FOREST, PIONEER FARMS, AND PASTURE: CHANGES IN LAND USE IN THE SOUTHERN MARACAIBO BASIN, VENEZUELA, 1944-1971

by

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I was able to visit Venezuela during January and February of 1972. At that time, I interviewed persons who were directly involved with the development that had occurred within the Southern Maracaibo Basin, and personally examined some of the results of that development.

Ten days were spent in Caracas interviewing officials in various organizations and in government Ministries and agencies that were involved with this development. A special thanks should be given to those officials who willingly gave of their time to assist me. They include: Drs. L. Wallis, Armando Yanes and Rafaél Berti of the Ministerio de Obras Publicas (MOP); Drs. Claverie, Gloria, Soler, Cesar Fuentes Marins, Mario Alfredo Duim, Gómez Paz, Mauricio Baez, Hugo Estrado, Foster Hamlin, and Antonio Vera Hernandéz, associated with various departments of the Ministerio de Agricultura y Cria (MAC); Dr. Pedro Moreno, Dr. Pedro Molino, and Señor Pohan of Cartografia; Frank Chávez of Inter-American Geodetic Survey (IAGS); Louis Heaton of the Consejo de Bienestar Rural (CBR); Dr. Eddy Rivas of the Instituto Agrario Nacional (IAN); Drs. Pompilio Rios, Hugo Mejades, and Alejandro Cooz of the Banco Agricola y Pecuario (BAP); Dr. Roberto Lizarralde, Professor at the Universidad Central de Venezuela in Caracas; Dr. Carlos Hohermuth, Director of Industria Lactea Venezolana C, A. (INDULAC); and Dr. Mejía of the Ministerio de Fomento. I wish to especially thank Mr. Donald M. Nelson, Jr., the Assistant

PREFACE

This study is an attempt to examine the reasons behind the rapid transformation of the Southern Maracaibo Basin of Venezuela. Preston James and other geographers have stressed the importance of the Valencia Basin because of its former role as a primary milk producing area for the country. However, within the last twenty-five years the Southern Maracaibo Basin has evolved from a forested, economically backward area into an important dairy and beef center which today has surpassed the Valencia Basin in livestock production. Although some studies have been made that deal with portions of the Southern Maracaibo Basin,[1] there has been no recent comprehensive study of this region. In this paper, I am attempting to make such a study, especially to demonstrate and explain the new economic importance of this area and the rapid transformation that has occurred there. I hope, also, to indicate, and show the impact of, some of the factors within the region which were the primary catalysts for change.

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[1] Some of the studies that deal in part with the Southern Maracaibo Basin include; Antonio Cárdenas' book, Geografía Fisica de Venezuela; The Ministerio de Agricultura y Cria's report, Estudio Sobre los Recursos Agricolas Pecuarios y Forestales del Estado Zulia; Dr. Henry S. Sterling's two-volume work, Problemas Economicas y Sociales de los Andes Venezolanos; Orlando Venturini's article, "Aspectos Geograficos de la Colonización del Piedemonte Noroccidental de los Andes Venezolanos"; Marco-Aurelio Vila's book, Aspectos Geograficos del Zulia; Pablo Vila's two-volume work, Geogafia de Venezuela; and R. F. Water's book, Shifting Cultivation in Latin America, and his article, "Economic Backwardness in Venezuela."

Agricultural Attache for the United States Embassy who went out of his way to assist me in my research.

In addition to time spent in Caracas, I also spent two weeks in the Southern Maracaibo Basin. Especially helpful in furthering the research at that time were: Joaquin Brilliambourg, owner of Hacienda Bolivar, who permitted me to stay several nights on the hacienda; Jórge Reimberg, foreman of Hacienda Bolivar; A. Spinac, Supervisor of the INDULAC plant in Santa Bárbara, who provided lodging and made available the use of an INDULAC jeep for transportation into the less developed areas of the region; Benedicto Marini, Manager of the El Guayabo INDULAC plant; C. Katzgraber, Manager of the El Vigía INDULAC plant; Paul Jung, Manager of the INDOSA (Industrias Lacteas de Occidente S. A.) plant at San Carlos; A. Subijaga, Manager of the KRAFT plant at San Carlos; Drs. Jean Kijewsky and Pedro Stagno from the MOP office in El Vigía; Drs. Rigoberto Andressen and Jose Rojas Lopez from the Universidad de Los Andes in Mérida; Dr. R. Blanco from the MAC extension office in Santa Bárbara; Dr. Benassai from the Division de Malariologia office in El Vigía; and finally Luis Molena and Argenis Angulo, employees of INDULAC in Santa Bárbara, who acted as drivers for me during part of the time I was working within the Southern Maracaibo Basin. To these people I extend my sincerest thanks.

Also, at this time, I would like to thank those people at the University of Wisconsin, Madison, who assisted me.

I first wish to thank the staff of the various libraries on the campus (Memorial, Steenbock, Medical, Geography, and the Land Tenure Center) where I did research. Special acknowledgment should be given to my advisor, Professor Henry S. Sterling of the Geography Department, who was extremely helpful and who permitted me unlimited use of his personal library. In addition, I would like to thank the other professors who consented to sit on my Master's Committee, Professor William M. Denevan and Professor Clarence W. Olmstead, both of whom assisted me in the writing of this thesis. I also wish to thank the many other people (friends, other students, and staff of the Geography Department) who have assisted me. Finally, I would like to thank my typist and editor, Miss Sandra White, without whose help and understanding this thesis would never have been possible.

C. D. L.

June, 1972

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CHAPTER I: INTRODUCTION

Many lowland forested areas throughout Latin America have recently undergone a transformation. Land that was formerly covered with forest has been cleared and put into small farms and pasture.[1] In many cases the original small farmers have sold their holdings, and the land has come under the control of large landholders who are primarily concerned with livestock production. The Southern Maracaibo Basin of Venezuela has recently experienced an unusually rapid change of this type. Thus, this region offers an excellent opportunity to study why and how such changes take place.

Before 1944, this area had been considered a barrier between the relatively productive region of the Andes and the ports on Lake Maracaibo (Vila, and Pericchi, 1968, p. 148). Transportation was limited, with only a few railroads passing through the region. These railroads connected the lake or river ports with the Andean outlet towns located at or near the foot of the mountains. The small amount of settlement that had occurred within the region was largely confined to the area near the railroads or along the rivers, with practically no settlement in the interior of the region.

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[1] This phenomenon has been reported, for example, in Nicaragua by James R. Taylor, Jr. (Taylor, 1969), in the Chapare of Bolivia by Ray Henkel (Henkel, 1971), in the Pucallpa area of Peru by William M. Denevan (personal consultation with William M. Denevan), and in the Western Andean Piedmont of Venezuela by Henry S. Sterling (personal consultation with Henry S. Sterling).

After 1944, a tremendous change took place. The area evolved from a largely uninhabited, disease-infested forest region into an area which is today the largest milk producing region in Venezuela (personal consultation with Carlos Hohermuth,[2] Director of INDULAC), and an important producer of beef and bananas. Nearly all of the dense forest has now been cleared and today the region is almost entirely in pastoral production.

This thesis will discuss the factors within the region which are responsible for the recent and dramatic changes that have taken place in the Southern Maracaibo Basin.[3] I will first define the region, and then describe the physical and cultural conditions that were present in the area in the mid-1940's when the recent and rapid change began. I will examine the ways in which the physical geography (tropical rainy climate, poor soils, poor drainage, frequent flooding, etc.) impeded the development of man's use and settlement of the region. Also included will be a brief history of the region which will attempt to explain the ways in which man persisted in overcoming the physical obstacles.

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[2]For a listing and identification of all consultants mentioned in the text, see page **129.**

[3]This thesis is only concerned with factors <u>within the</u> region which affected recent development there. Additional factors outside the region which also influenced development in the Southern Maracaibo Basin (e.g., outside markets, road construction outside the region, the oil boom, etc.) are not discussed in detail in this paper.

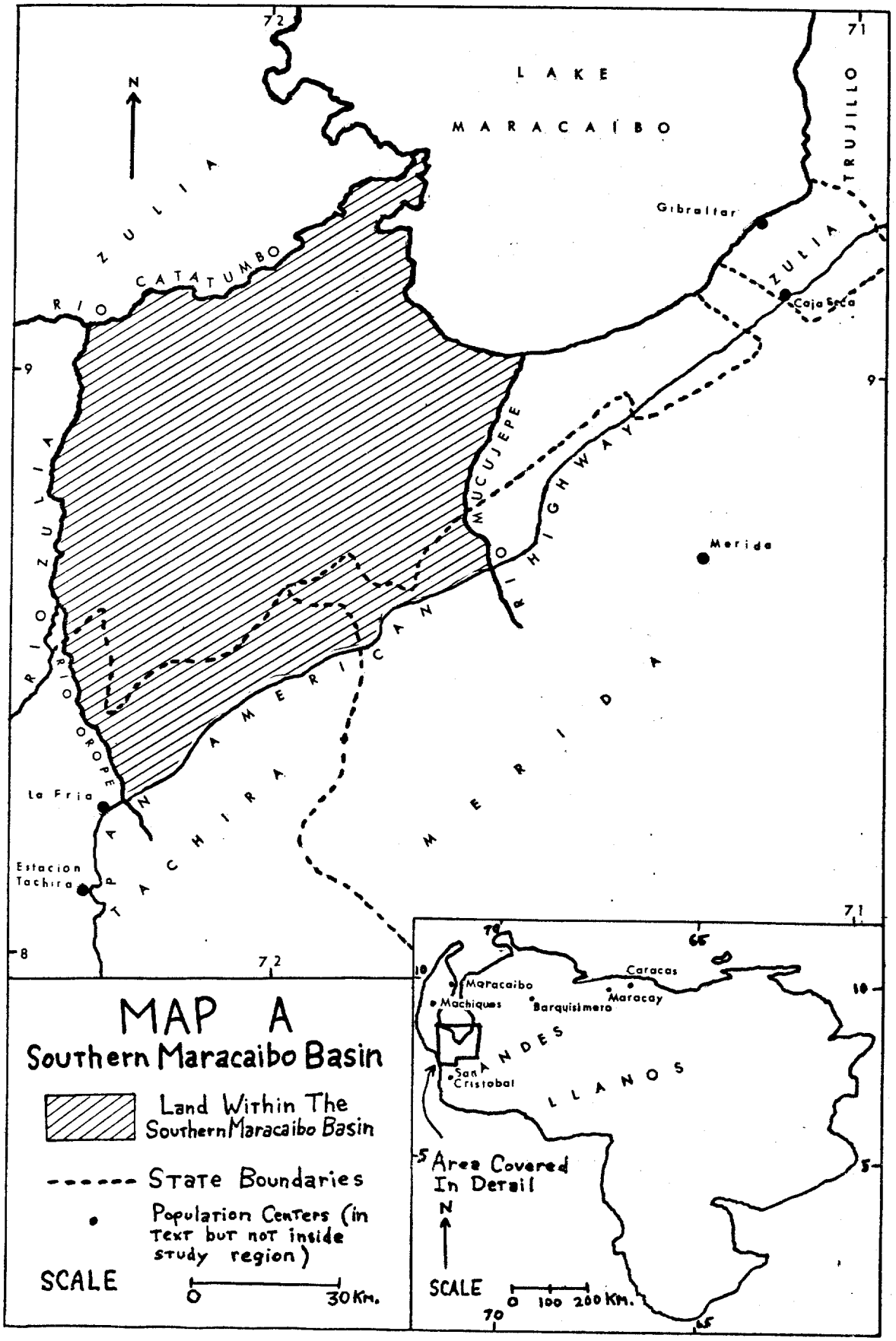
Chapter II, concerning the pre-development era, will be followed by a discussion of six dynamic factors within the region (milk processing plants, a malaria control program, road construction, government developmental agencies, the in-migration of settlers and entrepreneurs, and the availability of land) which I feel are most responsible for bringing about the rapid transformation of the Southern Maracaibo Basin. Each factor will be examined, and an attempt will be made to explain why and how it became involved in the Southern Maracaibo Basin, and the significant impact of its involvement there. Finally, there will be a description of the situation as it exists today after development has taken place.

CHAPTER II: DESCRIPTION OF THE REGION AND BOUNDARIES

In this thesis, the Southern Maracaibo Basin is defined as that area enclosed within the boundaries of the Río Orope, Río Zulia, and Río Catatumbo on the west, the Río Catatumbo and Lake Maracaibo on the north, the Río Mucujepe on the east, and the Pan-American Highway on the south. See Map A, p. 5.

Any line chosen as a boundary line to limit a region represents, at best, an arbitrary choice on the part of the researcher. It must be realized that all development did not occur within this given area described above, and that these chosen boundaries do not represent limits beyond which development has not taken place. Instead, these boundaries represent, as nearly as can be determined, the most logical natural boundaries surrounding the core area where the most dramatic development has taken place. The areas within these boundaries have undergone a similar evolution over a similar time period. This is not to say that the entire region is uniformly developed, as this is not the case; but that large areas within this region began to undergo development at approximately the same time, and that there are certain characteristics common to the development of most parts of the region.

These boundaries were chosen as limits for the Southern Maracaibo Basin by the Comisión Sur del Lago, a branch of



MAP A
Southern Maracaibo Basin

Land Within The Southern Maracaibo Basin

State Boundaries

Population Centers (in text but not inside study region)

SCALE 0 30 Km.

the Ministerio de Obras Publicas, and as a result, there are some statistics and maps available which use these limits. It is logical that in my study of this region, I use the same limits in defining the region, not only because of the statistics and maps available, but also because the Comisión Sur del Lago chose the most obvious geographical boundaries for the region.

The Río Zulia and Río Catatumbo are a logical western boundary because the eastern bank of this river system has been diked, and as a result, the area west of the river is still subject to severe flooding, and large-scale development and settlement have not taken place. Thus, this dike acts as an obvious western boundary, beyond which only limited development has occurred. The Río Orope is used as the western boundary between the Pan-American Highway and the Río Zulia for a number of reasons. It allows La Fría, which has historically looked toward, and been dependent upon, the Andean region, to be excluded from the Southern Maracaibo Basin. Also, the dike on the Río Zulia has not been extended south of the point where the Rio Orope enters the Río Zulia, and thus, the Río Zulia no longer is an obvious boundary south of this point.

The northern boundary is Lake Maracaibo and the dike along the Río Catatumbo. Again, as in the case of the western boundary, the dike separates usable land from the

severely flooded swampland to the north. The lake is a natural boundary which limits development in a northerly direction.

The use of the Río Mucujepe as the eastern boundary is probably the most arbitrary of all of the boundary line decisions. In the future, it may well be that the Río Chama, which is a larger and more important river, will be used as the eastern boundary for the region. There are plans made by the Ministerio de Obras Publicas to dike the west side of the Río Chama for flood control. This will have an effect similar to that of the dike on the Río Catatumbo and Río Zulia and could cause the Río Chama to act as the natural eastern boundary for the region. However, at the present time, these plans have not yet been implemented and the Río Chama does not really act as a line separating development. The Comisión Sur del Lago has chosen (and I agree with them) the Río Mucujepe instead, because it allows the inclusion of a large area in banana production.

The Pan-American Highway as a southern boundary is again a logical division because it is really a boundary line between the lowlands of the Maracaibo Basin and the steep slopes of the Andes. This highway was built along the southern edge of the piedmont plain and most of the area south of it is actually within the Andean region.

This was settled earlier than much of the Southern Maracaibo Basin was and the people consider themselves to belong to the Andean culture rather than to the Lake culture. While the Pan-American Highway is obviously a man-made line, its location makes it a logical choice for the southern boundary of the region.

PHYSICAL DESCRIPTION OF THE REGION

The region of the Southern Maracaibo Basin is one of the hottest and rainiest areas in Venezuela. This area receives heavy rain throughout the year. It lies to the south of a large warm body of water (Lake Maracaibo) and to the north of a high mountain barrier (the Andes). The prevailaing northeasterly winds push moist air against the mountain range and cause it to desposit large quantites of water, especially on the higher and windward slopes.

The region has no true wet and dry season as is found throughout most of the rest of the country. There is some variability in the amount of rain received per month, with the wettest months being April through November. The other months, while considered drier, may still receive a considerable amount of precipitation. See Table A, p. 9.

In 1953, a weather recording station was set up in Santa Bárbara de Zulia. Since then, this station has

recorded a variation in rainfall from 1,218 to 2,636 mm. per year (MOP, 1965, p. 25). This same station recorded an average annual temperature of 28.1° C. with a high of 37.4° C. and a low of 19.6° C. (MOP, 1965, p. 24). The average monthly temperatures are given in Table A below.

TABLE A* - Monthly Average Precipitation and Temperatures at Santa Bárbara (1953-64)

Month	Precipitation (mm.)	Temperature (° C.)
January	49	27.5
February	23	27.8
March	25	28.1
April	118	27.7
May	200	28.2
June	136	27.7
July	123	28.2
August	113	28.4
September	161	28.4
October	200	28.8
November	198	28.3
December	90	28.4
Total:	1,436	Average: 28.1

*Data obtained from MOP, 1965, p. 26 and personal consultation with Dr. Jean Kijewsky, Field Supervisor, MOP, El Vigia.

These figures were of course recorded for only a short period of time for only one station within the region. There is undoubtedly some variation within the region but it would be safe to generalize that throughout the region it is relatively warm and wet, and that it has probably been this way for some time. We do know from examining the natural vegetation (mostly tropical rain forest) and from looking at the records of early Spanish

explorers, that these wet, hot conditions have prevailed since the time that the white man entered the area in the late sixteenth century (Cordero, 1911, p. 17).

The land itself is quite flat, as it was actually part of the old lake floor which has gradually filled up with alluvial deposits (Cardenas, 1965, p. 128). The rivers originating in the Andes carry a tremendous load of alluvial material which over the centuries has been deposited on the flat basin floor. This has resulted in the gradual build up of alluvial material and in the formation of natural levees along the stream courses.

The overall flatness of this land has led, in most of the region, to very poor soil drainage. As a result, in much of the region the water table is only several inches below the surface (personal consultation with J. Kijewsky). The tremendous rainfall in the Andes and in the region itself has resulted in the formation of many rivers and streams which, because of the lack of relief, meander over the entire region. These streams are subject to periodic flooding, and this, coupled with the naturally poor drainage, has led to the creation of many swamps.

The soils that developed in this region are quite diverse in quality and potential. Parent materials in the mountain watersheds caused soil differences. Some of the soils found on the natural levees near the rivers are

adequately drained and potentially quite productive, while others found in low-lying areas are poorly drained and of less potential. The heavy rainfall increases severe leaching when vegetative cover is disturbed and this limits the potential agricultural usefulness of the entire region.

The climatic and physical conditions combine to produce a tropical forest vegetation for most of this region. Thus, it was a poorly drained, hot, rainy, forested region that greeted the early Spanish explorers to the Southern Maracaibo Basin in the sixteenth century.

EARLY USE OF THE REGION BY MAN

When the Spanish explorers first entered this region in the late 1500's, they found the inhabitants to be fierce and warlike (Cordero, 1911, p. 17). The Indians of this region included several tribes (Mape, Chakes, Pemeno, and Quiriquire) which were grouped together and called Motilones, a term given to all Indians in the region (Metraux, and Kirchhoff, 1963, p. 350). These Indians survived in this hot, wet environment by relying on hunting, fishing, and the production of yuca and maize (Hernandez de Alba, 1963, p. 470). They controlled the region through their use of the rivers where their dugout canoes were the primary means of transportation. The rivers made natural corridors

through the forest area, facilitating travel and also providing fish as well as periodic deposits of new alluvium which was essential for optimal crop production.

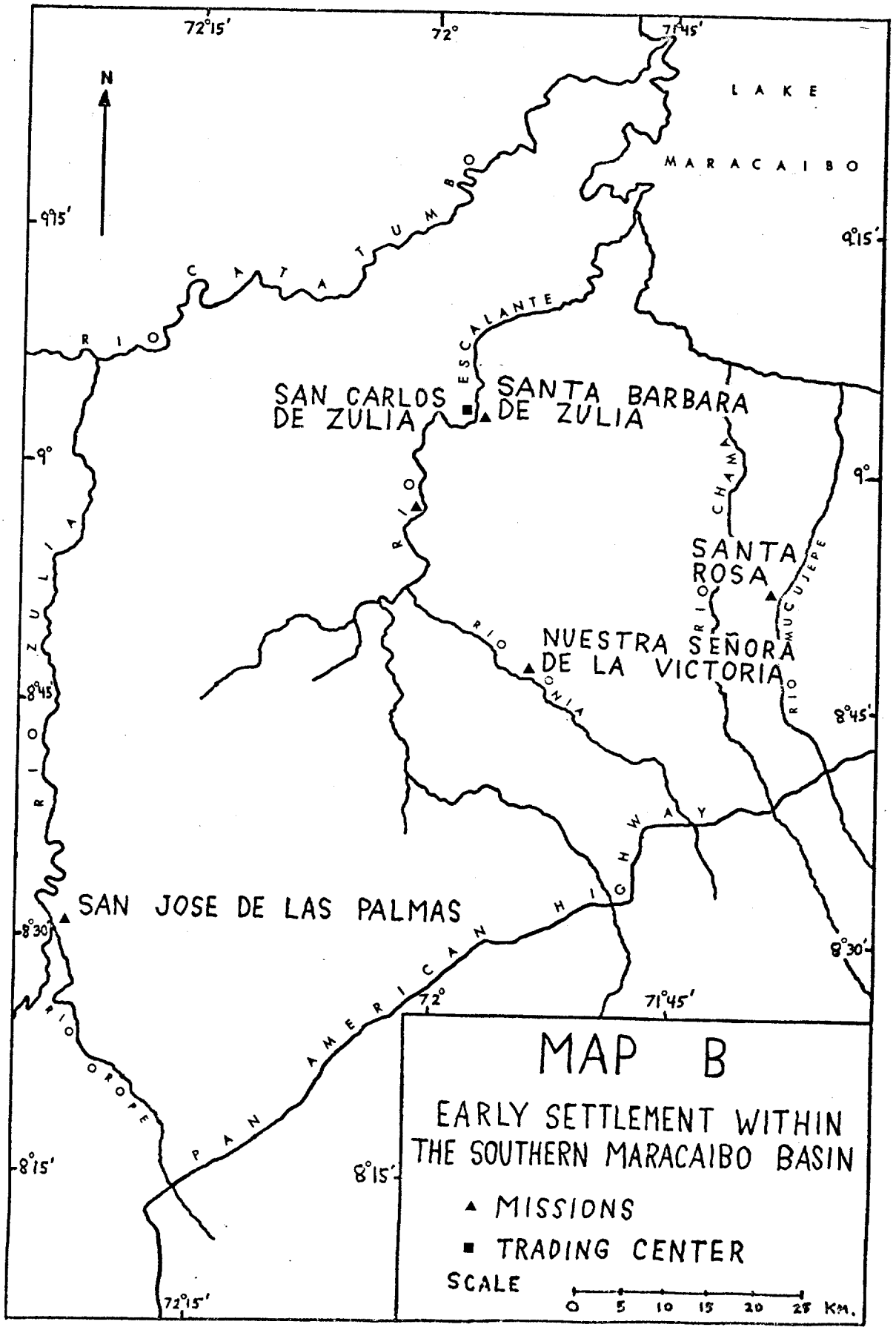
The early Spaniards largely ignored the area of the Rio Escalante and Rio Catatumbo because of the fierceness of the Indians and their frequent attacks and because the region held nothing of value for them. They did establish a settlement further east at Gibralter (see Map A, p. 5) (Chavis, and Vivas, 1968, p. 161). This settlement produced cacao and acted as a port for products coming from the Andean region. It actually served as the primary port for the entire area south of Lake Maracaibo. It was, however, out of the way for products produced in the western part of the Venezuelan Andes. It became increasingly obvious that the Rio Catatumbo could provide a natural outlet to Lake Maracaibo for goods produced in Tachira and that the Rio Escalante could provide an outlet for Merida (Sterling, 1956, p. 20). However, the frequent attacks by the Motilones limited the usefulness of these trade routes.

The Spaniards realized that it would be necessary to control the Motilones if this southern region was to be opened to trade. Jesuit missionaries went into the area to pacify and convert the Indians. This resulted in the

establishment of the first permanent settlements in this region. The first mission was founded at Santa Bárbara de Zulia in 1758. This was followed by the establishment of other missions at Santa Cruz de Zulia in 1781, Nuestra Señora de la Victoria in 1783, San Jose de los Palmas in 1784, and Santa Rosa de Muenjepe in 1787 (Vila, 1952, p. 173). In addition, a Spanish trading center was established at San Carlos de Zulia in 1778 (Vila, 1952, p. 178). See Map B, p. 14.

As a result of the missionary effort, diseases, and an increasing number of anti-Indian military expeditions, the number of Indians in this region decreased considerably. Many Indians left the region, moving into less penetrable regions further west, while others died from epidemic diseases brought by the white man. There is no accurate census data for the number of Indians in this region, but it is generally conceded that after the missionary effort was begun, the population dropped drastically (Chavis, and Vivas, 1968, p. 164).

As the problem from hostile Indian attacks diminished, the southern lake region assumed a new importance as a zone through which Andean goods were transshipped in their journey from the Andes to the markets of Maracaibo and beyond. Important river ports grew up at San Carlos-Santa


72°15'
72°
71°45'
N
LAKE
MARACAIBO
9°15'
RIO CATATUMBO
RIO ESCALANTE
SAN CARLOS DE ZULIA
SANTA BARBARA DE ZULIA
9°
RIO CHAMA
RIO ZULIA
SANTA ROSA
RIO MUCUJEPE
RIO ONIA
NUESTRA SEÑORA DE LA VICTORIA
8°45'
RIO
HIGHWAY
SAN JOSE DE LAS PALMAS
8°30'
RIO OROPE
PAN AMERICAN
72°
71°45'
8°15'
72°15'
MAP B
EARLY SETTLEMENT WITHIN THE SOUTHERN MARACAIBO BASIN
▲ MISSIONS
■ TRADING CENTER
SCALE
0 5 10 15 20 25 Km.

Bárbara and at Encontrados (cf., Map C, p. 18) (Chavis, and Vivas, 1968, p. 164).

By the time of the Wars for Independence, the Southern Maracaibo Basin was still largely uncleared and was inhabited almost entirely by Spaniards and mestizos. The bulk of this population was in the towns which had been established along the rivers to serve as ports for the shipment of goods (coffee, tobacco, hides, cacao, wheat and other agricultural products) from the Andes. Goods were brought to these ports by canoes from upriver, or by mule train, and were then stored to await shipment on larger ships that would carry the goods to Maracaibo (Vila, and Pericchi, 1968, p. 146).

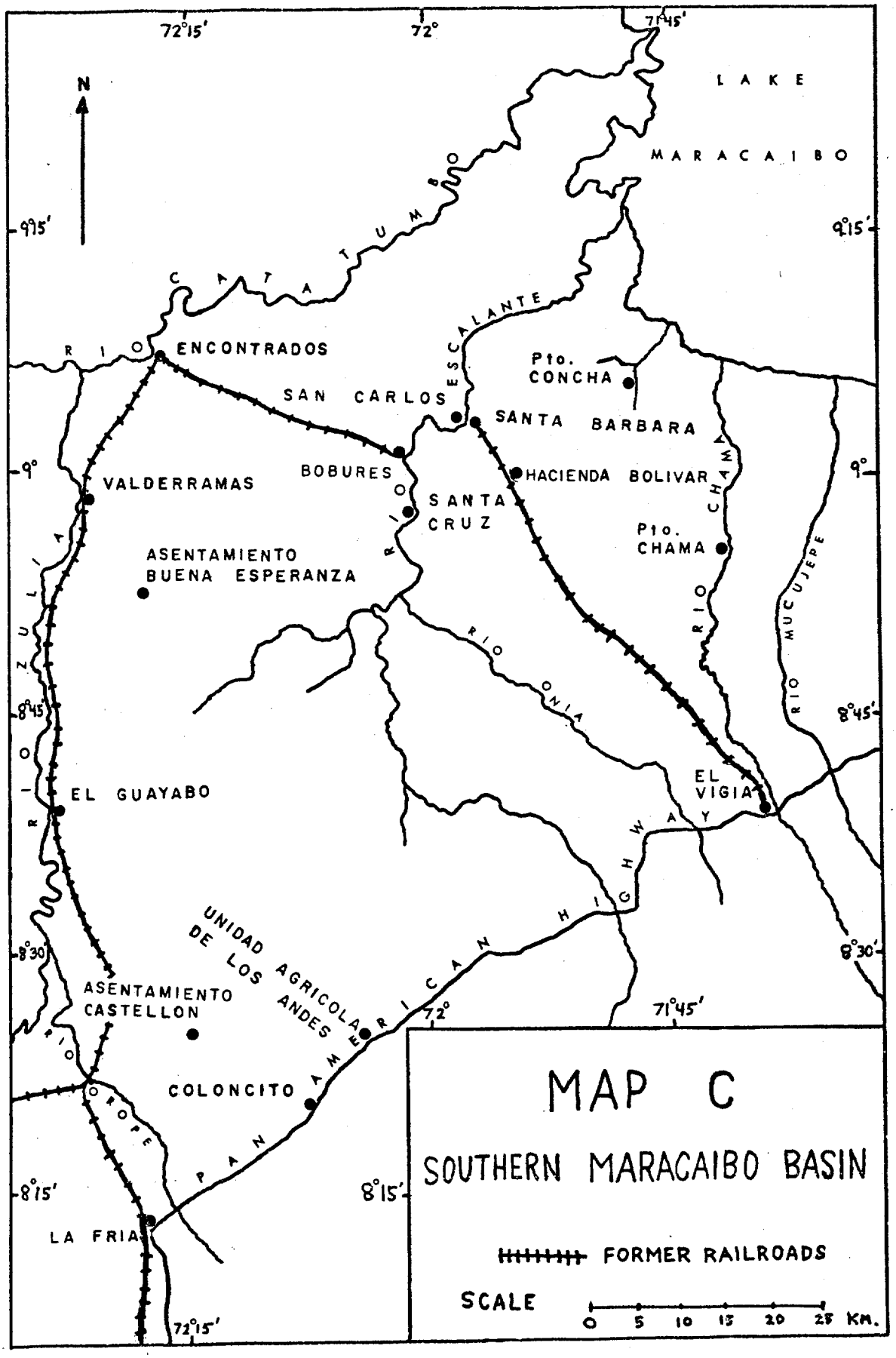
Although the region was primarily an area through which agricultural goods passed, there was also some agricultural production within the region. Nearly all of this production took place in the better alluvial soils along the natural levees of the rivers. The forest was cleared along the rivers and in the vicinity of the populated areas. In these clearings, cacao and sugar cane were produced for export and yuca and maize for local consumption (Vila, 1952, pp. 129-42). In addition, there was a continuing increase in the production of cattle, especially on the alluvial fans along the piedmont in the southern part of the region. Herds were built up from the descendants of

cattle that were brought to the area by the early missionaries. These cattle produced a poor quality meat that was consumed locally, and hides which were exported to Maracaibo (Vila, 1952, p. 155).

The region as a whole remained largely underdeveloped throughout the nineteenth and early twentieth centuries. The only significant economic investment occurred in the construction of railroads. Two main lines were built connecting the Andes with river ports. The first of these was the line connecting El Vigía with Santa Bárbara. This line was completed in 1893 by a private group who was given land to pay for its construction. This land, 500 meters on each side of the line, was then sold to farmers and speculators to raise money for railroad construction (Vila, 1952, p. 278). Despite the land grants by the State, the building company went bankrupt and the State was forced to take over the company in 1908 (Vila, 1952, p. 278). The other line connected Encontrados with Estación Táchira, and continued into Colombia. This line was completed between Encontrados and La Fría in 1896 and was finally finished as far as Estación Táchira in 1915 (Vila, 1952, p. 268). The Encontrados-Estación Táchira railroad was also begun by private entrepreneurs but was eventually taken over by the State. A third railroad was built by a private oil company in the early 1900's. This railroad

connected Encontrados with the port of Bobures on the Río Escalante (near San Carlos). This was a narrow gauge railroad and used single, horse-drawn cars. It was not really involved in carrying cargo for profit but was built to facilitate east-west travel. It did, however, serve as a penetration route into the forest's interior and thus encouraged settlement along its tracks (Vila, 1952, p. 279).

The two main north-south railroads, Encontrados-Estación Táchira and El Vigía-Santa Bárbara, stimulated trade and caused the towns at the ends of the railroads to grow considerably. In addition, the railroads encouraged agricultural production by opening up an area along each side of the tracks for farming and by making it possible to bring agricultural products to market areas. The intended purpose of railroad building was to stimulate trade <u>through</u> the region. Economic growth within the region was a by-product of railroad expansion and was not a primary goal. However, the ease of transportation that the railroads provided did lead to opening up new areas to economic exploitation. The land along the railroads was cleared and put into agricultural and livestock production. Thus the railroads directly stimulated economic growth within the region. Included here is a map (Map C) which indicates the location of places mentioned in the text.


72°15'
72°
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N
LAKE
MARACAIBO
9°15'
CATATUMBO
RIO
ENCONTRADOS
ESCALANTE
Pto.
CONCHA
SAN CARLOS
SANTA BARBARA
9°
VALDERRAMAS
BOBURES
HACIENDA BOLIVAR
CHAMA
SANTA
CRUZ
Pto.
CHAMA
ASENTAMIENTO
BUENA ESPERANZA
RIO MUCUJEPE
ZULIA
RIO ONIA
8°45'
EL GUAYABO
EL
VIGIA
HIGHWAY
UNIDAD AGRICOLA
DE LOS ANDES
8°30'
ASENTAMIENTO
CASTELLON
PAN AMERICAN
COLONCITO
OROPE
8°15'
LA FRIA
72°15'
MAP C
SOUTHERN MARACAIBO BASIN
FORMER RAILROADS
SCALE
0 5 10 15 20 25 KM.

THE SITUATION IN THE SOUTHERN MARACAIBO BASIN AS IT EXISTED PRIOR TO RECENT ECONOMIC DEVELOPMENT

Immediately prior to 1944 (the date I believe that the rapid change and modernization of the Southern Maracaibo Basin was begun), the area south of the lake remained largely underdeveloped and economically backward. Most of the population was centered in the larger towns (Santa Bárbara, San Carlos, Encontrados, El Vigía) and agricultural activity was largely confined to the corridor areas along the railroads and rivers and in the areas near the larger settlements. Most of the region remained forested and was not used for any economic production.

At this time, the low-lying areas of the Southern Maracaibo Basin were subject to periodic flooding. There had been no attempt to regulate river flow through damming, diking, or dredging. The flood problem was actually getting worse as the land in the upstream areas was being subjected to increasing deforestation. The periodic flooding and naturally poor drainage resulted in the formation of many lowland swamps. These swamps limited the advance of settlement and restricted the expansion of agriculture.

The swamps also provided an ideal breeding ground for the anopheles mosquito. As a result, the entire region was subject to chronic outbreaks of malaria. Also the

people of the area suffered from intestinal disorders which were largely caused by the lack of quality drinking water. Poor drainage, coupled with the lack of adequate sewage disposal led to a situation where intestinal ailments were the most commonly reported illnesses (Vila, 1952, p. 225).

Transportation within the region was largely dependent on the three railroads, canoes, river boats, and the mule. The railroads provided relatively fast and cheap transportation for passengers as well as cargo. The rivers and small streams remained important transportation routes, much as they had been in pre-Spanish times. Lake-going steamers would call at Encontrados and San Carlos-Santa Bárbara and accept cargo from the Andes and from within the region. They provided the major access to the populated areas to the north. Canoes and small motor launches were important for providing local inhabitants with transportation into the upriver areas where many of their haciendas were located.

There were also mule trails or paths which were important for bringing agricultural products to market from outlying locations. These trails could not really be considered roads, and there was little if any motor vehicular traffic. There were no all-weather roads anywhere in the region at this time (i.e., 1944).

There was a dirt airstrip at Santa Bárbara and another at Encontrados. These airstrips could not be used during rainy periods and there was no scheduled air service.

The largest population centers were Encontrados and San Carlos-Santa Bárbara. Encontrados was the most important port and largest city within the region because it served the large productive area of Táchira and Eastern Colombia. It had a population of 4,367 in the 1941 census. San Carlos-Santa Bárbara, which served as a port for the Mérida region, was the second largest center with a combined population in 1941 of 4,258 (Vila, 1952, p. 201).

The cities had grown largely as transfer points for trade from outside the region. However, they also served the important function of providing goods and services to the expanding agricultural sector within the region. Thus by 1944, these larger towns were no longer totally dependent on trade from outside the region, but had begun to act as service centers.

While at this time no concentrated large industry had yet begun to develop within the region, there was local production of a number of commercial agricultural products. The most important of these were sugar cane, cacao, bananas, and livestock. Cattle had long been produced for their hides, but the 1940's saw an expanding cattle fattening industry.

In this pre-development era, the agricultural industry was largely confined to the narrow corridor of cleared land along the railroads and rivers, and in certain cleared areas in the piedmont areas in the southern part of the region. Livestock fattening developed in response to an increased demand for meat in the oil fields to the north. As a result of this demand, cattle were driven from the Llanos area (see Map A, p. 5) to the ports at Encontrados and San Carlos-Santa Bárbara and then shipped live by boat to the market areas. Many of these cattle were kept on pastures within the region to fatten before being shipped on to Maracaibo (Crist, 1943, p. 525).

Although cattle were kept primarily for beef production, small quantities of milk were produced. In this hot climate, lack of refrigeration limited the potential for fresh milk. Many farmers used the milk to make a white cheese which could be sold or stored for future use, while other farmers fed the milk to hogs which when fattened could then be sold (Crist, 1943, p. 524).

The overall quality of beef produced was very poor. The quality of the animals was very low and there were no attempts to improve quality through controlled breeding. Production per hectare was also low (½ to 1 head per hectare). Pasture was usually of poor quality and there was a continuing problem with animal diseases. External parasites were a particular

problem, with the tick and torsalo (more commonly called the gusano de monte) the primary offenders (United Nations, 1960, p. 81). In addition, there were numerous internal parasites which caused weakening of the animal and retarded weight gain.

It is impossible to determine the overall production of animals for this region at this time period. No accurate census data were recorded and it would be impossible to determine how many animals were actually produced within the region and how many were brought in from outside to be fattened. However, in the early 1940's at least 6,000 animals a year were exported from Encontrados alone (Vila, 1952, p. 161).

In addition to livestock, crop production was also important. Again, as in the case of livestock production, it was largely confined to the cleared corridor areas and in the vicinity of population centers. The principal crops produced for export were sugar cane, cacao, and bananas, while maize, yuca, and bananas were produced for local consumption.

Many haciendas produced both crops and livestock. An area would be planted in crop production for a year or several years and when productivity declined, it was then allowed to go into pasture and was used for livestock production.

The area to the east of the Río Escalante was the most important sector of the entire region for agricultural production. This area is better drained and thus was able to support crop production better than the poorly drained western sector. It was this eastern part which experienced the most widespread clearing and the largest and most important production of crops. Sugar cane was the most important crop produced, as it was grown on many of the larger haciendas. The Central Bolivar was the largest producer of sugar cane within the region with 5,000 hectares in rotating production (personal consultation with Joaquin Brilliambourg, owner of Hacienda Bolivar). This Central located twelve kilometers south of Santa Bárbara on the railroad, shipped crude sugar by boat from Santa Bárbara. Other Centrales also produced sugar but on a smaller scale. However, the total production was quite large and made this one of the leading sugar producing regions in the State of Zulia.

By 1944, cacao was only produced on a small scale. The amount of land in cacao has been steadily decreasing since the glory years of the eighteenth century when this was the most important product for the entire region. The quality of cacao produced in this region was always very high, but disease, declining prices, and high production costs limited production. Still, many small producers

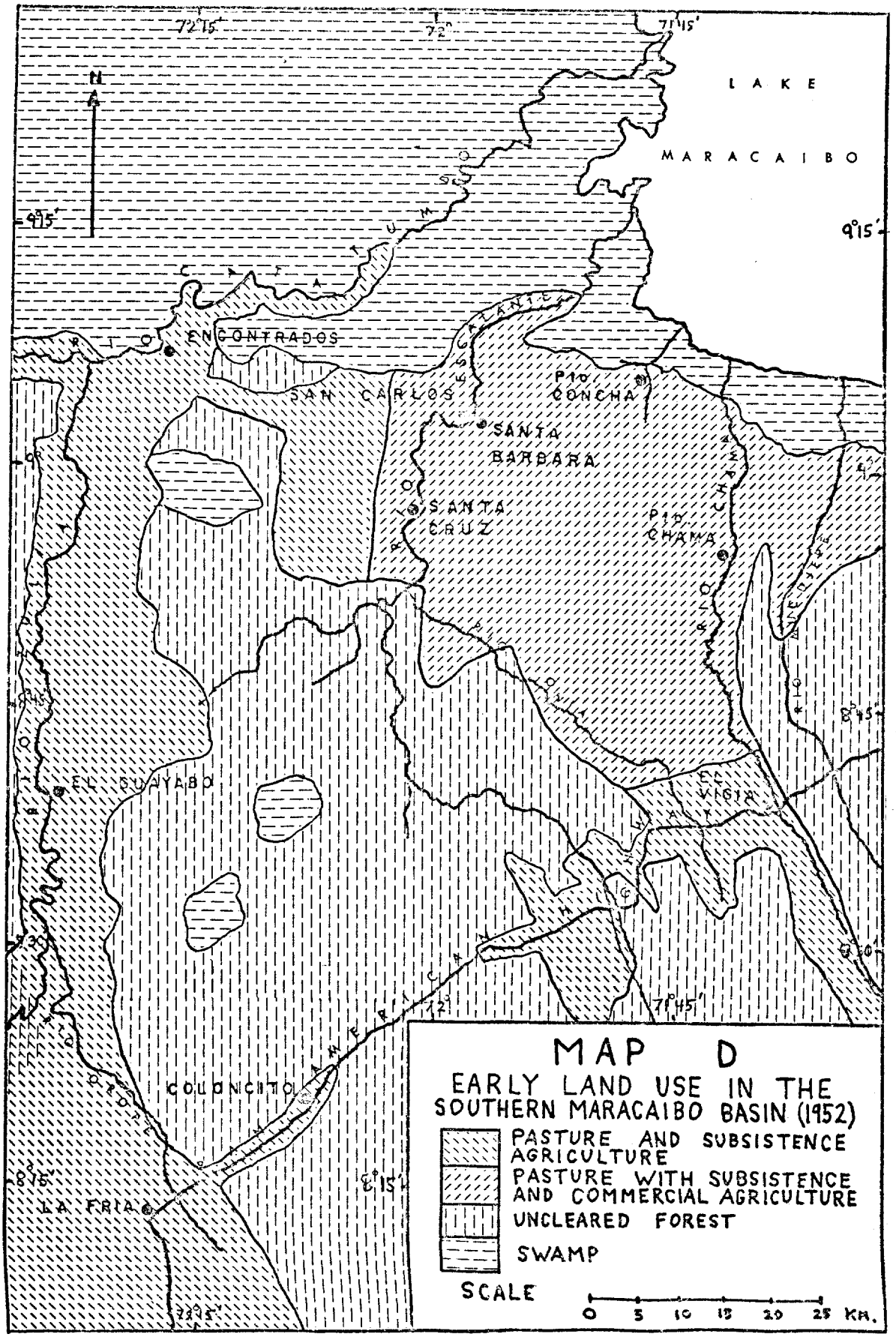
continued to produce cacao and its production remained locally important (Chavis, 1963, p. 176).

Banana production was also most important in the eastern sector. Both cooking and sweet varieties of the banana were produced. Transportation difficulties restricted the area under production and thus limited the quantity produced. Bananas need good drainage and this further restricted the area available for their production. Many farmers, away from easy transportation routes, fed bananas to their hogs and then sold hogs. Farmers near railroads or rivers shipped their banana production to market areas in the oil fields of the north.

There was also important production of crops for local consumption. Most farms produced bananas, yuca, rice, and maize, as well as vegetables, for home consumption or for sale in local markets.

No accurate agricultural census data exists for this pre-development period, so it is impossible to assign specific figures for the production of different crops. It would, however, be safe to assume that cattle, sugar cane, and bananas provided the largest source of agricultural income to the region for this time period.

Map D is a land use map of the region prepared from 1952 aerial photographs. These are the earliest aerial photographs which cover the entire region, and while



SOURCE: 1952 Air Photographs. Series A-58. (Supplied by Cartagrafia, Caracas, Venezuela)

evidence of recent development (since 1944) is present, the map still shows the importance and location of the corridor agricultural areas and the vast areas of unbroken forest.

The cleared land along the railroads or river corridors was usually privately owned and was often in large haciendas. This is the land that was granted by the State for sale by the railroads, or was granted in colonial times to Crown favorites. Often these large haciendas were owned by wealthy landowners who, because of the primitive living conditions within the region, preferred to live in Mérida, Maracaibo or Caracas (Crist, 1943, p. 527). Thus a system developed where the haciendas were largely run by the mayordomo or overseer and his crew of hired workers.

In addition to illustrating the area in crop and livestock production, Map D also shows the area which was unused forest. This large undeveloped area, which covered well over half the region, was almost entirely owned by the Nation or by municipalities, and represented a tremendous potential for future economic growth and development. Although the area was largely swamp and impenetrable forest in 1944, plans for the construction of drainage facilities and roads provided hope for future development.

CHAPTER III: CATALYSTS OF CHANGE

After 1944, the Southern Maracaibo Basin began to undergo a startling and rapid transformation which has continued up to the present. There are several dynamic factors operating within the region which I believe were responsible for catalyzing the rapid economic development of this area. In particular, the following six processes or agencies were most responsible for stimulating change within the region: 1) the introduction of milk processing plants, 2) the institution of a malaria control program, 3) road construction, 4) government developmental agencies, 5) the in-migration of settlers and entrepreneurs, and 6) the easy availability of land. I will examine below each of these dynamic factors and explain how each contributed to shaping subsequent development.

THE INTRODUCTION OF MILK PROCESSING PLANTS

INDULAC

The first milk processing plant in the Southern Maracaibo Basin was constructed in 1944 at Santa Bárbara de Zulia by INDULAC (Industria Lactea Venezolana C. A.). At that time, there was very little milk production within the region, and what little there was, was used primarily for cheese. The entire country of Venezuela was experiencing a milk shortage at this time because World War II made it impossible to import powdered milk from the usual sources in Europe. The Nestlé Company and the Borden

Company realized that it would be profitable to construct a powdered milk plant in Venezuela to supply the growing national market. These two foreign companies (Nestlé is a Swiss company and Borden is an American company) together formed INDULAC which was to be managed by Nestlé with financial support provided by Borden. This new company built a plant at Santa Bárbara which began to process milk in 1944.

The selection of Santa Bárbara as the site for the first powdered milk plant in Venezuela was important for the future development of the entire region. Although milk production in the region was low at the time of the plant's construction, the INDULAC planners felt that the Southern Maracaibo Basin had a great potential for future growth. Santa Bárbara was chosen for the site of the first plant because it was centrally located within the region and because it was a river port from which powdered milk could be exported. At the time that the plant was constructed, there were still no roads within the region and water transportation was thus very important. Milk could be brought to the plant by canoe or launch as well as by railroad and mule.

INDULAC built the milk plant for a much larger production than was available in 1944. The planners of this enterprise believed that the presence of the milk plant would encourage milk production for the entire region.

Thus in the early years of operation, production was well below capacity.

It was in the best interest of the Venezuelan government to encourage this new industry. Powdered milk was growing in popularity in Venezuela because it was easy to store in the hot climate. Before the construction of the INDULAC plant, Venezuela had been forced to import all of the powdered milk that was consumed within the country. Any national production of powdered milk would lessen the amount that needed to be imported and thus would save export capital. To encourage national production and to protect the home industry, the Venezuelan government imposed a high tax on imported powdered milk. However, it allowed companies engaged in national production of powdered milk to also import powdered milk at a lower tax rate in proportion to the amount of home production. This protected the infant Venezuelan powdered milk industry, permitted the importation of some foreign milk to meet the increasing national demand, and directly encouraged an increase in production.

As a result of this governmental protective policy, powdered milk prices were artificially high. However, instead of realizing large profits, most of the money made by INDULAC was reinvested in the region in the form of agricultural credit and technical assistance. INDULAC's

directors felt that it was in the best interest of the company to help develop the region and thus increase milk production.

Thus, the first INDULAC plant was built not only to produce powdered milk, but also to encourage development and growth of the dairy industry. The mere presence of a market for milk directly stimulated production. Milk that was before fed to hogs was now sold to INDULAC and made into powdered milk for human consumption.

To encourage growth, INDULAC set up an Office of Technical Assistance to advise and assist farmers in improving production. There were many problems in producing milk in a tropical environment. The best milk breeds could not live in the hot tropical climate. The Criollo cow, which was accustomed to the hot climate, was not a good milk producing animal. There were many experiments in breeding in an attempt to find an animal that could survive and yet produce large quantities of milk. INDULAC encouraged these experiments and several new breeds were introduced. The Cebu was brought in in great numbers, and today the Cebu-Criollo cross is probably the most common breed in the area. However, despite attempts to improve production through improved breeding, production per animal is still low; 6 liters/day is considered good while 4 liters/day is average. This is considerably below American and European standards

where the average production varies between 15 and 25 liters/day.

The Office of Technical Assistance also advised farmers as to what pastures to plant and what should be done to control diseases. It provided free veterinary service as well as advice on improving sanitary conditions for milk production.

In addition to free advice and technical help, INDULAC also provided farmers with low interest loans. These enabled the recipients to buy better cattle, to increase pasture acreage, and to increase milk production. When INDULAC first went into this region, there were no commercial banks nor government developmental agencies actively engaged in giving agricultural credits within the region. For many farmers, INDULAC was the only source of credit available. Thus INDULAC was forced to fill the roles of supervisor, developer, buyer and banker. That it succeeded in filling these roles is evidenced by the success and growth of the company and by the development of the region.

In the first several years after production was begun at the Santa Bárbara plant, the total amount of powdered milk produced per year was small. However, the amount produced grew rapidly as milk production increased in this region. See Table B, below.

TABLE B* - Powdered Milk Production (in kilos) at INDULAC's Santa Bárbara Plant

Year	Kilos
1944	3,344,833
1945	10,416,092
1946	10,463,972
1947	15,006,955
1948	12,814,361
1949	11,815,484
1950	12,144,224
1951	14,110,012
1952	20,048,064
1953	27,992,066
1954	30,608,323
1955	27,565,234
1956	25,359,857
1957	33,026,702
1958	43,903,013
1959	52,139,556
1960	68,459,600
1961	79,281,959

*INDULAC, 1969, p. 8. (No figures available for 1962-1971)

Although this is a table showing the growth in powdered milk production at the Santa Bárbara plant, it also illustrates the growth in milk production that the region was experiencing at this time.

Transportation from the farm to the plant at Santa Bárbara was a limiting factor in increasing production. Milk is a perishable product, especially in this hot region, and the lack of transportation facilities was a severe problem. It was simply impossible to transport milk to Santa Barbara from the far reaches of the region. Roads were necessary if the region was to develop. The national government recognized this need, and during the 1950's

large-scale road construction was begun. This road construction expanded the area in which it was economically feasible to transport milk to the Santa Bárbara plant. In addition to state constructed roads, INDULAC directly encouraged the construction of private roads or vias de penetración into the previously forested region where many of the new farms were being developed. INDULAC did this by making available loans to individuals for private road construction.

Milk routes were contracted out to private individuals who transported milk from the farms to the plant. As the network of roads expanded[1] the number of milk routes also increased, as did the area which sold milk to the Santa Bárbara plant. Finally, by the late 1950's, the Santa Bárbara plant was processing nearly 300,000 liters per day, or at a rate far greater than the originally intended capacity of 60,000 liters per day (INDULAC, 1969, p. 7).

The directors of INDULAC realized that there was still room for growth in production within the region. As a result, they embarked on a program of expansion. In 1961, a new plant was built at Machiques (northwest of the Southern Maracaibo Basin), and in 1962 another plant was built at El Guayabo in the western sector of the region near the Río

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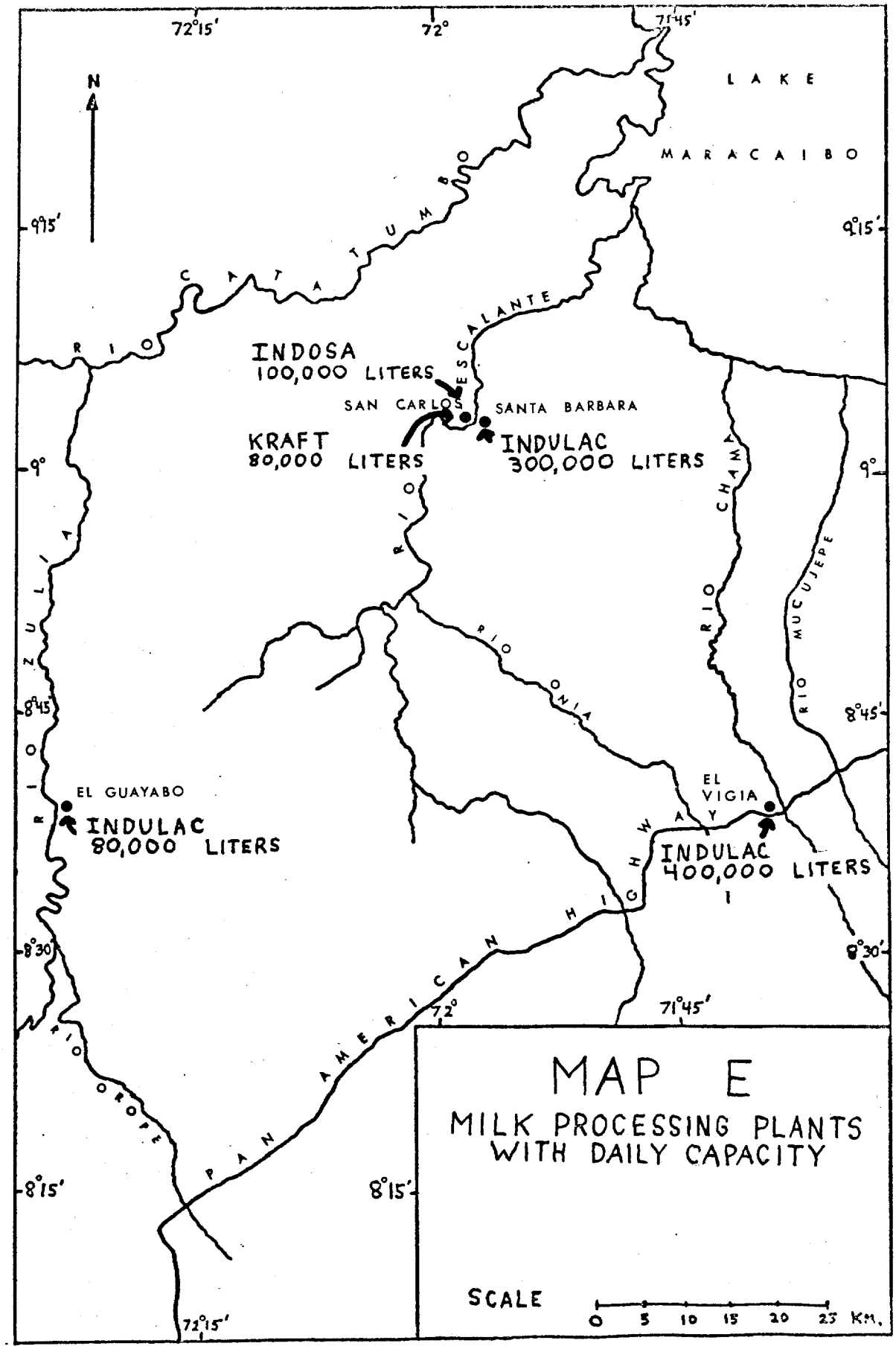
[1]In many cases the word "road" is a complimentary euphemism for what was really a muddy path.

Zulia. Finally, in 1968 the most recent INDULAC plant was completed in El Vigía. The addition of these new plants greatly increased the capacity of INDULAC to process milk from within the region. The total capacity for the three plants within the region is now nearly 800,000 liters per day. This represents a considerable expansion in capacity from the original plant that was constructed at Santa Bárbara. The location and productive capacity for each INDULAC plant can be seen on Map E, p. 36.

The original plant at Santa Bárbara is no longer operating at full capacity because many areas that had previously sent milk to this plant are now sending milk to other plants which have been constructed closer to their production areas. In 1971, the Santa Bárbara plant was only processing between 200,000 and 250,000 liters per day (personal consultation with A. Spinac, Supervisor, INDULAC, Santa Bárbara). The actual amount of milk processed is dependent upon both the time of year and the condition of the pastures. This latter factor depends on the weather, and varies considerably between wet and dry years.

The Santa Bárbara plant produces butter in addition to powdered milk. It is the only INDULAC plant to produce butter, and has an average daily production of 1,500 kilos (personal consultation with A. Spinac). The plant has its own electrical power plant (oil-burning) and also has an assembly plant for tin cans which are used as powdered


72°15'
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LAKE
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RIO CATATUMBO
RIO ESCALANTE
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SANTA BARBARA
KRAFT
80,000 LITERS
INDULAC
300,000 LITERS
9°
RIO CHAMA
RIO MUCUJEPE
RIO ZULIA
RIO ONIA
8°45'
EL GUAYABO
INDULAC
80,000 LITERS
EL VIGIA
INDULAC
400,000 LITERS
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MAP E
MILK PROCESSING PLANTS
WITH DAILY CAPACITY
SCALE
0 5 10 15 20 25 Km.

milk containers. The powdered milk is packed by automated and sanitary equipment into both 4 oz. and 2 kilo cans and then shipped by truck to markets throughout the country (personal consultation with A. Spinac).

The plant is still a center for assistance to milk producers. The staff of the Office of Technical Assistance has been expanded so that there are now three field technical advisors and one veterinarian. This is in addition to a supporting staff that remains in the office at Santa Bárbara. Every farm which sells milk to INDULAC is visited regularly by technical staff to check on sanitary conditions and to help the farmer with any problems he might have. The Santa Bárbara technical staff is also responsible for providing technical assistance to the farmers who sell to the El Guayabo plant. Members of the staff usually spend several days a week in this part of the region. In 1971 the Santa Bárbara INDULAC plant spent 584,000 bolivares[2] on operating this department. This represents a substantial investment in the development of the region.

The credit division of INDULAC is still very active. There is now over 15,000,000 bolivares in a revolving fund which is available for loans to INDULAC milk producers (personal consultation with C. Hohermuth). The size of this fund is annually expanded by INDULAC. Most loans from the fund are for periods of one to three years. They may

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[2] In 1972, one U.S. dollar equaled 4.35 bolivares.

be used by the recipient in any way that will improve his farm. In the past, farmers have taken advantage of these funds to buy breeding stock, to buy tractors, and to improve farm facilities. Each INDULAC producer must build a concrete floor milking shed. Also, INDULAC pays a higher price for better quality and refrigerated milk. Many farmers borrow money from INDULAC to buy refrigeration equipment and then pay back the loan through the higher price they receive for their milk. Thus, since 1944 INDULAC has been directly responsible, through the offering of loans, for many improvements made by the farmers in the region.

INDULAC pays the farmers a set price for their milk. The farmer is responsible for bringing the milk to a point where it can be picked up by a hauler. Farmers who are unable or unwilling to afford refrigeration equipment sell their milk warm for 65 centimos per liter. Refrigerated milk is sold for 68 centimos per liter. The hauler receives between 2 and 3 centimos per liter. The milk is carried to the plant in large milk cans where it is carefully weighed and measured and credited to each farmer's account. Some of the farmers who have large operations now own their own milk tank trucks and can thus carry their own milk to the plant and receive the extra 2 to 3 centimos per liter for transport.

Because many smaller farmers can not afford milk trucks, and because INDULAC does not wish to be in the transportation business, several milk transport companies have been established in Santa Bárbara to haul milk. These companies bid on the rights to certain routes. In 1971, there were eighteen routes that brought warm milk to the Santa Bárbara plant from 252 producers. Milk haulers on these routes collected milk twice each day, morning and evening, which accounted for approximately 100,000 liters per day. Most of this milk was from small producers. In addition there were ten routes that collected refrigerated milk once a day from 105 larger producers. These routes also accounted for about 100,000 liters per day (above figures furnished by A. Spinac). Thus, it would appear that in addition to encouraging milk production within the region, the Santa Bárbara plant is also directly responsible for the development of a milk transport industry as well.

In addition to encouraging milk production and providing work for private milk haulers, the Santa Bárbara plant provides employment for many workers from the Santa Bárbara area. INDULAC now employs about 120 men at the Santa Bárbara plant, most of whom live in the San Carlos-Santa Bárbara area. Before INDULAC built the Santa Bárbara plant, there was no steady industry in this region and there was periodic unemployment. INDULAC provided jobs for many

people. It also provided good salaries which resulted in the influx of large amounts of money into the region and directly stimulated other development. The rapid population and economic growth of the San Carlos-Santa Bárbara urban center is largely the result of INDULAC inspired growth. This rapid expansion has enabled San Carlos-Santa Bárbara to pass Encontrados in population and assume the position of primary center for the region.[3]

The INDULAC worker is paid between 13 and 40 bolivares per day, depending on his skill and the length of time worked. He also receives free hospital care for himself and his family, a pension, and a two-week paid vacation each year. These are considered very good wages for this region and there is a waiting list for those wishing employment. Also, many new stores have opened which offer consumer products to the worker. As a result, many INDULAC workers today enjoy the "luxury" of television sets and air conditioners.

INDULAC also has attempted to improve the living conditions of its workers by constructing modern housing which it sells to the worker at low cost and on easy monthly payments. Today, a majority of INDULAC workers are taking advantage of this low cost housing. INDULAC withholds a percentage of the worker's salary (25% to 50% depending on

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[3] 1965 census projections showed San Carlos-Santa Bárbara with a combined population of 22,457 while Encontrados had 3,477 inhabitants (MOP, 1965, p. 74).

how soon the worker wants to complete payment) and applies this toward the purchase price of the house. The worker is charged no interest. When the total cost of the house has been paid, the worker receives a clear title to the house and is under no further obligation to INDULAC. INDULAC also makes funds available for home improvements to workers who already own their own homes (INDULAC, 1969, pp. 11-12).

INDULAC has also helped the community develop, directly, by paying local taxes, and indirectly, by providing the salaries of individuals who pay taxes. INDULAC has made direct cash grants to schools, both in San Carlos-Santa Barbara and in rural areas so that the children of farmers who sell to INDULAC will have some formal education (INDULAC, 1969, p. 12).

The program of expansion which took place during the 1960's was also an example of INDULAC's plan to improve production by developing the region. In addition to providing a market for milk, all INDULAC plants (including the new ones at El Guayabo and at El Vigía) offered technical assistance and financial services to their milk producers.

The El Guayabo plant was built in 1962 as a receiving station for milk that was to be shipped to Santa Bárbara. This plant, located in the far western sector of the region, is in an area which has only recently undergone development. Most of its producers are small farmers who are too poor

to have refrigeration or other modern improvements. Of the 45,000 liters received daily, only 12,000 are received refrigerated (personal consultation with Benidicto Marini, Manager, INDULAC, El Guayabo).

In 1967, the El Guayabo plant began to produce powdered milk; however, it still relies heavily on the Santa Bárbara plant for technical assistance. Representatives from the Office of Technical Assistance in Santa Bárbara regularly visit the 150 small producers in this area and encourage them in improving both the quality and quantity of production.

In 1972, the El Guayabo plant was operating at only sixty percent of its productive capacity (personal consultation with B. Marini). However, the management of INDULAC feels that it is located in a developing area with a bright future for milk production. The recent completion of the dike on the Río Zulia should lessen the problem of flooding. This, coupled with the construction of all-weather roads within the region, should help development considerably. As more capital becomes available to the farmers of this region, milk production will go up. INDULAC will have played a large part in this region's economic growth through its input of capital and technical assistance.

Today, nearly all of the milk from this western region is made into powdered milk at the El Guayabo plant. (A

small amount of the best quality milk is sent to a pasteurization and bottling plant at San Carlos.) The powdered milk is then shipped to El Vigía or Santa Bárbara where it is packed in cans and sent on for sale in nationwide markets.

The El Vigía plant is the newest and most modern of all the INDULAC facilities. It has become the administrative headquarters for the entire INDULAC operation in the Southern Maracaibo Basin, and thus has a large number of employees engaged in administrative activities.

The El Vigía plant receives only about half of its milk from within the region. The other half is brought in from an area that lies to the east of the Southern Maracaibo Basin. The total average daily production received is 220,000 liters, which is well below the plant's capacity of 400,000 liters (personal consultation with C. Katzgraber, Supervisor, INDULAC, El Vigía). However, as in the case of the other INDULAC plants, there is a belief that the El Vigía region has a potential for future growth.

The El Vigía plant spent 471,500 bolivares in 1971 on technical assistance to its milk producers (personal consultation with C. Katzgraber). This money was used to support an eight-man technical assistance team which functions in the same way as the Office of Technical Assistance at the Santa Bárbara plant.

Private contractors are used to haul milk from the farm to the plant and are paid the same rates as at the other INDULAC plants. All milk received at the El Vigía plant is made into powdered milk and packed in one kilo cans which are then shipped to markets for sale.

The El Vigía INDULAC plant is the largest single employer in El Vigía, and through taxes and salaries paid has directly stimulated the growth of this urban center. The presence of this plant has also encouraged other industries (milk hauling and retail establishments). It has provided over 120 well-paying jobs, thus directly stimulating the economic development of this area. In addition, as in Santa Bárbara, the El Vigía plant has provided its employees with the opportunity to buy low cost housing.

It is difficult to assign an absolute value to the overall effect that INDULAC and its three plants have had on the economic development of the Southern Maracaibo Basin. In terms of jobs and of money brought into the area, the effect was considerable. However, I believe that the attitude taken by the directors of this company was even more important. The company directors believed that INDULAC could develop by developing the region. To this end, they provided technical assistance and loans which directly led to increased production. This attitude of encouraging development was in a large part responsible for the tremen-

dous success that INDULAC has experienced and for the tremendous economic growth within the region.

INDOSA

As milk production in the Southern Maracaibo Basin increased, other milk processing plants were built which were in competition with INDULAC. Perhaps the most important of these is the pasteurizing and cheese plant at San Carlos. This plant was originally started as a private concern in 1953. In 1956, the INDULAC management bought the plant and named it INDOSA (Industrias Lacteas de Occidente S. A.).

Under the pre-INDULAC management, this plant was not able to provide technical assistance nor credits to its producers. Consequently, few farmers would sell milk to it. Under INDULAC management, INDOSA producers receive the same benefits as INDULAC producers, and the Office of Technical Assistance in Santa Bárbara services the needs of the INDOSA producers.

Since INDULAC purchased the plant, INDOSA has been steadily expanding production. Before 1963, production at the plant was limited to approximately 20,000 liters per day. In 1963, the plant began to produce cheese as well as bottled milk, and production began to rise rapidly. By 1971, the plant had been expanded so that it could receive up to 100,000 liters per day. However, at this time, the

amount of milk received per day is closer to 70,000 liters. Of this total, about 50,000 liters are pasteurized and bottled. This milk is then shipped in refrigerated trucks to markets as far away as Barquisimeto, San Cristobal and Mérida. The INDOSA brand is found in stores throughout the region and retails for one bolivar per quart. It is bottled in quarts because the bottling machines were imported from the United States and liter machines were unavailable. The remaining 20,000 liters received each day are made into cheese whose major market is in the Caracas area. The average daily production of cheese is 2,000 kilos. Four varieties are produced: parmesan, gouda, gruyere and white. In 1971 construction was begun on a new addition to the cheese plant. When this is completed (expected date: April, 1972) it is expected that cheese production will rise to 3,200 kilos per day (above figures furnished by Paul Jung, Manager, INDOSA).

There are 190 producers who sell to INDOSA. Of these, 140 are small farmers who sell poor quality warm milk which is then used in cheese production. They are paid 55 centimos per liter for this milk. Again, as in the case of INDULAC, private contractors carry the milk from the farm to the plant. There are fifty large producers who supply refrigerated milk to the plant, for which they receive 67 centimos per liter. This milk is of top quality and is pasteurized and bottled fresh.

The INDOSA plant employs 90 to 100 employees. They receive the regular INDULAC wage of 13 to 40 bolivares per day depending on skill and length of service. They are also eligible for the same hospital care, pensions, and vacation benefits as the INDULAC employees. Again, many employees have taken advantage of INDULAC financed low cost housing, and with their relatively high salaries they enjoy a wide variety of consumer products.

INDOSA, like INDULAC, has taken an active role in the welfare of its employees, producers, community and the region. In addition to providing a market for milk, technical assistance, and credit, INDOSA has provided the public with high quality fresh milk bottled under sanitary conditions.

KRAFT

In addition to the INDULAC and INDOSA plants, there is presently a KRAFT cheese plant operating within the region. Located at San Carlos, this plant was started by a private concern in 1958. It operated for one year producing white cheese only. In 1961, the IBEC (International Basic Economy Corp.) Foundation bought the facilities and started DIPROLAC (Distribudora de Productos Lactea). DIPROLAC produced several varieties of cheese and offered technical assistance to its producers. However, the plant was never a financial success, and in 1969 it was sold to KRAFT. KRAFT cut expenses by discontinuing the free technical assistance program. It

introduced a complete line of KRAFT cheeses (gouda, yellow, white, parmesan, and cheddar) and with KRAFT marketing and advertising, the plant has developed into a financial success. It is presently selling everything it can produce. In 1971 it received about 45,000 liters of milk per day and produced 5,000 to 6,000 kilos of cheese per day. The plant has facilities to handle up to 80,000 liters per day but there is simply not enough milk of acceptable quality available. Approximately 100 farmers are selling to KRAFT (1971). KRAFT pays more for milk (69 centimos per liter for cold milk and 64 centimos per liter for warm milk) than either INDULAC or INDOSA. However, many farmers will not sell to KRAFT because it does not offer them the technical assistance they need (above figures furnished by A. Subijaga, Manager, KRAFT).

Since the plant's construction in 1958, it has helped the development of the region by providing a market for milk, by offering technical assistance between 1961 and 1969, and by providing jobs and paying taxes to the community. Presently, the factory has about eighty full-time employees whom it pays 15 to 40 bolivares per day (personal consultation with A. Subijaga).

MILK PROCESSING PLANTS OUTSIDE THE REGION

In addition to the milk processing plants located within the region, there are several outside the region which

receive milk from within it. There is a pasteurization plant in La Fría which bottles milk under the brand "Leche Táchira." The total production of this plant is quite small, but it is important in that it provides a market for some farmers in the southwestern portion of the region. Another plant at Caja Seca (cf., Map A, p. 5) bottles fresh milk under the brand "SILSA." This plant receives some milk from the southeastern sector of the region. However, the great majority of milk produced within the region is processed by INDULAC, INDOSA, and KRAFT. These companies have definitely played an important role in stimulating production and in developing the region.

MALARIA CONTROL

The low-lying swamps which in the pre-development era were prevalent throughout the Southern Maracaibo Basin, made an ideal breeding ground for several species of the malaria carrying anopheles mosquito. The four species of the anopheles mosquito that carried malaria in this region were the Anopheles darlingi, the A. albimanus, the A. nunex-tovari and the A. pseudopunctipennis (Gabaldon, 1949, p. 123). Of these, the A. albimanus and the A. darlingi were the most common, and thus they were the greatest threat to humans.

Because of the prevalence of these mosquitoes, malaria was a severe problem throughout the low-lying parts of Venezuela. In fact, it was the fourth leading cause of death for the entire country prior to 1945 (International Bank for Reconstruction and Development, 1961, p. 381). In areas where the disease was endemic, the mortality rate for young children was often as high as fifty percent while among adults it was as high as seven percent (Marrero, 1964, p. 237). These figures are quite high, and clearly indicate why malaria was so feared.

Malaria is spread by any of several species of the anopheles mosquito. Different species of mosquitoes prefer different hosts. Some species actually prefer to bite animals, and only bite humans when no animals are available. These are called zoophilic mosquitoes. Others, termed anthropophilic, prefer man to other creatures, and are naturally more dangerous to man in the spread of malaria (World Health Organization, 1963, p. 59). The A. darlingi is anthropophilic and as such is a particular menace (MacDonald, 1957, p. 69).

In 1945, the Southern Maracaibo Basin presented an ideal breeding ground for both anthropophilic and zoophilic varieties of the mosquito. There were numerous stagnant swamps which provided breeding areas. The climate was warm and damp which was particularly conducive to the A. darlingi, and there were people and animals in the region

to act as hosts for both zoophilic and anthropophilic varieties. At that time, the problem of mosquitoes and malaria had been largely ignored throughout the region and no steps had been taken to control the problem. Those conditions combined to make the Southern Maracaibo Basin one of the worst malaria infested regions in the entire country (Venturini, 1968, p. 76).

The A. darlingi was particularly prevalent in areas below 500 meters in altitude (Gabaldon, 1949, p. 116) and thus was particularly well-suited for the Southern Maracaibo Basin. Because it preyed on man, it usually preferred to live in close proximity to him. Large numbers of these insects would live in houses and farm buildings. Although it was known that the A. darlingi was responsible for much of the malaria in this region, no real steps had been taken to control this pest before 1945 because there was no cheap effective pesticide available. Even in other parts of Venezuela, malaria control efforts were primarily restricted to treating malaria after it had been contracted, or in attempting to drain certain areas near urban centers and thus eliminate mosquito breeding grounds (Gabaldon, 1949, p. 114). Because of the expense involved in large-scale drainage projects, most rural areas were largely ignored.

The extremely bad reputation that the Southern Maracaibo Basin had in respect to the endemic malaria situation was

a very important factor in retarding its development. There were large numbers of Andean farmers who were land poor but were afraid to go into this undeveloped, forested lowland because they feared malaria (Lizarralde, 1959, p. 340). Malaria also sapped the strength of those already in the region and certainly made the pioneer farmers in this region less effective and less productive. It was obvious that as long as malaria was allowed to remain a potent force, regions where malaria was prevalent could never develop to their full potential.

A nationwide program to control malaria was begun in 1936 by the Ministerio de Sanidad y Asistencia Social (SAS) (Oropeza, 1961, p. 7). This program was funded by the Venezuelan government with help from the World Health Organization. The campaign was largely limited to keeping heavily populated areas relatively free from malaria. Very little, if anything, was done in rural areas except to offer treatment to those who had contracted the disease. A separate division called the Servicio de Fomento Anti-malarico was set up within SAS to run the anti-malaria campaign.

Before 1945, the program enjoyed only limited success because no acceptable anti-mosquito pesticide was available. In 1945 this changed. The United States released DDT on the international market. DDT was an insecticide that was

highly effective in killing mosquitoes, and the leaders of the Servicio de Fomento Antimalarico (Drs. Gerardo Gonzales and Salvador Carillo) believed that it was the answer to the Venezuelan anti-malaria program (Gabaldon, 1949, p. 134). They saw in its use a chance to eradicate malaria from Venezuela. Thus the program of malaria control, which had been operating since 1936, changed, in 1945, into a program of malaria eradication.

After DDT became available, a spraying program was begun. The goal of this program was to spray every house and farm building in malaria infested areas of Venezuela with DDT. It was believed that this would kill off the anthropophilic species of the anopheles mosquito, particularly A. darlingi, which was known to inhabit buildings where man lived and worked. To spray every house and farm building in malaria infested areas of Venezuela was an enormous task. In many areas, there were no maps, no roads, and nobody knew where or if houses even existed. Nevertheless, the program was officially started in 1945 and difficulties were slowly surmounted.

The first difficulty was to obtain money to organize and carry out an effective spraying campaign. During the first year (1945) money was taken from the general fund of the SAS, but in each succeeding year increasing amounts were specifically set aside by the national government for the DDT spraying campaign. See Table C, below.

TABLE C* - Government Expenditures for Anti-Malaria Spraying Campaign

Year	Money (in bolivares)
1946-47	1,850,000
1947-48	4,000,000
1948-49	5,600,000

*Gabaldon, 1949, p. 136.

This money enabled the Servicio de Fomento Antimalarico to set up separate DDT spraying squads under the División de Malariologia in each state. Thus, the actual decision on where to concentrate the efforts of the spraying squads was left to the discretion of the state directors, rather than being made at the national level.

Each spraying squad was made up of six to eight uniformed sprayers with a leader and auxiliary staff. Most spraying was done with small portable pump spraying devices which could be carried on a man's back. Each worker was given orders to completely spray the interior of each house and farm building with 2 grams of DDT per square meter (Gabaldon, 1949, p. 135). This would kill any mosquito that was on the premises at that time. Since little experimental work had been done with DDT in relation to killing mosquitoes, it was not known how long the chemical would remain lethal after spraying had been completed. The first year, spraying was repeated as often as every three months, but in succeeding years it was found that once every six months was sufficient to eliminate the mosquito from human living areas.

Spraying began in the Southern Maracaibo Basin in 1946. The SAS director for Zulia did not consider this region a high priority center. For much of the region there were no maps available, and the lack of roads made transportation a serious problem. However, late in 1946, spraying squads were sent into the region to begin their work, utilizing launches and canoes in the river areas, and going by mule in the back country (Gabaldon, 1949, p. 136).

The national spraying program was not an immediate success. Possibly the goals were unrealistic. The problem was simply too large to be solved in a short time. It was impossible for a relatively small number of spraying squads to visit every house and building in mosquito infested areas. The area involved was too large, and the number of squads was too small. However, as more money was allotted to this program each year, more squads were trained and put into the field and the number of houses visited by the squads increased (Gabaldon, 1949, p. 137).

The final result of the spraying program was to largely eliminate malaria as a serious disease throughout most of Venezuela. This success is illustrated by the fact that while malaria had ranked as the fourth leading cause of death in Venezuela before 1945, by 1950 it was not even listed in the top twenty-five (Special Operations Research Office, 1964, p. 126).

Within the Southern Maracaibo Basin, there was only limited success in the fight against malaria. Malaria was not completely eradicated in the early years of the program because there were many unaccessible houses that were not sprayed and there were also zoophilic species of mosquitoes (which also bite humans) which were not affected by the spraying to as great a degree as were the anthropophilic species. Also, at this time, nothing was done to eliminate the swamps which acted as mosquito breeding grounds.

No matter how much is spent on even the most complete program, until the breeding grounds are eliminated (swamps drained and flooding controlled), the area of the Southern Maracaibo Basin will be continually subjected to reintroduction of malaria from areas where malaria has not been eradicated. The staff of the División de Malariologia in El Vigia believes that malaria has actually been eradicated in the Southern Maracaibo Basin and that the periodic outbreaks that occur are reinfestations of the area by Colombian mosquitoes (personal consultation with Dr. Benassai, División de Malariologia, El Vigía). In any event, the spraying program is continuing today, as ever increasing amounts of DDT are being used to kill increasingly DDT-resistant strains of the malaria carrying anopheles mosquito.

Despite the fact that malaria in the Southern Maracaibo Basin was not eradicated by spraying, it was controlled to

a point that by 1950 it no longer presented a serious hazard to man in the area. This factor (that living in the tropical lowlands no longer presented an extreme danger from malaria) directly stimulated migration from the Andes into this sparsely settled region (Venturini, 1968, p. 80).

It was necessary to attract people to the Southern Maracaibo Basin if significant development of this region was to take place. People from outside the region, especially from the overcrowded Andean region, had been afraid to move into the Basin because of the high probability of contracting malaria. The malaria eradication program carried out by the SAS and its División de Malariologia substantially reduced the malaria problem within the region so that by 1950 large numbers of people began to migrate into the region. Table D shows the number of Andean families which migrated each year from the Andes to settle in the piedmont zone in the southern part of the Southern Maracaibo Basin (from a sample of 177 families interviewed).

TABLE D* - Settlement of Andean Families Within the Southern Maracaibo Basin (by year)

Year	Number of Families	Year	Number of Families
1920	4	1938	2
1921	0	1939	0
1922	0	1940	1
1923	0	1941	3
1924	0	1942	1
1925	5	1943	3
1926	0	1944	1
1927	0	1945	8
1928	2	1946	1
1929	0	1947	6
1930	6	1948	5
1931	1	1949	7
1932	0	1950	14
1933	3	1951	10
1934	1	1952	28
1935	7	1953	15
1936	0	1954	28
1937	0	1955	11

*Lizarralde, 1959, p. 356.

Certainly much of the migration into the southern part of this region after 1952 can be attributed to the construction of the Pan-American Highway and the subsequent development along it. However, I believe that the significant jump in migration seen in 1950 is directly related to the widespread belief throughout Venezuela that the malaria eradication program had been a success. The success of this program was definitely a contributing factor in the dramatic development experienced throughout the region in the years following this program's inception.

ROAD CONSTRUCTION

In order for a region to develop to its full potential, it is absolutely essential that there be good transportation facilities available to all parts of the region. Prior to the recent development, the Southern Maracaibo Basin enjoyed very limited transportation facilities. Certainly, these facilities may have been considered adequate in areas immediately adjacent to the railroad lines and to the rivers. However, vast areas in the interior of the region had virtually no transport facilities available and thus were limited in their development.

It was necessary to supply these undeveloped areas with improved transportation facilities if these areas were to develop. It was a practical impossibility to make railroad and water transportation available to all parts of the region; it was much more economically feasible to initiate a program of road construction.

There were two basic reasons why roads were constructed in the Southern Maracaibo Basin: 1) as a means to development, and 2) as a response to development that had already occurred. In the first case, roads were usually constructed by a developing agency (usually the government) in an undeveloped area in an attempt to encourage settlement and development both along the road and in the region that the road serviced. In the second case, private groups or

individuals in an area saw that a road was needed in order to give the already developed region better access to markets. These people either built the roads themselves, or prevailed upon the government to build roads for them. In both cases, road construction resulted in the further development of the Southern Maracaibo Basin.

Perhaps the most important road built within the region was the Pan-American Highway. This road appears to have been constructed for both reasons. It acted as an agent of development for the area through which it passed, but it also served as an outlet for already developed areas (the Andes and parts of the Southern Maracaibo Basin). It was ostensibly built to connect eastern Colombia with the region within Venezuela that lay to the north of the Andes, and thence with the nation's capital (Caracas). However, perhaps a more important reason for its construction was a belief by government officials that building the road would lead to the development of the region through which it passed (Venturini, 1968, p. 74).

Construction on the La Fría-El Vigía section of the Pan-American Highway was begun in 1952 and was not completed until 1955. However, its construction began to have an impact on the region long before 1955. The immediate effect of its construction was to draw hundreds of people into the area (Lizarralde, 1959, p. 336). Many of these

people came to find work connected with the highway's construction, while others brought their families to settle in the newly opening area. In any event, the construction opened up to settlement an area or corridor along the road and encouraged migration from outside the region (Lizarralde, 1959, p. 341). Most of these incoming migrants were settlers from the Andean region (Venturini, 1968, p. 82).

A system of land tenure developed in the newly opening region whereby the newly arrived migrants cleared the land near the new highway and planted crops for several years. The land was cleared by using family members for labor and and by using machetes and fire as tools. After several years of crop production, yields declined and the farmer then sold his interest in the land to a newcomer who would then graze cattle on the cleared land. Often the second proprietor was a wealthy businessman who would buy up the rights of many small farmers in the area and thus acquire use of a large parcel of cleared land. Most of the land belonged to the central or municipal governments and neither the first farmer who originally cleared the land nor the second who later bought usufructuary rights to the land ever received a clear title to it. The first settlers did, however, receive rights to the improvements that were made on the land, and it was these rights that could be sold to newcomers or to those with money who did not wish to clear

their own land. Many times the first settlers, after selling their rights to their first cleared parcel, would move on to an uncleared region and begin the process all over again (personal consultation with Dr. Henry Sterling, University of Wisconsin, who has observed this pattern of sequent occupance at intervals since 1952).

The construction of the Pan-American Highway certainly did act as a causal factor for the development of the region adjacent to it. In addition, it spurred the development of the entire Southern Maracaibo Basin by providing an easy access outlet to the populated areas of the country. It provided a land link to the eastern markets and thus facilitated the export of products from the region. No longer did Santa Bárbara have to rely exclusively on lake steamers to export her produce. Trade patterns were completely rerouted. The region was no longer exclusively a zone through which Andean goods flowed on their way to northern markets. Instead, many Andean goods were now shipped by the Pan-American Highway directly to Caracas. River ports and shipping interests suffered from a decline in trade from the Andes. However, the overall loss of this trade to the Southern Maracaibo Basin was more than compensated for by the rapid growth of trade from within the region. The Pan-American Highway thus acted as a bridge which connected the Southern Maracaibo Basin with the rest of Venezuela.

An example of the second type of road (one built to serve already developed areas) was that built between Santa Bárbara and the junction of the Pan-American Highway at El Vigía. The growing urban center of San Carlos-Santa Bárbara with its flourishing INDULAC plant, desperately needed a highway link to the rest of the country. In 1953 a road was completed that in effect paralleled the old El Vigía-Santa Bárbara railroad. In this instance, the building of a road did not produce the immediate development of the area adjacent to it (the area had already been largely developed in response to the railroad), but instead acted as an outlet for an already established production center (Santa Bárbara). It did, however, act as a stimulus to further development of the Santa Bárbara area. The INDULAC plant was able to receive part of its unprocessed milk, and then to ship powdered milk, by truck instead of by boat; this lowered costs and directly stimulated production (personal consultation with C. Hohermuth). In addition, producers of bananas and livestock also found that the road lowered the cost of transport for their products. The net effect was to stimulate production and development in the San Carlos-Santa Bárbara area.

A third major road that was constructed within the region at this time was the San Carlos-Encontrados Highway. This road was also of the type built to connect an already

developed area (Encontrados) with the rest of the country, rather than one built to directly stimulate development along it. The San Carlos-Encontrados Highway roughly paralleled an old railroad, and like the Santa Bárbara-El Vigía road, was through an area that had already been largely cleared and put into crop and livestock production. Its major function was to connect the developed area around Encontrados with San Carlos-Santa Bárbara.

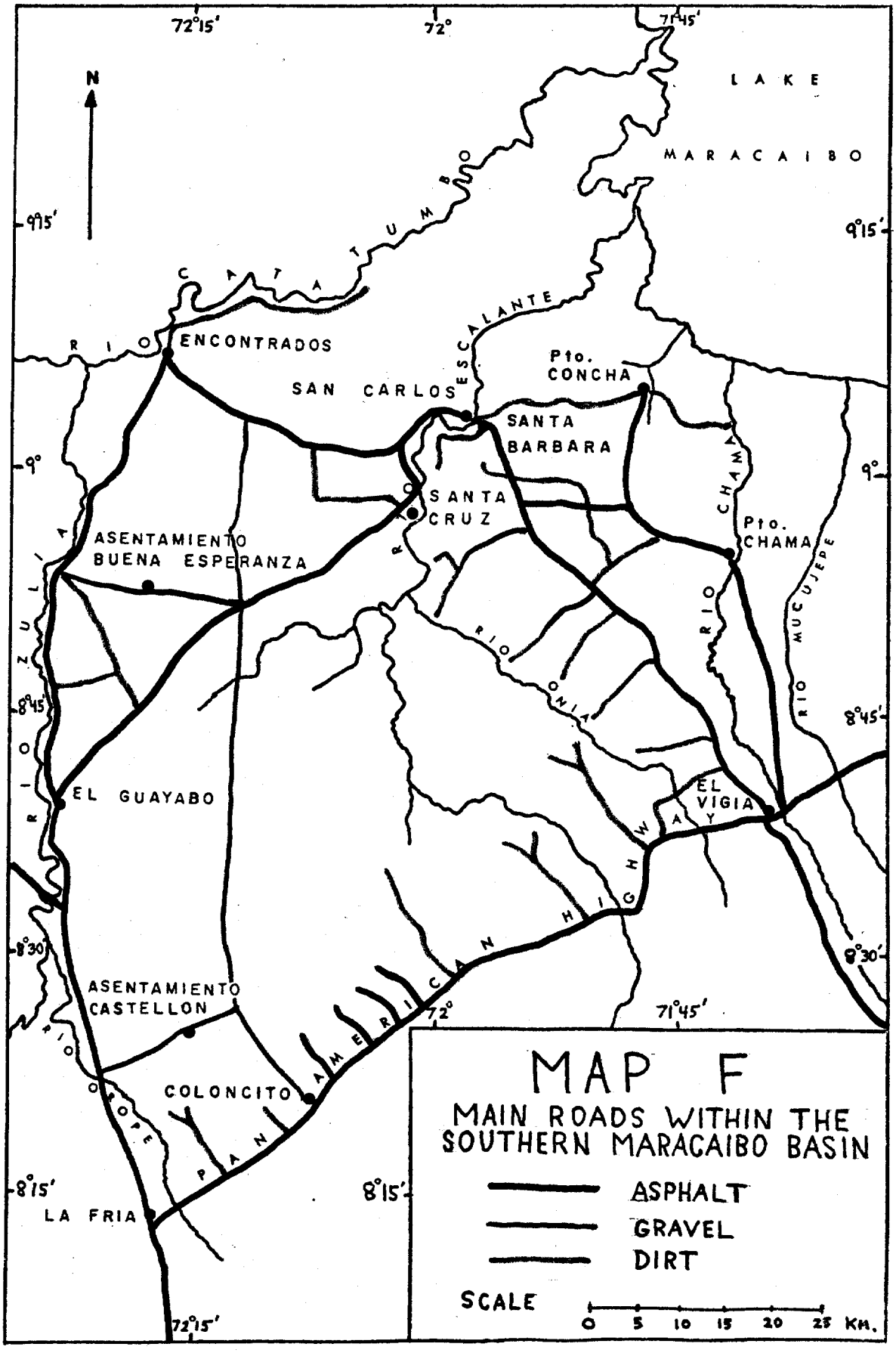
In addition, a road was built from Puerto Chama to Santa Bárbara during the late 1950's, as were several short connecting roads within the region. However, the basic road net remained the Pan-American Highway along the southern boundary of the region, the north-south route of the Santa Bárbara-El Vigía Highway, and the east-west San Carlos-Encontrados Highway in the northern part of the region.

Finally, in 1965, MOP began a plan for road construction under the Comisión Sur del Lago that was designed to develop the Southern Maracaibo Basin. Plans were drawn to develop a road grid that would cover the entire region and thus open the area to development. By 1971, a total of 135,133,483 bolivares had been spent in completing 247.4 km. of paved or gravel-surfaced highway within the region (MOP, 1971b, p. 14). One reason for the relatively high cost of this road construction was that there is little or no gravel in the region and so it must be brought

in from the Andean or piedmont areas at high cost. In addition, there are plans for another 121.8 km. which will be completed in the near future (MOP, 1971b, p. 14). The extent of this recent construction, in addition to the earlier road construction within the Southern Maracaibo Basin, is illustrated on Map F, p. 66.

The undeveloped area through which recently constructed roads pass has undergone a settlement and development similar to that experienced in the area affected by the construction of the Pan-American Highway (personal observation and interviews with farmers in the region). People settled in the newly opened areas, planted crops for several years until production waned, and then sold their improvements (basically just cleared land) to beef and dairy ranchers who arrived in the area after clearing had taken place. Thus, there are many recently established haciendas in the newly opened areas where recent highway construction has occurred.

Construction of a very important trunk road has recently been completed, which, although largely outside the arbitrarily defined limits of the Southern Maracaibo Basin (cf. p. 3), greatly affects its development. This is the La Fría-Machiques Highway. While only a small portion of the southern end of this highway lies within the region as here defined, it is significant because it provides an important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EL GUAYABO
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ASENTAMIENTO
CASTELLON
RIO
OROPE
COLONCITO
PAN AMERICAN
8°15'
LA FRIA
MAP F
MAIN ROADS WITHIN THE
SOUTHERN MARACAIBO BASIN
ASPHALT
GRAVEL
DIRT
SCALE
0 5 10 15 20 25 KM.

second connecting highway link[4] to the populated centers in the Northern Maracaibo Basin. While it is too soon to accurately assess the impact of this road on the region, it is likely that it will strengthen the tie between the Southern Maracaibo Basin and the populated centers to the north. Trade between these two regions is expected to increase substantially as a result of this construction. One immediate benefactor within the region is the INDULAC plant at El Vigía which now receives surplus milk produced in the Machiques area.

An important by-product of the road construction that has taken place within the region was a decline in railroad revenues followed by the complete cessation of rail service. The two main railroads, the Encontrados-Estación Táchira and the El Vigía-Santa Bárbara lines, were both state-owned and had long been in poor physical and financial condition. No money had been appropriated to replace worn-out and antiquated equipment and this resulted in the creation of largely inefficient organizations with high costs and overhead. The freight rates were necessarily high to pay for

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[4] There is an older paved highway on the eastern side of Lake Maracaibo which connects the Pan-American Highway with the populated centers in the northern Lake region. For a long time this was the only land link to the Northern Maracaibo Basin; however, it is less direct than the La Fría-Machiques route and so its use by people from the Southern Maracaibo Basin has declined since the construction of this newer highway.

the inefficient operation, but despite these high rates, both lines continually operated at a loss.

The construction of highways on routes parallel to the railroads finally caused both railroads to cease operations. It was much cheaper to ship freight by truck over the short distances involved. The corresponding drop in freight volume for the railroads made their operation impossible and unnecessary to continue. The El Vigía-Santa Bárbara Highway, completed in 1953, caused the railroad serving that area to cease operations shortly thereafter. The Encontrados-Estación Táchira line was able to function until after the La Fría-Encontrados Highway was completed in 1966.

The third railroad in the region (the privately owned Encontrados-Bobures line) actually ceased operating before the parallel highway (San Carlos-Encontrados) was completed. However, horse-drawn carts continued to use its rails until the highway's construction made them obsolete.

In addition to major trunk roads that were built by MOP, there were also very important vias, or penetration roads constructed that connected areas in the interior of the region with the major roads. Often these roads were built almost as if by accident. A mule path was used by a jeep and gradually was improved so that a truck could pass. Often, local labor would use hand shovels to build up the

path so that it was passable during wet times of the year. Sometimes a bulldozer was brought in to level or clear a way.

The construction of these vias de penetración was very important in providing access to the newly developing areas that were away from the main trunk roads. In most cases, the individual farmers concerned were responsible for the construction of these roads. Often, the same succession of land use developed that was common along highways built through undeveloped areas. The original farmer who settled and cleared the land often did not have the financial backing to further develop his farm nor to construct a road to get his produce to market. He sold his rights to a second farmer who had more money or at least could obtain credit and could further develop the area. Often farmers would band together and cooperate in financing the construction of a road that would benefit a number of farms.

In many cases, INDULAC would lend money to its producers to help in financing road construction (personal consultation with C. Hohermuth). It was important not only to the farmers involved but also to INDULAC that milk be provided with access to market.

The first vias de penetración were built at the same time that trunk roads were first being built in the area (early 1950's). They slowly expanded outward as the area

under settlement expanded. Even today, with the continued cutting of forested areas and new settlement in these previously unsettled regions, the roads have continued to expand.

There is usually a progression in road quality from very bad to quite good as one follows a penetration road from a newly developing area toward the main trunk roads (personal observation). The local district governments have taken over the maintenance of many of the older well-established penetration roads and many of these roads have now been graveled so that they are quite passable for automobiles. However, in the more recently cleared areas, the quality of the roads deteriorates to the point that often a road is nothing but a muddy track, quite impassable to all but four-wheel drive vehicles or to mules.

It is difficult to quantitatively determine the effects of the penetration roads on the development of the region as a whole. They are certainly necessary for development to have taken place. They act as an outlet to the outside market for goods produced in less accessible areas. However, their construction may have been as much the <u>result</u> of settlement and development, as a <u>cause</u> for it.

It is much easier to assess the impact of road construction in general upon the region. The Pan-American Highway served the dual purpose of connecting the region to the

rest of the country and of stimulating development along it. Its construction directly encouraged settlement within the region and stimulated agricultural and livestock production by making markets more easily accessible. The other trunk roads constructed within the region also served one or both of these functions. The overall effect of road construction within the region was to greatly improve transportation facilities, encourage in-migration and settlement, and thus directly stimulate production and development for the entire region.

GOVERNMENT DEVELOPMENTAL AGENCIES AND/OR PROGRAMS

MOP

The Venezuelan government has actively encouraged the settlement and development of the Southern Maracaibo Basin through the involvement of its various ministries and developmental agencies. The Ministerio de Obras Publicas (MOP) has probably been the governmental body most active in the development of the region. It has assumed the role of coordinator, and has created the Comisión Sur del Lago and the Dirección General de Recursos Hidráulicos to oversee development in the region. The stated goal of MOP concerning the Southern Maracaibo Basin is to direct development there in an orderly fashion, and to institute flood control projects and the construction of new highways (MOP, 1967b, p. 3).

MOP actually became involved with development in the Southern Maracaibo Basin during the early 1950's when it became the agency that was responsible for the first highway construction there. However, it was not until the 1960's that MOP entered into an organized comprehensive program that was to lead to the eventual planned development of the entire region. Before this time, the development that had taken place was largely spontaneous and of an unorganized nature. MOP was given the task of directing and organizing the development that was taking place, in an effort to create a more efficiently developed region.

MOP, through the Comisión Sur del Lago, initiated a plan for development that was intended to improve both flood control and transportation facilities. This plan was initiated in the early 1960's. By 1971, the first phase of this plan had largely been completed.

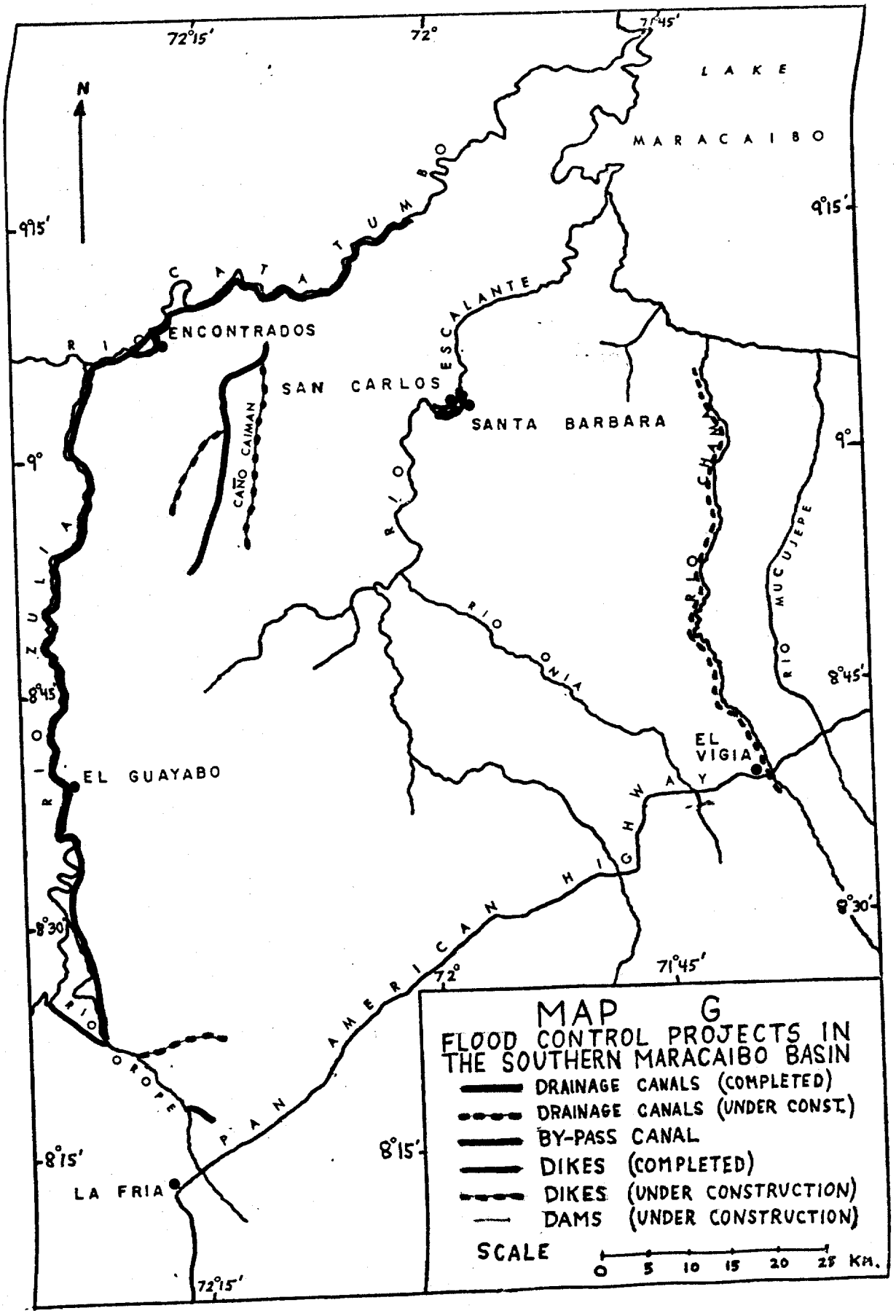
In the field of drainage and flood control, the entire east bank of the Río Catatumbo-Río Zulia had been diked. This project has considerably lessened the danger of flooding for much of the western sector of the region and has opened up a considerable area for production (MOP, 1971b, p. 9). Also, a program of drainage-canal construction is well under way in the Caño Caimán area (cf., Map G, p. 74) and in the Río Orope area. This will lead to the drainage of large swampy areas and will make more land available for crop and livestock

production. In addition, a channel has been cut in the Río Catatumbo which allows the river to bypass Encontrados and considerably lessens the danger from flooding in this area. Construction of a flood control dam for the Río Onía has also begun, as has construction of a dike on the west bank of the Río Chama (personal consultation with Dr. J. Kijewsky). Flood control projects, both completed and under construction are illustrated on Map G, p. 74).

A second phase of construction calls for dikes to be built on both banks of the Río Escalante, a dike for the east bank of the Río Chama, and dams to be constructed on both of these rivers. Finally, a third phase is planned that calls for the channelization of tributary streams throughout the region and for the drainage of all swampy areas south of the San Carlos-Encontrados Highway. The target date for the completion of this third stage is 1995, at which time it is hoped that the entire Southern Maracaibo Basin will be fully developed (MOP, 1971b, p. 12).

A total of more than 120 million bolivares has already been spent on drainage and flood control projects within the region (personal consultation with Dr. J. Kijewsky). This is approximately one third of the projected cost for the completion of all works planned for the Southern Maracaibo Basin (MOP, 1967b, p. 15).

In addition to flood control and drainage projects, as a part of the comprehensive plan for the development of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RIO ONIA
EL GUAYABO
EL VIGIA
HIGHWAY
8°30'
PAN AMERICAN
RIO OROPE
8°15'
LA FRIA
72°15'
MAP G
FLOOD CONTROL PROJECTS IN THE SOUTHERN MARACAIBO BASIN
DRAINAGE CANALS (COMPLETED)
DRAINAGE CANALS (UNDER CONST.)
BY-PASS CANAL
DIKES (COMPLETED)
DIKES (UNDER CONSTRUCTION)
DAMS (UNDER CONSTRUCTION)
SCALE
0 5 10 15 20 25 Km.

the region, MOP initiated a program of highway construction which has now largely been completed. The results and motives behind this program are discussed above under the section on road construction. It should be noted, however, that the area in which the major portion of highway construction was concentrated is also the area that received the major benefit from the flood control projects. This is the western sector of the region, which the Comisión Sur del Lago believed could be developed through improved transportation facilities coupled with improved flood control and drainage. By means of an integrated program, it was hoped that this western sector would undergo an orderly and planned development.

The overall effect of MOP on the development of the entire region is considerable. The physical improvements supplied by MOP in the form of highway construction and flood control have opened up new areas for production (particularly the western sector) and have directly stimulated the economic growth of the entire region.

MAC

The Ministerio de Agricultura y Cria (MAC) has also played a role in the development of the Southern Maracaibo Basin. However, it has been neither as comprehensive nor as important a role as that played by MOP. MAC actually had little or no involvement within the area until 1960,

when the first agricultural extension offices were established there. Thus the extensive development experienced within the region prior to 1960 occurred to a large extent without the aid of MAC. MAC has since established offices of agricultural extension at Santa Bárbara and at El Vigia, and (in 1967) an experiment station at El Guayabo.

Through the extension offices and the experiment station, MAC has begun to administer a program which, in a limited way, has helped development within the region. Throughout Venezuela, much credit for rural development has been given to the MAC-BAP (Banco Agricola y Pecuario) program that supplied agricultural credit to small farmers. In the Southern Maracaibo Basin, however, the credit function of MAC has been of very limited importance. The late appearance of MAC in the region, coupled with very poor advertisement of credit availability, and the complicated land ownership problem (most settlers within the region do not actually have title to the land they are farming) have created a situation where very few farmers have actually received agricultural credits from MAC. In fact, a major criticism of MAC's programs has been its apparent lack of response to the problems of small farmers (International Bank for Reconstruction and Development, 1961, p. 156). There has seemingly been no attempt by MAC to help the small livestock

producers within the region (personal consultation with farmers in the area). Instead, the limited veterinary and credit services offered by MAC have been largely restricted to helping the large commercial producers.

The Santa Bárbara extension office, which is located in the heart of a livestock producing region, has only one veterinarian assigned to it. Its major concern is with promoting agricultural production. Certain highly placed officials in MAC believed that the future development of this region lay in the production of bananas, cacao and palm oil. To spur the development of these products, the Programa de Fruticultura was initiated which provides credit to farmers engaged in the production of these crops (MAC, 1966, p. 1). The Santa Bárbara office has two extension agents working full time to promote this program. In 1970 over 1,000,000 bolivares in credit was extended through this office for the production of cacao, and in 1971, an additional 600,000 bolivares was extended for banana production (personal consultatation with R. Blanco, MAC, Santa Bárbara). During these two years, the Santa Barbara office extended no credit for livestock production, despite the fact that this had become basically a livestock producing region and that a production feasibility study conducted by MOP in 1971 (MOP, 1971a, p. 48) had shown that most of the region is best suited for livestock production. This appears to be

a case of conflicting priorities. MAC is attempting to develop a region, considered by MOP to be best suited for livestock production, into a center of crop production. The heavy investment in cacao appears to have been the result of exceptionally poor judgment. Low prices and high production costs have resulted in a situation where cacao is produced, but at a cost higher than that of the world market. Evidently, the stupidity of encouraging cacao production was realized by 1971; as of that date, no more credit has been extended for its production (personal consultation with R. Blanco). However, because of MAC's preoccupation with agricultural products, a considerable amount of money which might have been used to encourage livestock production has been largely wasted.

The agricultural experiment station at El Guayabo appears to be more useful in stimulating development within the region than are the agricultural extension offices. Experiments with pastures and improved breeding for milk and beef production are carried out at the station (MAC, 1971, p. 552). The results of these experiments are passed on to the farmers in the form of advice by extension agents assigned to the station.

The overall effect of MAC and its extension program on the region is difficult to determine. It certainly has not fulfilled one stated goal of providing low interest agri-

cultural credits to large numbers of farmers within a developing area. In addition, it has put too much emphasis on the Programa de Fruticultura (particularly on cacao) and not enough on livestock production. However, it has helped banana production which appears to be an important crop for parts of the eastern sector of the region. It has also made available information concerning the feasibility of planting different types of pastures as well as other information gained through its experiment station at El Guayabo. Thus, it has definitely acted as an agent for economic growth but through poor programing, it has not lived up to its potential.

BAP

The Banco Agrícola y Pecuario (BAP), in conjunction with MAC, is the Venezuelan agency responsible for providing agricultural credits to farmers in developing areas. Since 1960 this agency has granted supervised (usually under MAC) credit to small farmers at three percent interest per year (BAP, 1964, p. 1). This program has not been successful in the Southern Maracaibo Basin. Through 1971, almost no credit had been provided by BAP to the small farmers of this region (personal consultation in February, 1972, with Dr. P. Rios, BAP, Caracas). It appears that some larger farmers did, through political influence, receive BAP credits, but on the whole, the influence of BAP as an agent of change has been quite small.

Part of the problem is that there has been no one available within the region to supervise credit. The two MAC extension offices are small and do not have the staff to take on the additional duties that supervising a large amount of agricultural credit would entail. Also, there is the continuing problem of land titles or lack thereof, and the problem of a very transient population.

These problems are now gradually being solved, and BAP is now attempting to make a worthwhile contribution to the development of the area by instituting a program of agricultural credits. In 1971, 2,000,000 bolivares were released by BAP to be distributed throughout the region.[5] An additional 600,000 bolivares will be added to this in 1972, and if all goes well, a continuing addition will be made to the fund each year (personal consultation with Dr. P. Rios). This fund will be available exclusively to livestock producers. It is hoped that in this way, BAP will make a meaningful contribution to further development within the region.

IAN

The Instituto Agrario Nacional (IAN) has also contributed to development within the Southern Maracaibo Basin. IAN was founded in 1949 to aid in the resettlement of campesino families. However, not until 1960 was a strong land reform law passed and IAN given any real power (IAN, 1964, p. 68).

[5]As of February, 1972, this money had not yet been distributed.

Since then, IAN has been actively engaged in the redistribution of land and in breaking up the more inefficient examples of the latifundia system.

Within the Southern Maracaibo Basin where there has long been an abundance of unoccupied land, IAN has been primarily concerned with the establishment of agricultural colonies for settlement by migrants from the Andes or from elsewhere outside the region. The first and most ambitious IAN settlement within the region was started on the north side of the Pan-American Highway shortly after it was built. Northeast of Coloncito, four penetration roads were built northward from the Pan-American Highway, and farmers from the Andes were brought in to settle on the land (Lizarralde, 1959, p. 337). This became the Unidad Agropecuaria de los Andes (UALA). IAN built houses, cleared land, and supplied credits and technical assistance. Farmers were encouraged to produce livestock, milk, fruit, and vegetables. The amount of land allotted to each farmer varied depending on the experience and ability of the individual involved. Farmers who had more experience and ability were settled on farms averaging 100 hectares in size, while those who were less experienced were settled on smaller plots and were expected to supplement their farm income by working as day laborers on the larger farms.

This original IAN settlement (UALA), established under the Pérez Jiménez regime,[6] is no longer under direct IAN control. Individual farmers who have enough land to raise livestock have formed a cooperative which ships refrigerated milk to the INDULAC plant at El Vigia. Also, vegetables and fruits are produced for home consumption and for sale in nearby towns (e.g., Coloncito and La Fría). Despite the fact that IAN is no longer directly involved with UALA, the former colony is flourishing and today must be considered a success in that it has become economically self-sufficient.

In addition to this large showcase settlement of UALA, IAN has, since 1960, founded a number of smaller settlements within the region. There has not been nearly as large an expenditure of money per colonist on the development of these later colonies as was spent on UALA, and the results have been less spectacular. Colonists have been settled and many have remained on land that was before unoccupied, thus attaining a degree of permanence. However, these colonies are not as economically self-sufficient as the UALA colony.

Recently, for example, two new IAN developments or settlements were begun in the western sector of the region.

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[6]During the regime of the dictator, Pérez Jiménez, several showcase resettlement colonies (of which UALA was one) were founded. Large sums of money were spent on these colonies and a number of campesinos were resettled. However, the expense per family was so high and the number of families involved was so few that this method of resettlement was not considered to be economically worthwhile, and it was abandoned after Pérez Jiménez was overthrown.

IAN, in conjunction with MOP and the Comisión Sur del Lago, founded Asentamiento Castellón and Asentamiento Buena Esperanza. Both of these settlements are in the newly opening area protected from flooding by the dike on the Río Zulia, and both are serviced by a recently completed highway (cf., Map F, p. 66).

It is too soon to tell whether these new settlements will be successful. By 1971, only 6,950 hectares out of a planned total of 83,000 hectares had been distributed to new settlers (MOP, 1971b, p. 11). A total of 356 families had been settled, which makes the average farm (assuming that the land was divided equally) slightly less than 20 hectares in size. The quality of the soil in this western sector, while adequate for pasture, will not permit intensive crop farming. It was thus originally planned that the new settlers would become dairy farmers and produce milk that could then be sold to the nearby INDULAC plant at El Guayabo (MOP, 1971b, p. 11). However, it would appear that a 20 hectare farm size may be too small to permit successful livestock production.[7] It is thus questionable whether these settlements will be economically viable (at least for livestock production) until more land is allotted to each settler. Eventual plans call for creating farms of between 80 and 100

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[7]Most successful dairy farms in the region are at least 50 hectares in size.

hectares in size; until this is done, the new colony will probably not be viable.

The overall impact of IAN has been somewhat limited because there has not been enough money available to carry out the needed programs of land redistribution. There has also been a severe problem concerning squatters and the question of land ownership. In some cases, campesinos have moved onto land given to earlier settlers. (This has occurred most frequently on the 100 hectare farms in the UALA colony.) In the case of UALA, after IAN developed the area, other parties came forward claiming ownership. This has resulted in a costly legal fight which still has not been concluded (personal consultation with Dr. Eddy Rivas, IAN, Caracas). These problems have combined to limit the effectiveness of IAN in carrying out its role as a developmental agency.

Despite these problems, IAN has contributed to the development of the region through its sponsorship of a number of agricultural resettlement communities. As a source of credit (in conjunction with BAP) IAN has stimulated development in previously undeveloped sectors of the region. Through these means, IAN has directly helped poor landless peasants, supervising their resettlement and thus giving them an opportunity to improve their lives and, at the same time, to develop their country.

SAS

A final government agency which has been an important catalyst for development is the Ministerio de Sanidad y Asistencia Social (SAS). Its major impact has been in the field of malaria control (discussed above under that topic). It also has contributed to development by providing improved medical and social services to the inhabitants of the region. It has initiated an intensive advertising campaign, directed at the lower class population (in many cases, rural inhabiants), to make them aware of the importance of personal hygiene. In addition, it has been responsible for the construction of hospitals (e.g., at San Carlos, Encontrados, and El Vigía) (MOP, 1965, p. 93) and for initiating health and child care programs for young and expectant mothers (Oropeza, 1961, p. 22). The SAS has also initiated a program whereby immigrant doctors (often from Spain) are sent to rural areas to provide needed services. After working for several years at a rural clinic, these doctors are granted a license which enables them to practice anywhere in Venezuela. The effect of this program has been to provide some rural areas with trained medical personnel who would otherwise be unavailable (personal consultation with Dr. H. Sterling).

Even with this program, the Southern Maracaibo Basin still suffers from a shortage of doctors and trained medical personnel. Adequate health facilities are still

largely lacking except in certain urban centers. However, great strides forward have been taken in the field of health care since the region began its recent transformation in 1944, and most of this improvement is directly attributable to the work of the SAS.

The total impact of these governmental agencies on the development of the region is considerable. Again, as is often the case in attempting to determine the absolute effect of many causal factors, it is impossible to quantitatively determine the degree that these agencies have played in the total development of the region. Certainly some agencies have played a more important role in its development than have other agencies. Also, different agencies have been involved over a varying period of time. In several cases (notably in the cases of MAC and BAP), development had gotten well underway before the agencies became involved. Nevertheless, the combined effect of all of the agencies has been to stimulate growth within the region, and for this they should be recognized and commended. The existence and successes of these agencies are an indication of interest by the national government in the development and growth of the Southern Maracaibo Basin.

THE IN-MIGRATION OF SETTLERS AND ENTREPRENEURS

For development to take place in the Southern Maracaibo Basin, it was first necessary to attract people to the area who would cut down the forest and put the previously unused land to an economic use. During the pre-development era, the region as a whole was vastly underpopulated, and thus it was unable to supply the necessary labor to clear the forests and to develop the region (MOP, 1965, p. 67). Private entrepreneurs were also necessary to make use of the land and to develop it to its full potential.

Settlers were largely attracted from outside the region. The vast empty area where malaria was rapidly being eliminated acted as a magnet to landless people from populated areas. The obvious source for most migration was the overpopulated Andes. Andean peasants moved into the opening areas along the newly constructed Pan-American Highway and cleared small holdings for themselves. Usually they settled in the part of the Southern Maracaibo Basin that was located closest to the place in which they had lived before (Venturini, 1968, p. 74). Thus, the southeastern sector was largely settled by people from Mérida State, while the southwestern sector was largely settled by people from Táchira.

While the basic motivating force behind a settler's migration into the region was a desire on his part to

settle on new land and to establish a farm of his own, fully two-thirds of those involved became laborers for other farmers (Venturini, 1968, p. 83). Some settlers lacked the knowledge and financial support necessary to operate their own farms. In many cases, these settlers originally cleared a site and then sold their improvements or rights to another farmer. Some of them, often with a family to support, then contracted out as day laborers on other farms. Others, upon selling their original clearing, moved further into the forested region where they repeated this clearing-selling process again and again. Eventually, all of the unclaimed forest was taken up, and these forest clearers were then forced to work as hired laborers or else to leave the region.

Immigration from the Andean region was largely concentrated in the area adjacent to the Andes. Certainly, there was some migration from the Andes into areas north of the piedmont, but the percentage of migrants involved was less than for immigrants to the piedmont region. It was estimated that in 1968, seventy-nine per cent of the people living in the southern margins of the region were migrants or children of migrants from the Andes (Venturini, 1968, p. 81).

As one proceeds north and west, the percentage of Venezuelan Andean migrants drops and that for Colombians increases. Nobody really knows how many Colombian migrants are living

within the region. Many have illegally entered Venezuela and if questioned, will not admit to being Colombian. Estimates on the total number of Colombians within the region vary from the officially recognized ten per cent (11,000) of the 1961 population (MOP, 1965, p. 68) to as high as forty per cent (45,000). It appears that the number of Colombian migrants increases as one moves into the western sector of the region or in the direction of the Colombian border.

The number of Colombian immigrants seems to be increasing each year. They are drawn to the region by the high wages paid to laborers. Apparently, very few Colombians are attracted by the hope of obtaining free land since very few of them own their own farms within the region (personal consultation with A. Spinac). Instead, Colombians come to take advantage of the high pay scale which provides a manual farm laborer with 10 to 12 bolivares per day. Often, a farmer will pay a Colombian slightly less, but wages are still at least five times greater than could be earned for comparable work in Colombia. In many cases, the Colombian migrant supports a family which remains in Colombia, or he saves his wages with the eventual hope of returning to Colombia as a rich man. An additional factor which in the late 1950's and early 1960's encouraged Colombian migration, was the political turmoil that was present within Colombia. Many people in the border areas left Colombia simply to escape the possibility of being killed.

Venezuelan hacienda owners say that Colombian labor is necessary because there is not enough Venezuelan labor available. Perhaps a motivating factor behind this belief is actually the fact that Colombian labor is usually cheaper. For example, a Colombian will contract out to clear land for 120 bolivares per hectare while a Venezuelan laborer would demand at least 200 bolivares for comparable work (personal consultation with farmers within the area). Thus it is to the advantage of hacienda owners to allow the illegal Colombian labor supply to remain within the region and there has been no real attempt by the authorities to crack down on the situation.

The impact of local labor from within the Southern Maracaibo Basin has been of lesser significance to the overall development of the region. There were simply not enough people living within the region in the pre-development era to form a large labor group. Most natives to the region have continued to live in the towns where they have done well as storekeepers or industrial laborers, or they have become landholders by buying up land and thus establishing at least usufructuary rights to farms of their own.

The total impact of the settlers is of course very significant. It was essential that settlers be imported into the region to clear land and to operate the farms. Inmigration was encouraged to the southern sector by the

availability of free land. After clearing and selling land, many migrants returned to their old Andean status as laborers. It might be argued that the early Andean migrants came as settlers rather than as laborers. However, by choosing to sell their rights to clearings or farms, they were, in effect, selling their labor and might thereafter stay on as laborers for the farm purchaser (unless they preferred to follow the retreating forest). Colombians and some Andean laborers were drawn by high wages to other developing areas within the region. Their contribution has been a definite factor responsible for the unusual economic growth experienced throughout the region. Certainly this would have been impossible without the immigration of large numbers of settlers to this region.

Also of great importance to development was the appearance of private entrepreneurs who directed development and had, or could obtain, the necessary capital to finance it. While most migrants from outside the region were without sufficient funds to establish a viable farm enterprise, there were some private individuals who moved into the region and had enough operating capital. These men bought cleared land, or else hired labor to clear it for them, and then established medium-sized to large haciendas. In many cases they bought out and consolidated the holdings of a number of small farmers.

These men were basically from two backgrounds: local men who had acquired capital, or men from outside the region. Many were from the State of Zulia originally, and had made their money in the oil industry in the northern part of the state.

In many cases, the men involved were not extremely wealthy. They did, however, have enough money to establish **haciendas** and this gave them prestige that money alone could not buy. Others were wealthy individuals who established haciendas almost as a hobby, and continued to live and work outside the region. The actual operation of the hacienda was left to the mayordomo, or manager who was responsible for the everyday operation of the hacienda.

The impact of these entrepreneurs was important because they had the necessary funds and were educated so that they could understand and take advantage of opportunities to develop their land. For example, often the poor migrant settler could not afford to build a road connecting his farm with the outside, while the entrepreneur could arrange to have the road built, thereby further increasing the value of his own land and also making possible the production of milk and other perishable products.

Members from this group also saw the economic potential for producing, on a large scale, cattle for meat as well as dairy production. It became a profitable business to bring

cattle into the region from the Llanos and then fatten them on the green pastures of the Southern Maracaibo Basin before they were sold to the ever expanding markets of Maracaibo and Caracas. This operation developed particularly well in the piedmont region along the Pan-American Highway where the poor soils and correspondingly poor pasture has made dairy production a less favorable enterprise. Long before the recent change of the region began, cattle had been brought from the Llanos for fattening. However, this was usually done on a small scale. The entrepreneurs saw an opportunity to develop this industry on a large scale. In many cases, farmers engaged in beef fattening also bought land in the Llanos where the cattle were bred and raised. Cattle are now carried by truck over good roads from the Llanos to the fattening pastures of the Southern Maracaibo Basin. Thus, one owner is able to control the entire operation in beef production (personal consultation with P. Moreno, beef rancher, El Vigía).

Another important contribution to development made by the entrepreneur is in the field of improved breeding. The small farmer was lucky to own a few Criollo cattle and could not afford to buy improved cattle nor to run an expensive program of improved breeding. The large-scale private entrepreneur was more likely to have the capital

and the large operation that was necessary to make improved breeding economically feasible. Considerable work has been done in importing Cebu cattle into the region and crossing them with Criollo to produce an animal that is useful for both beef and dairy production. Many of these experiments in cross-breeding different types of cattle have been privately financed. As a result of these programs, nearly all cattle within the region show signs of improved breeding.

Of particular interest as an example of the effectiveness of improved breeding is the herd found on Joaquin Brilliambourg's Hacienda Bolivar. Santa Gertrudis cattle brought from the King Ranch in the United States have been bred with Criollos to produce, after five generations of controlled crossing, an animal which is particularly well suited to the region. It is a good milk as well as beef producer. The Hacienda Bolivar is practically a self-contained farm with its own slaughterhouse, milking parlor and storage tanks, animal hospital and artificial insemination center. Accurate records are kept on each animal. Over 8,000 head of the Santa Gertrudas-Criollo cattle are kept at the hacienda. Of these, approximately 1,500 steers are slaughtered each year. The beef is chilled in the modern slaughterhouse on the hacienda and then shipped by truck each week to be sold at a premium price in the CADA supermarkets in Caracas. In addition to beef production,

6,000 liters of milk are produced daily on the hacienda. This milk is sold to the INDOSA plant in San Carlos where it is bottled and sold as fresh pasteurized milk. The facilities and production methods used on the Hacienda Bolivar are among the most modern and efficient found anywhere in Venezuela. Certainly the Hacienda Bolivar is an atypical example, but it does show what is possible for this area if the money and managerial skill are available. It stands as a monument to its creator (Joaquin Brilliambourg), who, at the age of eighty years, still lives on the hacienda and is active in its operation (La Verdad, dic. 23, 1971, Sec. B, p. 2 and personal consultation with Joaquin Brilliambourg).

The total impact of the entrepreneurs in developing the region is very large. In the early years of development, there was little capital available in the form of agricultural credits. BAP was not actively engaged within the region and INDULAC, while giving credit, was only a limited source of funds. The entrepreneurs, either through the use of private funds, commercial loans, or political influence, managed to bring to the region the necessary capital to bring about change. They also recognized the opportunities to be gained from producing beef cattle, and the increase in production of this important product can largely be attributed to these men. In addition, they

were largely responsible for improving the quality of dairy cattle through improved breeding programs and thus are, to a large extent, responsible for increased milk production. The entrepreneur thus was able to direct both labor (Colombian and Andean migrants) and money to develop the region and, at the same time, he was often able to accrue a small fortune in the process.

AVAILABILITY OF LAND

A final factor which was responsible for catalyzing development within the Southern Maracaibo Basin was the presence of a large amount of free or very cheap land which acted as an incentive drawing people into the region. During the pre-development era, the major part of this region was in uncleared and unoccupied forest. With the clearing of the region from the sourge of malaria, and with the construction of the Pan-American Highway and other roads, this vast reservoir of unused land gradually became available for settlement. People from the overcrowded Andean region rushed into this newly opening area, cleared the forests and founded their small farm sites (Lizarralde, 1959, p. 337). Thus the land was a drawing force that brought settlers into the region.

Land also lured people who were already within the region out from the populated centers (San Carlos-Santa

Bárbara, Encontrados, El Vigía, etc.) and into the developing areas. Some of these natives cleared and founded their own farms while others bought already cleared land.

There was actually such a surplus of land that in the early years of development it was always possible to obtain free land by just moving further into the interior away from the main roads. However, for those with capital, cleared land could be bought very cheaply. This cleared land was often near the main roads and was usually suitable for the immediate production of milk or of beef cattle.

For most of the land involved, neither the original settler nor the newcomer who purchased cleared land ever received any title. Nearly all the unoccupied forest land was owned by the Nation, or by municipalities which had been granted land in their immediate vicinities during the colonial period (MOP, 1965, p. 44). This land is said to be in tierras baldías. This means that it can not be bought or sold and that it is legally impossible for a private individual to receive title to it. However, an individual can receive a right or derecho to any improvements that he makes on the land and he can sell this right to another party. It was this right to the improvements (usually just the clearing of the forest) that the late arriving entrepreneur was usually able to purchase. In effect, the original settler was being paid for the labor he extended

in clearing the land. The price paid per hectare of cleared land varied depending on the quality of the land involved, the extent of clearing, and whether or not the land had been planted in pasture so that it would be available for immediate production. Prices varied from 400 to over 1,000 bolivares per hectare (personal consultation with farmers in the area). In any event, the purchaser received only the derechos or rights to improvements and no title for the land itself.

The prices charged for rights to cleared land were quite low and did not represent a hardship to the entrepreneur. In effect, he was just paying to have the land cleared. An additional expense involved in operating a farm on land that was in baldíos was that each year the farmer had to pay rent to the owner (i.e., the Nation or municipalities involved). Usually, however, this fee was either ignored or was so minimal that it was of little consequence. Thus, the cost for using quite good land was very low and this, in turn, stimulated development.

This system, where land was kept in baldíos, directly encouraged a settler to make improvements on his land. The only way that the value of the land would rise was to make improvements on it. The more land that was cleared, the more money the settler could receive for his farm when he sold it. Thus, land clearing proceeded at a rapid pace, directly encouraged by the baldíos system.

Not all of the land within the region was owned by the Nation or by municipalities. Some private owners had acquired title to their land through ancient land grants, or by buying land that had been granted to the railroads for sale. However, most private land was in an area that had been cleared prior to 1944 and thus was not really involved in the recent development.

Despite the fact that the baldíos system encourages farmers to improve their land, there are certainly some problems involved with it. Perhaps a major problem lies in the field of credit availability. Because the farmer has no title to the land which he is attempting to improve, it has been difficult, if not impossible, to obtain credit from commercial banks. The banks simply do not wish to lend money without collateral, and derechos are not considered as sufficient collateral. This has led to a situation where the small farmer is often unable to make the desired improvements on his farm that would stimulate his production and would directly aid in the development of the entire region. For this reason, it might be argued that the baldíos system has directly hurt the overall development of the region.

On the other hand, the small farmer has often been forced (by declining yields and lack of capital) to sell his derechos to newcomers who have the capital necessary

to make improvements. Thus it might be argued that the baldíos system is actually helping development by forcing the small farmer to sell out. The newcomer or entrepreneur is more likely to put the land into commercial production because he has the necessary capital and know-how. He is less likely to allow the farm to exist on a subsistence basis which is what many small farmers are inclined to do. In this way, the baldíos system and its built-in problem (obtaining credit) may actually be stimulating economic development by forcing the small farmer out of business. However, the small farmer who has been forced off his land and into the position of a day laborer (cf. p. 87) is not likely to be interested in long-term benefits to regional development, and is much more inclined to believe that the lack of credit has retarded rather than helped development. No definitive study has yet been made on this problem.

The Venezuelan government officially states that credit should be made available to small farmers (BAP, 1966, p. 23). BAP is now entering into the region and will provide agricultural credits to farmers despite their lack of land titles. However, this recent interest shown by BAP is too late for many small farmers who have already been forced to sell out because they could not obtain credit.

In any event, the easy availability of land certainly did draw people to the region. The relatively good quality

of the land involved has allowed a rapid rise in production to take place. While many of the people who came into the region looking for land were not able to keep their land, many did remain in the area working as laborers, and thus they have been a force for the transformation that has taken place within the region. Thus it can be readily ascertained that easy land availability was a catalyst which stimulated economic growth within the Southern Maracaibo Basin.

CHAPTER IV: PRESENT CONDITIONS IN THE SOUTHERN MARACAIBO BASIN

Considerable changes have occurred within the Southern Maracaibo Basin since 1944. While the climate has remained hot and wet, man has, through the construction of flood control and highway projects, succeeded in minimizing some of the adverse influences of this natural environment. No longer is it necessary to rely almost exclusively on rivers for transportation within the region. The modern highway net allows a freedom and speed in mobility that were previously impossible to obtain. Likewise, the drainage and flood control projects have opened up thousands of hectares of swamp land to economic exploitation. Perhaps the most significant change that has occurred within the region is that man is now beginning to control his environment. Malaria has, for all practical purposes, been eliminated as a hazard; transportation has been facilitated; flooding has been partially controlled; drainage has been improved, and the entire region has been developed to the point where it now contributes substantially to the Venezuelan economy.

The physical geography of the region is today somewhat different from that found in 1944. While there is no evidence of major climatic changes (there are not enough records available to prove change), there is evidence of physical changes that have occurred. The vast forested area that was present in 1944 has been largely cleared and planted in

pastures or crop production (mostly bananas). This has probably had a micro-effect on the climate and has certainly affected stream runoff and drainage conditions. In some areas, especially in the piedmont and on the Andean slopes south of the region, deforestation has caused runoff to increase, and excess silting has become a major problem on the plain below (personal consultation with J. Kijewsky). This problem has hindered the development of this zone and has limited the potential for crop production.

Deforestation has also resulted in serious soil leaching. Before the forests were cleared, organic matter was continually being added to the soil (from decaying leaves, etc.). Clearing the forests destroyed this major source of organic matter and also exposed the soil to heavy rains. Many soil nutrients were washed out of the soil and thus lost. Throughout most of this newly opened region, after several years of raising crops, production declined and the land was then planted in grasses. This had the effect of slowing down nutrient loss. However, the quality of the soils is now so depleted, that, using present methods, most of the area involved is today unable to support continued crop production. There are pockets, especially in the eastern sector, where, due to differences in parent material and due to better drainage, continued crop production appears to be feasible. It is in these areas that the major production of bananas takes place.

Drainage and flood control within the region have been improved through two sources. MOP has been responsible for several large-scale and very expensive projects (discussed above under government developmental agencies) which have improved production and land quality (especially in the western sector). It is continuing with plans for improving drainage conditions throughout the entire region by 1995 (MOP, 1971b, p. 13). The major diking that has been completed on the east bank of the Río Zulia-Río Catatumbo has opened a large area in the western sector to development. The major drainage projects, also in the western sector, will further increase the amount of usable land. There has also been considerable work done by private individuals to improve drainage. These are usually small scale projects, privately financed and limited to an individual's private farm. An example is the private drainage network on the Hacienda Bolivar where 17 kilometers of primary drainage canal and over 200 kilometers of secondary canals have been completed (personal consultation with J. Brilliambourg). This is probably an extreme case, but nevertheless many other farmers have built at least rudimentary drainage systems to facilitate the removal of excess water from their land and to improve their pastures. In certain banana growing sectors in the eastern part of the region, the effects of these private drainage projects are especially significant. Bananas are by nature a crop which is dependent upon good drainage, and

it is only as a result of the extensive ditching that has taken place (privately financed) that this crop has been able to assume major importance within the region.

A major contribution that was brought about by improved drainage was the increase in productivity of the region's low-lying soils. Before drainage improvements were begun, low areas were periodically inundated and thus useless to economic exploitation. Improved drainage has allowed the planting of nutritive grasses in areas that were formerly swamp and has thus turned much of this former wasteland into livestock producing centers. The two most common grasses planted in the region today are guinea (Panicum Maximum) and para (Panicum Purpurascens). These grasses have more nutrients than do grasses native to the area. Their widespread adoption has resulted in an increase in milk and beef production per hectare that was impossible before their introduction.

While development has both led to, and been the result of, improved drainage within the region, it has also, in some instances, acted as a retardant to better drainage. The Southern Maracaibo Basin slopes from south to north and therefore drainage flow is generally in the same direction. This flow has been held back by the construction of privately built penetration roads running east-west. These roads have been built up so that they can be used during times of heavy rains. However, in many cases (since very little planning

went into their construction), little or no provision was made to provide for drainage under the road. These roads act like dikes across the normal drainage flow and this has resulted in the creation of many swampy areas in land lying immediately to the south of these roads. MOP planners believe that this problem will be solved when the third phase (channelization of tributary streams) of the comprehensive plan for drainage is put into effect. However, it appears that in the immediate future nothing will be done and that certain areas will continue to suffer from an overabundance of water.

Other problems have also developed which have retarded drainage. In many cases, the clearing of the forest was accomplished so rapidly that the farmers involved did not wish to take the time to properly dispose of forest debris. Most trees had no economic value and burning took both time and effort. One of the easiest methods of disposal was simply to pile the branches and debris in low-lying areas or in small streams, both of which were areas unsuitable for production. The net effect of this practice was to create a tangle of refuse in the streams, and this eventually clogged many of them. In effect, small dams were created which offset the improvements that MOP was attempting to create. Drainage in many areas today remains poor because the streams which are supposed to take water off the land are clogged and so, in effect, keep water on the land.

Also, lack of credit availability has limited small farmers in what they can do to improve drainage. It is very expensive to construct even a rudimentary drainage ditch grid. For many years, there has been no adequate source of credit available for the purpose of private drainage ditch construction. Most farmers in the area realize the importance of improving drainage and are genuinely concerned. They feel that they could eliminate the problem of poor drainage (and thus improve production) if they could obtain credit for this purpose (personal consultation with small farmers in the area).

Despite these problems, the net overall effect of man's efforts to improve drainage conditions within the region has been largely successful. Most of the region is much better drained today than it was in 1944. With the continuation of MOP's effort in this field and with increasing availability of credit to private concerns, the amount of land benefiting from improved drainage should continue to rise.

In summarizing changes in the physical geography that have occurred since 1944, it could be stated that the region has changed from a basically forested zone to one that today is largely in pasture. It has changed from a poorly drained and periodically flooded area to one that today is less subject to flooding and is more adequately drained. Where transportation was once extremely limited and difficult, it is now quite easy; and, where man's activities were once greatly impeded by the physical environment, he now has

surmounted many of the obstacles that the environment had placed upon him.

In addition to changes in the physical environment, the region has also experienced social changes. Obvious manifestations of this change are found by looking at the physical growth that has occurred both in population and in public facilities. While in 1944, man was largely limited to a few small towns and scattered settlements along the rivers and railroads, today man is settled throughout most of the region. Towns which were small and backward in 1944, are today larger and more modern, and are actively pursuing growth and development.

Perhaps the most noticeable improvements can be found by examining the growth in transportation facilities. Although there were no roads in the entire region in 1944, today there is an extensive grid which makes transport easy to points both within the region and outside of it (cf. Map F, p. 66).

The growth and importance of the region can also be seen by examining changes that have taken place with respect to air travel. The Santa Bárbara airport, which in 1944 was but a muddy landing strip with no scheduled service, is today a modern facility with an asphalt runway and scheduled daily passenger service to Maracaibo. Airstrips are also in operation at Encontrados and El Vigía but these do not offer scheduled passenger service.

The region has also experienced a growth in services which are available to its inhabitants. Daily mail service is available in Encontrados, San Carlos-Santa Bárbara, Santa Cruz, El Vigía, and Coloncito. Also available are telegraph and radio-telephone service between these cities and the rest of the nation, and telephone service within San Carlos-Santa Bárbara and El Vigía. This telephone service is also connected with the rest of the country but it is often a difficult and time-consuming chore to attempt a long distance call.

Running water has been made available to most urban centers in the region. This has been done largely at the insistence and with the help of the SAS through its División de Acueductos Rurales del Ministerio de Sanidad (MOP, 1965, p. 89).

Sewers have been constructed only in San Carlos-Santa Bárbara and in El Vigía. The sewage system at San Carlos-Santa Bárbara dumps its untreated wastes into the Río Escalante, and the El Vigía system dumps into the Río Chama. The San Carlos-Santa Bárbara sewage system has been functioning since 1964, while that of El Vigía is still under construction and is only partially in use. Despite the lack of sewers throughout much of the region, indoor plumbing is not uncommon since many of the houses have private septic tanks. However, in low-lying areas, this has often

resulted in the contamination of the domestic water supply, and this helps explain the high rate of intestinal disorders found within the region. Thus, sewage construction is a high priority item for the future.

Consumption of electric power has also grown rapidly in recent years. In 1949 (the only early date for which figures are available), San Carlos-Santa Bárbara, Santa Cruz, Encontrados and El Vigía were the only cities within the region that had electric generating plants. These plants were of small capacity and provided limited electricity to the immediate surrounding area (Vila, 1952, p. 258). By 1965, the number and capacity of electric generating plants within the region had grown considerably. The production of the San Carlos-Santa Bárbara plant had increased from 383,000 kilowatt-hours per year (Vila, 1952, p. 258) to 5,480,388 kilowatt-hours per year (MOP, 1965, p. 90). Other plants within the region also experienced similar growth. In addition, small generating plants were installed to supply Puerto Concha, Puerto Chama, Valderramas and El Guayabo. Also Coloncito and some rural areas in the southwestern sector receive electric power from a large plant built just outside the region at La Fría.

Most of the electric plants are diesel powered, and use cheap oil that is piped into the region from the oil producing north. La Compañía Anónima de Administración y

Fomento Eléctrico (CADAFE) is responsible for maintaining most municipal electric plants within the region. However, some large private plants do exist, notably the ones at the Santa Bárbara INDULAC plant and on the Hacienda Bolivar.

There has, as yet, been no concentrated effort to supply rural areas with electricity. Some individual farms do have their own small electric generators, and the Hacienda Bolivar has a large diesel plant. When dams are completed on the Río Chama, Río Onía and Río Escalante, there will be a tremendous increase in the amount of power produced within the region. Much of this power will be sold within the southern Maracaibo Basin and it is believed that the rural areas will then benefit.

The region has also undergone a tremendous growth in the number of schools and other public facilities available. Each important urban area now has both primary and secondary schools, and most rural centers have primary schools. This represents a tremendous growth in educational facilities since 1944 (MOP, 1965, p. 92). It is now physically possible for all students within the region to comply with the Venezuelan compulsory education law and receive at least a sixth grade education. Although schools are available, a limiting factor in many cases is that a child is sometimes forced by his parents to leave school and to work to help support the family.

The SAS has also made progress in constructing hospitals and dispensaries. In 1965, there were thirteen SAS funded medical centers and two private clinics located throughout the region. While this is a tremendous increase in available medical facilities, most of this growth has occurred in urban areas. Medical facilities and care are still woefully inadequate throughout the rural areas, despite the concerned effort to establish rural dispensaries (MOP, 1965, p. 92).

There has been considerable industrial growth within the region since 1944. The most spectacular growth has been in the milk processing industry where five plants have been built and are now functioning (three INDULAC plants, INDOSA, and KRAFT). These plants provide employment for many people within the region and also provide markets for milk producers.

Other important industries which have developed within the region since 1944 and are now important include a beef slaughterhouse at El Vigía, a small fishing industry at Encontrados and Santa Bárbara, and a lumbering industry near La Fría.

The slaughterhouse at El Vigía provides jobs for local people and a market for beef cattle from throughout the region (Corporación Venezolano de Fomento, 1968, p. 11). Actually, this slaughterhouse handles only a very small

percentage of the total beef cattle produced within the region. Most of the cattle, especially the better quality animals, are shipped live, by truck, to Maracaibo, Maracay, or Caracas where slaughtering takes place. Only old cows, and other poor quality animals to be used for local consumption, are slaughtered at the El Vigía plant.

There are two other slaughterhouses located outside the region (but in close proximity to it) which handle cattle produced within the Southern Maracaibo Basin. These plants are located in La Fría and in Caja Seca. They, like the plant in El Vigía, are primarily involved in the slaughter of low quality beef for sale in local markets. They are important locally, but do not process a large percentage of the region's total beef production. In addition, there is a small but very modern slaughterhouse and refrigeration plant on the Hacienda Bolivar which processes thirty very high quality animals each week. This meat is then chilled and shipped by truck to markets in Caracas.

The fishing industry has also expanded significantly since 1944. At that time, the fishing industry was limited by the lack of fast access to markets. Lack of refrigeration facilities, coupled with slow transportation, made it impossible to ship fresh fish to markets outside the region. The industry was largely limited to selling for local consumption.

Today, this has all changed. The Ríos Catatumbo, Escalante, and Chama, and the southern part of Lake Maracaibo offer excellent fishing. Most fishermen own only a canoe or a small launch which they use to net several varieties of fish (mostly bocachico and manamana). These fishermen sell their catch each day to a local fish buyer who has refrigerated trucks in which to take the local catch to markets outside the region. In 1964, over 2.5 million kilos of fresh fish from the region, with a market value of over 2 million bolivares, were sold (MOP, 1965, p. 133). While no more recent figures are available, the total value of production is substantially higher today than at any previous time (personal consultation with local fishermen). This is largely because today nearly all fish are sold fresh and are immediately refrigerated. In the past, many fish were dried and salted which lowered their quality and value.

Lumbering is an industry that, while still economically significant in the region, is gradually decreasing in importance. It developed first in the areas near the railroads, and then gradually spread outward into new areas where clearing was taking place. The forests of the Southern Maracaibo Basin were never really very good for lumber production. There were many species of trees, but most were not useful for commercial purposes. The few valuable species that existed were often quite scattered and thus

difficult to harvest economically. Despite difficulties, many of the more valuable species (mahogany, for example) were cut and transported to portable sawmills which were built in the newly cleared areas. Today, nearly all local sawmills have been shut down, since most of the forest has been cleared. The lumbering industry is confined to a small area in the southwest sector of the region which has not yet been cleared. Most of the logs now cut are sent by truck to a sawmill in San Cristobal (MOP, 1965, p. 132). In a few years, when all of the land within the region has been entirely cleared, lumbering will cease.

In addition to these major industries, there are many small industries which are today active within the region. Many of these employ only family members or a very few paid employees. They include food processing, shoe and clothing manufacturing, furniture making, printing, construction of building materials, repair shops and other small industries.

The economic census of 1964 credited the region with 126 industrial establishments which accounted for a total industrial production worth 82,124,115 bolivares ($18,880,000) (MOP, 1965, p. 135). The continued development of the region since that date makes it almost certain that today these figures would be even higher.

In addition to these industries, the growth of motor transport companies has also been vital to the development

of the region. Basically, two types of motor transport companies are operating: those that are primarily concerned with transport between points inside the region, and those concerned with hauling products produced within the region to outside markets.

Motor transport was not important in the Southern Maracaibo Basin in 1944 because there were no roads. Since then, the tremendous program of road construction has led to a situation where today, trucks have become the most economical and widely used method for transporting cargo. The resulting growth of trucking companies directly led to the decline in use and the eventual abandonment of railroads. Many small transport companies were started for the primary purpose of hauling agricultural products (mostly bananas and milk) to market. These were usually very small operations with only one or two trucks, and operated almost exclusively within the region. In addition, several larger companies were founded which hauled products produced within the region (beef cattle, powdered milk, bananas, and other agricultural products) to outside markets.

Today, motor transport is a vital and growing business within the region. It has replaced rail transport and surpassed river transport in importance. In 1964, approximately forty per cent of all vehicles using the highways within the region were cargo carrying trucks (MOP, 1965, p. 148).

This figure is indicative of the importance that motor transport has attained in the Southern Maracaibo Basin.

In addition to the increase in the number of industries and services, the Southern Maracaibo Basin also experienced a dramatic growth in population. This growth was both a cause and a result of development. While the accuracy of population statistics and projections is subject to question, there can be no doubt that this region did experience a tremendous growth. See Table E.

TABLE E* - Population in the Southern Maracaibo Basin

Year	Population
1941	43,000
1950	54,532
1961	112,922
1970	158,955 (estimated)

*MOP, 1965, p. 67, and MOP, 1971a, p. 8.

The 1970 figure is only an estimate but it appears that during the time in question the region has more than tripled in population.

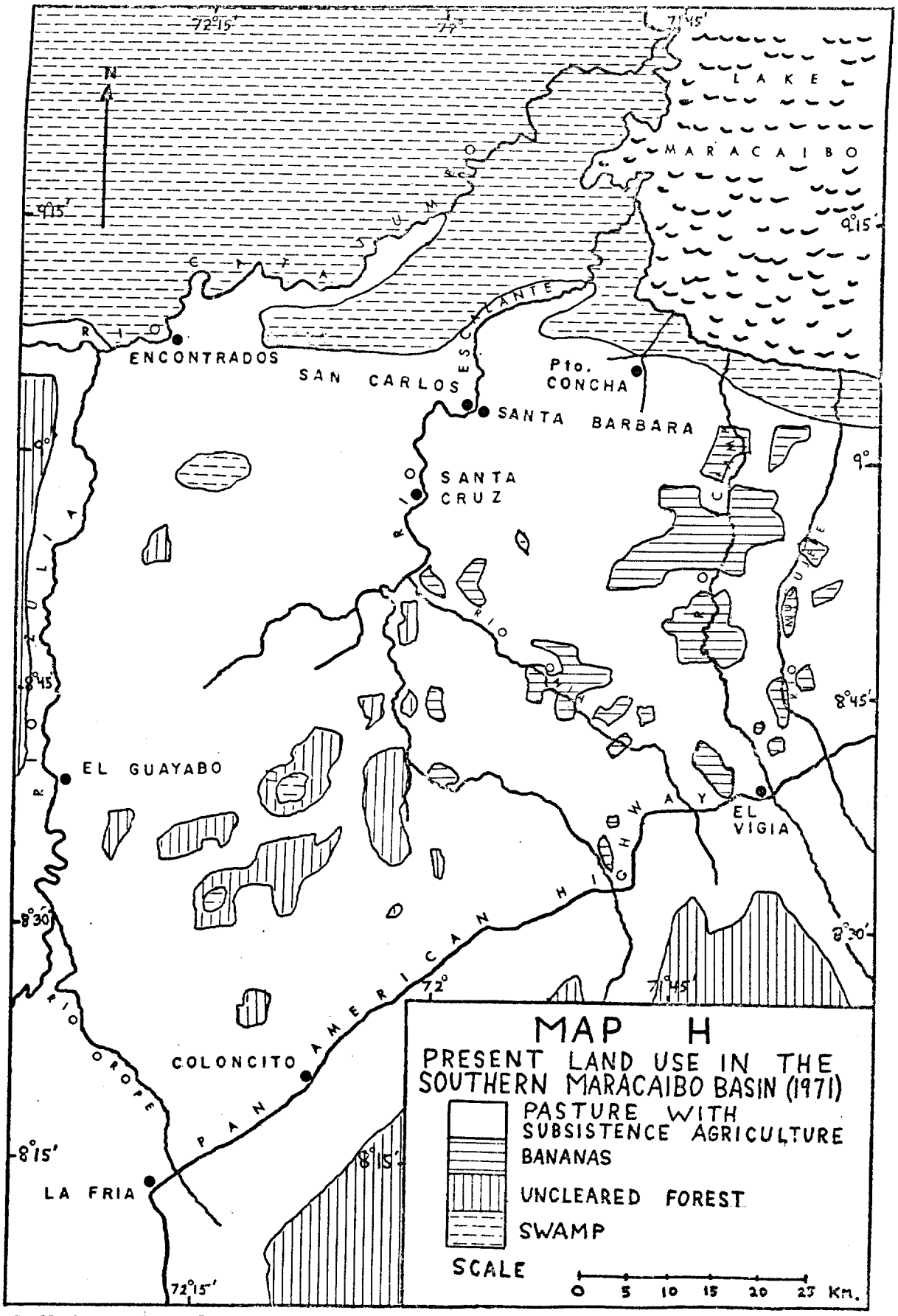
Much of this population growth is explained by rapid migration into the region. Many adult males left their families behind when they moved into the region looking for work. This resulted in a large male population (a characteristic common of rapidly developing areas where population growth is largely the result of migration). The 1961 census showed that in the Southern Maracaibo Basin males out-numbered

females by a ratio of 56.9 per cent to 43.1 per cent (MOP, 1965, p. 69). The 1961 census also showed a large rural population of over 69,000. This is a total greater than that counted for the entire region prior to 1944 (MOP, 1965, p. 73). These figures are an indication of the rapid growth which has taken place in the rural areas since that time.

Pre-1961 census data for the region are subject to question and this makes growth comparisons quite difficult. However, it can be assumed that the region did undergo a dramatic growth in population in both rural and urban areas. The most startling urban growth has taken place at San Carlos-Santa Bárbara and at El Vigía. Rural growth appears to be more uniform; only the small uncleared region in the southwestern sector and the swampy area north of the Encontrados-San Carlos Highway are still largely uninhabited.

The amount of land in economic production has also greatly increased since 1944. Map H (p. 119) is a land use map prepared from a 1971 MOP land use survey. When it is compared to the 1952 land use map (Map D, p. 26), it is obvious that there has been a rapid increase in the amount of land that has been put into production. Map H also clearly illustrates the drastic decrease in the amount of land left in uncut forest.

The Southern Maracaibo Basin today is almost entirely in banana and cattle production. Sugar cane has been



SOURCE: MOP land use map for the Southern Maracaibo Basin, 1971. Scale - 1:250,000.

entirely phased out of production and is no longer produced within the region. There is some limited production of cacao, African palm, and vegetable crops. However, bananas account for approximately seventy per cent (16,364 hectares) of the total land in crop production, and eight per cent (36 million bolivares per year) of the annual value of crop production (MOP, 1971a, p. 22). Approximately eighty-eight per cent of all bananas produced are of the cooking variety (Venturini, 1968, p. 92). The other twelve per cent (locally known as cambures) are the common eating banana. Most bananas are exported from the region and are consumed throughout Venezuela. Recently, cooking bananas have been exported to the United States also, where they are a popular food among people with Latin backgrounds. The major markets have been in Miami (where there is a large Cuban population) and in New York (with its Puerto Rican districts).

Banana production is actively encouraged by MAC through its Programa de Fruticultura, and it is projected that with improved drainage, production will eventually be expanded to 46,750 hectares with an annual worth of nearly 165,000,000 bolivares (MOP, 1971a, p. ii). Although present production is considerably below this figure, it still represents a sizable agricultural industry for the Southern Maracaibo Basin.

Production of bananas takes place primarily on small individually owned farms of five hectares or less (Venturini,

1968, p. 92) (although there is a small number of larger farms near the Río Chama which do produce bananas commercially The small farmers have joined together into several cooperatives which handle the marketing of the product. Map H (p. 118) illustrates how almost all banana production takes place east of the Río Escalante where there is better drainage and more sandy soils. Farmers west of the Río Escalante may have a few bananas planted for home consumption but most do not produce them as a commercial enterprise.

The total area in crop-farming is only four per cent of the surface area of the Southern Maracaibo Basin, or less than 30,000 hectares. Yet, bananas account for nearly seventeen per cent of the value of the combined agricultural and livestock production of the region. It is possible for a farmer to make, annually, over 1,000 bolivares per hectare for land planted in bananas. This is four to six times the amount that could be made per hectare with livestock production (personal consultation with J. Kijewsky). However, there is also a much greater risk involved. Approximately once every three years the entire crop is destroyed by windstorms. There are also problems with disease, laborers, prices, etc. Those farmers who own enough land to make a good living from livestock production usually prefer to do so, rather than take the risks involved with bananas. This is a partial explanation for why bananas are most commonly

produced on very small farms. It is also a sign that perhaps MAC's plans to increase banana production will not be successful. It will be very difficult to convince additional large landowners to take the risks involved in banana production.

Nearly all larger landholders and many small ones are engaged in livestock production. Most are primarily involved with milk production; the sale of milk accounts for sixty-five per cent of the annual value of livestock production, or about 106,000,000 bolivares per year (MOP, 1971a, p. i). Beef production accounts for approximately 59,000,000 bolivares per year (MOP, 1971a, p. i).

The total amount of land devoted to livestock production is considerable. Table F gives a breakdown of land within the Southern Maracaibo Basin according to its uses (1968 MOP estimates).

TABLE F* - Land Use for the Southern Maracaibo Basin (in hectares and its percentage of total land)

Use	Area (hectares)	Percentage
crop-farming	26,707	4%
artificial pasture	311,419	48%
low quality pasture	154,459	24%
forests	42,179	7%
swamps	113,549	17%
Total:	648,313	100%

*MOP, 1971a, p. 12.

Approximately seventy-two per cent of the land is in pasture. It is obvious that the value produced per hectare of pasture

is much lower than that produced by crop-farming. In most cases, the quality of pasture is such that each hectare can support only one animal or less. Pastures in the eastern sector, which are better drained and are on better soil, support up to two animals per hectare, but areas in the western sector where drainage is still a problem support only 1/4 animal per hectare.

Despite less income per unit area, the farmers involved are not anxious to begin crop-farming because livestock production carries very little risk. Prices for milk are steadily increasing and windstorms are not a serious threat.

Most dairy producers sell their milk to the five processing plants operating within the region, but there are some who sell to the pasteurizing plants at La Fría and Caja Seca. However, most dairy farms also receive a percentage of their income from beef production. The male calves (except those saved for breeding purposes) are sold for meat. Some farms raise these calves to maturity, while others (primarily smaller farms) sell them at a young age to ranchers who are primarily concerned with fattening beef cattle. Old dairy cows are also sold for beef after their milk production declines. Only certain of the larger haciendas (such as the Hacienda Bolivar) have well-coordinated programs for both dairy and beef production.

There are also some rachers who are engaged exclusively in beef production. Their haciendas are concentrated on

the poorer soils in the southern and eastern sectors of the region. There are several large haciendas in these zones which still import Llanos cattle for fattening. These ranches produce low quality beef for sale in Caracas and Maracaibo.

There are no accurate figures for total beef production in the area. Most beef cattle are shipped live, by truck, to markets outside the region, thus making local slaughter-house figures inaccurate as a guide to total production. MAC estimates that the region produced 67,390 head of beef cattle in 1968 (MOP, 1971a, p. 32). This estimate is probably well below actual production since many farmers do not report accurately to MAC census takers. In any event, the fact that the total value of beef production was considerable, illustrates that the Southern Maracaibo Basin has developed into an important beef producing region of Venezuela.

Before concluding this section on present day conditions within the Southern Maracaibo Basin, it is appropriate that the size of land holdings be examined. Most farms are quite small, less than fifty hectares. However, over ninety per cent of the land is held in holdings of greater than fifty hectares. Table G shows the number of farms of different sizes and the percentages of land involved in each case (from a sample of 4,160 farms in 1965).

TABLE G* - Distribution of Land in the Southern Maracaibo Basin (by farm size)

Farm Size (in hectares)	Number of Farms	Percentage of Total Farms	Total Area (in hectares)	Percentage of Total Area
less than 10	767	18.4%	4,033	.8%
11-50	1,598	38.4%	42,166	8.8%
51-200	1,259	30.3%	129,416	27.0%
201-500	370	8.9%	113,935	23.8%
more than 500	166	4.0%	190,179	39.6%
	4,160	100.0%	479,729	100.0%

*MOP, 1971a, p. 14.

It is obvious that a small percentage of landholders control most of the land in the Southern Maracaibo Basin. Many of these large landholders are the entrepreneurs who moved in while the area was being cleared and bought up the rights of many of the early settlers. Today, this land is largely in livestock production.

It is my belief that the present plans for the region (formulated by MOP, MAC, and the other government developmental agencies) to convert large portions of this land (presently in livestock) into crop-farming will ultimately fail, because the large landholders who control most of the region are unwilling to take the risks that are involved. Unless legislation is passed requiring landholders to put a percentage of their holdings into crops, or unless major land reform takes place, the Southern Maracaibo Basin will most likely continue to grow as a center of livestock and milk production.

CHAPTER V: CONCLUSION

The Southern Maracaibo Basin has definitely undergone a rapid transformation since 1944. A large area that had been undeveloped forest has now been cleared and has been largely put into livestock production. The better quality land in the eastern sector (east of the Río Escalante) that was in sugar cane or forest has also undergone a change in use, so that today this sector has become a primary banana producing region in Venezuela.

The Southern Maracaibo Basin has also undergone a dramatic growth in population. Small cities have grown up from what were once small towns and other small towns have come into existence. Industries have developed in an area that was largely an economic vacuum prior to 1944. Trade has expanded, both within the region and to points outside of it. The value of goods and services produced within the region has multiplied many times. In short, the region has evolved from an underdeveloped and largely ignored backwater, into a developing and prosperous center.

That this change occurred in a region with the physical handicaps of the Southern Maracaibo Basin is remarkable. That it occurred over such a very short period of time is even more startling. Man's ingenuity and labor have largely overcome the physical limitations of the environment (frequent flooding, malaria, difficulties in transportation,

etc.). The Southern Maracaibo Basin today is an example of what man can achieve through the development of a seemingly inhospitable region.

The remarkable development that has occurred here can be largely credited to the impact of six dynamic factors operating within the region. These factors (the introduction of milk processing plants, road construction, malaria control, government developmental agencies and/or programs, the in-migration of settlers and entrepreneurs, and the availability of land) are directly responsible for catalyzing and guiding most of the development that has occurred.

It is impossible to place an absolute value on the impact of any one of the factors involved. Probably the single most important factor was INDULAC, since it was the construction of the first INDULAC plant at Santa Barbara that initiated interest in the development of the region. However, it was a combination of all of the dynamic factors, interacting together, which led to the change that is clearly noticeable today.

It is unlikely that a different region in another part of the world could be transformed in the same way as was the Southern Maracaibo Basin. It would be impossible to duplicate the situation which existed there in 1944. Thus, the change that occurred there should not be taken as a model for development elsewhere. However, the sequence of change

(small farmers cut down the forest, and then are replaced by entrepreneurs with capital who consolidate small holdings and introduce a livestock economy) is repeated in many lowland forested areas of Latin America. Thus, some of the changes that occurred within the Southern Maracaibo Basin are also occurring in other parts of Latin America. For this reason, a study of the Southern Maracaibo Basin is valuable in understanding change that has occurred elsewhere.

The Southern Maracaibo Basin is an example of an area whose physical environment made it seem an unlikely place for successful large-scale economic production. Nonetheless, economic growth did occur over the last twenty-five years due to a combination of factors (six in particular) brought about by the technology, capital, and efforts of man.

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12. Dr. Eddy Rivas, from IAN, Caracas.
13. A. Spinac, Supervisor of the INDULAC plant, Santa Bárbara.
14. Dr. Henry S. Sterling, Professor of Geography, University of Wisconsin, Madison.
15. A. Subijaga, Manager of the KRAFT plant, San Carlos.

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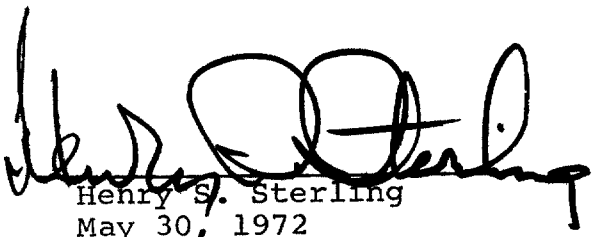
Approved 

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May 30, 1972
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