paper, wood, and printed matter	46.0
Textiles	1.8
Food	3.6
Beverages and tobacco	4.0
Electric power	90.0
Others (not elsewhere specified)	80.0
<u>Total</u>	<u>462.4</u>

<sup>a/</sup> Includes nickel.

/As a

As a result of the efforts made on this period, the industrial situation on the eve of the Revolution was as follows:

(a) The existing industrial sector could be classified into four parts with very different technical and economic characteristics:

(i) An industrial exporting sub-sector, which had to compete in foreign markets on the basis of price and quality, and the products of which were homogeneous. This comprised chiefly sugar, mining (including the nickel processing industry), and tobacco.<sup>8/</sup> As a rule, the industries of this group had a relatively high capital intensity<sup>9/</sup> and were efficient by world standards.

(ii) A sub-sector of modern and efficient industries producing for the domestic market. This group as a rule had no proper tariff protection and had to compete on equal terms with United States industry. To this extent their efficiency was notable. They had an imported input coefficient much higher the average of the sector and, in fact, most imports of intermediate goods were absorbed by them. It also deserves mention that as a result of their position relative to United States industry - many of them were, in fact, of foreign ownership - they mostly used the most modern organization and management techniques.

(iii) A third sub-sector born under the protection of the easy credit policy and noted for its high inefficiency and its modern buildings, which enclosed machinery already amortized during its use in the United States. These industries were in general administered by the para-governmental organizations that had to subsidize them when they were handed over by the capitalists who having obtained loans for them and earned large commissions for purchasing their machinery, had no further interest in operating them.

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<sup>8/</sup> The tobacco industry had special characteristics that distinguished it somewhat from the other members of the sub-sector. Its production was not strictly homogeneous since output was differentiated by the use of registered trademarks.

<sup>9/</sup> Here again the tobacco industry must be distinguished from the rest of the group, since its capital intensity was relatively low.

/(iv) The

(iv) The rest of the industry consisted mainly of semi-craft units, with little mechanization, poorly trained workers and inadequate management. The origin of their raw materials was varied, but, at any rate, most of the industrial inputs coming from non-cane agriculture were absorbed by them.

(b) The inter-industrial structure was extremely weak and the different branches had little technical interdependence, cane agriculture and foreign commerce being the chief sources of raw materials;

(c) In many industrial branches there was under-utilization of installed capacity, resulting in reserves of productivity. At the same time, large quantities of products that could be made in the country were imported;

(d) Although the compensatory policy was based on the operation of fiscal, financial and customs instruments, it was, in its particular manifestations, very chaotic. In spite of the general principle behind it of utilizing the factors mentioned as dynamic factors for development, no serious attempt was made to revise and adapt the régimes involved that, having come down from earlier centuries, were now anachronistic and inconsistent.<sup>10/</sup>

(e) As regards unemployment and under-employment, the situation was heart-rending. It is calculated that about one quarter of the labour force was unemployed or under-employed in 1959;

(f) The gold and foreign exchange reserves that the country possessed at the beginning of the fifties had practically disappeared. The Cuban economy was not able to rely at the beginning of the Revolution on the operational flexibility associated with a comfortable reserve position.

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<sup>10/</sup> Thus, for example, the indirect tax on salt was around 13 pesos per ton. Since the price of production of salt fluctuated around 27 pesos, the indirect taxes raised the price to some 40 pesos, which made the establishment of chemical industries using this product unprofitable. The origin of most of these taxes went back to the colonial epoch, when salt was a very scarce product and the tax represented a significant income for the metropolis. In the fifty odd years of the Republic these taxes were not altered and they continued to be an obstacle to the development of chemical industries based on salt. Meanwhile, the low demand meant that there was no stimulus to the modernization of salt production.

(g) Industry outside the sugar sector was concentrated to an extreme degree around the city of Havana. It is estimated that in 1958 75 per cent of the non-sugar industrial production was carried out in the province of Havana, which has about one quarter of the population of the country, while the province of Oriente, which has almost one third of the population and the greater part of the natural and mineral resources only contributed about one eighth of this production;

(h) Industrial articles had little chance of finding a market among the rural population, which represented 45 per cent of the population of the country. The small incomes of peasant and farm worker families did not permit them to consume any significant amount of manufactured articles, while their food requirements were satisfied at a bare subsistence level.

### 3. Industrial development in the period 1959-65

The period 1959-65 was fundamentally characterized by the profound changes in the property relations governing the means of production, and the taking of political power by the working class, through the inauguration of the first Socialist State in America. These historic events give it an exceptional character.

At the beginning of the revolutionary process, Cuban political economy was governed by principles based on the traditional idea that the development process must be associated with a growing level of industrialization.

This notion was strengthened in Cuba's case by the past experience that has been described, which made the single crop system and the extraordinary specialization in sugar appear as the fundamental reasons for the tragic development of the country's economy and the basis of its domination by United States imperialism.

"Industrialization" thus became a national slogan, at once patriotic and technical. In the first period, the trend towards an immediate replacement of sugar did not acquire too much force, because in view of the the decisive importance of sugar exports for the country's economic survival, any idea of a drastic modification of the structure was absurd.

At the start the principles governing efforts at industrialization were the attainment of internal growth by means of import substitution and the projection of an accelerated industrial development within a

/classical framework.

classical framework. Very soon, however, the policy followed by the United States Government towards the Cuban Revolution made it necessary to reconsider the position of sugar in Cuba.

Thus, in 1960 the United States Government unilaterally annulled the sugar quota to which Cuba was legally due under the commercial treaty of 1934. Cuba found itself suddenly with 3 million tons of sugar for which it had no guaranteed market. It was then that the Soviet Union and other socialist countries agreed to accept what the United States Government had rejected with a view to creating a crisis for the Revolution.

However, it was not then immediately possible to establish the co-ordination of plans that would ensure that Cuba could in future maintain her sugar production at maximum levels. This was not only because Cuba had not yet fully adopted socialism, but also because of her previous economic isolation from the socialist economies, as a result of which, a prior period of study was needed before it could be determined how to achieve a mutual adjustment that would be favourable for all the economies concerned.

On the other hand, the price of sugar on the marginal market that constitutes what is known as the world market, which was then unstable and tending to decline fell still further when the 3 million tons that Cuba traditionally sold in the United States market appeared there.

All this, in combination with the revolutionary leaders' lack of experience in the economic field and the emotional factors that associated the production of sugar with the enslavement of the nation, led to an underestimation of the possible role of the sugar industry in the framework of economic development which the process of revolution was initiating.

The problem of specialization and single crop cultivation had appeared in a confused light in the context of the world capitalist system, which placed the countries that exported primary products in an unequal situation, with the generic disadvantage of specialization itself, and the possibility of taking advantage of Cuba's experience in sugar production and her other comparative advantages in this respect, in order to make the sugar industry the fundamental pivot of a new type of industrial development

/within an



within an international division of labour associated with the socialist world system, was not taken into account.<sup>11/</sup>

This explains the general characteristics of the first years of the period.

On one hand, little attention was given to the cane growing sector and the sugar industry was allotted no resources for its upkeep and possible development.

At the same time, it was decided, with some precipitation, to make investments in internal growth through import substitution, only for it to be discovered, as more complete knowledge of the national economy was gained, that the amount of the imports to be substituted was minimal and did not justify, in many cases, the type of industrial production chosen.

The Revolution also led to a drastic change in the distribution of income. The reduction of urban rents and the later promulgation of the Urban Reform increased the available income of the middle classes and workers and restricted the incomes of the owners of housing. The introduction of free education benefited equally the petit bourgeois urban sectors and some of the higher-income groups within the proletariat, since under the deficient pre-revolutionary system these had had to make sacrifices in order to send their children to private schools. The reduction of rates for some public services, such as electricity and telephone, the cancellation of certain taxes, the increase of wages in poorly remunerated sectors and the increase of pensions, reinforced this trend.

Almost throughout 1959 the Agrarian Reform Law had the effects that had been foreseen and described in its preamble. It not only deprived the old large landholders of their income from rent, but exempted more than 100,000 peasants from the payment of any form of rent. It created the conditions for eliminating seasonal unemployment, promoting the complete employment of agricultural manpower and increasing the consumption capacity of agricultural workers and peasants.

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<sup>11/</sup> In the section of this report devoted to the development prospects of the industrial sector the reasons for and advantages of agricultural specialization are explained at greater length.

The total increase in the income of the working population was over 500 million pesos a year.

These measures enlarged the internal market and served as a basis for the expansion of consumption of domestic products, under the slogan, "To consume what the country produces is to build the country".

However, these increases in income exceeded the increase in industrial and agricultural production. This trend was reinforced by the boycott decreed against Cuba by the United States which obliged her abruptly to change the source of her imports of intermediate goods from a supplier whose nearness permitted minimal stocks of raw materials and a constant flow of provisions. It was then a matter of time before these could adjust their production lines to the specific requirements of an industry that had been entirely dependent on the United States for raw materials and spare parts.

These circumstances also made it necessary to establish a monopoly on foreign trade in this period in order to ensure the proper use of the country's international financial resources and as the only way of carrying out the necessary geographic reorientation of imports and exports.

The efforts made in this stage of the Revolution and the results obtained have been described in ECLA publications.<sup>12/</sup>

In the years 1961-63 there was a relative stagnation in the per capita product as a consequence of the reduction in sugar production for the reasons explained above, the difficulties related to putting into operation a socialist economic organization in the midst of a severe shortage of technical cadres, both for production and for the administration of the economy, and the extraordinary droughts of the years 1961 and 1962.

There was also some degree of frictional maladjustment between the political economy of the first years and the phase of accelerated development of the agricultural sector, which began in 1964.<sup>13/</sup>

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<sup>12/</sup> United Nations: Economic Survey of Latin America, 1963, Sales No. 65.II.G.1 - Fourth part.

<sup>13/</sup> Although the harvest of 1964 was still small relative to the averages of the pre-revolutionary decade, it represented an increase of 16 per cent on 1963. It also represented, in spite of the disastrous hurricane "Flora", the beginning of the line of development that was to culminate in a production of 10 million tons annually.

At the end of 1963 and during the first half of 1964, the prices of sugar in the world market increased considerably. As a result, the reduction in the quantity of exports associated with the small crops of 1963 and 1964 was more than compensated by the increase in their value.

Moreover, by the beginning of 1964 the fruits of the organizing work performed in earlier years were appearing, and the directing cadres of the various enterprises had acquired a certain amount of experience. In this period also the reorientation towards the agricultural sector had come into effect, and measures such as the creation of the Ministry of the Sugar Industry, which gave a hierarchical organization to the administration and direction of this priority branch of industry, were taken to ensure that it would receive adequate attention.

These factors led to a rapid escape from the stagnation that had been produced in the previous stage, and during the period 1964-65 <sup>14/</sup> large increases were registered in the per capita product.

The increases of production achieved in recent years do not relate only to the sugar industry. Industry outside the sugar sector has also progressed notably.

For example, the soft fibre textile industry produced in 1957 some 60 million square metres of cloth, as against an average production of about 100 million square metres in 1964-65.

Its installed capacity has been used at a much higher rate as well as being expanded. Thus, two new integrated textile plants are being installed which, when they operate at full capacity, will be able to produce around 70 million square metres annually. In the remainder of the textile branch considerable increases have also been registered. The production of knitwear and smooth fabrics has grown, by 3 per cent relative to the capitalist period. Leather footwear manufacture has also made considerable progress, its production rising from 8-9 million pairs in the years before the Revolution to about 12 million pairs.

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<sup>14/</sup> In 1965 a success of considerable importance was obtained in sugar production. In that year the harvest was more than 6 million tons, representing an increase on the previous year of about 35 per cent.

The nickel industry has had extraordinary success. In 1961 a plant for the production of nickel sulphate and cobalt, which uses the world's most advanced technology, was put into operation at Moa. This was a project that the United States monopolists thought the Cubans incapable of operating. At the same time, the Nicaro plant was kept in operation. As a result the production (in terms of nickel and cobalt) during 1961-65 was 35 per cent higher than in 1954-58.

The iron and steel industry, still incipient, also has some successes to show. In the four years before the Revolution, the cumulative production of steel was 120,000 tons. In the four years from 1962 to 1965 the cumulative production rose to some 285,000 tons, or almost two and one-half times the earlier figure. The industry is now being expanded in order to produce in the immediate future at a rate of about 290,000 tons of steel per year (in terms of ingots) which means that the annual production will be about the same as the entire production of 1962-65.

The petroleum industry has also made considerable advances. During 1956-58 three modern refineries were constructed, designed to process Venezuelan crude oil. They were operating practically at full capacity at the moment when they were nationalized. Obviously, the change in the specifications and sources of supply of crude oil produced a certain disorder; nevertheless, the effort of the Cuban workers and the valiant aid of the Soviet Union - which has guaranteed a constant and systematic supply, such that every three days there arrives at a Cuban port a tanker of crude oil brought from 10,000 kilometres away - has made it possible not only to maintain uninterrupted production, but also to surpass the estimated maximum capacities of the refineries.

Table 2

CUBA: OPERATING DATA OF THE PETROLEUM REFINERIES

Plant	Rated input capacity (tons per day)	Real present input (tons per day)
1. (Formerly Belot-Standard Oil)	5 000	5 000
2. (Formerly Shell)	4 000	3 600
3. (Formerly Texas Co.)	2 900	3 600
<u>Total</u>	<u>11 900</u>	<u>12 200</u>

The cement industry has also made considerable progress. In 1961-65 it produced about 4.1 million tons, 1.2 million tons or roughly 45 per cent more than in 1954-58. It is to be noted that the maximum level of production during the capitalist epoch was obtained in 1958 and was around 750,000 tons, while the 1965 production was over 800,000 tons. With the new plants contracted and under construction the industry's capacity will rise to 2 million tons annually.

The Cuban chemical industry is characterized by a high degree of dependence on the importation of intermediate products. In spite of this weakness, considerable achievements have been made in it. Thus, output of mixed fertilizers grew by 150 per cent between 1954-58 and 1961-65, from 1 million to 2.5 million tons.<sup>15/</sup> Production of soaps and detergents has also reached very high figures, giving an extraordinary large per capita consumption by world standards.

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<sup>15/</sup> The maximum production reached in the previous stage was about 272,000 tons in 1957, as against over 472,000 tons in 1965.

Table 3

CUBA: OUTPUT OF SOAP AND DETERGENT

(Thousands of tons)

Products	Year of maximum capitalist production	1964
Soap, washing	32.8 <u>a/</u>	36.1
Soap, toilet	7.6 <u>b/</u>	13.3
Detergent	12.6 <u>c/</u>	17.8

a/ 1956.

b/ 1957.

c/ 1958.

The development of the paper industry has resulted in two simultaneous achievements. In the pre-revolutionary period, output never exceeded 45,000 tons, as against a production of over 94,000 tons in 1964. In the same year about 30,000 tons of sugar cane pulp were consumed, which can be considered an important technological success, since before the triumph of the Revolution the manufacture of paper from bagasse was considered to some extent experimental. This is an important new line of development for Cuban industry.

The production figures for the mining industry (excluding nickel) do not show advances with respect to the position reached during the fifties. In this branch there prevailed foreign companies which following the techniques of selective mining in which one utilizes only the veins and strata of highest yield without making an integrated use of the resources, left a pauper's inheritance. A good part of the mines are in such a condition that their operation has turned out to be anti-economic. For this reason the efforts being made at the present time in geological work and mining exploration have an exceptional importance. In this field there are considerable advances. Previously geological work and mining exploration

/was done

was done on a small scale, while now - multiplied several times - it is part of a national plan, under the direction of the Cuban Institute of Mineral Resources. With the aid of the socialist camp, and especially of the Union of Soviet Socialist Republics, Cuba is becoming better acquainted with its own natural wealth. About 20 million pesos per year are devoted to this work.

The greatest reductions in mineral production are found in the extraction of metallic minerals. Exports of copper, iron, chrome and manganese, which in the period 1954-58 represented around 78 million pesos, generated only about 28 million pesos in the period 1961-65. The reduction of exports is fundamentally due to the drop in copper sales by about 30 million pesos. To a certain extent the reduction in extraction of metallic products has been compensated for by an increase in the extraction of non-metallic minerals, where some progress has been obtained. Noteworthy here is the growth achieved in the production of silicon sand - of great importance for the development of the glass industry, in view of its excellent quality - and of marine salt, in which production has risen from 66,000 tons in 1957 to 106,000 tons in 1965.

Another branch (which, although not classified in the generic concept of manufacturing industry, is of great importance for industrial development) that has made great strides is the electric power industry.<sup>16/</sup>

In the first months of 1959 the Revolutionary Government began to study the energy development that the country would have to undertake given the proposed growth rates.

Already in 1960, after nationalizing the industry, contracts were made with the Soviet Union and Czechoslovakia for a large number of units that are today in the process of installation. Relying solely on the plants that existed in the capitalist stage, and in spite of all the difficulties with respect to parts, the generation of electric energy for public service has been able to continue meeting the increase in demand that has resulted from economic development. The maximum production achieved

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<sup>16/</sup> In Cuba the production of electric energy is considered a branch of the industrial sector.

by the public service system in the capitalist epoch was about 1,850 million kWh in 1958 as against an output of about 2,600 million kWh in 1964. In 1966, two new units, of 50,000 kW each, started operating in the eastern network and two giving another 100,000 kW in the western sector. Two more units will be added to this second network before the end of the year, giving it a total starting capacity of 200,000 kW. Work is also in progress on three other power-plants, which will add a further 180,000 kW in 1969 and first quarter of 1970. In 1967, the construction of a fourth plant with a capacity of 66,000 kW will begin. Its investment will be over 75 million pesos.

The food, beverage, and tobacco industries have also thoroughly surpassed, in general, the levels of activity reached in the past. The production of flour products, for example, has increased from 190,000 tons to 337,000 tons - in terms of wheat flour -, while the present production of beer, around 105 million litres, is only of the order of 80 per cent of the maximum reached in the capitalist period.

The tobacco industry has enormously augmented its production of cigars and cigarettes. Although the tobacco statistics of the past are not reliable, given the great number of small cigar makers, it is estimated that the maximum level of production reached was of the order of 450 million cigars. At the present time, the production of cigars is of the order of 600 million units. Further, the production of cigarettes never in the past exceeded 10,000 million units, while since 1964 production has passed the level of 16,000 million cigarettes.

If the increases in production achieved in industry other than sugar during the phase of accelerated development of the agricultural sector are examined in conjunction with the advances achieved in that sector and with the notable improvement obtained in the production of services, it can be noted that already a systematic advance on all economic fronts is underway. In fact, the slow growth of production in the years of frictional maladjustment, which means only slow progress in per capita product during those years, has been followed by a strengthening of the economic activity, which has taken concrete form in significant advances in per capita income.

/The development



The development of industry during 1966, represented in table 4, allows us to evaluate the behaviour dynamics of the non-sugar industry in some of its more significant sectors. In spite of this revitalization, the Cuban economy still is subject to a series of structural problems which, to a certain extent, condition its further development. These structural faults that appear at present in the Cuban economy, have been formed in the course of its past development, and overcoming and eliminating them constitutes a very concrete objective of its future development.

Table 4

CUBA: SOME INDUSTRIAL PRODUCTIONS

Product	Unit	1963	1966
Sinter of N. & Co.	one thousand m.t.	14.8	8.6
Oxide of N. & Co.	one thousand m.t.	15.5 <sup>a/</sup>	20.4 <sup>b/</sup>
Sulphide of N. & Co.	one thousand m.t.	9.4	18.3
Electric power	millions kWh	3 058	3 454
Leather footwear	millions pairs	11.8	12.6
Detergents	one thousand m.t.	12.9	14.3
Beer	Millions litres	89.3	99.2
Refined vegetable oil	one thousand m.t.	32.1	45.8
Powder milk	one thousand m.t.	49.4	61.3
Pasteurized and natural milk	one thousand m.t.	147.7	325.1
Butter	one thousand m.t.	2.2	2.7
Bread and biscuit	one thousand m.t.	153.5	376.1
Flour products	one thousand m.t.	22.3	33.9
Cigarettes	Millions Units	15.3	18.4
Cotton products	Millions square metres	60.4	92.0

<sup>a/</sup> Total output. The greatest part of it is processed to obtain Sinter of N. & Co. Only 1,025 metric tons were left as ultimate product.

<sup>b/</sup> Of them, 9 metric tons to obtain Sinter and 11.4 as ultimate product.

## Chapter II

### ANALYSIS OF CUBAN ECONOMY

#### 1. The main problems

The revitalization of the Cuban economy during the revolutionary period has not signified, as a consequence, the possibility of eliminating all the structural problems that were created during a long and continuous distorting process imposed on the country by two successive colonial regimes.

These distortions can only be definitively eliminated in the course of future development.

The points of strangulation that still subsist as a consequence of the deformations mentioned can be summarized as follows:

- a) Disequilibrium between supply and demand of consumers' goods;
- b) Limitations on investment capacity;
- c) Regional disequilibrium between supply and demand of working power;
- d) Lack of skilled manpower, and
- e) Disequilibrium in foreign trade.

Let us briefly analyse each of them:

#### 2. Disequilibrium between supply and demand for consumer goods

The foundation of this disequilibrium is, as has been said, the rapid increase in the level of monetary incomes of the majority of the population and the lack of capacity for satisfying this new demand through an accelerated rate of domestic production.

The result has been the necessity of establishing rationing of several types and degrees.

It is certain that the level of availability of goods in the rationed categories is higher than average consumption in the majority of Latin American countries and much greater when one speaks in terms of the worker and peasant populations of those countries. But this comparison is not sufficient for a revolution with socialist objectives. Much less is it our intention to eliminate the disequilibrium through retail prices methods.

/The only

The only acceptable way out - and it is the way that has been chosen by the Cuban Revolution - is the most rapid increase possible of supply until this is adequate to the incomes of the population, and, finally, to bring about constant additional increases in the standard of living.

It is of interest to illustrate the changes in structure of funds available for consumption in relation to the demand structure occurred since the previous period.

Table 5

CUBA: CHANGES IN THE STRUCTURE OF THE CONSUMPTION FUND

(Percentages)

	Average 1954-1958		1963	1964	
	Current prices	1963 prices	Current prices	Current prices	1963 prices
Foodstuffs	46.5	42.1	40.3	41.2	40.3
Beverages and tobaccos	14.3	17.0	17.3	18.5	17.5
Clothing and footwear	7.3	13.6	17.3	16.3	17.0
Consumers' durables	4.3	4.4	0.7	0.7	0.8
Others	27.6	22.9	24.4	23.4	24.4

The foodstuffs group has a reduced participation in the total, which is associated with the breach that exists between supply and demand.

A situation that is more definitely marked, although of less social significance, is that of consumer durable goods. There is a considerable deferred demand for them, originating from the traditional consumption patterns of the Cuban economy, which were not, certainly, those of the most characteristic under-developed countries. This deferred demand will make itself felt to the extent that supply increases.

The previous remarks indicate that one of the immediate requirements of the Cuban economy is that of increasing the supply of consumer goods. The policy of the Revolution is directed, in the field of agriculture, to an accelerated rate of production, in a form that will be compatible with technical possibilities and investment capacity of the country. These increases will permit the elimination of rationing in the most outstanding categories of food consumption, and even its complete disappearance in the near future.

In addition, footwear production will assure growing levels of satisfaction with the installation of new factories already under construction, and the increasing number of cattle that will guarantee an adequate domestic supply of raw materials.

Although important installations for textile production are in the process of being placed in operation, the satisfaction of existing needs will continue to depend for some time on imports of clothing, which are now considerable. It is the same with consumers' durable goods.

### 3. Limitations on investment capacity

Limitations on investment capacity come from three principal sources: rate of capital formation, that is to say, the proportion of the product capable of being allocated to investment without creating inflationary pressures; real possibilities of obtaining the basic equipment for the investments planned, and, lastly, organizational capacity - economic plans, programmes, projects under way, etc. - for conceiving and carrying into practice the various tasks.

The rate of capital formation is not the fundamental problem. Although investment development is considerable in Cuba, the major consumption pressures do not come from this source.

At present, investment reaches approximately 40 per cent of the total of central expenditures, so that a high annual growth rate - of 12 to 13 per cent, for example - would be equivalent to an annual increase of 5 per cent in total expenditures. The financing of these expenditures may find a solution in the use of reserves of productivity that will be analysed below. The really relevant problems with respect to investment are found in the other two categories, basic equipment and organization.

/With respect

With respect to the provision of goods necessary for investment, the deficit in industrial construction has been felt to be a factor of decisive importance. Problems have developed in several respects.

Although at present the imported component for these activities is low, the capacity for production of intermediate goods has reached its limit, for which reason in a short time the increases in construction will have to be made through importation, which will impinge upon the capacity to import.

These effects will cease to make themselves felt in the near future, with respect to cement, on the placing in operation of new capacity, and by 1970 domestic cement production will have been duplicated. Steel products, however, will not grow immediately at a rate adequate for satisfying the demands of the investors.

On the other hand, the building capacity, especially complex constructions, with high technical requirements both in planning and execution, will be limited by the lack of skilled manpower, which will make it comparatively easy to engage in construction of simple design pertaining to the agricultural sector.

With respect to equipment, importation is the principal source. The credit facilities provided by the socialist camp, and especially by the USSR, permit the execution of investment projects with adequate financing.

In the Cuban case one can say that in practice there has not existed a limitation on investment that has its source in a shortage of immediate resources.

The national metal-transforming industry can, in addition, increase its production considerably, without additional large investments, as soon as it resolves its problems of technical manpower and management. In spite of the high imported component, the existing metal-transforming industry is able to substitute for much of the equipment now imported.

The other important problem is that of the deficiencies in investment organization. It has its origin in the heritage of low professional skills, that the long foreign economic domination left to Cuba. The professionally qualified bodies needed to analyse the economic aspects of investment projects suffers from an extraordinary shortage, relative to the total volume of  
/projects that

projects that must be managed in a series of stages. The shortage of engineering planners also lengthens the periods of maturation unduly or leads to construction defects that reduce the efficiency of the projects.

These gaps have been filled by considerable aid from the socialist countries for basic projects, but a full solution must await an accelerated programme for training appropriate cadres.

The difficulties noted mainly affect the rate of growth of the investment process, but have no undue influence on general development strategy.

#### 4. Regional disequilibrium between supply and demand for manpower

A third disproportion relates to the lack of human resources in the country, while there is relative abundance in the cities. As we will see, the labour force is marked by a considerable deficiency of skilled workmen.

The surplus of manpower in the cities is, at the moment, due fundamentally to groups who previously dedicated themselves to minor functions, semi-artesanal and independent, the remnants of social forces displaced from economic power and their personal servants, and a floating population not inclined to systematic work, making it difficult, in general, to find an incentive for transferring them to agricultural labour.

On the other hand, the country suffers from manpower difficulties, which reflect, in the first place, the displacement toward the cities of a considerable number of agricultural workers, who found less difficult employment and better pay there in the initial phase of the Revolution; from the necessary mobilization of human resources for the defense of the country; and the disappearance of the seasonal unemployment that facilitated manpower surplus for the harvest times that produced the peak of the labour demand curve; of the disappearance of hidden unemployment in the country families, as a consequence of the Agrarian Reform; of the rapid increase of rural construction, etc. One must not forget, at the same time, that at

/the beginning

the beginning of the Revolution, dozens of thousands of young people from the country moved to the cities to be educated as recipients of scholarships from the Revolutionary Government, at ages which in the pre-revolutionary period made them an additional source of manpower for agriculture.

Private and public agriculture, which possess, as has been noted, 40 and 60 per cent respectively of the cultivable lands,<sup>17/</sup> show an approximately equal distribution of manpower, with certain advantages for the private sector.

The level of income of peasants of small means exceeds at present their real purchasing power, due to the lack of industrial products, which reduces the desire of the agricultural workers to use, for purely pecuniary reasons, their excess labour power.

One cannot say, however, that manpower is totally utilized in agriculture, since investigations demonstrate that in most agricultural work the time spent working does not usually reach eight hours. This is due to defects in the organization of the work, to the inadequate functioning of production norms already established, and to the circumstance, which appears also in the case of agricultural workers, that steady work and incomes much higher than those before the Revolution, accompanied by a shortage of certain industrial products whose purchase would be an additional stimulus, makes it possible for the agricultural worker to reduce his work day in some of the most difficult tasks and to maintain, nevertheless, a level of income and a way of life that represent a leap forward with respect to the previous period.

The development of mechanized agriculture which is already underway will reduce, together with the full functioning of organizational measures and the establishment of norms, will eliminate what now constitutes a deficit which it is necessary to fill with voluntary mobilization of workmen and administrative workers from the cities, young students, revolutionary women, etc.

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<sup>17/</sup> In the total amount of land, the percentages are 30 and 70 respectively.

The tendency toward relative abundance of manpower in the cities continues to grow in the measure in which rationalization of the use of personnel is achieved, a process that will adjust the activities of each centre of work to the true necessities for manpower, and, at the same time, as a consequence of the systematic introduction of the most advanced technology, will bring about a higher organic composition of capital. This is a problem that Cuba will have to face in future years.

On the other hand, there still exist potential labour resources in the economy, for up to the present, as is the case with most developing countries, the greatest percentage of the female population remained unaccounted for in the evaluation of available working power. Yet, there exists in Cuba a powerful movement to incorporate women into productive activities, particularly agricultural. Social facilities are being created (child centres, temporary installations in the countryside) which will facilitate the incorporation of women into agricultural activities. Naturally, the jobs a woman does and will do are those more accessible to her as well as less heavy. Only in the Horticultural Programme of Pinares de Mayarí, Oriente, 12,000 women are being employed, which constitutes an impressive beginning for this campaign of national normalization.

##### 5. Lack of skilled manpower

One of the most serious points of strangulation that the process of accelerated development must face is making available skilled manpower, both at medium level and high level, both in production and in administration.

Cuba was not considered one of the most backward developing countries in so far as skilled labour is concerned. Nevertheless, experience indicates that there is a shortage of several tens of thousands of skilled workers, not only in industry, but for agricultural and livestock activities.

The problem of finding enough engineers is evident from table 6. Agronomists and veterinarians are in relatively short supply.



Table 6

CUBA: PERCENT OF ENGINEERS IN THE TOTAL  
NUMBER OF WORKERS EMPLOYED

Branches	Cuba	France
Chemicals	0.3	2.4
Petroleum	0.9	4.6
Metal-transforming	0.1	1.7
Textiles	0.04	0.6
Building materials	0.3	0.8

One of the most important tasks of the Cuban Revolution has consisted, precisely, in a movement for the massive preparation of technical cadres. Its point of departure was the literacy campaign.

At present, through the initiative of the Prime Minister Fidel Castro, the number of agricultural technical institutes in the country is being multiplied, with the objective of being able to prepare in a short time no less than 100,000 cadres of middle level for agriculture.

The massive preparation of workers, the enlargement of technical institutes oriented toward industry, and the movement for higher education in basic sciences and technical careers, form part of the campaign of the Cuban revolution for filling immediately and for the sake of the country's future development this need, which constitutes one of the most ominous heritages of the imperialist domination of Cuba.

In this sense, a greater quantifying detail has been achieved, and the following priority process has been established for university-trained people:

- Priority A: Necessities in definite development lines (fertilizers, cement, electricity, petroleum and nickel).
- Priority B: Necessities for the evaluation of techniques, co-ordination of projects and, in some cases, creating them in part, and, finally, their stipulations.
- Priority C: Necessities for the remaining industrial branches. (Sugar and foodstuffs excluded.)

/Until the

Until the year 1970, and including 1966, such necessities are expressed in the following figures:

	<u>Total</u>	<u>Priorities</u>		
		<u>A</u>	<u>B</u>	<u>C</u>
Chemical Engineer	374	221	10	143
Mechanical and Metallurgic Engineer	737	193	308	236
Electrical Engineer	336	110	147	79
Industrial Engineer	157	47	-	110
Civil Engineer	203	8	194	1
Tool-Designing Engineer	12	12	-	-
Mining Engineer	38	2	15	21
Geologist	74	-	14	60
Industrial Technician	65	-	65	-
Economist	34	5	29	-
Chemist	44	6	-	38
Architect	91	-	89	2
<u>Total</u>	<u>2 365</u>	<u>604</u>	<u>812</u>	<u>719</u>

Of these technicians, about 800, that is, about 40 per cent, must be foreigners, since the new Cuban graduates will not have adequate experience until they reach priority B.

The possibilities for graduates up to 1970, 1966 included, are estimated in the following figures:

	<u>Total</u>	<u>National universities</u>	<u>Foreign universities</u>
Industrial Engineer	169	169	-
Electrical and Electronical Engineer	836	683	153
Chemical Engineer	583	432	151
Metallurgic and Mechanical Engineer	696	469	227
Civil Engineer	185	150	355
Mining Engineer	80	43	37
Geophysics Engineer	41	5	36
Not yet determined Engineer	910	910	-
Textile, Naval and Other Engineers	82	-	82
Architects	184	184	-
Chemist	195	195	-
Mathematician	76	76	-
Geologist	76	76	-
<u>Total</u>	<u>4 133</u>	<u>3 322</u>	<u>721</u>

As a result of the presently established necessities and the sources of graduates, it is considered that the requirements for mining engineers will be satisfied in 1967, and the present deficit will be eliminated in the period up to 1970 with Cuban graduates. As for the need of geologists, it will be solved by approximately 50 per cent in the period up until 1970. The main difficulties until the end of this period will occur in the chemical, mechanical and industrial engineering.

In general, we can conclude that the notorious increase of university graduates will permit, from 1970 onwards, the alleviation of the present tense situation.

Concerning middle level technicians, especially in the industrial sector, the situation differs: here, the possible graduates hardly will cover the new necessities of the period. Yet, this level should be analysed in its relation to the university level, given that, in the same measure in which tenseness will decrease in the former, it will be possible to reinforce the latter with personnel who are at present fulfilling a part of the referred functions.

No concrete study has yet been made for skilled workers. Nonetheless, given that their training period is shorter, and that the rate of registration in the technical schools is high, no serious problems are expected. Much less so since the capacity of the schools is not yet exhausted. Additionally, the manufacturing centres, as is explained somewhere else in this report, are also prepared to train skilled workers.

Finally, for these two levels, it is still necessary to go much deeper. Not enough precise data is yet available to determine the situation. In this sense, it has only been possible to establish with relative precision the need for 1,369 technicians in the fertilizers field, and 3,370 for the field of industrial building.

For an approximate idea of the remaining necessities, we could make an estimate based on an average proportion of 4 middle level technicians to each engineer. Nevertheless, this proportion varies according to branches and the specialities, and could have only a qualitative total value. The figure would be close to 5,000, and together with the two previous ones, almost reaches 10,000 excluding, of course, the sugar and foodstuffs branches.

## 6. Disequilibrium of foreign trade

In presenting a sketch of our historical process beginning with the turn of the century, we showed the causes that made the Cuban economy one of the most open of the contemporary world.

This situation, aggravated by the circumstances that we have enumerated in another part of this report (sudden geographical reorientation of the foreign trade of Cuba, changes in the composition of raw materials due to this change, the necessity of increasing reserves due to the distance of the exporting countries, etc.) complicates the natural process of foreign trade of a developing country, which must undergo the pressures created by the increased incomes of the greater part of the population and by the requirements of accelerated growth.

At present, the process is reflected in a persistence of considerable annual disequilibria in the balance of payments.

The volume of imports represents between 25 and 27 per cent of the gross product; its present distribution is shown in table 7.

The relative weight of consumers' goods in imports will have a tendency to diminish in the future with the increase of domestic production, although Cuba will continue importing foodstuffs grown in the temperate zone.

Table 7

### CUBA: DISTRIBUTION OF IMPORTS BY DESTINATION

(In percentages)

	Averages 1963-1964
Consumers' goods	24
Intermediate goods	51
Basic means of production <u>a/</u>	25

a/ Does not include building materials.

Thus, it is the government's purpose to select crops in a manner that will not tend to total self-sufficiency in categories that can be produced in the country, while there exists the possibility of trading  
/those products

those products in which Cuban agriculture demonstrates a greater possibility of efficiency for products that can be harvested in the country but with a comparatively small yield.

It is not, however, from imports of consumer goods that the disequilibrium in foreign trade derives. The principal problem lies in the need for intermediate goods and basic resources. The comparative importance of intermediate goods, among total imports amounting to not less than 700 million pesos, reflects that lack of a raw materials base with which Cuban industry was organized and to which we referred previously.

More than 80 per cent of the total of this category, that is, more than 40 per cent of total imports, consists of raw materials for industry. Among them the most important are fuels and lubricants, raw materials for the food industry, and chemical, metallurgical, and textile raw materials.

With the assistance of the Soviet Union, Cuba is striving to find petroleum deposits in the country which would largely eliminate the need to import intermediate goods. Plans are also under way for the substitution of imports of intermediate goods that can be produced relatively economically in the country. Nevertheless, it must be noted that some of the intermediate goods used in certain technologically advanced industries will still have to be imported because the heavy and technologically complex investment required to produce them locally would not be warranted by the size of demand.

In the future, it will be necessary that in planning the industrial development of Cuba to give preference where possible to those branches for which a domestic raw material basis exists or can be developed. The imported component of domestic industry being about 20 per cent, the industrial growth of Cuba would gravitate toward an even more negative balance of payments were it not for the drastic reductions in importation that will be achieved through new investment projects.

With respect to Cuban dependence on the importation of equipment, it is typical for an under-developed country and the only point to be made is that the deficiency is worse in Cuba than in other Latin American countries with similar income levels. The proportion of imported equipment in the total is more than 80 per cent.

/To finish

To finish this picture, it is necessary to add that although the relations with the socialist camp have reduced to minimal proportions the necessity of commerce with the capitalist zone, there is a percentage, small but appreciable, which is still necessary, since it is a matter of imports that are decisive for the functioning of industry. To eliminate them definitively is one of the tasks of the next period. This elimination will give a guarantee of stability to the functioning of Cuban industry and will permit, besides, the dedication of resources in capitalist foreign exchange to the acquisition of technologically advanced equipment that Cuba considers advantageous in terms of comparative efficiency. In summary, one can conclude that the difficulties related to the disequilibrium of foreign commerce still constitute the most serious structural problem of the Cuban economy and its most characteristic point of strangulation, but they are the consequence of the distorted structure of the productive process that revolutionary Cuba inherited.

### Chapter III

#### TECHNOLOGICAL RESEARCH AND STANDARDIZATION

##### 1. The role of technological research

The task of technological research has been channelled in the industrial sector through specialized institutes, independent of the research directly conducted in the production centres.

Different areas of research have been divided according to the following criteria:

(a) The "Instituto Cubano de Recursos Minerales" is in charge of:

- prospecting for petroleum;
- all tasks related to geology or mining works;
- full use of minerals, and
- the technology required for the full exploitation of minerals, excepting the technology of laterite.

(b) Research on the benefit of laterites are conducted in the "Consolidated Nickel Firm" (Empresa Consolidada del Niquel).

(c) The prospects for development in the chemical industry made necessary the creation of an institute in charge of the research for an appropriate technology or the adjusting of already known technologies to local conditions. Such an institute will also be in charge of providing a solution to those technological problems of a certain complexity requiring more elaborate research and which usually cannot be practiced at the factory level. Also linked to such activities is the "Food Chemistry Group of the Academy of Sciences" (Grupo Químico de Alimentos de la Academia de Ciencias). This institute also has a well equipped textile laboratory, actually working for the manufacturing enterprises or the textile branch, with special attention to quality control and the resolution of certain technological problems related mainly to the dyeing process. This textile laboratory is considered to be the first step toward a future institute for textile research.

/(d) The

(d) The task of designing new machinery, especially agricultural, or related to the technology and sketching of spare parts for equipment from capitalist countries, along with the rationalization of the present national machine industry, has been entrusted to the "Institute for Machinery Development" (Instituto para el Desarrollo de Maquinarias). In summary, this institution plays a considerable role in developing the machine industry of the nation.

(e) Research on sugar cane products has been entrusted to a special institute called "Instituto Cubano de Investigaciones de los Derivados de la Caña de Azúcar". Meanwhile, the advancing technology of sugar production is supervised by the Technical Research Office of the Sugar Ministry (Dirección de Investigaciones Tecnológicas Azucareras del Ministerio del Azúcar).

(f) Those tasks concerning the application of automatization to industry are controlled by an executive board incorporated in the Ministry of Industries. The Cybernation Technology Department of the Academy of Sciences (Departamento de Cibernética Técnica de la Academia de Ciencias) also collaborates in solving the problems of the industrial automatization process.

(g) There exists a (Board of Technical Research) "Dirección de Investigaciones Técnicas", within the Ministry of Construction in charge of developing building materials as well as the building technology itself.

(h) In the Ministry of Communications there is a Central Laboratory for Telecommunications and a Telecommunications Workshop, created to help modernize communications service and promote productive activity.

(i) The Oceanology Institute and the "Alejandro Humboldt" Institute for Tropical Research, in the Academy of Sciences, are engaged in various types of research supporting industry.

We will now describe in a condensed form the general classifications in the work programmes of each of the above referred institutions:



(a) Cuban Institute for Mineral Resources

(i) Activity involving petroleum. This activity must be split into two big groups: prospecting for new deposits, and operating of those already known.

The prospecting area is located on the Northern Coast of Las Villas, where the best possibilities are thought to be. Of course, this does not exclude analysis of other regions presenting interesting perspectives, nor tasks of smaller intensity.

Three deep-drilling test operations have already been tried in Las Villas, considerably improving the knowledge of the zone.

As for the operating process, work continues at the three already known petroleum sites, with output slowly increasing.

(ii) Metallic minerals

The most important research has been conducted on the following minerals:

- Iron: In order to determine the existence of a base to establish an industry related to it.
- Manganese: Which has a certain export market.
- Copper: Which also has a stable export market.
- Nickel: In order to increase the reserves in our nickel industry.
- Chromium: For its use in refractories as a metallurgic agent.

(iii) Non-metallic minerals

- Raw materials for the cement industry.
- Raw materials for the refractory industry.
- Raw materials for ceramics and glass.
- Sands.
- Peat. Research has been done in order to determine the amount of peat contained in the Ciénaga Zapata, and there is a project to use it as a fuel and reducing agent in the iron and steel industry.

/(iv) Scientific

(iv) Scientific activities

Research has been conducted in the following directions:

- Preparation of a hydro-geological map of Cuba in scale of 1:1,000,000, which was made together with other national institutions.
- The necessary planning required to draw a geological map of Cuba scaled at 1:500,000.
- Surveys on tectonic and laterites presented at the International Geology Congress.

(v) Research for the production of cast-iron in rotating furnaces

A series of experiments have been carried out at a pilot plant, based on limonites and magnetites, which allow the use of cast-iron modules instead of scrap iron, in the Siemens Martin furnaces for steel production. At present, an economic evaluation of such a process is under way which will help to determine its application.

The interest and importance of the said research for the national economy is quite apparent.

(b) Consolidated nickel enterprise

Investigation of laterites based on:

- (i) Complete use of laterites.
- (ii) Determination of their behaviour in different industrial plants.
- (iii) Changes in the nickel and cobalt manufacturing technologies directed to increasing the recovery power of the plant.

These investigations are extremely important because they insist on the greater yield of the nickel plants. At the same time, they can be of capital importance in securing the necessary raw materials for the iron and steel industry.

(c) Cuban Institute for the Development of Chemistry

Several surveys are actually under way, such as:

- (i) The manufacturing of vegetable tanning materials from the leaves of the Eucaliptus-Salignas, Eucaliptus-Robusta, and the Pataban and Mangle trees.
- (ii) Obtaining of natural gum from the Casquilloa-Elastica tree.

/(iii) Refined

(iii) Refined cachaza <sup>18/</sup>wax. There are in Cuba several types of plants for the manufacturing of cane-wax made out of the "cachaza", itself obtained in the sugar making process. The wax thus obtained contains a number of impurities, and it is necessary to develop a wax refining process in which some of the impurities can be isolated along with oils applicable to additional industrial uses.

(iv) Avocado oil. With a market in the cosmetics industry.

As has already been said, the Institute includes a textile laboratory charged with the task of assisting the development and scientific advance of the textile and leather industries. Some of the surveys presently under way include:

- (i) Analysis and confirmation of faulty textile samples (raw materials, yarns and fibres).
- (ii) Analysis and testing of dyes. Chemical and auxiliary products creating manufacturing difficulties.
- (iii) Establishing the testing and solution preparing method.
- (iv) Quality checking of raw materials, dyes, chemical and auxiliary products and/or partly finished and finished products made in Cuba or imported.

There are also other investigations, such as the digestion of stem fibres from fructified and non-fructified plane-tree, headed toward the technical and chemical evaluation of the industrial possibilities of such fibres.

Apart from the said Institute, a Chemistry Group for Foodstuffs in the Sciences Academy has recently been created. This group is already working on the introducing and adapting a whole series of foodstuffs producing techniques, beginning from fruits, vegetables, meats and milks, for Cuban conditions.

(d) Cuban Institute for Machinery Development.

This Institute works fundamentally in the following three fields:

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<sup>18/</sup> "Cachaza"; first froth on cane-juice when boiled to make sugar.

(i) In the task of manufacturing spare parts for machinery bought from the capitalist world. Due to the blockade imposed upon Cuba in the supply of spare parts for machinery from the capitalist world, the necessity arose for organizing working programmes including the following items:

- Designing of manufacturing drafts for spare parts. In Cuba, the spare parts were ordered abroad with the help of catalogues, and no designs existed.
- Manufacturing techniques.
- Materials analysis and checking of mechanical characteristics.
- Production planning for spare parts.

The Institute also works on the development of technologies for other manufactures in the mechanics branch.

(ii) Development of agricultural equipment responding to concrete needs in agriculture.

In that sense, machinery designs have been made for the kenaff industry which embraces the following processes:

- Kenaff harvesting.
- Peeling of kenaff.
- Washing of kenaff.

Great progress has been made in the development of such machinery, and Cuba can be said to be in an advanced position in this field.

Work has also been done on the mechanization of the sugar cane harvest. And there have already been designed a lifting-machine, a model for cane-combining (successfully tested) and a cane-cutting-and-accumulating machine (in its testing stage) and more recently, a cane-sower.

Also under study at present are a kenaff-cutting-and-accumulating machine, a dehydrating-and-shelling machine, along with a mowing-lifting machine. Also, a coffee harvester, a land plane, and a grass-inlaying machine for citric fruits, a fertilizing machine and several other equipment.

(iii) The Institute is also equipped with a metallurgic laboratory offering help and technical assistance to enterprises in the mechanics branch. This laboratory prepares welding technologies, introduces new welding techniques and develops joining structures. It also co-operates

/in normalizing

in normalizing techniques pertaining to the mechanics branch, tests and specifies the components of alloys, and endorses the quality of spare parts, assisting their thermic treatment, and last, it checks industrial equipment applying physics methods in the search for imperfections, etc.

(e) Cuban Institute for Research on Sugar-Cane products

This Institute works on three specific fields of research, namely: sugar, cellulose, and fermentation.

(i) Sugar. Several projects are under way in this branch, among which the following can be cited: production of activated charcoal; decolorant; purifying of cane-juice; dextrine recovery and application, and production of bone-charcoal.

(ii) Cellulose. Research is being done in the pulp, paper and rayon industries, the first stage of which involves a general survey of cane bagasse as a fibrous raw material. Also a general survey of Cuban pine trees and plane-tree stems directed to producing "alpha-cellulose" (dissolving pulp) at pilot-plant scale. There is also a project for synthetic wood which involves making bagasse boards defying rough weather and using furfural alcohol resins as glue.

(iii) Fermentation. Work is being done on the following projects:

- How to elaborate analytical methods for the evaluation of molasses, applicable to the fermentation industry, which will make possible the designing of a quality record for molasses in different years.
- The Microbiology Department is trying to gather a collection of production micro-organisms for the textile industry as well as for the yielding of "torula" yeast. This project includes research and development of the varieties (termófilas) more adequate to production.
- A project of the Bio-engineering Department to study the basic parametres for semi-continuous and continuous fermentation of molasses and the must from the destilleries.

Also there are several projects in progress for the application and checking of techniques for organic and inorganic analysis and instrumental.

/(f) Administration

(f) Administration of technological research in the sugar industry

This Administration, located in the Ministry of Sugar Industry, (Ministerio de la Industria Azucarera) is made up of the following departments: industrial technology; automatization; agricultural technology and equipment extension; and the engineerings of industrial production. The Administration also investigates how to make changes in the industrial process of sugar production; renewal of industrial and transportation equipment, and those systems concerning the handling of sugar cane before it reaches the factories, etc.

(g) Administration of Automatization and Electronics

In its working programmes, this Administration follows the ensuing fundamental lines:

(i) To conduct the making up of a plan for the recovery and development of complex mechanization, and the automatization of the different branches of industry. At present, this is considered to be one of the fundamental working directions because of the shortage of spare parts due to the aggressive economic blockade imposed upon Cuba by North American imperialism.

(ii) To study and process the optional application of complex mechanization and automatization, following the characteristics and requirements of the different branches of industry, and attending to their economic foundations.

(iii) Direct and advise in the making up and implementing of specific programmes for the complex mechanization and automatization of summarizing operations and processes, as well as in the selecting and publishing of the technical and economical information concerning automatization.

(h) Department of Cybernation Technology of the Academy of Sciences

The Cybernation Technology Department, small and recently created, is located in the Sciences Academy. Its primary aim is the study of the problems raised by the so called identification of industrial processes. That is to say, toward establishing the static and dynamic properties of such processes with a view to their automatic regulation.

/The Department

The Department has an electronic laboratory, at present being developed and, along with the Ministry of Industries, is setting up another laboratory for analogical calculus.

(i) Technical Research Administration of the Ministry for Public Construction

This Administration conducts its activities through the departments of building techniques; construction materials; structures; mechanization and technology; execution of experiments; and technical-economical activities. Research is also conducted on different light aggregates. Plants and equipment are projected for production of materials and prefabricates. Original buildings are conceived and new structures designed to match the general necessities of the building industry.

(j) Telecommunications Central Laboratory and Telecommunications Workshop of the Ministry for Communications

These centres work on the development of different equipment adapted to national communication conditions; such as transmitters; antennae; telephonic equipment; lifters; (relevadores) multiplex equipment; and isolating materials, etc.

(k) Oceanographic Institute and Alexander Humboldt Institute for Tropical Research, of the Academy of Sciences

The Alexander Humboldt Institute is engaged in permanent research directed to improving the protective devices of industrial equipment and implements against weather conditions in the tropics.

The Oceanographic Institute studies means of assisting the merchant and fishing fleets as well as the fish and shell-fish processing industry.

2. Cuban experience of the development of standardization

The need to create a Central Council for Planning became apparent immediately after the triumph of the Cuban Revolution. That is, when the necessity of disposing of a centralized and high-level organism in charge of co-ordinating the development of the different economic sectors according to the fundamental propositions of the Revolution became apparent. The awareness of the significance of standardization for the future technical organization of the country, impelled the creation of a Department of Standards, directly dependent on the Council, which was then called the

National Laboratory for Standards and Industrial Processes, (Laboratorio Nacional de Normas y Procesos Industriales).

Previously, there had existed in Cuba a General Administration for Standards (Dirección General de Normas), dependent on the Ministry of Trade, with very limited functions and a negligible knowledge of standardization. Cuban industrial output was subject to and dependent on the technico-economical system of monopolies, fundamentally North American. Such a system facilitated industrial production in the quantitative and qualitative forms required by a competitive market. But it also forced our industry and technicians to work in a mechanical manner, without precise knowledge of the characteristics of the raw materials used, or of the processes, etc., all of which kept them in direct dependence upon the monopolies.

No national standardization activity or working programme whatsoever existed in this field. This is the reason why the General Administration of Standards never had been, nor was in a condition to furnish the country with either the technological experience, or the clear-sightedness required by the new stage.

Nevertheless, the results of standardization weighed effectively on the arrangement of production. From the technico-economical monopolistic system we received the product or raw materials corresponding to the technology of production, but, in most cases, all the technicians knew was the trade name of the product or the sales code they used.

Standardization activity was practiced, on a very limited scale, within the trade sphere. But, as is the obvious result in such a production pattern, standardization was merely another import product, obeying and directed by the monopolistic interests, and not concerned with rationalizing Cuban industrial production in a manner allowing a greater and better use of the national resources.

The bulk of manufacturing processes were initiated in Cuba and came to an end in the United States. Even the control systems for the technical checking of products were located in the central branches of the different monopolies.

/This economic



This economic and technical dependence upon North American monopolies already confronted Cuba in 1960, due to the deterioration of relations between this country and the United States and ensuing suspension of relations of any kind, with the two major problems which even today are not entirely solved.

After suspension of diplomatic relations with the United States, the links between our factories and the monopolistic technico-economical apparatus were suddenly severed. To start with, it became necessary to switch the sources of technical information and raw material supplies for industry. Secondly, the necessity appeared of suddenly having to create an appropriate technical development in the field of production.

The problem was difficult and pressing: not a single factory might stop production. The replacement of raw materials had to be operated through recourse to previously completely unknown markets, mainly those of the socialist countries. This requires, on one hand, the compiling of a large amount of technical documents, and on the other, adaption of production technology to the parametres of the new products. To the achievement of this first task contributed, if in a limited form, the newly created Standardization Centre, which minimized the damages and work stoppages envisaged by the imperialists with their then established blockade.

In the first days of 1960, the Central Planning Council began developing the first standardization programmes. The job was a tough one, among so many and urgent pressures. Yet, the fact that all industries are owned by the people facilitated the extension of the standardization process. The first stage, preparatory, was dedicated to compiling the required documents which would facilitate and serve as a basis for standardization activities. In 1961, Cuba solicited, and was granted, entry into the International Standards Organization (ISO). There, Cuba asked, mostly the socialist countries, to be instructed concerning the subject of technical standardization and its development.

In a short period of time, a centre for technical documentation began operations, supplied with more than 80,000 production standards from about fifty countries (then members of the ISO). Circulation of

/such documents

such documents began, and the most important among them were translated and sent to the factories. Then, step by step, the regular supply of information to our factories began to be organized. The standards received from ISO countries contributed also to filling up the gap for as long as Cuba did not have its own organized standardization programme.

Along with the previous documentary activity, the first steps were taken to prepare technicians to be conscious of the new modes of production now expected from them. Technical Committees for Standardization were created in the different industrial sectors consisting of a few pioneers in standardization work. This measure allowed each industrial branch in the country to know and simplify raw materials and products used in the nationalized factories, thus making possible the struggle against the blockade and exodus of principal technicians in the capitalist owned factories.

New technicians were being trained, and more are coming out of the collective work of the Committees.

In those days, the newly created Technical Committees, pressed by circumstances, worked in a makeshift fashion. But in a series of consecutive stages, the necessary raw materials and products were discovered, and our machinery could work systematically. Thus the technical forces available were put to the best possible advantage. A capital factor in the working of these Committees was the exchange of experiences between technicians and workers previously employed in similar branches of production by capitalistic firms, which had kept their production methods a "secret". From then onwards, such exchanges put the production methods at the disposal of the people.

In July 1962 the Vice-Ministry for Technical Development (Viceministerio para el Desarrollo Técnico) was created in the Ministry of Industries. The Standards and Metrology Administration began working with the above Vice-Secretariat charging itself with the responsibility of developing standardization in the country, since at that time, the Ministry of Industries controlled 80 per cent of industrial production.

The second stage was initiated by the Standards and Metrology Administration, with the publishing of results of standardization

/activities in

activities in the different branches of production. Such publications were then within the limits imposed by Cuba's lack of experience in standardization activities. The magazine Our Industrial Technology (Nuestra Industria Tecnológica), published every two months, was used systematically to introduce the standardization work done by our technicians, along with standard projects for public debate.

Thus, for example, basic standards for the extracting industry and the construction industry were published, keeping in mind the fact that they are two fields of activity in which standardization facilitates the intensive development required by our economy. Furthermore, in order to introduce the International System, the ISO/R 31 Recommendation was adopted, after being publicly debated as a standard of units. Simultaneously, the training of technical cadres in the referred activity was begun in the different economic sectors, the majority already having participated or collaborated in the original technical committees.

Early in 1963 technicians from different sectors of the national economy met in a Symposium, having as its basis the work accomplished by the Committees for Scientific Survey of ISO (STACO) Standardization Principles, and with the technical advice of the Polish People's Republic.

The members of the Symposium discussed the purposes, principles and goals of standardization, as well as types of standards, working methods, preferred numbers, statistical control of quality, planning of the standardization tasks, use of the International Units System, and application and benefits of standards.

The advantages brought to production by standardization became more and more apparent, and awareness of this brought about the first sectoral departments for standardization in the Ministries of Construction and Foreign Trade.

A new stage was initiated in 1964, aiming at the first Technical Standardization Plan within the limits of the Ministry of Industries. The main objective of this Plan was the establishment of appropriate definitions of export products in order to enlarge our foreign trade through having its quality guaranteed by technical standards.

The Plan consisted of more than 200 standardization tasks, counting export products and intermediate products, such as containers, packings, equipment, etc.

The first quality standards approved were for:

- Copper concentrates UNC-0038-64 Class A-33
- Nickel oxide UNC-0030-64 Class A-33
- Manganese dioxide UNC-0041-64 Class A-33
- Chromium minerals UNC-0080-64 Class A-33
- Sinter of nickel UNC-0040-64 Class A-33
- Minerals sampling and bulk concentrates UNC-0033 Class A-39
- Chemical analysis of nickel minerals and cobalt UNC-0036-64 Class A-39
- Chemical analysis of copper minerals and concentrates UNC-0037-64 Class A-39

The quality prescriptions today used in production, and the definitions set in international trade contracts were used in the creation of Cuban quality norms.<sup>19/</sup>

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19/ In elaborating the initial projects of sampling standards the following documents were used:

- |        |         |  |
|--------|---------|--|
| ISO/R  | 237-193 | Method of Sampling Manganese Ores, Part I, Ore loaded in freight cars  |
| ISO/TC | 102     | Secretariat 3/3F, July 1962-First Draft ISO Proposal for sampling Iron Ore Ships                             |
| ISO/TC | 102     | Secretariat 4/4 July 1962-First Draft ISO Proposal for Sampling Iron Ores from Conveyors and Falling Streams |
| ISO/TC | 102     | Secretariat 5/SS, July 1962-First Draft ISO Proposal for Sampling Iron Ores from Wagons                      |
| ISO/TC | 102     | Secretariat 6/SE, July 1962-Draft ISO Proposal for Preparation of Gross Samples                              |
| ISO/TC | 102     | Secretariat 7/72, July 1962-First Draft ISO Proposal for Moisture Determination in Iron Ores                 |
| ISO/TC | 102     | Secretariat 8/SE, July 1962-First Draft ISO Proposal for Size Determination of Iron Ores                     |

/In establishing

In establishing the analysis methods, those used in Cuban laboratories, along with those from other countries were applied.

The creation of basic standards for the metal-transforming industry was also initiated. Among the projects thereby created, which already have been approved we can quote:

- UNC - 0021      Deviations from ISA fittings
- UNC - 0022      Fabrication caliber and model
- UNC - 0023      Screw-threads unified by inches
- UNC - 0049 to 0052 and 0078      Screws, nuts, and washers by inches
- UNC - 0041      Metric screw-threads
- UNC - 0123      Basic rack for cylindrical gears
- UNC - 0102      Formats
- UNC - 0105      Principles of representation
- UNC - 0299 to 0306      Traction tests
- UNC - 0310 to 0312      Solidity tests

By the end of 1964, and following the experience achieved during our first plan, the guide for establishing the 1965 Plan was created. The different stages for a more organized execution of standardization activity were also defined and specified.

These stages are:

- Making up of the preliminary pattern form.
- Discussion of the preliminary pattern form.
- Debate and approval of the preliminary pattern form.
- Introduction of standard in production.

By the end of 1964, two new standardization departments were created, in the agricultural sector and in the communications sector. Cuban representatives that year started attending the international standardization work-meetings and the General Assembly of the International Standardization Organization, whose meeting at New Delhi (India) was attended by only two Latin American countries: Argentina and Cuba.

By 1965 Cuba was in contact with 25 technical committees from ISO, whose documents were circulated and analysed in the national committees when they were of interest for a given production.

/In 1964,

In 1964, Cuba adhered to the FAO/WHO Incorporated Programme on "Codex Alimentarius". The National Committee for "Codex Alimentarius" was created with members from all those organizations related to the food industries. Through this Committee, links with the international organizations were kept, and also the Codex documents were circulated all over the country. Cuba participated by correspondence in the workings of the 17 Codex Committees for Products and was represented by observers in the annual meetings of the former. Cuba is also a member of the Codex Committee for Sugar and attends its meetings.

It is interesting to observe that, following Cuban suggestions, the Codex Committees have amended various projects on world norms. The Codex Commission is also considering a Cuban proposal for the creation of a Codex Committee on Metrology.

The extensive work done by Cuba in the FAO/WHO Programme on the "Codex Alimentarius" resulted in our being elected, in 1965, to the place of Latin American Regional Representative in the Executive Committee for the period 1966-1967.

Once the organizing foundations had been created in factories and enterprises for development of the standardization task, by January, 1965, another symposium was organized with the assistance of those in charge of executing these activities. The following themes were discussed:

- (a) Standardization. Definition and concepts. Further definition.
- (b) Importance of standardization in socialism.
- (c) International organizations for normalization.
- (d) Goals of standardization. Kinds of standards. Conditions for their approval.
- (e) Levels of standardization.
- (f) Methodology of the rules for setting-up standards.
- (g) Technical situation.
- (h) Specifications for raw materials.
- (i) Documents and technical information for standardization.
- (j) International units system.
- (k) Planning and standardization.
- (l) Legal aspects of standardization.
- (m) Control of quality and standardization.

/By 1966,

By 1966, approximately 200 national standards have been created, independently of all those factory norms created by the enterprises themselves. This is another step in the liquidation of deficiencies yet existent in the field of technico-productive activities, and in itself establishes the system of regulations and standards which will make possible the planning and control of the production cycle, starting from the planning of supplies and their use in the production process to the delivery of the finished product.

In 1966 Cuba has attended the meetings of the ISO Council during June in Geneva. Cuba will be a member of the ISO Council (made up of 14 countries who are members of the Organization) during 1966-1967 and 1968, since it was so elected in the 1965 ISO elections.

It can be said that in Cuba conditions already exist for massive and extensive improvement in all branches of economy within the standardization field.

The principal sectors of the country are already provided with standardization centres. Apart from those already mentioned, standardization groups have been created in the sectors of transport, public health, nutrition, sugar, fishing, domestic trade, etc.

Already there are established and functioning, 17 National Committees for:

- Tolerances and fittings
- Technical drawing
- Mechanical metrology
- Testing of materials
- Thermic treatment
- Fixing elements
- Transmission elements
- Welding
- Metal-forming
- Smelting
- Machining
- Chemistry
- Paper

/Essential oils

Essential oils

Cement

Textile industry

Fruits and vegetables

And the following Committees are being organized:

Fertilizers

Synthetic wood

Manganese ores

Nickel and cobalt ores

Silicon sands

Non-metallic minerals

whose mission is the unification of standards in their own branches, from raw materials and tests to finished products. The above Committees are closely linked to their homologous ISO Technical Committees, and their task is to keep Cuban industry informed on the latest developments in world techniques, thus aiding the always increasing progress of our conditions and means of production.

The Revolutionary Government, aware of the significance of standardization for ordering and developing production, plans to separate the Standards and Metrology Administration from the Ministry of Industry, where, up to now, it had been in charge of the national activities on standardization, and put it directly under control of the Council of Ministers with the name of National Centre for Standards, Metrology and Quality Control.

The most important tasks of such a Centre will be:

(a) Conduct national activities in technical standardization, thus securing their unification, and making the activities in the different sectors of this field consistent, as well as dictating the methods, rules and regulations and any other required documents.

(b) To establish national standardization plans based on proposals of the central organizations for production, distribution, transport, training and research. All this taking into account the necessities of national economy, and especially making the best possible use of import resources as well as the substitution of imported materials by national products.

/(c) Conduct



(c) Conduct the creation of national standards, approving, reproducing and publishing them.

(d) To establish and co-ordinate the method and timing application of national standards. Particularly the transitory dispositions required for the progressive application of such standards, having to consider possible exemption demands.

Once the "emergency" stage was left behind in Cuba, we were in a position to face as a whole the problem of a planned development of standardization. Our intentions are, through prospective programmes and with the aims already stated to:

(a) Impose rational limits on products and their stocks, and create and unify the previous requirements for inter-changeability.

(b) Determine, through standardization of types, the different type and size products to be used.

(c) Assure the quality of tools and work utensils required for production, as well as the products for individual consumption, according to their destinations and, when necessary, to increase their quality.

(d) Unify the manufacturing procedures of products on the basis of the most recent technologies and organization of labour and production. This, is to be done in such a way that necessities can be met in the shortest possible time and to the greatest economic advantage.

(e) Prevent wastage of basic and auxiliary materials of all types.

(f) Secure the previous requirements for health defense and against accidents in production.

(g) Develop the required conditions for the analysis, supply, stocking and purchasing of products.

(h) Unify terminology in order to facilitate understanding.

The development and fulfilment of these programmes are conditioned by the disposal of specialized technical cadres. Hence the capital role played by the educational programmes of our technological schools and universities, which have been given, at all times, preferential treatment by our Revolutionary Government. The participating of technicians and skilled workers from our factories in standardization tasks contributes, because of their efforts and enthusiasm, to overcoming the difficulties referred to.

/The centralizing

The centralization of production, that is to say, the gathering of productive forces in always bigger working centres, and specialization, are well known economic laws acting in both the capitalist and the socialist systems. They are the expression of the progressive socialization of labour. Yet, their ulterior development is restrained in the capitalist world by the production relations prevailing in that system: ownership of the means of production.

One of the main goals of our Socialist Revolution is the expansion of production and the always increasing well-being of workers. Given the enormity of our necessities, not only in those referring to individual consumption, but also in productive consumption, it is also necessary to solve production planning problems. Standardization is among the best means for reaching such a production goal.

Apart from the goals already stated, standardization will also help in the definite elimination in our country of the remaining production divisions resulting from capitalistic competition. This is of vital interest for the subsequent centralizing and specializing of production, given that there still exists irrational production which prevent the introduction of progressive methods for organizing labour.

## Chapter IV

### A NEW STRATEGY FOR DEVELOPMENT

#### 1. Overall Strategy

The history of Cuban industry and the analysis of it that have been developed in this report, are preliminaries to consider when one brings into focus the future development of our industrial sector.

The concept of development, in capitalist and socialist economic theory, has been linked, for different reasons, with the theory of accelerated industrial development, as the only road for assuring a self-sustained process of income growth.

The Cuban case presents, for the first time, an experience capable of altering these principles previously considered the sine qua non of the development process. In order to demonstrate this possibility it will be convenient to make a short analysis of the reasons that make preferential attention to the industrial sector seem unavoidable when one considers the changes necessary in under-developed economies.

Common experience has been that to the extent that income elasticity of demand in the countries with capitalist development for primary products - which constitute the traditional imports of the under-developed countries - is notably lower than the corresponding elasticity of demand in the countries in the process of development; for the intermediate goods and basic equipment that they have to import, one arrives rapidly at the barrier of a growing deficit in the means of international payment of the under-developed countries. To this one adds that the same low elasticity of the demand for primary products and the relatively superabundant supply of them in world markets, has caused a process until now irreversible of deterioration in the terms of trade for primary products, which considerably aggravates the situation of the under-developed countries. In addition, other phenomena tend to make this situation even more difficult: the technological advances of the industrialized countries which have achieved and continue achieving considerable successes in the substitution for

/natural primary

natural primary raw materials coming from the less developed countries; the policy of increasing agricultural production which is being carried out in the most important industrialized countries, and the differences in the rates of population increase between the countries of low income and the countries of high income.

In the face of this picture, which corresponds to the ordinary process of trade between industrialized countries and those that find themselves in the process of development, it is clearly unobjectionable to postulate that the immediate and accelerated industrialization constitutes the only possible route and the only effective dynamic centre for development.

There have arisen, therefore, the well known policies of domestically oriented growth, which foster the diminution of the coefficient of imported inputs, through a relatively accelerated process of import substitution. There also arises as an optimum goal achieving a rapid industrial development capable of transforming a backward country into an exporter of manufactured products. But, since the resources for this second and more ambitious task turn out to be insufficient, this goal is linked time and again in governmental policies to the demand for external financing. Unfortunately, attempts to satisfy this necessity turn too often to the international monopolistic capital market, which, by private investment, fills the vacuum that is always produced in the first stage of this type of development.

When one postulates the schema described in the previous paragraphs as the only possible and desirable one, one begins with the false assumption that there is no alternative way. One ignores the fact that although this schema is valid in connexion with the relations between countries of the capitalist world system, it does not reflect the character of relations between the countries of the socialist system.

The experience of Cuba demonstrates that, for the first time, there are, given the conditions, due to the existence of a world socialist camp, for arriving at an adequate and beneficial use for all participants of the international division of labour, which, applied in an international capitalist system, has been only one more instrument for perpetuating inequality between countries and the exploitation of the more weak and backward countries by those more powerful and advanced. The prerequisite

/for making

for making the international division of labour function in a manner that will guarantee not only the optimum use of resources but also the equitable distribution of income, is the existence of a system of prices that removes at one blow the deterioration of the exchange prices of the products of the under-developed countries and re-establishes equivalent exchange. In this manner, there is achieved what was foreseen by Karl Marx in Capital when he assigned to foreign trade the task of promoting the exchange equivalent use values. In effect, this new type of relation will permit the countries in the process of development to take advantage of their experience and their natural conditions for the production of agricultural articles and items only minimally manufactured - like sugar - providing them to industrial countries at prices that are comparatively lower than the cost of production of these articles in the industrial country. At the same time, this exportation will generate a purchasing power sufficient for importing from the industrial country basic equipment, selected raw materials - such as those of chemical origin - durable goods and manufactured consumers' goods.

The existence of this possibility permits the country initiating its road to development to realize it by the ways that are most efficient and least costly. On one hand, it will receive for its own foreign exchange resources principally industrial equipment that the country itself would not be able to produce at the same technical level, and to achieve which - in conditions of technical inferiority - would require enormous human sacrifices. At the same time, the utilization of an initial agricultural phase in its development will give to the country an indispensable period for the preparation of technical cadres (from skilled workers to production engineers and managers).

In the particular case of Cuba, the conditions that permit a focus of the process of development on an adequate division of labour are met. In these conditions, and given the advantageous alternatives that are presented by the development of the agricultural sector in terms of import substitution, it has been decided to base the development of the next period on an accelerated expansion of that sector.

/This does

This does not signify in any way that during the coming years the industrial sector will stand still. In fact, the demand for industrial products that the development of the industrial sector creates is considerable, not only because of the important increases in this field, but also because during the period the production function of the agricultural sector will be modified in the direction of technical progress and the change toward more and more intensive agricultural and livestock production will mean a growing demand for industrial inputs. In these conditions important quantities of certain industrial products are required, in order to take advantage of internal and external economies and to develop those branches that present particularly favourable conditions.

On the other hand, the development of the industrial sector during the medium-run will not rely only on the satisfaction of the need for those products that the agricultural sector demands in increasing quantities. The type of development that Cuba has undertaken is precisely associated with the accelerated development of exports of products that, even when they originate in the primary sector, must be processed by the industrial sector; that is to say, agricultural development itself conditions the development of certain industrial branches. One should also take into account that agricultural growth itself will generate a series of external economies that will facilitate the development of new branches or the appearance of new industries, as has happened in the case of sugar and the industries based on cane (alcohol and other fermenting industries, paper pulp, etc.). It is within this context that one must examine the relations between agriculture and industry in the next period.

## 2. The role of reserves

As appears in the analysis previously presented, the tasks of the Cuban economy in the medium-run must be focussed on the elimination of the disproportions that are indicated therein (disequilibrium between supply and demand of consumer goods, slow growth of the organic capacity to invest, disequilibrium between regional supply and demand for manpower, lack of qualified manpower, and disequilibrium of foreign trade). It is a matter, then, of eliminating existing barriers in the most rapid possible way and of guaranteeing the continuity of development in the subsequent periods.

/Since in

Since in the last analysis the structural changes in the economy are conditioned substantially by the destinations and amounts of the uses of the savings fund, it is appropriate to examine the alternatives that provide agriculture and industry with the most rapid possible means for resolving the existing maladjustments, focussing the analysis on the alternative effects of investments.

On the other hand, given that in the Cuban economy there exists definite under-employment of resources as a consequence of the appearance of points of strangulation, one must take careful note of the existence of definite reserves at the present technological level. The principal reserves existing in industry - both in sugar and in industries other than sugar - are concentrated in the capacities not utilized, and in reserves of manpower and productivity. Nevertheless, the actual employment of these reserves, principally in the non-sugar industries, clashes, in a short time, with a basic problem.

Under present conditions, the character of existing industry itself with its weak technological structure and with structural points of strangulation in its capacity to produce intermediate goods, is not in a position to produce an effective volume of import substitutions that would permit it to augment considerably its activity without affecting the balance of payments in freely convertible currencies. An exception to these considerations is the metal-transforming industry, in which, given its productive capacity, it is possible to make important net substitutions. On the other hand, the maturation in the next period of certain plants that will break the existing points of stangulation in the production of intermediate goods, will tend to diminish the coefficient of imported inputs and to augment the levels of production of the non-sugar industry.

The foregoing does not prevent, however, the affirmation that the employment of existing reserves of the non-sugar industries - excepting the industries producing traditional exports - will not relieve the foreign commerce problem to any considerable extent unless there are corresponding important investments in the production of intermediate goods.

/In agriculture

In agriculture there exist reserves in the utilization of all the fundamental resources. With respect to the use of the land, for example, there are considerable reserves at the level of technology presently employed, which become particularly important if one takes into account the technical progress that should accompany agricultural development. Thus, it is estimated that the land not cultivated during 1964 was of the order of 1.5 million hectares (some 25 per cent of the total). On the other hand, and perhaps with the exception of cane, the agricultural yields obtained up to the moment are capable of being raised without improvements in the availability of technical inputs (fertilizers, pesticides, etc.), through greater attention to the organization of the cultivation. At any rate, the reserves of land associated with sugar production through the existing excess in the cultivation of cane are considerable. It suffices to examine table 8 to see how much advance is possible by this method. With respect to cattle, there are reserves principally in the improvement in yields that are presently very poor, both in beef and pork and in milk, which represents a considerable volume of production if one takes into account that the amount of beef cattle is greater than 6 million head; that is to say, more than 0.8 head per person. Although there are substantial problems with respect to good organization of management and care of cattle (birth, mortality, selection, use of pastures, etc.), the central problem is that of feed and its lack of balance between the dry seasons and the wet seasons. The complete employment of the possibilities provided by the considerable volume of the herds is tied to investments (artificial pastures, enclosures, installations, etc.), which will permit the satisfactory solution of the feed problem. The potential of the reserves associated with cattle is shown in table 9, in which some international comparisons of cattle production are made.



Table 8

	Tons of cane/ hectares	Tons of sugar/tons of cane	Tons of sugar/ hectares
Mexico	56.7 <u>a/</u>	0.108	6.2
Puerto Rico	68.7 <u>b/</u>	0.120	8.2
United States	63.9 <u>b/</u>	0.091	5.8
Hawaii	204.1 <u>b/</u>	0.114	23.3
Argentina	39.5 <u>b/</u>	0.080	3.2
Brazil	-	0.060	-
Peru	155.1 <u>a/</u>	0.111	17.2
Taiwan	80.6 <u>a/</u>	0.129	10.4
Mauritius	62.6 <u>b/</u>	0.100	6.3
Australia	64.4 <u>b/</u>	0.139	8.9
Cuba (average 63/64 64/65)	45.0	0.120	5.4
Cuba (projected 1970)	60.0	0.120	7.2

Source: Tons of cane/hectares: FAO Anuario de Producción, 1962.

Tons of sugar/tons of cane: Industrial Directorate, JUCEPLAN.

a/ 1960/61.

b/ 1961/62.

Table 9

PRODUCTION PER 100 HEAD OF CATTLE (1961)

	Meat-Tons	Milk-Tons
Austria	6.5	122
Belgium	7.4	143
Bulgaria	3.7	56
Czechoslovakia	4.1 (1959)	90
Denmark	6.6	154
France	7.3	122
German Democratic Republic	3.9	120
German Federal Republic	7.3	154
Italy	5.9	97
United States	7.6	59
Argentina	4.9	102
Australia	4.6	36
New Zealand	3.9	84
Cuba (1964/65)	2.7	11

Source: Cuba: JUCEPLAN.

Other countries: FAO, Anuario de Producción 1962. (Does not include milk devoted to nursing calves, except in the data for Austria, Czechoslovakia, France, German Democratic Republic, and German Federal Republic.)

/As has

As has been said previously, reserves of manpower and productivity also exist in the rural zones. Here also an improvement in organization and in the direction of work will permit a considerable increase in the efficiency of the utilization of these resources. Nevertheless, given that, as was mentioned in the preceding analysis, the amount of agricultural manpower - compared to the existing availability of labour in urban zones - constitutes a limiting factor for development, little can be achieved without a change in the process of production sufficient to permit a relative saving of manpower. Development is therefore associated with an increase of equipment per worker and a greater availability of technical inputs. This is precisely what will be achieved by present plans for mechanization and technification of Cuban agriculture.

If in addition one takes into account the fact that the typical products of the agricultural sector are to a certain extent perishable, it will be concluded that the full realization of the potentialities of the sector also calls for the assignment of investment resources to processing, storage, and transport.

From what has been said it follows that:

- (a) The problem of the development of the agricultural and industrial sectors cannot be looked upon as if they belonged in separate fixed compartments. The interaction in development of the two sectors is substantial, and the preference given to the agricultural sector, although it is identified as the pivot of the take-off, by no means signifies inadequate attention for the industrial sector.
- (b) Although important reserves exist in both industry and agriculture, the full use of them is associated with a selective programme of investments designed to destroy the points of strangulation that give an inelastic character to the supply those sectors can produce.
- (c) Careful attention to problems of organization and direction can show important results in certain branches of production.

Taking into account the conditions mentioned with respect to the role that existing reserves can play in agriculture and industry during the next period, one is ready to analyse the role that should be assumed by investments destined to these sectors.

### 3. Agriculture and industry in the next period

The Cuban economy, in undertaking an accelerated development, must take systematic care to shield itself during the next period from injury to its capacity to import. Under such conditions, the evaluation of possible investments must take careful note of the effect of the different projects on the balance of payments. In the Cuban case, in which surplus potential is not wasted on luxury consumption of the bourgeoisie, nor on large remittances in the form of the profits that are inevitably associated with foreign investments, the possibilities of capital formation in relation to national income are considerably greater than in the rest of Latin America.

In this circumstance, the organic capacity for investing with a given efficiency - more than the total volume of the capital fund - is what constitutes the limiting factor of the rate of growth of investments.<sup>20/</sup>

On the other hand, it clearly appears that investment projects have considerable different requirements, according to the sector to which they are allocated.

As has been stated previously, in the case of agriculture the needs for project engineers, for highly qualified supervisors, and for the management of complex equipment, are considerably inferior to those of industry. In this respect, the limitation indicated is less significant in agriculture than in industry.

In order to analyse in general terms the comparative effects of different developments of industry and agriculture on the balance of payments, it is helpful to present some data concerning both sectors.

The direct coefficient of imported inputs of agricultural production is around 0.06; if one takes into account the indirect requirements, the coefficient may double.<sup>21/</sup>

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<sup>20/</sup> The efficiency of investment referred to is associated with compliance with maturity schedules and the return on expenditures for construction and installation for the various projects planned.

<sup>21/</sup> Direct inputs are constituted principally by imported fertilizers, spare parts, seeds, and pesticides, while the indirect ones are fundamentally raw materials for the production of fertilizers, fuels, lubricants, feed grains, and chemical products for tire production.

On the other hand, the direct coefficient of imported inputs in the industrial sector is around 0.20, and since the direct and indirect requirements of the industries associated with the agricultural sector (sugar industry, meat industry, milk industry, etc.) are substantially lower than this average, primary attention to these activities and its preferential development compared to the others, will tend to diminish the coefficient of imported inputs for the economy as a whole. Since, in addition, an important part of the increases of production of the priority sectors will go to exports, the beneficial effect on the balance of payments will become particularly significant.

From the foregoing it follows that, given a surplus potential, its fullest utilization is associated with assigning important proportions of the capital fund to agriculture. On the other hand, it is precisely in the sector where the greatest reserves exist where there are the conditions for assigning it the role of pivot in the road to development.

At any rate, it is desirable to present some figures that show the efficiency of investments in the exporting sectors. As projects characteristic of this type of development, under Cuban conditions, one can consider the investments in sugar production and nickel production. In the first case approximately 1.5 dollars in imported component was necessary for each dollar of net favourable effect in the balance of payments. In this respect, it is necessary to make clear that this high efficiency is obtained because the majority of the investments are made in enlargements of existing plants. In the case of nickel similar coefficients are obtained. Of course, there are also other industries that present promising indices, although it is a matter of import substitution projects. For example, a plant making thread and smooth cloths has an index of 2.0. Nevertheless the absolute volume of substitutions that, in projects of this type, can be obtained in the immediate future is very limited.

Most of the non-sugar industrial investments will turn during the period on the construction of a base for agricultural development and cattle raising, and setting up of the industries originated by such development.

/This is

This is why the development has already been initiated for the branch in chemical industry, destined to produce technical inputs for agriculture. Negotiations have already been completed with the Soviet Union for a fertilizer composite which will produce 135,000 metric tons of ammonium nitrate, 35,000 metric tons of urea, and another 200,000 metric tons of complete fertilizers, for which, in the same composite, phosphoric rock will be elaborated, and simple super-phosphate will be produced.

Negotiations have also been completed with British firms for the second composite, which will produce 285,000 metric tons of ammonium nitrate and 180,000 metric tons of urea. New fertilizer factories are planned for the future, with investments totalling 300 million dollars.

Another field where great resources will be invested is that of the building materials industry, which at this time, constitutes the weak link in the Cuban economy. The needs for cement arise from the industrial building already explained, from road-building necessities, and from the house building programme which, beginning in 1970, will mean the construction of no less than 100,000 houses yearly. This has exacted a rapid expansion of the already installed cement producing capacities. In 1969 two new plants will be producing, with a capacity of 600,000 metric tons respectively, with total investments of 68 million dollars. The already existing plant of Santiago de Cuba is also being enlarged, and its capacity will be raised to 216,000 metric tons, with investments of 12.5 million dollars. With all this, cement production in 1970 will surpass 2.2 million metric tons, that is to say, two and a half times the 1959 production.

Investments continue in the metallurgic industry, on the basis of arrabio (cast iron fused for making steel) imports, and use of the iron scrap existing in the country. The first stage in this enlargement will raise production in 1968 to 230,000 metric tons, and the second stage will raise it to 350,000 metric tons annually.

Obviously, one of the principal problems to be solved in Cuban economy is that of achieving the greatest possible self-supply regarding mechanical production of implements and equipment for agriculture. There already exists installed capacity in this field to produce larger amounts

/than those

than those previously achieved. Yet there has been a lack, on one side, of essential raw materials, and on the other, technical manpower for execution as well as projection.

The Revolutionary Government has set as one of its main and immediate objectives, that of specifically propelling that branch of mechanics. That would be the first stage in that branch, which will enter its definite one when, from 1970 onwards, the programmes for steel and iron development, referred to further on, begin working.

If, as we have explained, the development of agriculture and livestock means the first step toward complete development for Cuba, this fact also determines the necessity of raw materials from agriculture and which will arise from the supplies of raw materials from agriculture and cattle breeding provided by the process itself.

If at that stage, cane is the capital agricultural product for industry, then cattle, as a source of milk and meat, will provide the second base.

Considering the 6.7 head of meat cattle available by the end of 1966, and considering also the important technification programmes in cattle breeding already at work, it can be said that in the years to come, Cuba will be able not only to completely fulfil the needs of milk and meat of the country, but also will be in possession of large exportable surpluses by 1970-1980.

Quantitative and qualitative development of such a stock of cattle, together with the present low industrial technical level make necessary the modernization and enlargement of already existing factories if we are to extract a net profit from cattle. They will also determine, at the same period, the building of new plants. Of these, the first to be started will be a meat complex in the Camagüey region which will process 1,000 head of cattle per day.

In the revolutionary period the pasteurizing capacity of fresh milk has risen by 0.5 million kilos a day, and the cooling capacity by 250,000. Furthermore, for the next period the opening of 5 pasteurizing plants is already planned in important centres of the country, (Matanzas,

/Santiago de

Santiago de Cuba, Santa Clara, Cienfuegos, y Ciego de Avila) with a daily capacity of 100,000, 50,000 and 30,000 litres. In future years the opening of pasteurizing plants will continue in relatively populated areas.

Immediately, a "Coppelia" ice-cream producing plant will be installed in the Camagüey region, which will supply this product to the two eastern provinces. A similar one will be installed in the central province of "Las Villas", and a third one is being considered for later on.

The increase in fruit yield, especially citrus, will demand the modernization and enlargement of the fruit and vegetable canning industry. Among the new plants, two important citrus complexes can be cited, one on the Isle of Pines (Isla de Pinos), (until recently the "Presidio Nacional" and transformed now into the Island of Youth (Isla de la Juventud)), where thousands of youngsters will combine their education with participation in the task of transforming that previously forgotten part of Cuba.

"Guane", another spot previously barren for the national economy, will receive the second of the referred to citrus complexes. This is due mainly to the fact that among the agricultural development programmes now being applied there, the most important one is the planting of almost 50,000 hectares of citrus fruit.

On the other side, in the flour industry, operating with imported raw materials, the installed capacities are not enough. We are working to enlarge the capacities of the existing mills, and on the building of a new mill in the central region of the country. Also anticipated is the building of four plants for flour products, the first of which, with a yearly capacity of 23,000 metric tons, is already under way in Havana province.

With the construction of the plants mentioned and many others whose discussion would be too long, the period of 1970 will register a substantial increase in the industrial production of foodstuffs. The increase will be even greater in the following 5 year programme, parallel to the development of the agricultural and cattle raising programmes.



#### 4. New industrial branches

Far from what has been claimed in circles interested in minimizing the economic significance of the Cuban Revolution, the utilization of the land and cattle base as the point of departure for economic development, does not signify the elimination of projects for industrial development which were formulated as ultimate goals from the first days of the revolutionary victory. It is not simply a matter of the industrial growth previously mentioned that will accompany basic land and cattle development, a development which industry will both serve and benefit from. In the future there will arise also important new industrial projects. This is imposed by inescapable economic necessities.

When sugar production reaches 10 million tons, the capacity to increase exportation to the socialist area will be limited, in the majority of cases, to covering annual increases in consumption. But this possibility will be itself limited, since the lands available specifically for sugar are limited. On the other hand, an acceptable rate of growth for the Cuban economy in 1970 requires a net favourable balance of payments on the order of 100 million pesos per year. This produces the necessity of increasing exports in a quantity of this order of magnitude, or obtaining minor increases in exports at the same time that there is substitution for imports. It follows that non-sugar exports and import substitution must become increasingly more important in the next decade.

It can be said that although the growth in exports of the meat industry will produce in each of the years of the period increases of exports tentatively valued between 10 and 15 million annually, and although the exports of vegetables, fruits and other agricultural products will reach figures much higher than the small amount of present income from this source, the necessities of paying for maintenance of a desirable rate of growth will not be able to be satisfied only by land and cattle production and its industrial derivatives. A limiting factor already indicated in the case of cane will come into play before the level of production is able to produce the sums needed: the scarcity of agricultural land. The role of industry is, therefore, considerable.

/The principal

The principal project in this direction is the one proclaimed by Cuba's Prime Minister in his speech on February 20 of this year, before the workers of the metallurgical industry. The project consists in the full use of laterites from Oriente province for the production of nickel, cobalt, alumina, chromium, iron, steel and as sub-products ammonium sulphate and others.

This is a very ambitious project which implies total investments, direct as well as infra-structure nearing 1,000 million pesos (dollars).

The laterites in that zone contain nickeliferous deposits considered to be one of the largest reserves of that mineral, perhaps comparable only to those existing in New Caledonia. The mineral can also be worked in the open air, and its standard quality is comparable to the highest known.

At present, the technology employed only allows extraction from those laterites of their values in nickel and cobalt only in the form of sulphide of nickel, nickel oxide and sinterized nickel, all of them containing the cobalt, which subsequently must be removed.

As a result of the technology used, there exists an enormous piling up of trains of minerals with a high content of iron, mixed with cobalt and other mineral fragments. An adequate technology will allow a yield of from 800,000 to 1 million metric tons of iron, along with very substantial alumina and chromium products. All of this offers the possibility of reaching for the period 1970 to 1980 an iron and steel yield of no less than 800,000 metric tons in addition to those yielded by the already mentioned plant. It also offers to Cuba the prospects of becoming a producer of special steel (alloys), with alloys of nickel, chromium, etc. In this way, the national needs for the principal products of sheet steel would be satisfied, and also the very important need for tin for the national canning industry. There would also remain the possibility of exporting steel products, special steels (alloys), chromium and alumina, as long as the latter is not transformed into aluminium.

After years of research, as announced by the Prime Minister, the first decisive steps are already being taken to transform this source of wealth into the beginning of the second stage of Cuba's economic development. Starting from iron and steel production, Cuba contemplates its inclusion in the picture of international production in the mechanics industry.

/An additional

An additional element in our development would be, naturally, the manufacturing of sugar products, from the bagasse products (pulp and cellulose) and those originating in fermentation.

At present, forest reserves are being studied which are likely to be used in the manufacturing of pulp as a raw material for the paper industry. Furthermore, Cuban forestry is already being organized according to a plan for industrialization that will provide in the future a solution to Cuba's increasing problems in the paper industry and, eventually, make Cuba an exporter of raw materials or even finished products.

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Such are the modest experiences that the Cuban Revolution can contribute to the International Symposium on Industrial Development.

From the previous analysis Cuba derives complete confidence in its future and proudly presents the example of a small nation that, taking the path of national independence and the using of its wealth for the benefit of society, has victoriously opposed all brutish attempts to oppress it once again and now confidently marches toward the future.

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