

MOLOKAI

Present and Future

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INTRODUCTION

The Island of Molokai is part of the County of Maui, except for Kalawao County which is 13 square miles on the north central tip. Kalawao County is the home of the Kalaupapa Hansen's Disease Settlement and is administered by the State of Hawaii Department of Health. Kalawao County is explicitly excluded from this report.

Molokai's population is presently slightly over 5,000 people, most of whom are scattered along the southern shore. Kaunakakai on the central southern coast, located near the only major port on Molokai, is the Island's trade center. Much of the northern coast of the eastern half of the Island is composed of very steep cliffs and high mountains resulting in high rainfall levels over the eastern sector. The western half of the Island is arid, thus requiring irrigation for any type of agriculture other than limited pineapple production or cattle grazing. This is one of the major constraints to further development of agriculture on the Island, for the water is at one end and the suitable land at the other.

The major economic developments foreseen on the Island involve both the closing down of the pineapple plantation operations by 1975 and the projected development of the Kaluakoi Corporation. The latter involves projected goals of 4,000 hotel rooms, a golf course, and various housing and condominium developments. Various other

announcements of major resort-housing developments have been made in other areas along the southeastern coast of the Island. However, these plans are not firm at the time of the study.

The 1970 Census indicated a median age of the males on Molokai of 29 and a median age of 23 for the females. The existence of an older group of unwed males as reflected in these figures constitutes an important factor in dealing with the future development of the community. According to the Census figures, approximately 43 percent of the Island residents were Hawaiian or Part-Hawaiian, 37 percent were Filipino and the remaining 20 percent were of other ethnic origins. People of various ethnic origins are distributed throughout the Island. However, there are concentrations of Filipinos in the two plantation towns of Maunaloa and Kualapuu, and Hawaiians and part-Hawaiians are concentrated in Hawaiian Home Lands areas and to a lesser extent in the southeastern portion of the Island.

University of Hawaii Study

In addition to useful information available from the U. S. Census and other secondary sources, further data are available from interviews conducted by the University of Hawaii study team with a sample of the populations drawn systematically and geographically to include one household out of every five. The sample for the entire Island

excluding Kalawao included 252 households with 442 adults 18 years of age or more. The accuracy of the sampling procedure is indicated by the inferred figure of 1,260 households on the Island which is within 5 percent of the U. S. Census figures for 1970.

Interviews by the study team were conducted between January 8 and 20, 1973. This was subsequent to the pineapple phase-out announcement by Dole, but prior to the similar announcement by Del Monte. Information was centered around basic characteristics such as ethnic background, place of birth, area of residence, and sex. Each provides a useful understanding of the population, particularly when related to age, years in the community, schooling, and income. Each question was treated within this framework by computing percentage distributions and the statistical significance of the respective differences in distributions.

The Need for Planning

Many of the social and economic changes in Hawaii in the past two decades have bypassed Molokai as is true of most rural areas in the country. With the announced phasing out of pineapple as an industry and indications of future visitor and residential developments of an urban nature on a portion of the Island, it becomes vital for various institutions and individuals associated with the Island to involve themselves in comprehensive planning as an investment for the future. Residents of the Island are now confronted with a tremendous challenge to their public and private resources: how to direct their environment so as to provide for better times in the future. Such comprehensive planning can show the people how they can

help themselves by capitalizing on their major advantages. It may thus be possible to suggest how recreation, tourism, agriculture, or other types of enterprises can be developed in harmony with each other and the environment. Indeed, the planning process itself will cause the Island economy to be looked upon more favorably by industry and businesses seeking new outlets for capital investments. Also, such planning can permit the Island economy to participate more effectively in County, State, and Federal development or other aid programs. If begun in time, and such can clearly be the case for Molokai, comprehensive planning will permit the institution of effective planning-zoning processes that will guide and direct future growth on Molokai. Wasteful and haphazard suburban or resort developments can thus be prevented. With such planning the conflicts between agriculture and other types of economic activities can be minimized.

Planning for the Molokai economy is necessary in much the same sense as planning is necessary for an individual or family. It is useful to be able to anticipate your problems and objectives and to thus outline the courses of action to be followed. The people in the best position to make such plans are located in various County and local agencies. They are both in close contact with the people to be affected, and have the expertise to know what is possible given the amount of resources to be devoted to the effort. This means that on a practical basis the Maui County government is necessarily the primary institution to be involved in comprehensive planning for Molokai. Thus, much of the work reported herein was pursued with the objective of providing basic data and analysis to the Maui County government.

Three types of information are presented in the following report. First, an effort was made to develop from the community's point of view general priorities and goals which should be pursued by future comprehensive planning efforts. Second, a large factual base has been developed with emphasis on socioeconomic factors which can now be made available in one package to not only County government but also to local civic organizations or State and Federal government agencies for their use in dealing with the future of

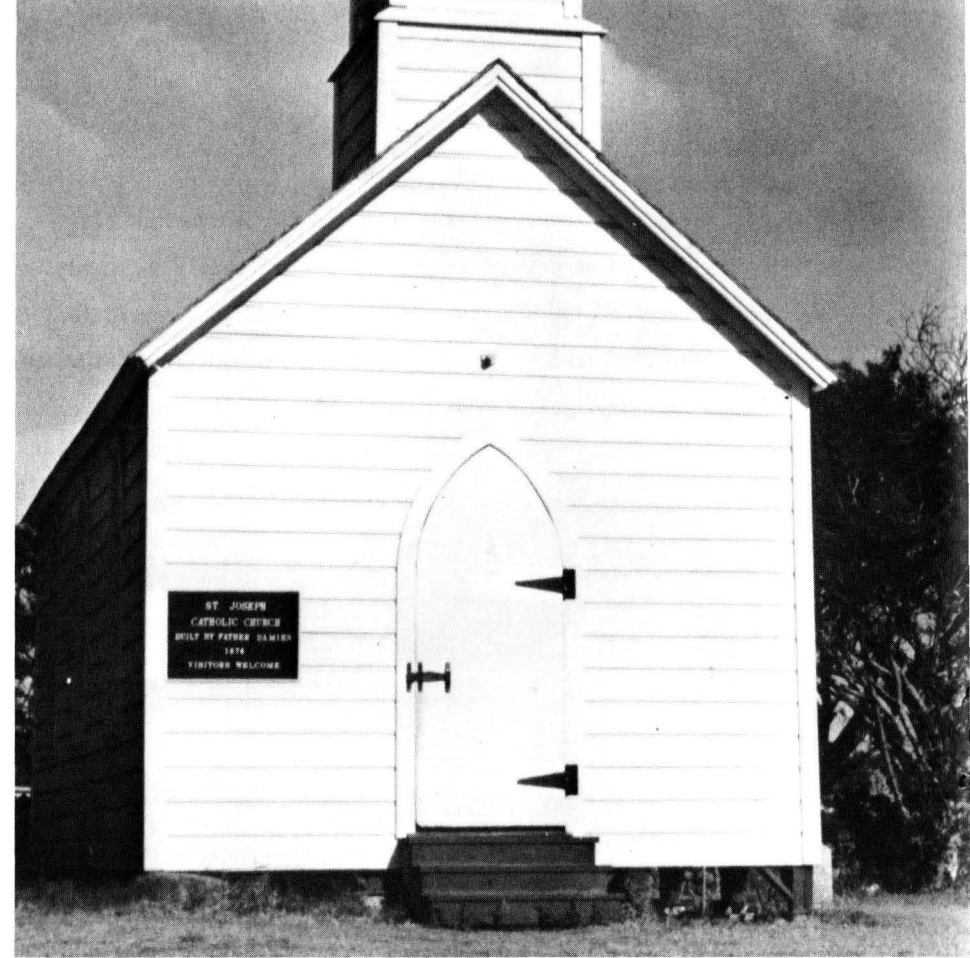
Molokai. Third, some consideration is given in this report to those bottlenecks and obstacles that are considered important factors in implementing the more obvious strategies and routes of development. By providing such a report as a prelude to and concurrent with actual comprehensive planning activities, it is believed that the implementation of whatever planning efforts are pursued will be much more fully realized and relevant to the problems at hand.

HISTORICAL SKETCH

The isolated feeling often expressed by Molokai residents has been both boon and burden throughout the recorded history of the Island. Because of relatively scarce resources and a sparse population, Molokai has seldom been significant politically. This lack of importance has sometimes been desirable. In the days of the Hawaiian chiefdoms, the residents enjoyed a relatively peaceful atmosphere, unlike that of many other islands. Prior to the invasion of Western commerce and technology, the people of Molokai were concentrated on the hospitable southeastern coast. Estimates of the population on Molokai as of about 1780 range from 10,500 to 36,000.

The basic economy up to that time centered around the cultivation of a number of crops, inshore fishing, and limited foraging activities. Groves of kukui (candle nut), puhala, hao (both used for fuel), pua and naio (hard woods) grew on portions of the now bleak and eroded slopes and valleys of the western portion of the Island. Bananas, ti, ohelo, ohia ai (mountain apple), wauke (kapa), bamboo, koa, cane and breadfruit flourished in parts of the more moist eastern portion of the Island. The central section now called Hoolehua Plains was covered with pili grass, the main material used for housing construction.^{1/}

^{1/} Vernon C. Bottenfield, Changing Patterns of Land Utilization on Molokai, unpublished Master's Thesis, University of Hawaii, 1958, pp. 49-61.



St. Joseph's Catholic Church was built by Father Damien.

Wetland taro cultivation in the valleys of the eastern half of the Island combined with considerably less dryland cultivation of sweet potatoes on the slopes of the southern shore and in a few areas of the drier western portions of the Island provided the staple diet of the residents. This was supplemented by mullet and other fishes, generally caught from the estimated 62 fishponds along the southern shore.

Arrival of Western traders and the concurrent uniting of the governments of the Islands under one kingdom brought devastating changes to the social economy of Molokai. Vast human misery was incurred in gathering sandalwood and pulu (pillow and mattress stuffing) as demanded by the royalty for trade with the Europeans and Americans. Additional tragedy was caused by the diseases introduced by the foreigners, for the population was drastically decimated. Attractions on other islands caused many residents to leave, further reducing the population.

Serious ecological changes occurred. Over-grazing of pigs and other animals combined with the introduction of new plant varieties caused many native plants to disappear. The American Sugar Company tried unsuccessfully to halt the erosion of soil from the Palaau mudflats by importing the Red Mangrove tree in 1902. Not only did the attempt fail, but the growth infested nearby fishponds causing their further deterioration.

By 1851 large areas of western Molokai (originally Crown Lands which became Molokai Ranch), and to a somewhat lesser extent of eastern Molokai, were already heavily grazed by cattle, sheep, horses, and goats. Consequent erosion destroyed large acreages, and fishponds deteriorated from siltation. The extent of this erosion is illustrated by the following account:

In 1923, Manuel Joao, Sr. was sent with Jorgen Jorgensen. . . to locate the boundary stone at the point where the boundaries of the lands of Palaau, Hoolehua, Kaluakoi, and Naiwa meet. Joao had seen this stone last in the plantation days of 1898 when it was waist high above the ground. When this point was located, he had to dig down a foot to find this stone. This shows that in twenty-five years, four feet of silt had washed

down from the kula; one foot in six years, or two inches per annum.^{2/}

Access was often restricted under the land tenure system introduced by the Great Mahele in 1848. The remaining land was often less productive for traditional uses. Many fishponds were no longer productive. The remaining residents had little choice but to embrace the economy brought in by the foreigners.

In many instances the adaptation to the new social economy was excruciatingly difficult. A large cattle operation headquartered in Palaau Village had been developed by R. W. Meyer and Reverend Ormel Gulick as early as 1850. The venture ended abruptly when it was

^{2/} George P. Cooke, Mooilelo o Molokai, Honolulu Star-Bulletin Printing Co., Honolulu, Hawaii, 1949, p. 46.



Some fishponds are still productive.

discovered that most residents of the village were implicated in an extensive cattle rustling scheme. The animals were being slaughtered in the hills and the hides and other remains were concealed. The alleged culprits were imprisoned on Oahu, and their families moved to be near their husbands and fathers. By 1851 the village of Palaau was deserted and was never reoccupied.

Many different types of agricultural enterprises have been attempted on Molokai including sugar, rice, sisal, coffee, and cotton. All of these failed due to water salinity, marketing problems, or destruction of crops by disease or insects. Until 1920, cattle



The first trans-Pacific flight landed in Molokai.

remained the only economically successful agricultural endeavor on Molokai. The future looked very bleak, causing migration to other islands. The population in 1920 had plummeted to 1,117.

California Packing Company introduced pineapple in 1919 on a small scale through contracts with small independent growers. In 1923 Libby, McNeil, and Libby leased 1,000 acres in the western portion of the Island from Molokai Ranch for pineapple planting. California Packing Company began pineapple production on a large scale around Kualapuu in 1927. The success of pineapple rapidly caused it to displace cattle ranching as the major economic activity on the Island.^{3/} Large numbers of laborers were brought in from the Philippines for work on the plantations, although some local Hawaiians and others were also employed.

The first specific goal pursued under the Hawaiian Homes legislation of 1921 was to establish a viable community of farmers and ranchers on Molokai. During the 1920's the Hawaiian Homes Commission began to develop roads and water, established a demonstration farm, and began to clear much of the land for future farm use. Due in large part to the scarcity of water on the Island and because of the poor quality of some of the land, a major part of the overall acreage was designated to be used as community pasture. The pitifully small beginning of approximately 100 farm homes by 1926 has not grown to anywhere near the anticipated levels in the subsequent decades. Most additional homes on Molokai under the auspices of the

^{3/} Ibid. p. 91.

Hawaiian Homes Commission are house lots rather than farmsteads.

The early years of farming on the Hawaiian Home Lands on Molokai were a history of droughts, saline water, improper marketing attempts, and administrative failures. By the end of the first decade of the homesteading experiment it was becoming increasingly clear that pineapple cultivation was the only economically viable use of the land given the existing conditions at the time. The recurring failures of diversified agriculture in the 1930's and 40's clearly established the need for an adequate water supply, particularly for the Hoolehua Plains. Optimism concerning dryland farming voiced at the time of the discussion over the Hawaiian Homes Bill simply did not prove correct.

The failure of attempts to establish independent farmers and ranchers in the Hoolehua and other Hawaiian Home Lands areas on

Molokai must also be traced in part to the basic fact that by the time an agricultural program had been developed the clientele of the Hawaiian Homes Commission retained relatively little interest in agricultural pursuits. Consequently, the Commission increasingly began to emphasize the development of house lots rather than agricultural homesteads.

Molokai is rich in ancient legends, Hawaiian lore, and sites of significant events. This report is not the appropriate place for the recounting of such a detailed history. Previous attempts at such a compilation are available. What is of more immediate interest to this report is the location and description of significant historical and cultural sites (see Appendix III), for the preservation and maintenance of many such sites is vital to both tourist development and the proper appreciation by Molokai residents of their heritage.

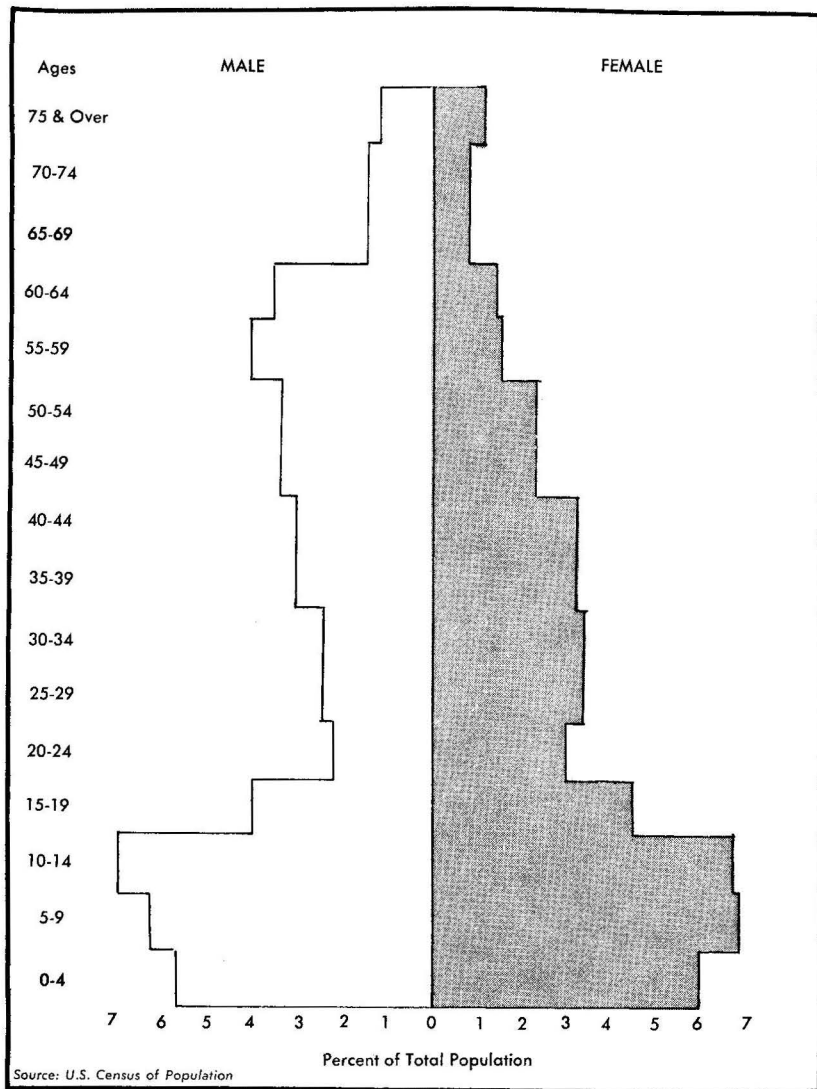


FIGURE 1. MOLOKAI AGE - SEX PYRAMID, 1970.

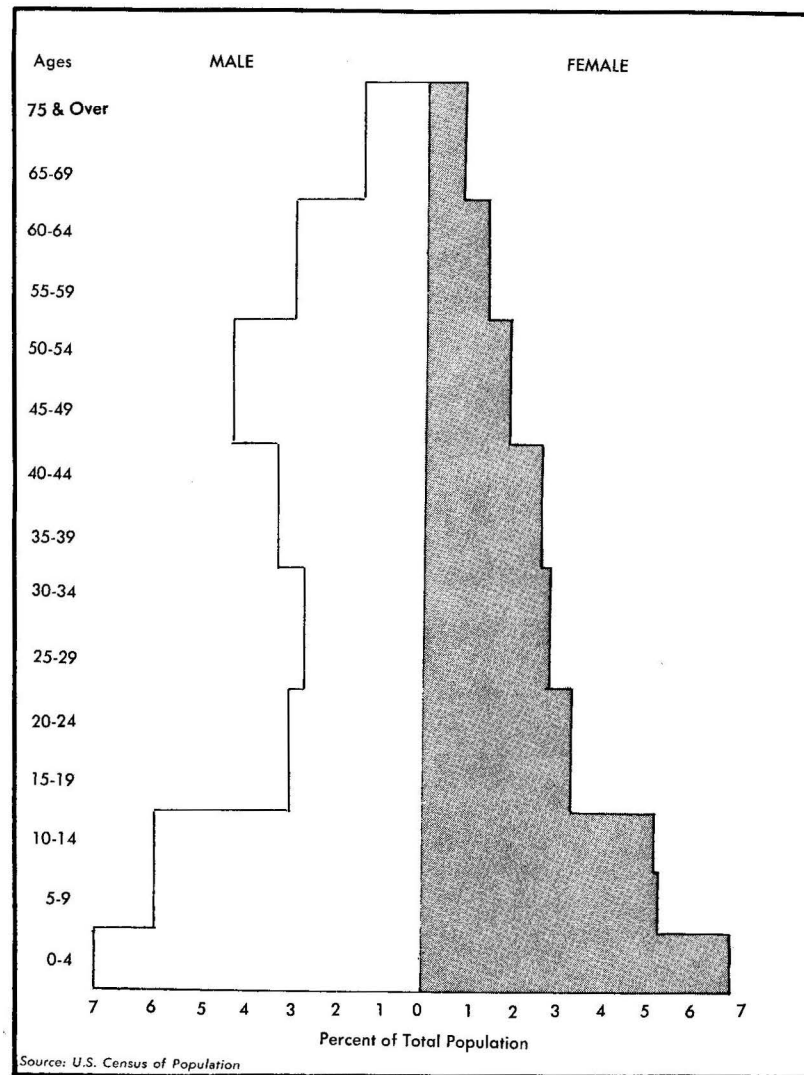


FIGURE 2. MOLOKAI AGE - SEX PYRAMID, 1960.

PEOPLE OF MOLOKAI

According to the 1970 Census there were 5,089 people residing on Molokai (excluding Kalawao). This represented an increase of 7 percent over the 1960 population of 4,744. Kaunakakai had a population of 1,074, Kualapuu had 441 residents, and 872 people resided in Maunaloa.

As is true in most rural areas of the U.S., more than half the youth leave the area following high school. This is inferred from the percentages shown in Figure 1 from the 1970 Census. This trend of outmigration has apparently increased over the last decade, for the percentages of people in their twenties were greater in 1960 than was true in 1970 (see Figures 1 and 2).

The much larger percentage of men than women on Molokai who are age 45 and above is also illustrated in Figure 1. That the major portion of men leave the Island at age 65 is also dramatically shown in both figures. This large reduction in the older population is unlikely due to deaths, for no such reduction is shown for females in that age group, and a similar decrease at age 65 is shown in Figure 2 for 1960. Furthermore, the male population does not decline appreciably in the age category 70-74. These unusual characteristics of the population can most logically be traced to the phenomenon of maturing, unmarried, Filipino plantation workers who move to Oahu or return to the Philippines following retirement.



Picking pineapple has supplied both young and old with supplemental income.

Data gathered by the University of Hawaii Study Team show that the adult population of the Island has a median age of 43 years, had lived on Molokai a median of 27 years, had completed a median of 11.1 years of school, and reported a median household income of \$8,441. (U. S. Census figures for 1970 show median family income at \$8,286.) People of Hawaiian ancestry accounted for 39 percent of the population, Filipinos 33 percent, and those with all other ethnic back-

TABLE 1. CHARACTERISTICS OF ADULT RESPONDENTS.

Demographic Characteristics	Percentage Distribution
Age	
18-29 years	19
30-39 years	21
40-49 years	19
50 or more	41
	100
Years in the Community	
Less than 10	23
10 through 29	34
30 and more	43
	100
Schooling (by grades)	
0-10	47
11-12	38
Beyond high school	15
	100
Income (Household)	
Less than \$6,000	34
\$6,000 to \$9,999	25
\$10,000 and above	41
	100
Ethnicity	
Hawaiian	39
Filipino	33
Other	28
	100
Birthplace	
Hawaii	64
Philippines	26
Elsewhere	10
	100
Sex	
Male	54
Female	46
	100

grounds 28 percent. Sixty-three percent were born in the State of Hawaii, 27 percent in the Philippines, and 10 percent elsewhere. Fifty-four percent were males and 46 percent females. Table 1 shows the percentages of the respondents with these various characteristics.

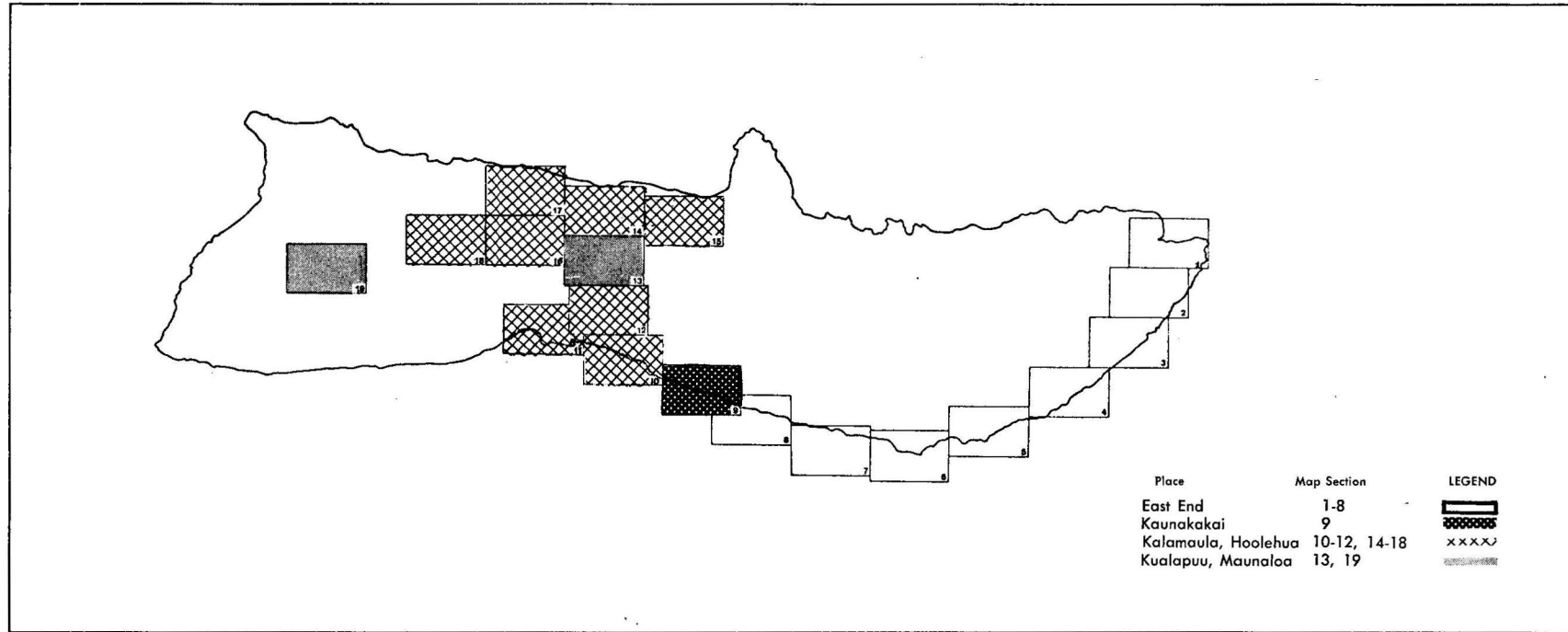
Data on full-time employment show two out of five adults employed in agriculture with 36 percent employed by Dole and DeI Monte. Fifty-three percent of all adults were employed full-time compared with 18 percent of the respondents employed part-time. Of those employed part-time, three out of ten were employed by retailers.

The median numbers of visits per year to doctors and dentists by adults were 2.9 and 0.9, respectively. Eighteen percent reported no visits to doctors, and 57 percent did not visit a dentist in 1972.

Fifty-two percent of the adult respondents said Molokai is a better place to live than two years ago. Only 21 percent reported giving consideration within the previous six months to moving from the Island. Irrespective of evident affection for the area, respondents were in agreement on the needs of the community. More jobs were of first importance, followed by training that would help workers adapt to anticipated employment opportunities. Health care, maintenance of agriculture, and housing followed in order of priority. Seventy-one percent favored resort development, for this represents new employment opportunities at a time when known and accepted types of employment may be disappearing. More than half (55 percent) indicated a willingness to participate in training programs designed to equip members of the labor force for employment in the resort industry.

Profiles are analytical descriptions of characteristics. With respect to the people of Molokai, central interest is directed to the ethnicity of the respondents, their birthplace, location of residence, and the distributions of men and women. When each characteristic is

FIGURE 3. RESIDENCE SAMPLING BLOCKS ON MOLOKAI.

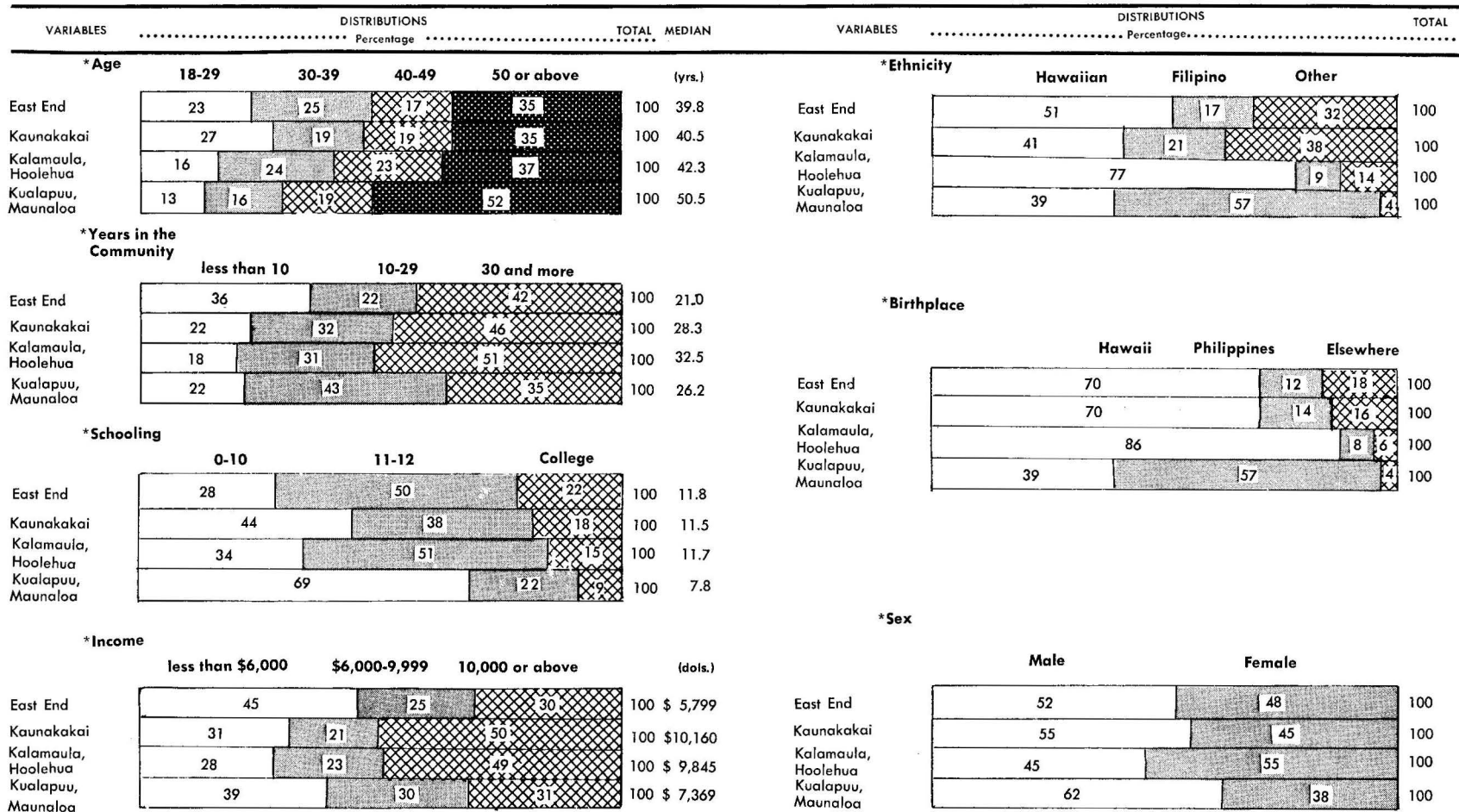


examined in relation to the other along with age, years in the community, schooling, and income, profiles become distinctive and varied, and serve to explain sources of influences that affect attitudes. The effects of ethnicity, birthplace, location of residence, and sex may be unique and can serve to help analyze varied community patterns. Patterns were reflected in community life, interests in the community, and attitudes held toward community needs. These patterns are further clarified by further examining demographic characteristics such as age, years in the community, schooling, and income.

Residence Location Profile

Examination of distributions by location of residence in relation to ethnicity, birthplace, sex, age, years in the community, schooling, and income showed differences in each case with the exception of sex. The sample was distributed throughout the Island of Molokai. Fourteen percent lived on the East End, 30 percent in Kaunakakai, 24 percent in Kalamaula and Hoolehua combined, and 32 percent lived in the two plantation towns of Maunaloa and Kualapuu. The specific locations are shown on the accompanying map. None of these areas was restricted to

FIGURE 4. RESIDENCE LOCATION AND VARIOUS CHARACTERISTICS.



*Differences in distributions are statistically significant at the .05 level.

a specific ethnic group. However, ethnic influences tended to be a major factor as shown by the information summarized in Figure 4:

1. People of Hawaiian ancestry comprise the majority of respondents in the East End, Kalamaula and Hoolehua, and people of Filipino ancestry make up the majority of respondents in Maunaloa and Kualapuu.
2. Hawaii was the birthplace of 70 percent of the respondents in the East End, 70 percent of those in Kaunakakai, and 86 percent of those in Kalamaula and Hoolehua. Of those living in Maunaloa and Kualapuu, 39 percent were born in Hawaii and 57 percent were born in the Philippines, with 4 percent born "Elsewhere." Of the total adult respondents, 63 percent were born in Hawaii, 27 percent in the Philippines, and the remaining 10 percent were born elsewhere, generally on the Mainland.
3. Of the total sample, 19, 20, 20, and 41 percent were of the ages 18-29, 30-39, 40-49, and 50 years and more, respectively. Slight departures from these distributions occurred in the different areas of residence, with the exception of Maunaloa and Kualapuu where 52 percent were 50 years of age or more.
4. The highest proportions of respondents with less than ten years on Molokai are found in the East End. The highest proportions from 10-29 years are found in Maunaloa and Kualapuu. The highest proportion with 30 or more years in the community are found in Kalamaula and Hoolehua.

5. Distributions by income varied by area, with the highest proportions with an annual income of less than \$6,000 found in the East End, and the highest proportion with \$10,000 and more found in Kaunakakai.

Figure 4 shows the greatest difference in age distribution occurring among respondents living in Maunaloa and Kualapuu. This is to be expected because of the older Filipinos in the area who came in the early years of the pineapple industry to serve as field workers. Years in the community, as shown in Figure 4, varies in the respective areas. Each area reflects unique influences in terms of trading centers, economic opportunities, and cultural influences. Thus, in each area sizeable proportions of long time residents were found. At one extreme, sizeable proportions of residents in the East End with a tenure of less than 10 years were found. The other extreme was the sizeable proportions of residents of Kalamaula and Hoolehua who had lived in these communities 30 years and more. The former group has found the East End a desirable place to live and work, and have come into this area in the past decade. Long-term residents in Maunaloa and Kualapuu represent the remainder of the Filipinos that came into these communities in the early days of the pineapple industry on Molokai. Residents living on Hawaiian Home Lands also had lengthy tenure.

Groups with the least schooling appear to receive the lowest family incomes per year. However, when distributions for the four areas are examined in relation to schooling and income, additional influences other than knowledge and skill appear to be important.

These influences include living conditions, aggressiveness, and opportunity. Attention is directed to the proportions of respondents in the East End with varying levels of educational attainment and the proportion with an income of less than \$6,000 per year. In contrast to the East End where 72 percent have more than 10 years of schooling, 50 percent of the respondents living in Kaunakakai have incomes of \$10,000 and more per year and 56 percent have more than 10 years of schooling.

Birthplace Profile

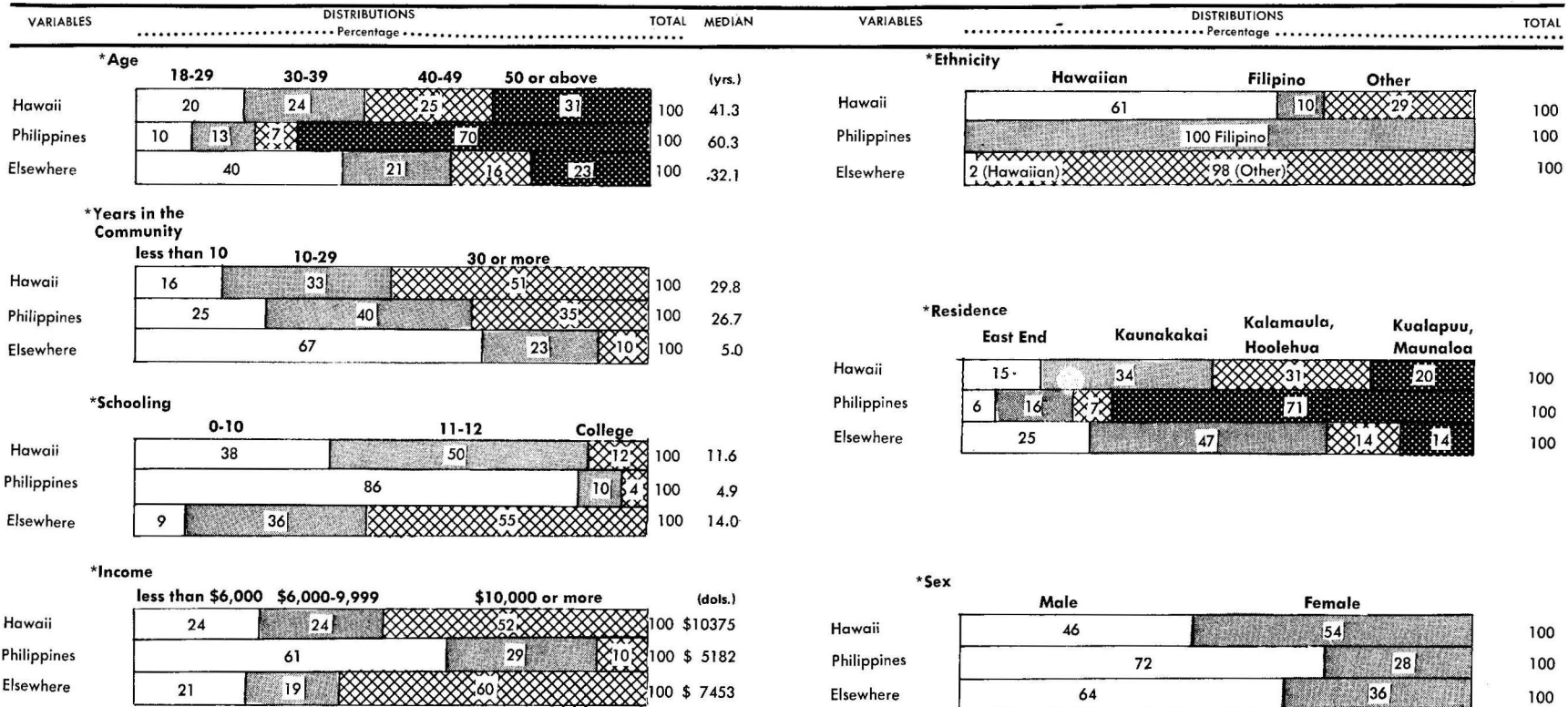
Distributions by birthplace when examined in relation to ethnicity, location of residence, sex, age, years in the community, schooling, and income were statistically significant. Each of these differences was largely influenced by the proportion of the population born in the Philippines, with the exception of years in the community, as shown in Figure 5. The majority of respondents born elsewhere than Molokai or the Philippines had come to Molokai within the past ten years. Some of the more important facts reflected in Figure 5 are as follows:

1. Sixty-four percent of the respondents (adult) were born in Hawaii.
2. People who were born in the Philippines generally are an older group on Molokai than either those born in Hawaii or "Elsewhere". Seventy percent of the Philippine-born respondents are 50 years of age or more compared with 31 and 23 percent of those born in Hawaii and those born "Elsewhere," respectively.

3. Hawaiians as an ethnic group comprise almost two-thirds of the respondents born in Hawaii.
4. People born in Hawaii and "Elsewhere" generally live throughout the Island. The majority of people born in the Philippines live in areas in or near Maunaloa and Kualapuu.
5. The larger number of males than females is statistically significant among people born in the Philippines and "Elsewhere," as contrasted to the more equal distribution of males and females among people born in Hawaii.
6. Respondents with the least schooling are those born in the Philippines, and those born "Elsewhere" have the highest levels of formal education.
7. Respondents with the lowest incomes from all sources are those born in the Philippines, and those with the highest incomes are those born "Elsewhere."

Birthplace is obviously a factor influencing ethnicity of the people of Molokai because of their origin, although 63, 27 and 10 percent of the total were born in the State of Hawaii, Philippines, and "Elsewhere," respectively. As anticipated, 100 percent of those born in the Philippines were Filipinos and 98 percent of those born elsewhere than Hawaii or the Philippines were categorized in the miscellaneous ethnic group of "Other." Both groups migrated to Molokai, settled in areas near places of employment, in the proximity of economic interests, or areas of personal appeal.

FIGURE 5. BIRTHPLACE AND VARIOUS CHARACTERISTICS.



*Differences in distributions are statistically significant at the .05 level.

Men from the Philippines, as indicated by the distributions by age, generally are 50 years of age or more and typically migrated to Molokai for employment as laborers on pineapple plantations. Males born "Elsewhere" generally are less than 50 years of age. In fact, 40 percent are less than 29 years of age. Since 91 percent of those born "Elsewhere," as compared with 14 percent of those born in the

Philippines, had more than ten years of schooling, not only is it apparent that the males of these two groups migrated to Molokai for different purposes, but they have vastly different economic capabilities. In contrast, there was no significant difference between the proportions of males and females among people born in Hawaii, and this group shows a considerable degree of balance among the various age

groups. Five out of eight of this group had completed at least ten years of schooling.

As indicated in Figure 5, those born "Elsewhere" are relative newcomers with 67 percent reporting they had lived on Molokai less than 10 years. This latter group comprises only 10 percent of the total sample.

Effects of schooling and income when viewed in relation to birthplace are shown in Figure 5. Those born in the Philippines tended to have lower incomes and levels of schooling in comparison with those born in Hawaii and elsewhere outside the State.

Ethnic Profile

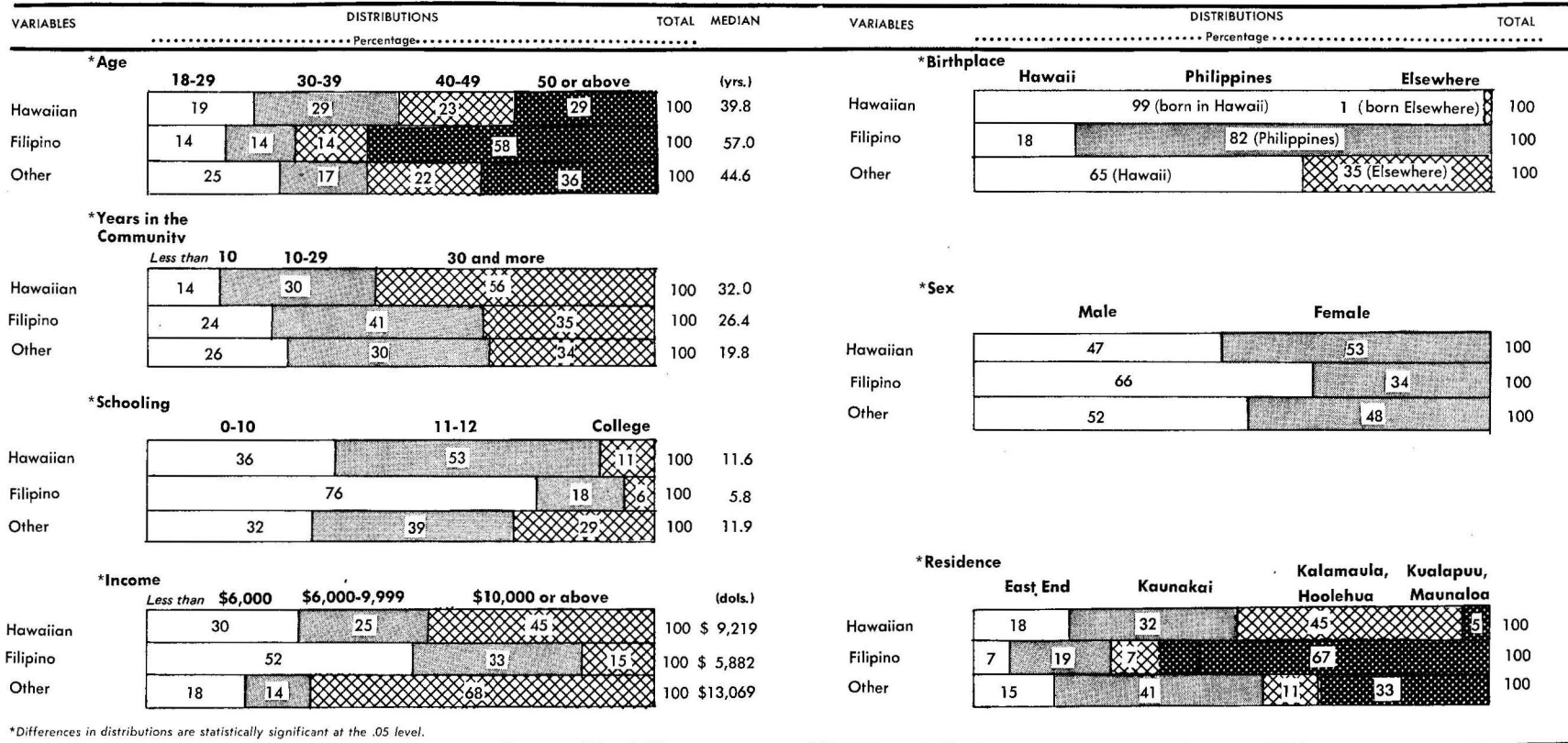
Thirty-nine percent of the Island population indicated that they were of Hawaiian or Part-Hawaiian background. Filipinos constituted 33 percent of the community, and the remaining 28 percent were categorized as "Other." More than half of the adult Filipinos, 58 percent, were 50 years of age or more. In contrast, nearly the same portion, 58 percent, of the adult Hawaiian population said they were under 39 years of age. The Hawaiian group also indicated a median of 32 years in the community. Filipinos, many arriving in response to labor demands in the pineapple industry, indicated a median of 26 years in the community. Other facts reflected in Figure 6 are the following:

1. Upper age levels occurred among each ethnic group, but were found predominantly among Filipinos.
2. The number of years residing in the community generally was substantial for the adults inter-

viewed, with less than a quarter (23 percent) reporting residency on Molokai of less than 10 years. However, 86 percent of the adult Hawaiians had lived on Molokai for more than 10 years, and 56 percent had been on the Island for 30 years or more. This compares with 35 percent of the Filipinos and 34 percent of the "Others" who had been there for 30 or more years.

3. Schooling among the majority of the adult Filipinos is at a relatively low level with 76 percent having completed less than the 11th grade in contrast to 36 and 32 percent of Hawaiians and "Others," respectively, with equivalent levels of schooling.
4. Differences among the income levels of the three ethnic groups suggest that education pays. More than half of the Filipinos (52 percent) had incomes of \$6,000 or less, compared to 30 percent of the Hawaiians and 32 percent of the others. Of the latter group, 68 percent had incomes of \$10,000 and more. These are the people with the most education and, consequently, the higher paying jobs.
5. As expected, most of the Hawaiians were born in Hawaii as were the majority of "Others." Also, 82 percent of the Filipinos were born in the Philippines.
6. Location of residences tends to vary for each of the ethnic groups, but each of the areas of the Island

FIGURE 6. ETHNICITY AND VARIOUS CHARACTERISTICS.



*Differences in distributions are statistically significant at the .05 level.

has members of each group.

- Distributions of males and females vary among each of the three ethnic groups, but the differences in proportions of males and females are statistically significant only among the Filipinos, with two out of every three who are males.

Molokai has in the past been a source of attraction for the Filipinos because of economic opportunities provided primarily by pineapple producers. Hawaiians, on the other hand, are residents of Molokai either because of their interest in acquiring Hawaiian Home Lands or maintenance of a life style they prefer, or both. Area of residence was found to be related to ethnicity as previously indicated.

Residence location is a phenomenon of human behavior, for people of similar interests, background, and resources desire to locate where they may live in the manner to which they have become accustomed or which enables them to meet the demands of their occupations. Those ethnic groups categorized as "Others" doubtless live in Kaunakakai because of convenience or economic opportunity.

Age distributions may be attributed to patterns of life adopted by the respective ethnic groups. The more normal distributions of age may be attributed to the continuity of family patterns and, in many instances, to the extended families. Years of residence in the community for Hawaiians was the greatest of any of the ethnic groups. Many had been born on the Island, and furthermore, many had an economic base for residency through holdings of Hawaiian Home Lands. Differences were slight between Filipinos and "Others" with respect to length of residency in the community. Filipinos came and primarily have remained as laborers in pineapple production. "Others" came to the Island for economic purposes other than labor in pineapple production, such as government workers or retailers, and some may have arrived without employment.

Schooling as related to ethnicity forms a definite pattern. Filipinos evidently had limited educational opportunities in the Philippines prior to immigration to Hawaii. Respondents categorized as "Others" in contrast to the Filipinos had the most education. Since 35 percent of the latter ethnic group had reported birthplace as other than Hawaii and the Philippines, it is appropriate to assume that many of this group may have been well educated and came to

Molokai where their skills were in demand.

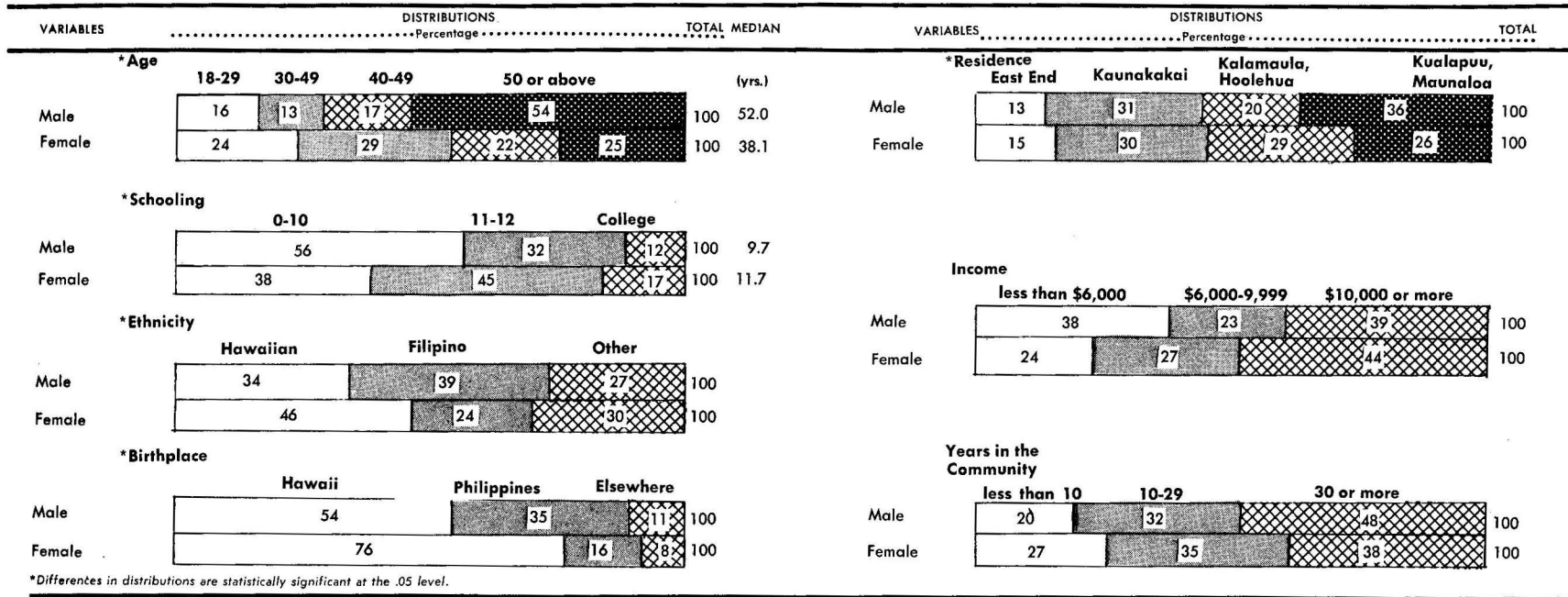
Income as related to ethnicity reflects educational background and access to different economic opportunities. Thus, Filipinos immigrating as laborers generally have had limited incomes because of pay and lack of mobility for occupational roles they have assumed. On the other hand, respondents categorized as "Others" with higher levels of education and other skills than either Filipinos or Hawaiians undoubtedly had greater access to employment or opportunities for economic gain.

Profile by Sex

Distributions of respondents by sex have been treated in sections concerned with ethnicity, birthplace, and location of residences on Molokai. Only those by ethnicity and birthplace differed significantly. When age, years in the community, schooling, and income are examined in relation to sex, differences in distributions of males and females are statistically significant with respect to age and years of schooling. Sex distributions by years in the community and income indicate similar distributions of men and women. However, as shown in Figure 7, distributions by sex of the respondents present a profile that differs from the profiles of the sample when examined by ethnicity, birthplace, and location of residences:

1. The proportion of females of Hawaiian ancestry exceeded males, Filipino males exceeded females, but males and females of the combined category of "Other" ethnic groups were approximately the same.
2. Patterns of distributions by birthplace paralleled those

FIGURE 7. SEX AND VARIOUS CHARACTERISTICS.



by ethnicity. A higher proportion of females than males was born in Hawaii, but a higher proportion of males than females was born in the Philippines, with small differences in the respective proportions born "Elsewhere."

3. The proportion of males 50 years of age and above exceeded that of females.
4. Higher proportions of females than males had more than 10 years of schooling.

Schooling for the majority of males and females has been less than high school graduation, but females generally have had more schooling. This may be attributed to the fact that 76 percent of the women were born in Hawaii and exposed to the educational advantages provided. In contrast, 56 percent of the males had ten years of schooling or less, a statistic due in large part to the Filipino immigrants. Another factor contributing to higher proportions of females with higher educational attainments may be the types of employment and educational requirements for the various occupations.

COMMUNITY ATTITUDES

Although interests and needs may vary according to the experiences of individuals or groups, shared experiences can result in common goals or concerns. Influences experienced by all or most of the residents of Molokai include the relative isolation of the Island, dependence upon outside resources for most consumption items, the predominance in the local economy of agriculture in the form of pineapple plantations, and a community preference for a rural environment.

As would be expected, the announced plans to discontinue pineapple production on Molokai has heavily influenced the perceived needs and interests of the residents. This should be kept in mind as the following data are examined. The survey from which the data were derived took place in January, 1973, several months following the announcement of the anticipated shutdown of Dole operations, and shortly before a similar announcement by Del Monte.

Desirability of Molokai

Irrespective of emerging economic problems on the Island, three times as many adult residents believed general conditions in the community had improved over the past several years as compared to the small minority (17 percent) who felt conditions had become worse (see Figure 8).

The general desirability of the community compared to other

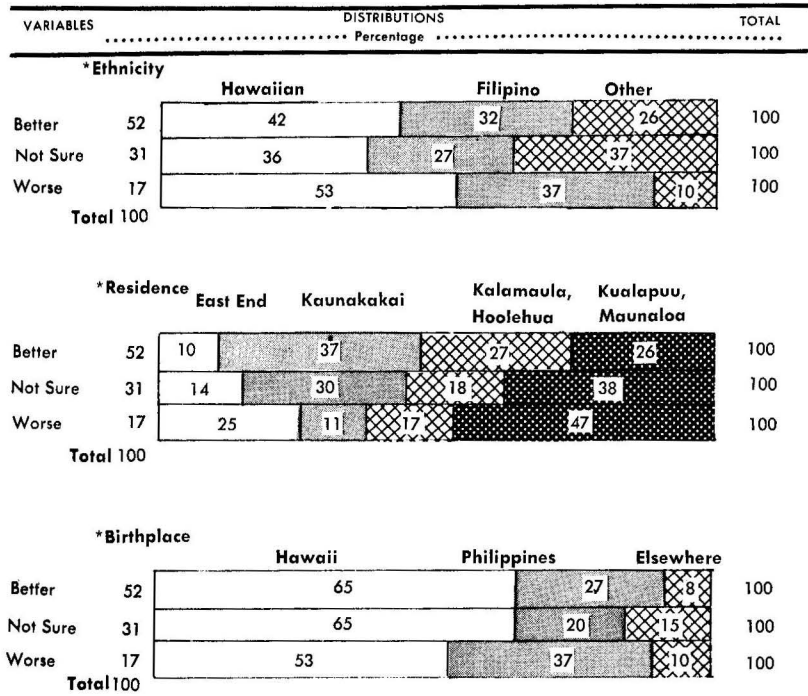


Kaunakakai Dock is Molokai's major port.

places is presumably reflected by the number of residents who had discussed the possibility of moving from Molokai. In the year previous to the survey, only 21 percent of the families had discussed moving (see Figure 9). Apparently the remaining 79 percent did not see better opportunities elsewhere, given their resources and preferred life styles.

As shown in Figure 9, there was a greater tendency for younger

FIGURE 8. APPRAISAL OF MOLOKAI AS A PLACE TO LIVE AND WORK.



*Differences in distributions are statistically significant at the .05 level.

adults to consider moving from the Island. This would be true in most communities. However, age was not a factor in determining whether the community had recently improved. There was also a greater tendency for the better educated to consider moving, although they tended to agree with the other residents that community conditions had been improving.

As shown in Figure 8, a greater proportion of those of Hawaiian

ancestry tended to feel that general community conditions had become worse. The large proportion of the miscellaneous ethnic group, (Haoles, Japanese, Korean, Portuguese, etc.) classified as "Other," who were not sure if the community had improved or worsened can be explained in part by the short length of time many of this group, particularly Haoles, had spent on Molokai. Members of this group also appeared most likely to leave the Island, as shown in Figure 9. Members of this group would be more likely to find employment elsewhere due to educational and other advantages compared to Hawaiians and Filipinos who showed less tendency to even discuss moving. In other words, in some cases the groups most likely to believe that community conditions had worsened were those least likely to consider moving.

This seeming contradiction was not evident when the responses are separated by area of residence on Molokai. Among the minority who felt conditions had been getting worse, people in the two plantation towns of Kualapuu and Maunaloa together with those living in the East End area most frequently felt that way. As might be anticipated, residents most frequently considering moving from the Island were living in Kualapuu and Maunaloa. This was not true for Molokai residents born in the Philippines, even though most of the residents of the two towns are of Filipino origins and it was true of Filipinos as an ethnic group. In other words, as is typically the case, the younger, more advantaged members of the two towns have a clear tendency to consider moving elsewhere.

In summary, the people who felt the community had become a worse place were not typically the ones who were considering moving from

Top: Improved medical facilities have caused many to say, "Molokai is getting better."

Center: Improved shopping facilities were not given high priority for future development.

Bottom: Mayor Cravalho christens the valve, marking completion of Kualapuu Reservoir, 1969.

Below: New jobs in diversified agriculture are being supplied by David Curtis' onion farm.

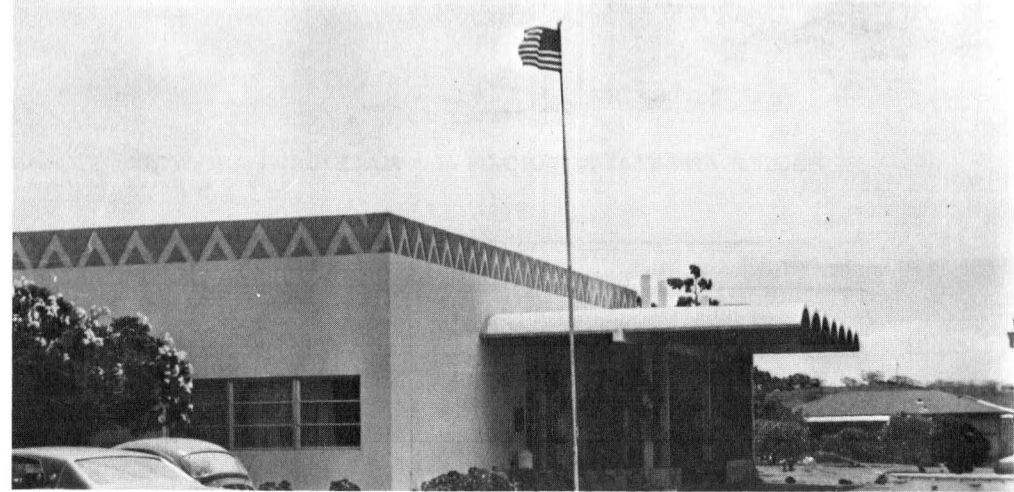
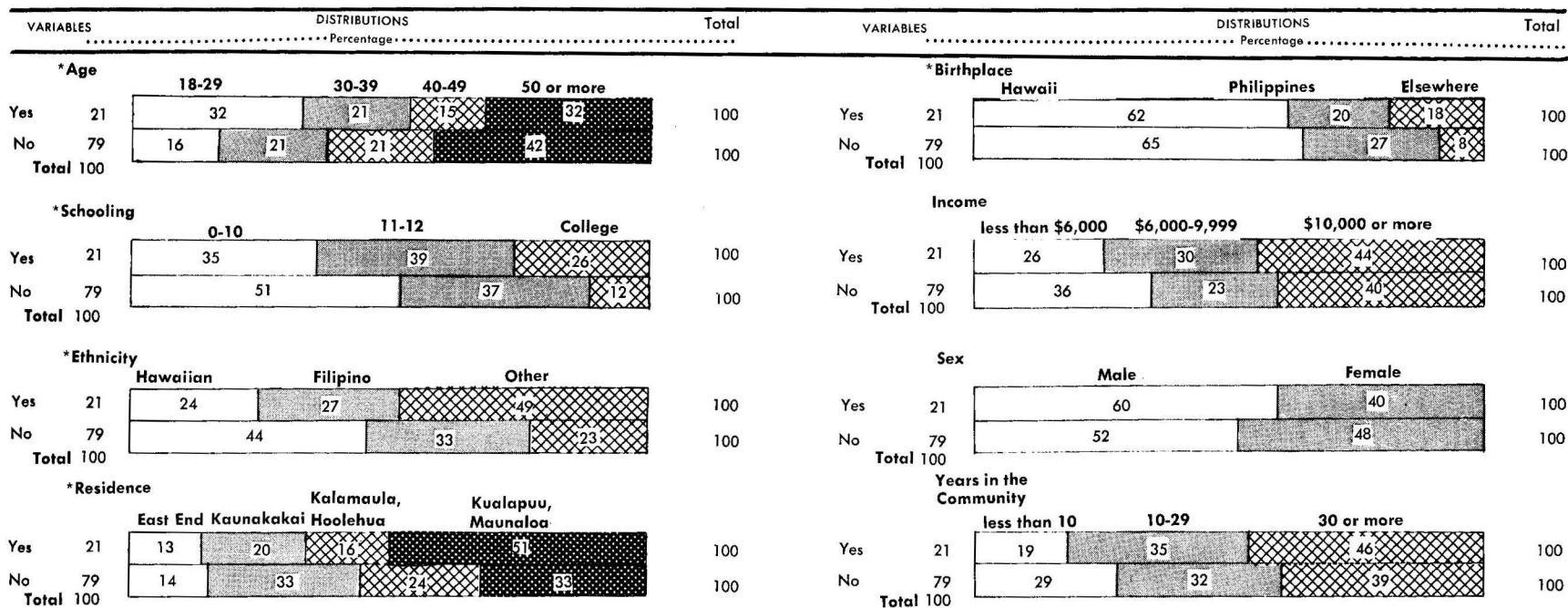


FIGURE 9. DISCUSSIONS OF MOVING FROM MOLOKAI.



*Differences in distributions are statistically significant at the .05 level.

Molokai. Factors such as income levels, length of time spent in the community, and sex of the respondent (see Figure 9) were not important factors associated with these attitudes. Basically, those most likely to consider moving were people with higher vocational and social skill levels. These types are the most mobile throughout any society. People at the bottom of the social scale typically do not perceive their situation or that of their community to be improving. On Molokai, such an opinion was a distinct minority, but it was more

likely held by people toward the lower end of the social scale. Perhaps most important of all, at the time of the survey only a small minority of the residents of Molokai believed the community had become a worse place to live. A similarly small minority were thinking about moving elsewhere.

Community Needs

The first step in identifying community needs was to simply ask a number of apparent leaders on Molokai what they felt were the most

TABLE 2. COMMUNITY PRIORITY STATEMENTS.

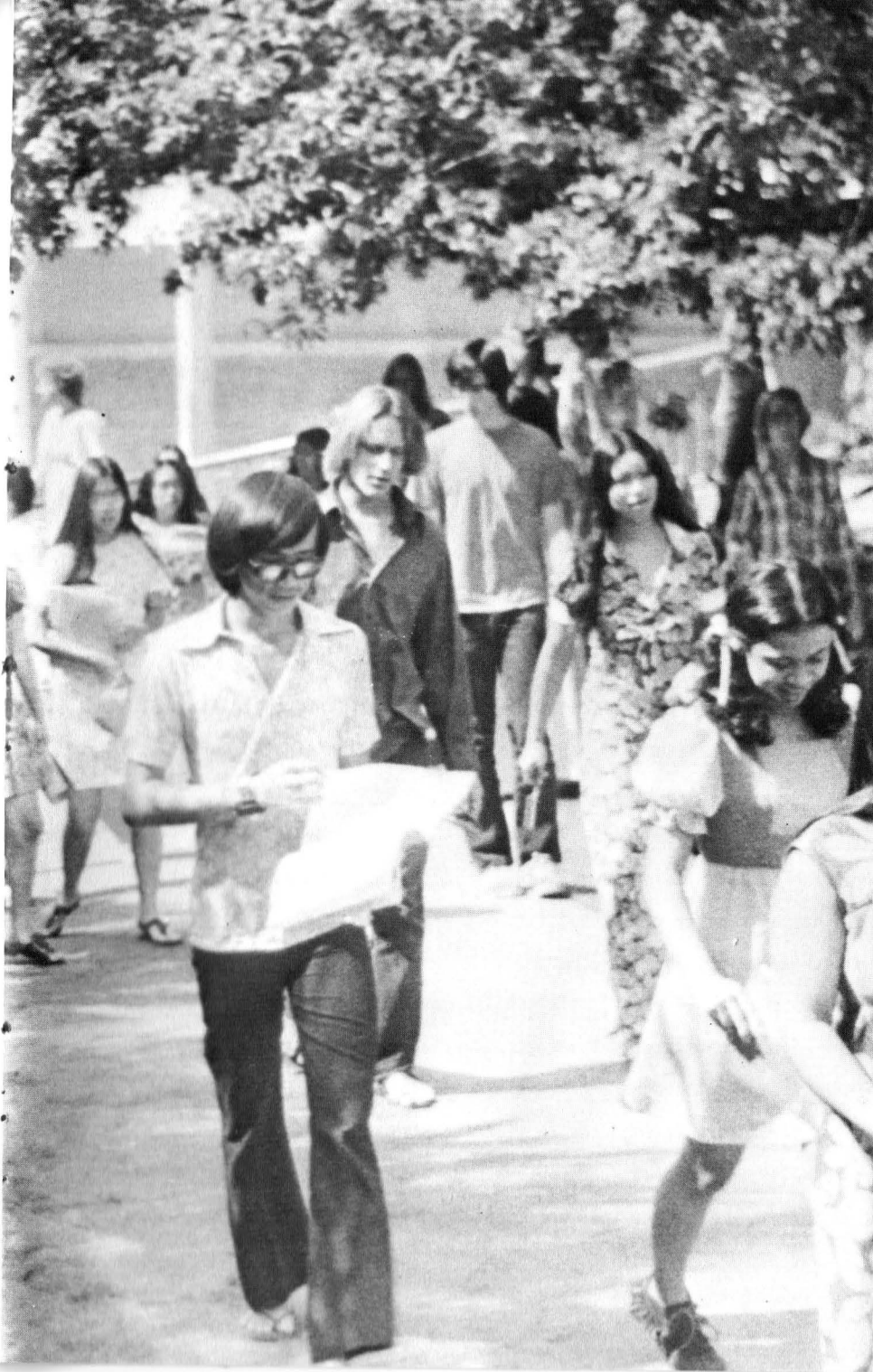
Ranking	Statements
1	Provide more job opportunities.
2	Provide job training (carpenters, mechanics, etc.).
3	Maintain agriculture as a major industry.
4	Provide better medical care.
5	Provide more housing at a reasonable price.
6	Provide housing for the elderly.
7	Improve the public schools.
8	Keep the young people on Molokai.
9	Develop better shopping facilities.
10	Keep Molokai like it is (no more resorts or manufacturing).

important things needed in the community. The extensive, detailed list put together in this way was then narrowed down to ten brief statements shown in Table 2. The community at large was then asked to rank the statements in terms of greatest need. The resultant rankings are also given in the table. Although everyone did not agree as to the precise order of the rankings shown, it was not possible to trace differences in opinions to the usual characteristics of sex, age, ethnicity, birthplace, area or length of residence, education levels, or income. This finding is most important. In other words, there

were no apparent splits within the adult community concerning the order of priority given the ten statements. (As discussed later, high school students did give different emphasis to several of the items.)

Given that the closing of pineapple operations on Molokai is widely believed to be an economic crisis for the Island, it is not surprising to find top priority given to jobs and job training. This is not to say that the needs toward the bottom of the listing are considered unimportant. However, the overall ranking seems realistic in terms of the severe economic problems facing the community. The high ranking given to agriculture is consistent with the overall satisfaction expressed with the rural community and is in line with the appeal to many people for diversified agriculture to take up the slack caused by the closing of the pineapple plantations.

Medical care ranked highest of all concerns for public facilities. Many tales were related to interviewers of medical tragedies on the Island attributed to a lack of skilled personnel and sophisticated facilities. Perhaps most surprising was the relatively low rank given to commercial shopping facilities. This need had been expressed repeatedly in preliminary interviews, but the community in general apparently is not greatly concerned with this need. Also of great importance is the lowest ranking given to preserving Molokai as it is without bringing in further resorts or manufacturing. The apparent rejection of this need in comparison with job creation is a clear-cut decision by the community that economic conditions must be improved, even if it means a change in the life styles and overall environment of the Island.



YOUTH AND THEIR FUTURE

As part of the overall Island-wide study a survey of the Junior and Senior high school students of Molokai High School was conducted. As shown in greater detail in Appendix II, a total of 142 students responded to the questions asked by the University study team. The students responding to the questionnaire were mostly 16 and 17 years old, with only 14 percent of them indicating that they were age 18. The males tended to be somewhat older than did the females in the grade levels surveyed.

Most of the students (71 percent) were born on Molokai. Only 13 percent were born outside the State. As indicated in Appendix II, a much larger portion of the respondents were Juniors. This imbalance corresponded to the size ratio of the actual enrollment. Students not taking part in the survey were those who were absent at that particular time or chose not to answer some of the questions involved. For example, 9 of the students declined to specify their ethnic origins. Of the 133 who did respond to this question, nearly half, 45 percent, were part-Hawaiian or Hawaiian. Surprisingly there were some differences according to sex for the different ethnic groups. There tended to be larger percentages of males in the Hawaiian and Filipino groups as compared to the Haole, Japanese, and miscellaneous categories.

Career Orientation

The students were asked to indicate the occupation they anticipated as they looked ten years ahead. They were also asked what occupation they would choose if money, training, or opinions of others were not problems, and they could do anything in the world. These responses were ranked in accordance with nationally developed occupational prestige scales. A similar study of high school Seniors throughout the State was conducted in the Spring of 1970. In both instances students at Molokai High School expected and aspired to careers of only slightly lower prestige levels than was the case throughout Maui County and the entire State. The median expectation of the students of Molokai High School, as well as their median aspiration, was for an occupation with a prestige level equivalent to that of a nurse, ranch or plantation manager, jeweler, or airline stewardess. Expected careers grouped by industrial classifications are shown in detail in the appendix. Thirty-six of the 142 students



Molokai High School is the main source of career information for youth.



A limited program of post-high-school education is available on Molokai.

did not respond to this question. Presumably this was because they were unable to specify expected careers at that point in their lives.

Only 5 of the students, all males, indicated anticipated careers in agriculture. Five times as many of the students anticipated careers in the tourism area. A major part of the students were expecting careers such as bookkeepers, beauticians, and others which could not be readily classified into the five industrial classifications shown in the appendix.

When questioned about their aspired careers, the industrial groupings remained largely the same. Once again those aspiring to careers in agriculture were extremely small in number. Fewer students aspired to careers in the construction industry as compared to those who actually anticipated such careers, whereas more students aspired to careers in government than anticipated such careers. Those with

professional or tourism orientations largely remained the same in terms of both expectations and aspirations. As anticipated both for expected and aspired careers, sex was a highly significant factor. Students were also asked whether they preferred to be self-employed or to work for someone else. A major portion of the respondents, 40 percent, were not able to state definite preferences in this respect. Somewhat surprisingly, nearly twice as many, 38 percent, preferred to work for someone else as did the 22 percent who preferred self-employment.

Students were asked to indicate the nature of their plans following the last year of high school. It should be kept in mind in analyzing responses to this particular question that such predictions are notoriously inaccurate. Nevertheless, nearly half, 47 percent, responded that they anticipated enrolling in either technical or further academic training following high school graduation. Distributions of these responses are also shown in Appendix II. About half of the students anticipated involvement in the military service during the first year following high school. A surprisingly small number anticipated some vague objective such as obtaining some sort of a job after high school. Again sex was significantly related to these preferences with much larger proportions of the males indicating plans for military service, and larger proportions of the females indicating plans for further technical or academic training. Since the survey was conducted approximately a month following the announcement that Del Monte would phase out its pineapple operations on Molokai and several months following Dole's similar announcement, the students

were asked whether their plans following high school had changed due to these announcements. Less than one-fourth, 23 percent, of the students indicated that they had been forced to change their plans. Perhaps significantly, nearly two-thirds of those who had changed their plans were males.

Students were also asked a series of questions concerning sources of both moral and financial support concerning their occupational training goals. Fifty-six percent of the students felt that they had fully discussed goals with their parents or guardians. Another one-third of the students were somewhat vague as to whether they had discussed these items and 11 percent reported they had not discussed their goals at all. It was shown to be statistically significant that the females tended to discuss these goals to a greater extent with their parents than did the males. When asked if parental approval of their goals had been secured, a full 71 percent of the students said they felt their parents or guardians did approve of the goals they had at that point. Only a miniscule 2 percent indicated that their parents opposed their goals, and only 4 percent indicated parental disinterest. Once again, a statistical relationship was shown to exist between sex and the responses to this question. Essentially, there was a greater tendency for the females to have the approval of their parents or guardians for the goals they had developed at that point in time.

Students were asked to indicate whether they were likely to receive financial aid from various sources as they pursued their training or occupational desires subsequent to high school. A full

60 percent of the students indicated that they expected to receive some degree of financial assistance from their parents or relatives if they were to go to school subsequent to completion of high school. Again there was a greater tendency for the females to indicate such support from their families than there was for males. Thirty-nine percent of the students indicated that they felt they were likely to receive some sort of scholarship assistance. Only slightly more felt they were likely to receive assistance through some type of a loan program. In both of these cases there was again a greater tendency for females to anticipate such assistance than there was for males.

In formulating career objectives, it was believed that the nature and source of information concerning such possibilities was of major importance. A large majority, 78 percent, of the students indicated that they had received such information through the school guidance program. This source of information greatly outweighed all other sources. Less than one-fourth of the students indicated they had received such information from family or relatives, other acquaintances, the media, or all other sources combined. Closer ties to the family and relatives of the females compared to the males was once again shown in this respect, as there was a greater tendency for the females to receive such information from those sources than was the case for males.

Orientation to the Community of Molokai

As were the adults in the community-wide survey, the students were asked a number of questions concerning their perceptions of the community of Molokai. A majority of the students, 53 percent, felt

that Molokai had improved as a place to live and work over the past several years. Only 21 percent of the students felt that the community had become a worse place. These figures are shown in greater detail in Appendix II.

The students were asked where they would prefer to live as adults. Only one-third, 34 percent, indicated a preference to reside on Molokai. The remainder of the students were somewhat evenly distributed in their preferences for Maui, Oahu, or the Mainland U.S. Sex was associated with differences in the preferences of residence. For example, three-fourths of the students preferring to live on Molokai were males, whereas three-fourths of the students preferring to live on Maui were females. Overall, there was a greater tendency for females to prefer to leave the Island of Molokai than was the case for the males.

It was believed by those conducting the study that a major factor in determining a preference for a place to live was the availability of jobs. Consequently, the students were asked where they would prefer to live if they would have no problems in getting a desirable job. Surprisingly, the distribution of responses did not change significantly. These are shown in the appendix.

Since the development of a resort industry on Molokai was somewhat of a controversial issue among various elements in the community the students were asked to state their preferences with regard to the development of such an industry. In contrast with the adults surveyed in the Island-wide study, only a minority, 22 percent, of the students were in favor of the development. A full third of the students were

not sure of their opinion, and a similar percentage was opposed to such developments. Those who were not sure of their opinions were perhaps unaware of the actual details for such developments, for only 30 percent of the students indicated that they had actually seen plans for the Kaluakoi Resort development. In contrast to their lack of enthusiasm for the development of the resort industry, a majority, 52 percent, were interested in receiving training for employment in the resort industry.

High school students were also asked to state their preferences for priorities of various problems and situations in the community. Adults in the community-wide survey were also asked the same question. The rankings of the student group are shown in Table 3. The students and the adults were both in agreement as to the top ranking given to increasing job opportunities and job training possibilities on the Island. They were also in agreement to giving a high priority to the maintenance of agriculture as an important industry for Molokai. Statistically significant differences, however, did occur with some of the other items. For example, the students placed at the bottom of their list the importance of keeping the young people on Molokai. Also, in contrast to the adults, the students gave a somewhat higher

TABLE 3. YOUTH PRIORITY STATEMENTS.

HS Survey Rank	Statement	Community-wide Survey Rank
1	Provide more job opportunities.	1
2	Provide job training.	2
3	Maintain agriculture as a major industry.	3
4	Provide more housing at a reasonable price.	5
5	Provide better medical care.	4
6	Keep Molokai like it is.	10
7	Provide housing for the elderly.	6
8	Improve the public schools.	7
9	Develop better shopping facilities.	9
10	Keep the young people on Molokai.	8

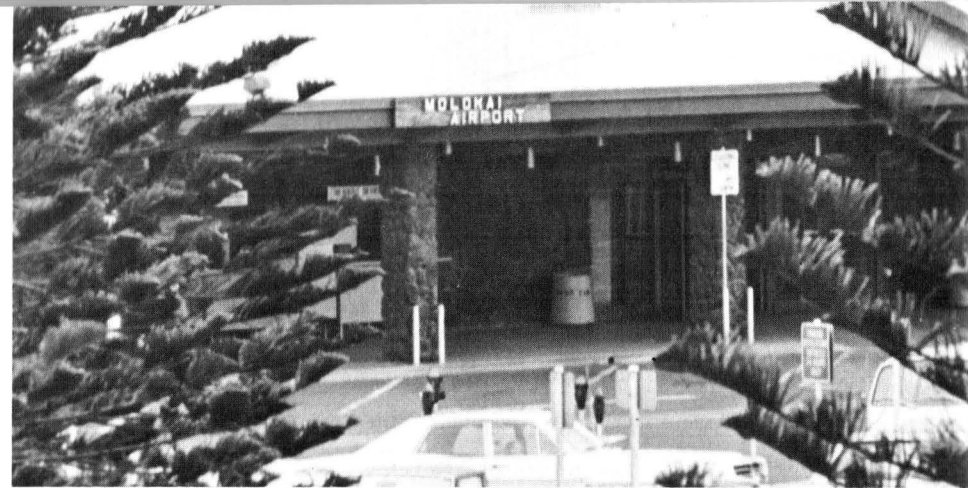
priority to a need to keep the Island of Molokai like it is. This is, of course, in agreement with their higher degree of opposition to further resort development on the Island. It is important to emphasize, however, that both adults and students gave prime importance to employment and income considerations for the future of the Island economy.

COMMERCE AND SERVICES

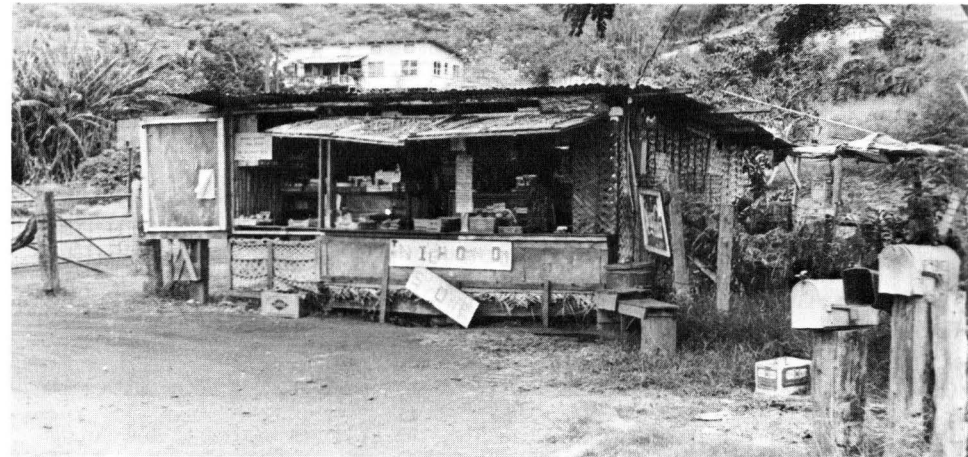
The dominance of the two pineapple plantations on Molokai is indicated by the fact that approximately one-third of all jobs on the Island are in some way associated with pineapple production. There are relatively few other jobs associated with the production of some commodity, such as cattle or seed corn, nor are there a significant number of jobs providing services in tourism for non-residents of Molokai. In other words, the economy can be divided into three major segments: (1) pineapple production, (2) government services, and (3) provision of retail, professional and other services to all residents. If the Island population declines significantly as a result of job losses in pineapple production, the latter two sectors of the economy will also be forced to curtail job opportunities. An understanding of this interdependence is vital to adequately plan for Molokai's future.

Businesses

Non-agricultural business activities on Molokai are centered in Kaunakakai. Activities elsewhere are necessarily tied to a specific site such as the sand-mining operation or are near specific clientele groups as is the case with credit unions, theaters, and small general stores. Most shopping facilities are housed in somewhat deteriorated structures and are managed as family enterprises. As previously discussed, the expressed need for improved facilities, such as a

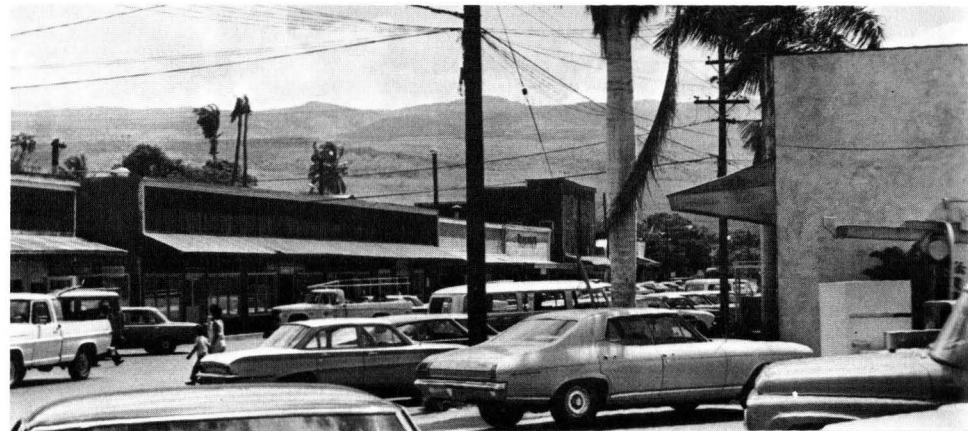


Top: Increasing tourist traffic will require improvements at the Molokai Airport.



Center: There is a relatively large number of small retail outlets on Molokai.

Bottom: Kaunakakai is the trade center for Molokai.



modern shopping center, was not ranked high among the community's priorities. This is not to say that the majority of the Island's residents would disapprove of such a modern facility, however. Feasibility studies of such a venture have shown that it could be justified purely on economic grounds, although the financial returns would not be extremely high. If present facilities do not improve and if the population were to increase, there is little question but that such a venture would be highly successful in purely economic terms. Such feasibility studies, however, do not deal with the possibility that segments of the community may wish to retain the somewhat rustic appearance of many of the present structures in Kaunakakai.

Economic analysis of a modern community of approximately 5,000 people^{1/} indicates that many of Molokai's retail operations could be more efficiently operated with fewer outlets on a larger scale. Comparisons of present enterprises with a theoretical business structure for such a community are shown in Table 4. There would appear to be far too many grocery stores, restaurants, and service stations to provide optimal levels of services. As operators of many of these facilities face retirement or encounter other business opportunities, it is reasonable to anticipate that many of these operations will phase out.

The listing for a hypothetical business community was developed on the basis of threshold levels for various businesses over the past

^{1/} R. N. Anderson, J. C. Barron and W. G. Marders, Hanalei Development Plan: A Socioeconomic Prelude, Departmental Paper 2, Hawaii Agricultural Experiment Station, September, 1972.

TABLE 4. COMMERCIAL SERVICE POSSIBILITIES.

Business Enterprise	For 5000 People	Presently on Molokai
Food Store	3	10
Tavern	2	2
Restaurant	2	7
Liquor Store	3	**
Bank	1	1
Real Estate Broker/ Insurance Agent	2	1
Service Station	3	7
Laundromat	2	3
Building Contractor	2	2
Drugstore	2	1
Auto Repair Shop	2	2
Beauty Shop	2	2
Hardware Store	1	2
Auto Dealer	1	1
Appliance Dealer	1	2
Construction Material	1	1
Lawyer	2	2
Meat Market	1	1
Furniture Store	1	1
Family Apparel	1	**
Medical Doctor	2	2
Variety Store	1	1
Dry Cleaning Shop	2	1
Bakery	1	1
Shoe Store	1	**
Undertaker	1	1
Barber Shop	1	3
Dentist	1	2
Jewelry Store	1	**
Men's Clothing Store	1	**
Women's Apparel Shop	1	1
Camera & Photo Supply Shop	1	**

** With Food Store as General Merchandise

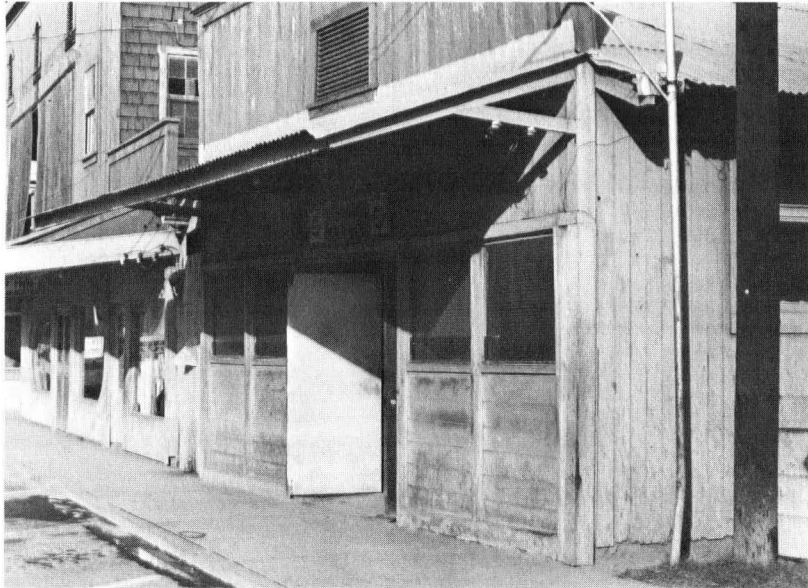
twenty years. For example, a minimum of approximately 600 people residing in the trade area is necessary for the successful operation of a food store. A second similar store would be possible with a total population of about 1,500, and a third could be established with a population of about 3,000. A fourth food store is apparently possible at a population level only slightly greater than 5,000.

Great care should be exercised in using the figures shown in Table 4, for the actual business possibilities will vary from community to community, depending upon the income and consumption patterns of residents. Some enterprises such as a meat market and a shoe store are not as viable as they have been due to changing technological and

institutional practices. Furthermore, people's capabilities may differ considerably in managing business enterprises. The availability of an adequate market does not guarantee success.

Molokai's business structure is somewhat unusual due to the nature of the laborers on the pineapple plantations. The continued functioning of three movie theaters can be attributed to the limited alternative types of recreation for the high proportion of mature unmarried men on the Island. Also, the various economic activities surrounding illegitimate cockfighting events are undoubtedly a significant portion of the Island's commercial activities.

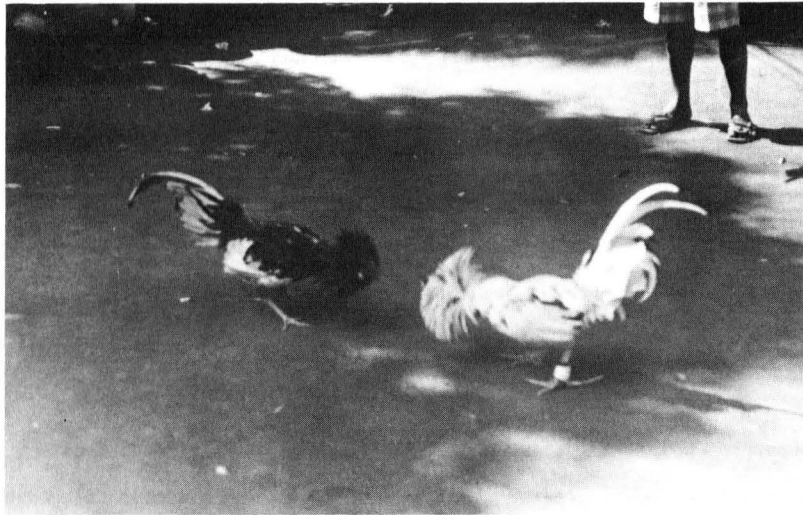
Resort developments are an important part of the Molokai economy,



Many commercial services are housed in older structures.



Most freight shipped to and from Molokai goes through the dock facility at Kaunakakai.



Economic activities associated with illegal cockfighting may be a significant portion of the Island's economy.



This grocery store serves the Maunaloa trade area.

TABLE 5. EMPLOYMENT SOURCES ON MOLOKAI, JANUARY, 1973.

Source	Full Time	Part Time
	-----percentage-----	
Dole and Del Monte	37	23
Government	17	7
Professional (Private)	4	2
Molokai Ranch	3	0
Resorts or Hotels	2	1
Self-Employed Agriculture	1	9
Other Retail	15	30
Miscellaneous	21	28
Total	100	100

Source: Data secured from the Hawaii Department of Labor and Industrial Relations

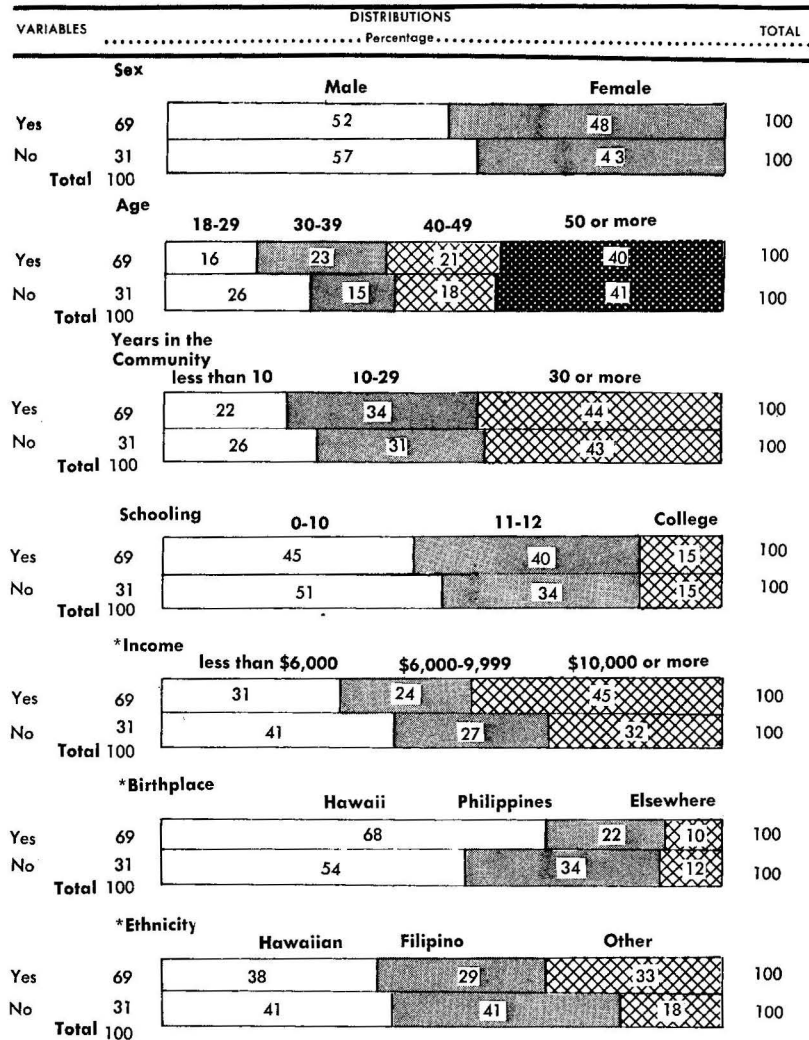
particularly in terms of anticipated growth. This sector of the economy is discussed in far greater detail in a later section of this report.

Employment

As of January, 1973, the labor force on Molokai consisted of approximately 1,500 people with jobs and another group of nearly 500 people who were actively seeking employment by registering for services from the State of Hawaii Employment Service office on Molokai. The University of Hawaii survey indicated that approximately 53 percent of the adults held full-time (30 hours per week or more) jobs, and another 19 percent of the adults were working on a part-time basis. The sources of these jobs are shown in Table 5.

The high degree of seasonality of pineapple employment is well known. Seed corn and onion operations on Molokai also show a con-

FIGURE 10. PERCEPTION OF EMPLOYMENT DISCRIMINATION AND VARIOUS CHARACTERISTICS.



*Differences in distributions are statistically significant at the .05 level.

siderable fluctuation in their need for employees throughout the year.

Of those employed full time, 71 percent were men. Only 54 percent of those with part-time jobs were men. There was a marked tendency for workers in all agricultural activities to have lower incomes and educations along with higher ages and length of residency in the community as compared to the entire labor force. The opposite was true of government and professional workers.

Respondents were questioned whether there was an equal chance among the various ethnic groups for good jobs. As shown in Figure 10, 69 percent believed that such discrimination in employment did not occur. There was a greater tendency for those in low-income categories, born in the Philippines, or of Filipino ancestry to feel they were not given an equal chance at the good jobs, all other qualifications being equal.

The State Employment Service is a primary route for seasonal workers to find jobs as well as to cushion their seasonal unemployment by collecting unemployment compensation. Most job referrals handled by the State involve relatively low skill and pay levels. The nature of these services is reflected in part by the fact that 52 percent of the applicants to the Employment Service between February and July of 1973 were less than 22 years of age. Forty-nine percent had not completed high school. Union hiring practices and private recruiting generally account for most higher paying job placements.

As shown in Table 6, the number of new applicants with the State Employment Service ranged from 2 in February, 1973, to 70 in July,

1973. The ages and educations of the applicants are also shown for each month.

During the first six months of 1973, 84 job orders were received by the State Employment Service on Molokai. A total of 134 referrals were made, resulting in 68 placements. Most of the nonagricultural placements occurred in June, and most of the agricultural positions were secured in January and June. The agricultural positions (46 percent) were typically for less than 150 days compared to the non-agricultural positions of a much more permanent nature.

Public Welfare

Limited job opportunities in the present economy and the possible lack of immediate economic alternatives to replace a substantial portion of the jobs scheduled to be lost in the pineapple industry point to a probable increase in community dependence on government assistance. In mid-February, 1973, members of the University of Hawaii study team examined public assistance data for Molokai. Programs examined were the General Assistance program (GA), Old Age Assistance (OAA), Aid to Families with Dependent Children (AFDC), medical programs, and Food Stamps (FS). If a family of six were receiving food stamps and medical aid at the time of the survey, they would be listed by the Molokai branch office under the two separate programs. Caseload counts would reflect this type of double counting. The University study counted the six individuals under one (major) program only, in this case medical care, i.e., the data reported are conservative. The concern was with the number and nature of the individuals who were receiving assistance as of February 12, 1973.

TABLE 6. APPLICANTS TO THE STATE EMPLOYMENT SERVICE ON MOLOKAI, FEBRUARY THROUGH JULY, 1973.

Characteristics	Months					
	Feb. (N=2)	Mar. (N=47)	Apr. (N=68)	May (N=63)	June (N=66)	July (N=70)
	-----percentage-----					
Age						
Less than 22 (N=164)	0	32	65	51	58	50
22-43 (N=116)	50	55	25	44	32	33
44 and older (N=36)	50	13	10	5	10	17
Total	100	100	100	100	100	100
Education						
Less than High School (N=153)	50	26	68	22	64	54
High School Graduate (N=111)	0	51	20	60	18	33
Beyond High School (N=52)	50	23	12	18	18	13
Total	100	100	100	100	100	100

Source: Data secured from the Hawaii Department of Labor and Industrial Relations



Postal facilities on Molokai were not a source of complaint.

TABLE 7. PUBLIC WELFARE RECIPIENTS ON MOLOKAI, FEBRUARY 12, 1973.

Ethnicity	Type of Assistance Received					Total
	General Assistance	AFDC*	Medical	Old Age	Food Stamp Only	
Hawaiian/Part-Hawaiian (N=701)	43	24	19	1	13	100
Filipino (N=298)	27	16	23	8	26	100
Caucasian (N=73)	23	13	4	0	60	100
Other (N=60)	18	15	47	8	12	100
Total (N=1,132)	36	20	21	4	19	100

* Assistance to Families with Dependent Children

There were 363 households or 23 percent of the Molokai population receiving some form of government assistance in February, 1973. Approximately 35 percent of the Hawaiians and part-Hawaiians residing on Molokai were receiving aid. Of these participants, 43 percent were receiving aid under the general assistance program. Another 24 percent of the Hawaiian/part-Hawaiian group were listed under the AFDC programs. Statewide indications on AFDC cases show that in many cases combined household incomes are not enough to support the family, or that job opportunities in the community are so limited so as not to serve as resources for additional income. Other programs and their percentage of Hawaiian and part-Hawaiian participants are shown in Table 7.

Of all recipients identifying themselves as being of Filipino ancestry, 298, or 19 percent, of the total Filipino population were listed. The programs most frequently used by this ethnic group were

the General Assistance program (27 percent), Food Stamps (26 percent) and medical programs (23 percent). The Filipino ethnic group had the greatest number of members participating in the Old Age Assistance program. The data indicate that at the time of the survey, 1.5 percent of the Island's Filipino population was retired or disabled and without sufficient support resources such as Social Security, company pensions, etc. Sixteen percent of the Filipino recipients were listed under the AFDC program, as shown in the table.

Sixteen percent of the Caucasians were receiving assistance at the time the records were examined. An unusually high proportion, 60 percent of these recipients, was listed as receiving Food Stamps only. Closer examination indicated that 98 percent of the Caucasian Food Stamp recipients were below 30 years of age. A survey of Food Stamp program participants in other ethnic groups indicated that 60 percent of the Hawaiian/part-Hawaiian group and a similar percentage

of Filipinos were below the age of 30. The younger members of both Hawaiian and Filipino groups tended to be dependents below the age of 18 years, while the Caucasians below the age of 30 tended to be single adults. Caucasians listed under medical aid and General Assistance tended to be older than those of the Food Stamps Only category. There were no Caucasians under the OAA program at the time the data was surveyed.

Of the group classified as "Other" (Japanese, Chinese, Portuguese, mixed ethnic background other than part-Hawaiian), 6 percent were listed as receiving assistance. Almost half of this group, 47 percent, were using the medical programs. Eighteen percent participated in the General Assistance program and 15 percent were using the AFDC programs.

As shown in Table 7, 36 percent of all recipients were under the General Assistance program. This program operates on State funds without Federal subsidy. Eligible households are provided with money payment for rental, utilities, food, clothing, transportation, etc. Previous to the institution of the partial Flat Grant program in July of 1973, an emergency allotment was also available at the discretion of caseworker and recipient. The new Flat Grant program to be initiated in January, 1974, will disburse monies through a schedule based on family size and type of housing unit. Regardless of unusual circumstances, maximum amounts will be established that households can receive for various needs.

Assistance to Families with Dependent Children (AFDC) is administered by the Department of Social Services and Housing with

matching Federal monies. This allows monthly payments of a supplemental nature or a sole source of income towards the support and well-being of minors in the household. Other programs supplemented by Federal funds include medical programs. Medical programs on Molokai permit eligible low-income people to receive dental care and other medical services frequently through prearranged, prepaid plans with Hawaii Medical Services Association (HMSA). Old Age Assistance (OAA) is for elderly individuals with insufficient pensions, Social Security benefits or other personal resources to provide for their basic needs. Food Stamp programs provide a supplemental resource to help stretch low-income food budgets. In all cases and programs, the low-income classification is determined in part by family size.

Of the Caucasian group receiving assistance, 60 percent were receiving Food Stamps only. Although there may be feelings among some applicants of reluctance on the part of State personnel to grant access to information about other assistance programs, a staff member noted that under the State regulations, employable adults without minor children are not eligible for money or medical payments.

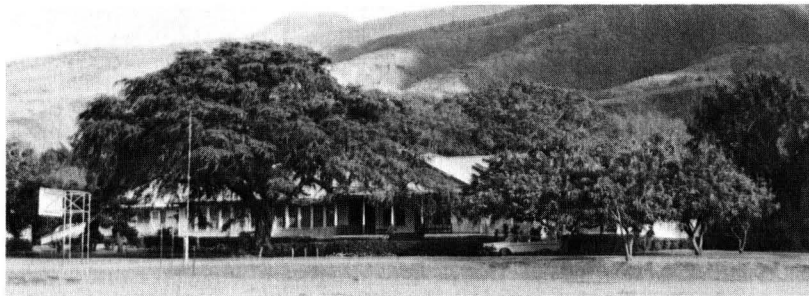
The three caseworkers on Molokai have experienced phenomenal caseload increases over the past three years. These increases were experienced statewide and are attributed to several factors, such as immigration, particularly from the Mainland. Another factor listed was the liberalization and broadening of the assistance standards making more people eligible for benefits. Increased awareness about the programs available and the gradual breakdown of social and cultural attitudes about receiving such aid are also cited as leading

to great increases. A major factor in the increase has been the rising costs of living, especially in the realm of medical services and care. Totals taken from Molokai DSSH branch caseworker records indicate that as of January, 1973, 496 cases were listed in various programs. The caseload of two years ago was estimated to be 45 percent of 1973's total. January 1972's total reflected 60 percent of the total number of cases handled on Molokai in January, 1973.

Certainly Molokai is not unique in its public welfare situation. Large caseload increases have been experienced statewide. However, besides being faced with factors that affect the low-income families statewide, such as rising costs of living and medical services, the major economic activity in the community is scheduled to close. Many of those not presently receiving governmental aid may find themselves forced to seek and accept help when their sources of income disappear or if retirement and other corporate compensation proves inadequate.

Health Care

Molokai General Hospital has a capacity of 30 beds and is staffed with six nurses and two laboratory technicians. Four medical



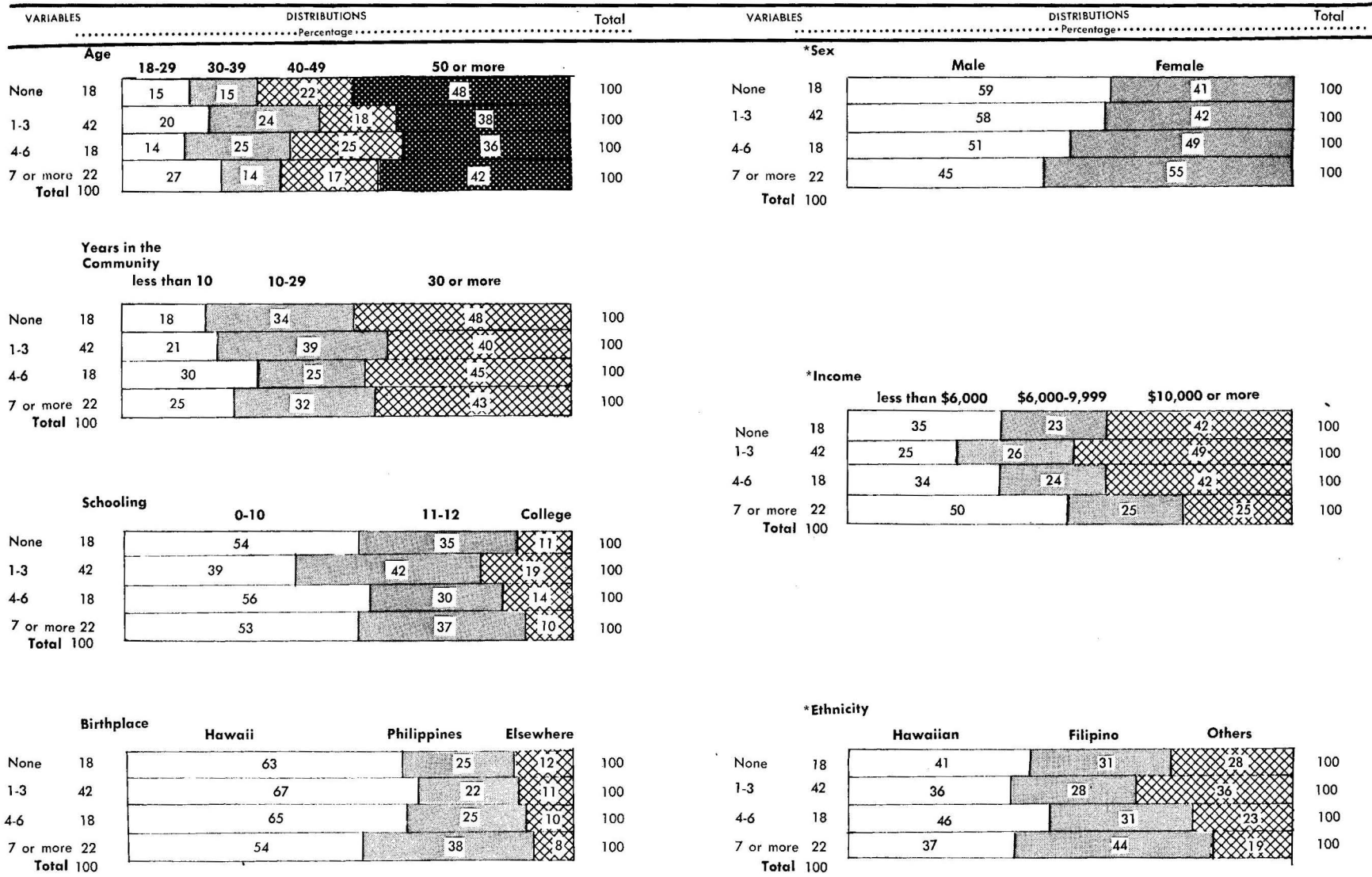
Kilohana Elementary School is located on the East End of the Island.

doctors reside and practice on the Island, three of whom are permitted to use the hospital facilities. The hospital also has a program of visiting specialists who visit the Island regularly and act as consultants. Among these specialists are a physical therapist (once per week), an orthopedic surgeon (every other week), and on a monthly basis an otologist, an ophthalmologist, a urologist, an obstetrician, a gynecologist, an optometrist, and a neurologist. There are also two dentists, one in Kaunakakai and the other in Kualapuu. An orthodontist is available on a visiting basis.

The State Department of Public Health has a staff of two public health nurses, a sanitarian, a vector controller, and a visiting psychiatrist. One of the two dentists is with the Department as well as the mental health caseworker who works jointly with the Department of Social Services and Housing. The Department of Public Health regularly conducts a number of clinics, the most frequent of which is a well-baby clinic held in various locations about 7 times per month. The government also finances the Expanded Nutrition Program through the Cooperative Extension Service in an attempt to assist low-income, handicapped, or very large families eat well for less cost.

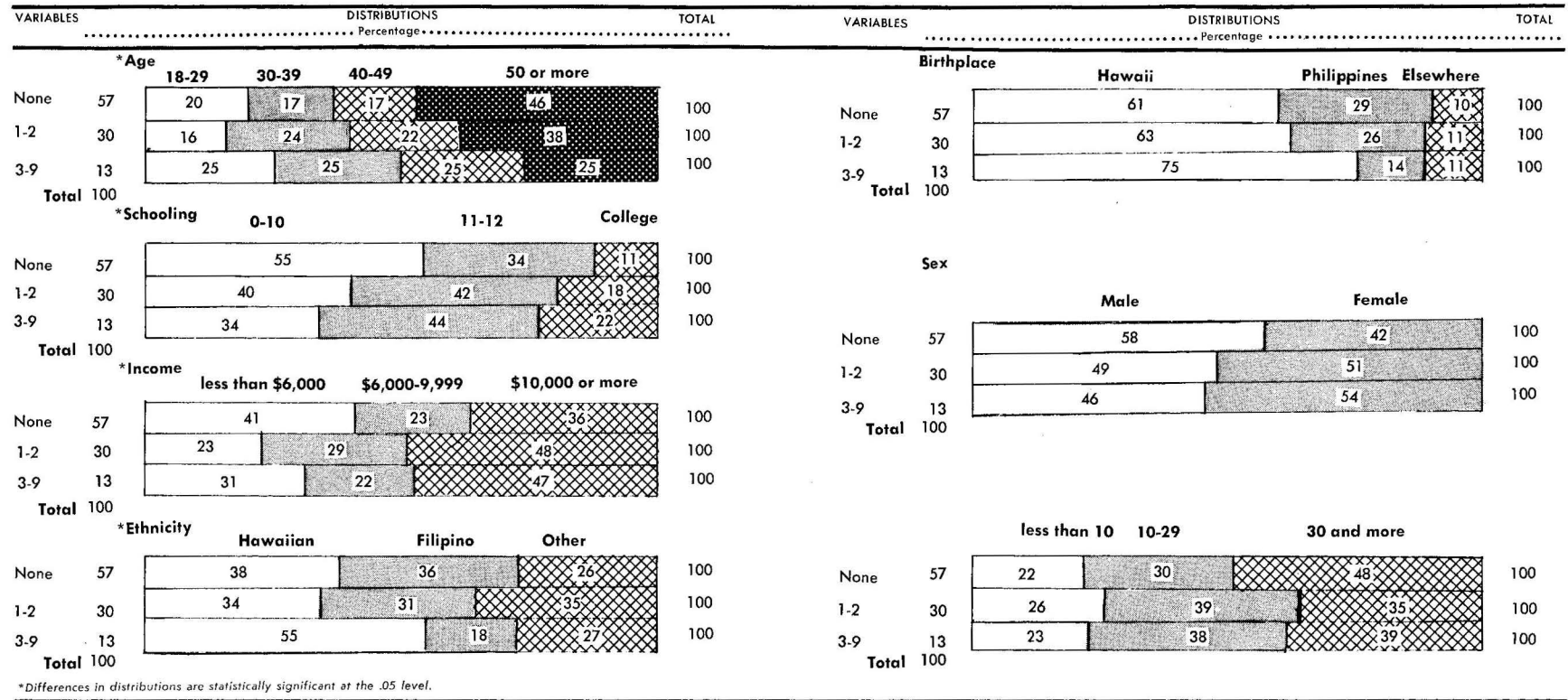
As part of the community-wide survey, adults were asked how many times they had visited a medical doctor in the previous year. As shown in Figure 11, nearly one-fifth, 18 percent, had not made any visits in the previous year. About the same percentage, 22 percent, had made seven or more visits. Somewhat surprisingly, age, length of residence in the community, education, place of birth, and sex were not associated with differences in the numbers of visits made. In

FIGURE 11. VISITS TO PHYSICIANS AND VARIOUS CHARACTERISTICS.



*Differences in distributions are statistically significant at the .05 level.

FIGURE 12. VISITS TO DENTISTS AND VARIOUS CHARACTERISTICS.



contrast, income and ethnicity were both factors affecting the frequency of doctor visits. The chronically ill had, as anticipated, a tendency toward lower income levels. Presumably due in large part to the high proportion of elderly men without families, the Filipinos evidenced an unusually large number of frequent doctor visits.

Visits to the dentist by adults are described in Figure 12. There was a marked tendency among older respondents to make relatively

few dental visits. People with higher incomes and education levels tended toward more regular dental care. A majority of those making three or more dental visits during the year were Hawaiians or part-Hawaiians as compared to that ethnic group constituting only 39 percent of the Island population. Contrary to expectations, sex, birthplace, and length of residence on Molokai were not associated with differences in the frequency of dental visits.

At the time of the community-wide survey, a small survey of 30 households in Maunaloa was also administered by the University study team. Due to the small sample taken, extreme care must be taken in drawing inferences to the general population. Most medical problems were confined to colds and influenza, as well as maternal care for the women. The frequency of dental care for children, a "free" fringe benefit for Dole employees' children, was very high. A high degree of confidence and trust in medical personnel was evidenced. This group perceived the priority of medical care in comparison to other community needs in approximately the same ordering as did the overall Molokai community. The group evidenced a high degree of both



Maunaloa has the only community fluoridation program in Hawaii.

use and appreciation of various health services such as the well-baby clinic and tuberculin tests.

Although generally pleased with present health care in the community, there were frequently stated wishes for more doctors, an improved ambulance service, and more comprehensive care and facilities so as to alleviate the need to go to Honolulu for some types of treatment or care. Ninety percent of the 30 households had some form of medical insurance.

Housing

As discussed previously, residents indicated in interviews that they considered housing at a reasonable price one of the more important concerns of the community. Housing for retirees and senior citizens also was considered a need for improving the quality of living in Molokai. Home ownership on Molokai is relatively low compared to the rest of the State, the obvious reason being the high percentage of the total population living in plantation-owned housing. However, even in Kaunakakai, which is more independent of company housing, only 34.2 percent of housing is owner occupied compared with an overall Maui County average of 53.7 percent.

The 1970 census indicates that 38.5 percent of all houses in Kaunakakai lack some or all plumbing considered essential for "standard" housing. This compares with 13.1 percent in Maui County as a whole. The census listed the value of owner-occupied homes in Kaunakakai at \$17,500 while Maui County's average was \$23,500.

There are some new housing developments underway with agencies such as Farmers Home Administration, Hawaiian Home Lands Department,

Top: This dwelling is representative of those found in the Hawaiian Home Lands.

Center: The Moanaloa settlement is typical of pineapple company housing.

Bottom: Adequate housing may become an increasing problem on Molokai.

Below: The Molokai Electric Co. generators at Kaunakakai produce all the electric power for the Island.



Hawaiian Housing Authority and HUD agencies providing counsel and financial assistance to prospective home owners. Most of these agencies work with local lending institutions to help people achieve their housing goals. Federal laws as presently written make some of the efforts to plan, finance, and build adequate housing for low- and moderate-income families difficult. Although efforts by Hawaii's congressional delegation to change the provisions of the law relative to financing homes with Federal funds in rural areas on leasehold lands were successful in terms of single family dwellings, the change did not provide similar approval for cooperative type housing which could be one of the most logical answers for some of the Molokai housing problems.

Housing alternatives available for residents of the plantation communities once the pineapple phaseout is completed should be considered at an early date. Many of the following programs do not presently have available funding, but some of the alternatives possible are:

1. New housing development for sale or rent to Molokai residents on state-owned lands by Hawaii Housing Authority Hawaiian Home Lands Commission and Maui County.
2. Housing and Urban Development (HUD) low-income housing (Section 502 Rural Housing Loans through Farmers Home Administration).
3. (HUD) Insured Mortgages under Section 235 of the National Housing Act (through Farmers Home Administration).
4. Rental Housing for Elderly and Handicapped (Section 202 through Farmers Home Administration and HUD).
5. Rental and Cooperative Housing (Section 236 through HUD and Farmers Home Administration).

6. Interest Subsidy (Section 235 multi-family) for rehabilitation of housing to be sold to lower-income families.
7. Organization of a housing cooperative in each of the plantation towns to lease all existing plantation-owned housing and rent to present tenants at a rental large enough to pay the cooperatives' expenses and operational costs.

Miscellaneous Services

Potable water is a primary concern of both residential and industrial development. Overall domestic water supplies in Molokai are apparently adequate for present requirements, although service to some areas remains a problem. However, expansion of residential areas, development of new resort areas and any consideration of industrial development would require assurance of an adequate water supply since diversion of water from the Molokai Water Project is legally possible only after all agricultural needs are met.

Although the County is engaged in further developing the water system along the southeast coast of Molokai, at present some residents in this area do not have adequate water for household use due to lack of transmission lines and must haul water for domestic needs. People in this area have listed domestic water as one of their highest priority needs.

Sewage disposal in Molokai has been accomplished by the use of cesspools or septic tanks for both private dwellings and commercial establishments. This does not comply with standards of either State or Federal government for areas where there are concentrations of people. A new sewage disposal plant is presently being completed in Kaunakakai to correct this condition. This system has a pond area of

3.2 acres and is designed to handle approximately the present population with a maximum flow of .318 million gallons per day and has expansion potential. New developments outside of Kaunakakai will be required to provide approved sewage disposal as a part of their development plans.

Cylinder gas for fuel is available through GASCO at a rate of \$13.57 per 100 pounds of fuel in areas near Kaunakakai and at a rate of \$14.04 per 100 pounds in other parts of the Island. This compares with \$12.45 in Honolulu and \$13.05 in Maui (Kahului).

Hawaiian Telephone Company provides all telephone service on Molokai. Service is generally good with toll-free service available to all parts of the Island. Coverage is adequate with more than 1,300 telephones in service. Rates are the same as on all other islands of the State.

Electricity is provided by Molokai Electric Company, Limited. Its present peak load of 4,000 kilowatts and a maximum capacity of 7,000 kilowatts would indicate that there is sufficient capacity for considerable expansion of electrical consumption. Rates for electricity are as follows:

SCHEDULE "A" - COMMERCIAL LIGHTING AND SMALL POWER (This schedule is applicable to single or three phase service including lighting and power.)

	<u>Base Rate</u>	<u>Effec. Rate</u>
Rate: First 15 kwh or less per mo.	\$ 2.50 per mo.	
Next 185 kwh per mo.	12.0¢ per kwh	12.417¢
Next 800 kwh per mo.	8.0¢ per kwh	8.417¢
Next 2000 kwh per mo.	6.5¢ per kwh	6.917¢
Over 3000 kwh per mo.	5.0¢ per kwh	5.417¢

(For each one cent in excess of \$6 per barrel cost of diesel oil, an additional charge of .002¢ per kwh will be made. Present fuel cost \$7.74 per barrel)

SCHEDULE "B" - LARGE LIGHT AND POWER

	<u>Base Rate</u>	<u>Effec. Rate</u>
Rate: First 100 kwh per mo. per kw of billing demand		
First 3,000 kwh per mo.	9.0¢ per kwh	9.417¢
Balance	7.0¢ per kwh	7.417¢
Next 200 kwh per mo. per kw of billing demand	5.0¢ per kwh	5.417¢
All kwh in excess of 300 kwh per mo. per kw of billing demand	2.7¢ per kwh	3.1176¢

SCHEDULE "C" - HEATING AND COOKING (Applies to commercial heating and cooking single phase)

	<u>Base Rate</u>	<u>Effec. Rate</u>
Rate: First 500 kwh per mo.	5.0¢ per kwh	5.417¢
Next 500 kwh per mo.	3.5¢ per kwh	3.917¢
Over 1,000 kwh per mo.	2.7¢ per kwh	3.117¢

SCHEDULE "R" - RESIDENTIAL SERVICE

	<u>Base Rate</u>	<u>Effec. Rate</u>
Rate: First 15 kwh or less	\$2.25 per kwh	
Next 35 kwh per mo.	8.0¢ per kwh	8.408¢
Next 50 kwh per mo.	6.0¢ per kwh	6.408¢
Next 100 kwh per mo.	3.4¢ per kwh	3.808¢
Over 200 kwh per mo.	2.8¢ per kwh	3.208¢

If customer has approved type water heater (usage between 200-500 kwh) 2.3¢ per kwh 2.708¢

Molokai has one fire station and a staff of sixteen full-time firemen located at the fire station in Kaunakakai. There is some additional fire equipment maintained at Molokai airport and supplemental equipment maintained by the plantations at Kualapuu and Maunaloa.

The Molokai Police Department is staffed by sixteen full-time police officers. Special juvenile officers are assigned to Molokai. The Judge of the Second Circuit Court of Molokai holds sessions on a regular basis in Kaunakakai.

Total public school enrollment on Molokai for the 1972-73 year was as follows:

<u>Location</u>	<u>Grades Taught</u>	<u>No. of Students</u>	<u>Instructional Staff</u>
Kaunakakai	K-6	369	23
Kilohana	K-6	115	18
Kualapuu	K-6	271	18
Maunaloa	K-6	131	9
Molokai High & Inter.	7-12	666	35
Total	K-12	1532	103

In addition to the public schools, there is a private school operated by the Seventh Day Adventist Church that enrolled seven students in grades K through 8.

There is widespread belief in the community that when a significant number of young people of high school age are sent to schools on Oahu or Maui, the level of achievement of the remaining students is generally lower than in other schools in the State. The University of Hawaii study team was unable to determine that a significant number were actually sent to schools off the Island. It is suspected that this belief remains from observed practices of the past and is no longer a significant practice in the Molokai system.

Molokai has a land area of 261.1 square miles, a general coastline of 88 miles and a total of 81.6 miles of roads and highways.

Most local travel is by private car, although there are U-drives and limited tour bus transportation available. Major inter-island travel is by air with Aloha and Hawaiian Airlines providing service. Royal Hawaiian, Air Molokai and Alii Air Hawaii provide small plane (air taxi) services on both scheduled and chartered flights. Roads and highways in portions of the Island are good. However, Kamehameha Highway in the East Molokai area needs improvement, and East End residents indicated in the survey that the need for better roads was one of their high priority concerns. Such improvements are anticipated soon.

Surface freight (barge service) is available on a regularly scheduled basis from Honolulu and Kahului, Maui via Young Brothers Transportation Company. Rates are controlled by the Public Utilities Commission. Inter-island ferry service is discussed further in Appendix IV.

Community Organizations

Molokai has, like most rural communities, many groups and organizations to serve various needs of the community. Molokai's community organizations may be classified as follows:

1. Business Related Organizations
 - a. The Molokai Chamber of Commerce
 - b. Junior Chamber of Commerce
2. Community Improvement (and Service) Organizations
 - a. Community Action Council
 - b. Community Associations
 - c. Community Arts Council
 - d. Molokai Citizens Advisory Committee
 - e. Molokai Community Center
 - f. Molokai Lions Club
 - g. Molokai Civitan Club

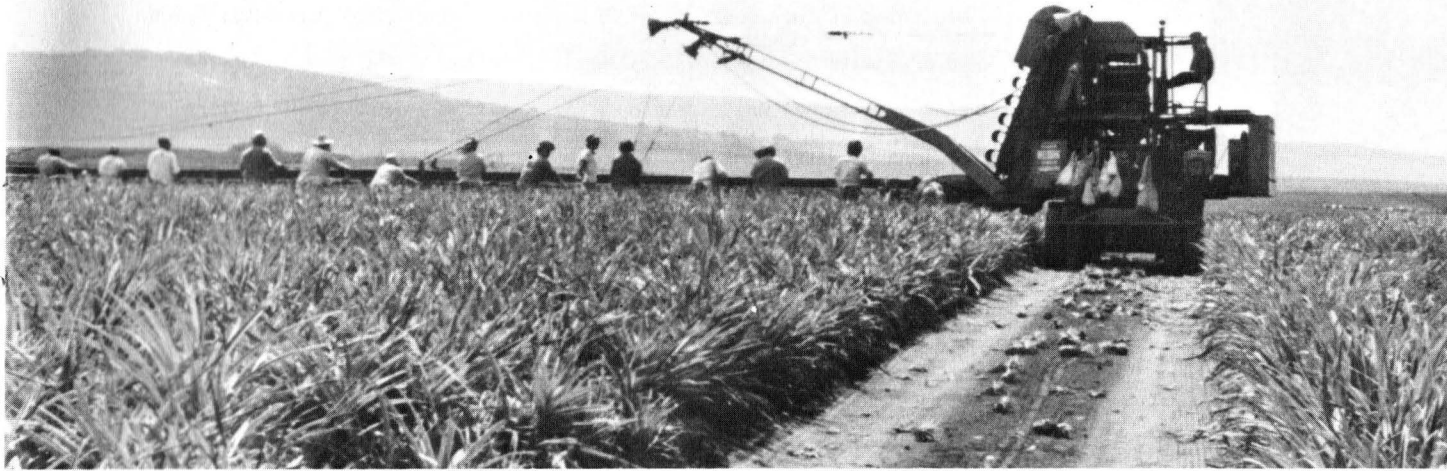
3. Ethnic Organizations
 - a. Molokai Filipino Council
 - b. Hawaiian Civic Club
 - c. The Hawaiians
4. Benevolent Associations
 - a. Kaahumanu Society
 - b. Kalaniana'ole Society
 - c. Kamehameha Society
 - d. Hale o Na Alii
 - e. Kaunakakai Mutual Aid Association
5. Religious Organizations
 - a. Catholic Church (41%)
 - b. Congregational Church (23%)
 - c. Mormon (13%)
 - d. Other Groups (13%)
 - e. No Church (10%)
6. Recreational Organizations
 - a. Little League
 - b. Molokai Roping Club
7. Soil and Water Conservation District

8. Youth Organizations

Organizations on Molokai to promote youth activity and interest have centered around Boy Scouts, 4-H clubs, Girl Scouts and church-affiliated youth groups. Of particular interest is the large percentage of participation in the Boy Scouts of America with nearly 85 percent of available boys between 8 and 18 years of age registered. A total of 516 boys and 83 leaders from Molokai were registered by Maui Boy Scout Council in 1972. This is the highest participation rate in the State and has held constant for the past four years. Girl Scouts had approximately 100 girl scouts of all ages registered during 1972. The 4-H clubs also have approximately 100 members (40 boys, 58 girls) on Molokai with considerable variation as to projects being taken.
9. Homemaker Clubs (U.E. clubs)

Sponsored by the Cooperative Extension Service, U.E. clubs have for many years been a popular educational, social and service organization for the Molokai community.

AGRICULTURE



Pineapple is a major source of jobs on Molokai.

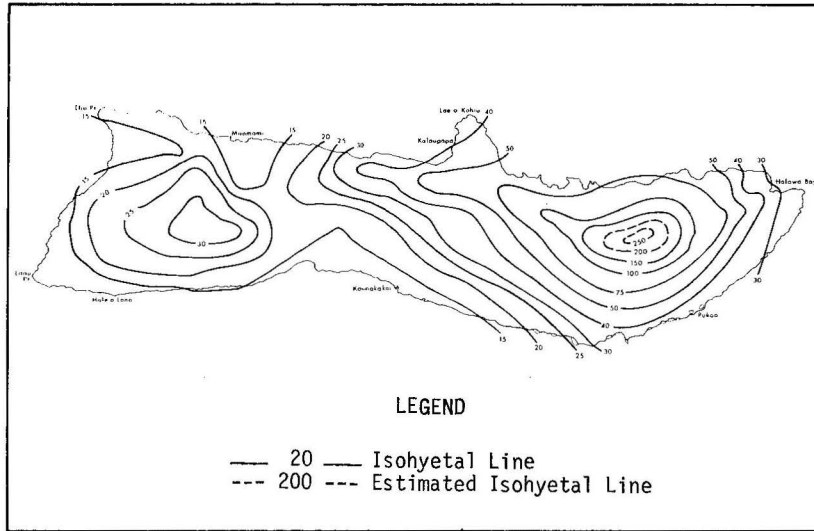
Maintaining agriculture as a major industry on Molokai received a high priority ranking in the community-wide survey conducted by the University of Hawaii study team. Agriculture occupies this place of importance due to several fairly obvious factors. A larger number of people seeking employment on the Island are not presently highly skilled, and as perceived by some of them agriculture offers a possible opportunity for employment. The low density of the population and the relatively low land prices, at least in comparison with those on Oahu, suggest that there may be an advantage for some type of agriculture to be located on Molokai. Since the most intense pressure for urban use of land is on Oahu, it seems reasonable to believe that the Outer Islands, including Molokai, will increasingly encounter advantages in agricultural production.

The future use of Molokai's land resources for agricultural production center around four basic factors: (1) available water supply, (2) basic availability and productive capabilities of the land, (3) demand for agricultural output, and (4) the human resource component of future agricultural developments.

Water Resources

Much of the early history of extensive agricultural enterprises on Molokai centers around repeated shortages of water, development of salinity in the water supply, and extensive soil erosion. Because of the lack of rainfall in areas that can readily be cultivated (see Figure 13) cattle grazing and pineapple have thus far proved to be the most successful agricultural enterprises of significance. Hopes for

FIGURE 13. MEDIAN ANNUAL RAINFALL ON MOLOKAI.



Source: Rainfall of the Hawaiian Islands, W.J. Taliferro, Hawaii Water Authority, 1959.

TABLE 8. WATER FLOW OF THE WEST PORTAL OF THE MOLOKAI IRRIGATION PROJECT, JULY 1965-SEPTEMBER 1972.

Water Year	Yearly Total (million gallons)	Average Daily Flow
July 1965-June 1966	668	1.83
October 1966-September 1967	1,050	2.88
October 1967-September 1968	1,017	2.78
October 1968-September 1969	1,505	4.12
October 1969-September 1970	1,504	4.12
October 1970-September 1971	1,446	3.96
October 1971-September 1972	1,393	3.82

Source: Compiled from Daily Gauge Heights recorded by the Water Resources Division, Geological Survey, United States Department of the Interior

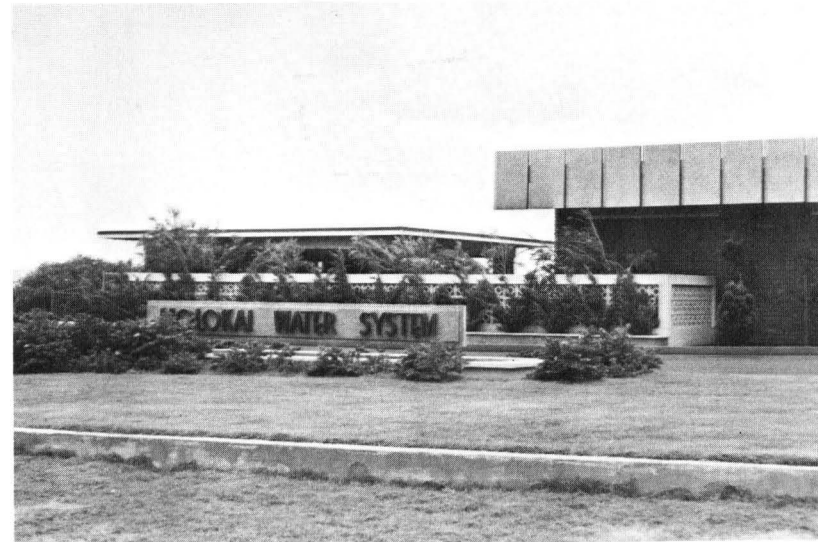
increased water supplies were raised considerably in 1958 with the beginning of the construction of a 5-mile tunnel from Kaunakakai Gulch to draw water from Waikolu Valley. Estimates at the time suggested that this tunnel would develop an annual supply of about 10 million gallons of water per day. Thus far the highest total flow on an annual basis has been an equivalent of 4.1 million gallons per day (see Table 8). To date, this has been more than adequate to supply the existing pineapple and other types of agricultural operations on the Hoolehua Plains area and on the western end of Molokai, but it does not provide a sufficient capacity for irrigation of other types of crops such as sorghum or alfalfa on the same acreage.

With the announced phaseout of pineapple operations, it is necessary to estimate the amount of other agricultural operations which may be sustained by the present water supply. With the completion of a new diversion structure scheduled for late summer of 1973 and the utilization of existing pumping facilities in the valleys, it is believed that there will be sufficient agricultural water to irrigate the following combinations of crops or their equivalents on the Hoolehua Plains or equivalent growing conditions: (1) 2,000 acres of grain sorghum; (2) 200 acres of various vegetable crops in a non-greenhouse production setup; (3) approximately 400 acres of papaya and/or guavas. In other words, approximately 2,600 acres of land in diversified agriculture could be irrigated with the water facilities anticipated to exist in the fall of 1973. The cultivation of extensive crops using less water and the use of drip irrigation may permit increases in the total acreages discussed. Other water systems

developed on the Island of Molokai are either so limited as to be useful for only household consumption, or have been earmarked for utilization in specific areas such as the Kaluakoi Development on the western shore.

While there is concern about expanding the acreage of agricultural production beyond the capabilities of supplying it with adequate irrigation water, there is also legitimate concern on the part of the State that an expansion of the water supply may be premature. An agricultural demand for the water may not actually develop. However, it is useful at this point to examine the nature and costs of possible expansions of the present Molokai Water System for potential agricultural consumption. An excellent feasibility study was conducted for the Department of Land and Natural Resources in January of 1969 which provides a good basis for many of the observations that follow.^{1/} Four stages of construction for the collection and transmission of water are recommended in this report. The first stage involves a total estimated expenditure of \$3.4 million in 1969 prices. A major portion of this stage is presently being constructed. This stage involves the addition of another 5 wells in Waikolu Valley, the construction of a more complete transmission system and the nearly completed diversion system below the east portal. With the completion of the first stage, it is estimated that an additional 3.8 million

^{1/} Water Resources Feasibility Study: Island of Molokai, Prepared for State of Hawaii, Department of Land and Natural Resources, Division of Water and Land Development by Parsons Brinkerhoff-Hirota Associates, January 31, 1969.



The Molokai Water System has improved agricultural possibilities.



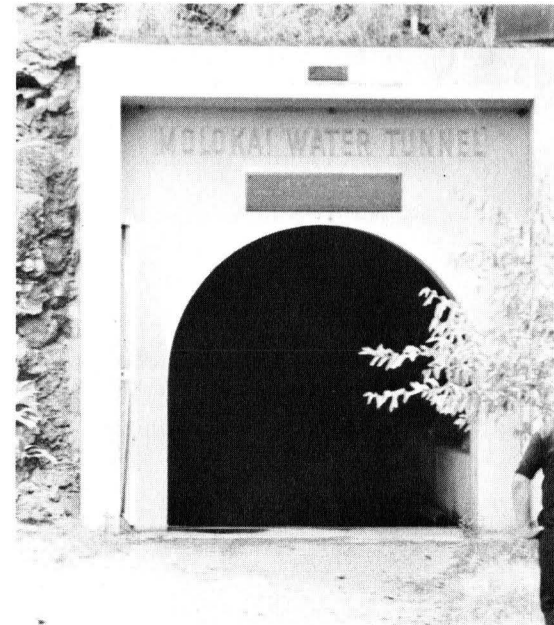
The first flow of water into Kualapuu Reservoir for irrigation storage was in November 1969.

gallons per day could be delivered. Proposed Stage II construction is estimated to cost (in 1969 figures) \$5.5 million. This would include an extension of the water system into the Pelekunu Valley where an estimated 5.2 million gallons per day (mgd) could be added to the present water system. Stage III at a cost of \$1.3 million would add 2 mgd to the water supply, and Stage IV at an estimated expenditure of \$12.6 million would add 8.3 mgd to the water supply system. In total, then, the study shows a potential water supply system which would provide, on the average, approximately the present 4 mgd plus a projection of nearly 20 mgd. This total is derived by extending the system into Pelekunu Valley and leaving the possibility of additional increases in the water supply by developing the system in the Wailau Valley, and, with extensive pumping, using the water that is available at lower elevations in both the Waikolu and Pelekunu Valleys.

Due to the high costs of construction as well as the high costs of electrical power on Molokai for pumping, it is not anticipated that the costs of such developments could be recovered at the present rate of \$.08 per thousand gallons charged for the water out of the Molokai Irrigation System. This would suggest that if the water supply is to be developed, a heavy degree of State subsidization must be made available in providing irrigation water for agriculture on Molokai. Furthermore, development of the water system as described above beyond Stage I will require at least 3 years lead time.

Land Resources

Molokai is the fifth largest Island in the Hawaiian group and



This 5-mile tunnel is a major part of the Molokai Water Project.

contains about 4 percent of the total State area, or 261 square miles. The Island is about 38 miles long and 10 miles wide and can readily be divided up into three major sections due to a set of volcanic formations on the Island topography: West Molokai-Maunaloa, Central Hoolehua Plains, and Eastern Molokai.

West Molokai-Maunaloa is geographically the oldest part of the Island. It is a relatively low, heavily eroded area centered around 1,390-foot Puu Nana. The terrain is desert-like with an annual average rainfall of about 20 inches, which occurs mainly during the winter months. This area contains about 30 percent of the Island's

total acreage, with pineapple presently considered to be the only crop suitable for the area. Pineapple is cultivated on those portions of the region where the rainfall is between 20 and 30 inches per year and the slopes are less than 15 percent. Most of the remaining area of the western end of the Island is used by Molokai Ranch for grazing. Mining sand for use on Oahu has been an economically successful operation on the West End for the past 14 years. The region also embraces Papohaku Beach, site of the proposed Kaluakoi Corporation Resort Development. Except for two small areas at Ilio Point and Laau Point which are owned by the Federal government, the entire area has been owned by Molokai Ranch. Only recently has a sizeable area been transferred to the Kaluakoi Corporation, which is also in part controlled by Molokai Ranch.

The Central Hoolehua Plains area is relatively flat and makes up about 20 percent of the Island's total acreage. Fifteen thousand acres of this land is characterized by deep, stone-free soils and much of it presently is producing pineapple. Rainfall averages from 15 to 30 inches per year and is reasonably spread throughout the seasons. Due to both sparse rainfall and the consistently strong winds, pineapple has been well suited for the area. Cultivation of other crops requires both heavy irrigation and suitable windbreaks. The Hoolehua area is largely controlled by the Hawaiian Homes Commission except for an area surrounding Kualapuu which is owned by Molokai Ranch. The area is also the site of the present and proposed Molokai Airport. The intensity and prevailing direction of winds in the Hoolehua area are indicated in Figure 14.

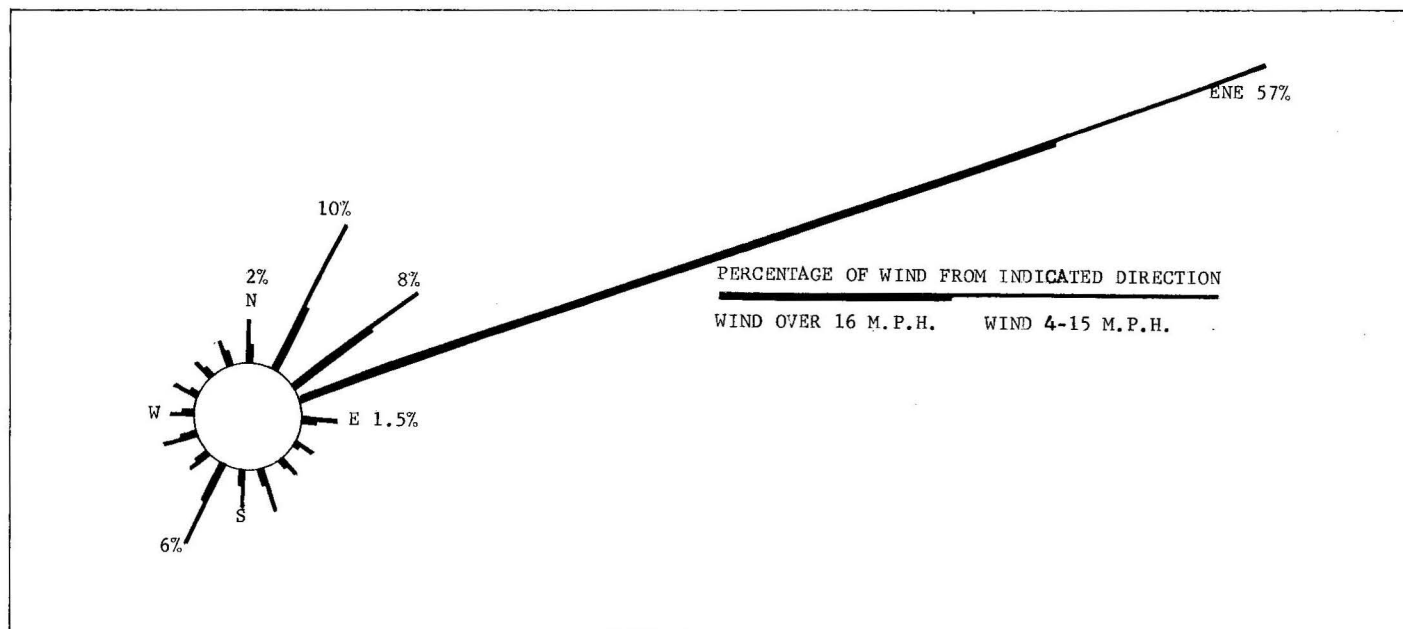


Top: Many gullies have been formed by heavy rains on the West End.

Bottom: Wind has a damaging effect on some plants in the Hoolehua area.



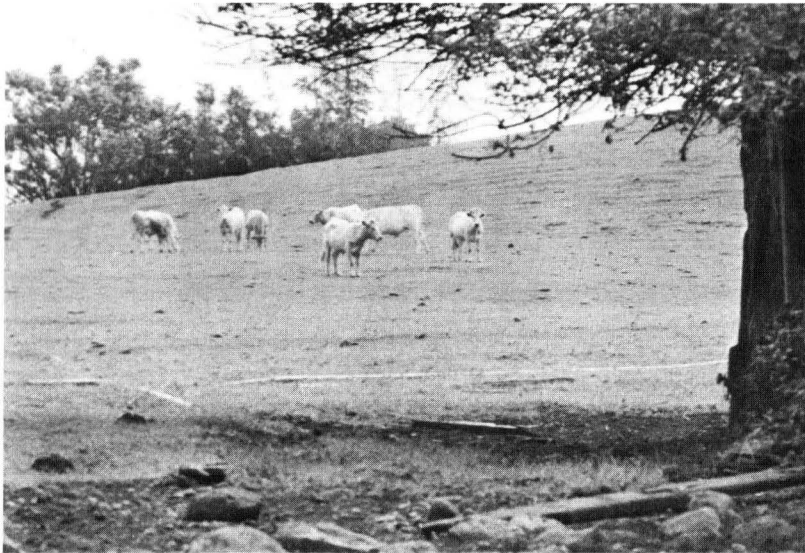
FIGURE 14. MOLOKAI WIND ROSE.



East Molokai is the entire eastern half of the Island. It ranges from the narrow coastal plains on the south coast to the rugged wet canyons and perpendicular cliffs on the northern shore. Puu Kamakou is the Island's highest point, 4,970 feet above sea level. The rain-rich valleys of Waikolu, Pelekunu, and Wailau are in this region. Rainfall ranges from a low of 15 inches just outside of Kaunakakai to a high of 250 inches at the highest elevation. The narrow coastal plains are mostly utilized for cattle grazing. There are, however, small acreages suited for diversified agriculture with

some portions presently planted in field corn for seed production or experimental breeding research. Much of the diversified agriculture of the past two decades has been located in this area. The extensive holdings of the Puu-o-hoku Ranch are on the far eastern portion of the Island. The summit and East Dome sections of this area contain parcels well suited for timber production, but the major importance of the area is that it is the basic water shed for a major portion of the Island.

Of the approximate 159,000 acres on the Island (excluding



Beef cattle are important on East Molokai.



Irrigation will be required for diversified agriculture.

Kalawao), 41 percent is controlled by Molokai Ranch. These lands are presently in pineapple and ranching with large acreages planned for urban development in future decades. Kaluakoi Corporation's proposed West End development involving 6,762 acres scheduled for resort development is flanked by some 44,000 additional acres held under option to the development company for further project expansion possibilities.

Sixteen percent of the Island acreage is under the control of the Hawaiian Homes Commission. Most of this is used for farmsteads, house-lots, a few diversified farms, and for livestock pasture. Most of this land is located in the Hoolehua Plains area and two large parcels are on either side of Kaunakakai.



Pineapple production is scheduled to terminate in 1975.

TABLE 9. MAJOR LANDHOLDERS ON MOLOKAI, 1973.

Landowner	Acreage	Percent of Total
Molokai Ranch	65,300	41
Hawaiian Home Lands	25,500	16
State of Hawaii	18,900	12
Murphy Ranch	9,000	6
Kaluakoi Corporation	6,700	4
Francis H. I. Brown	6,000	4
Lucy Kaiaha Ward Trust	4,700	3
*Reliance Industries (Bishop Estate)	3,900	2
Meyer Estate and Trust	3,000	2
Federal and County Governments	100	1
Miscellaneous Holdings	15,400	9
Total	159,000	100

*Sale of this property being in process at the time of the study.

Source: Tax key maps, excluding Kalawao.

Other major landowners are listed in Table 9. Table 10 reflects land use on Molokai as determined by the Land Study Bureau in 1968. It was determined that about 11 percent of the acreage was in croplands, 52 percent was used for grazing, 29 percent was held as forest reserve, 7 percent was in some form of nonagricultural use. The nonagricultural designation includes pali (cliff) lands, mangrove forests, urban sites, agricultural homesteads, recreation, and military installation areas.

The planned uses of Molokai's land by the Maui County Planning Department allow for most of the present agricultural lands to be retained in that use, with the exception of significant acreages involved in the Kaluakoi Development. These uses are shown in

Figure 15 (inserted in back of publication). With the exception of passage of necessary zoning legislation for the mixed resort-residential area planned for portions of the West End development, the designated areas of land use had been approved by the County Council as of July 22, 1969. The County has no power over the use of Hawaiian Home Lands and Federal Lands. Land use boundaries established by the State Land Use Commission are shown in Figure 16. The County has very little power to determine uses of lands designated as Conservation by the State Land Use Commission.

TABLE 10. LAND USE ON MOLOKAI.

Land Use	Acreage	Percent of Total
Pineapple	17,274	10.34
Vegetables ^{1/}	845	0.51
Grassland Grazing	28,707	17.18
Wooded Grazing	58,133	34.79
Orchards ^{2/}	104	0.06
Forest	2,037	1.22
Forest Reserve	48,332	28.93
Military	316	0.19
Recreation	415	0.25
Idle Agricultural Land	2,271	1.36
Pali Land and Mangrove	7,476	4.47
Miscellaneous Use ^{3/}	6	*
Urban	1,121	0.67
Water	48	0.03
Total	167,085	100.00

* Less than 0.01 of one percent.

^{1/} Primarily Irish potatoes and seed corn. 678 acres are irrigated.

^{2/} 20 acres are irrigated.

^{3/} Includes dairy, 1 acre; poultry, 1 acre; sugarcane test plantings, 4 acres.

Source: Detailed Land Classification - Island of Molokai, L.S.B. Bulletin No. 10, Land Study Bureau, University of Hawaii, Honolulu, Hawaii, 1968

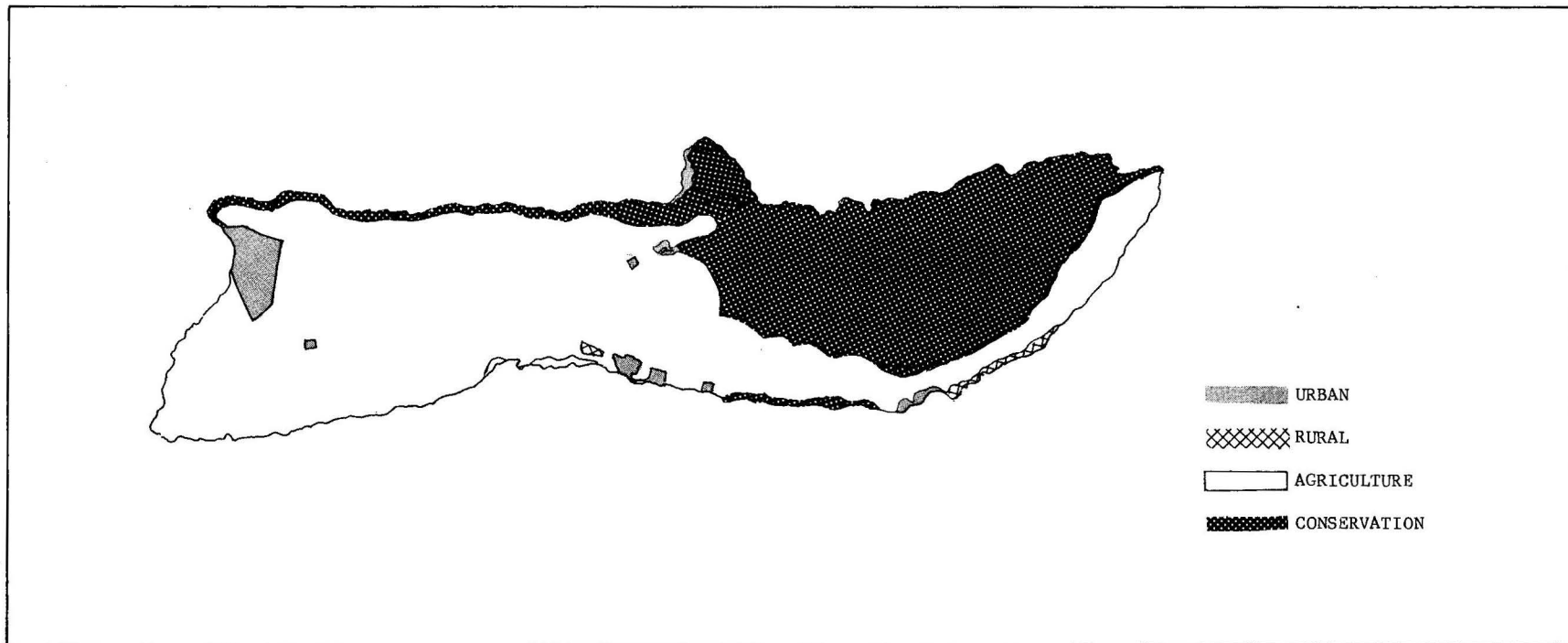
Agricultural Demand

Agricultural prices have increased phenomenally during the course of this study. While speculation and unusual market forces have been in part the causes of such fluctuations, it is widely believed that worldwide market forces will cause agricultural prices to remain at substantially higher levels than in the previous decade. If this is true, a number of diversified agricultural activities which have been marginally feasible in the past should become far more attractive for Molokai. There is insufficient space in this report to detail the

budgeting studies which have been conducted for producing sorghum, alfalfa, tomatoes and other vegetable crops, livestock feedlots, and other activities, some of which appear very attractive provided risk capital can be obtained. Furthermore, similar studies are continuing. Interested individuals may contact the Cooperative Extension Service or members of the Molokai Task Force subcommittee on agriculture for details.

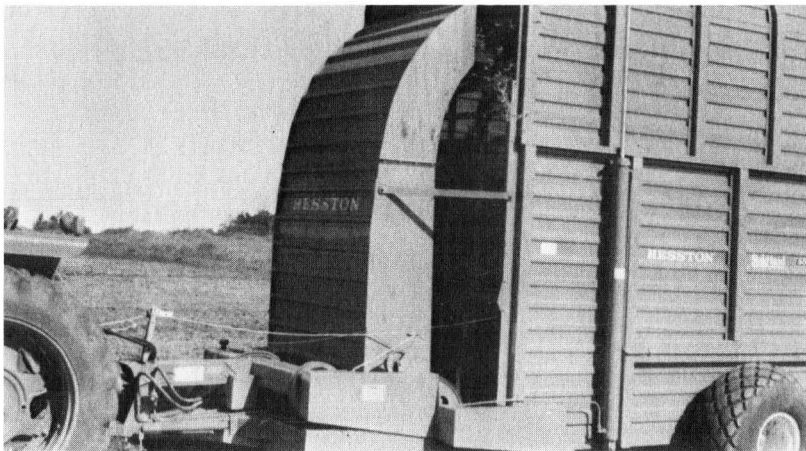
A major advantage of many types of diversified agriculture in Hawaii is the less expensive transportation costs in comparison with

FIGURE 16. STATE LAND USE BOUNDARIES FOR MOLOKAI.





Forage crops may replace pineapple on parts of Molokai.



Heavy investments in equipment may be needed for diversified agriculture.

products shipped from the Mainland. The opposite of course is true for agricultural commodities produced in Hawaii but shipped to the Mainland. Only in cases where Hawaii has clearcut production advantages, such as in pineapple and papayas, has it been able to successfully sell its agricultural products on the Mainland. Foreign export is also a possibility, particularly for extremely large levels of production for certain commodities. Consequently, non-corporate agriculture on Molokai is believed to have its best opportunities in producing for Hawaii markets. Production for sales outside Hawaii require higher levels of sophistication as well as assistance from competent marketing and promotion experts.

In estimating local market potential for an agricultural commodity, it is relatively easy to determine current marketings by adding together present local production and inshipments. If a product can be produced locally with some degree of efficiency, and inshipments are considerable, a farmer might reasonably assume that he would be able to capture a major share of the import market if he uses modern technology, maintains high quality, and through good management keeps his cost low enough to compete.

Table 11 indicates those crops which have some potential on the local market. Estimates are based on 1972 Statistics of Hawaiian Agriculture. (Crops such as macadamia, guava, pineapple, and papaya are not included since our local demand is being met and additional export markets are presently being explored by the industry.)

It is important to recognize that if sufficient managerial talent can be developed, financing made available, and windbreaks established

TABLE 11. ACREAGES REQUIRED TO REPLACE INSHIPMENTS, 1972.

Commodity	Amt. of Inshipment	Estimated Yield/Acre	Acreage
Alfalfa	21,120 Tons	10 Tons	2,112
Feed Grains*	96,718 Tons	3 Tons	32,239
Potatoes	27,163,000 lbs.	10,700 lbs.	2,538
Onions (dry)	8,866,000 lbs.	17,200 lbs.	515
Bananas	3,111,000 lbs.	8,300 lbs.	374
Tomatoes	7,054,000 lbs.	22,000 lbs.	321
Sweet Potatoes	394,000 lbs.	17,700 lbs.	22
Watermelon	4,333,000 lbs.	12,600 lbs.	344
Cantaloupe	2,171,000 lbs.	6,600 lbs.	329

* Includes corn, sorghum, barley, oats, millet, and other feed grains that could possibly be replaced by Island-grown corn, sorghum, or other grain crop.

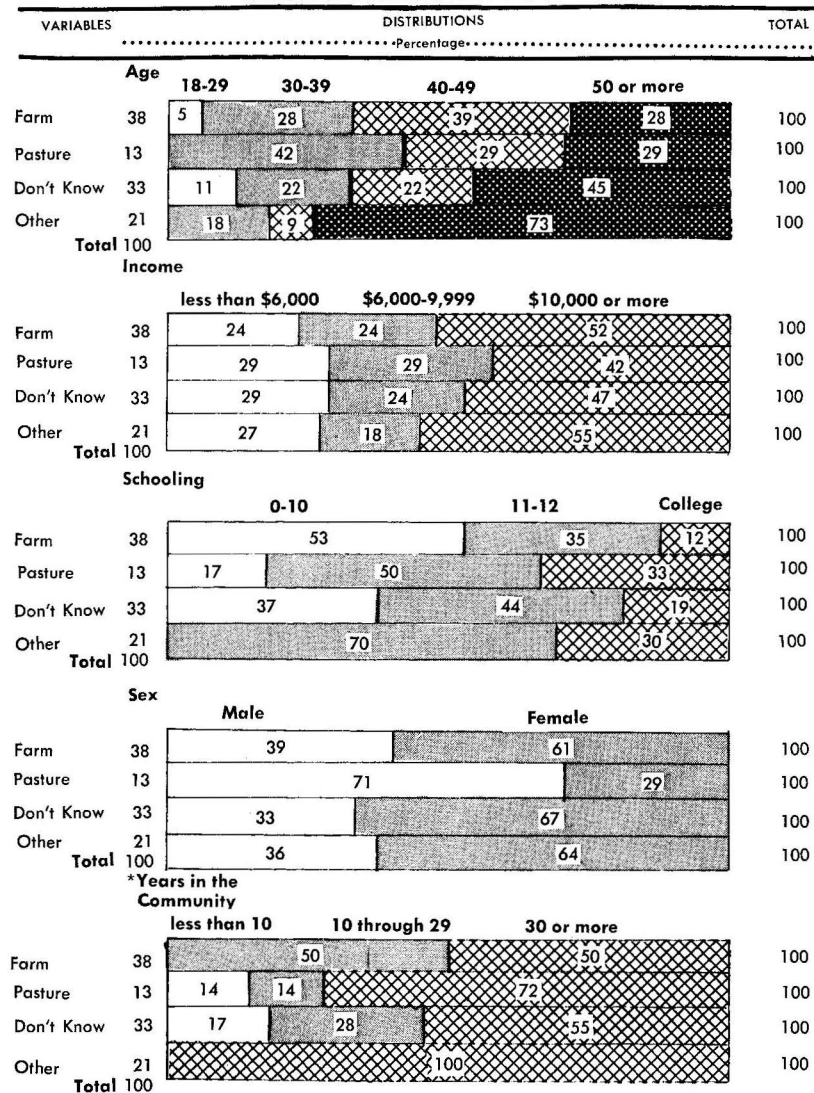


Sweet potatoes offer a limited economic opportunity.



Vegetable crops will require sophisticated production practices.

FIGURE 17. PROPOSED LAND USE FOLLOWING TERMINATION OF PINEAPPLE PLANTING AGREEMENTS.



*Differences in distributions are statistically significant at the .05 level.

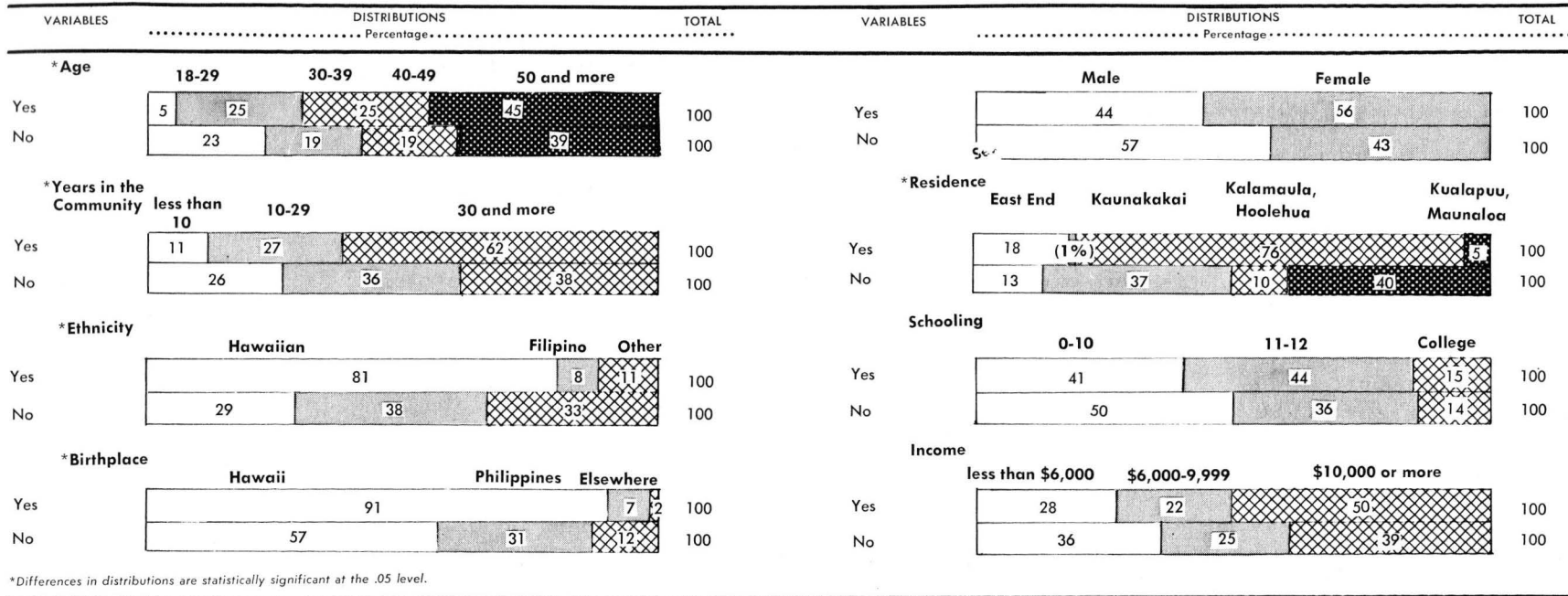
where needed, the amount of water presently available still places a major constraint on substantial efforts to cultivate diversified crops on Molokai for Hawaii's needs in place of present shipments from the Mainland. It is also important to note that possible acreages for some commodities, such as sweet potatoes, are limited unless foreign exports or Mainland sales become feasible. Nevertheless, neither water nor market demands seem to be the most serious constraints to developing large acreages of diversified crops on Molokai. The major obstacle is more likely a shortage of people with both the skills and motivation necessary for such efforts.

Human Resources

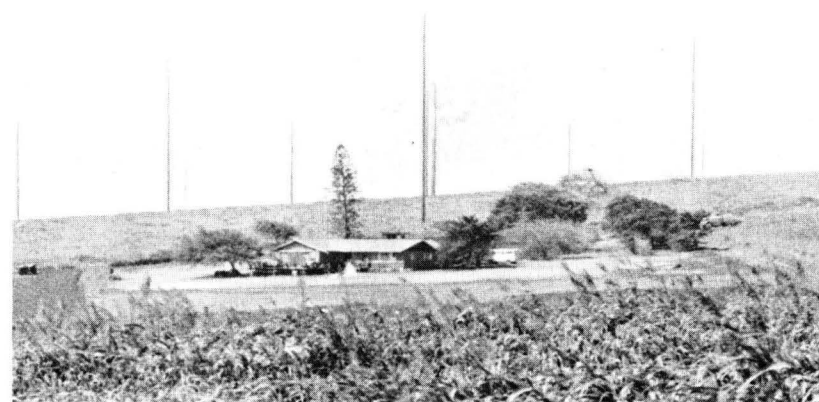
Homesteaders on Hawaiian Home Lands will have the most immediate potential for success in diversified agriculture because of their access to land. As part of the community-wide survey, the University study team asked respondents on Hawaiian Home Lands who had pineapple planting agreements what their plans were for the use of their forty-acre parcels. As shown in Figure 17, 38 percent indicated plans for the family to farm it themselves. Only 13 percent intended to use the land less intensively as pasture. Various other cooperative efforts were anticipated by 21 percent, and the remaining 33 percent did not yet have plans for the use of the land. Surprisingly, age, income, education, and sex were not statistically associated with responses to this question. Only the length of time spent in the community seemed to affect the responses, with long-time residents showing a marked hesitancy to farm the land intensively.

The community at large was questioned whether they had ready

FIGURE 18. ACCESS TO LAND AND VARIOUS CHARACTERISTICS.



access to land, even though they might not be interested in farming. Access was defined as owning, renting, leasing, or having other rights to two acres or more which could conceivably be used for some type of agriculture. The 19 percent positive response is thus slightly overstated, for two people, owner and renter, may be referring to the same piece of land. Nevertheless, the small number of people with present access to land will be a factor in future efforts in diversified agriculture on Molokai. Figure 18 illustrates a number of factors associated with access to land. Hawaiians and those born in Hawaii clearly predominate in having access. Most of



Homesteaders on Hawaiian Home Lands are searching for new uses of their lands.

this access is among Homesteaders in the Hoolehua area. Those with access to land also tended to be long-time residents who were slightly older.

About one-third of the respondents on Molokai indicated an interest in agriculture but very few had the experience or skills necessary, unless substantial assistance were available. Only a third of those with an interest in farming indicated a desire for agricultural training. Only 11 percent of those interested in agriculture

had experience in self-employed agriculture during the previous decade. Vegetable crops were most frequently mentioned as anticipated possibilities, although 35 percent of those interested in agriculture indicated desires to raise livestock.

If agriculture does remain as a major factor in the Molokai economy, it is also necessary to recognize that much of the labor demand may be highly seasonal in nature, thus giving rise to possible needs to import temporary employees.

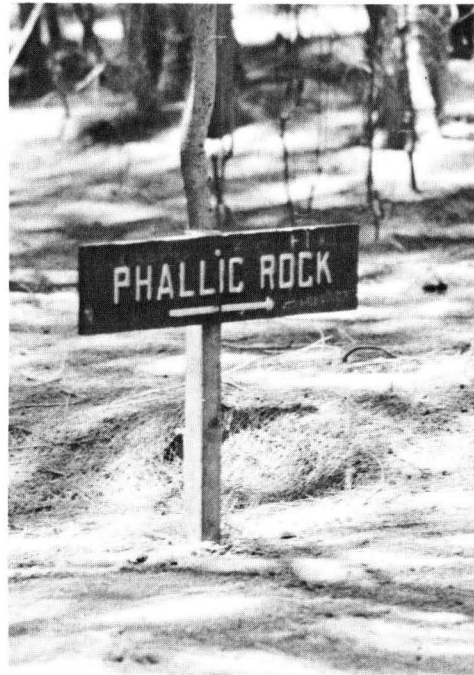
TOURISM



As residents of Molokai face the closing of pineapple operations by the end of 1975, many look toward the visitor industry as a major source of new jobs. Several questions are addressed below which have been widely discussed in the community, as well as in various levels of government concerned with the Molokai situation. Do the people on Molokai want more resorts on the Island? Are they interested in training for jobs in the resort industry? Can tourism succeed on Molokai? If it succeeds will local residents be able to gain employment or will outsiders be brought in? How many and what kind of jobs would be available?

Attitudes Toward Resort Development

As earlier discussed, the adult community gave a relatively low priority to keeping Molokai like it is without bringing in further resorts or manufacturing. This attitude is presumably tied to the concern for providing new jobs on the Island. As shown in Figure 19, 71 percent of the adults interviewed by the University of Hawaii study team were in favor of encouraging the development of resorts on the Island. (Many of those favoring resort development added qualifications such as not permitting high-rise development.) Ten percent were not sure of their feelings, and 19 percent were opposed to



Top: Hunting attracts some visitors to Molokai.

Left: Kalaupapa Lookout is a major tourist attraction.

Right: Molokai has many sites of historic and legendary significance.

further resorts. Interviews with 11th and 12th grade students on Molokai showed they did not share the enthusiasm of their elders for resort development; 22 percent favored it, with the remainder of the students evenly divided between being opposed and not having an opinion.

Attitudes of the adults were shown to be associated with age, length of residence in the community, education, income, ethnicity, birthplace, sex, and area of residence. The differences associated with these characteristics are shown in Figure 19. Generally speaking, the people most supportive of resort development were those facing loss of jobs in pineapple. Thus, two-thirds of those in favor were above age forty as compared to only 43 percent of those opposed being in that age group. Support most typically came from Filipinos in Kualapuu and Maunaloa. Opposition most typically existed among long-time residents, females, and those with higher levels of education and incomes. However, it is important to note that, with two exceptions, a clear majority of the respondents in all classifications shown in Figure 19 were in favor of resort development. (For example, although 71 percent of those opposing resort development were of Hawaiian ethnicity, those in opposition were only 21 percent of all Hawaiian respondents. Sixty-eight percent of the Hawaiians were in favor of the development.) A majority of the people with college educations and those born in places other than Hawaii or the Philippines were opposed to further resort development.

Interest in Resort Training

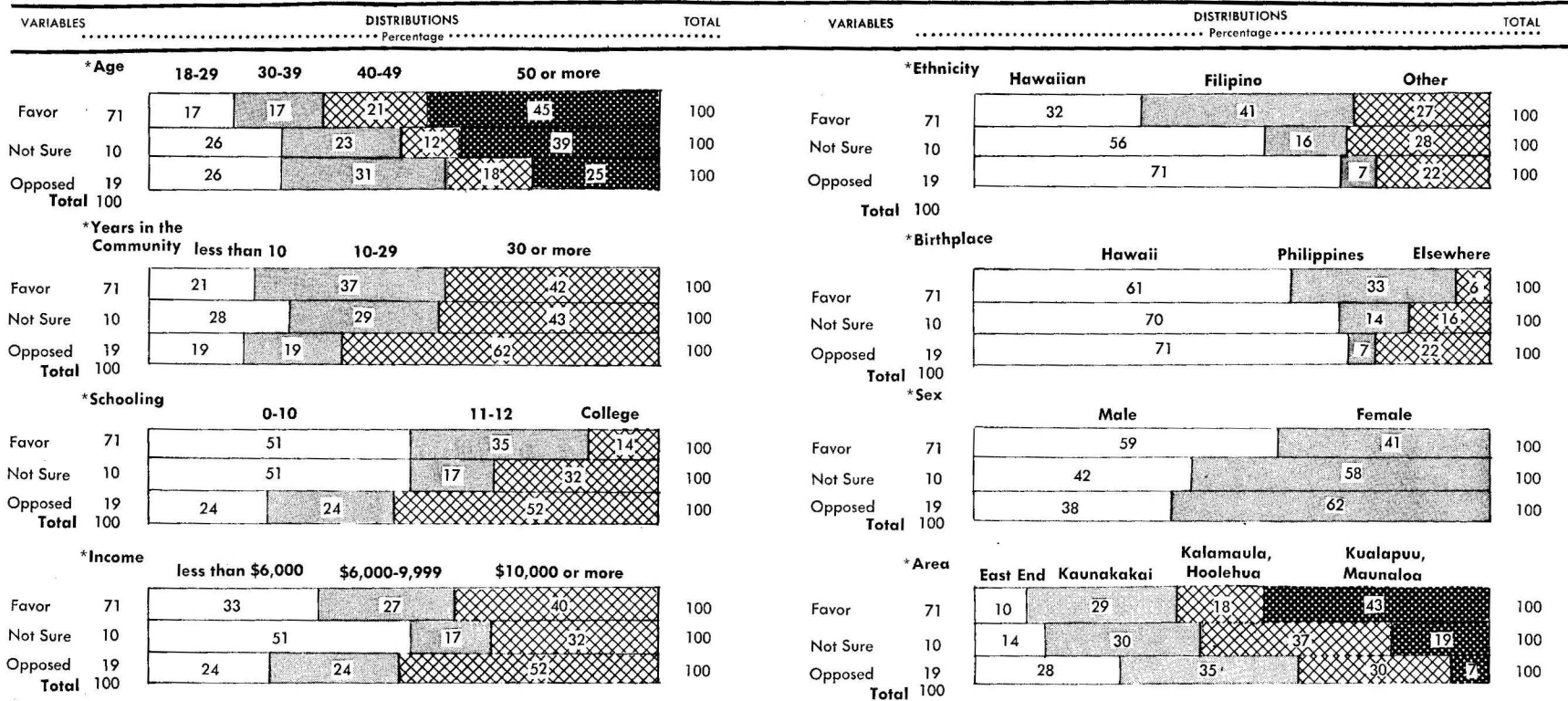
If a major reason for the favorable attitudes toward resort

development were a concern for more jobs, it would follow that a large portion of the adult population would be interested in job training which would prepare them for such jobs. As shown in Figure 20, 54 percent of the adults indicated an interest in such training. Not all of these individuals favored the development of the industry, but they apparently felt that if such developments were going to take place anyway they would be interested in participating in training. Others who favored resort development were often not interested in training, for they either were happy with other activities or they considered themselves ineligible for such employment due to age or similar reasons.

Some factors such as sex and place of residence on Molokai were not associated with differences in expressed interest in job training for the tourist industry. A number of other factors, as shown in Figure 20, did seem to make a difference in such interests. There was a slight tendency for older groups to be less interested in training. People with higher levels of education had a definite tendency to be less interested in changing jobs as would be implied by their participation in training. Also, a less definite tendency was shown by those in higher income groups to be interested in training.

There was a marked reluctance of people born elsewhere than in Hawaii to participate in training for jobs in the visitor industry. This reluctance was also characteristic of ethnic groups other than Hawaiians and Filipinos.

FIGURE 19. ATTITUDES TOWARD RESORT DEVELOPMENT.



*Differences in distributions are statistically significant at the .05 level.

FIGURE 20. INTEREST IN TRAINING PROGRAMS FOR TOURISM.

VARIABLES	DISTRIBUTIONS				TOTAL	
	Percentage					
*Age						
		18-29	30-39	40-49	50 or more	
Yes	54	24	21	21	34	100
No	41	14	21	17	48	100
Not Sure	5	19	14	14	53	100
Total	100					
*Schooling						
		0-10	11-12	College		
Yes	54	45	43	9		100
No	41	45	33	22		100
Not Sure	5	71		19	10	100
Total	100					
*Income						
		less than \$6,000	\$6,000-9,999	\$10,000 or more		
Yes	54	32	30	38		100
No	41	35	17	48		100
Not Sure	5	45	30	25		100
Total	100					
*Ethnicity						
		Hawaiian	Filipino	Other		
Yes	54	41	40	19		100
No	41	35	17	48		100
Not Sure	5	45	30	25		100
Total	100					
*Birthplace						
		Hawaii	Philippines	Elsewhere		
Yes	54	64	32	4		100
No	41	64	17	19		100
Not Sure	5	48	48	4		100
Total	100					

*Differences in distributions are statistically significant at the .05 level.



Pukoo is scheduled to be a site for a small resort development.



This nursery will supply plants for the Kaluakoi development.

TABLE 12. VISITORS STAYING OVERNIGHT OR LONGER, STATE OF HAWAII, 1962-1972.

Year	Westbound	% Increase	Eastbound	% Increase	Total	% Increase
1962	279,625	--	82,520	--	362,145	--
1963	332,680	18.9	96,460	16.8	429,140	18.5
1964	460,290	38.3	103,635	7.4	563,925	31.4
1965	567,218	23.2	119,710	15.5	686,928	21.8
1966	686,886	21.0	148,570	24.1	835,456	21.2
1967	893,103	30.1	231,715	55.9	1,124,818	34.6
1968	1,015,844	13.7	298,727	29.0	1,314,571	16.8
1969	1,181,029	16.2	345,983	15.9	1,527,012	16.1
1970	1,377,756	16.6	420,835	21.6	1,798,591	17.2
1971	1,430,325	3.8	388,619	-7.6	1,818,944	1.1
1972	1,782,737	24.7	461,650	18.7	2,244,377	23.3

Source: 1972 Annual Research Report, Hawaii Visitors Bureau

Generally speaking, the people most interested in job training were people facing economic difficulties due to termination of pineapple production or who already felt their employment opportunities were not highly desirable. This finding obviously holds no surprises and is typical of what might be expected anywhere in the State.

Can Tourism Succeed?

Jobs in the hotel industry in the State have increased from 4,235 in 1960 to 13,613 in 1970, an increase of 221 percent. This dramatic upsurge of tourism in Hawaii has been spurred on by increasing family incomes, more leisure time available for travel, and generally decreasing air fares. These factors indicate that the overall travel market will continue its rapid development. As shown in Table 12, the total number of overnight visitors to Hawaii increased from 362,145 in 1962 to 2,244,377 in 1972, an increase of 520 percent.

Hotel expansion in the past decade has grown from 10,915 visitor hotel rooms in 1962 to 36,608 in 1972. On the Neighbor Islands, hotel construction has represented between one-fifth and one-quarter of the total private investment and over one-half of the total commercial and industrial investment. The sharp increase in tourism experienced during the late 1960's was due, in part, to a combination of unusual forces—a booming U.S. wartime economy, the military Rest and Recreation Program, and a rapidly expanding Japanese economy. Molokai has not in the past bid seriously for a significant share of the tourist industry. This does not mean, however, that attempts cannot be made to develop potential resources on the Island that might have appeal for Mainland, Japanese, and local visitors.

Anticipated hotel occupancy is one of the primary factors governing decisions by investors regarding expansion. Construction and

TABLE 13. NEIGHBOR ISLAND HOTEL ROOM OCCUPANCY RATES, JANUARY, 1970, THROUGH MARCH, 1973.

Time Period	1970	1971	1972	1973
	-----Percentage-----			
January	59.4	52.7	52.5	74.6
February	71.5	72.6	77.2	94.1
March	73.4	69.4	78.6	88.9
April	58.6	63.1	61.9	
May	60.6	62.3	58.5	
June	64.4	62.2	60.0	
July	73.4	71.6	72.5	
August	81.9	78.5	78.5	
September	56.9	60.4	62.1	
October	64.2	67.6	73.9	
November	51.6	49.5	63.0	
December	58.3	52.8	57.2	
Year	64.8	63.5	66.4	

Source: Neighbor Island Hotels

operational costs in Hawaii require a correspondingly high occupancy rate if the enterprise is to be financially successful. Many operations view 70 to 75 percent occupancy as the "break-even" point. Generally, occupancy rates of slightly higher than 75 percent lead to only modest increases in hotel investments and 80 percent leads to more substantial expansion.^{1/} Occupancy levels in the Outer Islands since 1970 are shown in Table 13. Existing and planned facilities for Molokai are shown in Table 14.

If Molokai is to compete on a larger scale in Hawaii's tourist industry, it must either offer a unique package of attractions or it

^{1/} *Tourism in Hawaii*, State of Hawaii Department of Planning and Economic Development, Volume I. p. 25.

must do a better or equal job of offering similar attractions. It is clearly impractical and undesirable to propose an urban resort orientation such as is available on Oahu. If Molokai attempts to outperform established destination points on the Neighbor Islands, the most immediate competitor is the Kaanapali development on the west coast of Maui. In addition to having the advantage of being an ongoing destination area with attendant lower costs, the scenic attractions on Maui are at present more attractive to the typical tourist. The slight advantage Molokai has in terms of travel time and cost from Honolulu is not a significant portion of the tourist

TABLE 14. EXISTING AND PLANNED HOTEL AND CONDOMINIUM UNITS FOR MOLOKAI.

Name of Facility	Existing Units	"Planned" for Completion by December 1975
Hotel Molokai	56	--
Pau Hana Inn	32	--
Hawaiian General Corp. (Puhala)	--	125
Pukoo	--	85
Manuwai	--	10
Kaluakoi (unnamed)	--	236
W. Yee (unnamed)	--	18
Total	88	474

Source: Hawaii Visitors Bureau Research Department, "Visitor Plant Inventory," February 1973, and interviews with developers

dollar and time budget. This type of tourist development thus appears very discouraging as a major thrust for tourist development.

Three possible strategies for unique types of resort development are more encouraging. One obvious route is to try to preserve and foster an "undeveloped" image in terms of resort development. There is no question but that a significant portion of out-of-state as well as in-state visitors prefer this atmosphere to that encountered in more "commercial" resort areas. This approach has severe limitations, however. By its very nature growth of the industry is limited to some level, beyond which it is too "commercial." There is also a limit to the percentage of visitors who prefer this type of attraction.

A second promising approach would be to offer a "commercial," but unique, package. Some have talked of importing exotic animals on an extensive scale for viewing or hunting. Such ventures are becoming successful on the Mainland, suggesting that most tourists may prefer such an experience there for far less travel cost. It might also be possible to build a destination area around an exclusively Japanese clientele by providing facilities and services within the culture and language of this group. The obvious drawback of this approach derives from the unknown level of preferences for Japanese tourists to experience American modes of living rather than experience their culture simply transplanted to a tropical setting.

The third possible unique approach may be the most promising, although it may take a longer time period to achieve a major economic impact in the community. Due to Molokai's proximity to Honolulu and

anticipated dramatic improvements in the convenience and declines in the costs of transportation between Oahu and Molokai, it appears likely that the relatively uncrowded situation and low land costs on Molokai will attract part-time residents and some commuters to live on the Island. Many of these people will prefer condominium or apartment residences or some other type of planned development which would be similar in many ways to resort complexes. Employment is dramatically less for this type of development, given equal levels of capital investment, but the impact on the local economy is far more stable.

If resort development is to be encouraged, some combination of the above three groups of alternatives would be most successful. The type of developments encouraged will affect dramatically the level and nature of employment generated.

Number and Types of Jobs

Hotel investment has a favorable impact on a community only to the extent that it generates acceptable job opportunities both during the construction phase and the subsequent operation of the facility, and it stimulates other aspects of the economy involved. Experience in other rural isolated areas indicates that very few local residents will be employed in the construction of resorts and attendant facilities. People with specialized skills will be brought in from Honolulu and the West Coast for short time periods. Since these people are only temporarily living near the construction site, they tend to spend the bulk of their incomes near their permanent residences. The overall immediate economic impact of resort construction

in and of itself is thus not considerable.

To those in the Molokai community seeking employment the following questions are of interest:

- . How many jobs will be generated per hotel room?
- . What kinds of jobs will be generated?
- . What pay rates might be expected?
- . Where can potential employees obtain necessary job training?

An indirect method of answering some of these questions is to examine employment in hotels in the non-metropolitan areas of Hawaii. The hotels examined by the study team were large resorts of the type most prevalent in rural areas. Generally they accommodate the pleasure-seeking visitor for an extended stay. Although hotels studied had approximately 500 guest rooms, it is believed that the ratio between jobs and hotel units would apply for hotels half that size or somewhat larger.



Public parks must be further developed if tourism increases.

Employees were categorized as: (1) regular full-time employees (30 hours minimum per week on an annual basis); (2) regular part-time employees (a minimum of 20 or more hours on a weekly basis and 30 hours weekly on an annual basis); (3) supplemental employees (less than 20 hours per week). Each hotel unit (room) was associated with .38 full-time jobs, .12 part-time jobs, and .14 supplemental jobs. This amounts to a total of about .64 jobs in the resort complex per room. Data from a study of Maui County suggests that for every job in the tourist industry there will be an additional .72 jobs created as employees spend their income and as the resorts make purchases in the local economy.^{2/} This multiplier is likely lower for Molokai, but assuming it is reasonably accurate, there would thus be a total of 1.10 jobs brought into the local economy with the services associated with the construction of a hotel room.

Keeping in mind that many of the jobs in the resort industry are part-time, prevailing wage rates would permit reasonable levels of income. Existing wage levels are shown in Table 15.

The vast majority of jobs in resorts require manual labor with minimal training or moderate skills which can be learned on the job. Nevertheless, even these jobs require at least low levels of capabilities both in speaking and reading English. This is vital for all persons in contact with resort guests but is also necessary for

^{2/} Carlos Widmann and Heinz Spielmann, An Interindustry Analysis of the Economy of Maui County, Departmental Paper No. 5. Hawaii Agricultural Experiment Station, in publication.

TABLE 15. SALARY SCHEDULE FOR ILWU WORKERS, JUNE 1, 1973.

	Amt. per hour		Amt. per hour
Front Office		Dining Room	
Night Auditor	\$3.96	Bar Host	\$3.22
File Clerk	2.96	Waiter/Waitress	2.04
Cashier	3.52	Bus Boy	2.15
Room Clerk	3.45	Cashier	3.27
Key Clerk	3.16		
Lobby Services		Housekeeping	
Bell Clerk	2.68	Inspectress	2.88
Bellman	1.88	Houseman	2.77
Host	2.68	Room Maid	2.69
Bell Captain	2.25	Laundry Man	2.77
Food Preparation		Building and Grounds	
Cook I	4.48	Gen. Maintenance 1st class	4.68
Cook II	4.19	Gen. Maintenance 2nd class	4.06
Cook III	3.59	Gen. Maintenance Helper	3.29
Cook IV	3.16	Groundskeeper	2.93
Pantry I	3.59	Grounds Specialist	4.92
Pantry II	3.16		
Kitchen Utility	2.76		

Note: Salaries listed do not include tips, and lower salaries are listed for those who have the most opportunity to receive tips.

many other positions which involve some reading of instructions and writing of reports. Training for most jobs can be completed in a very short time, provided follow-up training on the job occurs and the trainees have the necessary minimal skills in English.

Of the hotels examined, approximately 29 percent of the positions are traditionally filled by women. Twenty-eight percent of the positions are most typically filled by males. The remaining 42 percent could conceivably be filled by either sex.

It would appear that residents on Molokai, given proper training,

should be able to qualify and compete favorably for most jobs.

Experience on Neighbor Islands resort areas has shown, however, that administrative personnel and key staff positions are usually filled with experienced people from either Oahu or other resort areas. Plans for development can include training opportunities for those who live on Molokai and hope to continue to do so. Whether this proves to be true will depend in part upon the interest and capabilities shown by local residents in such opportunities and upon the local pressures brought to bear upon developers and resort management.

POLICY IMPLICATIONS

Policy implications of this report can be divided into two levels--policies concerned with the transitional period and policies concerned with long-range developments. A number of actions such as income supplements and employment training will be essential to ease the transitional period of adjustment to whatever economic situation develops. Other more basic considerations are particularly relevant to the longer range development and planning of Molokai's economy.

Transitional Policies

Transitional activities can in large part be derived from ongoing government programs. Welfare and training programs are available once the need is established. Other efforts may necessarily be unique, such as the use of State funds for public works and the restoration of historical sites and trails. This effort might also be directed toward planting windbreaks on Hawaiian Home Lands or other State property with agricultural potential, although the legal technicalities of this possibility remain to be clarified. The use of plantation housing is also a short-run matter in that it must be resolved by the time the pineapple plantations close. This issue will likely involve negotiations between the ILWU, Molokai Ranch, the two pineapple companies, and County government.

While the information presented in this report should prove useful to various agencies and levels of government dealing with



Careful planning can assure a high quality of life for Molokai.

transitional problems, no concise policies emerge from the data. Only in the sense that general priorities can be established and the magnitude of the problem documented is it important that action agencies be aware of the findings of the report.

Since the members of the community will be forced to make many important personal decisions through the next several years, a knowledge of the findings of this report may be useful in assessing

future possibilities on Molokai as well as working for desired developments for the Island.

Long-Range Policies

The basic economic forces surrounding Molokai's future suggest that eventually the population may grow considerably, even to the point of being a suburb of Honolulu. This tendency does not mean that agricultural land use must disappear, nor that congestion and various types of pollution must occur. The question is no longer open as to whether Molokai will undergo considerable change and likely a considerable degree of stress. What remains to be determined is whether the changes can be controlled and planned in a manner that will be beneficial to the residents of the Island.

It will be necessary to deal with the two major bottlenecks for either agricultural or resort-residential development activity: water supply and surface transportation. Plans for further water development already exist, although they may need updating and more detailed preparation prior to implementation. Also, a lead time of at least several years will be needed before the present water supply can be substantially increased. Inter-island ferry systems have been dis-

cussed for many years. As discussed in Appendix IV, lower freight rates are not needed as much as better storing and shipping facilities along with far more frequent, regular docking. New technology and possible Federal funding make the implementation of such a system more likely than in the past. Considerable public expenditures will be necessary to deal with either of these bottlenecks. However, such efforts would likely benefit people throughout the State, not just those presently living on Molokai.

Another basic need that arises from this report is the eventual necessity for detailed land use and public investment planning for the Island. In some ways the next several years would be an advantageous time to prepare such plans. Only in this way will it be possible to plan the traffic arteries, recreation facilities and access, and the location of undesirable activities in such a way as to enhance the quality of living on Molokai. The alternative may be to see a period of economic quiet followed by a helter skelter of ill-conceived activities. The actions of Molokai residents, the Molokai Task Force, and various levels of government clearly indicate thus far that such a disastrous future will be avoided.

APPENDIX I HAWAIIAN HOME LANDS RESIDENTS

Approximately 303 households on Molokai occupy land leased from the State of Hawaii Department of Hawaiian Home Lands and administered by the Hawaiian Homes Commission. These lands constitute approximately 16 percent of the Island's total acreage (excluding Kalawao County) and are located in four basic areas. The Hoolehua-Central Plains homesteading area is the largest containing some 177 households. The other areas are near Kaunakakai: Kalamaula has 58 households, Kapaakea has 43, and One Alii II has 25.

About 7,721 acres of the Hawaiian Home Lands on Molokai are used for farmlots, 287 acres for houselots, and 832 acres for pasture lots. Additionally, there are 12,442 acres designated as community pasture for individuals residing on Molokai's Hawaiian Home Lands who wish to graze their animals.

Several major problems face the Hawaiian Homes Commission concerning the future use of land under their jurisdiction on the Island of Molokai:

1. The discontinuance of pineapple will eventually cause an approximate \$90 per month reduction in family incomes for those homesteaders holding pineapple planting agreements unless a viable alternative use for the land can be found.

2. Declining numbers of people with a high percentage of Hawaiian ancestry cause concern as to who should have first claim on future use of the land.
3. Paternalistic management of the homesteading program and retention of land titles by the government cause difficulties in establishing independent small-scale agriculture.

One of the purposes of this study was to attempt to provide information that would be useful to the Hawaiian Homes Commission as it faces the future problems under its jurisdiction on Molokai.

Survey Results

During January, 1973, a random sample of 20 percent of all Molokai households were surveyed. All adults, 18 years or older, were interviewed by the University study team. Among the Island-wide survey respondents were 118 individuals residing on Hawaiian Home Lands. It is believed that these 118 interviews constituted a representative sample of the entire adult population living on Molokai's Hawaiian Home Lands, for Department figures show 58 percent of the households under their jurisdiction to be located in the Hoolehua area, and the University survey indicated a similar proportion, 61 percent, to be in this area.

Table 16 shows a number of characteristics of adults residing on Hawaiian Home Lands as reflected by the survey. As shown in the table, 53 males and 65 females were interviewed. Although the fact that females constitute 55 percent of the adult population is typical of such rural areas, the age distribution of this population is unusual. The table indicates a higher proportion of males in the oldest age category than females. The reverse was true for the two younger age groups up through age 39. This indicates a greater tendency for the younger men to leave the community. Also, the major portions of both groups are in excess of age 40, leaving relatively few younger adults in the community.

Table 16 also indicates the number of years spent in the Molokai community by the respondents. As noted in the table, 56 percent of those interviewed had resided in the community for 30 years or more. As would be expected, age was a significant factor with regard to the amount of time respondents had lived in the community.

The levels of formal education completed by the adults are also shown in Table 16. Approximately 44 percent of the respondents indicated that they had received less than 11 years of formal education. An equal percentage indicated education levels at the eleventh and twelfth grades. Only 12 percent of the respondents claimed they had any formal education or training beyond high school. Lower education levels were associated with the oldest adults, while eleventh- and twelfth-grade-education respondents are somewhat evenly distributed among the younger groups.

Only 31 percent of the adults responding to the survey indicated

TABLE 16. DISTRIBUTIONS OF HAWAIIAN HOME LANDS RESPONDENTS BY AGE.

Variables	Age Level				Total	
	18-29 (N=18)	30-39 (N=29)	40-49 (N=25)	50-above (N=46)	Percent	Number
-----percentage-----						
Sex						
Male	13.2	18.9	22.6	45.3	100.0	53
Female	16.9	29.2	20.0	33.8	100.0	65
*Years in Community						
1-9	16.7	50.0	25.0	8.3	100.0	12
10-29	38.5	15.4	17.9	28.2	100.0	39
30 or more	0.0	25.7	22.7	51.5	100.0	66
*Education Level						
10th or less	0.0	11.5	17.3	71.2	100.0	52
11-12	28.8	26.9	30.8	13.5	100.0	52
Beyond H.S.	21.4	64.3	0.0	14.3	100.0	14
*Income Level						
Less than \$5,999	16.7	9.5	9.5	64.3	100.0	42
\$6,000 to \$9,999	18.5	29.6	25.9	25.9	100.0	27
\$10,000 and above	11.1	37.8	31.1	20.0	100.0	45
Doctor Visits						
None	7.7	19.2	19.2	53.8	100.0	26
1-3	12.8	28.2	17.9	41.0	100.0	39
4-6	20.0	32.0	28.0	20.0	100.0	25
7-above	21.4	17.9	21.4	39.3	100.0	28
*Dentist Visits						
None	12.5	18.8	17.2	51.6	100.0	64
1-2	19.4	35.5	16.1	29.0	100.0	31
3-above	17.4	26.1	39.1	17.4	100.0	23
Community Change						
Better	13.7	26.0	20.5	39.7	100.0	73
Same	14.8	22.2	25.9	37.0	100.0	27
Worse	22.2	22.2	16.7	38.9	100.0	18
*Move from Molokai?						
Yes	50.0	18.8	12.5	18.8	100.0	16
No	9.9	24.8	22.8	42.6	100.0	101

Table 16 Continued

Variables	Age Level				Total	
	18-29 (N=18)	30-39 (N=29)	40-49 (N=25)	50-above (N=46)	Percent	Number
	-----percentage-----					
Change Eligibility Requirement?						
Yes	17.1	29.3	19.5	34.1	100.0	82
No	13.8	17.2	31.0	37.9	100.0	29
Not Sure	0.0	0.0	0.0	100.0	100.0	5
Equal Job Opportunities?						
Agree	10.3	25.6	23.1	41.0	100.0	78
Disagree	27.0	21.6	16.2	35.1	100.0	37
Alternative Use of Pineapple Planting Agreement Lands						
Farm It Myself	5.0	30.0	40.0	25.0	100.0	20
Use As Pasture	0.0	42.9	28.6	28.6	100.0	7
Don't Know	09.5	19.0	28.6	42.9	100.0	21
Other Use	0.0	18.2	9.1	72.7	100.0	11
Interested in Farming?						
No	14.3	20.6	20.6	44.4	100.0	63
Yes, full-time	3.8	24.0	16.0	52.0	100.0	25
Yes, part-time	21.7	34.8	30.4	13.0	100.0	23
Not Sure	33.3	66.7	0.0	0.0	100.0	3
Need Financial Assistance?						
No Response	3.4	24.5	20.8	45.3	100.0	53
Yes	15.7	29.4	23.5	31.4	100.0	51
No	35.7	7.1	14.3	42.9	100.0	14
Farmer Training Program?						
No Response	9.4	24.5	20.8	45.3	100.0	53
Yes	17.6	27.5	23.5	31.4	100.0	51
No	28.6	14.3	14.3	42.9	100.0	14
Type of Farming:						
No Response	13.6	21.2	19.7	45.4	100.0	66
Livestock	15.1	30.3	21.2	33.3	100.0	33
Vegetables	23.0	38.5	19.2	19.2	100.0	26
Orchard Crops	28.5	28.5	28.5	14.2	100.0	7
Other	0.0	25.0	25.0	50.0	100.0	4

Table 16 Continued

Variables	Age Level				Total	
	18-29 (N=18)	30-39 (N=29)	40-49 (N=25)	50-above (N=46)	Percent	Number
	-----percentage-----					
Last Engaged in Self-Employed Agriculture						
Past Year	25.0	37.5	25.0	12.5	100.0	8
Last 5 Years	25.0	0.0	12.5	62.5	100.0	8
Last 5-10 Years	0.0	25.0	0.0	75.0	100.0	8
None	14.9	25.5	23.4	36.2	100.0	94
Others in Family Interested?						
No	11.1	16.7	27.8	44.4	100.0	36
Yes, full-time	0.0	45.5	27.3	27.3	100.0	11
Yes, part-time	25.0	0.0	25.0	50.0	100.0	4
Not Sure	0.0	40.0	13.3	46.7	100.0	15
No Response	25.0	23.0	17.3	34.6	100.0	52
Resort Development?						
Favor	14.5	24.6	23.2	37.7	100.0	69
Not Sure	18.2	27.3	22.7	31.8	100.0	22
Opposed	12.5	25.0	16.7	45.8	100.0	24
Training for Resort Industry?						
Yes	19.2	24.7	21.9	34.2	100.0	73
No	7.3	26.8	22.0	43.9	100.0	41
Not Sure	33.3	0.0	0.0	66.7	100.0	3

* Differences in percentage distributions are statistically significant at the .05 level.

that they were pure Hawaiian. Fifty-six percent were of part-Hawaiian ancestry. Surprisingly age did not result in statistically significant differences with regard to the ethnicity factor. As anticipated, age was definitely associated with various levels of income. Thirty-seven percent of the adults interviewed indicated that their household

income was less than \$6,000 a year. This percentage is approximately the same as that experienced by population of the Island as a whole. However, it is important to note that the bulk of the low-income population was respondents above age 50. As noted in the table, the other two income categories are much more evenly distributed among the four age groups.

Twenty-six of the adult respondents, or 22 percent, indicated that they had made no doctor visits during the preceding year. Nine, or 33 percent, indicated between one and three doctor visits. Other related figures are shown in Table 16. Most significant is that 28, or 24 percent, of the adult population indicated they had been to the doctor seven or more times during the preceding year. Although age was anticipated to be associated with a higher number of doctor visits, statistical measurements did not indicate such a relationship. A statistical relationship was established between years of age and the number of dental visits. Sixty-four respondents, 54 percent, indicated that they had not received dental care during the previous year. More than half of this group indicated that they were 50 years of age or older. Only 23, or 19 percent, of the total number of respondents indicated dental problems requiring three or more visits to the dentist.

When respondents were asked whether they felt the community had become a better place to work and live during the past several years, 62 percent indicated they thought the community had improved. This is contrasted to the 52 percent of the adult community at large with the same beliefs. Only 15 percent of those living on Hawaiian Home

Lands felt the community had become a worse place to live in contrast to the 43 percent of the respondents surveyed in the entire community with similar views. Age was apparently not an important factor in deriving this belief. Related to this question of community change was whether the respondents felt that they might move from Molokai. As shown in the table, only 16 of the 117 respondents indicated that they may move from Molokai in the next several years. A major portion of those indicating the possibility of moving were below 40 years of age.

As previously mentioned, one of the major considerations before the Hawaiian Homes Commission is whether or not the eligibility requirement should be altered so as to permit those of less than 50 percent Hawaiian ancestry to inherit the rights established under the program. Eighty-two, or 71 percent, of the adult respondents felt that this eligibility requirement should be amended. Age did not seem to be a factor influencing this opinion.

Economic Considerations

Hawaiian Home Lands respondents were asked if they felt that racial ancestry was an important consideration in securing desirable employment on Molokai. As shown in Table 16, 32 percent of the respondents felt that ethnicity was a factor while the remaining 68 percent did not feel that such discrimination existed.

The individuals residing on Hawaiian Home Lands most seriously affected by the anticipated economic transition will be those who have had pineapple planting agreements with the two plantations. As shown in Table 16, 59 individuals interviewed have had their lands in

such planting agreements. Twenty individuals in this group indicated that in absence of pineapple cultivation on their land they would use the land for pasture.

One hundred fourteen of the respondents on both houselots and homesteads were asked if they would be interested in farming. Of these respondents, 63, or 55 percent, indicated they had no such interests; 48, or 42 percent, expressed an interest in farming activities either on a full-time or part-time basis.

Respondents were also asked if they would need financial assistance if they were to engage in farming. Of the 118 respondents, 53 felt that they were not interested in farming or for other reasons could not answer the question. Of the 65 remaining respondents, 78 percent indicated a need for financial assistance. As also indicated in the table, the same proportions were interested in participating in farmer training programs. Age was not a significant factor in the distribution of responses for either of these considerations.

Respondents were questioned as to what types of farming they would be interested in. Of the 118 interviewed, 33 individuals indicated that they were interested in livestock raising. Twenty-six respondents expressed an interest in vegetable crops. In contrast, 66 individuals were not interested in farming or were not able to answer such questions. It is important to note that some individuals may have expressed interest in more than one commodity. The remaining responses are shown in Table 16.

Table 16 also gives some indication of the degree of agricultural experience of the respondents in the recent past. Of the 118 inter-

viewed, only 24 indicated any experience in self-employed agriculture during the past ten years, 13 of whom were age 50 or above. Responses indicated that only 11, or about 9 percent of the adults, had both the experience and youth that would be useful in entering into any types of new agricultural endeavors. Only 15, or 13 percent, indicated that other members of their family might be interested in engaging in some type of agriculture.

At the time of the survey employment in the resort industry appeared to be the most viable alternative to agricultural employment on Molokai. Of those interviewed, 60 percent favored further resort development on the Island. Although qualifications were often given to the stance offered, the majority of those residing on Hawaiian Home Lands seemed to favor the encouragement of resort development. As shown in the table, approximately the same percentage of those who favored development indicated an interest in resort training. However, it should be kept in mind that although some respondents indicated that they opposed further development, they also expressed a willingness to participate in job training programs in the resort field.

This discussion of the relevant characteristics of the respondents residing on Hawaiian Home Lands has largely been centered around the major determinant of age groupings. Of the total number (118) of respondents residing on Hawaiian Home Lands, 18, or 15 percent, were in the age categories of 18 through 29. Twenty-nine, or 5 percent, were in the age categories of 30 through 39. Twenty-five, or 21 percent, were in the 40 through 49 category, and 46, or 39 percent, were above age 50. These percentage distributions are considered to be

approximately descriptive of the adult population presently living on Hawaiian Home Lands on Molokai. This inference is also true for the other data reported. Discussion of the following data will not be as detailed as has been the case for age. Only the more important combinations of variables will be reported.

Schooling and Other Characteristics

Levels of formal schooling of Hawaiian Home Lands respondents are cross-classified with a number of variables, shown in Table 17. As earlier discussed, age is statistically related to the level of schooling. Perhaps the most telling statistics in this regard are that none of those interviewed in the age categories of 18 through 29 had less than a tenth-grade education, whereas 80 percent of those in the age category of 50 or above had lower levels of education.

The relationship between schooling and the years the respondent had spent in the Molokai community was also shown to be statistically significant. In large part this may be attributed to the obvious fact that those who have spent longer periods of time in the community are also older.

As noted in Table 17, there was a somewhat greater tendency for those with higher educations to indicate a possibility of moving from Molokai. (Only 16 of the 117 respondents indicated that they might possibly make such a move.)

As discussed earlier, respondents were asked what they thought they might do with land they presently had under pineapple planting agreements and if they were interested in going into farming themselves. These responses are shown in Table 17. Somewhat surprising-

ly, levels of schooling were not associated with the different responses given to these two questions.

In terms of attitudes toward further resort development on the Island and training for jobs in the resort industry, positive responses were generally given to both of these questions. Furthermore, the levels of schooling did affect the responses to both of these questions; it will be recalled that age did not affect responses. The majority of those favoring resort development indicated educations of eleventh grade or above, whereas the majority of those either opposing or not sure as to whether they favored further resort development indicated educations of tenth grade or below. Similar figures are shown for those individuals who are interested in training for employment in the resort field as opposed to those who were

TABLE 17. DISTRIBUTIONS OF HAWAIIAN HOME LANDS RESPONDENTS BY SCHOOLING.

Variables	Education Level			Total	
	10th or Less (N=52)	11th-12th (N=51)	Beyond H.S. (N=14)	Percent	Number
-----percentage-----					
*Age					
18-29	0.0	83.3	16.7	100.0	18
30-39	20.7	48.3	31.0	100.0	29
40-49	36.0	64.0	0.0	100.0	25
50 or more	80.4	15.2	4.3	100.0	46
*Years in Community					
1-9	8.3	50.0	41.7	100.0	12
10-29	28.2	56.4	15.4	100.0	39
30 or more	59.1	36.4	4.5	100.0	66
*Move from Molokai?					
Yes	12.5	56.3	31.3	100.0	16
No	49.5	41.6	8.9	100.0	101

Table 17 Continued

Variables	Education Level			Total	
	10th or Less (N=52) -----percentage-----	11th-12th (N=51)	Beyond H.S. (N=14)	Percent	Number
Alternative Use of Pineapple Planting Agreement Lands					
Farm It Myself	50.0	40.0	10.0	100.0	20
Use As Pasture	14.3	42.9	42.9	100.0	7
Don't Know	42.9	42.9	14.3	100.0	21
Other Use	63.6	36.4	0.0	100.0	11
Interested in Farming?					
No	41.3	47.6	11.1	100.0	63
Yes, full-time	60.0	32.0	8.0	100.0	25
Yes, part-time	34.8	43.5	21.7	100.0	23
Not Sure	33.3	66.7	0.0	100.0	3
*Resort Develop- ment?					
Favor	34.8	47.8	17.4	100.0	69
Not Sure	59.1	40.9	0.0	100.0	22
Oppose	58.3	37.5	4.2	100.0	24
*Training for Resort Industry?					
Yes	37.0	54.8	8.2	100.0	73
No	53.7	26.8	19.5	100.0	41
Not Sure	66.7	33.3	0.0	100.0	3

* Differences in percentage distributions are statistically significant at the .05 level.

not certain or who showed no such interest.

Income As a Factor

Table 18 shows the responses of the individuals as categorized by three basic income groups. Of the 113 people giving information concerning household income, 42, or 37 percent, indicated incomes of

less than \$6,000. Twenty-seven, or 24 percent, indicated incomes between \$6,000 and \$10,000. The remaining 44, or 39 percent, of the respondents estimated their household incomes as exceeding \$10,000 per year.

Somewhat surprisingly, the levels of income did not affect the responses to the question concerning perceived needs for financial assistance in farming. Although it might appear intuitively from examination of the figures reported in Table 18 that a greater proportion of those with higher incomes suggested the need for financial assistance than did those with lower incomes, such differences are not statistically significant.

As anticipated, age was shown to be associated with income levels. Individuals in the lowest income categories tended to be both the younger adults and the older respondents, while those in the age categories of 30 to 50 more typically reported incomes in excess of \$10,000.

It was also found that location was associated with the level of household income reported. A smaller proportion of those living in the Hoolehua area as compared with those on other Hawaiian Home Lands showed incomes below the level of \$6,000. Other than the speculation that the pineapple planting agreements provided supplemental income for the residents on homesteads, which is not the case in other areas of the Island, there is no other ready explanation for the income differentials shown with regard to location.

It is recalled that schooling and age levels were not significantly associated with areas of residence. In contrast to the rest

TABLE 18. DISTRIBUTIONS OF HAWAIIAN HOME LANDS RESPONDENTS BY INCOME.

Variables	Income Level			Total	
	Less than \$6,000 (N=42)	\$6,000-\$9,999 (N=27)	\$10,000 or more (N=44)	Percent	Number
	-----percentage-----				
Need Financial Assistance to Farm					
No Response	47.1	17.6	35.3	100.0	51
Yes	24.5	30.6	44.9	100.0	49
No	42.9	21.4	35.7	100.0	14
*Age					
18-29	41.2	29.4	29.4	100.0	17
30-39	13.8	27.6	58.6	100.0	29
40-49	16.0	28.0	56.0	100.0	25
50 or more	62.8	16.3	20.9	100.0	43
Schooling					
10th or Less	51.0	18.4	30.6	100.0	49
11th-12th	25.5	31.4	43.1	100.0	51
Beyond H.S.	28.6	14.3	57.1	100.0	14

* Differences in percentage distributions are statistically significant at the .05 level.

of the Molokai community, levels of schooling were not associated with differences in income levels. The income levels of Hawaiian Home Lands respondents as categorized by levels of schooling are also shown in Table 18. A number of other characteristics were anticipated to be statistically associated with levels of income. These characteristics included the number of dental and doctor visits, perceptions of improvement or deterioration of the community, intentions of moving from the Island, and the preference of changing the racial criterion for inheritance of Hawaiian Homes leases. However, it was found that income levels were not statistically significant in affecting those responses.

Length of Residence

One hundred sixteen respondents indicated the length of time that they had lived in the Molokai community. This is shown in Table 19. Only 12 of the adults, or 10 percent of the total, indicated they had been living on Molokai for less than 10 years while another 39, or 34 percent, indicated they had resided on the Island from 10 through 29 years. The remaining 65, or 56 percent, indicated residence on the Island for 30 years or longer.

Since age was necessarily associated with the length of residence on the Island, the statistical degree of association was quite high. For example, as shown in the table, the majority of those 50 and

TABLE 19. DISTRIBUTIONS OF HAWAIIAN HOME LANDS RESPONDENTS BY LENGTH OF RESIDENCY IN THE COMMUNITY.

Variables	Length of Residence in Years			Total	
	1-9 (N=12)	10-29 (N=39)	30 or more (N=65)	Percent	Number
	-----percentage-----				
*Age					
18-29	11.1	88.9	0.0	100.0	18
30-39	21.4	21.4	57.1	100.0	28
40-49	12.0	28.0	60.0	100.0	25
50 or more	2.2	23.9	73.9	100.0	46
*Schooling					
10th or Less	2.0	21.6	76.5	100.0	51
11th-12th	11.5	42.3	46.2	100.0	52
Beyond H.S.	35.7	42.9	21.4	100.0	14
*Ethnicity					
Hawaiian	10.8	16.2	73.0	100.0	37
Part-Hawaiian	7.7	41.5	50.8	100.0	65
*Move from Molokai?					
Yes	25.0	43.8	31.3	100.0	16
No	8.0	31.0	61.0	100.0	100
*Alternative Use of Pineapple Planting Agreement Land					
Farm It Myself	0.0	50.0	50.0	100.0	20
Use As Pasture	14.3	14.3	71.4	100.0	7
Don't Know	23.8	28.6	47.6	100.0	21
Other Use	0.0	0.0	100.0	100.0	11
Interested in Farming?					
No	9.7	35.5	54.8	100.0	62
Yes, full-time	4.0	24.0	72.0	100.0	25
Yes, part-time	17.4	30.4	52.2	100.0	23
Not Sure	33.3	33.3	33.3	100.0	3
Resort Development?					
Favor	11.6	39.1	49.3	100.0	69
Not Sure	4.5	31.8	63.6	100.0	22
Opposed	13.0	17.4	69.6	100.0	23
Community Change					
Better	9.6	34.2	56.2	100.0	73
Same	11.5	30.8	57.7	100.0	26
Worse	11.1	33.3	55.6	100.0	18

* Differences in percentage distributions are statistically significant at the .05 level.

above had lived on Molokai for 30 years or more. Obviously it was impossible for anyone who was 18 through 29 to have lived on Molokai for 30 years or more.

The statistical association of schooling with length of residence can in part be attributed to the previously discussed association between schooling and age. Ethnicity, i.e., Hawaiian versus part-Hawaiian, was associated with length of residence on Molokai. As shown in Table 19, 73 percent of the 37 individuals claiming to be pure Hawaiian had resided on the Island for 30 years or more. This compares with only 51 percent of the 65 individuals indicating that they were part-Hawaiian who had resided on the Island for an equal length of time.

The responses to the item concerning intentions of alternative uses for land now under planting agreements was conditioned in part by the length of residence on the Island. As stated in Table 19, there was a greater tendency of the groups residing on the Island for 30 years or longer to indicate that they would use their land for pasture. A related question was whether they were interested in going into farming themselves. This question was asked of all respondents, not only those who had land in planting agreements. Responses are shown in the table. In this case there was no association between the response to interest in farming and the length of residence on Molokai.

As indicated in Table 19, the length of residence on the Island did not affect the respondents attitudes toward the development of a resort industry or community improvement.

Other Variables

A number of other variables were cross-classified with the responses discussed thus far. Sex was not found to be statistically associated with the responses analyzed above and ethnicity was not associated with any variables other than the length of residency in the community. Consequently these percentage responses are not reported.

Department of Hawaiian Home Lands Census

During late summer, 1972, the Hawaiian Home Lands Department conducted a census of its clientele on Molokai. Residents were asked a number of questions concerning themselves and members of their household. As shown in Tables 20 and 21, information concerning household income was gathered for a total of 1,134 individuals.

Caution should be exercised in interpreting much of this data, for weaknesses exist in the method which was used to gather it. One major weakness is that sampling procedures were not utilized in an attempt to gather information for an entire population. Since only 229 of approximately 300 households were contacted, biases may result which may affect information which might be used to infer back to the entire population. Also, due to the techniques by which this survey was conducted, inaccuracies are known to exist for much of the data not included in this report. For example, the selection of individuals who were well known and residing in the community to conduct the interviews may have resulted in a hesitancy on the part of many respondents to provide information in such sensitive areas as income derived from welfare or other stigmatized sources. Neverthe-

TABLE 20. DISTRIBUTIONS OF HAWAIIAN HOMES CENSUS RESPONDENTS BY INCOME.

Variables	Total Number	Household Income Levels			Total (N=1134)
		\$0-4,999 (N=155)	\$5-9,999 (N=365)	\$10,000 and above (N=614)	
-----percentage-----					
*Location					
Hoolehua	661 (58%)	14.2	27.7	58.1	100.0
One Alii	99 (9%)	8.1	40.4	51.5	100.0
Kapaakea	188 (17%)	7.4	35.1	57.4	100.0
Kalamaula	186 (16%)	21.0	40.9	38.2	100.0
Total	1134 (100%)				
*Age					
1-17 years	548 (49.1%)	9.9	34.1	56.0	100.0
18-29 years	144 (12.9%)	13.2	30.6	56.3	100.0
30-44 years	159 (14.2%)	11.3	26.4	62.3	100.0
45-59 years	157 (14.1%)	13.4	33.1	53.5	100.0
60-69 years	63 (5.6%)	28.6	31.7	39.7	100.0
70-99+ years	45 (4.0%)	51.1	20.0	28.9	100.0
Total	1116 (100.0%)				
*Marital Status					
Less than 17 Years of Age	523 (46.3%)	9.9	35.0	55.1	100.0
Married	409 (36.2%)	12.2	30.8	57.0	100.0
Widowed	59 (5.2%)	42.4	18.6	39.0	100.0
Never Married	125 (11.1%)	18.4	28.0	53.6	100.0
Divorced or Separated	13 (1.2%)	38.5	53.8	7.7	100.0
Total	1129 (100.0%)				
Ethnicity-Father					
Mixed Hawaiian	438 (38.9%)	11.0	31.7	57.3	100.0
Full Hawaiian	421 (37.4%)	15.2	32.5	52.3	100.0
Non Hawaiian	268 (23.8%)	16.0	32.1	51.9	100.0
Total	1127 (100.0%)				
*Ethnicity-Mother					
Mixed Hawaiian	509 (45.1%)	11.8	27.3	60.9	100.0
Full Hawaiian	492 (43.6%)	15.9	37.6	46.5	100.0
Non Hawaiian	128 (11.3%)	13.3	32.0	54.7	100.0
Total	1129 (100.0%)				

* Differences in percentage distributions are statistically significant at the .05 level.

TABLE 21. DISTRIBUTIONS OF HAWAIIAN HOMES CENSUS RESPONDENTS BY SCHOOLING.

Variables	Total Number	Years of Schooling					Total (N=1145)
		None (N=179)	1-5 (N=216)	6-11 (N=448)	High School (N=251)	Beyond High School (N=51)	
-----percentage-----							
*Age							
1-17 years	550 (48.9%)	27.1	31.6	38.7	2.5	0.0	100.0
18-29 years	147 (13.1%)	.7	.0	8.8	76.2	14.3	100.0
30-44 years	160 (14.2%)	.6	1.9	42.5	42.5	12.5	100.0
45-59 years	158 (14.0%)	5.1	6.3	62.0	24.1	2.5	100.0
60-69 years	65 (5.8%)	10.8	21.5	47.7	13.8	6.2	100.0
70-99+ years	45 (4.0%)	13.3	28.9	44.4	11.1	2.2	100.0
Total	1125 (100.0%)						

* Differences in percentage distributions are statistically significant at the .05 level.

less, it is believed that the statistics reflected below are reasonably accurate for the general population residing on Hawaiian Home Lands on Molokai. (Duplications of some of the findings in the University survey discussed above are not reported as part of this census discussion.)

A statistical association between income and marital status was demonstrated in the survey results. Higher income groups are reflected in households with children under age 17. Individuals indicating they were widowed or divorced reflected much lower income levels than did those in other marital status categories. Of the 606 adults interviewed who indicated their marital status, 67 percent were married.

As part of the Hawaiian Homes Department census, respondents were

asked to state the ethnicity of their father and mother. Of the total of 1,127 individuals for which data was gathered with regard to the ethnicity of the father, nearly one-fourth, 24 percent, indicated that their father was not of Hawaiian ancestry. The remainder were approximately evenly split as to their father being mixed-Hawaiian or full-Hawaiian. Only 11 percent of the respondents indicated that their mother had been of non-Hawaiian ancestry. The remainder of the mothers were also evenly split as to being mixed-Hawaiian or full-Hawaiian in ancestry. Surprisingly, only the ethnicity of the mother was associated with various income levels. Although not clear cut, there was a statistically significant tendency for individuals whose mothers were of mixed-Hawaiian or non-Hawaiian background to have household incomes at slightly higher levels than those who indicated that their mothers were of full-Hawaiian background.

Conclusion

The basic data concerning the residents of Hawaiian Home Lands on Molokai suggest that although this population is not unduly disadvantaged, they do not possess any clear cut advantages over the

general population. Their incomes and education levels, as well as general levels of satisfaction with their community, suggest a moderately comfortable group of people who are deeply rooted in their community.

APPENDIX II DATA ON YOUTH

The following data are discussed in greater detail in the preceding text. Since the sex of the respondents was found to be a major determining factor in explaining the nature of many replies, responses are cross-classified by this factor throughout the table. Asterisks denote instances where differences associated with the sex of the respondent are statistically significant at the .05 level.

Variables	Total Number	Males N=73	Females N=69	Total
		-----percentage-----		
*Age				
16 years	61 (43%)	36.1	63.9	100.0
17 years	61 (43%)	57.4	42.6	100.0
18 years	20 (14%)	80.0	20.0	100.0
Total	142 (100%)			
Place of birth				
Molokai	100 (71%)	45.0	55.0	100.0
Oahu	20 (14%)	60.0	40.0	100.0
Elsewhere in State	3 (2%)	66.7	33.3	100.0
Philippines	11 (8%)	81.8	18.2	100.0
US Mainland	7 (5%)	57.1	42.9	100.0
Total	141 (100%)			
Grade				
Junior	93 (65%)	48.4	51.6	100.0
Senior	49 (35%)	57.1	42.9	100.0
Total	142 (100%)			
*Ethnicity				
Part-Hawaiian	40 (30%)	50.0	50.0	100.0
Hawaiian	20 (15%)	75.0	25.0	100.0
Filipino	38 (29%)	57.9	42.1	100.0
Haole	7 (5%)	28.6	71.4	100.0
Japanese	22 (17%)	31.8	68.2	100.0
Other	6 (4%)	16.7	83.3	100.0
Total	133 (100%)			

Variables	Total Number	Males N=73	Females N=69	Total
		-----percentage-----		
*Expected career				
Agriculture	5 (5%)	100.0	00.0	100.0
Construction	13 (12%)	100.0	00.0	100.0
Government	7 (7%)	42.9	57.1	100.0
Professional	4 (4%)	00.0	100.0	100.0
Tourism	25 (23%)	24.0	76.0	100.0
Other	52 (49%)	57.7	42.3	100.0
Total	106 (100%)			
*Aspired career				
Agriculture	3 (3%)	33.3	66.7	100.0
Construction	5 (5%)	100.0	00.0	100.0
Government	16 (15%)	50.0	50.0	100.0
Professional	6 (6%)	50.0	50.0	100.0
Tourism	26 (25%)	26.9	73.1	100.0
Other	49 (46%)	55.1	44.9	100.0
Total	105 (100%)			
Preference for self-employment				
Not sure	57 (40%)	45.6	54.4	100.0
Own business	31 (22%)	67.7	32.3	100.0
Work for someone else	54 (38%)	48.1	51.9	100.0
Total	142 (100%)			
*Plans for first year following high school				
Work	10 (7%)	60.0	40.0	100.0
Military service	32 (23%)	87.5	12.5	100.0
Tech or business school	17 (12%)	35.3	64.7	100.0
Community college	28 (20%)	39.3	60.7	100.0
Four-year college	21 (15%)	33.3	66.7	100.0
No real idea	23 (17%)	47.8	52.2	100.0
Other	7 (5%)	28.6	71.4	100.0
Total	138 (100%)			

Variables	Total Number	Males	Females	Total
		N=73	N=69	
-----percentage-----				
Plans change due to pineapple shutdown?				
Yes	32 (23%)	65.6	34.4	100.0
No	106 (77%)	81.3	18.8	100.0
Total	138 (100%)			
*Discussed occupational/training goals with parents/guardians?				
Yes	79 (56%)	43.0	57.0	100.0
No	16 (11%)	81.3	18.8	100.0
Sort of	46 (33%)	54.3	45.7	100.0
Total	141 (100%)			
*Parents/guardians approve of goals?				
Yes	100 (71%)	46.0	54.0	100.0
No	3 (2%)	33.3	66.7	100.0
They don't care	5 (4%)	60.0	40.0	100.0
They don't know about goals	19 (14%)	84.2	15.8	100.0
They have mixed feelings	13 (9%)	46.2	53.8	100.0
Total	140 (100%)			
Has Molokai changed in past several years?				
Better	75 (53%)	53.3	46.6	100.0
Same	25 (18%)	40.0	60.0	100.0
Worse	30 (21%)	50.0	50.0	100.0
Undecided	12 (8%)	66.6	33.4	100.0
Total	142 (100%)			
*Where prefer to live?				
Molokai	47 (34%)	76.6	23.4	100.0
Maui	30 (22%)	23.3	76.7	100.0
Oahu	20 (15%)	40.0	60.0	100.0
Mainland US	24 (17%)	41.7	58.3	100.0
Other	17 (12%)	58.8	41.2	100.0
Total	138 (100%)			

Variables	Total Number	Males	Females	Total
		N=73	N=69	
-----percentage-----				
*Where to live if jobs were no problem?				
Molokai	52 (37%)	69.2	30.8	100.0
Maui	26 (19%)	26.9	73.1	100.0
Oahu	19 (14%)	47.4	52.6	100.0
Mainland US	26 (19%)	34.6	65.4	100.0
Other	16 (11%)	62.5	37.5	100.0
Total	139 (100%)			
Development of resort industry				
Favor	31 (22%)	48.4	51.6	100.0
Not sure	48 (34%)	56.3	43.7	100.0
Opposed	50 (35%)	48.0	52.0	100.0
Not able to respond	13 (9%)	53.8	46.2	100.0
Total	142 (100%)			
Likely to receive aid from:				
*Parents or relatives				
No	57 (40%)	66.7	33.3	100.0
Yes	85 (60%)	41.2	58.8	100.0
Total	142 (100%)			
*Scholarship				
No	87 (61%)	54.0	46.0	100.0
Yes	55 (39%)	47.3	52.7	100.0
Total	142 (100%)			
*Loan				
No	81 (57%)	60.5	39.5	100.0
Yes	61 (43%)	39.3	60.7	100.0
Total	142 (100%)			
Other source				
No	120 (85%)	51.7	48.3	100.0
Yes	22 (15%)	50.0	50.0	100.0
Total	142 (100%)			

Variables	Total Number	Males	Females	Total
		N=73	N=69	
		-----percentage-----		

Information about career and training opportunities from:

School guidance

program				
No	31 (22%)	58.1	41.9	100.0
Yes	111 (78%)	49.5	50.5	100.0
Total	142 (100%)			

*Family and relatives

No	111 (78%)	55.9	44.1	100.0
Yes	31 (22%)	35.5	64.5	100.0
Total	142 (100%)			

Other acquaintances

No	114 (80%)	53.5	46.5	100.0
Yes	28 (20%)	42.9	57.1	100.0
Total	142 (100%)			

Media

No	118 (83%)	51.7	48.3	100.0
Yes	24 (17%)	50.0	50.0	100.0
Total	142 (100%)			

*Other

No	125 (88%)	54.4	45.6	100.0
Yes	17 (12%)	29.4	70.6	100.0
Total	142 (100%)			

APPENDIX III

HISTORICAL AND ARCHAEOLOGICAL RESOURCES

The following listing is by no means exhaustive of the interesting historical and cultural sites on Molokai. Further work is being undertaken by the Bishop Museum as part of the State's inventory of known archaeological and historical sites. The list presented here was compiled by a group referred to as the Preservation of Historical Resources Ad Hoc Committee of the Commerce and Industry Subcommittee of the Molokai Task Force. This list is not intended as a guide for exploration, as a major portion of the sites occur on private property and may not be visited without the special permission of the landowner. The listing is in geographic procession from Halawa Valley to Kalae and subdivided into two sections: historic and archaeological sites. It is believed that all major sites are listed. Committee members are as follows:

Dorothe Curtis, Chairman
Harriet Ne
C. H. Kikukawa
Joan Aidem
Noah Pekelo, Jr.
Steve Petro
Nora Katahara
Philip Solatorio
Mr. and Mrs. Charles Meyer
George Tamura

HISTORIC SITES

1. Congregational Church and Graveyard, 1855
Halawa Valley

The original church structure was of stone, later plastered with lime. The bell tower is of wood frame construction. In 1930 a company from Honolulu was engaged to repair the church, at which time it was replastered. It is in fairly good condition.

2. Moanui Sugar Mill, 1872 (ruins only)
Moanui

It was the first sugar mill on Molokai, and closed operations sometime in the 1880's due to fire. It was built by Eugene Bal and now consists of the stone ruins of walls and a round stack.

3. Mapulehu Dairy, 1920 (ruins only)
Mapulehu Valley

Built by George P. Cooke of reinforced concrete construction, it included a dairy barn to accommodate 48 cows, a building for ice-making, and a cold storage plant. The dairy supplied local residents and the Leahi Home in Honolulu. The operation was abandoned in 1933.

4. Our Lady of Seven Sorrows Catholic Church, 1874
Kalua'aha

This was the first church to be built by Father Damien outside of Kalaupapa peninsula. It is of wood construction, and having been restored in 1967 it is in a good state of preservation. It is well maintained.

5. Congregational Church and Graveyard, 1844
Kalua'aha

This large, impressive church is the first built on Molokai and is considered the "Mother Church" of the island. It is of coral stone construction and was built by the Reverend Hitchcock with the help of his large Hawaiian congregation. It is badly in need of restoration.

6. Hitchcock Monument
Kalua'aha

Located on the hill northeast of the church, it marks the grave of the Rev. Hitchcock.

7. Chinese Cemetery, circa 1918
'Ualapue

This land was set aside by Ah Ping whose store and home were nearby. It is the only Chinese cemetery on the Island. Most of the gravestones are marked in Chinese characters.

8. Puko'o Post Office, circa 1910
'Ualapue

This wood frame building served as post office and home for the postmaster. It is in a decaying condition with the roof partially caved in.

9. Smith-Bronte Landing Site, 1927
Ka'amola

There is presently a marker at the site of the forced landing of the first commercial plane flight across the Pacific, made by Smith and Bronte.

10. St. Joseph's Catholic Church and Graveyard, 1876
Wawaia

Built by Father Damien, it was restored in 1971. Of wood frame construction, it is in a good state of preservation and well maintained. The original stone wall on the highway side of the property was removed about three years ago.

11. Kamalo Wharf, circa 1860
Kamalo

Said to have been in use in the 1860's, it is "much older." It was the major wharf facility for many years, and is still in use by local fishermen. A stone wall extends to an old wooden loading dock. Further information is not obtainable on Molokai.

12. McCorrison Houses, 1900 and 1914
Kamalo

The larger of the two houses was built by Oscar McCorrison in 1914 and is in fair condition. Hugh and his brother Dan operated the Kamalo Sugar Mill and Plantation in the late 1800's. The other house to the west is somewhat older, and is in rather poor

shape. They are both of wood frame construction, with interesting architectural features.

13. Malama, Kamehameha V's house site, circa 1850 (platform only)
Kaunakakai, northwest of wharf

This raised stone platform marks the site of Kamehameha V's beach house which stood until 1908. The platform is in fairly good shape. The site has recently been restored and the surrounding area fenced and landscaped by Hui Hawaii o' Molokai and the Molokai Ranch. A marker will be placed on the site.

14. Wireless Station, circa 1900
Kaunakakai, northeast of wharf

The original wireless station was located at Kamalo, west of the wharf. The operation moved to Kaunakakai in 1910 and closed in 1931. The building is a wood frame house in fairly good condition.

15. County Court House, Tax Office & Jail, circa 1880
Kaunakakai, northwest of County Library

The original site of these buildings was on the west side of Pukoo pond, makai of the main highway. In the early 1900's they were moved to 'Ualapue, on the west side of Kilohana School, mauka of the main highway, then to their present location in Kaunakakai in 1936. They are of wood frame construction and in good condition.

16. Kaunakakai Hotel, 1921
Kaunakakai, Ala Malama Ave.

This was the first hotel built in Kaunakakai. It was built and owned by Yasuo Michihara and Masutaro Yamamoto. It is a wood frame, two-story structure in fair condition.

17. Chang Tung Store
Kaunakakai

One of the first stores in Kaunakakai, it was also used as a home. It is a wood frame in poor condition.

18. Guzei ji Soto Mission, 1927
Kaunakakai, Hotel Lane

The only Buddhist mission on Molokai, it was built by Rev. Hozui Nakayama of wood frame construction. The mural painting on the interior was done by Tomiki Nishimura.

19. Kapuaiwa, Kamehameha V Coconut Grove, 1860
Kalamauia

One thousand trees on 10 acres are said to have been planted for Kamehameha V in the 1860's. Five springs were to be found within the grove. Tradition says that one was used for drinking water, one for communal bathing, another for farmers, and another used as the "kitchen sink spring." Only two remain. The trees are old and some have died.

20. World War II Bunkers, 1942
Molokai Airport

These bunkers were used as hangars for planes with living quarters for the pilots below. There are other fortified machine gun emplacements at strategic locations around the Island. Even though these are not particularly old, they did play a role in the history of the defense of Molokai.

21. Hawaiian Homes Commission Headquarters, 1923
Hoolehua

Built by the early homesteaders, the building was originally used as a meeting hall, for conferences, parties and dances. It holds fond memories for the Homesteaders.

22. Block of Original Del Monte Plantation Houses, 1927
Kualapuu

Rather than retain one house, it is felt that an entire block of typical plantation houses should be preserved and maintained.

23. Molokai Ranch Workers Houses, circa 1900
Kualapuu

This group of old buildings mauka of the present Kualapuu Market was used as homes for early ranch cowboys and other workers. They were turned over to Del Monte in the 1920's for use as housing for the plantation workers.

24. Puu Kolea, Molokai Ranch Directors' Home, 1912
Kauluwai

Still in use today as a ranch vacation house, it was temporarily converted in 1941 into an emergency 25-bed hospital by the O.C.D. Medical Department. It is in good condition.

25. Kauluwai Cemetery, Cooke Family Graveyard
Kauluwai

Located on the top of the hill, this graveyard marks the spot where George and Sophie Cooke and other members of their family are buried.

26. Meyer Sugar Mill, 1878
Kalae

The mill was built and operated by Rudolph Meyer, well-known early resident of the island. It was a small mill, but is unique and extremely valuable in the history of the sugar industry, as almost all of the original equipment and machinery is extant. It is badly in need of restoration.

27. Rudolph W. Meyer Home, 1851
Kalae

Built by R. W. Meyer for his large family, it is of wood frame construction with corrugated iron roofing. The house has been renovated and modernized recently, and although the main structure has been retained, the original windows have been replaced and the interiors covered with new paneling. The first kiawe tree planted on Molokai is still standing next to the house. Two smaller houses nearby, said to be around 100 years old, were part of the family compound. The setting for these three houses, the adjacent Sugar Mill and the family graveyard is particularly lovely.

FISHPONDS

Only on Molokai does one find the unique occurrence of a continuous, almost uninterrupted progression of fishponds, which is of singular importance in the preservation of Hawaiian culture. These ponds follow one another for many miles along the southeastern shores of the Island. Listed below are only those which warrant special attention, although even these lose some of their significance when considered apart from the whole.

1. Nameless Pond
Honouliwai

A small but unique pond, it was used more as a fish trap, as the

fish came around the eastern point into the pond. A wall was damaged by the 1946 tsunami.

2. Kihaloko (Lizard's Pond)
Aha'ino

A beautiful small pond in good condition, it was used commercially until 1958.

3. Kupeke Pond
Kupeke

This is an excellent pond, still in limited commercial use. It covers 33.8 acres and has one Makaha. A wall connects two sides of the bay.

4. Panahaha Pond
Puko'o

This is the only loko umeiki type worth restoring on the East End. The walls are somewhat broken down. It has a unique large boulder, the size of a man, standing upright in the center of the wall.

5. Ni'aupala Pond
Kalua'aha

This pond is also in good condition and is still used commercially on a limited basis. It is 33.6 acres in size and borders the main road.

6. Ka'ope'ahina Pond
Kalua'aha

This is a well-preserved and maintained pond in use by the resident owner.

7. 'Ualapue Pond
'Ualapue

One of the best fishponds on Molokai, it has produced very good fish. Its condition is good but it could be improved. It is owned by the State and listed on the National Register of Historic Places. The 22.25-acre pond is presently in limited commercial use.

8. Keawanui Pond
Keawanui

Listed on the National Register of Historic Places, it is one of the largest (54.5 acres) on Molokai. Many local legends are connected with it. It is in fair condition, and hotel development is being planned on its shore.

9. Kaina'ohe Pond
Ka'amola

The inland part of this pond is now used for taro cultivation. The walls are somewhat broken down.

10. Pahiomu Pond
Keonoku'ino

Walls are in fair shape, but it is silted in.

11. Kakaha'ia Pond
Kawela

This is an inland pond, now partially overgrown with bulrushes. Rice was grown here at one time.

12. Kalokoeli Pond
Kamilo'oa

In relatively good condition.

13. Kaluaapuhi Pond
Na'iwa I

This pond is now landlocked, although originally it was probably a loko kaupa as the pond is walled. It is used commercially in a limited fashion and is in fairly good shape.

14. Pakanaka Pond
'Ili I

The best preserved of the few existing loko umeiki type, it is said to have had at least twenty lanes at one time.

ARCHAEOLOGICAL SITES

1. Kauleonanahoa (phallic stone)
Pala'au, Apana 3

This enormous phallic symbol represents Nanahoa, a demigod, who quarreled with his wife, Kawahuna, over a pretty girl. In the tussle, Kawahuna was thrown over the cliff and both husband and wife were turned to stone. Kauleonanahoa appears to be a natural formation partially modified by chipping. It is respected as a source of fertility. The female counterpart to the

phallic rock may be found in a northwesterly direction at the bottom of the hill.

2. Petroglyphs
Pala'au, Apana 3

Found on either side of the trail just before reaching Kauleonahoa, these petroglyphs are in danger of being completely effaced by weathering and modern graffiti. They are the only easily accessible petroglyphs on Molokai. This archaeological complex is found within the boundaries of Pala'au State Park.

3. Ma Imu Kalua Ua Heiau (the ovens to bake rain)
Na'iwa, Apana I

This heiau measures about 31 feet by 22 feet and is constructed of upright stones placed to form rectangles. These cubicles were designed to "cook" the rain which the mischievous Nanahoa sent to tease his sister, Paulea, who was working with her wauke. This rain heiau is unique in all the islands.

4. Nawahinewa'a (the mother and daughter stones) and Pohaku Holua (the athletes' stone)
Manowainui between Mimino and Kapale Gulches

The largest upright stone in this group is marked by indentations on the top and was the place where athletes preparing for the Makahiki presented their offerings and prayers. Even today offerings of food, drink and coins are left there. Originally this stone was the exclusive Holua Shrine of the Alii, but was later turned over to the Makahiki athletes. The two smaller stones represent a mother and daughter who had crept up to the Pohaku Holua to present the forgotten hookupu of their husband and father. Since the area was kapu to women, they were slain by the guard and then turned to stone.

5. Leina A Ka'uhane (the spirit leap)
Kipu cliffs

This is where the spirits of the dead leaped off to the Po (nether world).

6. Ka Lua Na Moku'Iliahi (sandalwood pit)
Kamiloloa, on the Forest Reserve Road

This pit, 110 feet long and 40 feet wide, was dug to the measurements of a ship's hold. After the pit was filled, the sandalwood was then hauled by the maka'ainana to the shore where it was sold by the chiefs to a sea captain. This is the only known pit on Molokai.

7. Pu'u Kape'elua (caterpillar hill)
Hooluhua, Apana 2, on the west side of Kapeelua Ave. between Moomomi Ave. and Farrington Ave.

Legend tells of the mysterious lover of a beautiful Molokai girl. He regularly disappeared before daylight, and was finally traced to this pile of stones where a large caterpillar was found sleeping. A fire was built and he exploded into myriads of small caterpillars (army worms).

8. Kalaina Wawae Petroglyphs (carved footprints)
Kaluako'i, about one-half mile from the sea south of Kalani, to the left of the road up the hill

Carved out of sandstone, the original pair of footprints are credited to a woman named Kalaina, who prophesied that strangers making similar footprints would come to Molokai. The remainder were reportedly made by ancient visitors from other areas of Molokai and from the other islands.

9. Canoe halau
Kaluako'i, east of Kanalukaha point

This is an enclosure 43 feet long with walls about 25 inches high and 3 feet wide. There is an opening on the south. This is the only example of a canoe halau remaining on Molokai. It is in a good state of preservation.

10. Heiau
Kaluako'i, northeast of Kanalukaha Point

This 38- by 25-foot heiau consists of two enclosures and a platform. The larger western enclosure contains two vaults in its walls. Sandstone slabs are in the smaller enclosure in the south-east. It has a vault in its northern wall. Dr. Kenneth P. Emory found the remains of a wooden slab image near this heiau.

11. Kalalua Heiau
Kaluako'i, at Pu'u Hakina at beach level

This heiau is a 2- to 3-foot high platform paved with stone slabs. Upright slabs stood at north and south positions on opposite sides of the platform. This heiau may have been used to mark the seasons. The eastern portion is partially destroyed by floods.

12. Well
Kaluako'i, 45 feet southwest of Kalalua heiau

This structure consists of a circle made of two rows of upright stones. Two of the uprights are papa konane. The center of

the circle is filled with rubble.

13. Adz Quarry
'Amikopala, Kaluako'i

This was the center of Molokai's adz quarrying activities. Piles of quarried stone, spalls, adz blanks, rejects and hammer stones were strewn about the area.

14. Piko stone
Kaluako'i, 3/4 mile east-northeast of 'Amikopala on a hill south of the road

Umbilical cords of newborn infants were hidden in the cracks of this stone.

15. Kalaipahoa
Kaluako'i 1/2 mile west of the Piko Stone, north of the road, on the northeast side of Kaka'ako Gulch

This is the site of the famous legendary clump of trees, entered by the gods, and imbued with poison. God-images from these trees were called Kalaipahoa. They were a source of great power to their owners, the Molokai chiefs. After the battle of Nuuanu they came into the possession of Kamehameha. God-images from these trees are preserved in the Bishop Museum. Nothing is left of the grove.

16. Petroglyph
Kukuku, Kaluako'i, on the north side of the road just west of Bench Mark 7

A figure representing a person encased in an 8-foot-high boulder.

17. Kalama'ula Rock
Kalama'ula

Local legend tells of the thwarted affair between an alii maiden and her maka'ainana lover. After a night in which the girl waited in vain at the rock for the young man, the rays of the rising sun are said to have awakened her and left a sunburst pattern of cracks on the stone. This is the rock for which the area was named.

18. 'Olo 'olo Rock and Pool
Kalama'ula, inland from the coconut grove

Used as a bathing pool by alii down to Kamehameha V, this pool was also used as a source of water by homesteaders when they first arrived. Legend tells of a beautiful mermaid who lounged on its walls and enticed men with her beauty. The name 'olo 'olo

describes her hanging breasts. The rock is about 1/8 mile mauka of the pool. Local people say that it is the mermaid turned into stone by her irate parents.

19. Stone Wall
Kawela to Kamalo above the flat land

This wall was built as a barrier to cattle endangering agricultural crops. Sections still exist.

20. Battlefield
Kawela

This area is the scene of two famous battles. The first was in the eighteenth century when Kapi'iohokalani, ruler of Oahu, invaded Molokai. He was defeated by Molokai chiefs who had the help of Alapa'inui of Hawaii. The second battle was fought by Kamehameha I after he conquered Maui. His troops desolated the countryside before he went back to Hawaii, taking Liliha and Keopulani with him.

21. Pu'uhoonua (place of refuge) and Heiau
Kawela, on the ridge west of the gulch

This area was used as a refuge and/or a fortification. There are several stone walls and enclosures. The heiau consists of two enclosures, the west one paved, and the south wall is stepped on the outside. The east enclosure is open on the south side.

22. Petroglyphs
Kawela, on a boulder east of the gulch at the 300-foot elevation

Triangular-shaped figures on the east and north sides of the rock represent people.

23. House Site and Shrine
Kawela, on the east ridge of the gulch at the 300-foot elevation

This is a large, well-preserved complex site including a midden area, an enclosure with two-foot-high walls on two sides, a platform and a walled "shrine" area containing a 22-inch-high slab, possibly representing a family deity.

24. Kapualei Heiau
Kapualei, at the mouth of Kapualei Gulch

This heiau includes a stone wall surrounding a raised rock platform 20 by 20 feet. South of this is a lower platform and a

horseshoe-shaped wall.

25. Puili Heiau
Wawaia, opposite St. Joseph's Church north of the highway
- This large heiau measures 144 by 84 feet, is partially surrounded by a wall, and is paved by large smooth stones. There are two enclosures, one to the south and the other on the northwest side of the heiau. The site is well preserved and maintained.
26. Wawaia-Puaahala Complex
Wawaia-Puaahala, broad area extending on either side of Pupu Kaneohe stream bed, mauka of road
- A large grouping of platforms, enclosures and terraces indicates a densely populated area historically. These numerous structures are still in fairly good condition and are important because of the apparent variety of uses.
27. Kukui Heiau
East 'Ohi'a, just north of the highway
- This was a large structure, 170 feet by 120 feet, made up of a collection of enclosures. It has of recent years been used as a pumpkin patch.
28. Kaluakapi'ioho
Manawai, on the east side of Manawai Valley on the west bank of the stream bed
- This heiau is made up of a main platform and walled terrace. The most impressive feature is a retaining wall which is 36 feet high at the southeast corner and 26 feet high at the northeast corner.
29. Kahokukano Heiau
Manawai and Kahananui, on the boundary line of the two land divisions
- This is a terraced heiau with walls protecting the upper terrace on the west, north, and east.
30. Paku'i Heiau
Manawai and Kahananui, on the ridge to the north of Kahokukano Heiau
- This is the highest and largest of the five stone platform heiaus in the area. It may have been a place of refuge. A remarkable view of the surrounding countryside can be obtained from this structure.

31. Kaluaonokukui Heiau
Kahanui, in the valley near the boundary of 'Ualapue
- This heiau is an irregular-shaped enclosure with a small stone platform.
32. 'Ili'iliopae Heiau
Mapulehu, at the foot of the ridge dividing Mapulehu Stream from Punaula Gulch
- Molokai's most famous heiau. 'Ili'iliopae Heiau is the largest heiau on the Island. Its present platform, 320 feet by 120 feet, is said to have once been much larger. Idols were placed on three terraces at the eastern end. Human sacrifices were reputedly made here. The six heiaus above are part of the 'Ualapue Complex recorded on the National Register of Historic Places.
33. Ke Ana O Hina (the cave of Hina)
Kalua'aha, on the eastern side of Maloka'inuiahina Gulch
- It is said locally that when you have seen this spot, you have seen all of Molokai, as from this place the Island derived its name. Here was the home of Moloka'i-nui-a-Hina, the mother of Molokai.
34. Kulahaloa Bell Stone
Mapulehu, about 1,000 feet north of the road on the west side of a small gulch
- The stone is a large slab of andesite resting on another boulder. It rings when struck. According to local belief Kauahaloa, a kahuna, was brought from Kau, Hawaii to overcome the power of Hina. Hina found him asleep and turned him into these two stones.
35. Pohaku He'e (the octopus stone)
Kupeke, on the north edge of the highway where the road turns sharply inland as one travels east
- Legend has it that this is the rocky remainder of the cave where a he'e kapua (supernatural octopus) lived. The stone, too, is reported to have supernatural powers.
36. Paikalani Taro Patch
Honomuni, at the entrance of Honomuni Gulch, extending from the highway to the sea
- Paikalani was otherwise known as Paikahawai and was the chiefs' taro raising area. Both Kamehameha I and Kamehameha V were said

to have obtained their taro here. The area, about 3 acres in size, was originally excavated to a depth of as much as twelve feet, the excavated material being heaped on both sides of the patch. The bottom area was filled with parallel rows of three-foot-high circular mounds about ten feet apart at the tops. Sugarcane and sweet potatoes once covered these mounds while taro was planted in the water between them.

37. Lenalenapohaku Stone

Pu'eielelu, on the north side of the highway

This basalt rock with eight hollows on its upper surface was once used as a place to give offerings to ease the labor of a woman undergoing childbirth. An egg, a piece of awa or other similar food gifts were placed in the hollows, prayers were said, and the woman reportedly immediately gave birth.

38. Weloko Heiau

Waialua, on top of the ridge on the east side of the valley

Weloko is cited as the place where Kamehameha-nui of Maui was reared. The heiau itself is in partial ruins.

39. Pakaikai

Waialua, at the head of Waialua Valley in the basin above the falls

Pakaikai is noted as the site where Kamehameha-nui was reared as a small child. The area has numerous taro terraces. Reportedly Kamehameha-nui was fed only on lu-au so that he might not choke on a fish bone. A rock at the head of the northernmost falls contains four eight-inch holes, said to have been used as awa cups for Kamehameha-ai-luau. Another larger cavity is locally called Kamehameha's bathtub.

40. Pohakula'ini (tall stone)

Honoulimalo'o

About 190 feet from the sea at 50 feet of elevation, this landmark, a 52-inch-high upright stone, marks the boundary between the ahupua'a of Honoulimalo'o and Honouliwai.

41. Kaho'onoho Heiau

Pohakupili, by the sea on the east side of the bay at the entrance to Pohakupili Gulch

A 50- by 30-foot stone terrace held by an 11-foot retaining wall makes up this small heiau at the water's edge.

42. Pohakuhawanawana Stone (whispering stone)

Pokakupili, at Pohakupili Gulch near the east side of the road

In the old days it is said that fishermen on their way to the sea would whisper to this rectangular upright stone, asking for a bountiful catch.

43. Ulu Kukui O Lanikaula (the Lanikaula kukui grove)

Keopukaloa, on the Puu o hoku Ranch about 3/4 of a mile northeast of the ranch house

The people of Molokai consider this spot the second most sacred in all the islands. Here lived the venerated prophet Lanikaula. It is said, also, that his body is buried here. The grove is being taken over by brush and other kinds of trees. Browsing cattle and deer prevent the reforestation by new kukui seedlings.

44. Niheukawa, Ka'ohela's leap

Keopukaloa, a gulch on the road just west of the Halawa lookout

Ka'ohela's leap is one of Molokai's favorite tales. At the time that Peleioholani came to make war on Molokai, the famous runner, Ka'ohela, was living in Halawa. Peleioholani's scouts were sent to watch for him, intercept, and kill him. However, Ka'ohela was too fast and agile for them. He fled Halawa along the pali, and here at Niheukawa, where the space between the pali's sides resembles a doorway, leaped the 21-foot gap as though it were nothing, eluding his pursuers. Dodging spears, he outdistanced his foes almost to Kalua'aha before he stopped for water, was hit by a sling stone and died.

45. Halawa Valley

The valley contains a wealth of archaeological and historical sites indicative of its large population, reported to have been 500 in 1836 by the Rev. Hitchcock. Intensive taro cultivation was practiced throughout the valley and slopes. The well-constructed walls of the terraced patches remain today. The raising of taro commercially was abandoned as recently as 1957 when a tsunami severely damaged the patches in use at the mouth of the valley. Archaeological excavations conducted in 1969-1970 indicate an extremely early settlement of the area.

46. Pohakuloa Heiau

Halawa

Easily accessible from the road, this is a terraced structure with a line of large boulders bordering the southern side.

47. Kapana Heiau
Halawa

Terraces of angular, flat stones are used, which is unusual for this valley. The builder of this heiau is said to have been Kaleikuahulu, often mentioned in the oral traditions of Molokai. A family of his descendants still live on Molokai.

48. Ko'a of Ho'onilianuhe
Halawa

This is a fishing shrine of the 'o'opu. It is a small enclosure built up to a larger stone. It is said to have been used until recent times.

49. Mana Heiau
Halawa

This is the largest and most imposing structure in the valley. It commands a striking view of both valley and the bay. Stokes was of the opinion that this was the only heiau in the valley used for human sacrifice.

50. Pu'uhonua of Ka'ili
Halawa

The site of this pu'uhonua is marked by the sacred grove of kamani trees. The age of these enormous trees has not been calculated, but the site is one of the most remarkable and little known in the valley.

51. Ko'a
Halawa-iki

This is a small enclosure built up to an imposing boulder. It

is in good condition today. It was dedicated to Kuula, the god of fishermen.

52. Papa or Kakau Heiau
Halawa-iki

This is a complicated combination of small platforms, terraces, and walls. It is said to have been built by Alapai, and to have originally included a lele.

53. Kapaku Heiau
Papalaua Valley

This structure is similar to the Papa Heiau and is also said to have been constructed by Alapai. Stokes suggests that it was used as a priests' college. This site is inaccessible except by sea.

54. Wailau Trail
Wailau Valley to Mapulehu Valley

This trail was used daily by the inhabitants of Wailau to travel to the Kona coast. Partially overgrown today, it is being cleared by the Sierra Club during the summer months.

55. The Valleys of Wailau, Pelekunu and Waikolu

These valleys have few structures visible today. Remains of house sites and taro terraces are found, but are badly overgrown with encroaching brush. They are all relatively inaccessible which provides some natural protection.

APPENDIX IV

IMPACT OF INTERISLAND TRANSPORTATION

*Peter V. Garrod and Alexander MaLaren

The analysis and discussion that follows must be considered tentative rather than conclusive, being based on initial estimates of intra-island commodity flows and costs between Molokai and Kauai and Honolulu developed by the authors as part of a broader study of Hawaii's inter-island transportation system. The discussion that follows focuses on the impact of water-borne commerce on the agricultural sectors of Molokai and Kauai. However, general conclusions relating to the impact of a change in transportation costs on the economies of the islands should be applicable to other sectors of the economy as well.

As only intra-state (inter-island) transportation costs are being considered, both islands can be considered as regions distant from a single central market. Neighbor Island producers will purchase some of their inputs and sell a portion of their output in the Honolulu market and the rest will be either purchased or sold in the local market (on the producing island).

All costs related to obtaining access to the principal market

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on Oahu occurring due to the location of the producers are transportation costs in that they relate to the location of the firm relative to the market and to the transportation system linking the producer to the market. Transportation costs include the transportation charges (shipping costs) between the production entity and the market, terminal charges (the loading, unloading and warehouse charges incurred), losses in product quality due to the process of shipping, and various opportunity costs incurred by the firm due to the nature and structure of the transportation system. A major opportunity cost incurred by producers on Molokai and Kauai is the cost associated with limited access to the principle market (i.e., three times a week for Molokai producers as compared with continuous access for Oahu producers).

Transportation costs affect producing sectors in several interdependent ways, the most important being the affect on the relative price structure and the concurrent affect on resource allocation. Consider for the moment a firm, located on a neighbor Island, producing a commodity which is at least partially marketed in Honolulu, and the total output of the island is sufficiently small as to have little or no affect on the Honolulu market. The price the firm receives for

its product will be the market price (Honolulu wholesale price) less all costs incurred in transporting the product to the market, i.e., the product price f.o.b. the farm is the market price less transportation costs. Similarly, the cost as any input purchased in the principle market f.o.b. the farm will be the market price plus transportation costs.

The profitability, and as such the economic viability of the firm as a producing entity, depends on the relation between the price received for the product and the costs incurred in producing it. Production costs are a function of the technology available, the cost of inputs, and the cost of the resources available to the firm. Resources are generally defined to include land, water and all factors affecting the quality of land and water, such as soil type, salinity, and climatological factors. The value of land to the firm as an input to the productive activity is determined by the profitability of the producing activity excluding the cost (or rent) of land. Generally, the value of land to the firm (what the firm would be willing to pay in rent for the land) is determined by the productivity of the land and the value of the product produced. This rental value is usually substantially lower than the market sale price of land as the market price is almost always determined by speculative factors rather than the value of the possible products of the land. For example, in Hawaii, where most farm land is leased, the lease rental a firm is willing to pay depends on the amount of money the firm can make using the land. The more profitable the production activity, the more the firm is willing to pay in rent for the land.

As the value of land for a given production activity depends on the profitability of the activity, the allocation of land between different production activities depends on the relative profitability of the activities. The more profitable activities will be able to pay more for the land and thus will be able to obtain the best land. Utilizing this discussion, it is possible to trace out the impact of a decrease in transportation costs on the agricultural sector of an Outer Island:

1. The product price f.o.b. the farm would increase by an amount nearly equal to the reduction in transportation costs.
2. The costs of the inputs purchased outside the producing region would decrease by an amount nearly equal to the reduction in transportation costs.
3. Initially, the profitability of the production activities would increase, but not all necessarily in the same proportion.
4. Increased profitability implies that the firms would be willing to pay more for land, the increase in the value of the land to the firm being proportional to the increase in profitability.
5. Furthermore a reallocation of land among the different producing activities would occur as the most profitable activities would bid away land from the less profitable activities implying an increase in the level of rents being paid for the land. Rents will increase until they reach a level such that no activity is earning an abnormal amount of profits.
6. The composition of the total output of the region will change. The change in transportation costs will cause some activities to become relatively more profitable than previously and the products of these activities will then account for a greater portion of the island's output. Generally, products most sensitive to transportation costs, i.e., bulky products, will show

the greatest relative increase in profitability and occupy a larger share of the total output after a decrease in transportation costs.

7. The total output of the island will increase to the degree that the resources become utilized more intensively due to the decrease in transportation costs and to the extent that resources which were previously unused are brought into production. However, if a resource necessary to the production activity such as land of a certain quality or water is not readily available, a change in transportation costs will have little or no effect on the level of output of the region. The only impact of a reduction in transportation costs in this situation will be an increase in the level of rents paid for land and possibly other productive resources.

Neither Molokai nor Kauai is a major agricultural market force on the Honolulu market. The total output of both represents less than two percent of the total market supply in Honolulu (see Tables 22 and 23). Although, for some products, particularly bananas, eggplant, cucumbers and peppers, Kauai's production will affect the market price.

Nearly all products produced on the Neighbor Islands and marketed in Honolulu are shipped to Honolulu by boat. The principle water carrier serving both Molokai and Kauai is a barge company (Young Brothers). Molokai has one agent port, Kaunakakai, and is served three times a week by barges in route to Kahului, Maui, but only twice a week on the return trip. Kauai has two agent ports, Nawiliwili, which is served twice a week, and Port Allen, which is served once a week. There is also a port at Kalaupapa on Molokai which is served about four times a year. Service to non-agent ports can be arranged with the barge company. Estimates of the actual shipments

TABLE 22. SHIPMENTS FROM KAUAI AS A PERCENTAGE OF HONOLULU MARKET SUPPLY.

Commodity	Year						
	1971	1970	1969	1968	1967	1966	1965
Avocados	*	1	*	2	na	na	na
Bananas (Bluefield) ^{1/}	40	35	32	31	18	15	17
Beans, snap	2	3	3	6	2	3	3
Cabbage	1	*	*	*	*	*	*
Corn, green	0	3	1	*	2	*	0
Cucumbers	13	21	16	20	20	18	13
Dasheens	1	0	0	1	1	3	3
Eggplant	36	36	27	22	22	20	8
Ginger Root	1	1	2	3	2	2	5
Mangos	19	0	4	12	na	na	na
Melons (water)	6	4	4	5	3	3	3
Onions	*	*	*	*	0	*	0
Papayas	8	5	6	7	7	8	5
Peas	3	5	5	8	na	na	na
Peppers	14	15	16	23	21	16	9
Potatoes	0	0	*	*	*	*	*
Pumpkins	5	5	2	3	3	1	3
Squash	6	5	0	*	1	5	3
Sweet Potatoes	13	11	8	3	7	10	1
Tomatoes	1	2	3	3	2	2	2

All data rounded to the nearest one percent

na = data not available

* = Shipments were made, but they accounted for less than .50 percent of market supply.

^{1/} From 1965 to 1967, the number in the table represents the percentage of Kauai's shipments of all bananas to the market supply of all bananas.

Source: "Honolulu Unloads," Hawaii State Department of Agriculture, 1965 to 1971

TABLE 23. SHIPMENTS FROM MOLOKAI AS A PERCENTAGE OF HONOLULU MARKET SUPPLY.

Commodity	Year						
	1971	1970	1969	1968	1967	1966	1965
Bananas	1	*	0	0	*	*	0
Beans, snap	*	1	0	0	*	*	*
Corn, green	3	1	0	*	*	*	0
Cucumbers	*	0	0	0	*	0	*
Eggplant	0	3	6	4	4	4	8
Mangos	0	9	0	0	na	na	na
Melons (water)	*	*	*	0	*	0	*
Oranges	0	0	0	*	*	0	0
Papayas	*	*	*	*	*	*	*
Peppers	0	*	0	0	*	0	*
Pumpkins	0	0	0	0	0	*	0
Sweet Potatoes	3	5	2	1	0	0	0
Potatoes	0	0	*	0	0	0	0
Tomatoes	0	2	0	0	0	1	*

All data rounded to the nearest one percent

na = data not available

* = Shipments were made, but they accounted for less than .50 percent of market supply.

Source: "Honolulu Unloads," Hawaii State Department of Agriculture, 1965 to 1967

of agricultural commodities by air and water are given in Table 24 for Kauai and in Table 25 for Molokai and the shipments of all goods by sea to and from Molokai and Kauai are given in Table 26.

The ideal measure of the impact of transportation costs on the economies of Molokai and Kauai would be to compare the transportation costs of imported inputs to total input cost and to compare the costs of transporting the output with the value of the output. However, the necessary information is not available. It was possible, however, to develop aggregate estimates of the cost of all shipments from Honolulu to Molokai and Kauai and the cost of all shipments from

Molokai and Kauai to Honolulu. (Rates were estimated for each commodity group using Young Brothers' rate schedule for the appropriate period.)

By expressing these aggregate costs on a per capita basis (Table 27), as a percentage of per capita income (Table 28), and on a per-unit-shipped basis, it is possible to gain an idea of the importance of shipping costs to the economies of Molokai and Kauai. The data illustrate quite clearly that shipping costs are a more important factor in the economy of Molokai than Kauai, primarily because of the importance of pineapple as an export from Molokai. Examining first the impact of transportation charges of goods shipped from Honolulu, we see that Molokai tends to import more on a per capita basis (Table 27) and the impact is even higher due to the low income level on Molokai (Table 28). Ignoring pineapple shipments, the per capita cost of exports from both Molokai and Kauai is small, never amounting to as much as one percent of per capita income. Total shipping cost is also not of tremendous importance, being between four and five percent of per capita income for Molokai and slightly more than two percent for Kauai.

The average shipping cost per pound for agricultural produce for Kauai ranges between .40 and .70 cents, and averages .55 cents and provides an idea of the importance of shipping costs relative to the weight of the products shipped. The variation from year to year is due to the changing nature of the products being shipped and the variation in the size of the average shipment rather to rate changes. The data for Molokai indicate a large yearly variation in shipping

TABLE 24. AGRICULTURAL SHIPMENTS, KAUAI, 1965-1971.

Commodity	1965		1966		1967		1968		1969		1970		1971	
	Boat	Plane	Boat	Plane	Boat	Plane	Boat	Plane	Boat	Plane	Boat	Plane	Boat	Plane
 (in 1000 lbs. net)													
1. Avocados	22	-	22	-	5	1	15	-	2	-	9	-	3	-
2. Bananas (Bluefield)	1123	1	1192	-	1309	-	708	8	501	41	484	-	505	-
3. Beans, Snap	33	1	28	-	21	-	41	-	24	1	17	2	15	-
4. Broccoli	-	-	-	-	-	-	-	-	-	-	-	-	1	-
5. Cabbage	11	1	19	-	45	-	11	-	4	-	12	-	14	-
6. Carrots	-	-	-	-	-	-	-	-	-	-	-	-	1	-
7. Cucumbers	386	1	558	7	592	1	491	67	365	70	661	15	389	10
8. Dasheens	5	-	6	-	2	-	2	-	-	-	-	-	2	-
9. Eggplant	48	-	156	2	172	-	160	-	186	7	283	1	235	-
10. Ginger Root	24	-	9	-	7	-	10	2	6	2	4	-	3	-
11. Grapefruit	2	-	-	-	-	-	-	-	-	-	-	-	-	-
12. Lettuce	-	-	-	-	-	-	2	-	-	-	1	-	-	-
13. Mangos	9	-	2	-	3	-	3	-	2	1	-	-	3	-
14. Melons, water	155	-	157	-	160	-	226	-	198	-	172	-	222	-
15. Onions	-	-	9	-	-	-	1	1	5	6	5	-	11	-
16. Oranges & Lemons	-	-	1	-	1	-	-	-	-	-	-	-	-	-
17. Papayas	654	1	962	1	948	4	617	84	368	90	449	24	550	2
18. Peas	5	-	6	-	3	-	3	1	-	4	4	-	2	-
19. Peppers	75	3	148	4	189	3	170	66	117	48	159	3	161	-
20. Potatoes	58	-	5	-	10	-	2	-	2	4	1	-	-	-
21. Pumpkins	10	-	4	-	12	-	6	1	4	1	18	-	9	-
22. Squash	6	-	8	-	2	-	1	-	-	-	14	1	22	-
23. Sweet Potatoes	107	-	98	-	68	-	24	2	36	27	118	-	101	-
24. Tangerines	-	-	2	-	-	-	-	-	-	-	-	-	1	-
25. Tomatoes	133	-	171	-	139	-	169	26	162	61	167	4	97	-
26. Corn, green	-	-	2	-	19	-	2	-	1	5	10	-	-	-
Total	2866	8	3565	14	3707	9	2662	261	1983	368	2588	50	2347	12

* Excluding all pineapple shipments

Source: "Honolulu Unloads," Hawaii State Department of Agriculture, 1965-1971

TABLE 25. AGRICULTURAL SHIPMENTS, MOLOKAI, 1965-1971.

Commodity	1965		1966		1967		1968		1969		1970		1971	
	Boat	Plane	Boat	Plane	Boat	Plane	Boat	Plane	Boat	Plane	Boat	Plane	Boat	Plane
	(in 1000 lbs. net)													
1. Bananas (Bluefield)	-	-	4	-	3	-	-	-	-	-	2	-	14	-
2. Beans, Snap	6	-	4	-	2	-	-	-	-	-	7	-	-	3
3. Corn, green	-	-	3	-	1	-	1	-	-	-	6	-	3	7
4. Cucumbers	3	-	-	-	5	-	-	-	-	-	-	-	2	-
5. Eggplant	54	-	33	-	28	-	32	-	39	-	23	1	-	-
6. Mangos	17	2	-	-	-	-	-	-	-	-	4	-	-	-
7. Melons, water	5	-	-	-	6	-	-	-	4	-	5	4	-	1
8. Oranges	-	-	-	-	1	-	1	-	-	-	-	-	-	-
9. Papayas	5	-	31	-	12	-	11	-	16	-	12	-	8	-
10. Peppers	4	-	-	-	1	-	-	-	-	-	1	-	-	-
11. Pumpkins	-	-	1	-	-	-	-	-	-	-	-	-	-	-
12. Sweet Potatoes	-	-	-	-	-	-	10	-	16	-	55	-	30	-
13. Potatoes	-	-	61	-	-	-	-	-	1	-	-	-	-	-
14. Tomatoes	14	-	-	-	-	-	-	-	-	-	154	8	-	-
Total	108	2	137	-	59	-	55	-	76	-	256	26	57	11

Source: "Honolulu Unloads," Hawaii State Department of Agriculture, 1965-1971

TABLE 26. ESTIMATED TOTAL SHIPMENTS BETWEEN KAUNAKAKAI AND HONOLULU, 1965-1970.

Data in Tons^{1/}

Route	Year					
	1965	1966	1967	1968	1969	1970
Kauai						
To Honolulu	na ^{2/}	31,200	71,700	47,700	41,700	na
From Honolulu	na	68,800	68,200	83,100	84,600	na
Molokai						
To Honolulu	225,300	263,600	242,900	225,500	241,500	220,300
From Honolulu	39,500	49,400	46,100	42,600	44,400	45,200
Molokai						
To Honolulu ^{3/}	7,800	8,400	7,200	4,600	16,100	7,400

^{1/} Tons are net except for box tare
^{2/} na = data not available
^{3/} Excludes shipments of fresh pineapple

Sources: "Waterborne Commerce of the U.S.," Army Corps of Engineers, 1965-1970
 Computer Printouts of Intra- and Inter-State Waterborne Commerce, Army Corps of Engineers, 1965-1970

TABLE 27. PER CAPITA SHIPPING COSTS, KAUAI AND MOLOKAI, 1966-1970.

KAUAI					
<u>Year</u>	<u>Percent Costs of All Inputs</u>	<u>Percent Costs of Ag. Outputs</u>	<u>Percent Costs of Other Outputs</u>	<u>Percent Costs of All Outputs</u>	
1966	39.33	.69	10.87	11.56	
1967	38.54	.72	19.91	20.63	
1968	55.95	.43	19.37	19.80	
1969	60.32	.55	17.54	18.09	

MOLOKAI					
<u>Year</u>	<u>Percent Costs of All Inputs</u>	<u>Percent Costs of Ag. Outputs</u>	<u>Percent Costs of Pineapple Output</u>	<u>Percent Costs of Other Outputs</u>	<u>Percent Costs of All Outputs</u>
1965	61.45	.07	202.15	12.42	214.64
1966	62.53	.12	237.25	14.46	251.83
1967	60.40	.16	219.08	19.96	239.20
1968	68.04	.06	225.79	12.15	238.00
1969	66.33	.22	230.31	26.48	257.01
1970	62.99	.06	217.60	24.84	242.38

Sources: "The State of Hawaii Data Book, A Statistical Abstract," Department of Planning and Economic Development, p. 10
 Computation from Tables 5, 6, 7, 8

TABLE 28. SHIPPING COSTS AS A PERCENTAGE OF PER CAPITA INCOME, KAUAI AND MOLOKAI, 1965-1970.

KAUAI						
<u>Year</u>	<u>Per Capita Income</u>	<u>Percent Costs of All Inputs</u>	<u>Percent Costs of Ag. Outputs</u>	<u>Percent Costs of Other Outputs</u>	<u>Percent Costs of Total Outputs</u>	
1966	2379	1.65	.03	.45	.48	
1967	2663	1.45	.03	.75	.78	
1968	2871	1.95	.01	.67	.68	
1969	3018	2.00	.02	.58	.60	

MOLOKAI						
<u>Year</u>	<u>Per Capita Income</u>	<u>Percent Costs of All Inputs</u>	<u>Percent Costs of Ag. Outputs</u>	<u>Percent Costs of Pineapple Output</u>	<u>Percent Costs of Other Outputs</u>	<u>Percent Costs of Total Outputs</u>
1965	1291	4.76	.01	15.66	.96	16.63
1966	1409	4.44	.01	16.84	1.03	17.87
1967	1495	4.04	.01	14.65	1.34	16.00
1968	1631	4.17	--	13.84	.74	14.59
1969	1726	3.84	.01	13.34	1.53	14.89
1970	1944	3.24	--	11.19	1.28	12.47

Sources: "The State of Hawaii Data Book, A Statistical Abstract," Department of Planning and Economic Development, p. 84
 U.S. Census Data for Molokai, 1970
 Computation from Table 9

cost and are of questionable validity, but over the six-year period 1965 to 1970, Molokai's cost per pound averaged .05 cents greater than Kauai's, although the basic rates to Molokai are less than those to Kauai. The difference between Molokai and Kauai is due to the nature of the commodities shipped and the relative size of the shipments. The absolute importance of shipping costs to the producer depends on the value of the product. For high-priced items such as snap beans (37.3 cents per pound in 1970), shipping costs amount to a small percentage of the value of the product for Kauai producers, about 1.6 percent. For lower priced crops, such as cabbage (5.2 cents per pound in 1970), shipping costs represent a significant portion of the value of the crop, being nearly 11 percent of market value.

However, these data have considered only the cost directly charged by the transporting industry and is thus only a part of the total transportation charges. Such costs to the producer as loading and unloading, storage, spoilage, and lack of continuous access to the market are not included. Although exact data on these other components of transportation costs have not been compiled, initial estimates indicate that they are very significant, possibly being of such magnitude that shipping costs alone would only account for less than one-third of total transportation costs. For example, for some agricultural products, spoilage alone can run as high as five percent of the volume shipped.

An estimate of the total cost of transportation could be gained if it were possible to compare the rent per acre of two nearly

identical pieces of land under similar lease terms between Oahu and an Outer Island. The differences between the rents should represent the difference in the total transportation cost between the regions. Again, however, it is not possible to make this comparison with any degree of accuracy due to the paucity of information available and the large variation that exists in land quality. However, all initial estimates indicate that the difference in land rents between Molokai and Kauai as compared to Oahu are substantial, being of the order of three to five times greater on Oahu. The ratio of total shipping expenditures for all commodities to the number of acres of utilized agricultural land is six dollars on Kauai and fourteen dollars on Molokai. If only land used for intensive and plantation agriculture is considered, the figures are eleven dollars per acre for Kauai and eighty dollars per acre for Molokai. It is apparent that other transportation costs and not just the shipping costs are major determinants of total transportation costs and are important factors in determining the profitability of production activities on Molokai and Kauai.

Transportation costs, although important, are not the only determinant of the relative profitability of different productive enterprises. The existing resource base and the socioeconomic infrastructure of the region are by far the most important factors influencing the viability of any production activity. If the resource base is inadequate or if the necessary supportive infrastructure does not exist, production can become so costly as to be infeasible regardless of the transportation situation. Lack of the necessary resources

or infrastructure imply that a decrease in transportation costs would not affect production levels but would tend to increase the rents that could be changed for land.

Conclusions

The discussion above, although brief, and limited by the lack of quantifiable data, does lead to the formulation of some general conclusions relating as to where future efforts should be concentrated if the goal is the augmentation of production on Molokai and Kauai:

1. If transportation costs were reduced, both production and exports would increase and there would be a shift of resources into agriculture production and a reallocation of resources presently devoted to agriculture. This does not imply that the focus should be primarily on reducing shipping costs, which appear to be reasonable for the services provided.^{1/} Alter-

^{1/} Miklius, Walter. Regulation of Inter-Island Water Common Carriers in Hawaii. ERS, University of Hawaii, 1969.

native methods of reducing the other components of transportation costs must also be investigated. New systems that reduced spoilage and loading and unloading costs could have significant effects on the economies. Also, systems providing more ready access to the principal market could provide new production alternatives and reduce total transportation cost. However, reductions in transportation costs will have little impact on the producing region if a major cause of the existing level of production is either a lack of a necessary resource or the lack of the infrastructure necessary to support productive activities.

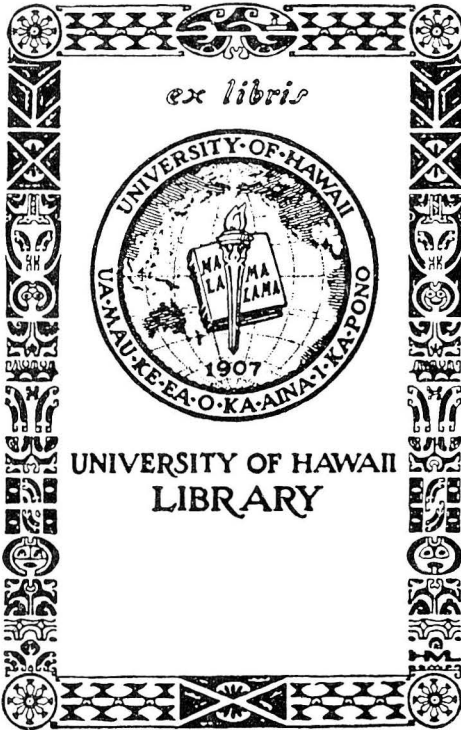
2. Advances in production technologies which permit the production of crops more amenable to transport would potentially have a major impact on the economies of both Molokai and Kauai.

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