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CHAPTER I
INTRODUCTION

Why Don't You Work Like Other Men Do?

This study analyses the factors involved in maintaining a high level of labor instability on sugar plantations in the Cauca Valley of Colombia. Sugar cane can be and is planted and harvested year-round in the Cauca Valley and the regional sugar industry therefore has an approximately stable labor requirement throughout the year. This pattern is in distinction to present *zafra* (seasonal harvest) sugar industries which now harvest for five months or less in a year and often evidence a high degree of seasonal unemployment and labor migration. Certain writers hold that sugar industries with a year-round harvest find it desirable to maintain a stable, relatively permanent labor force. The present work demonstrates that despite relatively stable year-round labor requirements for the Cauca Valley sugar industry as a whole cane workers there (particularly harvest workers) show a high degree of job mobility and employment instability. The major reason for the high labor instability among Cauca Valley cane workers stems from the fact that the component units of the industry go in and out of production throughout the year. This fluctuation is most noticeable for the host of independent, medium-sized colono farms which supply an increasing proportion of the cane ground in sugar mills. Colono farms do harvest throughout the year but only for periods of approximately two out of every five months.

The study demonstrates that differential mechanization of cane agriculture has concentrated the largest proportion of the labor force in the harvesting phase. This, in conjunction with the increasing use of colono cane farms (with their pattern of short-term, periodic harvests), tends to increase the degree of employment instability among cane workers. Labor instability is further raised by the increased use made of labor contractors who hire workers on a short-term basis for all phases of cane agriculture. One of the reasons that employment is so unstable on colono farms is that a permanent labor force is not desired by many producers, since this tends to increase the probability of and the strength of labor unions and generally requires the provision of higher wages and benefits than are paid to transitory workers.

1.
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Although this study deals in main with specifics of the Cauca Valley sugar industry, it is intended to be relevant to plantation studies in general. The problem raised by the labor patterns in the Cauca Valley sugar industry can best be posed by first briefly considering certain central features in extant analyses of plantation labor. Late 19th century and contemporary sugar cane industries have provided the proto-type for anthropological studies of plantation agriculture and society. Many studies indicate a general pattern of concentration of land and capital, the generation of a rural proletariat and an increasing amount of seasonal unemployment on modern sugar cane plantations (Mintz, 1956; Wolf and Mintz, 1957; Hutchinson, 1957; Padilla, 1956). But the economic and social patterns described as the "plantation type" may be less uniform than is presently recognized. Probably the most influential studies of contemporary sugar plantations and related cultural phenomena come from Puerto Rico, Northeastern Brazil, Cuba, and the Caribbean in general (Mintz, 1956; Padilla, 1956; Hutchinson, 1957; Handler, 1965; Guerra y Sanchez, 1964). All of these deal with sugar plantations in areas where a seasonal harvest (zafra) of sugar cane exists. The question arises to what extent the high level of seasonal and sporadic unemployment, labor migration, and the social phenomena reported as concomitants of sugar plantation labor are more directly related to the seasonal fluctuations in labor requirements associated with zafra sugar industries.

One recent anthropological study has questioned the applicability of the characteristics of zafra sugar plantations for plantations operating under different ecological conditions (Miller, 1964). Miller holds that major differences in labor utilization exist between zafra sugar regions and the pattern he observed on the Peruvian sugar plantations. He holds that the differences are attributable to the fact that ecological conditions in Peru create a year-round harvest and thereby make a permanent labor force desirable. He holds that:

The differences between Wolf and Mintz' general analysis of the plantation and the evidence for Peru may, to a large extent, be attributed to a specific national adaptation. In Peru sugar cane is harvested ten months of the year owing to the climate and the high fertility of the soil. Ideally, therefore, a permanent, stable labor force is desirable. The harvest season of sugar producing countries in other parts of Latin America is considerably shorter. Migratory workers may supply enough labor in these countries to render unnecessary mechanisms for attracting labor. (Miller, 1964:21-22)
Yet the permanent, stable labor force which supposedly was "desirable" for the year-round Peruvian industry has only recently materialized. Miller shows that a high degree of labor instability existed on the Peruvian sugar plantations until a combination of labor oversupply and tightened unionization made jobs per se valuable.

The dramatic nature of the *zafra* and the related seasonal unemployment is such that it has easily led to superficial conclusions about the causes and consequences of this pattern. Massive seasonal fluctuations in labor requirements are not inherent in sugar cane production, either in Peru, in the Cauca Valley, or in regions which presently maintain a *zafra* system. While there are climatic and agronomic reasons why cane provides maximum sucrose yield only during a limited season in many reasons, these ecological features are only some of the many factors which determine the economic profitability of harvesting cane during a limited length of time.

To a considerable extent, *zafra* labor patterns appear to be a relatively recent phenomenon in many New World sugar plantations, extending back no more than a hundred years in some industries. Studies of the Cuban, Louisiana and Caribbean sugar industries indicate that these regions, which are extreme cases of the *zafra* pattern today, once maintained a more balanced year-round operation with much more stable levels of employment. Before the mid-nineteenth century the non-harvest phases of cane growing in many of the present *zafra* industries absorbed approximately the same amount of labor as the harvest activity. (While these findings are not emphasized, documentation is found throughout Sitterson, 1953; Ely, 1963; Fraginals, 1964; and Beachey, 1957.) One of the most important changes that led to the development of a *zafra* pattern in the Caribbean sugar plantations was the differential "mechanization" of field tasks. Nearly a century ago the more advanced sectors of the sugar industry were replacing hoe cultivation by the extensive use of cultivating plows and other animal drawn implements. But manual harvesting was retained until recent years. This process of differential mechanization increased the proportion of workers employed in the harvest phase. Independently, the duration of the harvest phase itself was steadily decreased with the introduction of the high capacity, steam-powered mills which spread throughout these sugar producing areas during the latter half of the nineteenth century. Such mills ground the economically available cane in a shorter time than their predecessors. The seasonal nature of labor requirements in *zafra* industries has been increased with the introduction of tractors and other labor saving devices in the land preparation and cultivation phases since the early
The heavy equipment used in land preparation and the rapid spread of herbicides in the cultivation phase during the last two decades have, along with relatively unchanged use of manual harvesting, created the intense seasonal fluctuations in labor demands.

In the short run, the pattern of labor utilization flows from the technological and agronomic practices in effect at a given time. But the use of one set of techno-agronomic practices rather than another must itself be explained. To a large extent the explanation derives from differing conditions of economic profitability. In the case in point, the contemporary demand for large numbers of seasonal harvest workers in zafra industries can be circumvented by matching mechanization of the cultivation phases with mechanized harvesting. Mechanization of the harvest has not followed mechanized cultivation in most sugar cane areas even though this was technologically practicable by the early 1930's (Hawaii, Florida, and Australia are the major areas where cane is mechanically harvested). The low wages general throughout most of the sugar plantation areas have been an important factor allowing for the continuance of a manual harvest. Wage levels are dependent upon such factors as unionization in the industry, the general level of wages and the degree of employment in the region as a whole. Ultimately, questions of government labor policy, the political effectiveness of regional labor representatives, market prices for sugar and factors yet more removed from local ecology and technology enter into calculations of what is the most profitable allocation of men, money and machines in any given sugar industry.  

Many socio-political factors ultimately enter into the determination of economic profitability. It is misleading to treat such factors as purely technological or agricultural. It is useless to try to understand or solve them by the application of narrowly technical expertise.

What of sugar plantations and labor patterns in the Cauca Valley? The general consensus is that special environmental conditions foster cane and sugar production in the Cauca Valley on a year-round basis and provides steady, stable employment (Fadul and Peñalosa, 1961; Manual Azucarero de Colombia, 1964). One study in particular stresses that the expansion of sugar centrales there will circumvent the seasonal unemployment, internal labor migration and general social instability associated with regions having a seasonal harvest.

Unlike the case of the great majority of sugar producing countries, cyclical or seasonal employment does not exist in the Colombian sugar industry. The fact that the operative conditions permit milling
throughout all the year results in employment being maintained at constant levels in a more or less permanent form. (Padul and Peñalosa, 1961:23)

Most sugar centræles in the Cauca Valley mill and harvest cane throughout the year. The operations of the largest plantations show that steady, year-round employment is possible in the industry. Mechanization has been concentrated in only certain phases of cane agriculture. Labor-saving implements are mainly utilized in the planting, cultivating and other non-harvest tasks, while cutting and loading cane remain essentially unmechanized. An increasing proportion of the total agricultural labor is employed in the harvest. This is an historic trend beginning about fifty years ago, given primary impetus with the introduction of tractors in the late 1930's, and recently come into its own by the use of heavy field machinery and chemical weedkillers.

On Cauca Valley centræles, harvesting proceeds throughout most of the year - as long as the mill continues to grind. The size of the labor force required throughout the year is relatively stable. But the many colono farms which supply cane to the centræles do not operate on a steady level throughout the year. Their harvests are concentrated, of fairly short duration and offer only periodic employment for cane cutters and loaders. Such harvest workers now constitute the largest component of the labor force in the sugar industry. The cane grown on colono farms is now harvested mainly through labor contractors whose workers must find employment elsewhere when the mature cane on any one farm has been cut. Colonos avoid payment of most of the costly social security benefits stipulated by the national law and have effectively flouted or circumvented many of the legal provisions which protect unionization. Colono farms have proved to be virtually unorganizable by labor unions to date. Not surprisingly, they maintain wage scales considerably lower than those which obtain on the centræles.

In many sugar producing areas the growth of modern centræles has led to the absorption of most independent cane farms into the structure of corporate plantations. But in the Cauca Valley, the growth of centræles and the expansion of sugar production since the mid-1950's has seen the rise of a large number of colono cane supplier farms. They have spread in response to the growth of centræles. During the mid-1950's colonos provided no more than 10 to 15% of the cane ground by centræles but by 1964 they accounted for approximately 60% of all central processed cane. Between 1964 and 1966 this proportion continued to expand. Moreover, there is an increased use of rented land by centræles, where labor conditions much like those on colono farms obtain. These developments plus the rising proportion of workers engaged in the harvesting phases portend increasing labor instability in the Cauca Valley sugar industry.
Cane can be planted and harvested throughout the year in the Cauca Valley. But neither seasonal nor year-round harvesting is correctly explained by purely techno-environmental factors. The present study argues that the growth of the Cauca Valley sugar industry has retained and encouraged a pattern of short-term, periodic employment and internal labor migration. It analyzes the technological changes which have shifted an increased proportion of the labor force into the harvest phases of cane growing. It will argue that a large permanent labor force is not desired by many sectors of the industry since this increases the effectiveness of labor unions, and generally requires the payment of higher wages and social security benefits than are paid to transitory labor gangs.

So much for an outline of the problem. Let us next consider some of the basic features of plantations as a context for the Cauca Valley sugar producers. Following a brief introduction to the Cauca Valley itself and the field work, we may begin a documentation of arguments mentioned above.

**Plantations and the Cauca Valley Sugar Producers**

Greaves (1959) has pointed out that "plantation" has been used to designate an impossibly wide range of agricultural systems, from early West Indian "family-sized farms with delusions of grandeur" to the vast, highly mechanized cane growing factories of contemporary Hawaii. Similarly, Chardon, in an introduction which attempted to place his study of a Yucatan henequen area into the context of earlier plantation studies, says that

> The plantation, perhaps more than any other type of agricultural unit, has always eluded attempts at precise definition that would apply to all areas of the world...

> ...Part of the difficulty in defining the plantation lies in the fact that the concept has changed over time. (Chardon, 1961:2, 3)

The historically precedent use of "plantation" was linked with colonization. "A plantation" originally denoted a colony, not merely its agricultural organization. More particularly it was a colony whose main purposes were to provide a profit for those who supplied the financial backing. This denotation of "plantation" was current during the first British settlement of the New World but had been applied even earlier in the military occupation of sections of Ireland and Scotland by private companies under charter of James I (MacLeod, 1967).
Many of the "classic" plantation crops (sugar, coffee, cacao, tea, sisal, oil palm, bananas, pineapple, rubber, cotton and other more exotic crops) are essentially tropical and sub-tropical. But it would be a mistake to hold that plantations developed throughout tropic and semi-tropic colonial areas because these were frequently regions in which it was possible to grow crops not economically produced in Europe or other temperate regions. Neither specific crops nor tropical or sub-tropical environment are a necessary or a sufficient condition for extensive plantation agriculture. Plantation-like systems, in a wide range of environments, have been used to grow most of the major staple crops produced in the world today. These include the rye and potatoes grown on the Pomeranian and Baltic Junker estates, the historic wheat latifundia of Sicily, and (what might seem to be a pre-eminently small holder crop) the fruit and vegetable canny farms of California.

Thompson suggests a combination of "metropolitan" and "transportation" factors (see Mikesell, 1960) to explain the general location of plantation areas in relation to the regions of demand.

Western Europe, especially England, was the dominant consuming, manufacturing and marketing area of the world community at the time of the European settlement of the New World. Belts of plantations producing various staples developed at favorable places along a frontier describing a concentric circle around this central area, a circle measured in terms of cost distance. Along the eastern segment of this circle, east of the Elbe river in Germany, there appeared large plantation-like estates. To the west and south-west, along a segment accessible to the cheap transportation offered by the Atlantic Ocean, the Caribbean and the Gulf of Mexico there developed belts of classical plantation systems. (Thompson, 1959:30)

Such "concentric circles" of plantations began also to feed into the northeastern seaboard of the United States as urbanization and industrialization became established there in the nineteenth century. In the late nineteenth century, new transport technology (particularly steamship fleets and extensive rail systems) lowered the cost of shipping and greatly broadened the range of plantation areas. A dramatic instance of this process is mentioned by Strickon (1965:235) who holds that the development of the refrigerator ship in 1879 opened the European market to Argentine beef and fostered the rise of "cattle plantations" in Argentina.
8.

Similarly, McWilliams (1939:61) mentions how in 1888 the refrigerated boxcar opened the eastern U.S. market to fresh fruit and vegetables from California, thereby stimulating the rise of highly capitalized, irrigated fruit and vegetable farms there.

One characterization of plantations emphasizes the extreme rationalization of the factors of production to obtain the highest possible profit consonant with the amount of capital invested. (Such rationalization and capitalization are seen to be in conjunction with large scale farms growing a staple cash crop which is usually for export.) The plantation is then essentially a large scale, highly capitalized farm growing a commercial crop. According to this view all other features are secondary. A variant of this view suggests that it may be useful to distinguish plantations which are characterized by the combination of agricultural and industrial operations, from purely agricultural units regardless of their size, crop or labor pattern. This consideration might more usefully be used as a distinction internal to the plantation category. Sugar centrals are pre-eminently factory-in-the-field combines, as are many pineapple and other canneries. Possibly some large cotton plantations with attached gins also fall in this category. Although large sisal, coffee and cacao plantations also contain plants to handle the initial processing, these plants are relatively simple and of a totally different order of capitalization than those of sugar mills or canneries.

There are some striking similarities between plantations at the same level of capitalization. Plantations growing different crops but at approximately the same level of capital investment in land and machinery are more similar than plantations growing the same crop but at different levels of capitalization and mechanization.

....the slave plantation in early Puerto Rico and elsewhere was completely different from the modern sugar plantation, or central. The latter is far more like the Hawaiian pineapple "plantation", modernized coastal Peruvian cotton haciendas, or Californian Del Monte fruit orchards and canneries. To the extent that machines more and more dominate productive methods, these resemble factories rather than earlier methods of land use. (Steward, 1959:8)

Actually, taken in the context of Steward's work, the above quote may be also read to mean that it is basically the pattern of labor use and not capitalization which determines similarity or differences between plantations. (Although he would probably hold that the labor pattern stems from the degree of mechanization-capitalization to a considerable extent.)
Some observers consider a high level of rationalization and capitalization as inherent in the nature of modern large-scale agriculture and have emphasized the nature of labor utilization as a crucial distinguishing factor of plantations. Plantations are typified by situations in which large commercial farms develop in labor-poor areas (or where a system of open resources provides an option for laborers). Plantations then are large scale farms distinguished by their dependence upon some form of bound or involuntary labor. These are distinguished from other forms of large scale commercial agriculture which employ voluntary labor. Mintz' (1956) study of a Puerto Rican sugar zone generally retains "plantation" to apply to the slave-operated phase of sugar production. He applies "sugar hacienda" to the post-slavery but still localist phase and refers to the modern corporate sugar producers as "factory-field combines" or "sugar factories" or "corporate sugar farms". Nevertheless, it does not seem particularly useful to restrict "plantation" to designate the slave-operated phase. One should be able to retain the distinctions of slave-run, peon-operated and wage-labor plantations.

"Plantation" in this study will denote a system of agricultural production characterized by (1) extensive land holdings concentrated under private title, (2) using relatively advanced and capitalized technology in comparison to other farms in the area, (3) producing for large but not necessarily distant markets, and (4) employing large numbers of wage workers.

The use of large landholdings differentiates plantations from the whole roster of peasant small-holder and family farm producers while the concentration of ownership under a few private titles distinguishes plantations from such types of large scale agriculture as cooperative, collective or state farms. The use of advanced technology and relatively large amounts of capital differentiates plantations from latifundia based on extensive but relatively uncapitalized lands, such as some cattle ranches. In general, it distinguishes plantations from non-intensive forms of large scale agriculture. The relative aspect of these criteria stems from the fact that what counts as a highly mechanized and capitalized type at one time and place can count as a comparatively backward and uncapitalized type at another. The standard against which "relatively" is measured here is both the condition of other regional producers, who constitute the major competitors for land, labor and other factors of production and those producers of the same crop anywhere in the world who are also competitors. Reliance upon large markets distinguishes plantations from hacienda agriculture with its small regional or local markets which limited the profitability of increasing hacienda production and mechanization. The use of large numbers of wage workers distinguishes plantations from agricultural types such as large, mechanized family wheat farms in North America today, which may be similar to plantations in the other features listed.
Although I have modern sugar plantations in mind as the fullest exemplification of the above definition, the type is broad enough to include large scale producers of other crops and does not exclude historic plantations with different market, labor and machine uses. When all is said and done, the term "plantation" is mainly useful as an introductory term.

Centrales, Colonos and Trapiches

Consider the various sugar cane producers in the Cauca Valley. Three distinct types of units exist there at present - centrales, colonos and trapiches. Centrales are plantations by the previous definition while trapiches and colono farms are not. Centrales are large highly mechanized and capital-ized sugar factories, usually with extensive cane land attached. The usage of "central" denotes both the factory and the factory-field combine, the distinction depending upon the context. Here, "central" will refer to the whole factory-field unit while "mill" will be used for the factory itself. In the Cauca Valley today, "ingenio" is generally equivalent to "central". All of the sugar mills (centrales and ingenios) in the Cauca Valley today are generically centrales. Virtually all have milling equipment far in advance of the steam-driven centrales of the late nineteenth century, which when first established, were described by awed observers as "factories in the field". The Colombian centrales and ingenios are comparable to what are termed usinas in Brazil. They are quite dissimilar from the units historically designated as ingenios or those small scale, semi-mechanized producers which are called engenhos in Brazil.

"Central" also connotes an operation in which a substantial proportion of the cane milled by the factory is produced by a number of at least nominally independent cane growers. At present, almost all of the sugar mills in the Cauca Valley, whether they are called centrales or ingenios, obtain a significant proportion of their cane from independent colono farms. Colonos have become an important source of cane for Cauca Valley centrales only since the mid and late 1950's.

The term "colono" denotes an independent grower who delivers cane to a central under contract. They are independent in that they hold legal title to land and decide the manner in which they will grow cane. They are responsible for the financial risks, losses and profits involved. In the Cauca Valley, colono farms are relatively large scale units. They are in no sense smallholders. In the area investigated they varied in size from approximately 80 to 2,385 acres, the majority being within the range of 240 to 475 acres. A number of the colono farms in the area investigated formerly produced
crude sugar (panela). While a few colonos continue to produce some panela in their own mills, the vast majority only grow and sell cane. This pattern and even the term "colono" is common to many Spanish-speaking sugar regions of the New World, as Padilla (1960:27) points out. Cauca Valley colonos appear to be similar to the forneadores in the sugar region of Northeastern Brazil. There too, some (but far from all) of the cane growing farms which supply the Brazilian centrales formerly processed cane in their own small mills.

A widely used distinction between historic sugar mills is that of trapiche and ingenio (Deerr, 1949; Ortiz, 1947). This distinction goes at least as far back as late 16th century Mexico (Chevalier, 1966). Trapiches, in the historic meaning, are those mills in which the grinding apparatus is turned by animal power. Ingenios on the other hand were those installations driven by water wheels. Trapiches required relatively less capital to construct but were slower, generated less grinding pressure, extracted less juice from the cane and had a much lower production capacity than ingenios. These differences in milling capacity were generally paralleled by differences in the rest of the sugar-making apparatus, buildings and organization as well. Both trapiches and ingenios pre-dated steam-driven mills, the basis of the centrales. Although trapiches and ingenios showed considerable variation in efficiency and capitalization, they are more similar to each other than either is to modern centrales. Ortiz comments on the historic trapiches and ingenios in terms of production.

"Trapiche", as it is used in the Cauca Valley today, refers to the mills producing panela, a non-centrifuge sugar ("Panelero" is a roughly equivalent word). Although trapiches vary greatly in technology and capacity, the bulk of the panela reaching the commercial market today comes from trapiches of relatively homogenous size and type. Most are now driven by diesel engines and may produce over 1,000 tons of panela in a year. They are equivalent to the larger engenhos described for Brazil (Hutchinson, 1957; Harris, 1956) and to the steam-powered sugar haciendas of the 1870's described by Mintz (1956).
The Cauca Valley sugar region contains a variety of agricultural forms in addition to the three types of cane and sugar producing units discussed above. There are smallholder plots (parcelas) grouped together around some villages. There are relatively large commercial farms which grow rice, soya, and other food crops along with stock raising (agropecuaria). There are extensive dairy and cattle farms which despite ongoing reductions in size continue to occupy large tracts of the Valley floor. There are as yet no state farms or collectives.

The Cauca Valley and Field Work

The middle Cauca Valley lies between the western and central Cordilleras of the Andes and reaches from Santander in the south to Cargago in the north, a distance somewhat more than 150 kilometers. It is a generally flat plain, the bed of a Pleistocene lake. The Valley varies in width from over 35 kilometers at Cali to approximately 10 kilometers at Buga. Its floor lies at about 3,000 feet above sea level. On either side rise a narrow band of foothills and behind them the main slopes of the Andean Cordillera.

The flatland soils are generally heavy, rich in nitrogen, and widely underlain with clay. Drainage is in some areas a problem and extended rain can turn fields into gumbo mud. Average yearly rainfall is about 1,000 mm., although there is substantial variation from year to year. There are two "wet" seasons during the year but only one (in November and December) approaches a true rainy season. For almost ten months of the year short showers are interspersed with bright sun and warm weather. The climate is broadly semi-tropical, with a fairly uniform mean temperature of 24°C. and with less than 12°C. variation throughout the year. It is excellent cane growing country.

As of 1965, all but two of Colombia's modern sugar mills are located in this region, the bulk in the Department of Valle del Cauca. This study concentrated on conditions in the area bounded by the towns of Cali, Palmira, Florida, Pradera, Cerrito. It is the zone of most intense sugar cane cultivation in the central Cauca Valley (see Map ).

At the time of European entry, the Cauca Valley was covered by semi-tropical savanna, wet grasses and parkland, with gallery forest lining the water courses (Schorr, 1965:57). Today, non-domesticated plants are largely restricted to the margins of fields and roads and to some poorly drained patches of land. The foothills are clothed with mesquite, bunch grass and isolated thickets. Stands of forest remain only on the higher, more distant ridge lines and in some pockets of the
Republic of Colombia

Shaded area shows location of Valle del Cauca Department

THE CAUCA VALLEY

- Main sugar cane zones
- Western and Central Cordillera of Andes

Location of Centrales
mountains. The hillside biota has been created by continual logging and grazing, and around the urban centers hills are often scarred with swathes of exposed laterite (Crist, 1952: 65).

The Cauca Valley has historically been the Colombian area most dominated by latifundia. It is here that slave and then peon-operated sugar plantations spread most widely. The region has remained semi-isolated from the national capital and the other major regions of the nation until the present century. Until 1917, extremely rudimentary transport routes to the Pacific and Caribbean largely disallowed production for foreign export. The last 30 to 40 years have seen considerable changes in the region. Transport and communication networks now firmly link it with the rest of the nation and import-export trade flows through the Pacific coast port of Buenaventura. The formerly provincial town of Cali had grown, by 1965, into a sprawling, partly industrial, metropolis of 800,000. Towns have become cities and former villages with visions of urbanity have actually grown into towns. A major basis of the regional economy, however, continues to be large scale agriculture. The bedrock of this agriculture is highly capitalized sugar production. In the central Cauca Valley today, the bulk of the valley floor is given over to large tracts of sugar cane, to declining pasture and to some large commercial food crops. In many sections the valley is a sea of cane. Scattered throughout the area are islands of palm and shade trees. These indicate the location of the remaining nuclei of smallholder's plots, on which plantains, coffee and citrus fruits are grown.

The primary data used in this study was gathered during two field trips to the Cauca Valley, the first from June 3 to September 3, 1964 and the second between October 20, 1965 to January 27, 1966. Over five months were spent resident in the village of Bolo, which served as a base for field visits to centrales, trapiches, colonos farms and other hamlets. Village residence provided a valuable home-base from which both community and regional study could be carried out. In retrospect, most communities visited could have served as a site for the study. Each was a microcosm which included many, although not the same, features of the regional plantation pattern. Although I frequently visited batays, campamentos and the working class sectors of Palmira and other nearby towns, my initial decision not to locate in one of these places was, I believe, a correct one. Gathering much of the data I desired there would have been more difficult in batay or town settings than in Bolo.

The village of Bolo lies within the Cali-Palmira-Pradera triangle, the zone most intensively planted in cane in the entire Cauca Valley. The village itself is strung out along both sides of an important secondary road. Three county seats lie within eight miles of Bolo and the metropolis of Cali can be reached, weather and bus service providing, within a
little more than an hour. Within a radius of a little more than five miles there are four centrales, six large trapiches, and numerous colono cane farms. The mill and batay of Central Condor, one of the largest in the Valley, lies less than a mile from the village. Its cane fields, or those of its suppliers, stand on three sides of Bolo. Much of the data presented for colono farms and trapiches derives from the units found in this area. Two small hamlets and a few large food crop farms are also found nearby.

Behind the village stands an area of approximately 80 acres planted in coffee, plantain, cacao, and citrus fruits. This is divided into about 25 smallholdings (parcelas). Most smallholders live in dwellings on their plots, but since the average plot is only 3.2 acres the great majority of smallholders are also engaged in more or less full time wage labor, usually in the cane fields.

Approximately 1900 persons live in the whole Bolo area; 1600 in the village itself and the remaining 300 in the smallholder zone. Of the latter, only about 140 are members of smallholder families while the remaining 160 persons either rent or own dwellings (but no land) in that zone. There were approximately 525-550 adult men in Bolo, either employed or looking for work. In addition, about 30 to 40 women and some adolescents engaged in seasonal agricultural employment when they could obtain work. During the last half of July 1964, approximately 483 persons were employed in the following industries.

Three hundred and seventy-five (375) men were employed in the sugar industry; 306 were harvest workers and general field hands (188 on centrales, 118 on trapiche and colono farms); 41 were equipment operators and minor foremen (29 on centrales, 12 on trapiche and colono farms); and 24 were mill operators and maintenance men, all but one employed on centrales. Four "others", including two labor contractors, were also employed in the sugar industry. The other 108 men were engaged as follows: in brick kilns (22), commercial food crops (30), in trade (17) and as independent craftsmen and in trucking (35). (A police detachment made up 3 of the 4 "others".)

The bulk of employment in Bolo derives from work in the cane fields. Almost one-half of the employed labor force (240 men) was engaged directly by centrales; while another 135 persons were employed by colonos and trapiches. Only about 30 persons were employed in crops other than sugar cane. Family labor on parcelas has not been included here because it is usually a secondary source of income and is very difficult to estimate. Probably no more than 6 to 8 families, or one-third of the parcela holders, obtain their primary income from farming these plots.

Bolo then is a cane workers' community with persons employed in all branches of the industry, yet with a significant proportion of the local population engaged in other employment. It contains many of the features found throughout the Cauca Valley sugar plantation zone.
Field data gathered in Bolo included work histories of 51 individuals, covering all employment from the time of their entry into wage labor until September 1964 and a survey of employment and income for 78 households during November 1965 and extending over the previous year. In addition, twelve more intensive life histories were collected which focussed on work and migration. There were also two surveys of domestic budgets, each covering approximately 40 households. Of greater importance here is the field data gathered on the organization and agricultural techniques, the labor patterns and the working conditions and wages existant on a large number of centrales, trapiches and colono farms. Extended field visits were made to almost half of the Cauca Valley centrales (although on-going observation took place only for Central Condor), and relatively detailed surveys were made of four trapiches and four colono farms. Gathering the above material generally involved use of standardized questions and forms, filled out on the spot, with fuller field notes written soon after.

There were also the continual open-ended discussions with local people (mainly in Bolo, but elsewhere as well) which, as with all field work, probably consumed the most time but provided the most dramatic data. Such discussions ranged from partly drunken camaraderie to sober and often somber reflections. Recording such information on the spot was, of course, out of the question. Notes were written as soon after as time and privacy allowed, usually between an hour to a half day after the talk. It follows then that many of the comments quoted here are not word for word duplicates of what local people said. Despite this, I am personally satisfied that the quotes presented do accurately convey the substance and the tone of what was told me.

I have provided pseudonyms for all persons, settlements, farms and mills from which field data was used. In a few cases I have attempted to further disguise the identity of an informant or a farm. Nevertheless, persons knowledgeable about the Cauca Valley sugar zone will be able, in some cases, to distinguish the centrales discussed. The nature of this study makes complete anonymity of these large corporations neither possible nor absolutely necessary. The specifics on which this study depends may be used to identify some of the centrales mentioned. But they are powerful, and in any case revealed only what was generally common knowledge. Specific descriptions of certain aspects of rural Colombian society would have to be much more cautious, since jobs and possibly lives might be at stake. Such data will not be presented here.

Participant-observation depends upon, but also helps establish, rapport, and in general makes life liveable for the anthropologist. This method generally elicits data unobtainable in surveys or formal interviews - the interplay
of actual behavior in specific contexts, spur of the moment comments, rather than rationalized re-interpretations of these after the fact. The limitations of this approach are that it excludes past events (although not recollections of them), it generally is rather unsystematic and it provides relatively few cases as compared to more formal surveys and interviews. Limited and unsystematic as it may be, such data not only provides necessary depth and subtly to a study but serves as a measure of greater reliability against which to check the more extensive material.

Much of the socio-cultural data collected in Bolo will not be presented here. The body of this study is a consideration of the techno-ecological basis of the Cauca Valley sugar industry. It discusses how labor patterns in that industry have developed and changed and advances some 'economic' and socio-political factors which must be considered to understand these changes. Minimally, this study aims to provide a simple but detailed consideration of techno-agronomic factors and related processes involved in cane agriculture on plantations and other sectors of sugar production. It is hoped that this will prove an aid to other field workers who wish to take the techno-agronomic factors into fuller account when dealing with different problems. This is not a community study and it might be fruitful to present the more strictly socio-cultural material elsewhere.

One final note; I have generally converted kilometers, arrobas, quintales, almudes, plazas and other Colombian measures to contemporary American-British units. The one important exception is that labor and machine input figures in Chapter III have been left in the Colombian surface measure, the plaza. For purposes of conversion, note that one plaza equals 1.58 acres.
CHAPTER II

SUGAR CANE AND THE DEVELOPMENT
OF THE CAUCA VALLEY SUGAR INDUSTRY

Sugar Cane

Sugar cane is a giant perennial grass of the genus *Saccharum*. Wild varieties of the genus are indigenous to the New Guinea-Indonesian region, where it is believed to have been first domesticated. Although thousands of strains of domesticated sugar cane exist, only a few dozen strains have ever been dominant in different sugar producing regions.

In discussing the nature and requirements of sugar cane, it is important to specify the particular varieties considered since there is considerable variation. The commercial canes used in different plantation regions vary in stalk diameter, in height, in fibre content, and in form. Cane varieties often differ greatly in growing and maturation period, in nutrient requirements and in tolerance to drought and excessive ground water. Different cane strains, in conjunction with local environment and particular cultivation methods, vary considerably in juice and sucrose content and in yield per acre. No single variety of cane is best adapted for commercial use in all sugar regions but a small number of varieties usually dominate one particular area. An important compendium of tropical and subtropical agriculture says this about sugar cane:

> The case may be that if a variety has been selected in a given country because of its high yield under the prevailing climatic and soil conditions it will not do at all in other areas where they are absent. One of the outstanding examples of the lack of adaptability is the famous Hawaiian variety H 37 - 1933. This cane holds the world record for the highest yield of sugar per unit area in Hawaii, but it is at best a mediocre producer in other areas where it does not receive the heavy applications of fertilizers and irrigation water needed for its growth. (Ochse, Soule, Dejkman and Wehlburg, 1961, Vol. 2:1213)

The earliest varieties of cane grown in Colombia were derived from Mediterranean strains and were known collectively as *Criolla*. They produced a small and somewhat woody stalk, and today they are found mainly in a feral state among thickets and along river banks. By the early 1800's *Criolla* cane was replaced by varieties of *Otaheite* (first brought
from Tahiti in 1768). These new strains, collectively known in Colombia as *Castilla Nacional*, produced thicker and longer stalks with less fibre content and a greater sugar yield than *Criolla* cane. But in the first two decades of the twentieth century, a highly contagious virus infection known as cane mosaic, began to spread through many of the New World sugar regions.

In the late 1920's larger Colombian planters began to replace *Castilla Nacional* cane with P.O.J. 28-78, a Javanese strain hybridized in Puerto Rico and highly resistant to cane mosaic. In the Cauca Valley, the changeover to the new resistant strain was speeded by a very severe plague of cane mosaic which struck in 1934. The fact that the new strain produced yields as high or higher than the *Castilla Nacional* variety facilitated this changeover. Today, the overwhelming bulk of cane grown commercially in the Cauca Valley is P.O.J. 28-78 or the closely related M.C. 666. The following discussion of the characteristics and requirements of presently used cane in the Cauca Valley will refer only to P.O.J. 28-78. The requirements and characteristics of this variety is not necessarily the same as those of cane grown in other sugar plantation regions.

Sugar cane has heavy water demands but must also be well drained. Optimal yield occurs with an annual moisture equivalent to from between 50 and 70 inches of rainfall. If cane receives less than 50 inches of rainfall it should be irrigated while if it receives more than 120 inches of moisture it requires extensive drainage. The agronomic effect of rainfall and other water supplies is partially dependent upon the water retaining qualities of particular soils. Although cane grows best on rich bottomland, on moist but not heavy soil, it can profitably be grown on a wide variety of soils.

The temporal distribution of water is of great importance. A given amount of water distributed throughout the year is less beneficial than if it is present in a number of clearly demarcated periods. In order to obtain cane growth at optimal rates ground water should be maintained at least at 80% of soil saturation capacity. Any decrease of moisture below this point usually effects reduction in the yield. On the other hand, soils excessively saturated with water produce a heavy cane tonnage but only a relatively low sucrose content (Núñez, 1965: 66). Extended inundation of cane fields or waterlogged soil may rot the cane roots and "sour" the cane juice, making commercial sugar extraction unfeasible. The heaviest water demands of sugar cane are in the 4 to 6 weeks after planting. In many sugar areas of the world, and particularly in historic sugar industries, the planting period was often dependent upon rainfall and keyed to the local rainy periods. But with the use of abundant irrigation water one can plant at any time.

Irrigation and drainage of cane fields involves heavy capital investment in the construction of canals, aqueducts, wells and pumps and requires additional wage payments to main-
tain and keep the irrigation ditches open. While Cauca Valley central lands are irrigated for the most part, this is true of only a small proportion of the cane land belonging to colono farms and trapiches. While cane can be grown profitably without irrigation in the Cauca Valley, as is the case for most colono and trapiche cane, the irrigated cane plots of all centrales produce substantially higher yields with a higher sucrose content.

The best climate for sugar cane production is a hot, humid one with intense sunlight and fluctuations between well defined wet and dry periods. The high temperature is salutary for maximum cane growth. Extensive moisture provides increased tonnage of cane per unit of land and frequent periods of sunlight accelerate photosynthesis and increases sucrose content. The dry periods reduce the vegetative processes, particularly the growth of leaves, which require and produce simple sugars rather than sucrose. In addition to a high juice content rich in sucrose, good cane should have a low fibre content. Cane with a high fibre content increases the costs and difficulties of milling and is associated with a lower amount of sucrose per volume of cane ground. The fibre content of cane rises with each successive harvest until a stable ratio is established after four or five cuttings. Abundant water during the growing period lowers the fibre content in cane.

P.O.J. 28-78 cane matures within 16 to 18 months after it has been planted. It has the advantage of maintaining a high juice and sucrose content at a stable level for approximately six months (between 16 to 22 months of age) and it has occasionally proved economic to harvest 30 month old cane (Nuñez, 1965:38). This is a great advantage over cane types grown in some other sugar cane regions which must be harvested within a much more limited period after maturation. The cane grown in the Cauca Valley, therefore, allows for a certain flexibility of harvest operations. If, because of poor planning, heavy rains, milling difficulties, labor shortages or strikes, a plot of cane cannot be harvested when prime, it may be harvested later. The fact that Cauca Valley cane, unlike most crops, can be harvested long after it is mature tends to operate against the effectiveness of strikes by cane workers, a factor of some relevance in the later discussion of labor organization.

The disadvantages of P.O.J. 28-78 are that its stalks do not grow at a uniform rate or to a uniform height and often do not grow upright. This increased the labor needed in harvest and constitutes a major difficulty for the introduction of machine harvesting. Moreover, the cane yield of this variety falls markedly with each harvest. On the better central plots it yields over 55 tons of cane per acre (and frequently much more) on the first harvest after planting. But, by the fourth harvest, the yield may have fallen to about 40 tons per acre and less. On the less capitalized and more poorly tended plots of colono farms and trapiches, older stands of P.O.J. 28-78 frequently yield 30 tons and less per acre.
A mature stalk of P.O.J. 28-78 cane is composed by weight of approximately 85% juice and 15% fibre and woody material. Roughly 20% of the juice is sugar while the remainder is mainly water. The physical and biochemical composition of a single variety of cane differs and changes according to the ecological and agricultural conditions under which it is grown. Consider the variation in the constituents of commercial cane grown in the Cauca Valley at the present time (Nuñez, 1965:31).

<table>
<thead>
<tr>
<th>Component</th>
<th>Variation of amount per unit weight of cane</th>
<th>Average amount per unit weight of cane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fibre</td>
<td>10% to 16%</td>
<td>13%</td>
</tr>
<tr>
<td>Water</td>
<td>70% to 75%</td>
<td>72%</td>
</tr>
<tr>
<td>Sucrose</td>
<td>10% to 16%</td>
<td>13%</td>
</tr>
<tr>
<td>Simple sugars</td>
<td>.1% to 2%</td>
<td>1%</td>
</tr>
<tr>
<td>Organic acids, oils and</td>
<td>.5% to 2.5%</td>
<td>1%</td>
</tr>
<tr>
<td>nitrogens</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In practical terms, the table indicates that there is anywhere from 200 to 320 lbs. of sucrose in a short ton (2,000 lbs.) of cane commercially grown in the Cauca Valley. In addition, there is significant variation in the extractive efficiency of the sugar mills. No mill extracts all of the sucrose of the cane. Cauca Valley centrales supposedly manage to extract from 82% to 91% of the sucrose in the cane they grind (Manual Azucarero de Colombia, 1964:1-40), a level comparable to the more modern mills in the major sugar producing regions of the world. While trapiche owners often claim an 80% extraction rate as well, experiments have indicated that a typical commercial trapiche probably does not extract more than 50-60% of the sucrose in the cane (Izquierdo 1964:35-36). In the case of the Cauca Valley centrales, if we accept an estimated average of 13% sucrose per weight of cane and an 87% extraction rate, then one ton of cane must be grown, harvested, transported, milled and processed to obtain 226 lbs. of raw sugar.
Sucrose inversion is the major agronomic process determining a limited harvest period in *zafra* sugar regions today. With present mill technology, sucrose is the only type of sugar which can profitably be extracted from cane. Sucrose is synthesized in cane as the stored form of the simpler sugars which the plant utilizes for its own growth and metabolism. Only when cane produces an excess of sugars above its immediate needs does it synthesize sucrose. During long rainy periods cane continues to grow at a pace which does not allow the production and storage of excess sugar. This is especially true when rain is associated with long cloudy periods and when there is insufficient strong sunlight to photosynthesize the requisite amount of sugar used in plant growth. Under such conditions what occurs is sucrose inversion. The stored sucrose is reconverted (inverted) into simpler sugars, particularly into glucose, which are then used in the growth and metabolism of the plant.

While the process of inversion is never complete (a certain amount of stored sucrose is always present in cane) the percentage of sucrose may decline to a level at which it is economically unfeasible to mill the cane. Extended periods of rain, cloud, and reduced sunlight exist in most of the major sugar producing regions in the New World. The cane continues to grow throughout all or most of the year but only cane maturing during the relatively dry, sunny, seasons contains maximal sucrose content.

But the fact of sucrose inversion does not set an absolute period of time when cane must be harvested in any particular area. It is only one factor in a much more complex system. The proportion of sucrose per weight of cane that it is profitable to grind depends on a host of non-environmental factors, among them the capacity and extractive efficiency of the mill, transport and labor costs, and the price of the final product, sugar. The overall profit of a central or trapiche is often dependent upon milling partially inverted cane at a reduced marginal profit for part of the year. This seems to have been particularly true in the earlier Caribbean industries when sugar mills were not large enough to mill all of the cane available to them during the period of maximal sucrose concentration. More recently, Cuba seems to have had difficulty in milling all the cane available because of a shortage of harvest labor and has extended the harvest period by about 6 weeks or more. Presumably it is processing some cane with a lower sucrose content than previously. The crucial-calculation involved is always that of acceptable total production and profits.

Certain sugar cane industries in the Western hemisphere - the Guyana littoral, the coast of Peru and the Cauca Valley of Colombia - find it economical to harvest and mill throughout
virtually all of the year. In the Cauca Valley a uniform high
temperature (averaging 72.5°F), frequent showers and strong
sunlight during most of the year produce cane with relatively
high juice and sucrose content throughout virtually the entire
year. Annual precipitation is approximately 1,000 mm. - some-
what less than optimal. There are two wet periods, one from
the middle of March to the middle of June and the second from
October to early January. Nevertheless, days producing both
rain and strong sunlight occur with intermittent, short dry
spells for more than nine months of the year. During these
nine months planting and harvesting can proceed under extremely
favorable, if not quite optimal, conditions. With sufficient
irrigation, planting can continue virtually throughout the
year.

Harvesting and transport are seriously effected only
during the worst of the wet periods in the Cauca Valley, and
the sucrose yield is somewhat lower than that obtained during
the dry periods (Nuñez, 1965:43-44). During most of December
and part of January, heavy and fairly continual rains do make
harvesting difficult and many large centrales shut down for
this period. Such rains may come early or late or hardly at all.

A Synopsis of Sugar Cane Agriculture

Sugar cane, when commercially grown, is never raised from
seed since the time taken for cane seed to develop into mature
cane is approximately twice that needed if cane is propagated
through vegetative processes. Cane fields are planted with
sections (cuttings) from the upper stalk of harvested cane or
from the entire stalk of specially grown seed cane. The cut-
tings are laid end to end in furrows and covered with an inch
or two of soil. Under favorable conditions cane sprouts within
three weeks after planting and produces well developed shoots
by the end of 40 days. Any sections of the newly planted field
which do not show sprouting after this period of time are usually
replanted. Planting in the Cauca Valley is still done manually
and involves large amounts of labor.

Sugar cane in the Cauca Valley, and in most other important
sugar producing regions, is not replanted after each harvest.
The ratoons, the cane roots and stubble which remain in the
ground after the harvest, sprout perennially for an almost
unlimited time. The cane grown from such ratoons, ratoon
cane, constitutes approximately 80% of the sugar cane cultivated
in the Cauca Valley at any one time. During each harvest a
certain percentage of the roots are damaged, others die, the
soil nutrients in the vicinity of the roots becomes used up,
and the tonnage drops. Many ingenios and trapiches formerly
used to harvest ratoon cane from plots up to 30 years old but
it is now considered more profitable to replant cane after
yield falls below 35 tons per acre than to continue a specific ratoon plot. Plots are now replanted after an average of four to five cuttings, although there is wide variation and occasional plots continue to yield well even after ten harvests.

Cultivation begins after the cane has sprouted and grown for approximately a month. The main purpose of cultivation is to control weeds and provide a loose, water-retentive soil cap. Weeds are kept down because they use up a substantial amount of the available soil nutrients. Heavy weed infestation retards cane growth and lowers its yield. Weeding was formerly done by large numbers of workers using palas (long handled, flat spades which function also as hoes). Light mouldboard plows drawn by horses and mules were also important between the late nineteenth to the mid-twentieth centuries. At present, the bulk of the cultivation in the early stages of cane growth is carried out with tractor-drawn cultivators. While mechanized cultivation is not as thorough as hand hoeing, the savings in labor costs far outweigh any loss in yield due to residual weeds and cane damaged by tractors. Mechanized weeding is carried out two, or occasionally three, times during the first few months of growth. After the cane has grown too high for tractors to be driven over it, one or two additional manual weedings are usually applied.

The number of weedings applied per plot varies greatly, even on a single plantation. On the average, a plot is cultivated four to five times. Tractor cultivation can be used for the first two or three times. Mule drawn plows are still used occasionally for post-tractor cultivation on some colono and trapiche fields. But even there they are being replaced. The final steps of cultivation are still largely manual. This occupies the bulk of the field labor engaged in cultivation and utilizes the largest amount of field labor of any operation other than harvesting. Cane plots are cultivated manually between five and seven months after planting. At that time cane is usually so dense that even mules cannot easily enter the cane rows.

There has been a great increase recently in use of herbicides. Where mechanical application of these chemicals is used, the number of workers needed in weeding has been markedly reduced. Extensive use of weedkillers is still primarily limited to central lands but is slowly spreading to colono and trapiche farms as these units attempt to lower their labor costs and reduce the number of men employed.

Harvesting in the Cauca Valley proceeds throughout the entire year, although there are slack periods during the rainiest months. Harvesting is still totally manual. Cutting cane has changed very little from the earliest times. The cutter grasps the cane stalk, and with a blow of the machete severs it from the roots. He then lops off the leaves and the top,
and chops the stalk into two or three sections. Experienced and capable cutters cut the stalk level to the ground. If the cane stalk is cut a few inches above the ground surface the residual stubble prejudices the later development of the rattoons. The stubble presents and area where rot, fermentation and insect attack begins. This may then spread through the cane roots. When this happens on a large scale, the yield of the succeeding rattoon cane is markedly reduced. Cutting the stalk level to the ground requires extra stooping and cutting. An extra machete stroke into stubble and soil for each stalk is no mean addition to the already difficult work. This requirement is also one of the important difficulties in mechanizing the harvest.

After being cut, cane is loaded into carts or trucks and transported to the mill. Before mechanization, almost as many men were needed for loading and transporting as for cutting. These transport and loading operations have been the initial entry points for mechanization of the harvest.

It is desirable to mill cane as soon as possible after it is harvested. The juice in the cut cane evaporates, making cane more difficult to mill, and sucrose content of cane declines steadily after it has been cut because of inversion and fermentation. These processes are more rapid during hot, dry periods, when 10% and more of the sucrose content is lost 24 hours after cutting (Nuñez, 1965:77). Since a large amount of cane is needed to keep the mill operating efficiently and since harvesting proceeds at a number of locations simultaneously, maintaining a regular flow of fresh cane is an intricate process which often does not operate in the optimal manner. However, on Cauca Valley centrales most cane is ground within 24 hours of cutting.

Cane grinding equipment is so intimately involved with harvesting and is so important in the historical rise to dominance by centrales that virtually all studies of sugar plantations have considered the factory phase of sugar production. However, the actual grinding of cane is only one of a number of major processes which utilize heavy highly capitalized equipment in the modern mills. Let us now consider the history of mill and agricultural development of the Cauca Valley sugar industry.

Technological and Economic Factors in The History of the Cauca Valley Sugar Industry

The Early History

Sugar cane was introduced into the New World almost immediately after discovery. By 1510 it was being grown on Hispaniola. While sugar cane became a crop grown throughout much of the tropical and semi-tropical areas of the Western Hemisphere, major plantation regions developed only in a few regions - init-
ially in northeastern Brazil, much of the Caribbean and, somewhat later, in Louisiana. In most regions where sugar was produced the scale of the early operations was tailored for home consumption or for local markets. In an era when bulk transport was limited to ships, which were only beginning to make long range transport of commodities economically feasible, even potentially rich sugar lands could not be profitably developed unless they lay close to river and deep sea shipping and at a relatively short distance from the main market - Western Europe.

Sugar cane was grown around Cali as early as 1550. By 1588 a concentration of commercial sugar trapiches was centered around the town of Buga, and south of the Amaime River, still today an important center of sugar production. By 1638, numerous trapiches were well established in the Candelaria region, the area in which the present field work was carried out. Production was of sufficient quantity and regularity to create a fairly steady bulk trade of sugar to the then regional capital, Popayan. By 1799 a government census registered 127 trapiches in the heart of the Cauca Valley sugar region (Eder: 471-472).

The size, technology and production of many early trapiches can be seen in the transfer deed of a small commercial sugar producer in the Candelaria region in 1769. The total land utilized by this trapiche was 22 almudes, or a little more than 50 acres in area. The trapiche milling machinery consisted of a pair of wooden, horse-driven rollers and an evaporating furnace was set with three copper kettles. The trapiche had 27 horses, most of which were used in shifts to turn the rollers. It also had 18 yoke of oxen used in hauling sugar and plowing. The limited level of production can be seen by the fact that the trapiche owned only 18 sugar loaf moulds. Such moulds held between 40 and 50 lbs. of sugar but required periods of up to a few weeks to drain (Ibid.).

Although bars of sugar were transported occasionally from the Cauca Valley to Panama and Ecuador by the seventeenth century, the absence of any feasible overland or river shipping route ruled out any significant export basis for the Cauca Valley sugar producers. Sugar cane has been grown in the Cauca Valley as early as in many of the major producing regions of the New World. But the Cauca Valley producers have been mainly restricted to a regional market for the first 350 years of their existence. The region has developed into one producing for a national Colombian market only in the last forty to fifty years and has tentatively entered international sugar trade within the last decade. The limited market for purely regional producers undoubtedly was an important factor in maintaining the backwardness of the Cauca sugar industry.

The earliest trapiches in the Cauca Valley were operated largely by Indian labor working under a variety of labor binding practices. There is little historical record of this earliest
phase of Indian labor except that it is clear that depopulation and the retreat of Indian communities occurred throughout the 16th century. The increasing number of trapiches required more labor and by the early 1600's the establishment of new trapiches involved the acquisition of Negro slave labor for both field and mill work. During the 1700's, sugar plantations were run almost entirely with slave labor, although in some regions outside of the Cauca Valley a small percentage of 'free' labor was also employed on the large holdings (Escalante, 1964:131).

Eustaquio Palacios, a writer who observed the final stages of slave plantations in the Cauca Valley, describes a late 18th century sugar plantation in the Cauca Valley near the present city of Palmira and on the lands of the present Manuelita central. The plantation was worked exclusively by a Negro slave labor force of 200 men, women and children. The work force was divided into gangs under the direction of a captain who was himself a slave. All phases of cane growing and sugar milling was carried out with slave labor. Slaves also tended cattle, acted as artisans and were servants on the plantation. Although food rations were distributed more or less regularly, each slave family was allotted a small plot of land and one day a week to grow additional food (Palacios, 1942).

The number of manumitted slaves seems to have increased slowly throughout the late colonial period. In 1821, after independence, Colombia passed legislation which manumitted all children born of slaves after that date. But Cuellar (1963:76) is probably correct when he points out that such legislation was either disregarded or was implemented in a manner which created a form of peonage not significantly different from slavery. A stringent "Black Code" applying to Negroes, both free and slave, was instituted after a widespread slave uprising in the Cauca Valley in 1840. During 1847 the national government prohibited the importation of slaves to Colombia and in 1851 universal emancipation was declared. The regions dominated by large slaveholders, particularly in the Valle del Cauca, rose in a revolt which was crushed after bitter fighting. After a temporary disruption the slaveholding latifundists either became or were replaced by merchantile latifundists who were somewhat more closely linked to broader markets. According to one Colombian economic historian:

The suspension of slavery created a critical moment for the latifundists. But from this crisis latifundism emerged more vigorous and potent than before, for the economic development prescribed by the anti-colonial trade reforms of 1850 had made slavery an uneconomical institution. (Artete, 1962:158, 159)
The Manuelita Plantation Complex, 1864-1901

Little quantitative information on technology, agricultural practices and labor patterns in the Cauca Valley sugar plantations is available for the 19th century and the first quarter of the 20th century. An exception are two useful publications privately distributed by the Manuelita plantation. The Manuelita complex represents the technologically most advanced producer in the region up to the late 1950's, when a handful of other plantations began to equal or surpass Manuelita in size and modernity. Nevertheless, the developments on Manuelita are instructive because the other major producers of the region have generally followed the Manuelita lead.

Technology and Production: 1860-1873

In general, the agricultural techniques and mill technology of the mid-nineteenth century Cauca Valley sugar industry do not seem to have changed greatly since the earliest trapiches were established. In 1860 the Cauca Valley sugar producers had incorporated virtually none of the major advances in field and mill techniques developed in the major world sugar producing areas of that time. The Louisiana, Cuban and British Caribbean industries were using steam mills, controlled evaporation and crystallization apparatus, cane carts and some rail transport, irrigation, animal fertilizer, and a number of horse-drawn labor saving implements in cultivation (Sitterson, 1953; Fraginals, 1964; Beachey, 1957). The Cauca Valley producers used animal powered and some water driven mills, open kettle sugar boilers, no irrigation or fertilizer, and were almost totally dependent on manual labor for all field tasks except initial plowing.

It is instructive to consider the technological and productive status of one of the larger trapiches in the Cauca Valley in 1864, when it was bought by Santiago Eder and began its development into the present Manuelita plantation complex. The holdings consisted of 20 plots of sugar cane of unspecified size, 64 acres of improved pasture, small plots of coffee and plantain and rights to the use of a large, vaguely defined tract of woodland and natural pasture. The trapiche milling machinery consisted of two horizontal iron rollers turned by a wooden water wheel. This apparatus had a maximum capacity of approximately 375 lbs. of sugar per day, although this maximum was rarely reached and the mill did not grind every day. This was an advance over the horse-driven wooden rollers used in most of the Cauca trapiches at that time. But Manuelita cane was still milled one stalk at a time. In this way maximum pressure, extremely low by modern standards, was exerted by the rollers and a greater proportion of the juice pressed out of the cane. Care had to be taken lest too much cane be caught between the rollers, which might thereby
be forced out of position. Grinding was a very slow operation and limited the amount of cane that could be profitably grown, and used.

Two men fed the single stalks into the rollers. The juice was run into wooden storage tanks, where some of the sediment was trapped, and then passed into a series of six heating tanks. Quicklime and a flux were added here in order to neutralize much of the natural acid in the juice. It was then ladled through three copper boiling kettles where most of the water in the juice was evaporated. On reaching the consistency of a fluid syrup, in the last kettle, a charge of crystalline sugar was added to speed crystallization. This last process, termed "striking", was of crucial importance. It is indicative that the "striking" process was controlled solely by the sight, smell and touch of skilled sugar makers. Virtually no scientific or quantitative production controls existed.

The above process produced a syrupy raw sugar containing approximately 65% crystalline sugar mixed with 35% syrup. This sugar was then poured into clay or wooden moulds and placed in a warm storehouse where more of the syrup drained off and additional crystallization took place. After this draining process was complete the moulds were broken open and the final product, loaf sugar, was ready. Total sugar production was extremely low. An example of a particularly productive period for the Manuelita trapiche was between April 1-17, 1867, when the newly refurbished mill produced 105 loaves of sugar, an average of 310 lbs. of sugar, per day (Eder:97). Even when operating near maximal capacity the production was miniscule compared to the then contemporary Caribbean mills, some of which produced more than twenty times the daily amount of Cauca Valley ingenios (Fraginals, 1964:83, 85). 8

The Louisiana No. 1 Mill and Its Effects

Between 1871 and 1873 Manuelita replaced the existing trapiche with an all-steel, "Louisiana Number 1" mill. These mills incorporated some of the basic advances that had been made in mill technology, but they were still quite small and primitive compared to the most advanced mill equipment of that time. The Louisiana No. 1 mill used only one small set of steel rollers and was still driven by a heavy water wheel (although in many sugar regions outside Colombia these mills were being driven by steam power). Nevertheless, the mill constituted a great advance over mills prevalent in the Cauca Valley until then. The all-steel construction allowed much greater pressure to be applied on the rollers, thereby increasing the percentage of juice extracted from the cane. The rollers were mounted on hydraulic springs which allowed cane to be fed into the mill in bulk. With the Louisiana No. 1 mill Manuelita produced up to 2,000 lbs. of sugar per day, although this maximum production was rarely achieved. It became the largest producer of the Cauca Valley.
Other trapiches also began acquiring similar mills. The spread of these new mills changed some of the basic characteristics of the Cauca Valley sugar industry. Until this time all of the earlier mills in the region produced a very wet bagasse (the fibrous residue of ground cane) which even when used as fuel still left the mills mainly dependent upon wood to fire the evaporating furnace. This required a considerable expanse of woodland and figured as a major expense in sugar production.

The greater pressure and the higher rate of juice extraction of Louisiana No. 1 mills produced bagasse which was sufficiently water free so that, with some additional drying and improved furnaces, it could effectively be used as fuel. It was the improved extraction rate and the saving in fuel costs rather than making new land available for crops that acted as the initial reason for the spread of the all-steel mills.

After the installation of the Louisiana No. 1 mill and the improved furnace:

For the first time the boiling was done by means of the bagasse from the cane itself, thus replacing the burning of firewood, which had caused the destruction of the forests of the hacienda. The change notably reduced the costs of this industrial phase. (Manuelita, 1964:60)

The fuel used in the pre-bagasse burning mills was primarily wood cut on the monte, thicket and forested sections on or at the margins of the valley floor. Most of the sugar plantations and the other large landholdings seem to have included a portion of monte within their holdings. But by the last quarter of the 19th century, as Schorr's reconstruction of Cauca Valley ecology points out, woodlands on the valley floor were already quite limited (Schorr, 1965:57, 67). While available documents do not provide clear quantitative data for the amount of wood used per unit of sugar produced, there is good circumstantial evidence of the relative proportion of woodland to candeland utilized by the earlier Cauca trapiches. Consider the figures for a small pre-bagasse using trapiche farm incorporated into the Manuelita lands in 1900. The trapiche grew 47.7 acres of cane and had a wood lot of 79.5 acres which was used solely for producing firewood needed in the mill and the production of bricks to repair the trapiche (Eder:419). In view of the limited brick production and the additional fuel provided by pruning and cutting more than 10,000 coffee and cacao trees also grown by the farm, it appears that the trapiche retained more than one acre of woodland to process one acre of cane.9

The availability of fuel plots was not the prime limiting factor of production for most Cauca Valley trapiches (although the spread of such mills, and draft furnaces using bagasse as fuel, permitted the clearing and use of plantation woodlands for crops and ultimately provided for a greater concentration of land in cane). Even on those plantations where insufficient
woodland plots did pose a problem, such woodlands were not immediately converted to crop land once bagasse burning mills became established. The woodland on the valley bottom usually constituted the least productive and most difficult to work. If the pattern which emerges from the rather muddled history of Manuelita land expansion is at all representative of other trapiches in the region, expansion of cane production by any one plantation very frequently involved the acquisition of cane or other crop lands from neighbouring producers. But by the 1920's, and after, it appears that former woodlands and monte (broken, hilly outcrops) held by plantations were slowly being converted to cane. The ultimate extent of this conversion will be seen later in the record of land use of two expanding centrales.

Although no radical technological changes occurred on the Manuelita plantation between 1874 and 1892, small but cumulative improvements seem to have been made in the mill capacity. In the fields, there were very gradual changes toward a more highly capitalized (but unmechanized) agriculture. By 1885 Manuelita income was mainly based on cane and sugar production (although the amount of land devoted to beef cattle and other pasture was undoubtedly larger than the land in cane). Manuelita slowly began to expand its use of irrigation for the cane fields during this period but no major changes seem to have been introduced in agricultural techniques. Neither crop rotation nor animal manure were applied. Some desultory experiments with different strains of cane and various patterns of planting were attempted but agricultural tasks continued to be done almost entirely by hand. Men wielding palas and machetes performed the great bulk of the agricultural tasks. The only exception was that more effective steel plows were increasingly used for furrowing. Light, horse-drawn plows for use in cultivation were being tested commercially by the end of this period but spread to other Valle sugar producers very slowly.10

The Socio-Political Context of Manuelita's Expansion

One widely held view of the character of most pre-20th century sugar plantation owners is represented by Hutchinson who speaks of North East Brazil but implies a wider import. He says:

The cultivation of sugar cane, over a period of two hundred and more years, developed into a remarkably stable way of life and, in spite of a long history of good times mixed with depression, became firmly entrenched in the areas where it was possible to grow it. For centuries it was a family enterprise, based on slavery, and generation after generation exploited the same plantation with the same crop, to which they developed a strong loyalty. (Hutchinson, 1957:4)
Put more grossly, pre-modern sugar plantation barons were typically "tradition oriented", and therefore were presumably little motivated to attempt new techniques in agro-technology and labor utilization. The sugar planters and other entrepreneurs of the Cauca Valley during the 19th century cannot be so easily described.

The picture which emerges from regional histories and biographies of Cauca Valley notables during the latter half of the 19th century is hardly that of a solid front of old, traditional, aristocratic families holding exclusive wealth and power. While such families certainly did exist—for instance, the Astilla family which today owns (among other holdings) three of the largest centrales in the Valley. But such families were certainly not unchallenged. It appears that there was no shortage of men willing to experiment with new crops, business ventures and production techniques. The contention here is that substantive factors such as poor transport, social disruption, a limited regional market and lack of capital played the key roles in limiting entrepreneurial possibilities.

It is true that such businessmen were involved in many activities not currently regarded as business (by non-businessmen). But it should be pointed out that the typical political involvement of large landholders and wealthy merchants was not necessarily antithetical to and did not detract from their entrepreneurial acumen. Given the socio-political context, maintaining political favors were probably as important for success as keeping up with the latest market prices and with the newest production techniques. Political activity was an element of business entrepreneurship.

Between 1874 and 1892, the owner of Manuelita was engaged in a progressive expansion and consolidation of plantation lands which involved a welter of deals, purchases, sales and not infrequent setbacks. It is extremely difficult to determine the true size of the Manuelita holdings during the first 40 years of its existence. Constant purchases, transfers, re-sales, and interminable litigation over land titles are interwoven with its history. Furthermore, large tracts of land were only vaguely defined and *de facto* occupation counted for a good deal, especially on sections of unimproved land. The Manuelita case is intimately related to the broader social and political context of Colombia during the 19th century, particularly the internal struggles between various sections of the Colombian ruling class.

Between 1830 and 1903 Colombia was rocked by 29 major outbreaks of fighting. Disregarding local coups and guerrilla actions which sputtered on continually, there were 9 major civil wars, 14 regional civil wars, 2 wars with Ecuador and 4 major military uprisings. Cuellar suggests that shifting alliances of large landholders and commercial groups failed to unite into a single dominant class because of the limited profits available on the restricted market.
Neither latifundism nor commerce by themselves could create great fortunes. The fortunes which surpassed middle levels were made in the shade of businesses of the state.

This created a very important social factor: the important position of the bureaucracy in Colombian society and the importance for the directing classes to have control of the positions of public administration. (Cuellar, 1963:84)

The position of the Manuelita owner in relation to the already established latifundists and the effect of the continual fighting may have been somewhat atypical. The extraordinary political flexibility of the owner of Manuelita was dramatically exemplified during a lull in the extremely bloody "War of a Thousand Days". While in Bogota in 1900 he discussed a joint business venture for expanding Manuelita production with Raphael Reyes, chief of the Conservative Party and the national Caudillo at that time. Nevertheless, while on a business trip to New York in May 1901 he openly conferred with Uribe Uribe.

General Rafael Uribe Uribe was the chief of the revolution which was then developing in Colombia. He had gone to New York to buy arms, obtain economic aid and formulate plans to prosecute the civil war. As we have previously observed, Santiago [the owner of Manuelita] had good friends in both political parties. Later in the same year he dealt continually with General Reyes. (Eder:520)

While bands of armed irregulars occasionally penetrated the plantation boundaries and some military commanders attempted to draft peons on Manuelita, the plantation and its workers seem to have been relatively uninvolved in the fighting. Probably the most destructive effects of the internal wars for Manuelita was that they severed trade routes and forced periodic cutbacks of production. Sinisterra recounts how in the fighting of 1885 and 1895 the main towns in the Cauca Valley sugar zone were frequently cut off from one another. Communications, transport and government supporters in general were in danger even on the outskirts of the major towns unless protected by detachments of troops (Sinisterra, 1951:60-65).

On the plantations themselves there existed a system of low paid, semi-bound labor receiving largely script as wages. There was a company store which sold both those items produced on the plantation (beef, food crops, sugar) and goods acquired in the commercial ventures of the owner. Eder describes some aspects of the labor and social pattern existing on Manuelita in the 1880's-1890's when about 100 men and their families were working in the cane fields and mill.
The owner of the hacienda held a patriarchal authority which extended over the entire life of the worker. The workers were bound peons ["agregados"]. Changes in the composition of the labor force were rare. The hacendado not only gave out wages, he was "El Patron". The workers belonged to families that had lived on that property for a number of generations. It was to the interests of the hacendado that they be content and fairly treated, according to the common standards of that time.... (Eder:463)

In general, Cauca Valley agriculture was labor intensive. In some other American sugar industries, a number of labor saving implements had considerably reduced the labor input for certain agricultural phases. Sitterson, speaking of the southern U.S. cane industry, holds that the replacement of hoe cultivation by cultivating plows after 1840 reduced labor requirements in cultivation from one man per 7 or 8 acres to one man per 15 acres. Between 1880 and 1905 the replacement of cultivating plows with row cultivators, all animal drawn, further reduced labor in cultivation to one man for 25 acres (Sitterson, 1953:278). Similar trends had begun in Cuba and some of the British Caribbean industries but were not as advanced as in Louisiana (Ely, 1963; Beachey, 1957). The Hawaiian sugar industry began at this time as a relatively 'mechanized' industry (Fuchs, 1963). Why similar techniques were not deployed in the Cauca Valley cane fields ideally requires consideration of the status and cost of labor in the Cauca Valley. Unfortunately, I have been unable to find meaningful data on comparative cost of men vs. mules and plows for Cauca Valley plantations during this period.

A New Phase: The Steam-Powered Central

Between 1898 and 1901 Manuelita set up the first steam driven sugar mill in the Cauca Valley. The size and grinding capacity of this mill was small compared to the commercial producers in the major sugar regions of the world at that time. The new mill could grind 50 tons of cane in a 12 hour period and could manufacture 5 tons of sugar in a day. This capacity was not actually reached until a decade after installation.12 While the new mill still had only one set of rollers, these produced much greater pressure. The power needed to turn
such rollers was supplied by a steam engine. The sugar making apparatus of the new mill was more nearly on par with the standards of efficiency current in the large U.S. or Cuban centrales of that time. Conveyor belts moved cane and bagasse through the milling process. A system of pipes and pumps passed the juice through the purifying, clarifying and filtration tanks. Triple-effect evaporators, vacuum pan crystalisers, and centrifuges processed the juice and sugar at a speed and economy vastly superior to any other in the Cauca Valley. The boilers which ran the entire factory were fueled almost exclusively by bagasse. The sugar produced was centrifuge sugar, of a purity and storeability surpassing that of even the best loaf sugar.

In conjunction with the increased milling capacity came an increased need for more cane. Production had to be increased and maintained at a high level not merely to operate the mill efficiently but to earn the money to pay for the new machinery. The number of workers in the Manuelita fields and factory jumped upward. Whereas Manuelita employed only 100 workers in the mill and in the fields in 1898, after the operation of the steam-driven central it employed 250 men. The plantation lands were also being increasingly utilized for cane growing. In the period 1892–1898 only 10% of the plantation's land holdings were in cane while in 1911 approximately 1,208 of the 2,080 acres owned by the plantation, or 62%, were used for cane.

The amount of cane ground by any mill increases as a multiple of the increase in sugar production. Given the extractive efficiency of the mill established on Manuelita in 1901, more than 12 tons of cane had to be grown, harvested and transported to the mill for each ton of sugar produced. During this period harvested cane was transported from the fields to the mill on the backs of horses and mules. They carried a relatively small load and required an inordinate effort to load. Mules had the advantage of being able to negotiate slopes and gullies where cane carts can be used only with considerable difficulty. Little investment in access roads and bridges are necessary if mules and horses are used. Cane transport using horses and mules continued on many small plantations on the valley floor until the early 1930's. Hauling cane by ox-cart was much more economical than use of mules and horses. But on much of the valley bottom-land loaded ox-carts bogged down easily and their wheels damaged the rattoons. This difficulty was circumvented by laying portable sections of track into the fields being harvested and using ox-drawn rail carts on them. This mode of cane transport was introduced in 1897 and became predominant on Manuelita by 1911 with the increase of cane ground by the steam mill (Manuelita, 1964:119). But in the agricultural phases, mechanization or use of labor saving animal-drawn implements were still minor in scope and effect.
Despite increased production, financing the new steam-driven central created major problems for Manuelita during the first decade of its operation. It seems to have been difficult to sell the amount of centrifuge sugar which the mill could produce when in full operation. The regional market was restricted and much of the distribution was under the control of local, competing producers. Transport costs and fluctuating sugar prices still made it difficult and risky to sell sugar profitably on the Bogota market. Yet, these marketing limitations had to be overcome since it was essential to maintain high production in the mill to meet the interest on money borrowed for the construction of the central (Eder: 485-487).

A railway between Cali and the Pacific port of Buenaventura was finally completed in 1915 and reached Palmira in 1917. This allowed sugar from the Cauca Valley to be profitably shipped to the exterior during periods of high prices. Transport costs still remained extremely high but the price of sugar rose tremendously during World War I. A small export trade now began to develop for at least some Cauca Valley sugar.\(^\text{13}\)

Between 1915 and 1918 additional sugar making equipment was installed which effected a 35% increase in production capacity reaching 6,000 to 7,000 tons of sugar per year in 1918 (Eder: 492-493).

The increased amount of cane ground required new cane land and more cane workers. By 1918, during the first stages of expansion, somewhat more than 500 men were employed in the Manuelita fields and factory. We may consider the 1918 census of the Manuelita central as a kind of base-line for the modern phase of production.

<table>
<thead>
<tr>
<th>Land</th>
<th>2,050.0 acres total</th>
</tr>
</thead>
<tbody>
<tr>
<td>In cane</td>
<td>1,003.3 acres</td>
</tr>
<tr>
<td>Improved pasture</td>
<td>437.6 acres</td>
</tr>
<tr>
<td>Natural pasture</td>
<td>168.5 acres</td>
</tr>
<tr>
<td>Coffee plots</td>
<td>51.5 acres</td>
</tr>
<tr>
<td>Woodland</td>
<td>337.3 acres</td>
</tr>
<tr>
<td>Campamento</td>
<td>36.3 acres</td>
</tr>
<tr>
<td>Factory and yard</td>
<td>15.8 acres</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mill</th>
<th>A steam-driven mill with an annual capacity of 6,000 to 7,000 tons of sugar.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Field Equipment and Stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 major irrigation canals</td>
</tr>
<tr>
<td>3 kilometers of permanent railway</td>
</tr>
<tr>
<td>10 kilometers of portable track</td>
</tr>
<tr>
<td>60 rail carts</td>
</tr>
<tr>
<td>101 ox carts</td>
</tr>
</tbody>
</table>
Let us attempt to estimate the amount of cane available on the Manuelita plantation. Approximately 1,003 acres were under cane cultivation. A cautious estimate would place typical Manuelita cane yields in 1918 at about 44 tons per acre (70 tons/plaza) at best (Eder:589; Knight, 1968:98). Considering that cane required an average of 18 months to mature, the maximum annual cane supply available from the approximately 1,000 acres of cane land owned by Manuelita would be less than 30,000 tons per year. The Manuelita mill of that period purportedly extracted 10% sugar per weight of cane. This likely represented optimal cane and milling conditions and was probably rarely achieved. The Manuelita cane fields then supplied the mill with cane sufficient to produce well less than 3,000 tons of sugar. But the mill capacity was between 6,000 and 7,000 tons of sugar annually. The cane supplied by the Manuelita lands provided the raw material for roughly half of the mill capacity. If the increased production capacity provided by the new mill were to be utilized, additional cane had to be acquired.

Could the additional cane be supplied by expanded plantings of the land already owned by Manuelita? It might appear so. Only one half of the land owned by the plantation was actually planted in cane. Could pasture land be replaced by cane fields to produce the additional cane supply without the acquisition of new land? This seems unlikely. The 527 head of stock mentioned in the census of 1918 provided the primary traction power in cane transport and in all other phases of agriculture. They were not beef cattle which could be displaced to distant, marginal fields. Work oxen had to be kept near the centers of plantation field activity. Until mechanization of field processes, a development that reached fruition only after World War II, sugar plantations required a large amount of pasture land for their work animals. Moreover, the amount of plantation woodland was quite small and was usually the least suitable land present for growing cane, being difficult and expensive to clear, drain and prepare. Therefore, Manuelita began extensive purchases of additional cane land. The upward trajectory of land acquisition was linked with continuing expansion of the mill's capacity.
Continuous Expansion

Some of the other large ingenios in the region had installed new equipment and also began to manufacture centrifuge sugar by the mid-1920's. Central Providencia began operation as the second sugar central in the Cauca Valley in 1926 and was followed by the establishment of Central Rio Paila in 1929. In 1933 two smaller sugar mills, Bengala and La Industria, began producing centrifuge sugar. By 1935 there was a sixth and by 1938 a seventh central in the Cauca Valley. Other centrales opened during the next 12 years, so that in 1950, 20 of the present 21 centrales in the region had been established (Eder: 589, 590; Central Condor, 1965:93, 94).

Manuelita responded to this competition by continuing to expand the capacity and efficiency of its mill. Between 1928 and 1932 it greatly expanded its sugar-making equipment (other than grinding) which allowed round-the-clock milling. The most important step in reducing the per unit cost of producing sugar was the elimination of the prevailing pattern of 12 hour factory operation in favor of round-the-clock milling. When the price of sugar was low, as it was from 1929 through the early 1930's, production costs in the 12 hour system equalled the price received. The introduction of 24 hour milling lowered production costs sufficiently to make the difference between profit and loss (Eder:582; Manuelita:143). Round-the-clock milling required a larger factory labor force. The increased amount of cane ground also required a proportionally greater increase in cane workers and cane land.

The tempo of land acquisition was further heightened after the 1928-1932 expansion of the mill. The 2,050 acres owned by Manuelita in 1918 were increased to 3,680 acres by 1931, grew to 9,920 acres in 1947 and soared to 16,000 acres by 1961 (Manuelita:136-137). Sugar producing was very profitable during World War II and land acquisitions increased at a rate greater than the expansion of the mill capacity. Expansion of cane handling and sugar making apparatus occurred between 1953 and 1955. This allowed the mill to process sugar near the level at which it could grind cane. The growth of the Manuelita central leveled off after 1960. In that year the mill ground 400,000 tons of cane and had a grinding capacity of 2,500 tons of cane per day. Approximately 84% of its 16,000 acres were planted in cane and the central employed close to 2,000 workers in its fields and factory. Further large scale expansion of the Manuelita plantation and mill does not seem to be contemplated. Instead, the owners of Manuelita have invested in the construction of a second large central in the Department of Cauca, using both newly acquired lands and processing cane purchased from colono cane suppliers.

Between 1918 and 1927 the Manuelita labor force in the mill and in the fields increased from about 500 to approximately 1,000 men. During the mid 1930's its work force further expanded to 1,200 and then 1,500 men. By the early 1930's the majority of these workers appear to have been native to the
Cauca Valley 'plantation' region but only a small minority retained ownership or use of garden and house plots. They were basically a 'rural' proletariat. (Although it would be an error to disregard the wide influence plantation management still had on the social and political lives of its workers (Manuelita, 1964:121-122). Movement from job to job was quite usual and labor instability was accepted for many of the large number of 'single' workers housed in batay barracks. Piece-rate payments applied to all employment other than foremen, skilled technicians and clerical-administrative staff. A twelve hour work day was standard for the industry and social security payments were non-existent. In 1935 the mill workers on Manuelita succeeded in organizing and were able to win union recognition (the first in the sugar industry) in their 1936 strike (Manuelita, 1964:183, 185). Within a few years the field workers were also organized. Incipient labor unions were appearing among other cane workers by the end of the 1930's and it may be presumed that pressures for increased wages was a factor fostering the first major phase of mechanized cane agriculture in the region. In addition, the tractors which now became deployed in strength on the cane fields may have provided lower capital and operating costs than animals in the long run. Whatever the mix of techno-economic reasons, mechanization of field operations now began in earnest.
CHAPTER III

THE MECHANIZATION OF CANE AGRICULTURE

The Beginnings

The first indication that thought was being given to labor-saving devices in cane agriculture in the Cauca Valley was the spread of mule-drawn cultivating plows and wheeled, heavy plows in land breaking during the last decade of the 19th century. The shift from mule back to ox cart transport for harvested cane on Manuelita after the turn of the century was a trend in the same direction. In 1911 the first gasoline tractor was used in the Cauca Valley sugar fields, although for more than a decade they remained a mere novelty.

One of the first attempts to mechanize the land preparation phases of agriculture occurred in 1921. In that year the Manuelita plantation imported a Fowler steam plow. This was a locomotive-sized machine weighing 30 tons which pulled a set of plow shares across a plot by means of steel cables and pulleys. It proved impractical. It is not clear when gasoline tractors were introduced in quantity to the larger plantations but photographs of field activity taken on Manuelita in 1928 indicate that by this time they were already in regular use for some heavy agricultural work. Nevertheless, even partial mechanization was rare in Cauca Valley cane agriculture. The Chardon agricultural commission of 1929 reported that very superficial soil preparation using small, ox-drawn plows, was still by far the most usual pattern in Valle cane agriculture (Chardon, 1929, quoted in Manuelita, 1964:200).

The Shift to Tractors

No published data is available on the productivity of labor and machines and the use of animals in various phases of Cauca Valley cane growing during the recent past. Plantations did and continue to view such statistics as comparable to special trade secrets. Because of this I have attempted to compile some rough tabulations drawn from discussions with informants. The following estimates are taken from recollections of informants for Central Tupia during 1938-1940. Central Tupia was broadly comparable to Manuelita at that time. The data has particular importance in that it deals with the period of change-over from animal to machine-powered cultivation on the larger plantations.

By 1939, most of the phases of land preparation (plowing, harrowing, and furrowing) at Central Tupia were already done with tractors. Ox-drawn plows were used only on sections of rough and swampy ground where tractors were not effective. (But oxen were still the main traction force on most of the trapiches in the area and indeed were still used extensively
on some smaller centrales. Although these early tractors were not very powerful and the initial plowing to break up the rows of matted ratoons was still slow, the tractors were particularly effective for furrowing and harrowing. Ox teams were not only less powerful and slower than tractors but also had to stop to rest a good part of the time. Nevertheless, even on Central Tupia, tractors were little used in any of the field work other than land preparation. Planting was entirely by hand.

Cultivation was still mainly unmechanized in 1939. Manual cultivation with palas still constituted the basic form of weeding in the cane plots themselves. Small, mule-drawn plows and harrows were sometimes used in the cane rows and were the primary means of weed control on the margins of cane plots, roads and irrigation ditches. Cane plots were usually cultivated twice, although there was considerable variation from one plot to another. When manual labor was applied in cultivation, factors such as differential weed infestation, the character of the soil, and the condition of the cane were more fully taken into consideration. When tractors are applied to cultivation today the time taken for each weeding is about the same - the time it takes to drive a tractor, fitted with a cultivating plow, slowly through the plot. Probably the greatest saving of labor input was made when tractors were extensively applied to cultivation. But in 1939, tractor cultivation was only rarely used on Central Tupia and was virtually untried on most of the smaller surrounding farms.

The harvest phase was similar to that in existence today. The labor input required to harvest a plaza of cane was much more uniform that that involved in cultivation. A typical harvest gang of about 30 men working on the better-kept Tupia plots cut and loaded a little more than one plaza per day. While cane cutting was much the same in 1939 as today, the manner of cane transport was rather different. In 1939, most of the cane was transported from the fields to the mill in light rail carts which could be moved into the fields. Portable track was laid into each field harvested and moved along the cutting line. Ox drawn rail carts were moved into the fields, loaded and run out to a permanent rail spur. This system involved a considerable labor input, and a special team of track layers and transport workers was attached to each harvesting gang.

Consider a typical set of work rates for ox and tractor-drawn implements on flat, dry cane land in 1939. Work days for men, tractors and oxen have been here converted from the typical 12 hour day of that period to the current 8 hour work day. The reader is warned that the following data are only approximate, although the general order of labor, animal and machine input is held to be correct. Remember, one plaza equals 1.58 acres.
### CHART 2

Labor, Machine, Animal Input for First Year Cane; Central Tupia, 1939

#### Land Preparation:

<table>
<thead>
<tr>
<th>No. of Operations</th>
<th>Tractor Cultivation (Days/Plaza)</th>
<th>Ox Team Cultivation (Days/Plaza)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plowing (1)</td>
<td>1.5</td>
<td>9 - 12</td>
</tr>
<tr>
<td>Harrowing (2)</td>
<td>0.37 - 0.30</td>
<td>6+</td>
</tr>
<tr>
<td>Furrowing (1)</td>
<td>0.15</td>
<td>3</td>
</tr>
<tr>
<td>Average Total</td>
<td>2 man days</td>
<td>20 man days</td>
</tr>
<tr>
<td></td>
<td>2 tractor days</td>
<td>20+ ox days</td>
</tr>
</tbody>
</table>

#### Planting (No Tractors Used):

- **Planting**: 7.5 - 9
- **Cutting and transport of seed cane**: 3 man days (plus 2-4 oxen)
- **Average Total**: 11.25 man days; 3 ox days

#### Cultivation:

- **Manual First Weeding**: 9 - 15
- **Manual Second Weeding**: 6 - 7.5
- **Mule Cultivation**: 0.50
- **Average Total**: 19.7 man days plus 0.5 mule days

#### Harvesting and Transport:

<table>
<thead>
<tr>
<th>Harvesting -</th>
<th>Man-Days Per Plaza</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutters</td>
<td>25.0</td>
</tr>
<tr>
<td>Loaders</td>
<td>7.0</td>
</tr>
<tr>
<td>Foremen and Talleymen</td>
<td>3 - 4</td>
</tr>
<tr>
<td>Average Total</td>
<td>35.5 man days</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cane Transport -</th>
<th>Man-Days Per Plaza</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tracklayers</td>
<td>3</td>
</tr>
<tr>
<td>Cart and ox tenders</td>
<td>3</td>
</tr>
<tr>
<td>Average Total</td>
<td>5.5 man days</td>
</tr>
<tr>
<td></td>
<td>6.5 ox days</td>
</tr>
</tbody>
</table>
The following chart presents the total expenditures of man, animal and machine input for all phases of cane growing on Central Tupia in 1939. It compares the then extant system where tractors were applied only to the land preparation phases to that where no tractor power is used at all.

**CHART 3**

**Comparison of Total Labor, Machine, Animal Inputs**

*Central Tupia, 1939*

*(All phases for first year cane; in 8 hour days per plaza)*

<table>
<thead>
<tr>
<th>Partial Mechanization</th>
<th>No Mechanization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tractor days</td>
<td>2</td>
</tr>
<tr>
<td>Ox and mule days</td>
<td>10</td>
</tr>
<tr>
<td>Man days</td>
<td>73</td>
</tr>
</tbody>
</table>

In sum, the tractors used on Tupia in 1939 were small and underpowered. They were regularly applied to only one phase of cane growing - land preparation. Despite these limitations the application of a tractor for 2 days accomplished the work of 18 man days and 20 ox days. The tractors also eliminated the required pasture land for these oxen and the labor involved in tending them.1a

With total reliance on oxen for traction, somewhat over half of the field labor is utilized in the non-harvest phases: 51 man days in land preparation, planting and cultivation, as compared to 41 man days in harvest and transport. Even with the early, rather limited, use of tractors there is a shift toward concentrating field labor in the harvest phase. With tractors applied to land preparation, we find only 33 man days utilized in all the non-harvest phases and 41 man days employed in harvest and transport. When tractors came to be applied extensively to the cultivation phase, during the 1940's and early 1950's, the shift in concentrating field labor in harvest work was even greater.

**Agricultural Mechanization Today; Central Condor**

Today field machinery has totally replaced animal traction for the land preparation phases on centrales, colono farms and even on trapiches. Tractor drawn cultivators have largely replaced mules on even the smaller cane farms. Although a substantial amount of manual labor is still applied in weeding, this is slowly being reduced by increasing use of herbicides. Harvested cane is now transported to the mill mainly by tractor drawn trailers, although a few of the older centrales still employ the ox and rail cart system on sections of land close to the mill. Only cutting and loading cane has remained essentially unmechanized.
The faltering beginnings of mechanization, which saw a few small tractors deployed on the fields of some centrales in the late 1920's and which as late as 1939 had only begun to affect most agricultural tasks, became based upon a sizeable fleet of equipment by the early 1960's. In 1963, 17 centrales (of the 20 centrales then in operation) in the Cauca Valley reported using 156 heavy caterpillar tractors, 528 wheeled tractors, 25 graders and other heavy field equipment. The bulk of the cane was transported in over 2,800 cane trailers and rail wagons (Manual Azucarero de Colombia, 1964:40-118). This total does not include the tractors and other agricultural equipment used by colono farms delivering cane to these centrales, nor the trucks used to transport cane and the finished sugar, nor the fleet of jeeps operated by most centrales. In addition, centrales have a large stock of non-powered agricultural equipment, a wide range of disc plows, harrows, cultivators, chemical sprayers and other more exotic implements.

According to agronomists at Central Condor, the most rapid steps toward mechanizing and modernizing field practices began in the late 1950's. Until that time the only uniform advance was the increasing use of tractors in cultivation and in cane transport. Important changes took place in the next five years and continue today. Heavy, wheeled tractors, a sign of modernity a few years ago, have been virtually replaced on larger centrales by caterpillar tractors for all phases of land preparation. As one central engineer said, with obvious pride, "Not only are mules a rare thing in the fields now, but even tractors are being supplanted in many operations." The following discussion of central cane agriculture relates specifically to the conditions existent on Central Condor during 1964 and 1965. It is nevertheless representative of the agricultural processes operative on the larger Cauca Valley centrales in general.

**Land Preparation**

Preparing land and replanting cane is by far the most costly single phase of all the field processes. As of 1965, this phase is fully mechanized. Not even the smaller colonos use animal traction for land preparation anymore. Wheeled tractors generate relatively low traction for the heavy work of preparing land for cane. In wet fields their luged tires can tear up new and old cane plots badly. This shift has been rapid and nearly complete on the large centrales. Caterpillar tractors are used in plowing, sub-soiling, harrowing and furrowing while wheeled tractors are now used mainly for cultivation and transport. Indeed, even the size of the caterpillar tractors used is increasing.

The acquisition of heavy caterpillar tractors has allowed centrales to employ more elaborate techniques for land preparation as well as to reduce the costs of this phase. Heavy caterpillar tractors methodically prepare the large plots, some of which are larger than an entire colono farm. Decep-
tively slow at cursory inspection, the caterpillar tractors move at a surprising speed. On foot, one has to keep up a steady trot to follow them — and they hardly pause. Four or five heavy machines are frequently deployed in the same field, each carrying out a different operation. Plowing, sub-soiling, disc harrowing, and leveling may be proceeding at the same time on different parts of one plot. There are only a handful of foremen and machine operators on the fields during this phase. The large open plots, the powerful machines and the few men can be a breathtaking sight.

On Central Condor, preparing land for replanting involves the following steps. All the ratoons are torn up with heavy toothed, disc plows drawn by caterpillar tractors. This process is repeated two or three times). The broken fields are then given a sub-soiling (a form of deep plowing) with a massive harrow-like apparatus. This process loosens the soil to a greater depth (about 2 feet below the surface) than is possible in ordinary plowing and allows the cane to root more extensively. Sub-soiling is only feasible when land preparation is carried out with heavy caterpillar tractors. Although considerable controversy still revolves about where and when sub-soiling should be applied, its general value is widely appreciated.

Sub-soiling is followed by ordinary plowing and harrowing. Plowing may be repeated more than once, depending upon how compact the soil was initially and how loose it is intended to be. The heavy disc plows which cut deeply into the soil are pulled exclusively by caterpillar tractors. Even the largest wheeled tractors cannot efficiently manipulate such plows. Harrowing immediately follows plowing. Disc 'harrows' are exclusively used. They cut, turn and break the clods produced in plowing. This process serves to level the field and to create a loose cap of aerated soil which reduces the loss of ground water by evaporation. Each pass of the harrow works a 10 to 12 foot swath. Harrowing proceeds more rapidly than the preceding phases and on centrales this operation is now repeated more than was formerly possible. Depending upon the conditions of the particular plot, a field may be harrowed three to five times on central land.

Finally, a lighter tractor-drawn plow is used to throw up the furrows in which the cane rows are laid. The tractors move slowly and carefully to produce straight rows. Furrowing plows are often set on a wide carriage behind the tractor and open a number of furrows at a single pass. Finally, tractors or small caterpillar tractors are used on many centrales to cut the transverse irrigation ditches which have been obliterated by the preceding phases of land preparation.

Prepared fields may lie unplanted for a week until a work force is available, but rarely longer. Planting on Central Condor, as in all Cauca Valley cane fields, is still largely a manual operation. Specially grown seed cane is harvested, cut into sections and loaded into large cane trailers
by a gang of 6 to 10 men. The trailers are slowly drawn through the already opened furrows in the fields being planted. Three or four men throw piles of seed cane from the trailer into the open furrows. Another 6 to 8 men proceed behind the trailers and lay the cane sections end to end in the furrows. Such a gang can plant an average of 16 acres in a day. A planting gang usually contains 15 to 20 men, although more than one gang is frequently deployed in planting a particularly large field.

After the seed cane is laid in the furrows, it is covered with a few centimetres of soil. This work is done entirely with palas and requires approximately two to three times the labor of the previous phase. While covering the cane by tractor-drawn implements would provide a large saving in labor costs, no central has really mastered the technique of mechanically covering the cane with just the right amount of soil. Central Condor does occasionally employ tractors in this manner but this seems to be more in the nature of large-scale experimentation.

Heavy irrigation is applied immediately after planting and frequently during the first two months of growth. It is continued once or twice a month for the next 8 to 10 months. A single man, or two at most, will irrigate the entire plot in one or two days. Virtually all of the cane land owned by the central is irrigated, much of it by water pumped by electric or diesel engines from a number of deep wells. Although much of the rented land receives some irrigation, investment in irrigation ditches and in the labor needed to maintain them appears to be much lower than on the central owned land. ²

Cultivation

Cultivation on Central Condor in the period 1955-1959 was carried out primarily for control of weeds. At that time mule-drawn cultivators were still used for limited tasks, especially around the margins of cane plots. But most extensive cultivation was already done by tractor-drawn implements. By 1960, mules were very rarely used, but large numbers of workers were still deployed in weeding. The manual weeding was done with simple hand tools, primarily palas and machetes. Most plots were manually weeded at least twice and this constituted a considerable proportion of the labor used to grow a unit of cane.

By 1964, tractor cultivation was extensively applied to the fields about 4 weeks after planting. This serves both to uproot the weeds and to aerate the soil and prevent water loss. During the next 3 to 4 months tractor cultivation may be applied one or two more times. This phase is now extremely rapid and requires very small amounts of labor. Animal powered cultivation has been completely replaced by tractors on Central Condor. When the cane has grown too high to allow the passage
of a tractor, men with machetes and *palas* are detailed into the plots to weed. Manual weeding and cultivation is applied at least once, and more usually twice, to each plot. This is the most costly phase of cultivation. The thoroughness and the number of times weeding is carried out is not geared to producing the most cane per plaza but rather the estimated economic balance of labor costs and increased yields resultant from more thorough weeding. The number of men deployed in manually weeding a plot is extremely variable, ranging from 4 or 5 workers to over 30.

Workers engaged in cultivation and planting are organized in relatively stable gangs. The men in each gang, under the same foreman, work together on most days. These gangs are specialized only in the sense that some may be more consistently employed than others in planting, covering the cane, weeding or clearing the cane trash after harvest. Each gang is nevertheless involved in most of the different field tasks (other than harvesting) many times throughout the year. Such flexibility is necessary. Heavy rains may demand additional weeding manpower at one time, an extensive planting schedule may require a shift of gangs at another time, an increase in harvesting activity will demand more gangs detailed to clearing the harvest fields.

**Harvesting and Transport**

General field labor gangs are not employed in harvesting. A harvest team of 20 to 40 cutters and loaders under two or three foremen and checkers are deployed in a cane plot. The composition of harvest gangs is much more flexible and variable than that of general field labor gangs. Cutters and loaders are exclusively paid on a piece-rate basis - so much per ton cut or loaded. Cane cutters work independently, starting in a line facing the cane and cutting into the stand at their own speed. A cutter grasps the stalk, severs it at the base, pulls it free, slices off the top, strips the leaves and cuts the stalk into two or three sections, which he throws into a low pile behind him. Each man designates what he has cut by marked stakes driven in at the borders of his pile of cane. Loaders, one for every three or four cutters, enter the fields a short while after the cutters have built up piles of cane. One loader, or frequently a team of two, throw the cane from each pile into separate cane carts or trailers. One such trailer is generally filled from a series of cane piles of a single cutter. If cane from more than one cutter is loaded into a single wagon each portion must be clearly demarcated. There are typically four or five trailers in the process of being loaded at any time on one harvested field. In addition, a number of already loaded wagons may be awaiting transport to the mill and other empty wagons stand ready at hand.
A checker records the name of the cutter and the loaders against the designation number of each wagon loaded. When the wagon arrives on the central marshalling yard it is weighed and the amount of cane contained recorded. The piece-rate based wages of cutters and loaders are determined by this weighing.

On those sections of the central land where portable track and rail carts are still used, 2 to 4 men are employed in laying track and moving it to follow the line of cutting. Some oxen are still used to pull carts in this system. This requires an additional two men to handle the oxen. More frequently, however, the rail carts are now pulled by tractors. The great bulk of the cane is now transported in rubber tired cane trailers which are pulled directly into the fields, moved along the cutting line and hauled back to the mill by the same tractors. In addition to being faster than the rail cart system, this method eliminates the labor of tracklayers and ox tenders.

Labor and Machine Input on Centrales
And Colono Farms Today

The following two charts present estimates of labor and machine inputs in various phases of cane agriculture on Central Condor and on the fields of 20 of its colonos in 1964. Much of the data is drawn from Garcia and Zuluaga's (1964) study of the costs of cane production on Central Condor and on its colono farms. Translation of labor costs into labor input and some modifications of the figures presented for Central Condor and its colonos are based on my own field notes. In general, the figures presented here are to be considered as minimal, and probably underestimate the labor input on colono farms and especially machine input on centrales.

Labor and machinery input is approximately 20%-25% less for a crop of ratoon cane than for a newly planted crop. The reduction is due to the absence of planting operations for a ratoon crop. Since the cane tonnage per unit area declines with each ratoon crop, the amount of labor needed in the harvest decreases somewhat, although this is partly cancelled out by the increased difficulty of harvesting old ratoon cane. We must take the relative amounts of ratoon to new cane into consideration to arrive at an average of labor and machine input for the overall acreages. An average cycle for most colonos and centrales is to replant cane after the fifth harvest (although there is considerable variation from one plot to the next). Average total labor input per plaza is then based on 1/5 of the figure for new cane plus 4/5 of the figure for ratoon cane. Average total labor input per plaza per crop is then approximately 65 man-days for colonos and approximately 50 man-days for Central Condor.
### Chart 4

Labor Input and Machine Use Per Agricultural Phase:
Central Condor and Colonos, 1964

**First Planting (Man and Machine Days Per Plaza)**

<table>
<thead>
<tr>
<th>Field Phase</th>
<th>Colonos</th>
<th>Central Condor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td>(3)</td>
<td>(1)</td>
</tr>
<tr>
<td></td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>1. Land Preparation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plowing</td>
<td>2</td>
<td>.70</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.70</td>
</tr>
<tr>
<td>Harrowing</td>
<td>4</td>
<td>.84</td>
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<tr>
<td></td>
<td></td>
<td>.84</td>
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<tr>
<td>Furrowing</td>
<td>5</td>
<td>.22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.22</td>
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<tr>
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<td>-</td>
</tr>
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<td></td>
<td></td>
<td>2.50</td>
</tr>
<tr>
<td>Sub-Total</td>
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<td>1.76</td>
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<tr>
<td>2. Planting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cutting and transport</td>
<td>1</td>
<td>6.00*</td>
</tr>
<tr>
<td>of seed cane</td>
<td></td>
<td>?</td>
</tr>
<tr>
<td>Planting seed cane</td>
<td>1</td>
<td>4.29</td>
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<tr>
<td></td>
<td></td>
<td>.49</td>
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<tr>
<td>Sub-Total</td>
<td>10.29</td>
<td>.49</td>
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<tr>
<td>3. Cultivation</td>
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<td></td>
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<tr>
<td>Tractor cultivation</td>
<td>2</td>
<td>.42</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.42</td>
</tr>
<tr>
<td>Mule cultivation</td>
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<td>1.80</td>
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<tr>
<td></td>
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<td>-</td>
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<tr>
<td>Manual cultivation</td>
<td>2</td>
<td>9.46*</td>
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<tr>
<td></td>
<td></td>
<td>-</td>
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<tr>
<td>Application of weed killer</td>
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<td>3.00</td>
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<tr>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Application of fertilizer</td>
<td>-</td>
<td>-</td>
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<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Irrigation</td>
<td>-</td>
<td>-</td>
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<td></td>
<td></td>
<td>-</td>
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<tr>
<td>Other</td>
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<td>2.51</td>
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<td>2.16</td>
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<tr>
<td>Sub-Total</td>
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<td>.42</td>
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<tr>
<td>4. Harvest</td>
<td></td>
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<tr>
<td>Cutting</td>
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<tr>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Loading</td>
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<td>11.22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Supervision &amp; tally</td>
<td>-</td>
<td>3.00*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Sub-Total**</td>
<td>47.89</td>
<td>33.50</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>78.30</td>
<td>2.67</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.44</td>
</tr>
</tbody>
</table>

Note:  
(1) Average No. times operation repeated/crop.  
(2) Total Man days/plaza/crop.  
(3) Total Machine days/plaza/crop.

* Figures estimated from field notes.  
** Labor and machine input for cane transport is not presented here since reliable figures are not produced in available reports and were not obtained in field work. See footnote No. 2, Chapter III.
CHART 5

Labor Input and Machine Use Per Agricultural Phase:
Central Condor and Colonos, 1964

Ratoon Crops; Average 2nd to 4th Crops
(Man and Machine Days Per Plaza)

<table>
<thead>
<tr>
<th>Field Phase</th>
<th>Colonos</th>
<th></th>
<th>Central Condor</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(1)</td>
</tr>
<tr>
<td>1. Land Preparation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(not applicable)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Planting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleaning field</td>
<td>1</td>
<td>2.00</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Selective replanting</td>
<td>7</td>
<td>1.00</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td>Sub-Total</td>
<td>3.00</td>
<td></td>
<td></td>
<td>3.00</td>
</tr>
<tr>
<td>3. Cultivation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tractor cultivation</td>
<td>1</td>
<td>.37</td>
<td>.37</td>
<td>2</td>
</tr>
<tr>
<td>Manual cultivation</td>
<td>2</td>
<td>11.60</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Mule cultivation</td>
<td>2</td>
<td>1.80</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Application of weed killer</td>
<td>2</td>
<td>3.00</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Application of fertilizer</td>
<td>1</td>
<td>1.00</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Irrigation</td>
<td>-</td>
<td>-</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Sub-Total</td>
<td>17.77</td>
<td>.37</td>
<td></td>
<td>17.75</td>
</tr>
<tr>
<td>4. Harvest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cutting</td>
<td>-</td>
<td>24.00</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Loading</td>
<td>-</td>
<td>7.70</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Supervision &amp; talley</td>
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<td>?</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Sub-Total**</td>
<td>31.70</td>
<td></td>
<td></td>
<td>27.50</td>
</tr>
<tr>
<td>TOTAL</td>
<td>62.47</td>
<td>.37</td>
<td></td>
<td>48.25+</td>
</tr>
</tbody>
</table>

Note:  
(1) Average No. times operation repeated/crop. 
(2) Total Man days/plaza/crop. 
(3) Total Machine days/plaza/crop.

* Figures estimated from field notes. 
** Labor and machine input for cane transport is not presented here since reliable figures are not provided in available reports and were not obtained in field work.
To these inputs we must add the labor required in (a) cane transport and road maintenance and machine repair, and (b) foremen, talleyment and technical staff. These I would estimate (very approximately) as 5 and 4 additional man-days each per plaza respectively. This then gives us a total labor input of approximately 72 man-days per plaza per crop on colono farms and 59 man-days per plaza per crop on Central Condor. Translated into an eight hour day, this means a total labor input of 576 hours on colono farms and 472 hours on Central Condor per plaza per crop. Unfortunately, I am not able to give reliable estimates on labor and machine input for any of the transport phases. The previous charts then represent the great bulk, but not all, of the labor and machine inputs on Central Condor and its colono farms. Again, it should be emphasized that many of the figures are rough estimates. I believe, nevertheless, that they represent the approximate order of labor and machine inputs involved.

Continuing Mechanization

Application of Herbicides

In 1965 Central Condor, as most other centrales in the region, utilized increasing amounts of weed killer and herbicide. Pre-emergent weedkillers are applied at about the time of the first tractor cultivation, post-emergent herbicides at various times during the first 9-10 months of growth. Central Condor has apparently lagged behind other centrales in its use. Weedkiller is used sparingly and not on all fields. Moreover, it is still applied in a rather primitive way, largely by hand-operated spray pumps carried on the backs of men or by small tank carts wheeled along the roadways. Despite their high costs, herbicides are being widely adopted because of the savings they effect in manpower and wages. Although little quantitative data on the extensive application of herbicides was obtainable for Central Condor, the case of Central Sucre is quite instructive. Although Central Sucre is smaller and more committed to labor-saving agricultural practices than Central Condor, both centrales are broadly on the same level of agricultural mechanization.

Central Sucre shifted to intensive use of herbicide only in 1963. Herbicides had been used experimentally on a commercial scale for the previous three to four years but had generally proved to be less effective than the same amount of money spent on manual weeding. Good results were obtained after a few years of large scale commercial experimentation that solved numerous small but cumulatively important mistakes. These included using very effective but very expensive herbicides in too high solution, in applying spray too intensively and in spraying when oncoming rain tended to wash the herbicide off the weeds. Most important of all was the shift to
mechanical application. Juan Gomez, the Central Sucre field administrator, reported that:

When we were experimenting with the application of weedkillers we used hand operated sprayers with five gallon tanks. The men spraying the fields used to carry these on their backs. We still use this method to deal with weeds growing along ditches and places hard to get at. But spray-rigged tractors are the only economic method of applying weedkiller to large plots of cane. We were able to put together a very simple but effective spraying apparatus in our own repair sheds that can be added to any ordinary tractor.

Central Sucre still applies light tractor cultivation to its fields. Some manual weeding is still applied to fields that have been sprayed, especially for a final cleaning of weed infested cane. Occasionally, gangs of manual weeder are detailed to certain plots where spraying has not effectively suppressed weed growth. But all in all, the reduction in labor input in the cultivation phase has been staggering. One particularly rich and level section of the Central Sucre fields is approximately 1,500 acres in size. In the period 1961 and 1962 about 60 men were steadily employed in weeding and cultivation work on this section, in addition to occasional extra weeding gangs. In 1965, three spraying tractors, six tractor operators and aides, and 10 field hands carried out the bulk of the cultivation and weed control on this section with additional weeding gangs applied very infrequently. Large-scale, mechanical application of weedkillers has reduced the number of men employed in cultivation on this section to approximately one quarter of the previous number.

The switch to mechanically applied weedkiller on Cauca Valley centrales is not as extensive as the Sucre case suggests. Neither Centrales Condor, Tupia, Manuelita place the same reliance on large scale mechanical application of herbicides. Although Colombian agronomists have differing opinions about the economy achieved by weedkillers and although Central Sucre has gone further in implementing labor-saving agricultural techniques than most other centrales, the trend is clear. The proportion of field workers employed in the cultivation phase is being reduced. This phase is witnessing a rapid decline in the labor input required per unit of land.

**Mechanized Cane Transport**

Between the early 1950's and 1965 the narrow guage railways formerly used within the larger plantations to transport cane gave way to tractor-drawn convoys of rubber-tired cane wagons. These are hauled directly from the harvested plot to
the mill. The portable track system which uses ox-drawn rail carts continues to be used in the core areas of 5 or 6 of the centrales now operating in the Cauca Valley. But as the older equipment wears out it is replaced by tractors and cane wagons.

The rubber wheeled cane wagons are able to operate on public roads. This is the only feasible way, at present, of transporting large amounts of cane from the colono farms and from rented land scattered 3 to 25 miles from the mill. The tractor and cane wagon transport system has become essential with the increasing proportion of colono supplied cane now milled by centrales.

Today a relatively high proportion of central tractors are deployed in cane transport. The changes on Central Tupia between 1959 and 1963 throws some light on the transition to tractor-wagon cane transport. In 1959 Central Tupia obtained about one-third of its cane from colonos (5,600 plazas of own cane and 2,700 plazas of colono cane). Twenty-eight tractors and 183 cane wagons were used in transport, 15 tractors in cultivation and 28 wheeled and treaded tractors in land preparation. Despite the continued use of 5 locomotives, 148 oxen and 348 carts in rail transport, over 40% of the central tractors were devoted to hauling cut cane (Central Tupia, 1960, unpaginated). But by 1963 colono and rented land constituted about 60% of the cane milled by the central (8,308 out of 14,104 plazas). Twelve large caterpillar tractors were primarily responsible for land preparation and approximately two-thirds of the 59 wheeled tractors owned by Central Tupia were utilized in cane transport (Manual Azucarero de Colombia, 1964).

One of the major difficulties of tractor-drawn cane wagons is that they are rather slow, 10 to 15 miles per hour when loaded. This is not an important consideration if the fields are near the mill. But it becomes progressively important as the fields harvested are at an increasing distance from the mill. As the distance increases so does the proportion of time that the transport equipment spends on the road. This means a larger number of tractors and wagons required to transport any given amount of cane in a given time. Apart from the increased costs of fuel, labor and repair expenses involved in long range hauling, the large number of tractors and wagons needed for a given amount of cane involves increased capital investment in transport equipment. Ordinary commercial trucks are used by some smaller colonos and trapiches to transport cane. But these vehicles require a relatively long time to load and are costly in terms of loaders' wages. As central capacities expand, as rented and colono land is harvested at increasing distances from the mill, still greater investment in new types of cane transport equipment will take place.5
Problems of Mechanizing the Harvest

Just as land preparation and cultivation may be mechanized independent of the harvest, so too may the various phases of harvest (cutting, loading, and transport) be independently mechanized. By 1965, only the transport phase had undergone substantial mechanization in the Cauca Valley industry. Cane harvesting in the strictest sense of the word - cutting and loading - remains basically unchanged from operations practiced a half century ago, or earlier.

Mechanical Loading

A total of four mechanical loaders are used on 2 of the 21 centrales in the Valley. A number of difficulties arise with machine loading which do not have to be faced with manual loading and even highly capitalized centrales seem hesitant about the introduction of mechanical loaders at present. Mechanically loaded cane invariably contains more cane trash (cane top and leaves) and soil mixed with the stalks than hand loaded cane does. It therefore must be passed through a washing process before it can enter the usual grinding process and even then, increased amounts of the non-juice bearing trash is mixed with the stalks.

Central Sucre is the one central in the Valley which is primarily dependent upon machine loaded cane. It has found it necessary to adjust certain field techniques to effectively utilize its loading machines. This central quick-fires standing cane before harvesting in order to reduce the cane trash mixed with machine loaded cane. Such firing is intended to burn off much of the cane leaves without damaging the stalks and ratoons themselves. But, quick-firing is a tricky business. Ramos Nuñez, a leading authority on sugar cane cultivation in Colombia, holds that:

In countries where hand labor is scarce or expensive it is the custom to burn the cane immediately before cutting it, in order to reduce the costs of cutting. This system has been known to reduce harvest costs by 30% but because of rapid inversion the burned cane must be harvested and milled quickly and the plot intensively irrigated immediately. Where the soil does not take to irrigation well or where there is insufficient organic material, burning may produce greater losses in ratoons than it saves in labor costs. (Nuñez, 1965:75)
The mechanical loaders in use on Central Sucre during 1965 were medium sized caterpiller tractors mounted with hydraulic fork lifts. Their operation seemed relatively simple. The cane cutters threw cut stalks into regular rows behind them. The mechanical loader then moved along the rows of cut cane, scooping it up with its extended fork lift. When full, the loader drove to the nearby field road and dumped the cane into waiting cane wagons. A greater proportion of the ratoons are destroyed by the turning and braking of caterpiller tractors, however cautiously used, than by any form of manual loading. Machine loading increases the need for highly co-ordinated harvesting operations. The flow of cane from the fields to the mill becomes more vulnerable to blockages as the loading phase becomes dependent upon a few units. At Central Sucre two mechanical loaders handle virtually all of the cane processed. At the time of observation, both loaders were detailed to a single harvest plot. Although they have a high capacity, mechanical loaders are less flexible than teams of men loading manually. Breakdown of a single loader drastically reduces the amount of cane flowing to the mill. The central held a third mechanical cane loader in reserve in case of a breakdown. But even with reserve units, mechanized loading requires much fuller contingency planning than most centrales presently have for the manual method.

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The two mechanical loaders do the work of 25 to 35 men but Central Sucre has opted for mechanical loading only since 1963. According to the supervisor of the Sucre field operations, the present costs of mechanical cane loading are approximately the same as those of hand loading. He said that the introduction of the mechanical loaders was part of a long range policy of the central which expects and is preparing for wage increases. Given such wage increases, it is expected that machine loading will become more economical than manual loading.

**Mechanical Cutting**

A variety of machines exist for cutting cane mechanically. In Hawaii virtually all commercial cane is harvested by cutting-loading combines (Mollett, 1961). A large proportion of the cane harvested in Australia and in the U.S. Florida industry is now cut by machines. Large-scale experimentation in mechanical cane harvesting is taking place in Cuba (Cuba, 1964; Escobar, 1967). Although there has been some experimentation, mechanical cutting is used nowhere in the Cauca Valley today.

Many of the problems which exist for mechanical loading are exacerbated in mechanical cutting. Increased amounts of cane trash and dirt are mixed in mechanically cut cane. Additional machines operate in the fields, thereby damaging the ratoons. A greater degree of organization is required with increasing dependence upon a few harvesting units.
Capital costs are high. In addition, the introduction of mechanical cutting faces further difficulties in the nature of the cane lands and the particular cane used in the Cauca Valley today. These are difficulties which are of no significance when cane is cut manually.

An experienced cane cutter directs his blows so as to sever the stalk level with the surface of the ground. Taking the severed stalk in one hand, he cuts off the top section, whatever its height, strips the leaves and cuts the stalk into two or three pieces. It is extremely difficult to adjust mechanical harvesters to cut the stalk as close to the ground as is the case in manual cutting. The problems of disease and rotting which arise from leaving the stubble of cut cane above the ground must usually be met by adding another post-harvest phase: stubble shaving. Moreover, in the Cauca Valley cane fields the individual stalks of cane on any one plot are quite variable in height. Furthermore, a considerable proportion of the stalks do not rise perpendicularly from the ground. Although the blades of mechanical harvesters can be adjusted to different angles and heights, it is desirable that the cane growing in any one plot be more or less uniform in height. Cane tops should be at about the same height, with the majority of the stalks growing upright. When the above cane conditions are not met mechanical harvesting cuts and mixes a large amount of cane top with the cut stalks. The cane tops contain negligible amounts of sucrose. Large amounts of cane tops mixed with cane stalks significantly reduces the milling efficiency of the central. A labor team which sorts and strips the leaves from mechanically cut cane is often needed if unsophisticated machines are used.

The introduction of extensive mechanical cutting elsewhere has involved the selection and propagation of cane varieties which grow perpendicularly and to a uniform height. The P.O.J. 28-78 cane grown so widely throughout the Cauca Valley is notoriously deficient in the above features, despite its many other advantages. Hybridization and selection of cane varieties adapted to agronomic conditions in the Valley may be able to produce strains with the characteristics desirable for mechanical harvesting without significantly lowering the yield and resistance to disease. But in 1965, not even the largest and most modern centrales were ready to begin such a large-scale change to gain the labor-saving benefits of a fully mechanized harvest.

Another difficulty that arises in mechanical harvesting is that mechanical cutters have great difficulty on uneven ground. Blades and conveyor arms tilt and strike the ground, even when the unit moves slowly and carefully. This is not a great difficulty on the flat cane fields used by the centrales, but the rented lands and the lands of the increasing number of colono farms are much less suitable to mechanized harvesting.
The present ecological and technological obstacles to mechanization of the cane harvest do not constitute insuperable barriers since they have been solved in a number of other regional industries. The capital investments required for a total mechanization of the harvest, even of the largest plantation, would be less than the investments now involved in the expansion of mills. But labor costs of cutting and loading are low and continue to make the manual harvest less expensive than use of machines. The role of union organization and other processes which force real wages upward will have a crucial impact for the future implementation of mechanical harvesting. Central administrators are already considering the economics of as yet unrealized wage demands and are acquiring machines and organizational experience to meet these new conditions when they arise. The words of a field administrator on Central Tupia were echoed by a number of supervisors on other centrales. He said that:

Right now mechanized cultivation, machines, weed-killers and all of those things are not cheaper than using hand labor. Field labor is still cheap here in Colombia. Much of the changes in cane growing by means of machines and chemicals are in preparation for the labor contracts we will have to sign in the next few years. With each contract the workers have been getting about a 25% pay increase. Therefore we have to prepare to make do with less labor. The demands of the unions, once the workers held meetings and had organizations to speak for them has been a very big factor in forcing modernization [i.e. mechanization].

Summary

We have seen how differential mechanization of the field work has concentrated an increasing proportion of the field labor into the harvest phase, which now absorbs more than a half of the labor input utilized in cane growing. Earlier we discussed the expansion of the sugar industry and the increasing numbers of workers employed in it. There has been then an absolute as well as a proportional increase in the number of harvest workers in the sugar industry during the last twenty-five years. These two processes have been paralleled in many if not all of the New World sugar industries. But in most of these there has also been an important additional process operative. In most of the so-called safrano sugar industries the length of the harvest period has decreased to the point where it is primarily a seasonal activity. The shortened harvest period has usually meant an increasing proportion of cane workers who are fully employed only during the harvest and generally underemployed or unemployed during the remainder of the year.
The Cauca Valley sugar industry differs from the *safra* industries in that the harvest period has *not* been appreciably shortened and, for the region as a whole, continues throughout most of the year. But, as we will see in the succeeding chapters, many component units of the industry do go in and out of production for periods of the year. These fluctuations are most marked in the harvesting operations, although there is also an increase in short term use of planting and cultivation labor as well. Cane cutters and loaders while not seasonally employed are employed on a much more fluctuating basis than other workers in the sugar industry. This is an important difference in the labor pattern of harvest and other field workers, especially on colonio farms. The shift to a proportionally larger number of harvesters will be itself change, indeed has already changed, the overall pattern of labor stability in the cane fields.
CHAPTER IV

THE CENTRAL SECTOR

The Expansion of Centrales

The rise of steam-driven mills producing centrifuge sugar in the Cauca Valley was historically late and initially slow. Twenty-five years elapsed between the completion of the first mill in 1901 (Manuelita) and the opening of a second (Tupia) in 1926. In the next seven years three larger ingenios installed equipment to produce centrifuge sugar, Río Paila (1929), Bengala (1933) and La Industria (1933). Another was established in 1935 and the seventh opened in 1938. There was a continual increase in the number of mills in the Cauca Valley during the following 12 years. By 1950, 20 of the present 21 centrales operating in the region had been established (Eder, 1950: 589-590; Castilla Castilla, 1965: 93-94). Another was constructed in the mid-1950's. During 1964-65, three additional centrales were being built (two in the Cauca region), another had closed and many were undergoing massive expansion in mill equipment.

The increase in the number of mills does not by itself adequately reflect the growth of the sugar industry. More than a half of the present milling capacity of Cauca Valley centrales has been installed since 1950. As we have seen in the case of Central Manuelita, an initially small mill with relatively restricted production and with a limited amount of cane land began its most rapid expansion after the initial mechanization of the mill. Many of the larger sugar mills in the area today have gone through this process. Many have a history as fairly large, well-equipped ingenios before installing the grinding and sugar-making equipment which comprise the modern mill. They have grown to their present size through a series of enlargements and improvements. All of the larger ones have undergone rapid and extensive expansion in land and factory capacity since their initial establishment. There are, however, a few smaller mills which have remained relatively static in size or have expanded their initial installations only slightly.

The term central is not truly applicable to most sugar mills in the Cauca Valley until after the early 1950's. Strictly applied, "central" refers to a system in which a number of plantations and cane farms process their cane in a single mill, which because of pooled raw material and capital, is larger, more efficient and more economic to operate than mills for separate plantations could be. One of the arguments in favor
of centrales when they were first introduced in other Latin American sugar regions towards the end of the last century was that they would help maintain the existing cane plantations by increasing their milling efficiency and thereby make them competitive with producers having their own large mills. But in many areas where centrales were established they soon began to acquire actual possession of many of the plantations whose cane they ground. This process proceeded at a variable pace and resulted in variable degrees of land concentration. In most areas, centrales proceeded to expand their own holdings and to diminish their use of and dependence upon cane produced on the lands of separate suppliers. In the Cauca Valley the pattern has been somewhat different so far.

During the initial period of expansion, sugar mills in the Cauca Valley were built primarily to process the cane supplied by the lands of the plantation itself. Cane production on the plantation was expected to expand to provide the needs of the mill. The expansion of plantation lands through the purchase and incorporation of other cane farms was in some cases similar to the expansion of centrales elsewhere. But the central pattern of a large mill with its own lands, also grinding the cane of a number of cane suppliers, has only recently become important. The shift to colono cane supply became a consistent widespread central policy by the end of the late 1950's (Fadul and Peñalosa, 1961:68). In the Cauca Valley, then, the true central system appears to have evolved from a pattern of much greater concentration of field and factory processes on large plantations.

Some of the Cauca mills are part of a central system to a much greater extent than are others. There is both great variation in the amount of cane land supplying each mills and in the degree to which ownership of such land is concentrated. The total amount of cane land supplying each central ranges from about 3,000 acres to over 26,000 acres. The source of cane supply varies from virtually all the cane processed by the mill being grown by colonos to virtually all of the cane milled grown on the lands owned by the central. Actually, almost all centrales use a combination of colonos, rented land and their own land to produce cane for their mills. The relative proportion of each of these components of cane supply can be seen in Chart 6, which gives a breakdown of the ten Cauca Valley centrales which reported the sources of their cane supply for 1963.

There is also considerable variation in the amount of field equipment used on the lands of each central.
### CHART 6

Breakdown of Source of Cane Milled by Ten Centrales Reporting Completely, 1963

*(Manual Azucarero de Colombia, 1964:40-118)*

<table>
<thead>
<tr>
<th>Central</th>
<th>Total Area Supplying Cane (Acres)</th>
<th>Central Owned Cane Land (Acres)</th>
<th>Cane Land Rented by Central Suppliers (Acres)</th>
<th>Cane Land of Colono Suppliers (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condor</td>
<td>26,070</td>
<td>7,821</td>
<td>11,210</td>
<td>7,039</td>
</tr>
<tr>
<td>Tupia</td>
<td>22,285</td>
<td>9,158</td>
<td>5,661</td>
<td>7,465</td>
</tr>
<tr>
<td>Pichichi</td>
<td>11,670</td>
<td>3,928</td>
<td>3,002</td>
<td>4,740</td>
</tr>
<tr>
<td>Mayaguez</td>
<td>11,156</td>
<td>4,500</td>
<td>1,103</td>
<td>5,553</td>
</tr>
<tr>
<td>San Carlos</td>
<td>9,480</td>
<td>6,162</td>
<td>1,580</td>
<td>1,738</td>
</tr>
<tr>
<td>La Cabana</td>
<td>6,394</td>
<td>5,277</td>
<td>348</td>
<td>769</td>
</tr>
<tr>
<td>Sucre</td>
<td>6,320</td>
<td>3,160</td>
<td>2,528</td>
<td>632</td>
</tr>
<tr>
<td>El Productor</td>
<td>4,215</td>
<td>2,163</td>
<td>2,052</td>
<td>-</td>
</tr>
<tr>
<td>Balsilla</td>
<td>3,950</td>
<td>1,454</td>
<td>1,738</td>
<td>758</td>
</tr>
<tr>
<td>La Industria</td>
<td>2,997</td>
<td>2,697</td>
<td>300</td>
<td>-</td>
</tr>
<tr>
<td>TOTAL</td>
<td>104,538</td>
<td>46,320</td>
<td>29,522</td>
<td>28,696</td>
</tr>
</tbody>
</table>

Centrales in the Cauca Valley today vary in their mill capacity and the modernity of their sugar making facilities, in the size of their land holdings and in the proportion of the cane supplied by colono farms. The most generally used measure of mill size is the installed milling capacity - the amount of cane which the rollers could grind in 24 hours, operating at peak efficiency. Such milling capacity is virtually never reached, and in many cases the capacity of the rest of the central sugar making equipment would not be sufficient to process the amount of juice that would be so produced. Nevertheless, the installed milling capacity serves as a useful measure of relative mill size. In 1963 the milling capacity of Cauca Valley centrales ranged from 400 to 3,000 metric tons of cane per day *(Manual Azucarero de Colombia, 1964:16, 17)*. The actual amount of cane milled per central in that year varied from 25,000 to 547,000 metric tons of cane *(Chart 7 )*. 
<table>
<thead>
<tr>
<th>Central</th>
<th>Amount Cane Milled (Metric Ton)</th>
<th>Number Days Milled</th>
<th>Milling Period 1963</th>
<th>Labor Force 1963</th>
<th>Labor Force 1959</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manuelita</td>
<td>546,977</td>
<td>223</td>
<td>Feb 6-Dec 21</td>
<td>1,977</td>
<td>1,373</td>
</tr>
<tr>
<td>Condor</td>
<td>456,026</td>
<td>264</td>
<td>Jan 2-Dec 31</td>
<td>1,800*</td>
<td>1,506</td>
</tr>
<tr>
<td>Rio Paila</td>
<td>407,059</td>
<td>212</td>
<td>Jan 25-Dec 31</td>
<td>3,200</td>
<td>2,204</td>
</tr>
<tr>
<td>Tupia</td>
<td>374,650</td>
<td>317</td>
<td>Jan 2-Dec 19</td>
<td>2,000*</td>
<td>1,900</td>
</tr>
<tr>
<td>Pichichi</td>
<td>255,231</td>
<td>197</td>
<td>Jan 8-Dec 20</td>
<td>800</td>
<td>600</td>
</tr>
<tr>
<td>Mayaguez</td>
<td>199,167</td>
<td>263</td>
<td>Jan 8-Dec 27</td>
<td>600*</td>
<td>563</td>
</tr>
<tr>
<td>San Carlos</td>
<td>157,581</td>
<td>276</td>
<td>Jan - Dec</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td>Sucre</td>
<td>125,513</td>
<td>272</td>
<td></td>
<td>600*</td>
<td>520</td>
</tr>
<tr>
<td>Melendez</td>
<td>110,711</td>
<td>292</td>
<td>Jan 2-Dec 30</td>
<td>400*</td>
<td>587</td>
</tr>
<tr>
<td>Oriente</td>
<td>94,260</td>
<td>306</td>
<td>Jan - Dec</td>
<td>400*</td>
<td>300</td>
</tr>
<tr>
<td>Balsilla</td>
<td>76,631</td>
<td>247</td>
<td>Feb 1-Dec 10</td>
<td>400*</td>
<td>625</td>
</tr>
<tr>
<td>San Fernando</td>
<td>72,923</td>
<td>243</td>
<td>Jan 24-Dec 21</td>
<td>450*</td>
<td>600</td>
</tr>
<tr>
<td>La Cabana</td>
<td>60,150</td>
<td>253</td>
<td></td>
<td>440*</td>
<td>470</td>
</tr>
<tr>
<td>Bengala</td>
<td>58,904</td>
<td>186</td>
<td>Jan 2-Nov 27</td>
<td>400</td>
<td>600</td>
</tr>
<tr>
<td>El Productor</td>
<td>47,000 approx.</td>
<td>206</td>
<td></td>
<td>400</td>
<td>approx.*</td>
</tr>
<tr>
<td>Papayal</td>
<td>40,556</td>
<td>172</td>
<td>Jan 2-Dec 21</td>
<td>400</td>
<td>approx.*</td>
</tr>
<tr>
<td>La Industria</td>
<td>25,037</td>
<td>57</td>
<td></td>
<td>300</td>
<td>300</td>
</tr>
</tbody>
</table>

* Reconstructed estimates obtained in field.
63.

Central Condor

The core lands now held by Central Condor formerly supplied cane to a rather large panela trapiche which had been in more or less continuous operation since 1920. In 1945 a modern sugar mill was constructed which grew into what is now one of the biggest sugar centrales in the Valle.

The Central Condor Mill

The following description of the Central Condor mill is generally applicable to the seven or eight largest sugar centrales in the Cauca Valley. Most of the remainder are considerably smaller and much less modern. One can only appreciate the scale of such mills by going through them - they truly are factories in the field. Nevertheless, the Cauca Valley mills are small when compared to those in some of the major sugar producing regions of the world.

The Central Condor mill operates '24 hours a day', like all the larger mills in the Valley. To do this, large amounts of cane must be stored at the end of each harvest day. The greatest activity in the mill takes place during the two eight-hour day shifts, with a skeleton crew on the night shift. The mill actually grinds for less than 20 hours in a day - there are numerous stoppages every day and recurrent days when repairs or adjustments must be made. During 1963, the mill operated for virtually the entire year, but ground cane on only 264 days. Approximately 300-350 men work in the mill, including all shifts, technicians, operators, maintenance workers and general labor. About 50 other men work in the field machinery service shops nearby.

Harvested cane is transported to a marshalling yard beside the central mill where a large crane hoists three to four tons of cane, a wagon-load at a time, onto a large deck. A team of men channel the cane on to a conveyor belt which runs through a washing chamber to the shredder. The shredder is a rapidly revolving bank of closely set circular knives which reduce the cane to fairly small chunks. These flow into the crusher, a pair of heavy, toothed, steel rollers turning under high pressure. The crusher reduces the chunks of cane to pulp and small bits. The juice begins to run at this point. The cane mass then begins its passage through four sets of rollers. Each set consists of three steel rollers each six feet in length and three feet in diameter. They are set in hydraulic springs which produce sixty to eighty tons of pressure per foot of roller. These are turned by two electrical turbine engines which generate 1,500 horsepower. All of the grinding apparatus is incorporated in a single basin-like unit set on a massive foundation. The grinding phase involves the heaviest machinery in any central and is the most widely discussed aspect of factory operations. The efficiency of juice extraction for
different centrales is largely determined in this phase. During 1962 the mill ground an average of 85 tons of cane per operating hour, and extracted somewhat more than 80% of the juice.

The extracted juice is channelled off at each set of rollers and pumped into storage tanks. In the more modern centrales, including Central Condor and all the larger centrales of the Cauca Valley, the cane mass is sprayed with warm water near the end of the process and recirculated to achieve more complete juice extraction. Bagasse, the woody-fibrous residue of the cane from which nearly all of the juice has been extracted, leaves the end of the mill by a conveyor belt, passes through a dryer and is stored. It fuels the three boilers which generate steam for the electrical plant that runs the machinery of the entire mill.

The juice proceeds through the processes of clarification, evaporation and crystalization. Raw cane juice contains natural acids, cane wax and organic and inorganic impurities. The natural acids must first be neutralized or they will break down much of the sucrose into alcohol and unrecoverable sugars during the later heating processes. Initial purification consists of bubbling sulfur dioxide through slightly heated juice. The sulfur dioxide combines with and neutralizes much of the acids. Sediments and scum that form in this neutralizing stage are drawn off with a combination of rotary filters and traps. The treated juice is then passed into a series of large rotary cane juice clarifiers. These separate most of the remaining sediment from the juice. Finally, the clarified juice is filtered through a set of huge, bone-filled, filtration tanks. The main clarifying tanks have a combined capacity of 75,000 gallons, smaller tanks hold 20,000 gallons of juice. Filters and rotary drums are 20 feet and more in diameter.

The filtered juice passes into a set of juice heaters and then into a series of multiple-effect evaporators, each of which drives off a greater proportion of the water contained in the juice. To avoid the destruction of sucrose at high temperatures, the evaporators are under partial vacuum. This greatly reduces the temperatures required to boil the juice. When the bulk of the water has been drawn off, the final stage of evaporation is completed in the vacuum pans. These provide a more complete vacuum and a highly controlled temperature.

The crystallization of sucrose begins in the vacuum pans. It leaves as a heavy syrup and is completed in 13 special crystalizers. Sugar crystals are seeded into each load to speed precipitation. When the contents leave they are a granular, if somewhat syrupy mass. The sugar mass is then passed into a bank of 12 centrifuges. These spin at high speed and remove the remaining syrup from the crystallized sugar. The mass which leaves the centrifuges is what is commonly known as raw sugar. The only processes used to convert this raw sugar into commercial retail sugar are simple and inexpensive - drying, bleaching and packaging. The entire process of so-called sugar refining is thus circumvented by the Cauca Valley centrales.²
During 1964 the mill had an installed capacity to handle 3,000 tons of cane per day. In the previous year it milled 456,000 tons of cane to produce 58,000 tons of sugar, extracting over 90% of the sucrose in the cane. In addition to producing sugar, the mill complex also has a distillation plant turning out alcohol and also processes low quality syrup by-products for animal fodder. The many other by-products of sugar production are, as yet, little utilized, although one major central delivers a portion of its bagasse to a large (subsidiary) paper plant.

The above machines and processes are merely the bare bones of a modern mill. There are additional pumps, backup motors, conveyor belts, steam regulators, filters, tubes, more pumps and tubes, and in general a vast array of costly equipment. In its own way, it is quite beautiful. It does the work which machines, not men, should be doing - and it does it well. One can appreciate this fully only by spending some time in the ubiquitous trapiches, where most of the analogous processes are still manual.

Costs of mill construction and expansion are high and have risen sharply in the last decade. In 1950 the cost of establishing a new mill with modern machinery was approximately $1,250 U.S. per ton installed milling capacity, but about $3,000 U.S. per ton milling capacity in 1963. Expansion of already existing mills ran from $1,500 to $2,000 per ton (Fadul and Peñalosa, 1961: 67; Manual Azucarero de Colombia, 1964: 25). If we use an average cost of $1,800 U.S. per ton, the Central Condor mill, with an installed capacity of 3,000 tons in 1964, represents an investment in the order of $5,400,000 U.S. An expansion program to raise milling capacity to 4,500 tons will cost (using the above figures) at least $2,250,000 U.S. The figures are for mill costs alone and do not include investments in land, field and transport equipment, administrative and service structures, or the infra structure of roads, irrigation canals, housing, and so forth.

According to industrial publications, mill investment is (or can be) especially profitable in the Cauca Valley, particularly when linked to a colono system. In safra sugar industries where harvesting and milling extend only 120-150 days per year, the installed milling capacity required to handle a given amount of cane may be two to three times that needed for a Cauca Valley central, which can spread the harvest over the entire year. Continuous utilization of mill equipment 'throughout the year' allegedly results in lower fixed costs of milling and a lower rate of amortization (Manual Azucarero de Colombia, 1964: 24).
Conversion of Central Owned Land

The development of a sugar central from the former trapiche entailed not only the construction and expansion of the mill but also the expansion of land owned by the central. The increase in sugar production and the acquisition of new lands by the central for cane growing changed the patterns of land use in the immediate vicinity. According to Central Condor figures, land formerly under less intensive utilization, particularly pasture land and woodland, was acquired by the central and planted in cane (Chart 8).

During the last twenty years the pattern of land utilization on central holdings has shifted from a mix of cane, pasture and some woodland to an intensive conversion to cane. The introduction of bagasse-burning furnaces which eliminated the need of woodlands for fuel was already complete before the period here discussed began. But there was an ongoing replacement of animal traction by machines. This and the use of improved pasturage for remaining animals has allowed large sections of former pasture land on centrales to be plowed into cane. By the mid-1950's mechanization had already virtually replaced animals in all phases of central agriculture, although Centrales Tupia and Condor continued to use substantial numbers of oxen for cane transport. By 1964-65 oxen were used only on the core lands near the mill and their numbers had been greatly reduced. On many centrales they have been completely replaced by tractors.

The pastures for the work animals on Central Condor were formerly scattered in small sections throughout the central. These pastures now have been merged into the surrounding cane fields and the pasturage consolidated into a single unit of approximately 475 acres on land not suitable for cane. Whereas former pastures were mainly semi-improved meadows, pasturage is now treated as a crop. They are plowed, planted with heavy yielding forage crops, given chemical fertilizer and cut to provide 'hay'. This allows a much higher carrying capacity for livestock per unit of land than formerly.

Because of poor drainage, frequent flooding or the broken terrain, many sections of central land were not used to plant cane until recently. These sections were used as marginal pastures or remained in woodlots. Many of these sections are now being drained, leveled and filled in and prepared for cane at a cost two, three and more times that of preparing land already in cane. Drainage and irrigation canals must often be cut and fitted into the overall system. Extensive application of soil conditioners and fertilizers must frequently be made. It often takes years before sections produce cane economically. That centrales are now willing to bear the high cost of preparing what were formerly sub-marginal cane lands underlines the markedly increased demand for cane and cane lands.
### CHART 8

**Conversion of Land Into Cane Plots**

#### Central Tupia Land Use as of May 1960.

<table>
<thead>
<tr>
<th></th>
<th>Acres</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cane</td>
<td>8,852</td>
<td>72.1</td>
</tr>
<tr>
<td>Pasture</td>
<td>2,039</td>
<td>16.6</td>
</tr>
<tr>
<td>Woodlands and Monte</td>
<td>755</td>
<td>6.2</td>
</tr>
<tr>
<td>Roads</td>
<td>531</td>
<td>4.3</td>
</tr>
<tr>
<td>Buildings and Mill Grounds</td>
<td>95</td>
<td>0.8</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>12,272</td>
<td>100.0</td>
</tr>
</tbody>
</table>

(Central Tupia, 1960:3)

#### Former Use of Land

<table>
<thead>
<tr>
<th></th>
<th>Acres</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cane</td>
<td>2,314</td>
<td>18.9</td>
</tr>
<tr>
<td>Pasture</td>
<td>3,988</td>
<td>32.5</td>
</tr>
<tr>
<td>Woodlands, Wasteland,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monte</td>
<td>3,397</td>
<td>27.7</td>
</tr>
<tr>
<td>Swampland</td>
<td>371</td>
<td>3.0</td>
</tr>
<tr>
<td>Rice</td>
<td>1,961</td>
<td>16.0</td>
</tr>
<tr>
<td>Seed beds</td>
<td>206</td>
<td>1.6</td>
</tr>
<tr>
<td>Buildings and Mill Grounds</td>
<td>35</td>
<td>0.3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>12,272</td>
<td>100.0</td>
</tr>
</tbody>
</table>

#### Central Condor Land Use as of November '61

<table>
<thead>
<tr>
<th></th>
<th>Acres</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cane</td>
<td>8,739</td>
<td>88.9</td>
</tr>
<tr>
<td>Pasture</td>
<td>278</td>
<td>2.9</td>
</tr>
<tr>
<td>Woodland and Monte</td>
<td>218</td>
<td>2.2</td>
</tr>
<tr>
<td>Buildings</td>
<td>167</td>
<td>1.7</td>
</tr>
<tr>
<td>Roads and Mill</td>
<td>427</td>
<td>4.3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>9,829</td>
<td>100.0</td>
</tr>
</tbody>
</table>

(Central Condor, 1961:10)

#### Former Use of Land

<table>
<thead>
<tr>
<th></th>
<th>Acres</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pasture</td>
<td>4,887</td>
<td>49.7</td>
</tr>
<tr>
<td>Woodland, Wasteland,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monte</td>
<td>4,275</td>
<td>43.4</td>
</tr>
<tr>
<td>Swampland</td>
<td>430</td>
<td>4.4</td>
</tr>
<tr>
<td>Coffee, Cacao, Food Crops</td>
<td>237</td>
<td>2.5</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>9,829*</td>
<td>100.0</td>
</tr>
</tbody>
</table>

* By the early 1920's, roughly 1,000 acres of the above land was already in cane.
Consider the change in the pattern of utilization of land now held by Centrales Tupia and Condor. Chart 8 lists the land use of "all" holdings owned by these two plantations as of 1960 and 1961 and indicates how the land then held was previously utilized. (The period of land conversion recorded in these figures extends from the early 1920's to 1961 but was most intense after World War II.) It should be noted that these two centrales are in the heart of the most intensively planted cane land in the Valley. Moreover, these two corporations have engaged in a more rapid expansion than some other Cauca Valley centrales. The changes in land use described here are then representative of the more advanced cases of land concentration in cane. Nevertheless, the general pattern applies, to a somewhat lesser extent, to all of the centrales.

The most dramatic change in land use on these fields has been the extensive spread of cane. Cane lands amounted to only 12% to 15% of the previous crop pattern (if we include the Condor cane land of the early 1920's) but now constitute approximately 85% of the land owned by the two centrales. Pasture, woodland, and monte, which previously constituted about three-quarters of the land considered, has been reduced to a little more than 10% of the land owned by the centrales. Woodlands and "wasteland" have been reduced to one-eighth of their former size while pastures are no more than a quarter of their former size. Actually, the concentration of land in cane is even higher than indicated by these figures. In 1963 Central Tupia had rented land and colono suppliers with an additional 12,650 acres in cane, while Central Condor obtained cane from approximately 18,350 acres of additional rented and colono land.

Colono and Other Land

While there has been extensive acquisition of land by Central Condor itself, it should be noted that in 1963 only about 30% of the land supplying cane to the mill was actually owned by the central (Manual Azucarero de Colombia, 1964:113). (Although, as we shall see later, such official figures can be misleading since rented land may be that of farms owned by the same corporations which own the mill.)

<table>
<thead>
<tr>
<th>Cane Supply of Central Condor, 1963</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Area Suppling Cane to Central Condor</td>
</tr>
<tr>
<td>------------------------------------</td>
</tr>
<tr>
<td>26,070 acres</td>
</tr>
<tr>
<td>100%</td>
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One of the difficulties involved in expanding the area of cane supply, both when acquiring new land and when contracting cane from additional colonos, is that the cane is produced at an increasing distance from the mill. The far flung and scattered distribution of colonos, rented land and central land now supplying cane to Central Condor can be seen in Map 2. The transport costs per unit of cane rises sharply. Costs of transporting cane from colono fields to the mill are considerable, averaging .70 pesos per ton per kilometer for Central Condor in 1964. With colono fields at an average distance of 18 kilometers, and an average yield of 60 tons per plaza, average transport costs are 756 pesos per plaza for colono cane. (This is almost as much as the cost of the harvest itself.) Contracts had been let to transport colono cane from a distance of 45 kilometers during 1966. This is a greater distance than had formerly been held economic to haul cane, and the central was required to bear the transport costs itself. In 1964 and 1965 Central Condor was engaged in construction of access roads which when completed were to shorten the hauling distance of the cane received from the more distant colonos. It was said that in some cases the new routes spelled the difference between economic and uneconomic cane supply. Cauca Valley centrales, especially the larger ones most involved with colono cane supply, were much concerned with developing methods of more economic cane transport and a number of new techniques were being tried. Nevertheless, it would seem that the cost of transporting ever more distant cane will be the ultimate limiting factor of the size of mills in the Cauca Valley as it is elsewhere.

Despite such problems, during 1964 and 1966 Condor continued to increase its production and planned for yet further increases in milling capacity. The central staff emphasized that the additional cane supply would not be acquired by purchasing additional land. The land policy of the centrales during recent years has been to acquire additional cane through increasing the number of colonos and, when this is not feasible, to rent land which the central would cultivate itself. Central administrators in general held that with the rising price of cane land it was much more profitable for the central to buy contracted colono cane than acquire new land. This was an increasingly viable alternative with the growth in the number of farms planting cane for sale. As one Central Condor official said,

_We have enough land now. We're not going to buy any more - not with the cost of land in the Valle today. It's much cheaper to rent land or contract colonos for cane. That way one doesn't have all the expenses and difficulties that exist with developing new land of our own._
Reliable data regarding the cost and profitability of cane lands are difficult to obtain and even more difficult to weigh. Fadul and Peñalosa provide a breakdown of the average investments in land and equipment necessary for the production of an additional ton of sugar on the Cauca Valley centrales for 1959-1960 (Fadul and Peñalosa, 1961:67). Investment costs at then current prices were (in U.S. dollars) $44 for mill expansion, $16 for field and transport equipment, $10 working capital, $39 for land preparation and cultivation and approximately $100 for the 0.2 plazas of land required. If we exclude the recurrent costs of cultivation, the costs of land constituted $100 of the total $170 additional investment in fixed capital. By 1964, land costs have probably risen proportionally more than other costs.

In 1964, García and Zuluaga (1964:39, 61) calculated 8,000 pesos per plaza as the average catastral tax evaluation for colonos farms and Central Condor land. (They estimated the real value of Central Condor land at between 10,000 to 12,000 pesos per plaza.) But during 1964 and 1965 actual land prices in the area around Central Condor were higher than those presented by either Fadul and Peñalosa or García and Zuluaga. Two land transfers of which I have personal information involved purchases of smallholder plots by colonos farmers for conversion to cane. The two plots cost 12,000 to 14,000 pesos per plaza. Land already prepared for cane was even more expensive. Even allowing for the economics of large scale land purchases and using a figure of 13,000 pesos per plaza, purchasing the 11,550 plazas of rented and colonos land which supplied cane to Central Condor in 1963 would cost something in the order of 150 million pesos (or about 15 million U.S. dollars, before devaluation).5

The high cost of cane land does not, of course, answer the question of the relative profitability of renting, contracting, or actually purchasing such land. At least some major centrales have purchased and operate large tracts of land under dummy corporations as colonos farms. In Chapter VII I discuss the possibility that the present spread of colonos farms may be an intermediate phase lasting while the centrales concentrate their investment in mills and machinery, and possibly giving way later to fuller land concentration. Speculatively, another factor which may be relevant to the increasing reliance of centrales on colonos suppliers is the 'threat' of increased land taxes for large plantations as part of a future program of land reform.6 At present, land taxes in the Central Condor area seem to indicate that they were of minor significance for larger producers (García and Zuluaga, 1964:61). The catastral tax for colonos supplying Central Condor in 1964 was an average of 56 Colombian pesos per plaza per year (1% or 2% of cane production costs). This tax rate is approximately the same for smallholders owning 2 or 3 plazas and for centrales holding thousands of plazas (Fadul and Peñalosa, 1961:35). There appears
to be significant support in government and in sectors of the Colombian middle class for the introduction of heavier land taxes on a sliding scale for large estates. A more vehement but probably less influential demand for a halt to progressive land concentration and for opportunities to acquire actual land rises from the remaining smallholders. These now make up only a small minority of the population resident in the general plantation zone of the Cauca Valley. One reason for the increase in colono supply farms may be that centrales were wary about purchasing land which might soon come under heavier taxation. Although plausible, it is difficult to weight such claims — especially when implementation of land reform legislation appeared to be a dead letter in 1964 and 1965.

What are the reactions of the local people to the spread of cane fields? Not surprisingly, their reactions vary. Cane growers, many town merchants and a wide range of persons not connected with the industry take pride in the "progressive" expansion of the sugar industry. Interestingly, many cane workers, despite having no personal stake in the remaining smallholder sections in the area, felt a general antipathy toward the spread of cane fields. Many smallholders feel somewhat more vehement about the trend.

Let us consider the tenor of one man's view about the progressive expansion of cane. I do not know how general the feeling is, but it is a recurrent one.

As for you Adelberto, you can sell your land and buy a small house somewhere. You could probably afford one for the price of your land. And you could make a living working. But with the way prices are going up you'd never be able to get any land back again - here or in any place in the Valle. Even for twice as much. We can say that your land would just be plain lost. It takes twenty years to get a plaza or two of land - if you work and live like an animal. And even then you don't get it. People who get the land in inheritance just let it slip away. They won't even sell it to you or me. Just because the cane lords can give them the money immediately they sell it to them. They don't even get any more for it. They'd rather see the land go under cane and have their money quickly than take payments and have the land remain a poor man's finca.

You can see them chopping down the fincas now. Then come the bulldozers to level - and they knock down the houses too. They and their mayordomos and their foremen treat us like dogs at work. We live in a state of semi-slavery as it is. Now they want to make the slavery complete. They want to drive us off the land into caserios, into their houses and
Then if you say anything against them, if you don't grovel in front of them when you ask for your wage, if you don't accept what they throw to you, or maybe if they just don't like your face, they can tell you to get out and you'll have to get out.

This is all going to be a sea of cane - the whole Valle, all of the Cauca. They're going to knock down all the parcelas, cut down all the coffee and plantains, plow under all the maize and beans. We'll have to learn to eat cane, like the cattle. There'll only be the rich, their forement, and their slaves who work in the fields.

This vehement attachment to, and personalization of the land, this desire to remain 'independent' through having land of one's own, is quite atypical of most cane workers. Very few cane workers would consider skrimping and saving to purchase a plot of land to farm (although many wish for a house and yard and some hope to retire on inherited parcelas). In fact, the great majority of cane workers probably have very little interest in land per se, except as a valuable investment or item for sale. Ironically, even field workers generally have little desire for plots of their own - they are workers and not peasants. This is particularly true for those who work and live on centrales.

Resident Labor on the Central Batay

In addition to the mill, the various repair sheds and marshalling yards and the administrative offices, the central batay is composed of a number of residential compounds and certain service facilities. In 1964, about 1,485 persons lived on the batay, approximately 1,000 of whom were workers and/or salaried employees (empleados). They constituted about 55% of the 1,750-1,800 man labor force directly employed by the central. In addition, there were 485 women and children in the 150 families resident on the batay.

While the description of life on a central batay is not within the scope of this study, suffice it to say that it is much like a small company town. The family owning the central are seemingly more committed to an enlightened paternalism and some social-ideological direction than are other owners. This takes the form of 'voluntarily' providing certain social services along with a degree of manipulation.

For instance, the central operates a combined clinic and hospital serviced by two permanent nurses and a visiting doctor and dentist. The clinic is open a number of days a week to provide medical check-ups and preventative services for workers and their families. There is also an operating room for minor surgery and a 10-bed ward for workers injured in on-the-job accidents. One section of the clinic houses the offices of a social worker, whose duties were difficult to determine, and of a nutritionist who at the time seemed to be engaged in
determining the amount of Incaperina to be added to the mess hall food. However successful or salient their work, their presence indicates some interest on the part of the central in these areas. Nearby is a two-room primary school built by the central, which hires the teachers, buys the books and generally runs the operation. A few hundred yards away stands the cooperative store which has made the transition from its former status as a company store (for everyone refers to it as 'the cooperative'). It sells fresh meat, vegetables, and milk at prices competitive with those in the nearby market town, although most of its other goods are somewhat more expensive. It is a large, clean, new building with a modern bank-like department which facilitates credit.

Central services and interest extend to yet other areas. At the far end of the batay lies the adult recreation and education complex. There is a combined library and classroom in which central workers can peruse back issues of the journal Sugar and charge out copies of the few old textbooks and potboilers available. The educational director serves as librarian, teacher and movie projectionist. He gives evening classes in English and current events to a handful of men and occasionally distributes educational comic books alerting employees to the dangers of subversion and communism. The open-air movies shown weekly are the best attended facility on the batay, each showing finding 500 or more spectators. Beside the theatre is a roofed patio, the workers' casino, which sells soft drinks and has a billiard and a ping pong table. There are also well kept soccer fields. Neither of these are used to any extent by central workers, although the central team usually draws a large audience.

The remaining social services include a firehall and the local police station and jail. There is also a small company built church ministered to by a priest who makes visits during the week. Masses are moderately well attended by women and some children but men, especially field workers, rarely come. Occasional marriages and christenings bring out a greater mix of people. Last, but not least, are the offices of Catholic Action and the local office of the central labor union - nestled together beside the library. Of the central union, more later.

Despite all of the above, it appears (impressionistically, it is true) that the personal lives and thoughts of most resident workers remain largely unaffected and unreconstructed. Although batay life probably does have a somewhat deadening effect. Over 70% of the residents are 'single' men living in the barracks - they do not read the company literature or use the library; they do not have children and family to be affected by central regulations. When they want to drink or dance they walk the short distance to Bolo, which has a super-abundance of bars and a modest red light zone (zona de tolerancia). Social relations and information is not, for most, limited to that existing on the batay. Virtually everyone has a transistor radio capable of blaring out music, news and endless sport reports. Although admittance to the central batay is restricted by a
control post manned by company guards, workers can come and go without difficulty. Most of those resident on the batay have friends or relatives throughout the region and Sundays are widely used for visiting villages, towns, and even the city of Cali. While there are important differences between living on a batay and in an 'independent' village or town, life on the central is not the encapsulated society formerly existant and still extant in some Latin American plantation regions. Cauca Valley central workers are a part of regional and national society. One feature of batay life which is consonant with classic company towns is the separation and ordering of residence and interacting groups according to place in the company-occupational hierarchy.

Off the main road leading to the batay stand six residences, the Big Houses of the owning family and top administrators. Each house is set in lush, well-tended gardens and patios, even though the owners rarely visit the central and only two of the administrators live there. The rambling California-Spanish ranch houses with their swimming pools and car ports have an air of a republicanized aristocracy. Nearby (but not too near) is a group of about 20 houses, duplicating a block in a U.S. middle income suburb. These are the permanent residences of the professional staff - agronomists, agricultural, mechanical, civil and chemical engineers, secondary administrators - their families and their domestic servants. A mesh wire fence bounds the compound but is probably unnecessary. Except for a few exceptional men, this group of Colombians and displaced Cubans has isolated itself from social interaction with the rest of the batay. This, of course, is not different from analogous North American situations.

A few hundred yards from this compound stands the casino - a combined dormitory, club and cafeteria which houses the 30 to 35 junior white collar staff. These are single men who range from assistant accountants and laboratory technicians to surveyors. These are men with technical school training or occasionally a college degree, with probably a limited hope for upward mobility. Here, lack of privacy and hierarchy reaches the point of military order. Seating in the dining room is reminiscent of the British merchant marine, a place for everyone and everyone in his place. Nevertheless, positions such as these are eagerly sought after by thousands of young men in the region.

There are two blocks of family residences for central workers. About 100 dwellings house somewhat over 150 employees and their families, a total of approximately 550 men, women and children. One block of 40 odd houses is fairly near the mill. Most of the household heads here appear to be skilled technicians or foremen in the mill. Another block of about 60 houses lies a kilometer away at the other end of the batay. There are a number of mill operators and maintenance workers and many minor field foremen living here. But the majority of the residents are field machinery operators and general field workers who have a
record of long and satisfactory (in the eyes of the central) employment. The houses and facilities are, of course, owned by the central, which deducts monthly rent from the pay packets. While the dwellings are relatively standardized, varying individual tastes and initiative make some rather comfortable and others quite barren. In any case, all those in the family houses have been employed by the central for a number of years and are the most stable part of the labor force.

Over 70% of the resident workers actually on the central, however, live in 10 barracks grouped into two complexes, one near the mill and the other beside the larger block of family houses. These barracks house 700-800 men, on an average. Virtually all men living in the barracks are harvest workers or general field hands. The accommodations are army style dormitories - cots, foot lockers, some barracks have lounging areas - all simple, clean and sparse. Each complex has one or two mess halls in which most of the men eat. No provisions are made for wives or children and the men living in the barracks are either single or have left their families elsewhere. Not surprisingly, there is a constant turnover in barrack residence. Few have been there as long as two years, most probably less than a year. Many cane workers spend only an initial period in the barracks. They later rent rooms in Bolo or one of the other nearby hamlets, while continuing to work on the central. While this shift entails longer travelling time and somewhat higher rents, it allows men to live with their families and permits at least a feeling of greater independence and privacy than live on the batay (as many will tell one).

The approximately 240 central workers now (1965) living in Bolo are the largest concentration residing off the batay. The central is now fostering a scheme of long term credit for self-built houses in Bolo to be owned by relatively new married workers. Another 100 to 150 men, largely mill workers, live in two neighbouring small towns connected to the central by fairly regular bus service. An equal number of field and harvest workers live in a number of nearby hamlets. Finally, there are about 8 sites scattered around the central and rented fields which contain the houses of mayordomos and, on some sites, small barracks usually used by 'extra' gangs provided by labor contractors.

A rough estimate of the number of men engaged in various phases of production on Central Condor at any given time during 1964 is as follows:

- professional and senior staff: 25
- junior and white collar staff: 35+
- mill (operators, maintenance, general labor): 300
- repair and field equipment shed (mechanics, helpers, general): 50+
- field machinery operators and assistants: 125+-
- mayordomos, foremen, talleymen, etc.: 60+
- harvest labor, cutters and loaders (585) approx.
- general field labor (planting and cultivation): (465) approx.

Total: 1,050
Other field labor (track layers, irrigationists) 60+-
Other (guards, animal tenders, gardeners, firemen, etc.) 45
1,750+-

As we have seen, approximately 1,000 of this labor force is resident on the batay. But it must be remembered that the 1,800 men directly employed by the central (whether resident on the batay or not) are only a portion of the labor force engaged in supplying cane to the central mill. Calculations from the labor input documented in Chapter III and the data on colono labor utilization in Chapter VI indicate that the colonos (with 7,040 plazas) supplying cane to Central Condor must use a minimum of an additional 1,500 to 2,000 workers. Well over 90% of these are general field hands or harvest workers. It is not clear what percentage of its 'own' workers Central Condor utilizes on rented land. Observation and discussion lead me to believe that rented lands are worked by central machinery (land preparation, mechanical cultivation and transport) but that the bulk of the manual labor on such lands is hired through labor contractors. Indeed, according to the labor input estimates in Chapter III the agricultural labor force directly employed by Central Condor is only slightly larger than needed to work the 4,950 plazas of central owned land. Given that rented land has approximately the same labor regimen as colono farms (with the exception of greater use of machinery in land preparation and cultivation), the 4,445 plazas of rented land probably involve the labor of an additional 1,000 cane workers, all harvesters or general field hands. Given all this, we come to the remarkable conclusion that the approximately 1,050 field and harvest workers directly employed by Central Condor (or its total agricultural labor force of approximately 1,300 men) comprise between one-quarter to one-third of the workers engaged in growing and harvesting the mill's cane supply.

The agricultural regimen operative on Central Condor has already been discussed in detail in the previous chapter. Both the changing nature of labor use and the situation existant in 1964-65 were mentioned. A chart providing the estimated labor input for the major phases of cane growing and harvesting was presented for Central Condor. This was compared to labor input on colono farms. A full discussion of colono farms, their agriculture, labor patterns and position in the Cauca Valley sugar industry is presented in Chapter VI. The case of a colono delivering cane to Central Condor is considered in some detail. The next chapter provides further discussion of the use made of land rented by centrales, and labor patterns thereon. The cases of Centrales Progresso and Condor are particularly relevant. Let this then suffice as an overview of the production techniques and let us go on to a consideration of the actual patterns of labor stability on centrales.
Labor Stability on Centrales

The number of workers employed by the individual centrales and by the sugar industry as a whole is difficult to estimate. Official statistics invariably disregard or underestimate the number of workers on sectors subsidiary to the centrales. According to Fadul and Peñalosa (1961:24) the total labor force employed by all Cauca Valley centrales grew from 5,981 persons in 1945 to 13,581 in 1955. Interestingly, between 1955 and 1960, a period of increasing sugar production, the number of workers on centrales remained the same or actually declined. This was the period when colonos began to be used increasingly. In 1960, there were reportedly 13,605 workers 'permanently' employed on the 21 centrales operating and another estimated 3,400 workers on colono supply farms (Fadul and Peñalosa, 1961:24). [A gross underestimate considering that a single central estimated about 2,000 workers on the colono farms supplying it. (Central Condor, 1961:11)] By the end of 1963, approximately 18,000 workers were employed directly by the centrales. The Manual Azucarero de Colombia referred to these as the "important nucleus" who receive "stable employment, high permanent salaries, and fringe benefit payments" (1964:27). Figures for 1959 and 1963 indicate a range in the number of field and mill workers employed on individual centrales as varying between 300 (La Industria) to about 3,200 men (Rio Paila) (Chart 7). These figures represent only those men permanently employed on the central lands themselves. The workers employed by labor contractors on cane land rented by the central or those workers employed either directly or indirectly on colono farms delivering cane to the central are not included. The cane workers employed on colono farms and by labor contractors who work land rented by centrales constitute a labor force which is probably 1.5 times that of cane workers directly employed by the centrales.

In 1961 Central Condor estimated that approximately 2,000 workers were employed on the colono farms delivering cane to its mill (1961:11). This was more than its own work force of 1,500 men and was at a time when colonos supplied a smaller proportion of the cane than today.

An analysis of labor requirements and employment stability in the central sector would ideally present two sets of data: (1) a record of the number of workers employed in the various phases of central production each month over a number of years, and (2) a record of the number of distinct individuals who comprised the labor force in each productive phase at different times. The first set of data would allow us to definitely document whether there is or isn't a seasonality in labor requirements and whether other than seasonal fluctuations exist. It would permit us to calculate the extent of such fluctuations and to specify the agricultural phases in which such fluctuation in labor requirements are concentrated. The second set of data would allow us to more fully determine the pattern and actual extent of labor stability. For instance, it might be that a relatively constant number of workers are engaged throughout
the year in certain phases of field work on a central. Yet the individual workers employed in those jobs might show a fairly high rate of turnover - a very different pattern than if the same number of jobs continued to be held by approximately the same workers.

While the acquisition of the two sets of data may seem simple enough, they in fact proved to be unobtainable. Central administrators had neither the time nor the inclination to retrieve such employment data from their files - or allow me to do so. Moreover, I have found no publication which presents monthly (or annual) employment figures for centrales, either as a whole or broken down by agricultural tasks. This gap is surprising when it is remembered that one of the important public relations efforts by the sugar industry is to convince government, investors, and sundry on-lookers that, because of the absence of a seasonal harvest, the expansion of the Cauca sugar industry will permit a high level of employment stability for the regional labor force.

While it proved feasible to make my own surveys of labor fluctuations on trapiches and colono farms, such a task for centrales is beyond the capacity of an individual observer. There are nevertheless three sources of data which this study has drawn upon which, when taken together, outline the pattern of labor stability on centrales. These sources are (a) the operation periods of the centrales, (b) the long term work histories gathered in the field, and (c) field data on employment/unemployment during 1965. Let us consider these.

What is the nature of the "year-round" operation of the Cauca Valley centrales? It appears true that the centrales operate throughout most of the year. As we can see in Chart 7 the typical period of milling extends from mid-January to mid-December. This is different from the pattern existent in any of the safrasugar regions where intensive milling and harvesting continue over a definite period of 120 to 150 days. But, it is also clear that most Cauca centrales do not operate continually over their 11 month milling period.

We may consider year-round mill operation in the Cauca Valley to entail a minimum of 280 days of work per year. This figure is based on what would constitute paid employment throughout the year. It allows for the non-working days for which wages or social security benefits are paid - 52 Sundays, about 14 holidays, and an average of two weeks paid vacation (for permanent employees). During 1963, the most recent period for which relatively complete data was available, Cauca Valley centrales actually milled from between 57 to 317 days of the year (Chart 7). Only three centrales milled full-time by the criterion of at least 280 days operation.

During a three week rainy period in December and January many centrales close down for repairs and many employees are engaged in part-time work or are on unpaid 'vacations'. Considering this, we may take 260 mill days per year as relatively steady operation. Three centrales operated between 260 and 280 days in 1963. Any central which mills less than 260 days per year must be considered as engaged in less than full-time or steady
operation. Seven centrales, including the two largest ones, milled between 200 and 260 days of the year while another three smaller centrales milled only for 150 to 200 days. One small, marginal central operated for only 57 days during 1963, and during 1964 sold much of its cane to larger mills.

The duration of the milling period affects the employment of field and mill workers in quite different ways. Discontinuities and periodic shut-downs in milling do not seriously curtail the employment of workers in the sugar mill itself. During a halt in milling, at least on the larger centrales, mill workers are engaged in cleaning, adjusting, refurbishing, repairing or (sometimes) just looking busy. There are relatively few mill workers and their skills are generally strategic to the central. In a number of centrales, mill workers have union contracts which disallow lay-off during mill shut down. While the mill shut down affects field workers much more drastically, it does not affect them equally. Planting and cultivation work fluctuates somewhat in intensity throughout the year but proceeds irrespective of whether the mill is grinding or not. Indeed, the wet period, which makes the harvest least profitable and most difficult (the period when most mills close down for repairs), is the period when planting is most productive and cultivation most necessary. Harvesting, on the other hand, is closely linked to milling. It is not possible to store harvested cane. When milling stops, harvesting stops.

Mills often do not grind at a steady rate even on the days when they are in operation. Large amounts of cane may arrive and begin to accumulate. Storage tanks for juice become filled and grinding must slow down. Machinery jams and the mill, or some part of it, must be temporarily stopped. In addition, mills generally require recurrent repairs and stop for a few days at various times throughout the milling period. If blockages are of longer duration or if mill blockages accumulate during a day, the inflow of harvested cane begins to pile up and orders are sent out for some harvest gangs to slow down or quit early. Blockages and bottlenecks in cane transport have a similar effect for harvest workers. It is easier to cut back on incoming cane, to slow down harvesting operations, than it is to detail extra workers to increase the tempo of harvesting. Central strategy seems to be to have more harvest workers on hand than would be required for a smoothly run operation. Since cane cutters and loaders are paid exclusively on a piece rate, the central pays only for the amount of cane harvested. The extra labor force in the fields does not cost any extra wages.

It must be understood that harvest workers are not discharged once milling stops. To a limited extent, some are re-deployed in other field tasks. More usually, they remain "employed" by the central but are not drawing pay until harvesting begins again. Vacation pay, bonuses and other social security benefits are disbursed at these times (particularly during the wet season at the end of the year) and help tide the harvest workers over these periods. Some also find short term work with labor contractors on colono farms and trapiches for the duration of the longer
stoppages. The credit extended by the cooperative and by most small storekeepers to their regular customers is particularly important at such times. This, then, is the nature of "permanent employment" of harvest workers on most of the centrales. Accepting these provisos, we may consider the length of tenure of such "permanent" jobs on centrales.

In 1960, 41.4% of all central workers had a job tenure of less than one year (Fadul and Peñalosa, 1961:25). If we allow for the various foremen, equipment operators, and mill workers who invariably have been employed on a central for a number of years, well over 50% of the actual agricultural laborers employed by the centrales must have had a job tenure of less than one year. Moreover, such tenure obtains only for those directly employed by centrales. The figures do not include those workers employed on a fluctuating basis by labor contractors and colonos engaged in supplying cane to the centrales. Fadul and Peñalosa (ibid.) hold that a more stable pattern is developing throughout the industry. They attribute the 1960 job tenure pattern largely to the recent growth of centrales. It is true that the majority of centrales have arisen only in the last 20 to 25 years, and have expanded even more recently. But all of the larger centrales noted here have been in operation for the last 10 years and we may validly compare job tenure on different centrales for that period. There appears to be considerable variation in the length of job tenure within the central sector which is not related to the age of the central. For instance, we see that at the oldest central, Manuelita, 55.1% of the permanent employees have a tenure of 10 or more years whereas at Tupia, the second oldest central in the region (in operation for 40 years), only 4.6% have a similar tenure (Manuelita, 1964:181; Central Tupia, 1960:17).

The above figures on central job tenure do not distinguish between different categories of workers. Such differences are of prime importance in understanding the present and emergent pattern of labor stability in the Cauca Valley sugar industry. Consider the job tenure of 36 men employed on Central Condor during July 1964.

CHART 9

Job Tenure of Thirty-Six Central Condor Employees; July 1964
(From Field Data)

<table>
<thead>
<tr>
<th>Less than 1</th>
<th>1-3</th>
<th>3-5</th>
<th>5-10</th>
<th>10 and over</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutting and loading:</td>
<td>6</td>
<td>7</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>General field work and cane transport:</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Field equipment:</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Foremen:</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Mill and maintenance:</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>TOTAL</td>
<td>7</td>
<td>9</td>
<td>8</td>
<td>9</td>
<td>3</td>
</tr>
</tbody>
</table>
As one would expect, foremen, field equipment operators and mill workers have been in the employ of the central for a longer period than most other workers. Indeed, these are jobs which are obtained only after an initial number of years of satisfactory work in lesser jobs. Of greater interest is the fact that harvest workers have, on the whole, a much shorter job tenure than general field hands (workers engaged in planting and cultivation). Fully one-third of the harvest workers, but only one-tenth of the general field hands have been employed on the central for less than one year. Despite the small number of cases, the above data suggests that harvest workers employed by centrales are likely to have a much shorter job tenure and be more mobile than other central workers. More intensive work histories and observation tend to support this view. All things remaining the same, the increasing concentration of agricultural labor in the harvest phase will of itself increase the degree of labor instability in the Cauca Valley sugar industry. This is to be expected even on the centrales which operate "throughout the year".

Despite the differences in job tenure between harvest workers and general field hands on centrales, both show a more stable pattern of employment than exists in other sectors of the Cauca Valley sugar industry. With the possible exception of a small core of permanent employees, labor is yet more fluid on colono farms and trapiches than on centrales. This can be seen in a tabulation of the duration of jobs held during the working lives of 51 men ranging in age from 19 to about 50 years.

A few cautionary comments should be made about the figures presented in Chart 10. It is almost certain that job tenure in most categories of employment is actually lower than indicated here. This view stems from my own field observations, the 1965 employment survey and extensive work histories of a dozen cane workers. This disparity stems from two sets of factors. (1) There was a noticeable tendency to merge a number of past jobs which had been held in short succession. For instance, a man working on three colono farms in one year (5 years ago) would tend to report this as a year's employment with a single colono. Despite rechecking, such merging could not be eliminated in recording. Even more problematic, the tendency to merge similar jobs held successively was not the same for employment on centrales as for employment on colono farms and trapiches. Jobs on specific centrales seem to have been reported separately whereas work on a series of colono farms and trapiches was less frequently distinguished. In this sense, duration of employment listed for jobs on colono farms and trapiches denotes, in many cases, the duration of a series of successive jobs in that sector. This is even more true for the jobs in smallholder and commercial food crops and in brick kilns. (2) Moreover, a relatively large proportion of the persons who provided the data for the work histories had established families and residence in Bolo. Less than a quarter of the work histories were obtained from men living in the campamentos of colonos, trapiches, and centrales. That is, the sample presented here represents the more settled and stable elements of the local labor force engaged in cane agriculture.
CHART 10
Jobs Held and Job Tenure (From 51 Work Histories)

Jobs in the Sugar Industry:

<table>
<thead>
<tr>
<th>Type of Job</th>
<th>Centrales</th>
<th></th>
<th></th>
<th>Colono Farms &amp; Trapiches</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of</td>
<td>Total Time</td>
<td>Average Duration</td>
<td>No. of</td>
<td>Total Time</td>
<td>Average Duration</td>
</tr>
<tr>
<td></td>
<td>Jobs</td>
<td>(Mos.)</td>
<td>of Job (Mos.)</td>
<td>Jobs</td>
<td>(Mos.)</td>
<td>of Job (Mos.)</td>
</tr>
<tr>
<td>Gen. field work:</td>
<td>30</td>
<td>986</td>
<td>32.9</td>
<td>27</td>
<td>578</td>
<td>21.4</td>
</tr>
<tr>
<td>Specialized field work:</td>
<td>10</td>
<td>282</td>
<td>28.2</td>
<td>9</td>
<td>134</td>
<td>14.9</td>
</tr>
<tr>
<td>Cane loading:</td>
<td>24</td>
<td>566</td>
<td>23.5</td>
<td>73</td>
<td>971</td>
<td>13.3</td>
</tr>
<tr>
<td>Cane cutting:</td>
<td>36</td>
<td>875</td>
<td>24.3</td>
<td></td>
<td>971</td>
<td>13.3</td>
</tr>
<tr>
<td>Loading &amp; cutting:</td>
<td>12</td>
<td>483</td>
<td>40.3</td>
<td></td>
<td>248</td>
<td>12.4</td>
</tr>
<tr>
<td>Field equip. &amp; transport:</td>
<td>13</td>
<td>470</td>
<td>36.2</td>
<td>6</td>
<td>109</td>
<td>18.1</td>
</tr>
<tr>
<td>Field foremen, counters, etc.:</td>
<td>4</td>
<td>200</td>
<td>50</td>
<td>2</td>
<td>10</td>
<td>5.0</td>
</tr>
<tr>
<td>Mechanics &amp; mill operators:</td>
<td>12</td>
<td>325</td>
<td>27.1</td>
<td>20</td>
<td>248</td>
<td>12.4</td>
</tr>
<tr>
<td>TOTAL</td>
<td>141</td>
<td>4,187</td>
<td></td>
<td>137</td>
<td>2,050</td>
<td></td>
</tr>
</tbody>
</table>

B. Jobs Outside the Sugar Industry:

<table>
<thead>
<tr>
<th>Type of Job</th>
<th>No. of Jobs</th>
<th>Total Time (Months)</th>
<th>Average Duration of Job (Months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. On smallholder and commercial food farms:</td>
<td>44</td>
<td>792</td>
<td>18.0</td>
</tr>
<tr>
<td>2. On cattle ranches:</td>
<td>17</td>
<td>256</td>
<td>15.1</td>
</tr>
<tr>
<td>3. In city industry:</td>
<td>12</td>
<td>385</td>
<td>32.0</td>
</tr>
<tr>
<td>4. Railway and construction:</td>
<td>14</td>
<td>347</td>
<td>24.8</td>
</tr>
<tr>
<td>5. Pedlers, shopkeepers, store employees:</td>
<td>17</td>
<td>507</td>
<td>35.7</td>
</tr>
<tr>
<td>6. Logging, mining, woodcutting, brick kilns:</td>
<td>11</td>
<td>741</td>
<td>67.4</td>
</tr>
<tr>
<td>7. Others (teaching, mule-driving, soldiering, etc.):</td>
<td>42</td>
<td>832</td>
<td>19.8</td>
</tr>
<tr>
<td>TOTAL</td>
<td>157</td>
<td>3,860</td>
<td></td>
</tr>
<tr>
<td>TOTAL A and B</td>
<td>435</td>
<td>10,097</td>
<td>23.5</td>
</tr>
</tbody>
</table>

Despite the difficulties mentioned, we can see that the average duration of employment in every job category is significantly shorter on colono farms and trapiches than on centrales. Even the "permanent" employees engaged on colono and trapiche fields (part of the "general field work" category) do not have as long a job tenure as their counterparts on centrales. In the case of harvest workers, those on centrales have an average job duration almost twice that of those on colono and trapiche farms (even by these figures). Finally, the difference in job tenure
between harvest workers and general field hands (planting and cultivation workers) is relatively small on centrales. But on colonos and trapiche farms the harvest workers have an average job tenure less than a half that of workers employed in planting and cultivation.

Data on jobs other than the sugar industry held by the 51 persons surveyed has been added here for general comparative interest. It should be noted that approximately 63% of the jobs held (278 of 435) and 60% of the working lives (6,327 of 10,097 months) of this sample were in sectors of the sugar industry. Although not observable in the chart here, inspection of work histories themselves indicate that a majority of cane workers have at one time or another worked in all three sectors of the sugar industry and also in non-agricultural employment. Finally, these figures suggest that the sugar industry, as a whole, provides approximately as stable or unstable employment as most other industries in which the inhabitants of Bolo find employment.

Central administrators recognize that there is a considerable mobility of field workers, particularly harvest workers. They admit that labor instability on colonos and trapiche fields is due, to some extent, to the relatively short term labor requirements of specific jobs. But central administrators insist that more or less permanent employment is possible for harvest and other field workers on centrales and that even here there is a considerable labor turnover. They claim that this is mainly explainable by certain psychological and sub-cultural traits found among cane workers. Many in the urbane professional staff of centrales invoke "migratory value system" for these cane workers and point to the alleged fact that most cane workers on centrales quit their jobs merely because they "get bored with" one place after awhile.

There is a component of truth in the above view but the situation is much more complex than usually recognized. One can see the voluntary movements of cane workers partly as a rejection of being a wage slave in a vast machine, as a quest (usually unsuccessful) for dignity, of a demand for 'rice and roses too'.

Some of the subjective quality of labor migration in the sugar zone can be appreciated even if we consider a single individual's work history. It is of a man who probably typifies many single cane workers formerly from peasant areas but now firmly established in wage labor in the sugar industry. Lazarillo Soto is from a mountainous peasant area in Nariño. At eighteen, Lazarillo left his father's smallholder plot because, as he says, "There were just too many of us to make a living on that small piece of land". He is now thirty-two years of age, with no desire to return to a peasant life. Here he describes his entry in the cane field labor force, his attempts to leave it, and some of the factors behind his continuing search for different jobs.
My first job here was on Trapiche San Pedro, near Palmira. It sends its cane to Manuelita now but at that time it was a trapiche. Well, I worked there for a year, was laid off during a slack period and then returned again after about two months. My first work in the cane fields was planting and cultivating. That was a good thing because it takes a few years to acclimatize oneself to the work and cutting cane is dangerous if you haven't done it before. Quite frankly, I was afraid of cane cutting at first. Lots of people cut themselves and it's easy to make yourself a cripple if you don't know what you're doing. One begins by cutting the outside rows on the cane plots. In that way, there is much less danger that you'll get in the way of anybody's machete, and you have more room to swing and work in.

After about one and a half years I was laid off San Pedro again so I went to Cali. I was going to go to Narino for a visit but I only got as far as Cali. There I was drinking and with women and in a few weeks I didn't have any more money. I had to go looking for work again.

After a short while, less than a month, I got a job at Condor. I spent two years there working in the fields - planting, weeding, clearing ditches. It wasn't anywhere near so big then, not like today. Well, after those two years I had had enough of cane fields, truly I did. I thought I'd try the industries in Cali or Palmira to see if I could get a job where one could learn to be a mechanic, or drive a truck or anything like that. But these companies always ask for experience. It was just hopeless. When I couldn't find a job worth anything in Cali I thought I'd try other parts of the Valle. At least it would be interesting to change around a bit. I kept looking around, trying different places. But it was all about the same - it's more or less all about the same sort of work. Most of the time I was cutting cane but sometimes I worked in the fields. I was at Central Melendez for a couple of months, at Central Rio Paila for five months, back again at Trapiche San Pedro for a month, at Tupia for two or three months and finally at Central Papayal for fifteen months.

One should have about four hundred pesos, more or less, if one is setting out on a search for a better job. That's for bus fare, for rooms and food - these things are much more expensive when one is travelling around. If you are really economical you can make four hundred pesos last for a month of looking around. Of course, you might also wind up in a town with some of your friends - you know - and spend it all in a few days. Sometimes it's easy to fall into situations like that. You may work on a trapiche or hacienda for two or three or four months and still not save enough
to go and look for work elsewhere. Often when you get laid off of one job you have to take the first job that you can find, anything, because you don't have enough money to say no...

One is always looking for a company and a job where there is better pay and conditions and some chance of improving one's position after awhile. One always thinks and hopes that one will find it. I've tried hard myself to get a job where I could learn some trade. But the only job out of the fields that I could get was in a coal mine in the Department of Cauca, not far from Cali. I was there only a few weeks - there was so much dust in the air. It was very unhealthy and dangerous. I didn't like working underground either. Besides that, with all the difficulties, the pay was low and they didn't have many social security payments either. I took the job because I thought I would have the opportunity to learn something and get things like sick pay, accident insurance, holiday pay. But they didn't provide any of these and they only paid ten pesos a day. When I quit that mine I went back to my father's finca in Nariño. I thought I would stay there. But after about ten months I got fed up and came back to the Valle.

When I came back to the Valle I got a job cutting cane at Central Mayagüez. I was there about two years, very active in helping to build the union. I got into some quarrels with certain foremen there and with some of the other men. The foreman finally forced me to leave. After I left Mayagüez I went up to Palmira and pretty soon I got a job on Central Progresso as a cutter. I had worked eight days - let's say one week - when one of the foremen told me, "We don't need you here anymore". In the week since handing in my papers and job recommendations the Central office had written a letter to my last job. Mayagüez probably told them that I had been organizing there.

When I left I thought I'd see a bit more of the country. It's good to see other parts. If I could I wouldn't even mind trying another country. Besides I was pretty fed up with this Valle then and I thought things might be better elsewhere. First I went to Pasto. I wasn't looking for work there. It would be senseless to go from here to there in search of better conditions. I just went to see some friends. I didn't even bother going up to my father's finca because I was in Pasto only for three days. Then I took busses all the way down to Barranquilla, on the Atlantic coast. Down there I took a job on a banana plantation for about two weeks. But the housing and food were something unbelievable. People there lived like animals. The wages were nothing - one thought that one was back in slavery again. I had so little pay coming after two
weeks, after everything was taken out, that I didn't even stop to pick it up.

From there I went up to Bogotá. I spent an awful lot of time looking for work there. I liked the place but I just couldn't get any job. I was there for over a month and I got only a few days of work helping to build houses. By that time my money was almost gone so I came back down to the Valle again where I knew I could at least get some sort of job in the cane fields.

Well, just when I had no more money I got a job building a new central - Central Cauca - it's just over the Cauca border. I was doing general construction work on it for about five weeks for a small contractor. When we finished the job we were working on, most of us were laid off. After about two weeks I got a job cutting cane again on Hacienda Guaymas. It's a pretty big trapiche and it sells cane too. One can make almost as much there as on a central. They even give you most of the social security payments that one gets on a central. I've been working there a little over six months now and I don't have any thoughts about leaving - just yet.

What do the cane workers themselves say about why they left particular jobs? Analyzing the reasons for the individuals involved is, admittedly, a tenuous strategy. People do not remember fully, they rationalize, they re-interpret the past. With this caution, let us then consider the following reasons given by 51 workers for the termination of 394 jobs which they once held.

CHART 11

Reasons Given by Workers for Job Termination

A. Involuntary Termination on Part of Worker

<table>
<thead>
<tr>
<th>Reason</th>
<th>No. of Cases</th>
<th>Percentage of all cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Laid off or job finished</td>
<td>48</td>
<td>12.2</td>
</tr>
<tr>
<td>2. Discharged or fired</td>
<td>33</td>
<td>8.4</td>
</tr>
<tr>
<td>3. Went bankrupt (after attempts to found shops)</td>
<td>19</td>
<td>4.9</td>
</tr>
<tr>
<td>4. Termination due to accident or illness</td>
<td>13</td>
<td>3.3</td>
</tr>
<tr>
<td>5. Lost job during a strike</td>
<td>12</td>
<td>3.0</td>
</tr>
<tr>
<td>6. Left job to do military service</td>
<td>11</td>
<td>2.8</td>
</tr>
</tbody>
</table>

136 34.6
B. Voluntary Termination on Part of Worker; Due to Work Conditions

<table>
<thead>
<tr>
<th>Reason</th>
<th>No. of Cases</th>
<th>Percentage of all Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Quit because of low pay or better pay offered elsewhere</td>
<td>64</td>
<td>16.1</td>
</tr>
<tr>
<td>8. Quit because of lack of social security benefits</td>
<td>31</td>
<td>8.0</td>
</tr>
<tr>
<td>9. Quit to find better opportunities of advancement</td>
<td>25</td>
<td>6.3</td>
</tr>
<tr>
<td>10. Quit because of poor food and housing</td>
<td>23</td>
<td>5.9</td>
</tr>
<tr>
<td>11. Quit because didn't like aspects of job (danger, night work, strenuousness)</td>
<td>21</td>
<td>5.5</td>
</tr>
<tr>
<td>12. Quit because of &quot;excessive discipline and humiliation by foremen&quot;</td>
<td>16</td>
<td>4.0</td>
</tr>
<tr>
<td>13. Quit because &quot;bored with job&quot;, or wanted a rest</td>
<td>32</td>
<td>8.1</td>
</tr>
<tr>
<td></td>
<td>212</td>
<td>53.9</td>
</tr>
</tbody>
</table>

C. Voluntary Termination on Part of Worker; Due to Other Than Work Conditions

<table>
<thead>
<tr>
<th>Reason</th>
<th>No. of Cases</th>
<th>Percentage of all Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>14. Quit because of personal difficulties required departure from locality</td>
<td>13</td>
<td>3.3</td>
</tr>
<tr>
<td>15. Quit because of political and other violence in locality</td>
<td>16</td>
<td>4.0</td>
</tr>
<tr>
<td>16. Quit because of &quot;unhealthy climate&quot;</td>
<td>17</td>
<td>4.2</td>
</tr>
<tr>
<td></td>
<td>46</td>
<td>11.5</td>
</tr>
</tbody>
</table>

TOTAL OF ALL CASES OF JOB TERMINATION 10. | 394 | 100.0

Interestingly, 258 of the 394 job terminations were indeed reported as voluntary by the employee and only 81 terminations were reported as due to discharge or layoffs. This ratio does not accord well with the established fluctuation in labor requirements on colono farms, trapiche fields, and on the rented land of centrales. The disparity derives, to a certain extent, by a tendency to report terminations due to impending layoffs and discharges as voluntary (similar to "you can't fire me, I quit"). While the data indicates that there are significant factors other than layoffs and discharges creating the level of labor mobility, this does not mean we should accept the "migratory values" view as to the nature of such voluntary job termination.

While it is true that the most typical reason initially given for quitting a job was "I got bored", or "I got fed up", these statements usually serve as a stock answer and further questioning elicited more specific reasons for quitting in the
90.

great majority of cases. Only 32 of the 394 responses could be recorded as job termination solely due to a general malaise, a desire to try a new employer or locality, or "boredom". To put this another way, although almost all cane workers are bored or fed up with their jobs (it would be surprising if they were not), this in itself is not usually a sufficient reason to quit. The desire and search for jobs with higher pay, greater social security benefits, some chance of advancement and better working conditions (items 7-11) comprise 164 of the 212 reported reasons for quitting.

It is in order to mention the recent trajectory of wages in the Cauca Valley sugar industry before going on to some salient socio-political and economic factors effecting labor stability. Fadul and Penalosa list the daily basic wage averaged for field and mill workers on seven Cauca Valley centrales between 1951 and 1961. Basic wages (apparently including minimum social security payments) rose from 3.95 pesos/day in 1951 to 5.83 pesos/day in 1955 to 11.00 pesos/day in 1961. In 1960, labor costs allegedly ran to 67.9% of production costs (Fadul and Penalosa, 1961:26, 27, 30). Consider changes in wage rates for Central Condor workers between 1955 and 1963 (Garcia and Zuluaga, 1964:51).

<table>
<thead>
<tr>
<th>Pesos per day</th>
<th>1955</th>
<th>1957</th>
<th>1959</th>
<th>1961</th>
<th>1963</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily Basic Wage:</td>
<td>4.52</td>
<td>5.71</td>
<td>8.01</td>
<td>10.32</td>
<td>18.08</td>
</tr>
<tr>
<td>Social Security Costs:</td>
<td>5.56</td>
<td>7.31</td>
<td>10.97</td>
<td>15.79</td>
<td>30.74</td>
</tr>
<tr>
<td>Daily Real Wages:*</td>
<td>12.84</td>
<td>13.61</td>
<td>16.70</td>
<td>20.97</td>
<td>30.74</td>
</tr>
</tbody>
</table>

* Real wages here comprised the combined daily basic wage plus average social security payments adjusted for rise in regional cost of living as reported by the Department of National Statistics. (Base year 1963.)

In 1964 and 1965 the average basic rate for field labor on most larger centrales varied between 17.50 and 20 pesos per day (in addition were the social security costs of 10 to 14 pesos per day, of which possibly one-half was paid directly to employees).

Wages on colono farms and trapiches have been consistently lower and more variable. Izquierdo's survey of trapiches in 1961 gives an approximate range of 8 to 11 pesos per day for field workers with highly variable income for mill hands. Labor costs averaged 73% for total production costs on trapiches (including the 20% paid out for social security). Garcia and Zuluaga provide no wage rates or reliable breakdowns of labor costs on colono farms. In general, it appears that these have always been lower than wages on centrales, but that the differences have increased since 1960-61. Typical basic rates on colono farms were 12 to 14 pesos per day for field hands in 1964-65. Let us now consider some of the responses to the rise in real wages, especially on centrales.
CHAPTER V

UNIONIZATION AND THE RESPONSE
OF THE CAUCA VALLEY SUGAR INDUSTRY

The expansion and growth of large, modern centrales in the Cauca sugar industry has been paralleled by greater participation of central workers in labor unions, which in turn has resulted in increased pressure for higher wages. Owners and managers of the various types of cane producers have shown a wide range of responses to the increased wage demands and the cost of social security payments required by national laws. Important sectors of the industry continue to resist unionization and attempt to circumvent payment of part or all of the social security benefits to which their employees are (or might be) entitled. A few of the smallest centrales, the great majority of the trapiches and virtually all of the colono cane growers take this line. To date, colonos have effectively circumvented national labor laws that protect unionization by rotating a large percentage of their employees, through selective discharge of potential union organizers and supporters, and particularly by employing labor contractors. The larger centrales are also deeply, if indirectly, involved in this strategy through their increasing use of colono cane suppliers. In addition, centrales are also making substantial use of rented land and dummy corporations to grow cane with labor patterns approximating those existing on colono farms.

Certain weaknesses in the Colombian Labor Law make the formation of union locals extremely difficult when faced by hostile employers. Specific clauses and loop-holes in the law provide management many opportunities for selective hiring, advancement of pro-company workers and a variety of tactics for weakening already established but uncooperative unions. The latter tactics are often used even on centrales where the legitimacy of labor unions has been accepted. Unions attempt to extend and strengthen the guarantees provided by the Labor Law through their own work contracts. But the implementation and enforcement of legal rights largely depends upon the relative strengths of the union and management themselves.

Until 1965, the Colombian Labor Law guaranteed the right to strike (under the proper procedures), but also the right to work. Companies could use non-striking employees during a legally constituted strike. The "right to strike" was effective only when unions could physically block the entrance of strikebreakers. The repeal of this provision in March 1965 may remove much of the immediate basis of violence arising from labor disputes. But a number of strikes and lockouts which developed during the period of field work show a host of difficulties that still face union organization.
Colonos and trapiches owe part of their success in avoiding unionization to their use of labor contractors. Under this system, the bulk of the labor force on any farm is constantly rotating and never has any direct dealing with the owners or management of the farm itself. Under these conditions, unionization is obviously difficult. Use of labor contractors has the immediate advantage that the contracting farm pays none of the social security payments that it would have to pay workers directly employed by the farm. (The labor contractor may provide a small proportion of them.) Although all of the larger centrales seem to have accepted the inevitable growth of labor unions, an increasing number of centrales have opted for the creation of what seem to be company unions. Such unions are organized for workers employed on the lands owned by the central itself—where unionization of one sort or another is most likely to develop. These unions are directed mainly at the permanently employed workers of a central and appear uninterested in organizing as yet non-unionized workers.

Union Organization and Colombian Labor Law

The structure of the present labor and social security legislation in Colombia applies mainly to a relatively advantaged labor force centered around the more modern, highly capitalized industries. Workers in the industrial sector are generally unionized and have such legally guaranteed wage supplements as vacation pay, pay for overtime, family bonuses, work bonus, pay for Sundays and holidays. Health and safety regulations at work are also more likely to be implemented. The industries effected are concentrated in cities and larger towns. The sugar centrales are the major exceptions.

The bulk of the Cauca Valley labor force is not covered by the national labor and social security legislation. This legislation specifically excludes family and hired labor on "peasant" farms, all tenant farm workers, independent tradesmen, vendors, storekeepers, service workers and apprentices. More important, these laws do not cover the employees of the host of labor contractors that have sprung up in recent years. These contractors provide a variable (but always considerable) proportion of the field labor in the sugar cane industry, be it in the fields of colonos, trapiches, or centrales. Moreover, cane producers seem to be increasing their use of labor contractors, who now supply the bulk of the field labor used by colonos and trapiches.

The lower the registered capitalization of the company, the lower are the social security payments required by the national laws. Theoretically, the level of capitalization (800,000 Colombian pesos) above which companies must provide some of the social security benefits is set low enough to include all the centrales and most of the trapiches and
colonos. In actuality, conditions on colono farms and trapiches vary from virtual non-compliance to provisions as extensive as on some centrales (although the latter case is exceptional).

However clear the stipulations of the Labor Law, the provisions made for enforcing them are inadequate. The rights to union organization as established by the statute are uniform throughout the nation, but implementation of this right differs greatly from one region to another, from one industry to another, and between different enterprises in the same industry. A labor union can legally be organized in any establishment which permanently employs twenty-five or more workers. An employer cannot, legally, discharge workers who are in the process of founding a union. This right to job protection for members of a labor union in the process of formation is called Fuero Sindical. It is supposed to operate in the following manner. Once an assembly of employees has taken place with the objective of forming a union, on one who has signed the petition of organization can be discharged or transferred to another work site. Once the union is duly recognized by the Ministry of Labor as representing the employees of a particular firm, it is illegal to discharge or penalize any employees for their union activity. That is, they cannot be discharged for this reason.

The difficulties of organizing and maintaining a union are of course much greater than the legal guarantees might suggest. Many colonos and trapiches utilize informers among the employees. At the early state of union organization, it is relatively easy for the employer to discharge whomever are considered as ringleaders. It is simple enough to find a reason for discharging employees. Even if an incipient union has been constituted, leaders and activists may be discharged. Although such action on the part of an employer is illegal, it is a serious obstacle to nascent unions unless they have the support of a well-established labor federation. Recourse to the Ministry of Labor and to the courts is slow, difficult, and often of questionable efficacy. Key discharges are usually sufficient to intimidate other employees from signing the formal organizing petition.

Despite such obstacles, workers on some trapiches and on colono farms have at times been organized in the Cauca Valley. During 1961 and 1962 a number of trapiches and a few colono farms in the Buga-Tulua region were organized. But none of these organizations had survived by August 1964. According to officials of the labor federation which had supported this organized drive, the majority of the workers on these colono farms and trapiches had signed up as union members but no governmental recognition was forthcoming. Papers legally incorporating the unions arrived from six months to almost two years after the individual unions were organized. By that time the employers had replaced the union leaders and activists. When the Ministry of Labor inspectors came to
check that the unions were legally constituted, the leadership
and a part of the membership were already dispersed.

Flagrant violations of the Labor Law are most common on
trapiches and colono farms, although they do seem to occur in
the small, most marginal centrales. Open opposition to the
law is now much less feasible for the larger centrales. But
even here it is difficult to maintain strong, independent
unions. Organizing a union and obtaining a work contract is
just the first hurdle. The national Labor Law requires an
open-shop system and it prohibits industry-wide unions. A
labor union cannot require membership by or union dues from
the employees of a company. Organizers, union activists, and
rank-and-file union members must use personal persuasion and
social pressure to influence new workers to join and to keep
already unionized members in the organization.

It is illegal for employers to discriminate against
employees in any way because of their union activity, but
the law makes no reference to job seniority. Advancement to
better and higher paying jobs is solely at the discretion of
mayordomos, administrators and employers. Most cane workers
hold that if one wants to move from a job as field hand to
that of equipment operator, mechanic, minor foreman, etc.,
it is necessary to cultivate good relations with the immediate
supervisors or other potential "patrones". Said a married
immigrant from a mountain region who hoped to advance himself
within the plantation system:

I don't want to spend the rest of my life
working in cane fields, cutting cane and hanging
over a pala. I'd like to find some job - it
doesn't matter what - where I can learn something.
Getting training, getting into the mill, that's
very difficult. Here, on these cane fields and
haciendas, once you start working in the fields, it
is very difficult to get out. The only way an
ordinary person can improve his position here is
with the help of someone of importance. One has
to see to it that someone, a mayordomo or maybe
one of the field supervisors, notices you. Other-
wise, I would say that it is impossible to improve
one's position. In Colombia, here, everything
requires lots of recommendation and lots of paper
documents. Everyone has to look out for himself.

Hiring is completely at the discretion of the company
and securing employment depends to a considerable extent on
having a "clean" set of work recommendations from previous
employers. Although blacklisting is illegal it appears to be
widely used by employers. Although I never personally saw
such files or documents, some central administrators admitted
the use of "cooperation" between the larger employers to
help keep out "trouble makers". A number of personal
experiences of blacklisting were mentioned by workers in describing their work histories. An individual active in organizing, canvassing and other union activities may find it exceedingly difficult to get a better job within the company. If he quits he may find it difficult to get employment in other centrales and in the larger trapiches in the region.

One of the big problems facing sugar cane worker unions is job security for their members. Selective hiring is an important method by which centrales promote a cooperative labor force. All men are initially hired on a trial basis for a test period of four to eight weeks called Prueba. During this period the new employee cannot join the union, is not protected by the work contract and can be dismissed at any time with no reason given. The Labor Law delineates the Prueba in the following way:

**Examination period (Prueba)**

76. The examination period is the initial stage of the work contract and has as its objectives, on the employer's part, the evaluation of employees' aptitudes, and to allow the employee to evaluate the working conditions.

77. The duration of the examination period may be stipulated, otherwise the duties are understood as governed by the general norms of the work contract....

78. The duration of the examination period may not exceed two months.....

80.1 The examination period may be liquidated at any time by unilateral discharge without previous notice.

.2 Employees receive all social security payments during the examination period. (Código Substantivo de Trabajo, 1964)

The centrales use the Prueba period to ensure that the employee's work is satisfactory and also to check his documents. The documents now required vary from central to central, but usually the worker must have a valid identity card, papers showing discharge or exemption from national service, and a work book giving a history of previous employment filled out by former employers. Some centrales spot check their employee's former employer during the Prueba period in order to verify the entries in the work book and to obtain fuller, more subjective comments. Some centrales occasionally demand a statement of good character from the police at the former place of residence if the employee is newly arrived in the region. The individuals most likely to be excluded from
employment (those considered as undesirable) are, as one might expect, workers with a record of activism in militant unions. Both the stated attitudes of central administrators and the work histories of cane workers bear this out. But "undesirables" also include a wide range of individuals whose actions in the past suggest that they have not accepted constituted authority passively. These include men known to have had serious quarrels with foremen elsewhere, anyone with a prison record, and, on one central, members of evangelical sects.

A number of legal provisions allow for the discharge of workers who, in the employer's estimation, are not satisfactorily performing their duties. In addition, Article 48 of the Colombian Labor Law provides a legal carte blanche for dismissals if the employer is strong enough and determined enough to use them. This clause increases the difficulty of maintaining union organization in the face of company hostility. Article 48, known among workers and administrators alike as the Cláusula Reserva, allows an employer to discharge any employee after giving him forty-five days notice. It states:

Article 48

In contracts of indeterminate duration or without any expiry date, the parties can reserve the right to terminate the contract at any time by giving written notice not less than forty-five days in advance and previous payment of all outstanding debts, indemnifications and social security payments. The employer may forego the advance notice by payment of the salary corresponding to forty-five days. (Código Substantivo de Trabajo, 1964)

Article 48 is not utilized for true lay offs (where discharge is due to a decrease in the number of workers required) since it is frequently applied to individuals at the same time that new employees are hired. The employer can select the individual to whom the Cláusula Reserva is applied without regard to seniority. Although it is illegal to utilize Article 48 to hamper union activity, it can be an effective weapon for just that purpose.

The foregoing is not intended to suggest that centrales blithely and unconcernedly manipulate the articles of the Labor Law to dismiss union activists and to cow labor unions. But it does emphasize the fact that in operation, Colombian Labor Law is vague enough and has enough loophole s so that, in itself, it provides rather weak protection for union organization. A labor union must be sufficiently strong so that the employer in effect relinquishes his use of some of the prerogatives allowed by the labor code. In recent work contracts some unions have been able to force certain centrales to formally renounce their right to use specific legal prerogatives. For example, the right to use the Cláusula Reserva has been restricted on a number of Cauca Valley centrales by the stipulation of work contracts.
Strikes

Until March 1965, Colombian Labor Law was rather ambiguous about strikes. It was the balance of forces in the field which determined what actually occurred. While the right to organize and the right to strike were guaranteed, so was the right to work. When a strike was voted by the membership of a union, the non-unionized workers, and even those union members who wanted to, were legally entitled to work on the struck shop. On the other hand, employers were legally proscribed from engaging new employees for the duration of a legal strike. Obviously, these were rather unrealistic limitations. They were particularly crippling for the labor union if, as seems frequently to have been the case, employers did in fact introduce new workers into the fields after a strike was in effect.

Let us consider an important strike which occurred before the period of my own field work, but whose effects still were plainly visible in the village of Bolo. The strike at Central Condor indicates the range of tactics utilized until recently by employers and unions and represents the kind of dispute which fostered the surge of company unions discussed later. The description of the strike presented here was a verbal account given by an activist in the former union. It has the merit of being a detailed description by someone who was in a position to know what was going on. While difficult to substantiate, other more fragmentary versions lead me to believe it is a relatively reliable (if partial) account. At the least, it represents a strongly held view representative of a strategic minority of sugar cane workers.

There was already a union at Condor at the time we started organizing, but it was a useless thing. We decided that what was needed was a union which was something more than a marriage of priests and bosses. We talked to our friends and workmates, making sure that no one said anything to the known company stooges. Before the company knew it we had the majority of the workers signed up. We held the first assembly. All the paper work and legal steps were completed and we received official recognition as representing the workers at Condor....

At the time this was going on other people were organizing in Igenio Calizo and at about the same time a union affiliated with the same labor federation as us was recognized there. Everything seemed alright, but not long after there was a new work contract to sign. We asked for a two peso increase in the basic wage and a forty centavo raise in the rate for cutting cane. Well, Condor just refused to make any offer, or even to negotiate. So, after all the due processes, we went on strike.
The same thing happened at Calizo - the people there went step in step with us throughout.

At that point we had more than 1,200 of the 1,700 people working in Condor in our union and all except forty or fifty were for the strike. At Calizo, which was smaller - there were under 500 men working there then - an even higher proportion of the workers were in the union. Calizo didn't have any sort of union before that, just like now, not even a patronal union.

Once the strike started we set up blockades on the main entrance ways to Condor and Calizo, with tents and banners and enough people so they could stop the company from bringing in strike-breakers. One month passed, two months passed, and we knew that they would try to conquer us with hunger. The men couldn't get any work - except a few days here and there. The families of each man, or his friends who were working elsewhere, helped each one as best they could. Other unions and public collections brought in some money to buy food. The situation was very tough but still almost everybody was determined to carry on the strike.

About the third month the company started telling everybody that they could work if they came to Condor and signed up with another union that the bosses had brought in - the one they have now. They even offered them a higher rate than they paid before. But they wouldn't negotiate with us. One by one, workers started going back to work at Condor, living in the campamento there. Condor is so big and has so many entrance roads that we couldn't be everywhere. The police would escort them in over some back road at night.

After that they started bringing in new workers from other places by the truckload. The police would arrive in force, open up our lines and let the strikebreakers in. It was like a fortress in there with armed guards continually patrolling the fences. But still the strike went on. We still had the majority of the original workers on Condor and they continued to support the strike committee.

In the fifth month of the strike - that was when our leaders sold us out. They were paid off by the company. They arranged a letter to the Ministry of Labor in Bogota saying the majority of the workers had left our union and that it no longer represented the workers there. An official arrived from Bogota, declared the strike illegal, and registered the new union as representing the workers at Condor. Of course, everyone knows that this is a purely patronal union.
Even in the fifth month, with all of the difficulties, the majority of the original men who had been for the strike were still with the union. But when the leaders sold out everything collapsed. The strike at Calizo collapsed too. Those boys over there had it even tougher than us. There was continual persecution and not a little shooting too. They had been counting on us winning at Condor.

Those leaders who sold us out also delivered a list of the active organizers of the strike to the central. After the strike was broken Condor circulated blacklists of all the active members of our union. They sent these to centrales and other companies all over the Valle. These people either had to pack up and leave this area or take work in places that don't pay anything. They can't get a job on any of the centrales or ingenios around here. Even now, after all this time, they still persecute us.

Look at me. Last Friday the mayordomo where I'm working came up to me and said, "Listen, the boss got a letter about you from Condor. It says that you are a communist and a dangerous revolutionary. For my part, you've done good hard work here and I'll put that on your work book. But I have to let you go. And it's no use looking for work at Don Jaime's finca because they wrote him the same letter."

Look at me. I can't even work on that shit trapiche for a miserable twelve pesos a day.

The above mentioned strike continues to be a sensitive issue among many Bolo residents and few are willing to discuss it in public. Some of those men who supported the strike and who are still resident in Bolo hold that the union leadership worked to maintain the strike even after it was clear that it could not be won. This, they claim, was one of the prime reasons why so many union members returned to work. Moreover, some of the field workers who were union members, and many workers hired since the strike, believe that unions do not have the legal or moral right to restrict anyone who wants to work. Others who were opposed to the strike throughout, a heterogeneous group composed of foremen, mill hands and some field workers, either were, or felt themselves to be physically threatened during the strike. Some hold that a minority or a small majority of the workers were actually for the strike, and that majority was lost as the strike continued. Central officials do not elaborate beyond claiming the strike was due to communist agitation.
One of the most bitter strikes in the Valle sugar industry during the 1964 period of field work occurred at Hacienda San Pedro. I spent some time in the strike camp, at union meetings and in accompanying collection teams for the strike fund. Hacienda San Pedro lies a few miles from the outskirts of the city of Palmira. It comprises 2,226 acres totally under cane, which until about 1961 were utilized in its own trapiche operations. The Hacienda is now owned by a land-holding corporation controlled by a large nearby central. It delivers all of its cane, about 300 to 360 tons a day, to that central. While Hacienda San Pedro is a legally separate unit it is in practice an integral part of the Progresso central complex. But the wages are much lower and the working conditions poorer on Hacienda San Pedro than on the central lands proper. Consider the wage rates for basic field labor and for harvest work on the two entities in June 1964.

<table>
<thead>
<tr>
<th>Hacienda San Pedro</th>
<th>Central Progresso</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Wage per Day</td>
<td></td>
</tr>
<tr>
<td>General field labor</td>
<td>11.75 Pesos Col.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Piece Rates</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cane Cutting: per ton cut</td>
<td>3.47 Pesos Col.</td>
</tr>
<tr>
<td>Cane Loading: per ton loaded</td>
<td>.80 Pesos Col.</td>
</tr>
</tbody>
</table>

In addition to the lower rates and basic wage paid, virtually all of the cultivation on Hacienda San Pedro is done under the piece rate system. The basic wage is paid mainly to those engaged in planting. These workers and some tractor drivers are the only people receiving a daily wage on the Hacienda. Some workers engaged in cultivation work under the piece rate payments claimed that they frequently had to work ten hours a day to earn the equivalent of the basic daily wage.

Most of the social security payments given at Hacienda San Pedro conform to those made by the central. But since these payments are proportioned to earned income they are absolutely less than those paid to the equivalent central employee. Furthermore, most of the services provided by the centrales on their own initiative or obtained by union contract are absent on Hacienda San Pedro. For instance, the Hacienda does not provide transport to work areas in the field, which often means one to two additional hours per day used in travel.

Hacienda San Pedro is not bound by any job security agreement. It lays off many of its employees for occasional periods throughout the year and whenever the Progresso mill closes for repair. As distinct from Progresso and most unionized centrales, the Hacienda is not required to rehire the same employees after it begins operation again. The relatively new union organized there had not been able to impose a job
The security clause in its work contract and this was one of the important issues of the strike.

The Hacienda employed 220 field and harvest workers on a "permanent" basis and about 20 salaried foremen and supervisors at the time of the strike. It was unionized to an unusually high degree - 206 of the 220 workers were said to be members of the union local. This local in turn was affiliated to a regional grouping of sugar cane worker unions. The Hacienda San Pedro union began negotiations in February 1964 for a new contract which demanded (1) the wage scales obtained at Central Progresso, (2) payment of the social security benefits made by Progresso and provision of transport facilities and a loan fund for workers' houses, and (3) job security (i.e. employment priority for men layed off during stoppages). Negotiations were carried on until the middle of May 1964, when the strike was finally called.

A live-in strike camp was set up a few hundred yards from the Hacienda offices and 30 to 40 pickets maintained union presence throughout the day and night. Some single men lived in the camp and all union members did a stint of picket duty during a week. At the time of the strike, the union local did not have a single paid official, let alone a strike fund. By the middle of June the personal savings of most members were already exhausted. Support for the strikers was widespread throughout the sugar cane workers of the region as a whole, even amongst many men working on trapiches and colono farms. In the city of Palmira and in the small towns of the region many people employed neither in the sugar industry nor in agriculture contributed to the strike fund. Collection teams also frequented crossroads where local busses stopped. Sympathetic bus drivers often allowed a collector aboard to make his round of the passengers, which usually produced some small contributions. Collections taken up in the small towns of the vicinity were often done unobtrusively, if not secretly, but an open and regularized network of collectors canvassed much of the working class sectors of the city of Palmira. The largest regular financial support came from the sugar cane unions of the labor federation to which the Hacienda San Pedro local belonged. These unions instituted a weekly collection among their members. But as the strike dragged on into the third and fourth month it became more and more difficult to collect such weekly contributions.

The limited funds and provisions were distributed to the union members twice a week, but gifts and loans by friends and relatives played a substantial role in maintaining individual families during the strike. By the end of June conditions had already become very difficult for some strikers but morale was still high. By the beginning of August, the strike committee was doing its utmost to hold the membership together and to prevent union members drifting off into other jobs. One of
the difficulties of maintaining union organization during a drawn-out strike is that a large percentage of the original workers and union members are forced to seek employment elsewhere. Strike funds are almost always less than that needed to provide the basic necessities for a large family. In order for the striker to obtain employment with any larger company he must present his work papers. These will be released by the struck employer only if the worker formally quits. Some men may find occasional employment with labor contractors. But here, too, they tend to be drawn away from the original job. In any case, the strike only remains operative as long as the union holds the majority of the original workers together.

Although there was considerable tension on the picket line, the Hacienda San Pedro strike was free of violence and the company did not attempt to introduce strike breakers. The determination among union members to continue the strike weakened during August. But pressures against the company position also began to develop. The mayor of Palmira attacked the company's intransigence, cautious criticism appeared occasionally in the conservative regional press and the Ministry of Labor began pressing for a new round of negotiations. A settlement was finally reached near the end of September. This provided a raise of approximately two pesos in the basic wage with a twenty to thirty per cent increase in the majority of the piece rates. Even with these increases the wage level on the Hacienda remained far below that obtaining on the Progresso plantation itself.

The limited gains made by the Hacienda San Pedro workers must be viewed in relation to the widespread support they had, for many other unions on small centrales fail to develop such support. For example, during the four month period between October 1965 and February 1966 the 300 men of the large trapiche Las Palmas and the 550 workers on the small central El Productor went out on strike. Both of these producers paid wages considerably less than the large centrales in the Valle. Both had small, effectively independent and isolated unions. The El Productor workers settled for a flat 10% increase in basic wage and piece rates after a three week strike which almost destroyed the union. This increase barely met the increased cost of living. The Las Palmas strike had been in progress for almost four months by late January 1966. The company made no offers in negotiations and the strike demands had apparently collapsed in what had become a desperate effort to break a lock out.
Since cane in the Cauca Valley continues to grow throughout the year without any crucial harvest period, sugar cane growers are particularly well situated to sustain long, drawn-out strikes. Although it is most economic to harvest cane at the peak of maturity, the cane which goes unharvested during a strike can usually be processed later. This opportunity to wait out strikes with relatively little loss exists particularly for the colono cane suppliers, the dummy cane supply farms of centrales, and the marginal trapiches which frequently go in and out of production. Centrales, on the other hand, are in the position of industrial plants. For them, a strike not only ties up cane harvesting but also shuts down the mill. Closing down a multi-million dollar mill is rather different from the colono who watches his strike-bound cane fields grow a little higher (if more weedy) each day.

It is here in order to sketch an outline of the history of the Colombian labor movement and the nature of union organization in the Cauca Valley. Writing the history of the Colombian labor movement will provide a fertile area for numerous dissertations. But very little in the way of comprehensive studies have been written or researched. It appears that the documents have yet to be gathered, the recollections of persons involved written, the interviews made, the basic data compiled. This brief overview of the Colombian labor movement which follows must be considered against this proviso.

True union organization, as distinct from small mutual benefit societies for workers in specific crafts, first appeared in Colombia after World War I. The first great organizational campaign of the Colombian labor movement developed on the United Fruit banana plantations of the Magdalena Valley. This was broken up by the Army in the now infamous Santa Marta massacre of 1928. The region around Cali was an important focus of union organization from the mid-1920's and on. With the election of the Liberal party in 1934 under Alfonso Lopez (a moderate Colombian Cardenas), legal basis was laid for union organization. In 1936 the first broadly based labor federation, the Confederación de Trabajadores de Colombia (C.T.C.) was founded.

The relatively rapid industrialization of certain areas in Colombia (especially during World War II) and a series of governments somewhat sympathetic to organized labor aided the spread of C.T.C. affiliated unions. Alexander considers that the zenith of C.T.C. strength and influence was reached between 1943 and 1946, when it represented approximately 120,000 organized workers in the broad range of affiliated unions (Alexander 1965:136). From its inception until 1950 the C.T.C. was riven by continual factional disputes between those elements
focusing the official Liberal party and those supporting a more militant attitude. For much of the 1936-1948 period, the C.T.C. was strongly influenced by the more left-wing forces.

In 1946 a parallel labor federation, the Unión de Trabajadores de Colombia (U.T.C.), was launched under the auspices of the Catholic church. During the second half of the 1940's both the Liberal and Conservative parties drifted to the right, leading to a Conservative dictatorship in 1948 and to the Falangist regime of Gomez in 1950. The C.T.C. was purged of its left-wing elements in 1948 and 1949 but by 1950 it had ceased to function openly. The U.T.C. inherited much of the nominal representation of labor unions formerly affiliated to the C.T.C. With phenomenal growth the U.T.C. could claim to represent 472,000 members in 288 locals by 1956 (Poblete and Burnett 1960:86). The fortunes of specific labor unions fluctuated greatly during the regime of General Rojas Pinilla (1953-1957), but in general, the few militant unions were kept pretty well disorganized by arrests and persecution. The attempts of Rojas Pinilla to found a broadly based "Peronist type" labor federation, the Confederación Nacional de Trabajo (C.N.T.), to support the military regime failed.

In 1957 Rojas Pinilla was replaced by a coalition of Liberal and Conservative parties under the leadership of A. Lleras Camargo. With parliamentary democracy restored, to a certain extent, the C.T.C. made rapid gains, re-absorbed many of the U.T.C. affiliates, and again moved to the forefront of the Colombian labor movement. (Cuellar 1963:262) By 1962, a strong left-wing and communist-led spectrum of unions existed within the C.T.C. The C.T.C. leadership expelled a large number of these affiliates, including many of the most powerful industry-wide union organizations and the labor federations of entire departments. One of the most important departmental labor federations expelled from the C.T.C. was the Federación de Trabajadores del Valle (Fedeval). The Federación de Trabajadores Libres del Valle (Festralva) was created during 1962 and 1963 as a competing, parallel organization to the Fedeval. Festralva operated as a semi-autonomous affiliate of the C.T.C. During 1964, Fedeval joined, at least nominally, with a number of other major regional and industry-wide labor federations throughout the country, to form the Confederación Sindical de Trabajadores Colombianos. Evaluating claims of union strength in Colombia often requires considerable intuitive imagination. The estimates given by Viera and Delgado for the total strength of the national federations are based on the claims made by these organizations themselves (Delgado 1964:6; Viera 1965:103, 104). Some of the difficulty exists in distinguishing nominal from effective membership, nominal from effective affiliation of unions to federation, and just plain inflated membership figures.
In addition, Viera estimates that there were, by the end of 1964, another 135,000 organized employees in unions not affiliated to any of the above federations (Viera 1964:103).

During 1964 and 1965, four labor federations existed in the Cauca Valley - the Utraval (Union de Trabajadores de Colombia, a U.T.C. affiliate), Festralva (Federación de Trabajadores Libres del Valle, a C.T.C. affiliate), Fedetav (Federación de Trabajadores de Valle, a C.S.T.C. affiliate), and Blóque de Sindicatos Independientes (a small amorphous grouping of unions in Cali). The U.T.C. unions represented almost all sectors of the regional industry and in addition had a number of peasant and cooperative organizations incorporated in their ranks. Utraval probably was the biggest, and despite its conservative top leadership, the most heterogeneous grouping of unions in the area. Festralva also had unions from most of the region's industries. It was spreading rapidly, particularly in the industrial sectors of Cali (a fact not unconnected to its favorable image among many industrial associations). Fedetav, although under severe attack by industries and affected by union raids, continued to maintain unions in many industrial sectors. According to Herrera, then president of Fedetav, the federation was comprised of about 75 union locals having a combined membership of 18,000 to 20,000 workers. But he states that between 1962 and 1964 Fedetav had lost about 50 union locals comprising 25,000 to 30,000 members (Herrera 1964:3, 4). Finally, the Blóque de Sindicatos Independientes was restricted to a few unions in some industries in the city of Cali.

What of union organization in the Cauca Valley sugar industry? A number of centrales seem to have responded to the threat of strikes by increasing reliance upon what even apolitic workers consider company unions. Here, working agreements and compromise with the union leaders are the order of the day. Strikes, bitter sieges, and lock outs are becoming less acceptable to central administrations. Consider the solution presented in a recent Asocaña publication, voice of the Cauca Valley sugar industry.
The Cauca Valley has been the center of worker agitation of a dangerous orientation that has been able to be contained because of the tightening of worker-management relations in the sugar industry and the organization of labor groups of democratic orientation, whose aim is the unionization of the workers in the sugar mills. On the other hand, the intelligent divulgation of the collective benefits that the increase in sugar production and exports can bring to the workers and the country has greatly influenced the maintenance of social peace in the region. (Manual Azucarero de Colombia, 1964:27) (English text in original)

A facet of the dangerous orientation to which the above quote refers is the attempt of Fedetav to create a single industry-wide sugar workers union. To date, such industrial unions are not permitted by Colombian Labor Law and Fedetav has combined its organizational efforts with political efforts to implement the necessary changes in the national laws. This strategy necessarily entails mobilization of sugar workers on broader political issues. This is a long-term program and the union leadership are fully aware of future difficulties and past defeats. Said one Fedetav official, commenting on the current outlook of many of their members:

There are people who see the problems and are without hope. They think in terms of great men, like Gaitán. As if these leaders were a gift of God, as if they dropped from the heavens like Jesus Christ to save the nation. Naturally, when these leaders fail, or are assassinated or prove to be opportunists, people who think in terms of personalities cannot understand. They fail to realize that these leaders are generated by real conditions, more specifically, the conditions of the masses - and it is these conditions which forge the solutions.

While there may be some truth in the addage that "No strike is ever lost", it is evident that many workers become demoralized by repeated defeats. For more than a few people, past and current conditions do not so much forge solutions as despair. An eloquent testimony of this process was given by Ricardo Paja, an old man who now worked for labor contractors on trapiche and colono farms.

Some people talk about organizing all the workers in one region, on all the fincas and trapiches and centrales, all under one workers' federation. But I'd like to know who is going to do this. We tried to organize a union on just one central and we failed. The trapiche where I'm at
has over a hundred men - plenty for a union - but not the slightest sign of activity. Organizing is becoming more and more difficult around here as the companies get smarter. If they are forced to, they will set up their own organizations. Fighting them only serves to pit one poor man against another. The leaders of the people are either assassinated or bought off. The leaders sell you out each time.

But the most basic reason for all of this is that there is no solidarity between the workers of Colombia. We live divided, one against the other. One can't trust anyone - a few friends and no more. One man will sell out his workmate for the boss' favor. It's not just that there are patronal unions but rather that the attitude of the workers allows them to continue.

It is difficult to estimate exactly how widespread such demoralization and distrust is. It is equally difficult to estimate the conditions under which such feelings multiply or are reversed. It is clear, nevertheless, that the above statement is not an isolated case. This makes the present acceptance of company unions by former union activists and supporters more understandable.

The "labor groups of democratic orientation" mentioned in the Manual Azucarero de Colombia quote are those union locals grouped together in the Federation of Free Workers of the Valley (Festralva). If this federation is not completely free it is at least reasonable. The organizational activity of this group has been directed mainly to winning the jurisdictional rights to represent the workers on large centrales now organized by other unions. They were not engaged in organizing the half dozen smaller ingenios and centrales or the hundreds of large trapiches or colono farms which are totally unionized.

While charges of traición (literally "treason" but better rendered as "sell out") and esquirol ("company stooge") are generously thrown about in the Colombian labor movement, the sugar worker locals grouped together in Festralva can fairly be categorized as an example of company unionism. Two separate central administrators indicated that the organization of Festralva was partly funded by a number of industrial associations after the period of bitter labor conflict in the sugar industry during the early 1960's. In 1965 Festralva's annual assembly was held in the offices of the Association of Colombian Cane Cultivators. This is the headquarters of the public relations and coordinating activities of the large centrales which control the Cauca sugar industry.

The Festralva-associated union now existing on Central Condor became established there during the bitter strike
discussed earlier. Other unions of the *Festralva* federation have been successful in taking over the union representation of a number of companies in the sugar industry recently (and have had rapid success in winning jurisdictional rights from other unions in the industrial sector). The relative number of centrales organized by the various union federations in December 1965 was as follows:

**CHART 12**

<table>
<thead>
<tr>
<th>Federation</th>
<th>Centrales Locals Affiliated</th>
<th>Approx. Number of Permanent Workers on Central</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fedetav</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manuelita</td>
<td>1,977</td>
<td></td>
</tr>
<tr>
<td>Sucre</td>
<td>550</td>
<td></td>
</tr>
<tr>
<td>Oriente</td>
<td>400 <strong>approx.</strong></td>
<td></td>
</tr>
<tr>
<td>San Fernando</td>
<td>450 <strong>approx.</strong></td>
<td></td>
</tr>
<tr>
<td>Mayaguez</td>
<td>700</td>
<td></td>
</tr>
<tr>
<td>Papayal</td>
<td>400 <strong>approx.</strong></td>
<td></td>
</tr>
<tr>
<td>Trapiche La Quinta</td>
<td>350 <strong>approx.</strong></td>
<td></td>
</tr>
<tr>
<td>Hacienda San Pedro</td>
<td>220</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>5,047 <strong>approx.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Festralva</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rio Paila</td>
<td>3,180</td>
<td></td>
</tr>
<tr>
<td>Central Condor</td>
<td>1,700</td>
<td></td>
</tr>
<tr>
<td>Bengala</td>
<td>625</td>
<td></td>
</tr>
<tr>
<td>Tupia</td>
<td>2,000</td>
<td></td>
</tr>
<tr>
<td>Cauca</td>
<td>700 <strong>approx.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>8,205 <strong>approx.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>U.T.C.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melendez</td>
<td>600 <strong>approx.</strong></td>
<td></td>
</tr>
<tr>
<td>El Productor</td>
<td>550</td>
<td></td>
</tr>
<tr>
<td>San Carlos</td>
<td>600 <strong>approx.</strong></td>
<td></td>
</tr>
<tr>
<td>Trapiche Las Palmas</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2,150 <strong>approx.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Non-unionized</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>La Cabaña</td>
<td>396</td>
<td></td>
</tr>
<tr>
<td>El Naranjo</td>
<td>300+</td>
<td></td>
</tr>
<tr>
<td>Calixo</td>
<td>300 <strong>approx.</strong></td>
<td></td>
</tr>
<tr>
<td>La Industria</td>
<td>300 <strong>approx.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,296 <strong>approx.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>16,698 <strong>approx.</strong></td>
<td></td>
</tr>
</tbody>
</table>
Since many Festralva locals are widely regarded as "patronal", even by their own members, one might expect dis­sention and opposition to the leadership among the rank and file. Indeed, all but one of the interviewees who responded to the question evaluating the union at Central Condor held that it was either a weak or a company union. Approximately a half of the respondents refused to comment on the matter and one man said "I have so much to say about that union that I had better not say anything." While dissatisfaction is easily discernable among the rank and file workers and union members at Central Condor, very little open opposition exists. To understand this one must realize that determined or organ­ized internal opposition meets active resistance and retaliation by the union leadership. This leadership has the support of the central personnel office and it is widely believed that the union leadership cooperates with the personnel office in ferreting out activist union members. However true or untrue, it is widely felt that the union leadership passes on informa­tion about actual or potential agitators and generally acts as a transmission belt of company policy to the union membership. Dissatisfaction and calls for increased militancy among the membership is a threat to the position of the Festralva local and regional leadership personally. Under the combination of company and union control there are few workers who will openly oppose the current arrangements.

Centrales and Rented Land

The bulk of the cane grown on the company-owned land of the larger centrales is worked by men directly employed by the central. They are unionized and covered by the national social security regulations. As the sugar industry itself claims, only the sugar centrales have brought the wage rates and social security benefits applicable in urban industries to the Colombian countryside. There is considerable truth in this claim. What is not mentioned is that the centrales are also deeply implicated in the use of labor contractors and the various strategems used to reduce wage payments to cane workers. The extensive use of colonos to supply cane to the central is probably the most important of these tactics. But, in addition, the land rented and worked by the central (plots which are part and parcel of the central complex) are largely tended by labor supplied by contractors.

A situation similar to the Progresso-Hacienda San Pedro arrangement discussed earlier also existed on Central Condor. The family which owned Central Condor also held large tracts of nearby land under title of a company called Agropecuaria Amarilla. Most of the Agropecuaria fields border the central owned land and are integrated into the overall plantation complex. While Agropecuaria Amarilla has its own pool of
field machinery, additional equipment from Central Condor is widely employed. The administrators and agricultural staff of the two companies confer on a day-to-day basis at the field offices of Central Condor.

The Agropecuaria holdings amount to over 2,885 acres. Although certain sections of Agropecuaria Amarilla are given over to intensive cattle pasturage and small plots of soya and cotton are cultivated, the bulk of the land is planted in cane destined for the Central Condor mill. A single large section consists of 860 acres completely under cane. This tract has been rented on a long-term basis by Agropecuaria Amarilla and is co-administered by Central Condor. Wages and labor conditions on Agropecuaria Amarilla are markedly different from those on Central Condor. Men working for labor contractors make up the bulk of the field labor on Agropecuaria Amarilla while the labor force on central land is basically unionized and directly employed by the central. A *mayordomo* and his assistant act as the immediate supervisors of field operations on the Agropecuaria tract. They are directly employed by Central Condor and their main task is to check the quality of the work done by the gangs supplied by labor contractors and to inform field offices of the central what additional work is required. The central staff arranges for the labor contractors to be used and negotiates the prices to be paid them for specific pieces of work. During November 1965, labor contractors resident in Palmira, Pradera and Bolo were engaged to work this section. They supplied all the field hands used in planting, cultivation and harvest, while tractors, cultivating equipment, transport machinery and machine operators were supplied by Central Condor and Agropecuaria Amarilla. During July 1964, when field work on this tract was mainly cultivation, only 40 men were employed on an average day. But during January and February of the same year, when planting was in operation, there were up to 200 men deployed on the tract on some days.

Virtually all work done is on a piece rate basis. These rates vary considerably for each specific task, differing according to the character of the cane to be worked and by the price which the different contractors felt they could get men to work for. Some contractors had a core of men who regularly worked for them. These were given Sunday pay and vacation pay. These social security payments often varied according to whether the contractors had made a profit or not. At best, only a reduced level of social security benefits were ever paid and then only to a minority of the workers employed on that tract. A small dormitory and a few huts on the tract are used by some of the workers but the bulk of the men working for labor contractors seem to reside in the neighbouring hamlets and in Palmira. Central Condor and Agropecuaria Amarilla themselves have no dealings whatsoever with the workers on this tract. They deal only with the labor contractors and even then the supervision is usually left to *mayordomos*. No labor union of any sort, company or otherwise, exists on this or on any of the other Agropecuaria sections.
Labor Recruitment and Some Aspects of Migration

Until the early 1960's, some centrales engaged in labor recruiting in particularly backward regions of southern Colombia, particularly the mountainous peasant region of Nariño and the frontier areas of the Pacific coast. According to employees who reached the Valley in this way, a variety of arrangements, from labor recruiters bringing men directly to the central in trucks to pre-paid passage to mere job offers, were used to induce men to come to the Valley sugar industry. If the recollections given by many migrants are at all correct they needed little inducement from the labor recruiter to leave home.

Probably much more important than the number of individuals directly recruited for the Cauca Valley cane fields was the effect their emigration had on employment seekers in the home areas. Sporadic labor recruitment on the part of centrales played only a minor role in fostering the general migration from the backward regions into the Valley. But it seems reasonable to believe that such recruitment did facilitate the channelling of workers from some of the most underdeveloped regions into the expanding sugar industry. Many men who have migrated to the sugar region from these areas and who have established themselves on a central frequently encourage relatives and friends in their home areas to come to the Valley for work. By 1964 the migration from the backward regions to the sugar producing region was so well developed that there was no need for labor recruitment. Indeed, there was an excess of migrants searching for jobs on the centrales and even on the colono farms and trapiches.

By 1961, only 32% of the Central Condor employees had been born in the Department of Valle del Cauca. This situation is markedly different from the historic pattern where the majority of workers on plantations and haciendas were either attached to specific plantations or recruited from the immediate surrounding area. Approximately a half of the labor force of 1,497 listed on the 1961 Condor census came from underdeveloped areas. There were 442 workers from Nariño alone, a Department of minifundio where a large part of the rural population live on semi-subsistence farm plots. Unfortunately, the place of origin within the Department cannot be determined from these figures. The Chocó and the Pacific coast of the Valle del Cauca Department are largely areas of swidden and subsistence plots. From my own census of Bolo residents it seems reasonable to presume that at least one-third of those listed in the table as being from the Valle del Cauca are from the Pacific coast region. Tolima and Huila Departments are basically peasant areas, and many zones in the Department of Cauca and at the northern end of the Valle del Cauca are also primarily peasant areas little affected by large-scale industry.
Many of the longer established workers harboured distrust for the workers recently arrived from the Chocó and from the Pacific coast of the Valle. A high proportion of these recent migrants were single and lived in the central barracks. Even in the village of Bolo they were clustered in certain sections. There are certain antagonisms between the older and more recent elements of the labor force employed in the sugar industry. The majority of the new arrivals from the Pacific coast regions are Negro while a large number of the migrants from Nariño are

<table>
<thead>
<tr>
<th>Place of Origin by Department</th>
<th>Workers, Central Condor, October 1961</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>Antioquia</td>
<td>45</td>
</tr>
<tr>
<td>Atlántico, Bolívar, Córdoba, Magdalena</td>
<td>4</td>
</tr>
<tr>
<td>Santander, Boyacá, North Santander</td>
<td>12</td>
</tr>
<tr>
<td>Cundinamarca</td>
<td>25</td>
</tr>
<tr>
<td>Caldas</td>
<td>74</td>
</tr>
<tr>
<td>Tolima</td>
<td>65</td>
</tr>
<tr>
<td>Huila</td>
<td>31</td>
</tr>
<tr>
<td>Cauca</td>
<td>256</td>
</tr>
<tr>
<td>Nariño</td>
<td>442</td>
</tr>
<tr>
<td>Chocó</td>
<td>56</td>
</tr>
<tr>
<td>Valle del Cauca</td>
<td>484</td>
</tr>
<tr>
<td>Non-Colombians</td>
<td>3</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,497</td>
</tr>
</tbody>
</table>
phenotypically Indian. Racial differences heighten, to a
degree, division between workers, although the basis for this
division is often highly ambiguous.

Many of the established workers feel that the influx of
migrants in the Valle seeking employment on an already crowded
job market undercuts wages and working conditions. Moreover,
it is widely held that new workers from peasant areas and
from the semi-frontier regions are unresponsive to labor
unions. But an official of one sugar plantation union who saw
the problem in a long-term context said:

Some of these people just can't conceive of
making demands and taking a position opposed to the
boss. This, of course, is a very great problem for
us. Nevertheless, many of these people, after some
years in the Valle, under the conditions which exist
here, can be brought around to our way of thinking...
but it needs continual explanation, patience - a work-
mate carefully explaining the necessity and importance
of each position. And, if many of these people coming
to the Valle are too old and too set in their ways to
be influenced by explanations, their sons, who grow
up in the Valle, can often be made to understand.

Colonos, Labor Contractors and Wages

The larger centrales have come to terms with some form of
unionization but a few of the smallest centrales, almost all
of the trapiches and all of the colonos continue to fight the
entrance of labor unions. One of the most important tactics
in combating labor organization by colonos and trapiches is
the extensive use made of labor contractors. Reliance on
labor contractors has spread and on all the colono farms and
trapiches surveyed they provided the bulk of the labor used
in the fields. The colono Don Roberto says he would prefer
to have 'permanent' employees, living in his campamento,
working in his fields. But he foresees increased wages and
other demands and so he is making progressively greater use
of labor contractors. He now considers only the fourteen men
in the campamento as "my men" and uses labor contractors to
provide approximately two-thirds of the labor required, saying
"it saves me a lot of bother with these people". Don
Roberto might have added that it also saves him a lot of money.

In addition to simple mechanization, colonos and trapiches
reduce their labor costs by circumventing payment of many
social security benefits, by paying low wages and by employing
labor contractors. This entire strategy is increasingly dependent
upon use of contractors. Let us consider first the costs of
social security payments on the centrales, where the national
labor law is enforced through the activity of union and government agencies. We will then be able to appreciate the extent and importance of circumventing such payments on colono farms and trapiches.

In 1960 the social security payments legally required of centrales with a total capital value of 800,000 Colombian pesos and over (i.e. all centrales) constituted 44.4% in addition to the current basic wage. Although workers make a small contribution toward some of these funds through payroll deductions, over 80% of the social security payments are financed by company contributions. The legally required social security payments cost the centrales the following amounts (Padul and Peñalosa, 1961:20).

<table>
<thead>
<tr>
<th>Type of Social Security Payment</th>
<th>Percentage of Basic Wage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(in addition to the basic wage)</td>
</tr>
<tr>
<td>1. Unemployment benefits (Cesantía)</td>
<td>10.5</td>
</tr>
<tr>
<td>2. Retirement fund</td>
<td>6.0</td>
</tr>
<tr>
<td>3. Vacation pay</td>
<td>4.2</td>
</tr>
<tr>
<td>4. Bonus pay</td>
<td>8.3</td>
</tr>
<tr>
<td>5. Life, Accident and Disability insurances (total)</td>
<td>3.3</td>
</tr>
<tr>
<td>6. Health insurance (Seguro Social)</td>
<td>4.0</td>
</tr>
<tr>
<td>7. Family Bonus and Job Training Funds</td>
<td>5.0</td>
</tr>
<tr>
<td>8. Other (transportation, school fund, special clothes)</td>
<td>3.1</td>
</tr>
<tr>
<td></td>
<td><strong>44.4</strong></td>
</tr>
</tbody>
</table>

The majority of centrales provide social services and payments in addition to the legally required social security benefits. Although some of these "services" might better be considered as investments in labor control or subsidized central expenses of on-the-job training, they did provide payments generally desired by the workers. These include credit for home construction, partial payment of medicines, provision of medical care not covered by the national health insurance scheme, extra scholarships and school facilities. The benefits over and above those legally required are invariably described as "voluntary" social security payments by central administrators, industry publications and even by most workers themselves. But
as numerous union contracts published in *Derecho de Trabajo* (Journal of the Colombian Labor Relations Association) make clear, these benefits are largely obtained through the work contracts which are negotiated between labor unions and the centrales (*Derecho de Trabajo* 1964, 1:17; 1965, 6:2; 1965, 13:2).

The aggregate costs to the centrales of legal and "voluntary" social security payments and services are clearly quite high. In 1960:

> In the great majority of centrales, the additions and supplements [legal and "voluntary"] represent 70% and more of the basic wage. Actually, it is difficult to determine exactly the cost of the legal and voluntary social security payments because these vary by the size and the financial capacity and efficiency of the mill.

> In any case, these immediate and deferred supplementary payments, in kind and in money, are not less than 50% and occasionally represent 90% over and above the basic wage. (Fadul and Peñalosa, 1961:30)

Central Manuelita also estimated the cost of its legal and "voluntary" social security payments as 70% over and above wages during 1963 (Manuelita, 1964). Even if the aforementioned cost estimates have been inflated as a public relations effort on the part of the industry, it is clear that the actual payments are an important supplement to the wages of sugar plantation workers.

Despite variation among colonos and trapiches in the matter of social security payments, some stark generalizations can be made. Firstly, colonos provide no social security payments at all to the two-thirds and more of their labor force which is employed through labor contractors. Payments are restricted to the small "permanent" labor force. Moreover, the "permanent" labor force is typically provided with only a restricted number of the social security benefits. Sunday pay (always a rest day) is almost universal. Payment, at reduced rates, of unemployment insurance, *Cesantia* and family bonuses are frequent (although even many "permanent" workers who are legally entitled to them are excluded). Other social security payments are either disregarded or paid at the discretion of the colono. For instance, the employer may provide an end-of-the-year bonus and pay "his" permanent workers if they are incapacitated by an on-the-job accident. But the amount of such payments are lower and less reliable than provided for by law or provided on centrales. A similar situation exists on most of the commercial trapiches, although trapiche mill workers generally seem to receive a somewhat wider range of
social security payments than do colono field workers. A somewhat impressionistic estimate of the level of social security payments on most colono and trapiche operations is that one-third of the workers receive somewhat less than one-half of the financial benefits received by central workers. The other two-thirds of the workers, those hired by labor contractors, receive almost nothing. (What social security payments labor contractors do provide are usually over-matched by reduced wages.) Even the larger commercial trapiches officially reported an average of only 20% of labor costs as due to all types of social security payments (Izquierdo 1964: 100). This was probably less than one-third of the level provided by centrales at that time.

While reduced social security payments are important in the labor economics of colono and trapiche operations, there is a much more obvious disparity between these sectors and centrales. Wage scales on colono farms and the great bulk of trapiches are markedly lower than on even the lowest paying centrales. In 1965, the standard wage for the field hands permanently employed in planting and cultivation on colono farms in the area surveyed was 12 pesos per day. Only one central paid less than 17 pesos a day for general field labor while the great majority of centrales paid a minimum daily wage of 18 to 19 pesos for this category of work. It is difficult to compare wage scales for other tasks on centrales and colono farms, since the latter now rely primarily on labor contractors for the bulk of the remaining agricultural tasks.

Labor contractors pay their workers exclusively on a piece rate basis. Under this system the wage that a cane worker earns is determined not only by the rates paid and the amount of time he works but also by the conditions of the cane, the equipment and overall organization brought to bear on the task. Colonos and trapiches have relatively little investment in field equipment or in improved fields. They cannot grow, cultivate or harvest their cane as effectively as centrales and the amount of cane which a worker can weed, cut or load per day is considerably less than on central fields. Use of labor contractors and piece rates transfers much of the potential labor costs arising from inadequate farm organization and lack of equipment onto the workers themselves. Put simply, it is the difference between the worker being paid or not being paid for the extra time and labor he has to invest to complete a certain task with inadequate equipment and in badly grown cane.

Most colono and trapiche cane fields have sections of stunted, spindly, sparsely scattered cane. A significant proportion of this cane has been cultivated only lightly and is mixed with weeds. Heavy weed infestation slows cutting and makes it an even more exhausting job than it is normally. Cane planted on broken and sporadically inundated land is
frequently intertwined and partly flattened. Cutting such cane demands extra pulling, shifting stance, and disentangling of cane stalks. All of these conditions are much more frequent on colono and trapiche fields than on centrales and results in lowered wages and increased work. Piece rate payments for cane cutting are based on the weight cut and even if the same rate is paid on centrales and colono farms this still means a lower total wage on the latter.

When loading cane, it is important that cane wagons be moved to where the cut cane is lying. Centrales usually use a large number of wagons stationed along the cutting line, with oxen or tractors constantly available to move the wagons to the piles of yet unloaded cane. On most colono and trapiche fields, however, there is frequently an insufficient number of cane wagons or tractors. In one extreme case I saw loaders carrying bundles of cane up to 100 yards to four stationary wagons scattered about a field. In some cases, loading requires approximately twice as much work per unit loaded as on a well-equipped operation. It is quite usual to see loaders on contract operations waiting for the single tractor available to move the cane wagons closer to the cutting line. Even when slightly higher piece rates are paid by colonos, the daily wages are considerably lower than those obtained for the same amount of work on the centrales.

Moreover, different piece rates apply to dozens of particular tasks. Rates for specific tasks vary according to the condition of the cane, according to the price the contractor has received and according to the availability of men to work at the given rate. The only feasible way of disentangling the mesh of variable piece rates is by considering the differences in total weekly wages received by a sample of workers employed on centrales, colono farms, and trapiches.

This data is taken from my survey of income and unemployment for 78 households in the village of Bolo for 1965. The weekly income is that actually received in the last week of November 1965. The level of unemployment is here tabulated as "weeks unemployed in previous year" (although it seems to be under-reported). "Unemployment" here refers to any period when wages are not being earned. It includes those periods during which a worker continues to retain a job but, for various reasons, is on an enforced "vacation" without pay. I have combined the data of all men working on colono and trapiche fields during the time of the survey, approximately 60% of whom were employed through labor contractors.
# CHART 14

## Income and Unemployment on Centrales, Trapiches and Colono Farms

<table>
<thead>
<tr>
<th>No. Cases</th>
<th>Weekly Income (Pesos)</th>
<th>Weeks Unemployed In Previous Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Average</td>
</tr>
<tr>
<td><strong>Cutters and loaders</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Central</td>
<td>21</td>
<td>3,171</td>
</tr>
<tr>
<td>- Trapiches, Colonos and Labor Contractors</td>
<td>13</td>
<td>1,560</td>
</tr>
<tr>
<td><strong>General Field Workers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Central</td>
<td>9</td>
<td>1,349</td>
</tr>
<tr>
<td>- Trapiches, Colonos and Labor Contractors</td>
<td>20</td>
<td>1,932</td>
</tr>
<tr>
<td><strong>Foremen, Equipment Operators and Others</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Central</td>
<td>17</td>
<td>3,381</td>
</tr>
<tr>
<td>- Trapiches, Colonos and Labor Contractors</td>
<td>8</td>
<td>935</td>
</tr>
<tr>
<td><strong>Mill Workers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Central</td>
<td>7</td>
<td>1,379</td>
</tr>
</tbody>
</table>
The median income for all categories of workers is consistently lower on colono farms and trapiches than on centrales. The wage differences vary from the 30 pesos per week more paid to the median central harvest worker than to his colono counterpart, to the 84 pesos per week difference for field equipment operators in the two sectors. Indeed, there is very little overlap in the wages of these two sectors. The highest wages, in the entire colono and trapiche sample, are only slightly greater than the lowest wage in the central sector.

An even greater disparity exists between central workers and those employed on colono farms and trapiches in terms of the total period spent unemployed during the year. Whereas harvest and general field labor on centrales reported an average of approximately 4 weeks per year unemployed, their counterparts on colono farms and trapiches average approximately 10.5 weeks of unemployment per year. If the "permanent" general field hands on colono and trapiche farms were excluded from this sample the disparity would be even higher.

The colono s and trapiche farms are "sweatshop" operations. In this they require the aid of labor contractors and a few "faithful" workers. One older man who had worked in the cane fields of colonos, trapiches, and centrales for over 20 years and who now worked for different labor contractors made his feelings clear. He understood that labor contractors could only exist with the support and instigation of farm owners and mayordomos and by the conditions which allow the contractors to find sufficient workers. Nevertheless, he projected his most intense frustrations on the person of the labor contractor. From the lips of this generally mild old man came this comment on labor contractors.

Well, the contractor gets together let's say ten men and offers them so much for each piece of work he's gotten. Maybe, in all, it amounts to half of the price he got. He doesn't take any chances - you get the money when you've finished your portion of the plot. They always say, "That's all I got for the job. I'm losing money on this one."

He has no responsibility for the people who work for him. But people have to take the work even if they only make ten pesos a day for ten to twelve hours of work; even if they don't get Sunday pay or vacation pay or family bonus or anything. Even if there are absolutely no social security payments and when they are sick or have an accident they have to get by on their own. They have to take the contractor's offer, because if they don't take it someone else will. They don't have any money, the wife and children are hungry, they can't get any more credit and there are no other jobs. There are always enough people to take the contractor's price.
These contractors are the most despicable, degraded people on the face of the earth. They are dragged up from the human refuse - parasites, thugs and people who feed on the misery of others.

This reaction is indeed one of the reasons why contractors are becoming a favored vehicle in the labor policy of many colonos and trapiches. They not only serve to frustrate unionization, circumvent payment of social security benefits and provide lower pay, but they also act as a buffer, absorbing the frustrations and hostility which workers might otherwise vent against the colonos and trapiches owners themselves.
CHAPTER VI

COLONOS AND TRAPICHES

Colonos

The recent expansion of central sugar production in the Cauca Valley has involved the creation of a large number of nominally independent colono cane growers. Most colono farms are largely given over to the production of cane which is contracted for delivery to one or at most two, centrales. Colono cane production has become crucial to mills only recently. The use of colono cane producers was of relatively little significance before the late 1930's and even in the first years of the 1950's was not of great importance. There are historical precedents to the present colonos in the farms owned by relatives of owners of trapiches and small centrales. Frequently such farms were planted in cane which was ground in the trapiche or mill of the relative. The rapid increase in colono cane supply began in the late 1950's but by 1959-1960, after an already rapid rise in the number of colonos, the colono sector still only accounted for 28% of the cane ground in centrales. But by 1964, approximately 60% of the land supplying cane to centrales was rented and/or colono land.

In the beginning, the sugar industry was organized in a vertical way. Thus, the totality of all lands supplying cane to the mill were the property of that mill. Such organization was the mill owners' answer to the low level of capital formerly available [to colono cane farmers] for the industrial development of agriculture. For many years, the best opportunities for profitable investment were in trade and in the processing industries located in urban centres.

These conditions have changed, and at present sugar mills own only 40 per cent of the land supplying sugar cane. The other 60 per cent belongs to other persons who supply cane to the sugar mills under contracts.

All the new sugar mills, like those being rebuilt, will be corporations. The majority of them will own only the mill and will have to buy all their sugar cane from growers. The proportion of the total amount of cane from the land owned by the sugar corporations will continue to diminish. (Manual Azucarero de Colombia, 1964:8-9)

122.
The rapid rise in the number of colono farms is not only due to the expansion of central mills, but also to the period of sharp credit restrictions for middle-sized farms and trapiches during the 1959-61 period. Panela production was undergoing one of its expansive fluctuations in 1958-59 when a drop in panela prices affected many overextended producers. Bank credit to trapiches almost dried up in 1960-61, forcing the closure of many units (see Izquierdo, 1964). Under these conditions, contracted cane delivery to centrales offered a relatively profitable and secure opportunity for those producers already involved in cane growing.

Cane growing is not a new activity for many colonos. Many of the present cane farms were formerly given over to a balance of cattle, sugar cane and smaller amounts of food crops for the market. Two of the five colono farms surveyed in detail during the field work had formerly operated small panela trapiches which were now in a state of disrepair. Another colono farmer formerly ground his cane in a trapiche owned by his mother. Many colonos formerly had standing arrangements to supply neighbouring trapiches, a large number of which went in and out of cane growing and panela production as the price of the article fluctuated. This pattern of fluctuating production is still evident in smaller trapiches today.

Most colonos are now under long term contracts to deliver most or all of their cane to a single central. Contracts are of variable duration but may average about five years. The stipulations of each contract apparently vary in that they specify, within flexible bounds, how much cane is to be delivered at what price at approximately which periods. The majority of colonos are paid a straight rate for their cane, usually based on the tested total sucrose content in the cane they deliver. The rates amount to approximately 50% of the value of the sugar extracted from the cane. Centrales pay some colonos in kind, returning approximately 50% of the sugar extracted from the colonos' cane. Some colonos prefer this system over simple monetary payment because it allows them to retain their own outlets for independent commerce. 1

It is not clear to me how cane rates are adjusted to the fluctuating price of sugar but renegotiation and adjustment of contracts seems to be a continual activity in colono-central relations. The contracts to produce cane for a central are not themselves the basic factor keeping colonos deeply involved in cane production over a long period of time. It is widely held that at least four harvests must be obtained from a single planting in order to pay for planting and cultivation costs and provide an acceptable profit; four harvests span approximately 5 years. Continuation of cane production after the initial cycle is generally felt to be the most profitable course by colonos.

Consider the colono farms which supplied cane to Central Tupia in 1960, during the initial rise of colono suppliers. At that time the central produced cane on about 8,850 acres of its own land. It received cane from ten colonos whose cane lands ranged in size from approximately 200 to 753 acres.
Central Tupia did not utilize rented cane land in 1960 but the colonos provided approximately one-third of the cane land supplying the mill. By 1963 the number of colonos supplying Central Tupia had risen to 19 with a total of 7,850 acres in cane. In addition, the central was growing cane on 5,680 acres of rented land (Manual Azucarero de Colombia, 1964:98). Its own cane lands had increased only slightly since 1960 (to 9,110 acres). Therefore, about 60% of the land supplying cane for the mill in 1963 was colono or rented land. An even higher proportion of external cane supply was evident on Central Condor in 1963. In that year colonos and rented land constituted about 70% of the 26,070 acres supplying cane for the Condor mill (Manual Azucarero de Colombia, 1964:113).

A view widely held (or at least stated) in many government, academic and urban middle class circles represents colonos as the Colombian rural middle class, standing somewhere between the modern U.S. family farmer and English gentlemen farmers. In fact, colonos are neither a Colombian yeomanry nor typical hacendados. They are substantial businessmen, owning relatively large farms, variously appended to the centrales, with relatively scarce capital and more involved in dealing with the exigencies of present financial, legal and labor conditions than with sugar cane agriculture per se. They are 'middle' in income and ownership only in the sense that their farms are much larger and more capitalized than the peasant holdings of less than 15 acres and smaller than the thousands of acres held by each central. Colono farms in the area of field work ranged from 95 to almost 2,385 acres. In 1964 the majority were between approximately 238 to 636 acres in size. The really large colono farms of over a thousand acres fall into the category of plantations.

### CHART 15

Sizes of Colono Farms Supplying Cane To Central Tupia, 1960

<table>
<thead>
<tr>
<th>Range</th>
<th>Number of Colono Farms</th>
<th>Total Cane Land Supplying Central</th>
</tr>
</thead>
<tbody>
<tr>
<td>199 to 239 acres</td>
<td>3</td>
<td>646 acres</td>
</tr>
<tr>
<td>240 to 398 acres</td>
<td>2</td>
<td>795 acres</td>
</tr>
<tr>
<td>399 to 557 acres</td>
<td>3</td>
<td>1,503 acres</td>
</tr>
<tr>
<td>558 to 718 acres</td>
<td>1</td>
<td>601 acres</td>
</tr>
<tr>
<td>719 to 795 acres</td>
<td>1</td>
<td>758 acres</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>10</strong></td>
<td><strong>4,303 acres</strong></td>
</tr>
</tbody>
</table>
Finca La Estrella, A Colono Farm

Let us consider a single colono farm in detail. Don Roberto, the owner of Finca La Estrella is a man in his late fifties. His family has held land in this region for several generations (at least some colonos are first generation land owners). Educated in England and France, he makes regular visits to Europe and the United States. He is an urbane man.

In addition to the colono farm, Don Roberto owns a large home in a fashionable district of Cali. This is where he lives most of the year. He also has a small ranch in the hills behind Cali which serves mainly as a summer retreat.

The cane sold from Finca La Estrella is allegedly his prime source of income. While he has unspecified financial investments he does not own any other commercial or industrial enterprises (as some other colonos do). The administrator of the central to which he delivers cane considers Don Roberto a fine example of the progressive Colombian farmer. This means that Don Roberto makes extensive use of tractor cultivation, is interested in new cane varieties, applies some chemical fertilizer, uses some weedkiller and is planning to irrigate part of his land.

On Finca La Estrella, as on similar farms in the Valle, the particulars of day to day management are in the hands of the mayordomo and a labor contractor. During various crucial periods Don Roberto drives the 30 miles to the Finca from Cali two or three times each week to check current operation. This is closer supervision than given by many colonos.

Colonos like Don Roberto are so often described as "progressive, revolutionary in a true sense" by their business associates and by central administrators that the observer sometimes may feel as if he is trapped in a Brecht play. Don Roberto's comments are quite illuminating and generally representative of the character of this group and of the position they fill in the contending political forces of the nation. Said Don Roberto, more in relation to politics than to agriculture,

The price of fertilizer and herbicides and agricultural equipment is just criminal in Colombia. Everything is done to help the industries and nothing for the farmer. The fertilizer companies here are just plain robbers, we could buy the stuff much more cheaply directly from the United States. It's this game of tariffs and tax aids and manipulation of trade that the government is engaged in. I thought we were supposed to be free enterprise.

After all, agriculture still produces the bulk of the national income, most Colombians are still engaged in agriculture.

Sometimes I wonder whose government this is anyway, what sort of system we are living under.
Finca La Estrella is one of those colono farms which formerly operated as a trapiche. Colono farms with a similar history of panela production seem to constitute a substantial minority of the current colonos. An unpublished census by Asocaña for 1960 indicates that Finca La Estrella at that time consisted of about 350 acres of cane and a small amount of pasture land. The estate included a fairly large trapiche which produced panela throughout the previous year. At that time field operations were still partly dependent upon animal traction. Tractors, oxen and mules were all in use on the fields. Chemical fertilizers and weedkillers were little used.

At the time of the 1960 census the field operation employed 50 men: 24 cane cutters, 6 men loading cane, 4 tractor operators, and 16 men engaged in planting and cultivation. In addition, there were 32 workers employed in the trapiche on a 6:00 a.m. to 10:00 p.m. shift. Seventy of the 82 field and mill workers lived in the trapiche's campamento. Most of the field and mill workers were hired by the mayor-domo himself. Relatively little use seems to have been made of labor contractors.

During 1964-1965 Finca La Estrella comprised 380 acres in cane fields and about 16 acres in buildings and grounds. A small amount of pasture was rented. The trapiche was in a state of disrepair and all cane grown was contracted for delivery to Central Condor. Tractors had totally replaced the draught animals and only a few riding horses were still used. Cane yield in 1964 allegedly averaged over 50 tons per acre per cutting (which would be at least 10-20% higher than obtained on most colono farms). A plot is now regularly replanted when it yields less than 32 tons per acre. Chemical fertilizer is now generally applied, in sparing amounts, to most plots for the first through third harvests.

Tractor-drawn disc cultivators are currently used to cultivate the cane plots during the first 2 to 3 months of growth. During the fourth to fifth month, a quick weeding with palas and machetes is applied, possibly repeated during the seventh to eighth month of growth. In order to decrease cultivation costs Don Roberto has begun using weedkillers to a greater extent. He would prefer to use more hand labor than he does, but in practice he is increasingly relying on tractors and chemicals. He says

I would like to give people a chance to work. It is one of the responsibilities of an employer to the economy of the country. Besides, machines and chemicals do not care for the land the way men do.... But in all truth, labor costs have become prohibitive. Mostly it is due to the high wages that one has to pay here. Wages have gone up tremendously in the Valle in the last few years.
Of course, one can't really blame the workers for demanding more. The costs of food have gone up something terrific. But, when labor costs go up to what they are now one is forced to look for another solution. Weedkillers are extremely expensive here but one is forced to use it more and more. I just can't afford to pay the costs of manual weeding.

In 1964 there were 14 workers living on the campamento of Finca La Estrella who were almost continually employed in planting and cultivation. These were the workers who were permanently employed and whom Don Roberto considers "my men". This work force is not able to handle all the planting and cultivation on the farm. The additional labor is now supplied by a labor contractor who deployed gangs of 10 to 20 men in weeding about six times in the previous year. On an average, these gangs were employed for about two to three weeks each time they are used. In addition, there are almost continually a small core of men provided by the labor contractor for a host of various small jobs around the farm.

Planting or cultivation proceeds throughout most of the year and keeps the permanently employed workers more or less fully engaged. They are rarely deployed in harvesting cane. The harvests are now almost exclusively carried out by workers employed by a labor contractor. During the previous year, there were two periods when major harvests were in operation on Finca La Estrella, along with a quite minor clean-up harvest. During one period of investigation in 1965 harvesting was rather slow on the Finca and only 18 men were working under a labor contractor. The peak of a harvest finds the contractor with 25 to 30 men engaged in cutting and loading cane. While the harvests were scattered throughout the year, harvesting was actually in progress for less than 180 days in the previous year. Although some of the harvest workers employed by the labor contractors may also be engaged by them at other times for cultivation work, the majority try to find work harvesting with other contractors on other colono and trapiche farms once this phase is finished on one farm. Those men who are capable of sustained heavy work and who can find harvest work without too much loss of time are able to earn more on harvest piece rates than those employed in cultivation and planting.

Don Roberto likes to discuss the responsibilities he has to his workers, that is, to the 14 men who live on the Finca. This responsibility extends to "finding them work" on the Finca throughout the year, but not to increasing the subsistence level wages or paying the legally required social security payments. Except for a limited number of tasks, the permanent workers are paid a straight wage of 14 pesos a day, approximately 60% of the basic wage paid for the same work on centrales. An urbane man, Don Roberto takes a tolerantly
relativist view of what he takes to be the aspirations of the
great majority of the cane workers. He explained

Most of the people who work in the cane fields
here are paid on a rate basis. If they want to advance
themselves, if they want to increase their pay, they
only have to work harder. If they are lazy or want
to take it easy their pay is accordingly lower. It
is completely up to them.

But you will find, very generally here in
Colombia, many people are not so concerned about
doing better. They will work just so much and so
hard as to provide a modest living for themselves
and their families. They are not materially inclined.

Ironically, in the Cauca Valley, the material aspirations of
the cane workers and their pressure for unionization and
increased wage demands has been a crucial factor in widening
the niche in which colonos can exist and multiply. Centrales
have used colonos as a source of cane supply rather than
increasing their own land holdings, on which unionization
must be dealt with and higher wages paid.

Colono cane farms require the use of substantial numbers
of workers for short, intermittent periods. This was less
true formerly when manual labor was used extensively for most
agricultural phases and when there was a greater flexibility
of use of the workers on one farm. Today, labor contractors
are increasingly used to supply workers for specific short-
term tasks. These contractors are utilized for reasons other
than, or in addition to, the technologically based fluctuations
in labor requirements. For Don Roberto, and for many other
colonos, the use of labor contractors keeps the size of the
permanent force below the twenty-five employees which con-
stitute the legal minimum for the formation of a union (al-
though union organization on most colono farms would be
exceedingly difficult even given a larger permanent labor
force). Furthermore, through the use of a labor contractor
a colono can avoid payment of most of the social security
benefits to the contract workers and also give minimal pay-
ments to the permanently employed workers.

Don Roberto has reduced the size of the campamento,
which housed 70 men and their families when the farm operated
as a trapiche in 1960, and now has only 14 permanent workers
living there. He says this of his progressively greater use
of labor contractors.

The contractor will look around and say to me,
"Don Roberto, this and this field needs another
weeding. I can do it for so much -- the weeds are
hard to get at". Then I say, "Alright, go ahead."
He then goes to some of the small towns and villages
around here and gets people to work. He hires them,
tells them what to do and pays them. I advance him so much and pay him the remainder when the job is finished. Anything that passes between him and the people he gets to work is between them and him. It saves me a lot of bother with those people.

Don Roberto, like many other colonos, attempts to evoke the aura of patron-client relationships, and the noblesse oblige of "taking care of his workers". While he may enjoy evoking this aura and might prefer to retain numerous loyal workers, he is under the pressure of increased labor costs. Although he feels that he has to justify the use of labor-saving devices he has greatly increased his use of mechanical cultivation and weedkillers. In the preceding four to five years, he has made increasing use of labor contractors interposed between himself and now largely unknown workers.

Colonos have attempted to reduce production costs in two general ways: (1) by introducing labor-saving field practices and mechanizing many phases of cultivation, and (2) by patching together strategies aimed at paying substantially lower wages than those applicable on centrales. Many colonos seem to retain "paternalistic" images of the proper relationship between landowner and land worker. But both colonos and employees have in general been forced to accommodate to more strictly capitalist relations (one is tempted to say "modified 19th century" capitalist forms). The colono is now concerned with keeping down wage costs rather than with exercising control over a pervasive range of patron-client relations with his workers.

Labor Stability on Colono Farms

Whereas most centrales do harvest throughout most of the year (even if sometimes sporadically), individual colono farms do not. Taken as a whole, there are harvests on colono farms throughout the entire year, but it is quite clear that individual colono farms harvest for only a limited period each year. The total amount of time during which harvesting was in operation ranged from less than 20 to little more than 25 weeks per year on the four colono farms in my survey. They harvested a total of 91 weeks in 1965, an average of 22.8 weeks each. Moreover, the total harvest period is spread over two or three separate harvests during the year on each farm, each having its own cycle of labor requirements. A harvest on one farm might typically begin with 10 to 15 men, require 25 to 30 men during a peak of 3 to 4 weeks, and then taper off quickly to a rate which required 10 or less men. Harvesting is then generally discontinued for a number of months until another plot of cane is mature, when a new composite harvest force is again deployed.
The total number of men employed in the harvest is difficult to specify. There is variation from day to day and over the cycle of a specific harvest. Furthermore, even when the number of men employed remains approximately the same, this number will usually be constituted by different individuals. It was possible to establish only an approximate figure for the amount of labor used on the various farms. The harvest data presented here (Chart 16) are for the number of harvesters employed during the time of investigation or, where harvesting was not in progress, the estimated average number of men employed in the last harvest period.

On the four colono farms surveyed, 91 cutters and loaders were employed during the average 23 weeks of harvesting. The number of harvest workers on each farm varied from 10 to 30 men between the low and peak points of each harvest. A median figure of about 20 men throughout the harvest may be accepted. Only 5 to 10 (of the 91 harvesters) were men who are permanently employed by the farms and who are at other times engaged in cultivation and planting. The overwhelming bulk of harvest labor was supplied through labor contractors. Such contract labor was used even when harvest was organized, paid for, and directed by the central purchasing the cane, as in the case of the Rio Sucio colono farm listed here. This provides a considerable saving in wages over what the central would have to pay if it employed the unionized labor force existing on its own lands.

There are a total of 42 permanently employed workers, an average of 10 to 11 on each farm, who are engaged more or less continuously throughout the year in planting and cultivation tasks. But even planting and cultivation are increasingly being carried out by contract labor on colono farms. The four colono farms employed a total of 60 to 75 men through labor contractors for planting and sporadical cultivation. The number of men so employed on each farm, and the duration of the tasks, was highly variable. A rough estimate would be somewhat less than 20 men deployed on each farm, for a duration of one month, four to five times a year. In sum, even in planting and cultivation approximately a half of the labor input is now through contract labor, and this proportion is rising very rapidly.

The overall picture is that in 1965 there was a labor input in the fields of the four colono farms equivalent to 200 men. Short-term employment was provided for virtually all of the 91 harvest workers and for approximately 65 of those men engaged in planting and cultivation. Only 20 to 25 weeks of employment for these tasks was available on any single colono farm throughout the year. Many of the men employed in these tasks at one time of the year did not return to the same farm when work was again available there. Of the over 200 men employed on the farms only 40 to 50, including mayordomos and their assistants, were permanently
## Chart 16

### Land, Labor and Machines on Four Colono Farms During 1965

<table>
<thead>
<tr>
<th>Name</th>
<th>Amount and Use of Land (In Acres)</th>
<th>Field Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Rio Suci o</td>
<td>370 cane</td>
<td>1 tractor (cane trailers and additional tractors provided by central)</td>
</tr>
<tr>
<td>2. La Capitana</td>
<td>355 cane approx. 40 pasture</td>
<td>4 tractors 18 cane trailers 1 truck</td>
</tr>
<tr>
<td>3. Finca La Estrella</td>
<td>380 cane approx. 16 grounds</td>
<td>4 tractors 10-12 cane trailers (central provides additional cane trailers and tractors)</td>
</tr>
<tr>
<td>4. Los Limones</td>
<td>237 cane approx.</td>
<td>1 tractor 1 truck</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>1,342 cane approx. 72 pasture and grounds (+ rented pasture)</td>
<td>10 tractors 2 trucks 30+ cane trailers</td>
</tr>
</tbody>
</table>

Continued....
### Chart 16 (continued)

**Land, Labor and Machines on Four Colono Farms During 1965**

(Continued)

<table>
<thead>
<tr>
<th>Field Practices</th>
<th>Periods of Harvest</th>
<th>No. of Weeks Harvested in 1965</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Land preparation and single cultivation by tractor; no fertilizer or weedkiller used.</td>
<td>April 1965 to July 1965; Oct. 1 1965 to Jan. 1966</td>
<td>25</td>
</tr>
<tr>
<td>4. Rather cursory land preparation, little use of tractor cultivation - main reliance on hand weeding, mules still used.</td>
<td>Sept. to Dec. 1965; small harvest in early 1965</td>
<td>18-20</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>91 (Average of 23 weeks)</td>
</tr>
</tbody>
</table>
### CHART 16 (continued)

**Land, Labor and Machines on Four Colono Farms During 1965**

(Continued)

<table>
<thead>
<tr>
<th>No. of Men in Harvest</th>
<th>Planting and Cultivation Work</th>
<th>No. Men Employed in Planting and Cultivation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 22 men: all arranged through the purchasing central which hires through labor contractor</td>
<td>Special tasks done by labor contractors sporadically throughout year.</td>
<td>10 men permanently; 13 men by labor contractor (every 2nd month).</td>
</tr>
<tr>
<td>2. 35 cutters and loaders, all hired by mayordomo, approx. 5 harvest workers &quot;permanently&quot; employed.</td>
<td>Special force of hired help through labor contractor 5 times in year for approx. 4-6 weeks each time (25 men).</td>
<td>10 men permanently; 25 men sporadically throughout year (labor contractor).</td>
</tr>
<tr>
<td>3. 18 men currently employed through contractor. May be as many as 30 at harvest peak.</td>
<td>Done by the permanent employees with the additional application of variable numbers of workers under contractors.</td>
<td>14 men permanent; 10 to 20 men sporadically by labor contractor.</td>
</tr>
<tr>
<td>4. 16 men during harvest; a few permanent workers but most newly hired by mayordomo.</td>
<td>Done by the permanent employees with the additional application of variable numbers of workers under contractors.</td>
<td>8 men permanent; highly variable number of short-term workers by labor contractor.</td>
</tr>
</tbody>
</table>

**TOTAL**

91 (23 average per farm per harvest) 42 permanent plus 60-75 sporadically by labor contractor.
employed. These 40 to 50 permanent employees constitute a relatively stable group. But the 150 temporary workers listed here actually comprise the average size of the fluctuating labor pool. Considerably more than 150 actual individuals passed through temporary employment on these four colono farms in 1965. The above chart outlines the agricultural and labor features of the four farms discussed.

A further discussion of work organization and some difficulties facing those laboring on colono farms and rented land appears in the previous chapter. Particularly, the section Colonos, Labor Contractors and Wages presents the level of wages, social security payments and the amount of unemployment of workers on colono farms as compared to central workers.

TRAPICHES

"Trapiche" as used here refers to any present day mill producing the non-centrifuge sugar called panela. The continuing importance of panela, and the trapiches which produce it, can be seen in the fact that approximately 75% of the 843,000 acres planted in cane in Colombia in 1961 were utilized for panela. An estimated 774,000 metric tons of panela were produced that year, or more than double the amount of centrifuge sugar (Izquierdo, 1964:20-22). To an extent, the same process of concentration and enlargement evidenced on centrales is paralleled by the dominance of a small number of producers in the trapiche sector. Compared to the bulk of the roughly 50,000 "trapiches" in Colombia (90% of which are animal powered), the commercial trapiches of the Cauca Valley are relatively large and mechanized. They depend on crews of wage laborers and are deeply involved in large-scale regional marketing of panela. The trapiches in the Cauca Valley vary from two old sugar mills reconverted to produce panela to the horse-driven "mills" and open kettle operations found in some peasant zones. In the Departments of Cauca and Valle del Cauca, the heartland of Colombian sugar production, there were (as of 1963) 86,600 acres of cane land devoted to panela production by trapiches (12,000 acres of which belonged to colonos supplying trapiches) (Izquierdo, 1964:25). In 1964 centrales utilized approximately 178,000 acres in the same area. This indicates that over 30% of the cane land in even the desirable Valley flatland region was dedicated to panela production. This is particularly striking when it is remembered that almost all of the centrales operating in Colombia are located in the Cauca Valley and about 90% of the nation's sugar is produced there.
Despite great variation in the nature of trapiches the bulk of the *panela* produced for commerce is manufactured in trapiches which are generally similar in size, labor power, and technology to the pre-steam-driven sugar mills. These are the types of trapiches which predominate on the flatland of the Cauca Valley and are those discussed here.

In Valle del Cauca, cane land destined for *panela* production is concentrated under relatively few trapiches. Of the 1,082 trapiches in the Department of Valle del Cauca in 1961, some 81 owned over two-thirds of the *panela* cane land, produced over 65% of the *panela*, and employed 43% of the total labor (4,746 of the 11,017 persons employed).

**CHART 17**

**Size and Labor Force of Valle Del Cauca Trapiches, 1961**

<table>
<thead>
<tr>
<th>Size (Range in Plazas)</th>
<th>No. of Trapiches</th>
<th>Total Area in Acres</th>
<th>Total No. Employees</th>
<th>(Per Trapiche) Average No. Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 20</td>
<td>924</td>
<td>7,775</td>
<td>4,875</td>
<td>5.2</td>
</tr>
<tr>
<td>20 to 50</td>
<td>48</td>
<td>2,114</td>
<td>705</td>
<td>14.7</td>
</tr>
<tr>
<td>50 to 100</td>
<td>29</td>
<td>2,862</td>
<td>691</td>
<td>23.9</td>
</tr>
<tr>
<td>100 to 200</td>
<td>29</td>
<td>7,028</td>
<td>2,862</td>
<td>3,673</td>
</tr>
<tr>
<td>200 to 300</td>
<td>31</td>
<td>11,887</td>
<td></td>
<td>49</td>
</tr>
<tr>
<td>300 to 500</td>
<td>15</td>
<td>8,782</td>
<td>1,073</td>
<td>194</td>
</tr>
<tr>
<td>500 and over</td>
<td>6</td>
<td>7,870</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1,082</strong></td>
<td><strong>48,318</strong></td>
<td><strong>11,017</strong></td>
<td></td>
</tr>
</tbody>
</table>

Mechanization of field tasks has proceeded on trapiche lands to approximately the same degree as for colono farms. In 1960, over 85% of the cane utilized for *panela* production in the Valle del Cauca was ground by trapiches driven by some form of mechanical power. But the level of mechanization in the field processes was still low, comparable to the conditions on Central Tupia in 1938-40. On the smaller trapiches, in 1960, animal traction was still important in many field phases and even on the larger trapiches the great bulk of the cane was still transported by horse, mule and oxen. Chemical fertilizer was rarely used, and application of weedkillers was virtually absent. Although tractors were used frequently for land preparation and cultivation, they were relatively small in size and few in number (Izquierdo, 1964:28, 31, 32).

By 1964 and 1965 the commercial trapiches in the zone studied had eliminated draught animals completely in both the growing and transport of cane (although in the nearby hill land trapiches continued use of mule cane transport).
As with colonos, the larger trapiches had shifted to increased usage of tractor cultivation and manual application of weedkillers. Chemical fertilizers were beginning to be used, although irrigation was still rare. Despite these changes, there was still considerable reliance on large amounts of manual labor in planting, cultivation and harvest. Even the larger panela producers required a relatively intensive application of labor per unit of cane and panela produced. Some observers of small-scale production in general and the panela industry in particular see the labor intensive character of these producers as a blessing in disguise. Izquierdo, for example, notes the high volume of manual labor involved per unit of production in the panela industry, and says:

There exists then, in the panela industry, a high absorption of manual labor in the countryside which produces a beneficial socio-economic equilibrium in these zones, at least for now. . . .

The level of employment generated by the combined operation of the field and trapiche mill acquires major importance if we consider that it is located in the regions of the country with the highest indices of demographic growth. It is also logical to suppose that it is supporting an elevated percentage of the redundant farming population. The production of panela, by maintaining a high level of employment, thus helps to diminish unemployment and to sustain a certain equilibrium in the involuntary unemployment of the countryside . . . . (Izquierdo, 1964:48, 49)

Let us consider what the paeans of praise raised to the labor intensive trapiches looks like on the ground, in the fields, and inside the trapiches.

**Trapiche Santa Rosa**

The owner of the trapiche, a wealthy widow, very rarely visits the trapiche which is run by a salaried superintendent. One of her sons received a 400 acre section of neighbouring land in inheritance and is one of the larger colonos of Central Condor.

The present mill equipment used by the trapiche was installed in 1956. Although the design and construction of the buildings and mill might be mistaken for the sugar factories that existed there a century ago, the machinery is slightly larger and more efficient than that of most paneleros in the area and is operated throughout much of the year. Trapiche Santa Rosa stopped milling its own cane for a few years in the late 1950's and early 1960's and sold all of its cane to Central Condor. But by December 1965 it had been
again producing *panela* more or less continuously for approximately two and a half years. It no longer sells cane. The cane milled is supplied mainly from its own fields but it also grinds some cane from the colono farm owned by the son of the trapiche owner.

The 380 acres of cane land owned by Trapiche Santa Rosa can be expected to produce roughly 7,000 to 8,000 tons of cane per year on an average. The cane plots are allowed to go somewhat longer before replanting than on the better colono farms and this is visible in the overall cane yields obtained (probably 30 to 35 tons per acre per harvest). There is no irrigation and fertilizer is used sparingly. The land nevertheless is flat and fairly good for cane (according to experts). About 30 beef and dairy cattle are run on 47 acres of semi-improved pasture but this is considered something of an idiosyncracy.

The production methods used in the mill itself are common to almost all of the trapiches in the area. Cane is brought from the fields in tractor-drawn cane trailers which are parked beside the grinding mill. Two or three men (*tañadores*) feed the cane from the wagons directly into the rollers. Each stalk must be inserted into the rollers singly. Sometimes the hands of the *tañadores* seem to get dangerously close to the rollers while inserting the cane. There are many accidents in the fields and the machines of such outfits. The grinding apparatus itself (the trapiche) is extremely small and primitive compared to analogous equipment on even the smallest sugar central. It consists of a single set of three rollers run by a small diesel engine. There is no cane crusher or shredder, the cane pulp is not recirculated and the rollers exert only a fraction of the pressure developed in central mills. (Whereas most centrales extract well over 80% of the sucrose in the cane, most trapiches probably do not manage much more than a 50% extraction rate on an average.) The cane juice runs from the rollers into a flume and is channeled into a storage tank in the boiling shed. The *bagasse* falls from the rollers into a short chute and is scooped into baskets and carried to the drying sheds by two men called *bagaceros*. *Bagasse* is produced in considerable quantities as long as the mill continues grinding and *bagaceros* often move at a slow jog.

*Bagasse* is the basic fuel used in firing the evaporating furnace. Some trapiches extract more of the juice from the cane than others but even the best extraction rate leaves the *bagasse* too wet to be used immediately. It is stored for about two weeks in open sheds and allowed to dry. Another two men (*materieleros*) remove *bagasse* from the storage shed to the furnace mouth where a stoker (*atisador*) constantly feeds the fire. Stoking *bagasse* into the furnace is an exhausting job and in the Trapiche Santa Rosa two *atisadores* regularly spell each other. The furnace must be kept burning
at about the same rate, regardless of how much cane is being ground, as long as juice is being evaporated. The bagasse is supplemented with dry cotton husks, wood and some coal. The amount of such supplementary fuel needed increases when there is a major fluctuation or a decrease in the amount of cane ground. The cost of such additional fuel is a stimulus to a steady, high level, grinding rate.

When cane juice runs into the storage tanks it is mixed with dirt, cane trash and other impurities. Some of these impurities settle to the bottom of the tank as sediment and some is skimmed off the top with long-handled sieves. The line of purifying, evaporating and boiling vats and kettles which follow constitute the tren de trapiche. The vats and kettles are set into the broad, horizontal flue of the furnace. Flames and hot gasses passing along the flue bring the vats to a boil. Juice and syrup is continually ladled from one vat to the next with long-handled scoops. The juice is passed from the storage tank to the purifying vat, which is under a slow boil. Here, calcium carbonate and a flux are added. Much of the impurity rises to the surface and forms a scum which is skimmed off. The juice is then passed through two large evaporating kettles. When this begins to thicken it is ladled into the first of three boiling kettles. The juice in these kettles boils furiously. As it is passed from one kettle to the next it becomes progressively thicker, with a higher concentration of sucrose, as more and more water is evaporated. The mixture in the boiling kettles can be described more properly as syrup than juice. The two men who ladle this juice down the tren de trapiche (contorneros) work in a mist of sweetish vapor.

The panela is "struck" in the single kettle at the end of the tren de trapiche. This is the most crucial phase of panela making. The syrup is already very thick. The evaporation in the final kettle must reduce the water content of the syrup to the point where crystallization occurs rapidly enough to prevent granulation yet the temperature and time used must not be so great as to allow the sugar to burn. The man who operates this process, the melero, is the master sugar craftsman in the trapiche.

The already thick syrup rapidly becomes a semi-solid mass of panela and when ready is scooped from the last kettle into a number of wooden trays. Three men (batidores) then mix the panela with short wooden spatulas until it is a cohesive, homogenous mass. As soon as they finish another man (rayador or pesadór) scoops out the panela with moulds which form the shapes of the final product. This must be done quickly as panela hardens and becomes brittle rapidly. Finally, another man (entallador) wraps and packs the panela bars into boxes and bundles. In smaller trapiches this work is done by the batidores and rayadores while waiting a fresh batch of panela. There is also a relief man (pié de amigo or pato) who takes over any position on the tren de trapiche or elsewhere in
the mill while the other rests or eats. A considerable inter-
change of aid between workers obtains in most small trapiches. 
A bagaero will spell a materielero for a while when the 
grinding has momentarily halted but when the furnace must 
be kept going. Batidores and rayadores will exchange work or 
will occasionally spell contoroneros while awaiting a fresh 
batch of panela.

Trapiche Santa Rosa also hires a salaried mechanic to 
tend the diesel engine. There is a mechanic's assistant and 
two general maintenance men who receive piece rates as do all 
the other trapiche workers. Trapiche Santa Rosa, like most 
of the larger paneleros hires a mill foreman (cabo) on salary 
to oversee the team of workers. In addition, there is the 
superintendent who acts as a direct representative of the 
owner and handles purchases, wage payments and sales at the 
trapiche. He receives a basic salary and a small percentage 
of the profits made by the trapiche. On smaller trapiches 
the superintendent is usually a relative of or part-owner 
of the trapiche.

Trapiche Santa Rosa begins operations each Monday at 
about 3:00 a.m. when a skeleton crew arrives to adjust the 
machinery and fire up the furnace. The full crew comes on at 
about 5:00 a.m. and the trapiche begins grinding between then 
and 7:00 a.m. The crew works straight through until 9:00 or 
10:00 p.m. For the remainder of the week operations begin 
between 5:00 and 6:00 a.m. Depending upon the amount of cane 
available, work continues throughout the day, afternoon and 
night – usually until 9:00 p.m. or a bit later. The mill 
does not stop grinding for any of the meals and coffee breaks 
taken throughout the day. All trapiches hire a woman who 
lives on the campamento and prepares food for the workers. 
When meals are ready, one worker after another (or sometimes 
a few at a time) goes to the kitchen shed to eat. His work 
position is taken either by the pato or by one of the other 
workers. Snacks of agua panela (panela dissolved in hot 
water) and buns are eaten in momentary intervals between 
tending the equipment. Workers take about 20 to 30 minutes 
to eat a meal and rest a bit. These breaks vary in duration 
according to the amount of work going on and the pressure 
from the other workers. This work schedule, so reminiscent 
of the early European Industrial Revolution, is quite general 
in the trapiche sector.

With the exception of the foreman, the mechanic and the 
superintendent, all workers receive wages based on a piece 
rate – so much per man per box of panela produced by the 
trapiche. The piece rates for the 23 men engaged in the 
Trapiche vary, by job, between .20 and .28 pesos per man per 
crate of panela produced. The average is .23 pesos per crate. 
In addition, the mechanic and the cabo receive a straight 
earnage of 250 pesos per week. The superintendent admitted that 
the working conditions were not easy but held that the long
hours of continual operation were to the workers benefit. "After all, the more they work the more they produce. They come out with better wages that way", he explained. The beauty of the piece rate system, for the owner, is that it largely produces its own control of work. As the superintendent put it, "The employees regulate themselves. We don't have to trouble with that. They know how to deal with those whose work leads to less production or those who don't do their share." Little or no supervision is needed to keep the employees working. The foreman is there mainly to see that the quality of the *panela* is acceptable and that none is stolen. The superintendent sees to decisions of when to repair machinery, purchases and sells goods, and hires labor. Accounting and wage payment under the piece rate system is simplicity itself. The workers in the trapiche do have one advantage, of sorts, which contract harvest workers do not have. They know the exact amount of *panela* produced and what is due to them on the piece rate scale.

The wages paid for these long hours of work hardly can be considered as "coming out with more", unless that "more" is measured in relation to what workers on yet smaller trapiches earn. During the period of investigation the trapiche was producing at a higher rate than normal. During the week ending December 24, 1965, it manufactured 601 boxes of *panela*. The average piece rate paid was .23 pesos per box per man and the average wage for that week was 138 pesos. Sunday pay, at a flat rate of 12 pesos per Sunday, was added to the piece rate wage. The average total for the week - one which was more productive than usual - was then 150 pesos for approximately 92 hours of work. This wage is only slightly higher than the minimum wage paid to general field labor on the large centrales for a 48 hour week. Furthermore, Trapiche Santa Rosa, as most trapiches, pays only some of the social security payments provided by the centrales. On Trapiche Santa Rosa these are:

**Domínical**
(Sunday pay)
- Paid for each Sunday and legal holiday at a rate of 12 pesos per day.

**Prima**
(Bonus)
- Paid each six months, at Christmas and at the end of June, to "most" workers who have been employed 3 months or longer. It is paid at a rate of two weeks average earnings for each 6 months worked.

**Cesantía**
(Vacation pay)
- Payment is supposed to be one-twelfth of the average monthly earnings for each month worked. Although it need only be paid when the worker leaves the job, the trapiche makes a policy of advancing up to the full amount of the
(Continued)

cesantia held in reserve for each worker without requiring termination. It is frequently paid out during intermediate periods of mill stoppage.

Subsidio - Paid at the rate of 5% of the average weekly earnings to heads of families.

(Family Bonus)

In actuality, it is only the workers who have been with the trapiche for a year or more who are likely to receive all the social security payments listed above. Trapiche workers hold that some of even these restricted payments are evaded or made capriciously - particularly Family Bonus. Disputes are most likely to arise over social security payments which are based on long run earnings. The Bonus and Vacation Pay benefits on Trapiche Santa Rosa, and the Retirement funds paid by some other trapiches are prime examples. The accounting of the employee and the administrator are most likely to be at odds when calculating long-term benefits.

Trapiche Santa Rosa had milled more or less continuously for the preceding two and a half years, shutting down for repairs in the previous year for no more than 4 weeks. Because of this it had a more stable employment pattern than most of the large trapiches in the immediate area and provided employment with considerably longer duration than did any of the small trapiches, which fluctuated in and out of production. Despite this, the average duration of employment at Trapiche Santa Rosa was only between 6 and 12 months. At the time of my investigation the mill workers had been employed in the trapiche for the following periods:

<table>
<thead>
<tr>
<th>Duration of Employment on Trapiche</th>
<th>Number of Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 6 months</td>
<td>6</td>
</tr>
<tr>
<td>6 to 12 months</td>
<td>13</td>
</tr>
<tr>
<td>12 to 30 months</td>
<td>7</td>
</tr>
</tbody>
</table>

Indeed, only three men in the mill itself had worked there continuously since the trapiche started milling two and a half years ago.

About a half of the 24 men working in the trapiche mill have families living in Bolo and other nearby hamlets, but only 2 or 3 return home each night during the week. The rest sleep in the barracks, or if this is too crowded, on the floor of the mill and in the bagasse shed. The work pattern separates men from their families and requires a double food budget. Returning home except on occasional weekdays is virtually impossible for those whose families are resident.
more than a few miles from the trapiche. But possibly this is
too grim a view. As a counter-balance we may contemplate the
superintendent's view of working conditions.

The employees get their food here. There is
a woman who cooks for them. There is a small store
where they can buy tobacco and soft drinks. We give
them a place to sleep. It saves them travelling time
back and forth from their homes. They have all they
need right here.

Besides, we stop early on Saturday and give out
the pay. Everybody is gone by four or five in the
afternoon. Saturday evening and all day Sunday are
for them to do with as they please. They can visit
their families or bathe in a river or get drunk.

Presumably, in the satanic mills of Dickens' England there
were similar views.

Field Labor

In addition to the men working in the mill, Trapiche
Santa Rosa employs 16 men to plant and cultivate cane. These
are permanently employed and receive a daily wage and the
complement of social security benefits mentioned above. Many
of these workers have been employed in this capacity for
over 2 (up to 10) years. A number were born in the immediate
vicinity and a few feel a personal bond with the family owning
the trapiche. In addition to these 16 men, who are almost
exclusively engaged in cultivation and planting, extra gangs
of men are hired through labor contractors from time to time
to carry out particular cultivation tasks.

There were 25 cane cutters and 6 cane loaders employed
in harvesting cane for Trapiche Santa Rosa at the time of
the inquiry. The majority of the harvest labor force was
hired through a labor contractor. They were housed in bar-
racks on the trapiche grounds. There was also occasional
interchange of labor between the harvest gangs used on the
fields of Trapiche Santa Rosa and on the colono farm owned
by the son of the trapiche owner. Cane is cut on the colono
farm for use in the trapiche occasionally during the year, as
was the case during the time of inquiry. Trapiche harvest
workers are also sometimes used to cut the cane which the
colono farm delivers to Central Condor (as was the case during
the inquiry).

According to the mayordomo of Trapiche Santa Rosa, the
6 or 8 harvesters which he usually hires himself rarely stay
longer than 6 months. But according to at least one such
harvest worker, a number of such men have been repeatedly
hired, laid off and then re-hired a short while later. The
harvest workers hired through labor contractors on the trapiche (over two-thirds of the harvesters) are usually engaged for even shorter periods than those hired directly by the mayordomo. Many of the harvesters are from settlements scattered throughout the region. A substantial number have wives and families living elsewhere. No families are housed in the trapiche barracks.

Labor Stability on Trapiches

Trapiches are generally intermediate between centrales and colonos in the degree of job stability. The larger they are, the greater their labor stability. The working conditions, the wages and the social security payments are uniformly better on the larger trapiches. The two largest trapiches in the area, the two using old reconverted sugar mills, maintained a higher and more regular level of operation and seemed to have a more stable labor force than a number of the smallest centrales in the Cauca Valley. These two trapiches also provided higher wages than the small centrales. Such trapiches are nevertheless exceptional.

Whereas colonos require harvest workers only during those periods when they are delivering cane to a central, the trapiche requires harvesters as long as it continues to operate. Trapiches attempt to mill cane at a fairly regular rate. Although they are less successful at this than the centrales, larger trapiches, like Santa Rosa, do utilize roughly the same amount of cane per month while in operation and require approximately the same sized harvest force throughout. On smaller trapiches there is considerable unplanned fluctuation in production from day to day, week to week, and month to month. Because of this they generate much greater fluctuation in their weekly harvest requirements than do centrales. The weekly wages earned by "permanent" mill workers often fluctuates widely.

Most trapiches retain a relatively permanent body of field workers who are more or less continually employed in planting and cultivation. As with colono farms, labor contractors are increasingly being used to supplement this permanent labor force for specific tasks in planting and cultivation.

Most of the problems encountered in estimating the number and period of employment of workers in different phases of field activity for colonos also arise in an analysis of trapiche labor. It might be noted that no mayordomo or owner of a colono or trapiche interviewed had any meaningful records of the number of men employed in the various phases. Some showed considerable (if skeptical) interest in a reconstruction of labor input on their farms.

The four trapiches surveyed milled and harvested between 100 and 270 days each during 1965. A normal milling period for such trapiches is between 200 to 250 days per year. The
trapiche harvest differs from that of the colonos in that it continues at approximately the same rate as long as the mill is operating. Compared to the colono harvest force, a much higher proportion of the trapiche harvesters were employed directly by the trapiche and not through a labor contractor. Nevertheless, only 11 of the more than 80 harvest workers and 21 of the over 45 planting and cultivation workers were considered to be permanently employed by the trapiche.

An overview of land, labor and machine utilization on the four trapiches discussed appears in Chart 18. As with the analogous chart for colonos, the figures for men employed in planting-cultivation, and especially harvesting, are minimal. Again, they represent an estimate of average labor input. The actual number of individual workers employed in a year on these four trapiches is considerably higher.

In general, there seems to be somewhat less reliance on labor contractors on trapiche fields than by colonos. This may stem from the greater necessity of having a relatively steady flow of cane for the trapiche. Labor contractors frequently are not able to find all the workers they need on some days, or a week at a time. A decline in the number of workers and a slowing down of the harvest does not greatly inconvenience colonos who usually have the central harvest force to draw on in an emergency. But for trapiches, insufficient cane causes the mill to run below capacity and increases operating costs. Moreover, if trapiche production is low for a long period (or for frequent short periods) the total wages earned by the mill crew drops and they are likely to drift away to another job.

In addition to the field labor force, 95 men were employed in the mills of the four trapiches. The labor force which works in the trapiche mill differs from central mill workers in a number of important ways. Whereas central mill workers have probably the most stable employment in the entire sugar industry, the workers in the trapiche mills are second only to the contract and harvest workers in the degree of employment instability. If a trapiche stops operations through lack of cane or because of serious mechanical or financial difficulty, no alternate employment exists for the mill workers on the trapiche. If it shuts down for a stipulated, relatively short period (or for a specific repair) most of the mill workers will probably remain. But if the duration of stoppage is not known, a two week period will see almost the entire mill crew searching for jobs elsewhere. In a month they will probably be scattered over other trapiches.

When a trapiche begins operations again after an interlude of a few months it expects to hire a more or less new mill crew. This happened once or twice a year for the small trapiche El Placér. It is a process typical of the smaller producers. The members of the former crew are employed elsewhere and are rarely requested to or interested in returning.
### CHART 18

**Land, Labor and Machine Utilization of Four Trapiches During 1965**

<table>
<thead>
<tr>
<th>Name</th>
<th>Amount and Use of Land (In Acres)</th>
<th>Amount Panela Produced</th>
<th>No. Days Milled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santa Rosa</td>
<td>380 approx. cane land, 47 pasture</td>
<td>500-600 boxes/week</td>
<td>270 approx.</td>
</tr>
<tr>
<td>Machado 6</td>
<td>73 cane (plus 190 acres cane attached to separate farm of same owner)</td>
<td>400 boxes/week average</td>
<td>190 approx. in 1965</td>
</tr>
<tr>
<td>La Rica</td>
<td>174 cane, 16 monte</td>
<td></td>
<td>220-240</td>
</tr>
<tr>
<td>El Placer</td>
<td>87 cane plus additional cane purchases</td>
<td>180 boxes/week; highly variable</td>
<td>100-120</td>
</tr>
<tr>
<td>TOTALS</td>
<td>714 cane plus 190 cane from supply farm (plus purchased cane) 63+ acres in pasture and monte (probably incomplete)</td>
<td></td>
<td>200 days average</td>
</tr>
</tbody>
</table>

Continued....
## Chart 18 (continued)

### Land, Labor and Machine Utilization of Four Trapiches During 1965

<table>
<thead>
<tr>
<th>Period Milled During 1965</th>
<th>No. Men in Mill</th>
<th>Duration of Mill Shift</th>
<th>Field and Transport Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Entire year</td>
<td>26</td>
<td>6:00 a.m. to 10:00 p.m.</td>
<td>3 tractors 10 cane trailers</td>
</tr>
<tr>
<td>2. June 5 to Dec. 31 1965</td>
<td>32</td>
<td>24 hours, in two shifts</td>
<td>2 rented tractors 6 trailers</td>
</tr>
<tr>
<td>3. Throughout year (with occasional stoppages of a week or more)</td>
<td>23</td>
<td>4:00 a.m. to 8:00 p.m.</td>
<td>1 tractor 6 cane trailers</td>
</tr>
<tr>
<td>4. Jan. 10 to March 20; Oct. 1 to Dec. 24, 1965</td>
<td>14</td>
<td>highly variable, depending upon cane supply - averages 10 hrs./working day</td>
<td>1 rented tractor 1 truck</td>
</tr>
</tbody>
</table>

**TOTALS**

95 | 13.5 hours average | 7 tractors 1 truck 22 cane trailers

Continued....
CHART 18 (continued)

Land, Labor and Machine Utilization of Four Trapiches
During 1965

<table>
<thead>
<tr>
<th>Field Practices and Cane Supply</th>
<th>Planting and Cultivation (No. of Men)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Grows all cane used and has sold surplus cane to central. Occasionally mills cane for another colono.</td>
<td>16 men permanent. Occasional gangs of men under labor contractor employed for specific task.</td>
</tr>
<tr>
<td>2. Most cane used bought from colono farm of the trapiche owner (who also delivers cane to a central).</td>
<td>5 men permanent; and highly variable number under labor contractor.</td>
</tr>
<tr>
<td>3. Own cane supplies for 5-6 months; purchases cane for 3-4 months milling.</td>
<td>8-12 men; all work arranged through labor contractor.</td>
</tr>
<tr>
<td>4. Supplies cane from own land for 4 months - purchases standing cane for 2 months milling.</td>
<td>4-8 men, all by labor contractor.</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>35-45; plus additional occasional contract labor</strong></td>
</tr>
</tbody>
</table>

Continued....
### CHART 18 (continued)

**Land, Labor and Machine Utilization of Four Trapiches**  
*During 1965*

<table>
<thead>
<tr>
<th>Harvest (No. of Men)</th>
<th>Estimated Stability of Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 31 men hired by trapiche but high turnover</td>
<td>Most of cultivation workers and some mill hands considered permanent.</td>
</tr>
<tr>
<td>2. 7 men hired directly by trapiche, plus 10 to 20 men employed through labor contractor</td>
<td>About one-quarter of mill force and 7 field workers considered permanent</td>
</tr>
<tr>
<td>3. 21 men, all hired through labor contractor</td>
<td>None of field force permanent; about one-quarter of mill force employed for over one year.</td>
</tr>
<tr>
<td>4. approx. 8 harvesters by labor contractor; 4 truck hands relatively permanent with trapiche</td>
<td>Only mill foreman and truck hands relatively permanent</td>
</tr>
</tbody>
</table>

**TOTALS**  
71-81; plus additional occasional contract labor
The most common pattern of operation on the larger commercial trapiches is a period of fairly continuous milling for 1 to 2 years with interruptions of usually no more than a few weeks. Then there is frequently a stoppage for a number of months. During the period of relatively continuous operation a constant labor turnover occurs, so that by the end of the average year and a half period of operation there is likely to be no more than a third of the original labor force still engaged on the trapiche. After a stoppage of a few months most trapiches hire a virtually new crew with only a few men of the old crew remaining.

**In Sum**

Differential mechanization of field tasks has resulted in an increasing proportion of field labor being engaged in the harvest phase of cane agriculture. We have seen that the duration of employment for harvest workers in the industry as a whole is shorter and less stable than for other categories of field workers. Differences in employment stability between harvest and non-harvest field labor are relatively minor on the larger centrales. But on colono farms the great bulk of the harvest workers are now employed for only a few months at a time, while a still substantial proportion of the labor force engaged in non-harvest tasks are "permanently" employed. Parallel differences in employment stability between harvest and non-harvest workers are also apparent on most trapiches, although here the harvest continues as long as the trapiche continues to mill and is not limited to the short periods characteristic of colono farms. But since trapiches go in and out of operation with considerable frequency, the employment stability of their entire labor force, with the exception of those "permanently" engaged in tending the growing cane, is much lower than that of central workers.

Colono farms and trapiches rely heavily on labor contractors for an increasing amount of the work done in harvest and non-harvest agricultural phases. As we have seen, centrales also make indirect use of labor contractors, although to a much lesser extent than do colonos and trapiches.

An increasing proportion of the cane ground by centrales is produced by colono farms. These farms employ an increasing proportion of the labor force engaged in cane production. The pattern of employment instability associated with colono farms is then increasing as centrales obtain more and more of their cane from colonos and colonos obtain more and more of the labor through labor contractors. The pattern of relative labor stability which is possible in this non-zafra industry, and which indeed exists to a certain extent on some large centrales, would appear to be declining in the industry as a whole.
CHAPTER VI

THE CAUCA VALLEY SUGAR INDUSTRY AND THE PLANTATION PATTERN

Let us consider some broader aspects of the Cauca Valley sugar industry and the workers in it in a comparative context. We will consider three broad areas of comparison. The first deals with the degree to which centrales have concentrated ownership and control of land and processing mills and the position of colonos and similar supply farms in this process. The second concerns differential mechanization of agricultural phases and the concomitants of such mechanization, particularly the nature of labor instability. Thirdly, we will consider an aspect of the socio-political character of plantation labor and discuss the validity of viewing such laborers as a rural proletariat.

**Centrales, Colonos and Land Concentration**

Possibly the single most frequent theme in plantation studies has been the documentation of land concentration by modern sugar mill corporations (Guerra y Sanchez, 1964; Ely, 1963; Steward, 1956; Mintz, 1956; Hutchinson, 1957). Mintz summarizes the developmental pattern as follows:

1. All available land is concentrated in large-scale holdings with the effect that small-scale landholders are eliminated, or become dependent upon the corporation. [And parallel to this development]....All small-scale processing is supplanted by large-scale centers. (Mintz, 1956: 415)

On the other hand, at least two anthropologists have recently reacted against Mintz' generalization and have purposed to document cases where corporate sugar plantations operate in conjunction with tenant plots and smallhold farms which produce both sugar cane and food crops (Handler, 1966; Miller, 1964). How general are these two patterns and how do they relate to the processes operative in the Cauca Valley sugar region?

In Puerto Rico, the area which provided the empirical basis for Mintz' generalization, consolidation of cane fields and sugar factories was occurring throughout the nineteenth century. Between 1830 and 1870 the number of sugar ingenios in Puerto Rico dropped from 1,552 to 553, despite a considerable rise in total production. Massive expansion of cane
fields and mill construction did not develop until extensive new capital became available after the American occupation and in 1903 there were still 325 mills operating in Puerto Rico (Steward, 1956:54, 56). With the spread of large centrales came an initial growth in the number of colono cane supply farms, but this trend soon gave way to central land concentration.

Although the development of the modern sugar central permitted commercial cultivation of cane on a few acres of land, thus encouraging small farmers to take up cane cultivation, it had a more profound effect in the opposite direction, placing a premium on extensive cultivation and on the wedding of central to cane lands. The Brookings Report (Clark, 1939:826) estimated that in 1930 "of the 237,000 acres of cane...one-fourth belongs to colonos, one-half is owned by plantation companies. The remainder is leased by these companies from private owners." (Steward, 1956:67-68)

In 1934-35 four corporations controlled 46% of the total area operated by all sugar companies (Steward, 1956:67, 68, 70). By 1960-61 most of the 30 centrales were owned by a few corporations.

As Mintz points out, the expansion of sugar production and centrales (both in Puerto Rico and elsewhere in the Caribbean) has often witnessed this rise of a class of colono cane suppliers during the initial period of development. But by 1948-49 such colono units were largely absorbed into, or controlled by, the central plantation complex (Mintz, 1956:339). In addition to land and mill concentration by individual centrales is the consolidation of a number of centrales in a single corporation. These corporations in turn, may be merely one sector of yet larger national and international trusts.

The first centrales in Pernambuco State (Northeast Brazil) were established there in 1884 primarily as mills but began to acquire land of their own in 1890. By the 1946-1948 period, 57% of the approximately 1,793,000 acres of cane land in Pernambuco was directly owned by 60 centrales (usinas). Medium-sized colono farms (forneadores) supplying cane to the centrales owned another 19% of the cane land and 24% of the area in cane was retained by the remaining 636 small-scale sugar producers (engenhos) (Smith, 1964:350-351). Despite the survival of a large number of "independent" forneadores (colono-like cane farms), concentration of ownership is even more advanced in some areas of the Northeastern Brazilian sugar region than Smith's figures suggest. The individual centrales are only part of much larger and broader corporations.
In 1950, 5 of the 9 centrales found in the Reconcávo region of Bahia were owned by a single corporation. In addition, a single one of the central corporations owned most of the fornecedor supply farms in one region and controlled many of the remainder (Hutchinson, 1957:16-20, 621).

Similarly, Jayawardena reports that the 157 sugar plantations existing in British Guiana in 1870 had been merged into 16 plantations growing approximately 80,000 acres of sugar cane by 1958. Even more dramatically, these 16 plantations were controlled by two companies "with a consequent co-ordination and standardization of policies" (Jayawardena, 1963:26). And as a final example, the southern U.S. sugar industry, in which 1,144 mills producing 136,491 tons of sugar were consolidated into 214 mills producing 325,000 tons of sugar between 1880 and 1919 (Sitterson, 1953:252). By 1960-61, 56 mills processed all of the 770,000 tons of sugar produced on the U.S. mainland. Nine mills in southern Florida, mainly owned by a few 'refining' companies, processed over half of this total (International Sugar Council, 1964).

Contrary to the above, Handler claims that the Barbadian sugar industry casts doubt on the generalization that modern sugar production is overwhelmingly a corporate plantation enterprise. He holds that small-scale "peasant" production of cane is wide spread in Barbados despite the established modern centrales (Handler, 1966:264-265). But despite his emphasis of "peasant" cane growers in Barbados, Handler reports that in 1965 virtually all cane was milled in the 16 centrales on the island. These centrales, furthermore, grew 85% of all cane processed on their own lands. The remaining 15% of the cane grown on Barbados was not produced solely by smallholders, since Handler describes the operation of four 154 acre cane farms in the Chalky Mountain "small holder" region he studied. The smallholders' 1 acre plots (half of them rented from plantations) have subsistence crops interplanted with their cane rows (Handler, 1965:17, 18, 27; 1966:275, 280). The case for Barbadian exceptionalism then appears to reduce to a case of marginal plots, worked by part-time cultivators, on marginal land not wanted by the centrales, producing less than 10% of the total cane milled.

Miller, in his discussion of land use in the Peruvian sugar region, suggests that mono-cropping and land concentration are not necessarily associated with corporate sugar plantations, at least not to the extent that obtained in the Puerto Rican area described by Mintz. As late as 1959, Peruvian corporate sugar plantations continued to maintain a large proportion of their land in crops other than sugar. He cites the land use of one typical plantation, with 4,500 acres in cane, 3,000 acres in small tenant subsistence plots and 3,000 acres in large commercial crops and pasture (Miller, 1964:23, 98). It is certainly important that less than half of the plantation land is planted in cane. But we are also told that
all the land which was not under cane was either inferior or too far from irrigation water to be profitable. (Ibid.)

In other words, this is land which the plantations have as yet found uneconomic to put under cane. As it is, the non-cane land does play an intimate role in plantation economics. Miller cogently points out that the plantation under consideration uses a substantial proportion of its non-cane land to grow food crops, which it 'distributes' to its workers.

The distribution of food permitted the administration to keep wages low so that the accumulation of cash was slow, if not impossible, while at the same time the men and their families were fed. Second, it was cheaper to distribute food than to have to pay men enough to purchase an equivalent amount in the market place. (Ibid., 111-112)

The Peruvian exception looks to be merely a contemporary sugar plantation trying to hold on to some of the land patterns of its hacienda past. Moreover, it must be remembered that in 1960-61 virtually all of the 798,000 tons of centrifuge sugar produced in Peru (more than the total amount produced on the U.S. mainland) was processed in only 14 centrals (International Sugar Council, 1964).

There is at least one clear case of centrals not leading to land concentration – northern India. The modern Indian sugar industry began its major period of mill construction during the early 1930's but, according to Hirsch, the plantation system continued to be of minor importance even in 1955. In northern India, sugar factories have acquired little or no land of their own. Cane in this region is grown exclusively by smallholders (Hirsch, 1961:55, 57, 89). Direct government intervention was a major factor disallowing land acquisitions. The Arjuma Sugar Factory, a supposedly typical larger mill in Uttar Pradesh, produced 14,300 tons of sugar in 1955-56 and had an allotted cane supply area extending approximately 6 miles from the mill in all directions. In this zone about 8,000 peasants cultivated some sugar cane for sale. They grew an estimated 365,000 tons of cane (on 22,000 acres), 60% of which was sold to the Arjuma mill. The remaining 40% was used in the production of home-made gur (non-centrifuge sugar) (Hirsch, 1961:106, 150).

Developments in the Cauca Valley sugar industry in recent years appear to represent, at least superficially, a trend contradistinct to the general pattern of land concentration seen in the aforementioned cases. Cauca Valley centrals have generally increased the size of their land holdings but the amount of cane land owned by colonos has increased even more rapidly. The proportion of central milled cane grown on rented or colono farms has increased from about 10 to 15 per cent in the early 1950's to approximately 60 per cent of the total in 1964. This pattern appears to indicate a progressive deconcentration of the ownership of cane lands. But the fact
that colono cane lands and farms have increased in size and numbers and provide an increasing proportion of the cane processed by centrales does not vitiate the fact that central land holdings themselves have increased tremendously with the expansion of sugar production.

An increase in the number of colono cane suppliers is not in itself necessarily indicative of a trend counter to land concentration. According to Mintz, a typical feature of the spread of modern corporate plantations is the elimination of all small-scale sugar processors by centrales (Mintz, 1956:337, 338, 415). Sugar haciendas, engenhos, trapiches and other primitive processing units are generally forced out of competition and their land either directly incorporated into central plantations or used as colono cane supply farms. Padilla's (1956) study of a north coast Puerto Rican sugar region documented how fully colonos were under the control of centrales. If the colonos of the Cauca Valley are composed mainly of former trapiche operators who have entered into the role of cane supplier by the bankruptcy of their own small 'mills', their history is then parallel to that experienced in most other areas where corporate plantations have developed. The Cauca Valley colonos today may represent a form of land ownership transitional between the independent small-scale sugar (or panela) producers and the consolidation of most cane land in the hands of the centrales. Indeed, the very increase in the numbers of the colonos may indicate the extent to which small-scale sugar producers have been eliminated.

Although it is not clear what percentage of the present colono farms in the Cauca Valley formerly were engaged in the production of panela it is certainly a minority. Possibly as many as a quarter to a third of the colono farms delivering cane to Central Condor did at one time process their cane in their own trapiches. Nevertheless, Cauca Valley trapiche operators as a whole are apparently not being pushed out of operation by the centrales. Some cane growers continue to sell part of their cane to trapiches, some trapiches sell part of their cane to centrales, and a number of trapiches have opened to replace those shut down and converted into colono farms. Furthermore, there is some question as to the extent of the growth of colono farms. As examples in previous chapters have indicated, at least some colono farms are merely dummy corporations established by the central owners to take advantage of certain loopholes in the labor, tax and land reform laws. In some cases, colono farms are held by close relatives of the central owners and may well be ancillary sections of a type of family corporation. Nevertheless, the majority of colono farms are indeed ownership entities distinct from the centrales. But mere legal ownership of land may not be the crucial criterion to be used when considering the character and extent of land concentration. Legal title to land may be highly circumscribed
by delivery contracts, mortgages, and credit requirements, and so forth, as to be largely nominal ownership. Actually, the effective ownership of even the centrales is open to considerable question. The titles to centrales and plantations held by family and local corporations may in some cases constitute nothing more than holding companies for banks or larger national and international corporations. In understanding the spread and nature of modern corporate agriculture, it may be more crucial to consider the concentration and centralization of the productive control of the variously owned titles than the concentration of land ownership itself. It would nonetheless seem important to distinguish between patterns of concentrated control of production, which may be effected in a number of different ways – the concentration of land ownership being one of those ways.

On the one hand, the land supplying cane to any single central is now composed of a much larger number of ownership units than was previously the case. On the other hand, the growing number of colono farms may be seen as part and parcel of the process of land concentration in sugar cane, under the aegis of central expansion. The fact that there has been a relative de-concentration in the ownership of cane land holdings does not contradict the fact that there has been a continued concentration and centralization of productive control in the Cauca Valley sugar industry. The growth of colonos in the Cauca Valley may be just another example of an initial phase of central expansion, with colono farms becoming fully absorbed by the centrales at some later date.

Mechanization and Labor Stability on Plantations

Agricultural mechanization on plantations is widely held to be a response to increasing costs. It results in a reduction of the number of workers required per unit produced and is also frequently held to lead to a more stable labor force (Kelly, 1967; Padfield and Martin, 1965; Mollett, 1961; Miller, 1964; Norbeck, 1959). But, it is suggested here that mechanization (especially partial mechanization) may also result in a substantial use of seasonal labor in some industries or, under conditions of year-round production, may maintain and stimulate the high level of labor instability in a sector of the work force, which functions in some ways like a labor reserve.

In considering the mutability of labor instability and the duration of the harvest season in specific sugar industries it is instructive to consider the recent history of labor utilization in the Cuban sugar regions. The extensive social transformations occurring in Cuba have included certain novel methods of dealing with seasonal labor requirements in a zafra sugar industry.

The technological and ecological basis of former corporate plantations in Cuba remain relatively unchanged (by 1965). The zafra harvest and the seasonal fluctuations in the need for labor continued. This created problems in many ways similar to those faced by corporate plantations. The problems of labor supply for the harvest grew worse with the expansion
of new job opportunities for cane workers. It was increasingly
difficult to obtain a sufficiently large work force for the
sugar harvest in 1962 and 1963. Alfredo Cruz (1963) states
that of the estimated 352,000 experienced cane cutters needed
for the 1963 crop only 260,000 were initially found available.
He attributes this striking change from earlier conditions of
labor oversufficiency to the fact that land distribution in
peasant areas, expanded industrial activity, higher school
enrollment and widespread construction programs in many rural
areas produced local employment for many who would formerly
have migrated to the cane fields for the harvest season. After
all, even cutting People's cane is a backbreaking business for
those who have to do it for a living (a very different kettle
of fish from volunteer jaunts into the cane fields). Many
who now could escape the cane fields for better employment did
(see Huberman and Sweezy, 1964:637).

The Cuban government's response to the problem of labor
scarcity took two different approaches. On the one hand, it
introduced new forms of labor utilization in the harvest to
implement a short-run solution. Special units of the most
experienced and capable cane cutters were organized to work
throughout the harvest. These units moved from zone to zone
in conjunction with the peak harvest demands of each region.
Extensive use was made of members of the army and volunteer
labor recruited from public employees and from those sections
of the population not normally employed (Cruz, 1963; Valdes,
1963)

The other approach to the problem of labor scarcity during
the harvest phase was the introduction of mechanical harvesting.
This step was intended to be more than a solution to the present
scarcity of cane cutters during the harvest. It was intended
to be a major step in the creation of relatively stable, regular
employment in the sugar industry.

Mechanization during the 1963 harvest was small-scale and
of uneven success. The manufacture of mechanical cane loaders
in regional shops was even discontinued during 1964 because
these machines proved difficult to operate. Despite these
difficulties, by 1967 the bulk of Cuban cane was handled by
mechanical loaders (Escobar, 1967). The on-going acquisition
of cane cutting-loading combines since 1964 is part of a trend
which should effect major change of labor patterns in the Cuban
cane regions, although this will obviously not happen overnight.

In addition to the above developments, the Cuban harvest
has been lengthened by more than six weeks since the early
1960's. This is primarily due to the continuing difficulties
of obtaining sufficient labor to harvest the cane in the former
4 month period. The recent changes in labor utilization will
not eliminate the seasonal harvest itself. But a more fully
mechanized harvest will mean that relatively few additional
workers will be needed during the harvest, which will continue
to be a seasonal activity. In a broader context, it should be
remembered that a seasonal harvest pattern and seasonal unemployment of cane cutters are not necessary concomitants of each other. Seasonal fluctuations in labor requirements may continue in a sugar industry yet seasonal unemployment may be eliminated by planned or unplanned "off-season" employment outside the sugar industry. In the early 1960's for example, public works, construction and new forms of agriculture were planned in Cuba with phased labor demands roughly complementary to the sugar harvest. It is not certain how these have fared. But it is important in general to know what alternate seasonal and permanent employment exists for cane workers and to what extent they can obtain such alternate employment.

Let us consider some examples of recent mechanization and labor patterns in a number of non-safras sugar plantation areas - Peru, Hawaii, Guyana. Miller describes the forces at work in the mechanization of the Peruvian industry along these lines. The organization of Peruvian plantation workers into effective unions during the mid-1950's raised the price of wage labor. Following this

The drive toward complete mechanization of field operations continues, no longer under the impetus of the labor shortage but because: (1) through union efforts the cost of labor has increased significantly; (2) a reduced labor force is likely to be less disruptive; (3) fewer workers would ease the housing shortage and other plantation investments in labor provision. (Miller, 1964:118)

But more generally, Miller's study also describes how mechanization-capitalization on haciendas and plantations has played a substantial role in creating a condition of labor over-supply. While the former level of regional and inter-plantation migration has been reduced, mechanization and a huge labor surplus had made it largely impossible for cane workers to find supplementary work when their plantation shut down for a two-month or longer dead season. By 1959 plantation management was in a position to threaten layoff of many of its older or 'less productive' workers (Miller, 1964:117-119, 141). (That's stability with a vengeance.)

Mollett records that mechanizing all phases of sugar cane agriculture on the Hawaiian plantations reduced the labor force of 56,660 employed in 1927 to one of 14,150 in 1960 - with approximately the same level of production (Mollett, 1961:16-17). This required a six-fold increase in capital invested in field machinery. This heavy capital investment is due (according to Mollett) to the shortage of labor (read "sufficiently cheap" labor) and local ecological conditions which allow for the use of expensive mechanical harvesters throughout most of the year (Mollett, 1961:43-45). The present labor force has supposedly become quite stable.
Norbeck mentions the successful organizational struggles to unionize the Hawaiian pineapple plantations in the late 1930's and the succeeding rise in wages. As a former manager of a Libby's pineapple plantation, he tells us that

It was clear that operations must be changed to increase production and cut costs, in particular to pare the costs of now expensive labor. The obvious answer lay in greater mechanization and higher crop yields. (Norbeck, 1959:4)

Extensive mechanization of both pineapple and sugar plantations in Hawaii since the end of World War II has greatly decreased the total number of field hands required. Increased pay and the reduced employment alternatives for unskilled labor has made plantation jobs desirable, according to Norbeck, and labor turnover on plantations has been greatly reduced (Norbeck, 1959:28-30).

But the effects of mechanization have not been quite as simple and straightforward as suggested by the previous citations. Mechanization has rarely affected all phases of agriculture to the same extent, and even mechanized plantations and farms have often developed strategies to maintain a periodically employed reserve labor force. The data supplied by Norbeck to demonstrate the marked reduction in labor also shows that while 'permanent' plantation labor has become more stable, mechanization has led to a drastic increase in the use of a seasonal labor force - primarily in the three to four month harvest period. These seasonal workers are drawn from the unemployed in neighbouring towns, from Hawaiians resident on marginal farms, and from students on summer vacation. Working on a piece-rate system, they are the type of reserve labor force employed by agriculture in relatively affluent regions.

**CHART 19**

Variations in Annual Employment on Maunaaloa Pineapple Plantations

(See Norbeck, 1959:139)

<table>
<thead>
<tr>
<th>Year</th>
<th>Maximum No. Employed (July)</th>
<th>Minimum No. Employed (December)</th>
<th>Percentage Seasonal Fluctuation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1936</td>
<td>1,289</td>
<td>1,109</td>
<td>16.3%</td>
</tr>
<tr>
<td>1946</td>
<td>898</td>
<td>619</td>
<td>26.3%</td>
</tr>
<tr>
<td>1956</td>
<td>709</td>
<td>411</td>
<td>53.2%</td>
</tr>
</tbody>
</table>
Fluctuating employment of cane workers also appears in British Guiana, which, like the Cauca Valley, is frequently said to have a "year-round" or "non-safr" sugar industry. There is in fact, not only a certain seasonality but also considerable variation in employment on any one Guianese plantation during any one season.

The unpredictable variations of weather from year-to-year, combined with day-to-day uncertainty about the amount and kind of work which can be performed within the seasonal pattern, make for an almost daily change in labor requirements. The industry is able to offer a steady year-round job only to a handful of those who labor in field and factory below the supervisory level. Except for those paid on a weekly or monthly basis, the companies have no obligation to offer work on any particular day, and days of idleness may come in the midst of the busiest periods. (Ruebens, 1962:17)

These "uncertainties of employment" and the day-to-day variations in labor requirements of the plantations are not purely a matter of unpredictable weather. As Ruebens makes clear, they stem in considerable measure from the fact that the sugar companies have opted out of exactly those "obligations to provide work" (called "steady jobs" elsewhere) which were formerly greater.

Jayawardena indicates that even the elementary mechanization which had developed on Guianese sugar plantations by 1957 had had a powerful effect in reducing labor requirements in all but the harvest phase. He holds that a reduction in the "permanent" labor force was in fact an important goal of the sugar companies, who continued to draw their manual harvest gangs from the now increasingly underemployed villagers. He says that

...technological developments tend to make large concentrations of resident laborers unnecessary. The policy of management is to mechanize to reduce the number of residents for whom they are responsible, and to depend increasingly on the impersonal relations of the labor market. (Jayawardena, 1963:26)

Elsewhere, somewhat different strategies have been used. One of the typical ways in which large plantations have obtained a reserve labor force is through the use of separate colono-like supply farms. Here, the problems of dealing with and maintaining a fluid, unstable, low-paid labor force are shunted from the plantations to their suppliers. Such colonos are particularly valuable to plantations where capital for mechanization is scarce and where pressures to increase wages become
effective on the larger units. In a sense, colono supply farms may provide a temporary or partial alternative to mechanization on plantations.

The sugar plantation regions of the southern United States witnessed a phase comparable to the present rise of colono farms in the Cauca Valley, when wage costs of gang labor rose during the 1880's and after. Although early campaigns to organize plantation labor were broken, such as that mounted by the Knights of Labor in 1882-1884, spontaneous stoppages, slowdowns and a general drift of workers in search of higher paying jobs made it difficult for the planters to acquire a labor force which was both cheap and reliable. Planter discovered from experience that when labor costs were "high", cane could be produced more cheaply by a tenant or sub-let system than by the gang system. Share-cropping was tried by some cane planters but it was found that the infrastructure of roads and ditches could or would not be maintained by small tenants. But, by the turn of the century, numerous colono-like cane farms operated on a tenant basis and independent colono cane supply farms began to develop (Sitterson, 1953:313-323, 240-241, 347).

Between the planters and hired field workers, there grew up in the postwar [civil war] generations an increasingly large group of white tenants and a few small cane farmers. In the Louisiana sugar regions in 1910 there were about 4,000 white tenants, with the heaviest concentrations in the southern parishes. Tenants usually farmed tracts of 60 to 300 acres. Where the size of the crop warranted it, they hired six to twelve Negro workers to help cultivate and harvest the cane crop. Although there were more than 804 cane farmers who did not mill their own cane, the majority of these in 1910 were still substantial planters and not small farmers. (Sitterson, 1953:314-315)

But the cheap labor provided by tenant families and small groups of hired hands spread over colono farms could not compete indefinitely with capitalization of the field processes. Mechanization of cane agriculture in even the backward Louisiana sector of the U.S. sugar industry became necessary for economic survival by the early 1940's. Mechanization of the non-harvest phases was due largely to the savings in labor costs effected, although other factors were involved as well (Sitterson, 1953:388). 4

But there are strong indications that almost complete mechanization may not remove the desirability, to the planter, of a ready labor reserve. Let us consider an industry which has already been fully mechanized for approximately a decade. The larger cotton planters in the U.S. south acquired equipment to mechanize the harvest even before all cultivation
phases were completely mechanized. The rationale for tenant farms was thereby vitiated and the great majority of such farms were reabsorbed into larger plantations between the 1940's and late 1950's (Vandiver, 1966:27-29). But Vandiver goes on to note that mechanization, until the early 1960's, was not fully adequate and that it was advantageous for planters to have reserve labor forces at hand. The use of this reserve labor force became increasingly casual and given to fluctuations as mechanization advanced. Speaking of the late 1950's and early 1960's, Vandiver says

Plantations have always used casual labor from nearby towns and cities during periods of peak demand, but, with the reduced working force on the land, such labor has become relatively more important. These day workers are sometimes recruited by "truckers" who haul them to the plantations; the wise planter seeks the cooperation of a dependable trucker to maintain an adequate labor supply. (Vandiver, 1966:29)

There is a functional similarity between the "truckers" of the southern cotton fields and the labor contractors operating in the Cauca Valley. The depressed wages for the reserve labor force so contracted applies in both areas.

The relationship between mechanization and labor stability in the Cauca Valley sugar regions is as follows. The growth of centrales has led to greater participation of workers in labor unions. Unionization and the implementation of national laws requiring social security payments by most larger employers have increased the wage costs on centrales in comparison to those paid in other sectors of the industry. Centrales have responded with an attempt to reduce the size of the work force on their own lands by increasing their use of field machinery and weedkillers. They have attempted to create a proportionally small, more stable and "less disruptive" labor force, as did the Peruvian plantations discussed by Miller.

But in the Cauca Valley, agricultural mechanization has only been extended to land preparation and cultivation tasks. The harvest remains essentially manual. The differential mechanization of cane agriculture transfers an ever increasing proportion of the field labor into the harvest phase. Harvest workers in all sectors of the industry have a relatively lower employment stability than do other workers. But it is on the colono cane farms that harvesters truly take on the characteristics of a reserve labor force. Colonos (in distinction to centrales) also rotate a high percentage of their cultivation workers by use of labor contractors. Although colono farms are mechanized to some extent they also tap cheapened, mobile labor. They utilize both. A seasonal labor force has not, however, developed.
The pattern of labor instability associated with colono farms will probably increase as centrales also obtain more of their labor through contractors. Only part of the response of Cauca Valley centrales to increased wage costs was to create a small, relatively stable, work force through mechanization. Another important response was to create an even larger and increasingly unstable labor force. This labor force is tapped indirectly through colonos and acts as a labor reserve.

In sum, while plantations may mechanize and attempt to develop a small, stable labor force on their own lands, they may at the same time foster increasing instability among a larger body of workers in allied sectors of the industry. The variable importance of colonos as a source of cane supply may prove to be a cyclical phenomenon which arises under conditions of increasing real wages.

Are Cane Workers a "Rural" Proletariat?

One of the salutary features of most plantation studies has been their concern to place local developments within national and sometimes international contexts. Steward is at pains to emphasize that national forces enter into the life and culture of rural plantation workers. Indeed, this condition constitutes one of the basic distinguishing characteristics of modern plantation culture for Steward. As he says

(4) the workers' subculture is being affected not only by the economic arrangements but by education, mass communication, urban influences and face-to-face contact with other persons. The workers have a national rather than local orientation. (Steward, 1959:10-11)

Mintz' (1956) study of a Puerto Rican corporate sugar plantation clearly documents how investment decisions of U.S. corporations and the economic policy of the island government established the conditions for the evolution of the contemporary centrales. He also shows how political developments throughout Puerto Rico - unionization, provision of social services, better communications, and extension of legal rights - entered the domain of the local plantation society.

In A Typology of Latin American Sub-Cultures, Wagley and Harris note that marked cultural differences exist between the urbane cosmopolite owners and the more localist workers on engenho plantations but hold that on usina plantations (centrales) the effect of national forces is increasingly felt by the mass of the population.

The usina plantation is more closely integrated with national institutions and cultural patterns. Labor unions are sometimes active among workers and social welfare legislation is enforced more often
than in the engenho plantation. There may be electric lights, modern housing, schools, medical clinics, public health facilities and excellent communications with the metropolitan centers. The workers on such establishments seem to have a way of life more similar to that of the growing urban-industrial proletariat of Latin America than of the workers on the engenho plantations. (Wagley and Harris, 1955:51)

Miller's study of The Hacienda and the Plantation in Peru (1964) discusses such factors as improved road transport in the Andes, the overthrow of the dictator Odria, the legalization and organization of labor unions nationally and on sugar plantations. These and other macroscopic factors are involved in explaining why Indian plantation workers are becoming stabilized on the coast and rapidly becoming nationally Peruvian. In a similar vein, but describing a different tendency, Margolis (1966) has pointed out how the 1964 military coup in Brazil, and the widespread repression which followed, quickly reached into the operation and life of a backwater sugar plantation and strengthened the pattern of worker-master subservience which she noted.

According to one prevalent view, the spread of plantation agriculture (especially of crops which involve elaborate processing in the field) is in many ways analogous to the growth of early factories. Modern plantations have tended to create, or concentrate a "rural" proletariat of increasing homogeneity. With the spread of corporate plantations, "local social organization is altered so that a larger proportion of the population form a landless wage-earning group" (Mintz, 1956:415). Members of this group, to one degree or another, become aware of their common position and condition. Plantations, especially when a number are concentrated in the same region, are frequently accompanied by the first and often the only union organization in the agricultural sector of the particular country.

In discussing the impact of sugar plantations in pre-revolutionary Cuba and the importance of distinguishing the various sub-groups, in the Latin American countryside, Mintz says that

A very substantial part of the Cuban rural force was a proletariat, but a rural proletariat: landless, propertyless, wage-earning, and store-buying. Such people view their lives and their labor differently from peasants; accordingly their values (while they may share a certain "Cuban-ness") differ significantly. For anyone desirous of understanding the rural sector of a Latin American nation, it is a serious error to confuse a peasantry with landless rural wage-earners. Such rural social groupings stand in different
relationships to the rest of their society and may even be counterposed economically or politically.

Dr. Guerra points out that the plantation (or latifundium) is an urbanizing force. As such it urbanizes while it proletarianizes. By creating company towns, by appropriating large areas within which the rural population must concentrate itself densely, by bringing improvements in transportation and communication, by standardizing work practices, by establishing company stores, the latifundium does its powerful best to create a factory situation, albeit a rural one. (Mintz, 1964:xxxvi-xxxvii)

More recently, there has arisen some contention as to whether plantations are indeed characterized by a population polarized into essentially two classes, a small owning and managerial-professional group, and a large rural proletariat. In addition, there has been some contention about the extent of unity and solidarity among plantation workers. A particular bug bear is consideration and evidence of class solidarity by plantation workers.

Jayawardena, writing of social structure on plantations in British Guiana in 1959, rejects the association of plantations with a proletariat as meaningless. He stresses that individual plantation workers are not merely wage laborers. They are also members of specific religious groups, belong to particular ethnic groups and support different political parties, and maintain unique sets of kinship relations with different statuses as fathers, sons and so forth.

Further, within this structure, there is considerable latitude for personal choice...This being so, it is pertinent to question the validity of attempts to freeze an essentially dynamic situation and formulate rigid categories such as "plantation society" (based on differentiation in the industrial structure) or a "proletarian society" (based upon differentiation in the class structure). (Jayawardena, 1963:10)

Yet despite all this wonderful social heterogeneity Jayawardena admits that Guayanese plantation workers generally remain plantation workers, field hands remain field hands. Positions as minor foremen and clerks represent the maximum occupational mobility possible (Jayawardena, 1963:6).6

Hutchinson's study of a fornecadore cane "plantation" in the Reconcâvo region of Bahia during 1950-1951 reports considerable isolation and division between agricultural workers. This division is exacerbated by massive use of seasonal harvest labor and use of labor contractors throughout the year. Hutchinson holds that plantation workers were still exclusively concerned with the social relations of the particular plantations on
which they lived. They still attempted to operate through traditional patterns of paternalism and submission (Hutchinson, 1957:22). He implies that because of the localist outlook and reliance upon traditional patterns, fornecadore workers were distinct from a true proletariat and that

The present social system tends to follow the old, traditional family-oriented slaveholding complex. The pattern of face-to-face interpersonal relations developed during centuries of sugar cane monoculture based on slavery, persists in a modified form. Although the relations between workers and owner on these family plantations are now those of employee and employer, and not slave and owner, there is still the highly personal, intimate relationship based upon mutual rights and obligations and a sense of the obligations of nobility. Even the usina system perpetuates this paternalism to a high degree. (Hutchinson, 1957:8)

Nevertheless, sufficient wider allegiances on the part of plantation workers existed to effect a general strike in much of the sugar region during the period of Hutchinson's field work. The traditional pattern of personalistic relations and noblesse oblige was re-established only with the intervention of State Police units (Hutchinson, 1957:184). Margolis (1966) working on the same plantation in 1965, reports that the plantation mangers actively strive to maintain traditional patterns of submission. This had been facilitated by the national government which had crushed the regional sugar workers union and had made most other workers' organizations inoperative.

Handler also questions the proposition that corporate plantations generate a rural proletariat. He holds that there is no distinguishing class sub-culture among Barbadian plantation workers in the region he studied. Neither is there any significant degree of solidarity among plantation workers. According to Handler

Regular plantation workers have some notion of their occupational unity and commonality of interest, but this does not promote unique bonds of solidarity among them within the village. (cf. Mintz, 1956, Jayawardena, 1963) In Chalky Mount, plantation workers do not form a distinctive sub-cultural unit, nor do they feel that their problems, economic or otherwise, are unique to themselves as plantation workers. Their consciousness of kind is that of "poor people", and as such they align themselves with most other villagers regardless of occupational pursuits. (Handler, 1965:36)
It should be remembered that Handler is describing conditions in a backwater, smallholder region, not those of the main plantation areas in Barbados. But, one aspect of his critique is well taken; plantation, peasant and other rural workers often overlap considerably in employment, income, group membership, cultural background and the conditions in which they find themselves.

Sutton presents a rather different picture of class and occupational solidarity in the principal plantation areas of Barbados. She describes how a spontaneous general strike spread among field labor on Barbadian sugar plantations in 1958. This strike involved over 19,000 harvest workers dispersed in hundreds of small gangs working on some 260 different cane estates (Sutton, 1966:3-4). Presumably, the Barbadian cane workers have multiple roles as do those living on the Guyanese plantations described by Jayawardena. This does not obviate certain crucial similarities among them.

Says Sutton

First, although agricultural workers in Barbados constitute the single largest occupational category, they occupy the lowest rung in the occupational and prestige hierarchy. They share a common subordination to management and there is a relative lack of differentiation in skills among them. Their social interaction, in turn, is guided by the concept that they share a common fate and are equal to one another in social status and power. (Sutton, 1966:4)

On the Peruvian plantation studied by Miller in 1959, a high degree of unity also existed among Indian field workers. They constituted the bulk of the employees on all plantations and the majority of the sugar workers' union membership. Far from being prone to paternalistic arrangements, they tended to press the union leadership for greater militancy. Solidarity with plantation workers in other areas was manifest. Miller observed an unorganized but massive slowdown and sympathy strike among workers on one plantation in support of non-unionized workers whom they did not know personally, on a distant plantation which most had never seen (Ibid.:123).

In Colombia, the first large-scale organizational struggles of the labor movement developed on the banana plantations of the Magdalena region. The first labor federation in the Cauca Valley had important bases among the sugar central workers. In Colombia today the unionized plantation workers constitute the core of organized labor in the countryside. Plantation unions are also important organizational links between rural and urban workers. Correlatively, plantations show the highest development of modern management techniques in the countryside, employing specialist personnel managers, administrators, and a wide range of professional and technical staff.
The Cauca Valley centrales generally maintain impersonal, market-determined relations between administrators and workers. The impersonal framework of employee-employer relations does not eliminate attempts by plantation management to direct certain aspects of their employees' lives unrelated to work tasks. But under current conditions such manipulation is relatively feeble and the behavior of employees is in fact much less amenable to control by plantation management than was formerly the case. Even on most colono farms, a relatively impersonal relationship of wage laborer to employer is well established. Even those colono farmers with a 'paternalistic' outlook are increasing their use of labor contractors and temporary labor in an attempt to circumvent a larger permanent labor force and the increased payment of wage and social security benefits this would entail.

While it is important to distinguish a peasantry from a rural proletariat (as the Mintz quote earlier pointed out) it may be equally important not to distinguish some "rural" proletariats from urban workers. The fact that cane workers are employed in the fields can be misleading. A considerable proportion of the cane workers employed by the centrales in the Cauca Valley actually live in cities or large towns. Although the proportions of central workers living in towns and cities is far from uniform, it is instructive to consider a few areas. A number of centrales are clustered around the industrial city of Palmira and a large number of workers from these plantations reside in the city. There appear to be sugar cane workers in all of the working class sections of Palmira. The majority of the field and factory personnel of centrales Tumaco and Papayal live in or around the city of Palmira. A large number of workers employed on centrales Manuelita, Providencia and Oriente also reside in Palmira (although each of these centrales have campamentos for single men and a certain amount of family housing on company land). In addition, Manuelita has sponsored a number of housing developments for its permanent workers, the largest of which is, effectively, a distant suburb of Palmira.

The cane workers living in Palmira comprise a minority of the workers employed in the entire Cauca Valley sugar industry. But one should not underestimate the importance of this minority. It is probably no accident that the centrales around Palmira are unionized by the most militant of the existing labor federations. One can make a good case for the view that the cane workers living in Palmira are part of an urban proletariat who happen to work in the surrounding cane fields during the day.

In another area, all of the workers employed at Central Melendez live in or on the outskirts of the city of Cali. Elsewhere, the bulk of the labor force employed on Central El Porvenir lives in the town of Miranda. The town of Florida houses many cane workers employed on centrales Balsilla and
La Industria. Candelaria contains many workers from Central Mayagüez and the huge La Quinta *panelero*. The company town of La Paila contains about 150 family houses and some barracks which accommodate a large proportion of the labor force employed by Central Rio Paila. The towns of Corinto, Buga, Tulua, Cerrito and Bugalagrande all have their complement of cane workers. Indeed, most of the towns in the sugar region of the Cauca Valley contain both men employed on centrales and others employed in the fields of trapiches and colono farms. In addition, many (possibly the majority) of even the cane workers in *campamentos* and small villages have on-going ties with urban life.

Town and city residence provides a degree of privacy and anonymity that is impossible in the smaller settlements. A number of union leaders and activists held that unrestricted organizational and educational activities are much more difficult to carry out in small villages or on plantation *campamentos*. In Palmira, or even in a town like Florida, there are large numbers of cane workers who can be drawn into union activities. The presence of workers from other, more strongly organized, unions serves to reinforce members of newer unions.

The structure of the present labor and social security legislation in Colombia applies mainly to a relatively advantaged labor force centered around the more modern, highly capitalized industries. Workers in the industrial sector are generally unionized and have legally guaranteed social security benefits. These industries are concentrated in cities and larger towns. The sugar centrales are the major exceptions. The workers on Cauca Valley centrales constitute a true proletariat. They are bounded by virtually no traditional rights and duties and they have only their labor to sell. For many issues it makes more sense to think of them as an extension of a nascent national proletariat into the fields rather than a specifically rural proletariat.
CHAPTER VIII

SUMMARY AND CONCLUSIONS

What have the figures, charts and maps presented so far shown? Where have the discussion of sugar cane agriculture, machinery, land uses, work histories and labor unions led us? What questions and conclusions does the rather inconsequential Cauca Valley sugar region raise for plantation studies in general? Let us first review the main points of the preceding chapters. The findings are generally presented in the order in which they appeared, although at some junctures data from various chapters has been combined. Having done this we will proceed to the conclusions. These are presented in tabular form, moving from those specifically dealing with the Cauca Valley sugar plantations and most clear-cut, to those which are somewhat more ambiguous but of considerably wider implications.

Summary

Chapter I introduced the topic of the study as an analysis of labor instability in a plantation system with approximately stable labor requirements. It set this topic in the context of studies of seasonal sugar industries, raised the question of the role of ecological conditions as they may effect the labor patterns of some year-round sugar regions and introduced some of the complex factors effecting cane harvest periods. The basic agricultural types found in the Cauca Valley sugar industry were discussed in relation to various definitions of plantations. It was held that centrales were generically plantations, while colonos and trapiches, although intimately involved in the plantation pattern, were not. A brief description of the Cauca Valley sugar area and the nature of the field work was given and the collected field data listed.

Chapter II provided some essential background data on the ecology of sugar cane and of the agricultural practices involved in cane growing. It discussed the agronomic and technological factors which effect variations in sugar yields and indicated how central plantations are at an advantage over the typical colono cane farms. The process of sucrose inversion was discussed as one important factor in determining the period during which cane can be harvested in many sugar regions. This process is largely absent in the Cauca Valley. The situation is markedly different from that obtaining in the safran

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sugar industries, where significant levels of cane inversion occur for many months of the year. Nevertheless, the process of inversion does not set an absolute period during which cane can be harvested and is only one factor in a much more complex system. Other factors involve the efficiency and economy of the processing system, which determines to what extent inverted cane can profitably be harvested and ground. A synopsis of cane agriculture reminded the reader of ratoon cane and underscored the interrelated nature of many phases of cane growing as they effect yield and labor input.

We then considered some aspects of and some limits within the early Cauca Valley sugar industry, particularly the small-scale and primitive nature of the sugar mills and the relative backwardness of the entire industry throughout the latter half of the nineteenth century. The development and expansion of the Manueltita plantation and mill complex was discussed in detail. The intricate and changing interrelations of mill technology, land use, traction animals and labor for the period 1864 to 1900 indicates that no intensive concentration of land and labor exclusively in sugar production was yet possible. The steam driven mill established in 1901 triggered an expansion of sugar production and heightened the tempo of land acquisition by the Manueltita complex. Factors such as political turmoil and civil wars, the capacity and availability of transportation and markets, and the status of the labor force are facets of the context which has to be considered to understand the existing agro-technological developments. The opening up of new markets for Cauca Valley sugar after World War I and the establishment of round-the-clock milling in 1929 presaged the continuous, if sometimes sporadic, expansion of sugar plantations. One important concomitant was the greatly increased number of cane workers engaged primarily as a wage-earning proletariat (at least on the largest centrales).

The third chapter outlined the rise of mechanized cane agriculture during the last forty years and described the processes, techniques, and labor and machine inputs on contemporary centrales. Differential mechanization of cane agriculture since the mid-1930's has concentrated an increasing proportion of the field labor into the harvest phase. But even the initial cursory use of tractors greatly reduced the labor force and oxen required in land preparation. A chart of the labor, machine and animal inputs for the basic phases of cane agriculture on Central Tupia in 1939 was given. When tractors were extensively applied to the cultivation phase, during the 1940's and early 1950's, the shift to concentrating field work in the harvest was even greater. The spread of heavy equipment for land preparation and of mechanization of cane transport during the late 1950's and early 1960's have intensified the process. Today, well over a half of the field labor utilized in cane agriculture is concentrated in the harvest phase. As we saw for one central, the mechanical application of weedkillers will carry this shift in labor utilization yet
further. A detailed discussion of the agricultural practices on Central Condor in 1964-65 provided an outline of those typical on centrales today. Heavy machine inputs have not only reduced the amount of labor needed for some phases but have also allowed much more elaborate working of the fields and the introduction of novel agricultural techniques.

We discussed the operation of mechanical cane loading on one central and considered the continuing obstacles to a fully mechanized harvest in the Cauca Valley sugar region. The higher level of organization needed, certain inflexible characteristics of loading and cutting machines, the difficulties presented by the nature of the regional sugar cane, and the capital required were mentioned as important factors. Nevertheless, it was held that the most basic reason why mechanical harvesting has not become established in the region is the low cost of labor, which still makes cutting and loading cane manually less expensive and less risky than machine harvesting.

The central sector of the present Cauca Valley sugar industry, with particular reference to Central Condor, was the topic of Chapter IV. There is a considerable range in the milling capacity, size and distribution of land holdings and number of men employed by individual centrales. Nevertheless, the description of the Central Condor mill underlines the factory-like and highly capitalized basis of central production. The amount of capital invested in any central is of a totally different order than that involved in colono farms and trapiches, and runs into millions of dollars for most centrales. In addition to the mill and machinery investments, centrales have also intensified the use and capitalization of their land. Conversion from a relatively heterogeneous pattern of land use to cane mon-cropping was quite dramatic. Figures for the land owned and acquired by two centrales during the last forty years indicate a staggering conversion of pasture, woodland and other crops to cane. Cane constituted only 12% to 15% of the former crop cover, but by 1961 made up 85% of the land on those two centrales.

Until the mid-1950's, most centrales grew the great bulk of the cane they milled on their own lands. Expansion of production usually also involved expansion of their own land holdings, although most centrales purchased relatively small amounts of cane from colono growers. Massive expansion of the sugar industry coincided with the temporary retrenchment of trapiche production. Within a ten-year period the colono cane suppliers changed from a rather ancillary source to become crucial to most centrales. By 1964-65 a variable but generally considerable proportion of the cane processed by centrales was grown on colono farms and on land rented by centrales. Despite the apparent deconcentration of ownership of cane land supplying mills, centrales remain (possibly more than ever) the directing and coordinating forces of cane and sugar production.
A recurrent reason given by central management for the increasing use of colonos was that high land costs now made the purchase of additional cane land unprofitable and that capital was better invested elsewhere. Rough estimates for Central Condor indicated that the purchase of the colono and rented land delivering cane to that mill would have cost, at then current rates, as much as the entire established central complex. Nevertheless, both colonos and some centrales are continuing to buy land, although the latter sometimes do so under the guise of dummy corporations. A number of other factors were suggested which might better explain the present reliance of centrales on colono and rented land. One of these was the threat of possible tax and land reform. It was suggested that the greatly reduced labor costs of cane on colono or rented land probably provided a more important immediate reason.

A description of the Central Condor batay indicated that it was much like a small, simple company town, although the impact of the company's social policies were less than might be expected. A rudimentary listing of the labor force maintained by Central Condor suggested that only one-third of the total field labor force engaged in growing cane to supply the mill was actually employed by the central itself. The remainder labored on colono farms or for labor contractors on rented land.

We considered the claim that employment is maintained at the same level throughout the year in the Cauca Valley sugar industry and is more or less permanent because ecological conditions permit year-round harvesting and grinding. It appears that the alleged conjunction of a year-round harvest and more or less stable labor requirements throughout most of the year is misleading. While the labor requirements of the industry as a whole may be fairly stable throughout the entire year, considerable fluctuation in employment exists in the component units. The typical colono farms and the smaller trapiches go in and out of production throughout the year. Most colono cane growers harvest less than a total of six months in a year, usually spread over two or three periods. Although the larger centrales harvest and grind cane for up to eleven months of the year, even among them there is considerable variation from one central to the next and from one year to the next.

Despite claims of 'permanent employment', it was shown that in 1963 only three centrales milled full-time throughout the year (280 days) while four centrales milled less than 200 days of the year. The remaining ten centrales which provided figures were also held to maintain considerably less than full-time milling and harvest. When the mill stops, harvesting stops, although general field gangs continue planting and cultivating.

The expansion of the Cauca Valley sugar industry has seen an absolute as well as proportional increase in the number of harvest workers during the last twenty-five years. These two processes have been paralleled in many if not all of the New...
World sugar industries. But in the so-called *zafra* sugar industries there has also been an important additional process operative. The length of the harvest period has decreased to the point where it is primarily a seasonal activity. The shortened harvest period has usually meant an increasing proportion of cane workers who are fully employed only during the harvest and generally underemployed or unemployed during the remainder of the year. The Cauca Valley sugar industry differs from the *zafra* industries in that the harvest period has not been appreciably shortened and, for the region and industry as a whole, continues throughout most of the year. The Cauca Valley centrales, as well as the colonos and trapiches, have not developed seasonal labor requirements.

Job tenure was hardly "permanent", even on the centrales which did operate throughout the year. In 1960, about 40% of even the workers directly employed by all centrales in the Cauca Valley had been working for their present employer for less than one year. We considered a central where job tenure was relatively high, Central Condor in 1964. There was a marked disparity in job tenure between different categories of workers. Harvest workers had the shortest job tenure (one-third employed for less than a year); that of general field hands was significantly higher (one-tenth employed for less than a year). Only a few of the field equipment operators or mill workers had been employed by Central Condor for less than three years. The possibility of permanent employment throughout the year exists mainly on the cane lands directly owned by the larger centrales. Nevertheless, a high turnover of labor exists even on the largest centrales.

A chart tabulating the duration of 435 jobs held during the working lives of 51 men indicated an average duration of employment on centrales of 23 months for harvest workers and 28 months for general field hands. Significantly longer job tenure existed for most other categories of central labor. In all categories, job duration on colonos and trapiches was much lower, with harvest workers having job tenure approximately one half that reported for centrales. Moreover, there is strong reason to believe that the figures for average job tenure on colonos and trapiches often constituted employment on a series of different farms. Finally, most men had worked outside of the sugar industry at one time of their lives or another. We considered the reasons subjectively given by cane workers for job termination and found that over three-quarters of the cases were reported as voluntary job termination on the part of the employee. Such a ratio cannot possibly apply for most colono and trapiche employees. I suggested that the reported ratio of voluntary terminations represent, where they are not rationalizations, a pattern more prevalent for certain categories of central workers than for any other sector of the industry. Despite these provisos, the great majority of
the reasons given for voluntary job termination revolved about gaining or attempting to gain higher pay, greater social security benefits and better working conditions elsewhere. Work histories, such as that of Lazarillo Soto, indicate that such mobility requires little or no reference to exotic sub-cultural values for migration per se.

The year-round labor requirements for both harvest and non-harvest field labor are relatively stable on the larger centrales. In distinction, on colono farms, almost all of the harvest workers are now employed only for a few months at a time. Furthermore, hardly more than a third of the labor force engaged in planting and cultivation are "permanently" employed. Similar fluidity in the utilization of harvest and general field workers are also apparent on most trapiches, although here the harvest continues as long as the trapiche continues to mill and is not limited to the very short periods characteristic on colono farms. Since many smaller trapiches go in and out of operation with considerable frequency the employment of their entire labor force, with the partial exception of those "permanently" engaged in tending the growing cane, is more unstable than that of centrales.

The fluctuations in employment are most marked in the harvesting operations. The employment pattern of harvest workers, and that of planting and cultivation labor hired through labor contractors, on the colono farms is not strictly a case of seasonal employment since the harvest and other field activities for the colono farm sector taken as a whole do occur throughout the year. One of the most immediate differences between a system of seasonal employment and the pattern of fluctuating employment which exists in the Cauca Valley sugar zone is that, in the Colombian case, workers laid off from one farm on which a certain agricultural task is completed may find employment on another farm that is just beginning this task. Some of the distinction between seasonal and fluctuating employment is blurred when, as in the Cauca Valley, there is a large "oversupply" of labor. Men laid off one job often find it difficult and time consuming to find another.

Despite the above considerations, the reported level of unemployment among experienced, adult cane workers is lower than might be expected. A census of the employment and income of harvest and general field workers on centrales showed a mean unemployed rate of three to four weeks a year (although this does not include the period when they were not working but receiving partial income through the vacation and similar payment of the social security funds administered by centrales). Some reasons were given as to why these figures may be under-estimates. In comparison, harvest and general field workers on colono farms and trapiches had a mean unemployment rate of more than ten weeks per year. But to maintain this level of employment, cane workers on colono farms and trapiches often have to travel around the region in search of jobs and often
have to accept employment at whatever rates are offered and on jobs a considerable distance from where they worked previously. One of the effects of such internal migration has been to heighten the difficulties of unionization, particularly on colono farms.

Chapter V provided a brief introduction to sugar worker unions in the Cauca Valley and mentioned some salient features of national labor and social security laws. At present, the bulk of the centrales, a handful of the largest trapiches, and none of the colono farms are unionized. Both the bargaining power of organized labor and the costs of social security payments have increased real wages on centrales during the past ten years. Owners and managers of centrales, colono farms, and trapiches have shown a variety of responses to the increased wage demands and the substantial cost of social security payments now required by national laws. Various weaknesses in the national labor law provide management many opportunities for selective hiring and firing and other tactics for weakening already established unions. Such tactics are used even on centrales where the legitimacy of labor unions has been accepted. Unions attempt to extend and strengthen the guarantees provided by the labor law through their own work contacts. The implementation and enforcement of many of the legally guaranteed labor and social security rights depends, to a considerable extent, upon the policies and relative strengths of the union and management.

Strikes are an important means for unions to obtain acceptable wage and working conditions. In the Cauca Valley sugar industry, strikes have often been drawn-out and, at times, violent conflicts. The impact of such strikes is different for centrales, where multi-million dollar mills are made idle, than for purely cane growing farms and plantations, where the crop is merely harvested somewhat later. The response of centrales has been to limit the work force and contain labor conflict on their own fields and to increase their use of 'independent' colono farms and rented land for their cane supply.

Although most of the larger centrales now seem to have accepted the inevitable growth of labor unions, an increasing number of centrales have opted for the creation of company unions. Such unions are organized for workers employed on the lands owned by the central itself - where unionization of one sort or another is most likely to develop. These unions are directed mainly at the permanently employed workers of a centrale and are uninterested in organizing as yet non-unionized workers. The larger centrales are also deeply, if indirectly, involved in the strategy of keeping labor rotating over numerous farms by their increasing use of colono cane suppliers. In addition, centrales are also making substantial use of rented land and dummy corporations to grow cane with wage payments and labor patterns approximating those in effect on colono farms. We considered the organization and utilization of two blocks of land, under dummy corporations, and indicated that real wages on them were possibly 60% of that paid on centrales,
despite the fact that they were fully integrated into the mill complex.

Important sectors of the industry continue to resist unionization and attempt to circumvent payment of part or all of the social security payments to which their employees are legally entitled. A few of the smallest centrales, the great majority of the trapiches, and virtually all of the colono cane growers take this line. To date, colonos have effectively circumvented national labor laws that "guarantee" the rights of union organization. They have achieved this through selective discharge of potential union organizers and supporters, and by employing labor contractors for much of the field labor required. Colonos and trapiches owe part of their success in avoiding unionization to their use of labor contractors. Under this system, the bulk of the labor force on any farm is constantly rotating and never has any direct dealing with the owners or management of the farm itself. Unionization is extremely difficult under these conditions. Use of labor contractors has the immediate advantage that the contracting farm pays only a small proportion or none of the social security payments that it would have to pay workers directly employed by the farm. Confirmation was presented in the charts comparing the levels of income and unemployment of workers employed on centrales, colono farms, and trapiches. In every occupational category, those workers employed by colonos and trapiches received less than two-thirds the income of their counterparts employed on centrales. Even this lower income was frequently obtained only by longer and more arduous work than is required on centrales. Finally, colono and trapiche workers were unemployed and received no income for a period two and a half times greater per year than was the case for central workers.

Chapter VI provided an overview of the colono and trapiche sectors of the Cauca Valley sugar industry. It indicated the interrelation between these sectors in the supply of cane and interchange of workers. It was suggested that such interrelationships were even greater in the immediate past. Many colonos have long been engaged in growing cane for sale to trapiches and in some cases to provide cane for their own small 'mills'. One colono farm was discussed in detail. Although a 'progressive' colono farm, it witnessed a relative lack of machinery, a poverty of infra-structure and relatively little application of variable capital such as fertilizers. Despite attempts to maintain elements of the 'patron' role, the owner was committed to reducing the permanent labor force on the finca as much as possible.

Certain basic statistics of the trapiche sector of the Cauca Valley sugar industry were also presented. It is clear that a small percentage of the trapiches operating in the area incorporate most of the wage labor, land and *panela* production. A detailed description of production operations
on one typical trapiche indicated almost unbelievably long and poorly paid working conditions. Casual observers who might be inclined to derogate the value of mechanization and modernization were asked to carefully consider the trapiches.

Long and moderately detailed charts tabulating the size, agricultural features, and labor patterns on four colono farms and four trapiches were provided as descriptive summaries.

Both colono farms and trapiches rely heavily on labor contractors for the bulk of the work done in both harvest and non-harvest phases. Centrales also make direct use of labor contractors, although to a much lesser extent than do colonos and trapiches. More importantly, the cane lands rented by large centrales are largely worked through the use of labor contractors who hire and fire workers on a short-term basis for the specific jobs they have contracts for. An increasing proportion of the cane ground by centrales is produced on colono farms. These farms employ an increasing proportion of the labor force engaged in cane production. The pattern of employment instability associated with colono farms is then increasing as centrales obtain more and more of their cane from colonos and colonos obtain more and more of the labor through labor contractors. The pattern of relative labor stability which is possible in this non-safra industry, and which indeed exists to a certain extent on the large centrales, seems to be declining instead of spreading.

The final chapter considered some broader aspects of production and labor in the Cauca Valley sugar region in a comparative context. We dealt with three broad areas of comparison. The first revolved around the nature and generality of land concentration by corporate plantations and the role and importance of colonos (and smallholder) cane production in this process. The second area of comparison considered agricultural mechanization on plantations and its effects on the size, seasonality and stability of the labor force. Lastly, we discussed views on the class nature of plantation workers and considered whether cane workers may validly be considered a rural proletariat.

The comparative material for this analytic outline was drawn largely, but not exclusively, from New World sugar plantations in the present century. In all cases, contending views were given and general patterns indicated. We indicated how the comparative material related to and made the Cauca Valley pattern more understandable and suggested ways in which the Colombian data supported or modified various positions. In most of the areas of comparison, it was suggested that stated exceptions to general patterns were not as exceptional as they seemed on the surface. A brief overview of the findings for the three topics of comparison appears in the nineth conclusion.
Conclusions

1. The environment of the Cauca Valley is indeed such that sugar cane can be and is planted and harvested throughout virtually the entire year. This derives from the fact that cane grown there typically does not develop a significant level of sucrose inversion at any time of the year. It is profitable to harvest and mill Cauca Valley cane throughout the year. Ecological 'peculiarities' of Cauca Valley sugar cane agriculture are then, as Fadul and Peñalosa and other Colombian writers proposed, one set of significant factors involved in determining the production pattern of that regional industry. But such ecological factors are not the only, or even the most basic factors involved. The profitability of a year-round harvest, as distinct from the possibility thereof, also depends on features of the mills, transport equipment and land distribution of Cauca Valley centrales.

2. In many zafra sugar regions the seasonality of the harvest stems partly from the fact that sugar mills with a milling rate many times that of the Cauca centrales have been built. They grind all of the cane which can be economically transported to the factory within five months or less. The harvesting and milling period is set in the season during which the available cane contains the highest sucrose concentration. Cauca Valley sugar mills, despite their steady growth in milling capacity and extractive efficiency, have not generally developed to a size where a limited period of milling is set by the amount of cane available within a radius of economic transport. (Manuelita plantation is probably the only one as yet to approach such limits.) The spread of mechanized cane transport has played an important part in enlarging the area from which individual Cauca Valley mills can obtain cane for year-round milling.

Cauca Valley sugar mills and centrales do harvest and mill throughout almost all of the year, even though approximately two-thirds of the centrales do not operate continually during the year. The centrales do have relatively stable labor requirements throughout the year when compared to sugar plantations in zafra regions. All of the agricultural phases - planting, cultivation, and harvesting - are carried out at approximately the same level during virtually the entire year on the Cauca Valley plantations. The larger, more modern Cauca Valley centrales are also those most likely to operate steadily throughout the year. The process of increasing the mill size, to date, appears to have had different results in zafra regions and in the Cauca Valley. Where increasing mill size has tended to shorten the harvest period in many zafra areas, the mill expansion in the Cauca Valley has led to a more steady, year-round harvest on centrales.
3. Mechanization of cane agriculture developed relatively late in the Cauca Valley, beginning with tractors only in the mid-1930's. But the field machinery introduced resulted in differential mechanization (as occurred in most other sugar industries). The land preparation and cultivation phases of cane agriculture were mechanized while harvesting was not. Differential mechanization has been recently intensified in the Cauca Valley by the use of heavier equipment and weedkillers in the non-harvest phases of agriculture. Mechanical harvesting continues to be avoided partly because of a number of organizational and agronomic difficulties it poses, but basically because manual harvesting remains less costly than machine harvesting. Both in the Cauca Valley and in safra sugar areas, differential mechanization reduced the labor input needed in all agricultural phases except harvesting and thereby concentrated an increasing proportion of the total amount of field labor employed in the harvest phase.

In distinction to the results of differential mechanization in the safra sugar industries, the increasing concentration of labor in harvesting in the Cauca Valley has not led to greater seasonal fluctuations in labor requirements. Simply, where the harvest phase has become seasonal an increase in the relative numbers of harvest workers results in an increased seasonality of labor required. In the Cauca Valley on the other hand, where harvesting is not seasonal, an increase in the proportion of harvest workers does not result in increasing the seasonality of labor required by the industry. The labor requirements for the various phases of cane agriculture appear to be approximately constant throughout the year for the industry as a whole.

4. Despite the fact that there are no important seasonal fluctuations in the labor required for harvesting or any other phase of cane agriculture in the Cauca Valley, a high level of labor instability exists among cane workers as a whole and is particularly prevalent among harvest workers. Thus, despite the absence of seasonal harvests, the increasing proportion of labor utilized in the harvest phase will create a situation of increased labor instability in the Cauca Valley sugar industry. In some sectors of the industry, the degree of labor migration and instability may be comparable, if not the same, as that which exists in some safra industries. This finding conflicts with claims about the Colombian, Peruvian and other non-safra industries that year-round, stable labor requirements provide year-round, stable employment.

The apparent paradox in the Cauca Valley is explained by the fact that the component units of that sugar industry, particularly the increasing number of colono farms, do not have stable labor requirements throughout the year. Their harvest phases in particular entail great fluctuations in the labor required, each farm harvesting an average of two or three
times a year for a total period of approximately six months. There is then a periodic and cyclical, although not seasonal, fluctuation in the labor requirements of the component units of the colono sector of the Cauca Valley sugar industry. Such periodic fluctuations are typical for harvest work on colono farms. But similar patterns are developing for many of the workers engaged in planting and cultivation on colono and central rented land as increased use is made of labor contractors who hire workers for short-term tasks in all phases of cane agriculture. Simply, probably the single most basic reason for the level of labor instability is that permanent jobs are not available for a large and increasing proportion of the cane workers.

5. There is an important proviso which must be made to the preceding conclusion. In the Cauca Valley today, most of those workers employed by the larger centrales could retain more or less permanent, year-round employment. Yet about a half of all field workers voluntarily quit such jobs after one to two years. Such voluntary job terminations are not primarily due to any sub-cultural values fostering migration, as some Colombian savants claim. There are no particularly exotic values involved, as anyone who has grown up in even vaguely similar North American situations appreciates. Some observers seem to have been so struck with the hardships created by seasonal or periodic unemployment in plantation that they have come to view steady, year-round employment as a solution in itself. But under certain conditions such permanent employment can be so unrewarding as to make quitting and temporary unemployment a not unreasonable response. There may be something to gain, and there isn't much to lose, by leaving (unless one gets caught in the coils of colonos and labor contractors).

The reasons given for leaving potentially permanent jobs on Cauca Valley centrales were, in the overwhelming majority, attempts to gain employment with higher wages, fuller social security benefits, better working conditions, or for the opportunity to rise out of cane field labor. For many cane workers, permanent employment is not enough. They want "rice and roses, too" and are ready to risk some unemployment in their attempts to get them. It is equally clear that they rarely succeed.

6. The labor intensive sectors of the sugar industry most clearly represented by the colono farms and trapiches of the Cauca Valley do not warrant the praises frequently sung to their labor absorptive capacity. Trapiches, and similar enterprises, are quite different from certain labor-intensive industries observable in developed economies. Trapiches produce neither high quality, luxury nor any other particularly profitable goods. Rather, they produce essentially those goods which the highly capitalized industrial sectors
could and often do produce more efficiently. Trapiches continue to compete with modern sugar factories because they pay low wages for long hours. They are rural sweatshops. Trapiche Santa Rosa, which was described in some detail, evidenced working conditions and wages which in many ways are reminiscent of the nethermost depths of the early industrial revolution. It is typical of that sector of the Cauca Valley sugar industry.

There is considerable interchange and mobility between workers on trapiches and colono farms, and to a lesser extent with centrales. It seems reasonable to suppose that the particularly low wages and poor working conditions in the backward sectors tend to depress wages and conditions throughout the entire industry. Substantial raises in wages are more difficult to obtain, even on unionized centrales, when a large even more under-paid, reserve force is standing ready at the mill gate. This was the case with a number of union disputes mentioned in the text. Trapiches and colonos operate by substituting cheapened labor for machinery and capital investment. These sectors not only are labor absorptive but also would appear to undercut the effectiveness of unions in making wage demands. Appreciation of the considerable amount of employment which is indeed provided by the trapiches (and similar labor-intensive sectors) depends upon the acceptance of a stultifying force in a relatively static economy. Whatever the faults of the Cauca Valley centrales today, and they are numerous, whatever the degree of exploitation, a careful perusal of labor conditions on most small-scale producers can serve as a rather powerful defense of large-scale agriculture. Needless to say, plantations are not the only organizational forms of highly capitalized, large-scale agriculture about in the world today.

7. Central use of colono supply farms and rented land is rapidly increasing in the Cauca Valley. These sources have come to supply approximately 60% of the cane milled by centrales within ten to fifteen years. The reason given by the central sector of the industry for their increasing use of colonos and rented land is that high land costs now make it unprofitable to expand cane supply by direct purchase of land. High and rising land costs form the single largest category of investments necessary to expand sugar production on centrales. But it is still apparently profitable to acquire additional cane land since purchase of even unusually costly land for conversion to cane was being carried out by colonos and trapiches during the period of field work. Moreover, at least some centrales have continued to acquire new cane lands, although they may operate them under the guise of dummy companies similar to colono farms. Centrales are able to mobilize the capital necessary for multi-million dollar mill expansion and it is presumed that in the long run they are capable of obtaining the additional capital necessary for the purchase of all needed cane land. It may be more profitable, at the present time, to invest in
expanded mill facilities rather than in additional land. But it would seem that such expansion will rely on additional colono supply only as long as colono cane rates are sufficiently low as to keep new land purchase 'relatively' unprofitable. Low wages on colono farms are a very important means of keeping cane rates low.

Another factor involved in the increasing reliance of centrales on colones and rented land may be the potential threat of tax and land reforms. Although land and tax reform legislation on the books posed little immediate worries or increased costs to sugar centrales, their owners-directors may, quite astutely, have been preparing for future political developments in this area. Where such developments might limit the ownership and profits of concentrated land holdings, multiple titles held by colones can serve to protect the area of cane supply. An increased number of influential colones defending the interests of the sugar industry in government councils may be an added benefit. Naturally, a strategy efficacious in securing centrales against potential land and tax reform can also be important in keeping down labor costs and the cost of purchased cane. In any case, it is secondary whether the spread of the colono system occurs because of a conscious and coordinated policy of central owners and directors (and the 'allied' colones) or because of the blind workings of the plantations in a particular capitalist economy.

Although the mix and priority of the causes underlying the rapid spread of colono cane farms and use of rented land is not fully clear, the causes do not all have the same order of importance. This study argues that the Cauca Valley sugar industry has retained and encouraged a pattern of short-term employment in the colono sector which, because of this and other already discussed reasons, can operate with lower wage costs than centrales. However disputable this view of the reasons for the colono system, the results are fairly certain. The colono system has had a number of effects on the labor and wage conditions in the sugar industry: (a) It fragments the labor force engaged in supplying the mill with cane and provides numerous cane suppliers to any central, thereby making it unlikely that the flow of cane will be significantly affected by labor disputes on any single farm; (b) To date, the colono system has prevented unionization and payment of many of the national social security payments to cane workers in that sector and has thereby markedly reduced wages for that source of central cane; (c) Lastly, it maintains a large, increasingly fluid, labor force with many of the characteristics of a reserve labor force. Its members also seek employment on centrales, which probably tends to weaken unionization and undercuts wage levels in the industry as a whole. In addition, land rented by centrales is generally worked with the extensive use of labor contractors, generating the wages and fluctuating employment found on colono farms. That centrales have recently acquired new land but have attempted to operate it in a colono pattern strengthens the argument that a prime
reason underlying the increasing use of colono cane suppliers and analogous forms of production is to tap a large, low-paid labor reserve now difficult to maintain on centrales themselves.

8. Labor patterns in sugar plantation regions can be considered as one set of factors in a complex economic-ecological system. Such an approach requires the investigation of non-behavioral, broadly ecological and technological factors as well as the extant labor patterns themselves. For instance, we discussed the limits placed on the concentration of land in cane when plantations still required extensive tracts of woodland to fuel their mills and needed considerable pasturage to feed their draught animals. We also considered the agronomic factors involved in setting the maximum period of harvest possible and discussed the differential mechanization of cane agriculture. These factors and processes are important in determining the size, work activities, and seasonality of the labor force on sugar plantations. If we are to do more than describe how various factors of production are interrelated and utilized at a given place and time, if we are to explain why that system operates as it does, we must also consider those factors which determine economic profitability. As an instance, machine harvesting is absent from the Cauca Valley sugar industry not because it is impossible or extremely difficult to introduce but because it is still cheaper for plantations to maintain manual harvest. Factors of economic profitability in turn depend upon other phenomena which can be broadly considered as socio-political. Wage scales and labor costs for Cauca Valley cane producers depend partly on such factors as unionization, the variable effectiveness of government social security schemes and the presence of a large labor reserve. Of course, labor costs and the socio-political conditions which effect them are not the only factors involved in calculating profitability, as we have seen. But they are crucial, especially in an industry such as Cauca Valley sugar production where roughly 60% of the production costs are labor costs.

The fact that the system of resource, machine and labor utilization operative on any plantation depends basically upon its economic profitability (at least at one level of analysis) raises an important consideration which must be dealt with by culture-ecological and evolutionary studies of such systems. The issue raised by such phenomena as the recent developments in the Cauca Valley sugar industry is that under some conditions it is economically more profitable to utilize relatively inefficient systems of production if labor costs are thereby sufficiently reduced.

The recent expansion of colono farms is an instance of how technological backwardness may be fostered by the most advanced sectors of an industry. Colono farms in the Cauca Valley generally lack irrigation and use fertilizers and weedkillers sparingly. They typically utilize older ratoon cane than do centrales. Heavy equipment is only casually used on colono
farms. There is usually a shortage of tractors and mechanical implements on these farms and cultivation, cane loading, and cane transport are relatively inefficient, when compared to the same operations on central lands. The above factors create both markedly lower cane yields per unit of land and considerably higher labor input per ton of cane produced on colono farms than on centrales.

The planting of largely unimproved rented land by centrales and the use of comparatively unmechanized and technologically backward colono supply farms increases when it is profitable, in dollars or pesos, regardless of whether land, labor and machinery is more efficiently and productively used or not. As private enterprizes, sugar plantations are ultimately in the business of making profits—not sugar.

9. What conclusions can we draw from our comparisons of the Cauca Valley sugar industry with features of other plantations in the New World? Is there such a thing as a plantation pattern? Although many features have been left undiscovered and although regional and historical variations occur everywhere, I personally find the comparisons persuasive. There are recurrent, and not at all simple or obvious, processes operative in the organization and structure of production and labor in many disparate plantation regions. Consider the three broad areas of comparison.

(a) Land concentration and conversion of crop land to cane by centrales appears to be general. True, small-scale cane producers (with the Indian exception) appear to be marginal to sugar industries, despite claims to the contrary. Nevertheless, most modern sugar industries have relied upon one form of colono-like cane supplier or another at one time or another. The spread of colono farms and the increasing percentage of cane they provide has created (in a sense) a recent deconcentration of ownership in Cauca Valley cane land. But in broader terms, there has been an increasing concentration of land and other productive forces in modern sugar production. This is under the predominant control of centrales and is probably more crucial to the developmental process than the increasing proportion of nominally independent cane farms. Moreover, the variable importance of colonos as a source of cane supply may prove to be a fluctuating phenomenon which rises under conditions of increasing real wages.

(b) Agricultural mechanization is widely seen to decrease labor input needed and often does lead to increasing job stability for a substantial sector of plantation labor. Developments in the Cauca Valley indicate that while mechanization on plantations may foster the creation of a smaller, more stable labor force on central lands, the centrales may at the same time stimulate increasing labor instability among an even larger body of workers in allied sectors of the industry. In many plantation regions mechanization has been paralleled by the maintenance or growth of a labor reserve. However, the full range of effects are rather variable, depending upon the particular industry, the nature of mechanization, and upon
non-agricultural conditions such as extant political and labor policies. At least in some cases, agricultural mechanization (especially partial mechanization) may actually increase the seasonality of employment for a sector of the labor force. The complex of technological, economic and political variables which affected the mutability of the seasonal and other labor instability in the Caribbean sugar industries are matched by broadly analogous factors in other plantation regions.

(c) Cane workers on modern plantations generally appear to be validly and usefully classifiable as a proletariat. Such a view does not contradict the fact that there are considerable variations in the class consciousness and solidarity among members of this group, nor that they may decline to distinguish themselves from other laboring classes, nor that there are cultural, ethnic and other subjectively important distinctions within such groups. A general feature of workers on contemporary sugar plantations is the role of urban and national forces on their lives. While it is usually important to distinguish plantation workers from a peasantry, it may not be useful to distinguish them as a specifically rural proletariat. In the Cauca Valley, as in many regions, plantation cane workers may more meaningfully be considered as an extension of the national proletariat into the fields.

10. The final and most basic conclusion is that the general factors and developmental processes observable in the Cauca Valley cane region are consonant with those existing, or formerly existent, in most other sugar plantation regions. This consonance is not vitiated by such regional peculiarities as a year-round harvest, the late growth of a colono sector, or other more purely social characteristics of the Cauca Valley sugar region. Similar developments in both the agro-technological and as well as in the economic and socio-political spheres can be seen in many other, although not all, sugar plantation regions. This study should present no functional surprises nor provide any essentially unique structural features for those already well versed in the operation of sugar plantations elsewhere. Reference to more or less exotic cultural features or appeal to unique features of local history and social structure was not found to be necessary to understand the basic and important processes considered in this study. Those important historical, socio-cultural and political phenomena which were involved can be found, in general outline, in a wide array of disparate plantation regions. Anticlimactic and heretical as this final conclusion may seem, it is an important confirmation in the often frustrating search for regularities among men and their works. The outlook of any discipline does not auger well if each study claims to be a major exception to its predecessors on the given topic. To those who ask, "What, nothing new out of Colombia?" let it be answered, "No, why should there be?"
APPENDIX I

Aspects of Ingenio Land Use Which Limited Mono-Cropping

In addition to growing cane, pre-central sugar plantations utilized their lands for a number of other purposes; to provide wood to fuel the evaporating kettles and later to fire the steam engine, to provide pasturage for the oxen, mules and horses which provided the basic traction power for field work and transport, to grow alternate cash crops and livestock intended primarily for market, to grow subsistence crops for the plantation workers, either by alloting garden plots or by large scale food production under plantation aegis. In addition to these uses of land, early plantations (at least in some areas) held "unutilized" land so as to create a system of artificial closed resources, which tended to force members of local populations into plantation employment at subsistence wages (Wolf, 1962:205-206). A comparative discussion of these various forms of land use on pre-modern sugar plantations is beyond the scope of this note. The material presented here deals only with woodlands and pasture. This data indicates that the factors which I propose disallowed intensive mono-cropping in the early Cauca Valley sugar industry were more or less general to other sugar regions at the same level of development.

Consider the relatively small proportion of plantation-owned land actually planted in cane in a region of intense sugar production during the zenith of slave operated plantations. Westerhall Estate on Grenada Island was one of the best equipped, most intensively planted sugar estates of the British Caribbean during the late 18th century. In 1770, near the peak of its production, it comprised 982 acres; 332 acres were in cane, 101 acres were in pasture, 77 acres were planted in provision crops. The remaining 222 acres were bush, woodland and uncultivated land. In short, only one-third of the land was in cane (Hall, 1961:340). A contemporary land formula for establishing a large, efficient sugar estate in West Jamaica in 1790 proposed 300 acres in cane, 100 acres in provision crops, 100 acres in improved pasture and woodlands of at least 100 acres (Hall, 1962:305).

Before the development of mills and furnaces which could utilize bagasse as the prime fuel (in the latter half of the 19th century), sugar mills required a substantial area of woodland to fuel their sugar evaporating equipment. Fuel land was an important concern of the large sugar ingenios in southern Mexico during the early 17th century. In addition to cane fields

Such estates also had their cultivated fields, which grew the workers' maize. Above all, they had to encompass vast stretches of wooded land, or Montes, for their great boilers devoured enormous quantities of

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fuel, even though the fibrous residue of the sugar cane was also burned. (Chevalier, 1966:82).

Hutchinson (1957:29) mentions that the exhaustion of coastal woodlands in the Reconcavo area of Bahia was an important factor which led to the inland shift of the centre of sugar production as early as the end of the 17th century. Fuel shortages continued to pose a problem throughout the history of the regional sugar industry and during the 18th and 19th centuries.

Firewood soon became a crucial problem, one which has haunted the sugar industry for centuries...As time went on it became necessary to import firewood by boat from wherever it could be found, which added greatly to the costs of producing sugar. The steam mill came much later and added further to the problem. (Hutchinson, 1957:34)

Fraginals' outstanding history of the sugar industry in Cuba holds that during the first half of the 19th century even the most efficient ingenios there required over 1 caballería (33½ acres) of fuel land annually for each 325 tons of sugar produced. The more primitive trapiches operating at that time required 2 to 3 times as much fuel per ton of sugar (Fraginals, 1964:101). He cites the case of two ingenios which in 1826-1827 cut and burned 67 and 84 acres respectively of their best fuel land for a single harvest (ibid., 102). Presumably 10 or more times this amount of land had to be retained in woodland if fuel was to be provided on a sustained basis.

In the Louisiana industry, massive amounts of firewood were needed by the relatively inefficient steam-run mills of the 1850's to 1870's. Numerous mills were forced to buy fuel wood from distant sources, while some of the larger mills turned to coal. In the 1870's and 1880's fuel coal was one of the largest production expenditures, with some mills using almost 3 pounds of coal for each pound of sugar made. The perfection of the mills producing dry bagasse and bagasse using furnaces, during the late 1880's and 1890's, lowered coal consumption to seven-tenths of a pound per pound of sugar produced (Sitterson, 1953:284). This advantage was only available to the large, high pressure multiple-roller mills. In any case, the woodland equivalents to the amount of coal or bagasse used as fuel would be massive.

In the case of pasture requirements, the larger pre-modern ingenios were even more demanding. In addition to providing traction for agricultural work, large numbers of animals were also needed to haul the cane to the mill, and the sugar to the market. In early larger trapiches numerous animals were also needed to turn the mill. Chevalier's discussion of Mexican sugar plantations during the 17th century suggests the large number of animals used to provide traction power. Despite the
fact that even the largest mills of that time produced no more than 200 tons of sugar annually, "haulage was an item of primary importance in the plantation's operating budget" (Chevalier, 1966:290). One moderate sized mill in 1665 used 190 oxen for ploughing and hauling and 98 mules to turn the trapiche. Somewhat later, a larger mill is reported as having 504 work oxen, 378 of which were used in hauling (Chevalier, 1966:290). To this complement must be added the breeding stock needed to produce oxen. If we accept a conservative estimate of four acres of grassland per head of stock as the required pasturage, then this ingenio needed 2,400 acres of grassland to maintain its work animals. This must have been considerably more land than the ingenio had in cane.

Sugar plantations continued to require massive numbers of draught animals until mechanization of field work became effective in the twentieth century. Indeed, in some regions the partial replacement of manual labor in land preparation and cultivation by animal drawn implements during the mid-nineteenth century may even have increased the amount of pasturage required. Fraginals mentions that the larger Cuban mills of the mid-nineteenth century frequently used 600 to 800 oxen for hauling and field work and that there was considerable difficulty in providing sufficient pasture (1964:103-104). More recently, 420 oxen were required to cultivate and harvest an 800 acre cane crop in Puerto Rico during 1900 (Mintz, 1956:353 fn.). Even given the more intensive types of pasturage which had developed by 1900, it is likely that the sugar hacienda alluded to by Mintz must have utilized a larger area of pasture than cane land.
Chapter I. Introduction

1. Some sections of the Louisiana sugar industry are an exception in that winter conditions do stringently limit the harvest period. This has long been a marginal area in which to grow sugar cane.

2. The study of resource utilization and productive organization of plantations, and indeed all modern agriculture, raises some problems for some contemporary evolutionary and culture-ecological approaches in anthropology. One is faced with not only many more elements to consider (as compared to traditional horticulture systems) but also with an array of socio-political and economic factors which crucially effect the local ecological arrangements studied. The cost-profit calculations established by distant markets, by investment policies or by political deals often outweigh the techno-ecological advantages or disadvantages of specific production systems. As Blaut puts it

   As a general rule one can probably say that optimum ecological conditions will be selected for plantation sites or such sites will fare better than ecologically less favorable competitors in the short-run, only when the cost differential based on this factor outweighs all others - labor, land availability, marketing cost, political stability, etc. In the long-run, however, it is sites from the standpoint of crop ecology which survive in a given region. (Blaut, 1959:94)

3. Virtually every Colombian study which deals with the Cauca Valley sugar industry in the present bibliography takes this view.

4. These figures include both the land of colono farms and land rented by centrales. Certain distinctions between these two sources will be clarified later.

Chapter II. Sugar Cane and the Development of the Cauca Valley Sugar Industry

1. Cane mosaic destroys cane by attacking the leaves and until recently, there was no economically practical means of combatting the disease. In general, the solution to most cane pests and diseases continues to be the development of or importation of resistant cane varieties.
2. One of the reasons why the higher yielding M.C. 666 cane has not spread beyond the confines of a few centrales is the fact that it must be harvested within one or two months after maturation. It seems to be limited to a few of the best organized centrales.

3. In some of the more marginal sugar cane areas, such as in parts of Mexico and Louisana, sucrose levels may be as low as 6% to 8% per weight of cane - approximately a half of those obtained in the Cauca Valley.

4. Better cane cutters harvesting in heavy central fields can average 5 to 6 tons in an 8 to 9 hour day. Typical rates are lower, and may drop below 4 tons per day on colono fields. Cane loaders average approximately 10 tons per day on centrales but considerably less where cane has to be carried.

5. Sugar production for large regional and occasionally extra continental consumption developed in the south Mexican plateau during the 16th century as well.

6. Before the introduction of centrifuge sugar processing in the 1880's, most commercial sugar contained substantial amounts of syrup which seeped away in transport. Hall notes the problems and cost of shipping sugar from the island of Grenada in the Eastern Caribbean in the period around 1797. He calculates that even in the relatively short and rapid passage from Grenada to London an average of 6.5% of the sugar shipped was lost through leakage (Hall, 1961:346). As late as 1845 the average seepage loss of muscovado sugar (a crude granular sugar which comprised the bulk of production for many industries) shipped from Jamaica to London was 15% or more (Hall, 1961:346 fnt.).

7. One, cited here as 'Eder' is a collage of personal papers and plantation documents dealing largely with events between 1864 and the First World War. The second, cited as 'Manuelita', primarily describes aspects of field practices and mill technology between 1900 and 1964, with some comments on their socio-economic context.

8. Fraginals (1964) gives average production capacity of large Cuban steam mills in 1860 as 80,391 arrobas sugar in a 150 day period, or 15,400 pounds per day.

9. Appendix I provides comparative and better quantified data on the woodland and pasture requirements of pre-bagasse using sugar ingenios in the New World.
10. For comparative purposes, it must be remembered that mechanizing agriculture did not wait upon gasoline tractors in other areas of the world. Horse and mule drawn implements spread through many types of agriculture in the second half of the 19th century. On Louisiana and Cuban sugar plantations during the 1880's and 1890's, for instance, horse drawn implements had reduced labor input in various field phases to one-half and one-quarter of what they had been 30 years previously.

11. While a comprehensive history of Colombian entrepreneurial activity and political infighting during the 19th century has yet to be written, a vast store of source material appears to be available in the biographies and autobiographies of regional notables. For the Cauca Valley, an uninitiated reader might find Arboleda (1956), Raffo (1956), Parson (1950) useful beginnings (as is Eder 1959 himself). The Boletín de la Academia de Historia del Valle del Cauca also provides bibliographic leads. For a brief commentary on entrepreneurship surrounding Manuelita plantation in the 19th century see Knight (1968:81-88).

12. The capacity of Cuban steam centrales was greater than this even in 1860 and Sitterson (1953:285) states that U.S. mills with 10 to 30 times the capacity of the Manuelita mill were already common by the turn of the century.

13. A 1917 plan to expand production for export to the New York market estimated that shipping costs would equal all labor costs and constitute 37.5% of total cost. Transporting the sugar 150 miles from Manuelita to the port of Buenaventura would have constituted 40% of the shipping costs (Eder:501-503).

14. Cane transport costs continue to be an important factor in determining the location and ultimate size of mills by limiting the maximum distance that cane can be hauled and therefore the maximum area of cane which is economically available to any single central. Such transport costs have in some sugar industries operated as the effective limits to central size (although not necessarily the expansion of sugar company holdings). A particularly clear case existed in the Louisiana mills at the turn of the 20th century (which had a rail transport system comparable to Cauca centrales of the early 1950's).

Cost of transportation, when it exceeded 75 cents a ton, or one-fifth to one-fourth the current value of the cane, tended to act as a final limiting factor on the size of sugar plantations, since decrease in cost of manufacturing was offset by the higher cost of transporting the raw material. (Sitterson, 1953:265)
14. Continued
At present, cane transport costs for typical colono farms supplying centrales are .60 to .70 pesos per ton per kilometer, totaling over 700 pesos per plaza harvested. This is well over a fifth of the value of the cane, and in some cases may approximate something like 30% of the cost of production. Transport costs from central core land is much lower.

Chapter III. The Mechanization of Cane Agriculture

1. The acquisition of a Fowler steam plow in 1921 indicates the extent to which even the most advanced Cauca Valley central was behind the major sugar producing areas. Such steam plows were working on some Cuban sugar fields as early as 1863 (Fraginals, 1964:92). By 1920 they were obsolete in most regions of the world.

1a. The reader may find it instructive to compare the 1939 data with the labor and machine inputs on Central Condor and its colonos in 1964 (Charts 4,5). In doing so, a few provisos should be kept in mind. Firstly, the actual labor force per unit area in 1939 was probably only somewhat larger than at present because of the rigorous 12 hour work day (this is so despite the actual larger labor inputs). Also important, the cane yields were considerably lower than at present. So that the equivalent labor inputs (let us say in harvesting) are not applied to the same amount of cane. There is also certain speciousness in the equivalence of machine input and the agricultural phases themselves. For instance, land preparation now involves much more intensive and repeated working than previously. More and larger machines have been used not only to reduce labor input but to carry out novel and repeated operations which improve cane yields. "We just used to scratch the surface of the land in those days", said one man about early tractor use. The dramatic changes wrought by field machinery between 1939 and 1964 are much more than would appear in a mere comparison of the changing amounts of machine and labor input. Finally, a more complete picture of labor input in 1939 would require figures for a number of phases (irrigation, road maintenance, clean-up, etc.) on which I was unable to obtain any reliable data.

2. Since the remaining work animals are both few and not stabled, it is not feasible to use animal manure as a fertilizer. Chemical fertilizers have been used in substantial amounts on centrales for the last 10 to 15 years. While 'expensive', it produces profitable increases in cane yields if applied in the correct amounts (which is rather sparingly compared to its application in North America). Cane plots with
2. Continued

different soils and varying cropping and yield histories often receive different amounts and kinds of fertilizer. Nevertheless, a general picture is possible. Naranjo (1963), using unpublished Asocaña estimates, calculates that 135 kilograms of Urea (a low cost, general purpose fertilizer) is applied per plaza per harvest on centrales. In 1964, on Central Condor, this averaged 183 pesos per plaza per harvest, plus the cost of 0.8 to 1.2 man-days labor (Garcia and Zuluaga, 43; Naranjo, 10). Virtually all fertilizer is still applied by hand. Men walk through the rows of young cane directing a stream of powdered fertilizer from a sack to the base of the stalks. It is not clear to me why this simple task has not yet been mechanized. By 1964-1965 even many colonos were beginning to apply fertilizer (in sparing amounts).

3. Since Garcia and Zuluaga are primarily interested in costs of cane production, the actual labor and machine inputs for some phases are not directly given. The figures for many agricultural phases have been calculated here by dividing the labor costs per phase by the average daily wage rates for these particular tasks then in effect on colono farms and on Central Condor. The figure for labor input in manual weeding on colono farms has been doubled since internal evidence suggests an error in calculation in Garcia and Zuluaga. This also brings the figure into line with my own estimates. (Although a valuable study, my impression is that many of the figures for colono farms presented by Garcia and Zuluaga are underestimated.)

Machine input, especially on Central Condor, is probably more than twice as high as listed here, although I have no quantitative figures for this.

3a. This also accords with the views of Central Condor administrators that the Garcia and Zuluaga figures on labor input are incomplete or too low. For most colonos, however, the addition of 9 man days per plaza for maintenance and supervision may be too high since these units tend to scrape by on a haywire basis.

4. Tractors usually draw 5 to 6 wagons loaded with 4 to 5 tons of cane each to the mill. Such a convoy is manned by a tractor driver and his assistant. Given an average distance of 20 to 22 miles per round trip and an average speed of 15 miles per hour, and also allowing for hook-up and 'dumping' time, such a team can transport roughly 25 tons of cane every 3 hours. But a host of seemingly minor difficulties (mud, breakdowns, flat tires, etc.) can cut this rate down substantially. There are at least two transport teams attached to a harvesting crew of 30 men.
4. Continued
A very approximate estimate of the labor input in transport would be somewhat more than 2 man days per plaza. What makes transport so expensive is the cost of running and repairing the tractors.

5. For instance, Central Rio Paila, with the most extensive and scattered cane supply in the Cauca Valley, is experimenting with the so-called 'Florida system'. This uses large trailer trucks which dump automatically and are loaded by fork lift tractors (the cane is still harvested and piled manually). These rigs required improved plantation roads, a considerable investment, and cost more than 3 or 4 smaller tractors. But they provide high speed hauling (40 to 50+ miles per hour) of fairly large loads. They can complete many more trips in a given amount of time than tractor convoys. In addition, some larger centrales were considering long distance, bulk hauling of cane on the national railway system. This would entail construction of a number of spur lines.

Chapter IV. The Central Sector

1. The machinery pool of Central Condor in 1964 is representative of that available on the larger, more mechanized units. It had 13 heavy bulldozer-caterpillar tractors, 2 graders, 55 wheeled tractors (of which more than 40 were heavy types), 281 cane trailers, 130 rail carts, plus an uncounted array of unpowered agricultural equipment. The largest central, Rio Paila, had even a larger pool, including 45 caterpillar tractors, 49 wheeled tractors, more cane transport equipment, and even two large power shovels. One of the smallest centrales, La Industria, had only 2 caterpillar tractors, 13 wheeled tractors and 84 cane wagons.

1a. The 21 centrales in the Cauca Valley employed a total of approximately 18,000 'permanent' workers in 1963-64. The dash (-) in Chart 7 indicates that the central was operating but no figures on labor force are available. In most cases a 10% to 20% increase in labor force between 1959 and 1963 seems reasonable. (This does not include the workers on rented or colono land.) Centrales Melendez, Industria and Maria Luisa are exceptions in that their labor force declined or remained stable. At least two mills not listed here went out of operation in the period mentioned.
2. The only exception is Central Manuelita, which has installed and operated a plant producing refined sugar since the early 1950's.

3. Ideally, a series of tax-based crop maps for the region, covering 40 to 50 years, is required for documentation. If they exist, no one in the area knows of them. The figures presented here were issued by the two centrales themselves. The extent to which cane land is purported to have increased at the expense of woodland and pasture, without substantially effecting food crops, is open to some doubt. Central policy has included public relations efforts to minimize the impact of expanding cane fields on regional food crops and food prices.

4. Garcia and Zuluaga (1964) estimated cane transport costs per plaza from colono farms as higher than presented here. Transport costs for the most distant colono plots may be as much as 1,000 pesos per plaza per harvest and approximate 20% to 25% of the costs of cane production.

5. Inflation, devaluation, international exchange rates and monetary policy in general is a strange world which I do not pretend to understand. Suffice it to say that a conversion rate of 10 Colombian pesos to 1 U.S. dollar is used here (and is the ratio used in the Manual Azucarero de Colombia, 1964). Actually, a number of exchange rates seemed to exist for some government transactions, for preferred foreign trade, and finally the ordinary bank rate of 10 to 1 (during 1963 and most of 1964). By early 1965 a government devaluation policy had lowered the rate to approximately 19.5 Colombian pesos to 1 U.S. dollar. Some guessimates as to the 'real' value of the peso may be in order for the reader to appreciate what the wages discussed mean in terms of consumer costs. The purchasing power of the Colombian peso in the Cauca Valley in 1964-65 dropped (possibly 25% in two years) but was roughly equivalent to .15 to .20 U.S. in nationally produced consumer goods and possibly somewhat more in locally produced food. For imported goods, of course, the purchasing power was much less.

6. A large literature exists on various socio-economic reform schemes in the Colombian cockpit. Although a consideration of these is a study in itself, two 'popular' accounts may be worth the reader's attention. Probably the best known discussion of land and tax reform in Colombia in the early '60's, and the events leading up to this period, is "Land Use and Land Reform in Colombia" in Albert Hirschman's optimistic Journeys Toward Progress (1963). A more down to earth appraisal is Feder's "Post Scriptum a La Reforma Agraria en Colombia" (1965).
7. A company rule that no liquor may be kept or consumed on the _batay_ is fairly stringently enforced. Those workers who become involved in fights on the _batay_ are disciplined by being laid off for a number of days or weeks and, if the offence is repeated, fired. Some men quit before they are fired.

8. In 1961, before the cost of food prices had risen, the central prided itself on the fact that its dining facilities provided a worker with full daily food requirements for only 40% of his daily basic wage (Central Condor, 1961:14). The barracked workers generally earn little more than the basic wage (plus social security payments). The remaining wages available to the families of barracked workers must have been limited indeed.

9. The central is now fostering a scheme of long term credit for self-built houses in Bolo to be owned by relatively new married workers. It is also deeply enmeshed with the local village council and has paid for a number of developments in Bolo, including installation of partial electricity, water, a primary school and a teaching order of nuns.

10. The figures on job tenure in Chart 10 do not, of course, include the jobs presently held by the 51 men interviewed. The difference between the 435 jobs listed as to job tenure and the 394 reasons given for leaving those same jobs stem from the fact that past reasons were sometimes not remembered. Moreover, in the cases of voluntary job termination, there were frequently a number of equally important reasons given for leaving a single job.

Chapter V. Unionization and the Response of the Cauca Valley Sugar Industry

1. Occasionally, men who are particularly effective union leaders may obtain desirable junior or middle-rung administrative jobs on centrales, whereupon they leave union work. Buying out such persons is not uncommon.

2. The _Codigo Substantivo de Trabajo_ is unpaginated. All articles mentioned here are to be found serially, arranged by numbered article and sub-clause.

3. The social security payments are not included in the basic rates and constitute an additional value _paid out_ to workers of roughly 40% plus _over_ basic income.
4. There are also the Centrales Carmelita, Pichichi and Balsilla which may have nominal, independent unions for a small proportion of their employees.

5. The actual percentages remained fairly stable, despite some increases, up to 1964. Since the benefits are generally geared to earned income, and wage payments rose sharply in those years, the absolute costs involved in social security payments rose steeply. Finally, it should be noted that the figures presented here are averages - less capitalized centrales pay significantly less, while the largest centrales pay somewhat more than these averages.

6. While I have no breakdown of the costs of total social security payments on Central Condor, they appear to be similar to those for Manuelita. In 1963 Central Condor estimated the average daily wage for all of its workers as 18 pesos, but that social security payments and all other contributions to workers' 'benefits' cost an additional 12 pesos per person per day (about 67% over average wage). This was generally unchanged in 1964-65.

7. Two additional points should be made here. One, I would emphasize again that the unemployment figures here seem lower than the more subjective data obtained through extensive discussion with informants and in participant-observation in general. This appears to be particularly true for central harvest workers. Secondly, the level of employment is not synonymous with labor stability. In many cases, other than on centrales, a record of 40-48 weeks employed per year involves jobs on various farms. This is almost always true for those employed by labor contractors.

Chapter VI. Colonos and Trapiches

1. Some centrales also purchase cane crops from farms on a one-shot, non-contractual basis - so much per ton delivered or per standing crop. This, in most cases, is merely cane ancillary to the main supply. Centrales require an assured and steady flow of cane. They cannot depend for much of their cane on the vagaries of market prices or the changing cropping decisions of nearby planters. Contracting an assured supply a number of years in advance is quite necessary for most of the cane to be purchased.
2. On other colono farms there is considerably more variation. While I do not have detailed accounts, some colono farms seem to harvest under 4 months in a year while certain of the larger ones may harvest over 7 months during some years.

3. A box (caja) of panela weighs about 40 kilos.

4. Vicente Izquierdo's rather remarkable study of Cauca Valley trapiches provides cost of social security payments for 7 large trapiches in 1961. All categories of social security and ancillary payments for these trapiches average 20% of the total labor costs (Izquierdo, 1964:98-100, Chart 53). This was approximately the same in 1963-64, remaining about a third of the percentage paid by centrales. In absolute amounts, trapiches probably paid less than a quarter the amount of centrales. This ratio may serve as a rough guide to the level of payment by colonos as well.

5. Many colonos, trapiches and other agricultural units in the area have a small number of personally loyal workers who may have been working on the farm for much of their lives. Usually there are 4 or 5 on each of the units we are discussing here. Such workers earn little or nothing more than others but usually can rely on truly permanent employment and the favor of the patron in such things as loans, occasional gifts, and possibly support in court cases if needed. Nevertheless, they comprise only a small percentage of the total labor force and probably a minority of even the 'permanent' employees.

6. Trapiche Machado obtained three-quarters of its cane from a separate colono farm operated by the owner of the trapiche. I have here treated the labor force as only those employed in the mill and on the 63 acres directly attached to it. The rest of the cane milled is treated as if it were purchased from a separate colono farm with a distinct labor force. In actual practice, there was probably some overlap.

Chapter VII. The Cauca Valley Sugar Industry and the Plantation Pattern

1. Probably the anthropologically best known case of peasant production continuing in intimate association with large scale sugar manufacture is documented for Java in Geertz' (1963) Agricultural Involution. This brilliant analysis raises questions for most of the processes discussed here and the interested reader is urged to reconsider it. I am personally unfamiliar with Indonesia and there are many facets of the checkered history of Javanese sugar plantations which seem difficult to understand, but I am unable
1. Continued
to check the Dutch or Indonesian sources. It would appear, however, that a substantial sugar worker proletariat had developed by the mid-1960's and was one of the targets of the 1965-1966 army-led massacres.

2. Hirsch mentions a few larger growers in the North Indian area who produce 90 to 105 tons of cane per year. Considering local yields, the cane fields of these 'larger growers' can be no more than 10 to 15 acres (Etienne, 1968:71-79; 135). Since the mid-1950's, the focus of investment in sugar mills has been in South India and there plantation owned lands do appear to have developed, on a small scale (Hirsch, 1961:54-56; Ghosh, 1959:313).

3. One other alternative, seldom available to plantations today, was forced labor. For instance, 12 of the 18 sugar plantations in Texas relied heavily upon convict labor in 1882 (Sitterson, 1953:315-317).

4. By 1940 both the capital and operation costs of tractors were less than mules. The capital cost of tractors sufficient to work 200 acres was approximately two-thirds the cost of equivalent mules needed. At the same time, the operating costs per acre of cane for tractors was roughly one-half that of mule cultivation (Sitterson, 1953: 386-387).

5. The long overdue anthropological study of migrant workers in the United States has been begun in Friedland and Nelkin's *Migrant Agricultural Workers in America's Northeast* (1971). It provides a dramatic picture of the world of hundreds of thousands of persons in the reserve labor force of the highly capitalized and mechanized agricultural industries interwoven among the great cities of the eastern U.S. seaboard. Let no one be surprised at the conditions existing in the secondary ranks of Colombian agriculture.

6. The thrust of Jayawardena's *Conflict and Solidarity in a Guianese Plantation* is that there is relatively little conflict and certainly no class-wide solidarity. While attempts to expunge the concept of class are not too useful, Jayawardena does touch on an obvious but important point. People who are objectively in the same class position may be divided by subjectively important differences in culture and 'racial' or ethnic group status.


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