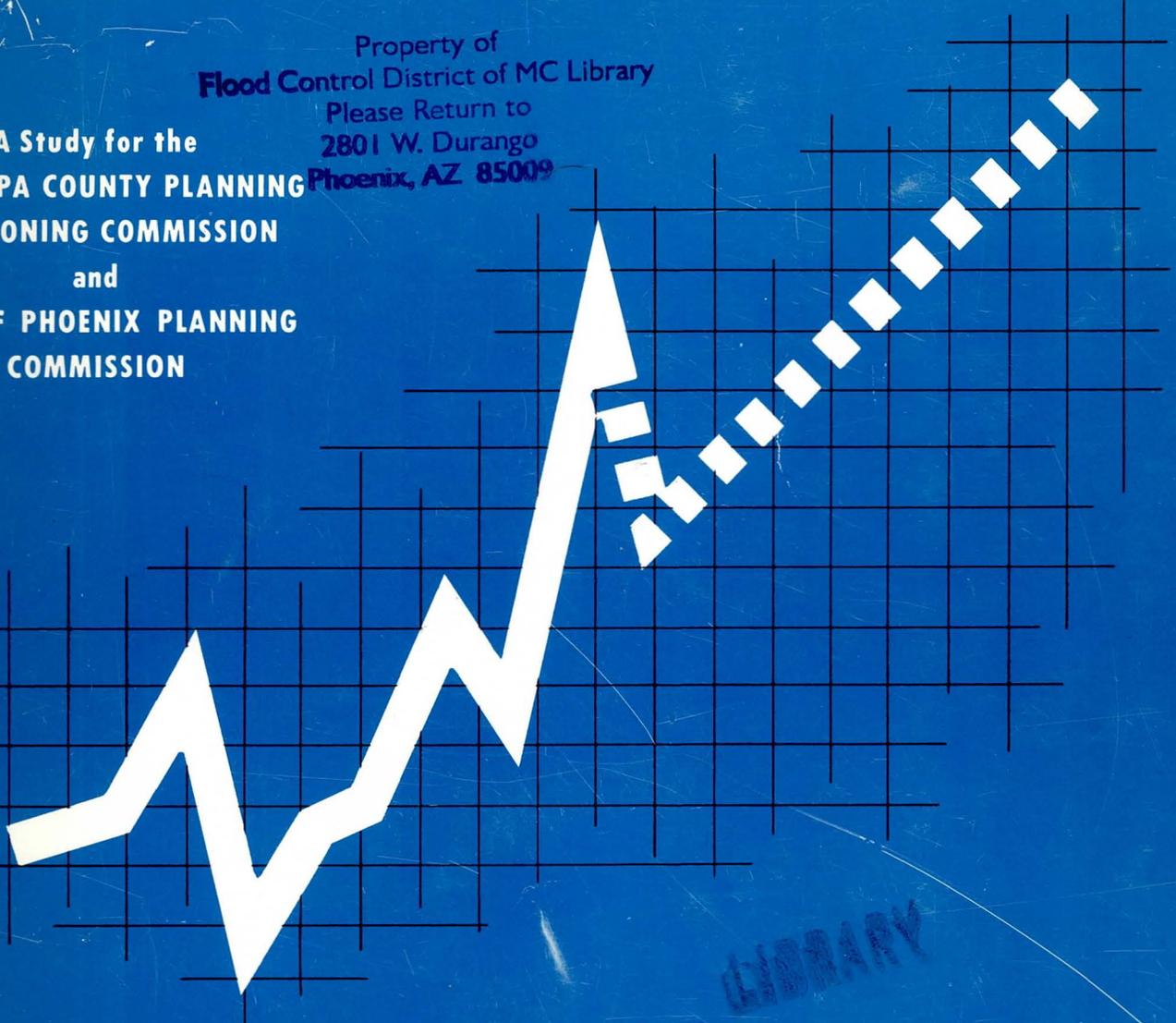


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ECONOMIC ANALYSIS AND PROJECTION FOR PHOENIX AND MARICOPA COUNTY

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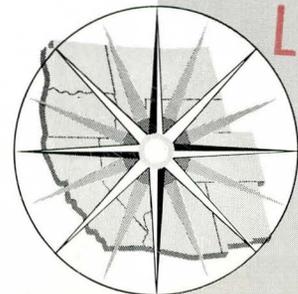


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PHOENIX, ARIZONA

November 11, 1959

The Maricopa County
Planning and Zoning Commission
103 West Jefferson
Phoenix, Arizona

The City of Phoenix
Planning Commission
827 East Jefferson
Phoenix, Arizona

Gentlemen:

We are pleased to submit herewith our report "Economic Analysis and Projection for Phoenix and Maricopa County."

This analysis of basic economic trends in Maricopa County and the Phoenix Urban Area, which was made by Western Business Consultants, Inc. for the Maricopa County Planning and Zoning Commission and the City of Phoenix Planning Commission, will serve as a basis for the development of a coordinated master plan of land use for Phoenix and the surrounding unincorporated urban fringe, as well as for other planning purposes. Although this report is primarily intended for utilization by public agencies, its findings can also facilitate the advance planning of business and industrial firms interested in this area.

The study provides an evaluation of population growth, economic base, industrial potential, industrial land requirements, future of the tourist industry, the outlook for mobile homes, water sources and uses, and the growth potential of the Phoenix Central Business District. These factors collectively represent the economic forces which will determine the scope and nature of the growth that will occur in this rapidly expanding metropolitan area. The manner in which these elements are controlled and channeled by proper planning and zoning will in great part establish the pattern of land use and the character of development which ultimately evolves.

In view of the unforeseeable trends and developments which invariably occur in any rapidly changing economy, a periodic re-evaluation and updating of the material in this report would be desirable in order to assure its continued usefulness for planning purposes.

During the course of the project, our staff had the full cooperation of many individuals who contributed generously of their time and knowledge. Information relevant to one or more parts of the study was provided through conferences, personal interviews or mail surveys by: public utilities; financial institutions; industrial firms; federal, state, county and municipal government agencies; wholesale and retail establishments; civic and trade associations; management of office-buildings; hotels, motels, and resorts; and mobile-home parks.

Mr. Donald W. Hutton, Director of the Maricopa County Planning and Zoning Department; Mr. John W. Beatty, Planning Director of the City of Phoenix Planning Department; Mr. Paul Van Cleve and Mr. William Phelps, Principal Planners; and the staff of the City-County Advance Planning Task Force provided valuable assistance during the accumulation and analysis of the information upon which this report is predicated.

This study was made by the staff of the Economic Research Department of Western Business Consultants, Inc., under the supervision of Dr. Hiram S. Davis, Director of Economic Research. A special report on "Available Water for Urban Development in the Phoenix Area," was prepared for Western Business Consultants, Inc. by Samuel F. Turner of Turner and Associates, Consulting Geologists, and is submitted under separate cover.

We have appreciated this opportunity to be of service to the City of Phoenix and Maricopa County, and are happy to have been able to assist their planning officials in the initial phase of the creation of a long-range plan to guide the growth and development of this dynamic area.

Sincerely,

WESTERN BUSINESS CONSULTANTS, INC.

William C. Turner

William C. Turner
Vice President

CITY OF PHOENIX AND MARICOPA COUNTY

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Paul Van Cleve

ECONOMIC ANALYSIS AND PROJECTION FOR PHOENIX AND MARICOPA COUNTY

A Study for

THE MARICOPA COUNTY
PLANNING AND ZONING COMMISSION

and

THE CITY OF PHOENIX
PLANNING COMMISSION

by

WESTERN BUSINESS CONSULTANTS, INC.

PHOENIX, ARIZONA SAN DIEGO, CALIFORNIA

October 1959

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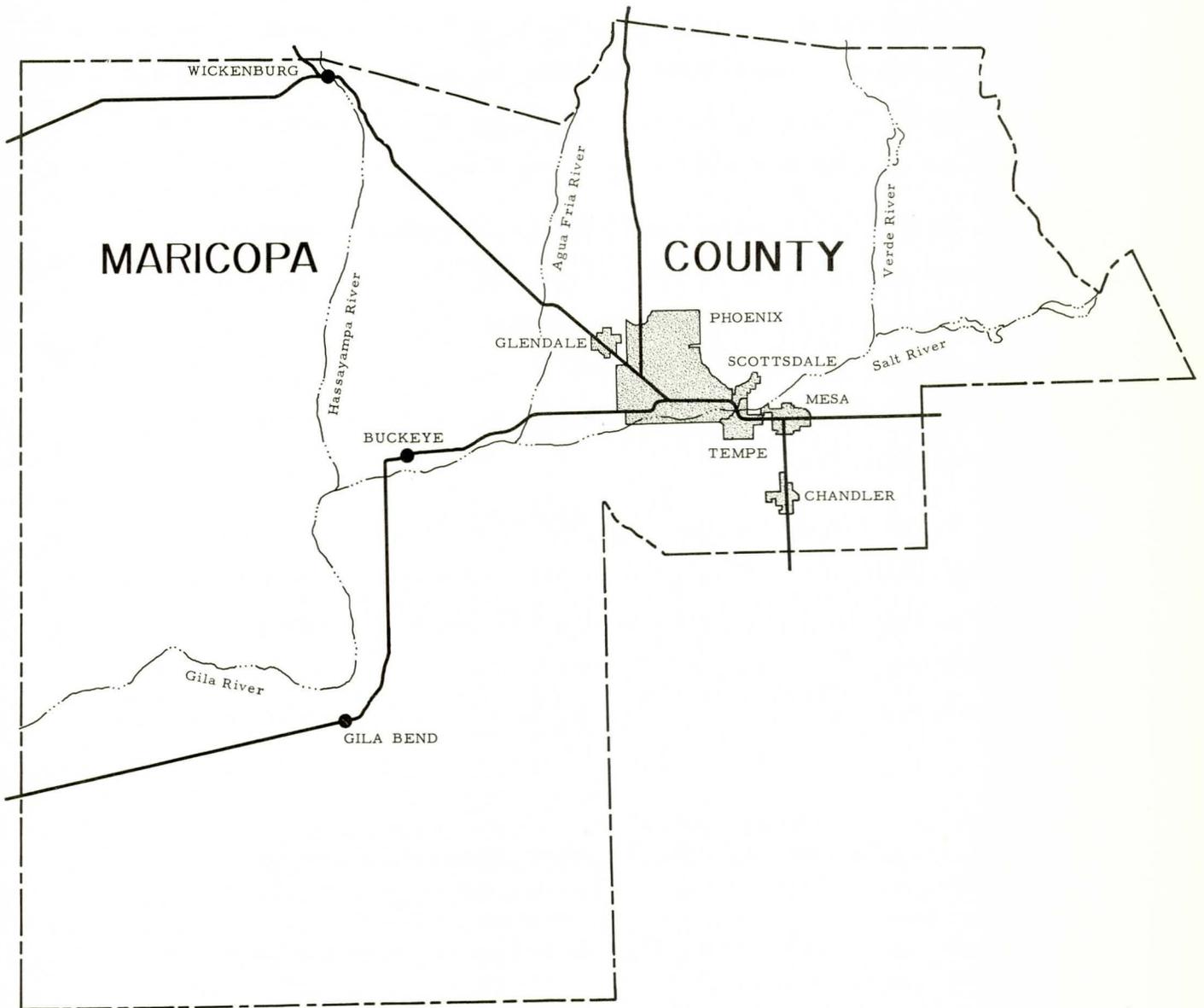
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FIGURE 1



SUMMARY AND CONCLUSIONS

General Outlook

National trends promise very substantial growth for Maricopa County and the Phoenix Area ^{1/} over the next two decades. The anticipated steep rise in national income, vast changes in technology, and further increases in population, are expected to accelerate the movement of both people and industry to the West and South -- a migration which has been particularly evident since World War II.

As a result of national trends and its locational advantages, Maricopa County, and particularly the Phoenix section, should become one of the major industrial centers of the West. Analysis of the prospects, the details of which are given in this report, indicates that manufacturing employment in Maricopa County may more than quadruple, and population more than double before 1980.

Whether Maricopa County and the Phoenix Area realize the great expansion of industry and population that is in prospect may largely depend upon present residents. Deterrents to growth are already evident, such as increasing traffic congestion, decreasing water resources, and increasing land speculation. Unless steps are now taken to hold growth-limiting

^{1/} In this report, the term "Phoenix Area", when used without any qualification, refers to the City of Phoenix, all neighboring cities and towns, and the surrounding unincorporated areas. This territory corresponds roughly to that portion of Maricopa County which is sometimes referred to as the "Salt River Valley."

factors in check, it is very possible that local growth will fall far short of the employment and population levels which now appear possible before 1980.

There are other areas in the West and South which offer the same basic locational advantages to people and industry as does the Phoenix Area and Maricopa County. Unless local planning and preparation for growth is at least equal to that of the competitive areas, it is probable that a significant share of the plants which might have been established, and of the migrating population which might have settled in the County, will go elsewhere.

But the spur of competition is not the only reason, nor perhaps the most important one, for taking steps to solve the problems which further expansion is almost certain to accentuate. Unless there is adequate planning and preparation for the growth that is in prospect, the Phoenix Area will needlessly become a much less desirable and a more costly place in which to live and do business.

Population Growth

Maricopa County, it is estimated, will have a population of 1,400,000 between 1975 and 1980, if both national and local conditions continue favorable. This figure is more than twice the County's population as of April, 1959, which is estimated to have been 637,000.

Two methods of projecting population were used - one based on the prospects for employment and the other based upon the outlook for migration and natural increase. These prospective trends, though related, are somewhat independent because they are in part subject to different forces. Analysis of employment prospects indicated that it might be 1980 before the County's population attained the 1,400,000 mark. Study of migration trends revealed, however, that the 1,400,000 level might be reached at an earlier date - possibly by 1975.

It is anticipated that the population within the May, 1959, boundaries of the City of Phoenix and of the adjoining unincorporated areas will total nearly 1,000,000 persons by 1975-80, if the population of the County increases to 1,400,000, and present patterns of geographic growth persist. The City of Phoenix and adjoining unincorporated areas had an estimated population of just under 480,000 in the spring of 1959.

Economic Base

Maricopa County is in the process of shifting from an agricultural-commercial to an industrial-commercial economy. Twenty years ago agriculture was the leading source of employment in the county. By 1958 average monthly employment in manufacturing was moving ahead of that in agriculture despite the doubling of farm employment. Meanwhile the number of jobs in retail trade, service, and government had reached even higher figures than in either manufacturing or farming. By 1980, however, the prospect is that manufacturing will provide more employment than any other economic activity in the County.

The question may be asked whether or not the prospective dominance of manufacturing in the County's economy is wholly desirable. Much will depend upon how employment is distributed by industry within manufacturing, and upon the vigor of non-manufacturing activities such as the tourist trade, farming, and wholesaling. But the vigor of these non-manufacturing activities by 1980 may be largely determined by the consideration which they have received from the community during the intervening years. Their interests could be overlooked in the enthusiasm for bringing more factories to Maricopa County.

Industrial-Growth Potential

There are at least four reasons for expecting manufacturing employment in Maricopa County to increase from about 26,000 in 1958 to around 117,000 by 1975-80:

1. The technological and market developments in prospect for the 1960's and 1970's at the national level which should cause explosive growth in the science-oriented industries.

The electronic group of industries are expected to have the largest increase in both production and employment of any group of manufacturing industries in the United States over the next twenty years. The Phoenix Area is already beginning to be known as a center for electronics manufacture. In addition, the Area has an established reputation for gas turbine production, a system of propulsion which is gaining favor, and it could become the leading center for solar energy research.

2. The continued decentralization and migration of industry, particularly southward and westward.

These trends, which have become particularly noticeable since World War II, may well be accelerated by the technological developments already mentioned which can make whole plants obsolete. In addition, the need for personnel with advanced scientific and technical training will undoubtedly grow, and, in the competition for such personnel, pleasant living conditions will doubtless continue to be emphasized in locating new facilities. Such considerations have already brought plants to the Phoenix Area, and they should have a similar influence in the future.

3. The further growth of the Pacific Southwest, particularly Southern California.

Because of population and industrial growth in the Pacific Southwest, Maricopa County and the Phoenix Area is becoming part of one of the largest consumer and industrial-market areas in the United States. Southern California is expected to have a population of over 17,000,000 by 1980. The population of Arizona by that time should be sufficient to give a combined total of 20,000,000 or more for the Pacific Southwest, or double the present population by 1980. Even more significant as a measure of market potential is the forecast of the Federal Power Commission that the use of electrical energy for non-farm residential purposes may increase 3.5 times in Region VIII which comprises the states of Arizona, Nevada, virtually all of California, and a small portion of New Mexico.

4. The growing local market within Maricopa County reaching a volume sufficient to justify local production for product after product.

There is already evidence that local demand is reaching the volume in a variety of lines sufficient to justify local manufacture; for example, the steel mill under construction, the announcement of a corrugated board plant, and the many precision machine shops that have been in business for some years. This trend should accelerate as more plants are established to supply outside markets and thereby raise local demand for components and supply items to levels that warrant local production. In addition, the more population grows, the greater opportunity there will be for local production to supply the local consumer market.

Even though national and regional developments may be extremely favorable to the industrial growth of Maricopa County and the Phoenix Area,

such growth will only occur if local conditions continue favorable. Manufacturers now operating in the Area mention rising land cost, transportation problems, labor-supply problems, taxes, air pollution, and water problems as "conditions" which could retard future industrial growth.

Industrial Employment

In 1958, the production of aircraft equipment and components provided the most employment among manufacturing industries in Maricopa County. The electronic-electrical equipment industry ranked second followed by primary metals. By 1980 the electronic-electrical industry will be in first place, and the firms now classed in the aircraft-equipment category in second place. Primary metals will still be third.

Even more significant is the fact that the electronic-electrical industry of 1980 will dominate local manufacturing much more than the aircraft-equipment plants do at the present time. In 1958, the aircraft-equipment plants accounted for about 20 per cent of the manufacturing employment in the County, but by 1980 prospects now indicate that nearly 35 per cent of the persons employed in manufacturing will be working in the electronic-electrical apparatus and equipment industry.

Growth of this dimension in the electronic-electrical industry will require substantial expansion of existing major producers and the establishment of still more major plants within the County. This growth of large producers will be influenced by the extent to which supporting shops are set-up to provide both electronic and non-electronic components and services, and the extent to which the Phoenix Area becomes a recognized center for advanced training and research in the sciences upon which the electronics industry is based.

Industrial-Land Requirements

Manufacturing plants in Maricopa County were using just under 2,500 acres of land in 1958. If employment grows as expected, and there are no major changes in land requirements per employee, the manufacturing plants of 1975-80 will be using over 7,000 acres. This estimate assumes that the new plants of the future will have land requirements per employee similar to those of the more recently constructed plants in each industry.

Non-manufacturing industries with locational requirements similar to manufacturing are expected to use about 4,400 acres in 1980 as compared with approximately 2,300 acres in 1958. These industries consist of wholesalers, trucking firms, public warehouses, commercial laundries and dry cleaning plants, contractors engaged in heavy construction with storage yards, and major utilities. The requirements of railroads and of industrial proving grounds were not projected; over 10,000 acres were used for such purposes in 1958.

Future of the Tourist Industry

In 1958 the tourist industry of Maricopa County is estimated to have been a \$165,000,000 business, including receipts from both sale of services and of merchandise. By 1980 it could be about \$400,000,000 at 1958 prices. Whether this increase of nearly two and one-half times is realized will depend primarily upon local factors. The national outlook is very favorable.

Among the local factors which can affect the tourist business is the availability of moderate to medium-priced accommodations. No doubt the volume winter-trade will continue to be winter visitors in the middle to lower income brackets. In addition, the impact of further growth in population and industrialization is uncertain. The effect could be adverse if traffic congestion, air pollution, and other urban irritations increase substantially with further growth. Such conditions could even discourage the visitors who

might otherwise find a winter vacation in a metropolitan center a welcome change from their normal life in the smaller winter-bound communities of the West and Midwest.

The Outlook For Mobile Homes

Mobile homes are becoming a permanent form of housing for an increasing number of families. This conclusion is based on: (1) a survey of mobile homes parks and of the families living in mobile homes in Maricopa County in the spring of 1959; and (2) an analysis of pertinent trends both in the County and at the national level.

If the growth of mobile home housing in Maricopa County were to follow national projections, it is possible that 140,000 persons, or ten per cent of the population, would be living in mobile homes by 1975-80. Whether this growth is realized will depend primarily upon: (1) the extent and quality of new park construction; (2) public policy regulating parks and homes; and (3) the availability of favorable financing for parks.

Mobile home living is attractive to many families because it offers many of the advantages of apartment living - for example, compactness and low operating costs. But, like apartments, the mobile home park is not always compatible with single-home residences. Yet, if the demand for mobile home sites that appears to be in prospect were to be met without appropriate planning, small mobile home parks could be scattered throughout the County to the dissatisfaction of both conventional home and mobile home owners alike. One answer may be mobile home subdivisions of sufficient size to provide their own amenities.

Water Sources and Uses ^{2/}

The Phoenix Area of Maricopa County should have sufficient water on an overall basis to supply the needs of the population and the industrial expansion which is in prospect for 1975-80. The supply will only be adequate, however, with an appropriate margin of safety, if irrigated land continues to be withdrawn from agriculture.

Nevertheless certain sub-areas within the general Phoenix Area are likely to face serious water problems. Some wells may be producing water of such high salinity by the late 1970's that desalting will be necessary. In other sections, the water table may fall to such depths that pumping costs will have become excessive by 1980, and, in some localities the underground supply may be exhausted to bedrock.

However, a substantial portion of the Area, including nearly all of the land within the City of Phoenix (May, 1959), is within the Salt River Project. All lands within the Project have rights to the surface water produced by the flow of the Salt and Verde Rivers. This flow alone should probably be sufficient to supply the domestic uses of a population of considerably more than 2,000,000 persons. But there will probably still be a significant demand for irrigating water by some Project lands even in 1980. Furthermore, some allowance should be made for additional industrial use and for a safety margin. Therefore, it may be necessary, even in 1980, to pump underground water in the Project to supplement surface-water supplies.

The use of underground water in the Phoenix Area has reached such volume, at least outside of the Project, that use exceeds recharge -- in other words, water is being mined. Additional water supplies will eventually have to be provided if long-run growth is to be sustained.

^{2/} This section is based upon Available Water for Urban Development in the Phoenix Area, a report prepared especially for this study by Samuel F. Turner of Turner and Associates, Consulting Geologists.

Growth Potential Of The Phoenix

Central Business District

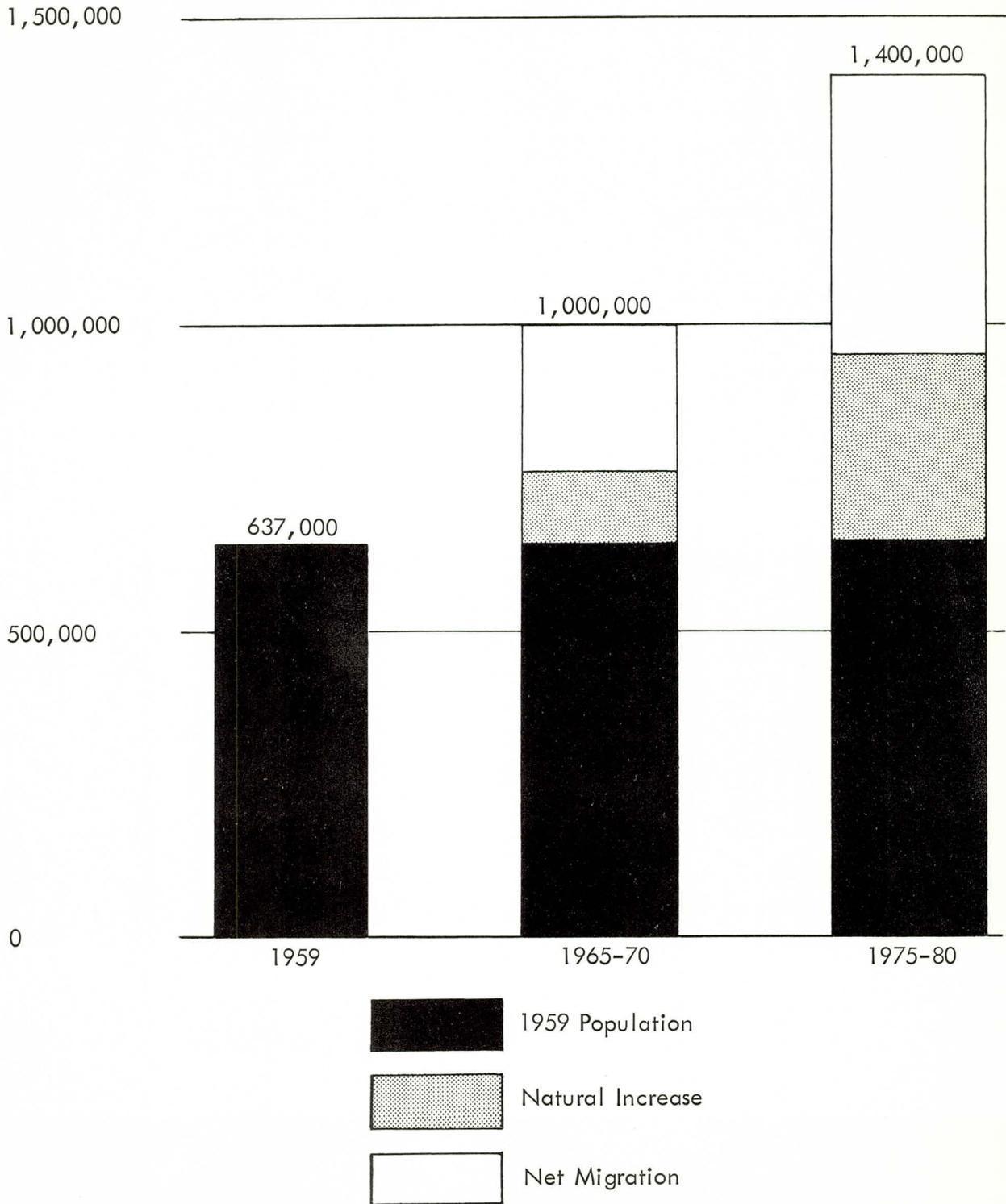
The retail sales of the Phoenix Central Business District could reach \$200,000,000 in 1980 as compared with \$130,000,000 in 1958. This projection is in 1958 prices and assumes that the population of Maricopa County will increase to 1,400,000 by 1980.

Considerably higher sales would be forecast in light of the expected increase in population were it not for the development of regional shopping centers. This projection does assume, however, that there will be a vigorous effort to cultivate the customers for whom the Central Business District may have particular appeal, including nearby residents, out-of-county visitors, persons employed in the District, and consumers who may be occasionally drawn past regional shopping centers for something special downtown.

It is estimated that private industry will need 2,500,000 square feet of office space in the Phoenix Central Business District by 1980 as compared with about 1,250,000 in existence in 1958 -- both estimates representing gross floor area. The prospective growth of the Phoenix Area would suggest even higher space requirements within the Central Business District but for the substantial office development which is occurring outside the District boundaries and yet is centrally located with respect to the Phoenix Area.

FIGURE 2

POPULATION GROWTH OF MARICOPA COUNTY



PART I
POPULATION GROWTH

The projections to be made of population growth were described as follows in the study plan:

"Total population will be projected to 1980 for Maricopa County and for the Phoenix Urban Area. For purposes of this estimate, the Phoenix Urban Area is to comprise the present city of Phoenix plus the surrounding, now unincorporated, urban fringe.

"Account will be taken of both natural increase and migration in making the projection, rather than relying on a purely mechanical extrapolation of the past overall rate of growth."

Population Projections For Maricopa County

Outlook for 1980

The population of Maricopa County will probably reach 1,400,000 some time between 1975 and 1980, if both national and local conditions continue favorable to the County's growth.

Analysis of the County's employment potential, so far as it can be evaluated at this time, indicates that the 1,400,000 level may not be attained until about 1980. On the other hand, study of the outlook for migration and the rate of natural increase reveals that the 1,400,000 figure could be attained considerably before 1980, and, if the most optimistic view is taken of migration prospects, even before 1975.

Maricopa County, in other words, faces a very substantial growth in population - an increase that could more than double the April, 1959, figure which is estimated to have been 637,000. Even though it is not possible to determine precisely in what year the population of Maricopa County may reach 1,400,000, the analysis of the growth outlook that is presented in this report does lead to the conclusion that a population increase of at least this dimension may be expected by the late 1970's.

The possibility should, of course, be kept in mind that the economic development of Maricopa County may occur more rapidly than can now be foreseen. Therefore, public and private planning for a population of 1,400,000 might have to be accelerated from the late 1970's to an earlier period. Conversely, the necessity for stretching out planning programs could arise if unexpected national events should slow economic expansion generally, or if local deterrents to growth should prove more potent than is now anticipated. Hence, periodic review of the growth outlook for Maricopa County will be required to keep both public and private planning in line with prospective need.

Trends, 1940 - 1980

If the population of Maricopa County does reach 1,400,000 within the next 15 to 20 years, it means that over 760,000 persons will be added to the present population. This increase in number of persons would be a substantially greater one than the County has ever before experienced in a similar period of time. Between 1940 and 1959, the increase was slightly over 450,000.

As shown in Table I, the larger part of the growth in the population of Maricopa County since 1940 has been concentrated within the last nine years - over 300,000 since 1950. Prospects now indicate that this volume of growth, which averaged around 34,000 persons per year, could well be exceeded during the next two decades. If a population of 1,000,000 is attained within ten years

(or by 1969), average annual growth would be 36,000; and, if a population of 1,400,000 is reached within 20 years, the average annual increment would be just over 38,000. Attainment of these levels in shorter periods of time would mean a corresponding increase in the annual growth increments. For example, to reach the 1,400,000 level by July 1, 1975, would mean adding an average of nearly 48,000 persons per year to the County's population. Such an average annual increment is entirely possible, and could even be higher, according to the migration outlook.

TABLE I
POPULATION OF MARICOPA COUNTY
SELECTED YEARS, 1940 TO 1980

Year	Population	Increase By Periods
1940	186,000	
1950	332,000	146,000
1959	637,000	305,000
1965-70	1,000,000	363,000
1975-80	1,400,000	400,000

Source: 1940 and 1950--actual population as of April 1 according to the United States Bureau of the Census; 1959 (April), 1965-70, and 1975-80 -- estimates prepared by Western Business Consultants, Inc.

How Projections Were Made

The conclusions presented here on the outlook for population growth in Maricopa County during the 1960's and 1970's are based upon two separate projections of the County's population - one based upon employment prospects and the other based upon the trend of net migration to the County and of local birth and death rates. The projection based upon the outlook for migration and natural increase tended to be higher than that based upon employment prospects for reasons that are discussed after the projection methods are outlined.

Projections Based Upon Employment. Two markets provide employment in any community - the local market, or purchasers residing within the community; and the outside market, or purchasers residing outside of the community, including tourists and other visitors. This fact was used as a basis for estimating the growth of employment in Maricopa County over the next two decades, and in turn the probable population such employment would support. The estimation procedure consisted of the following steps:

1. Estimates were made of the employment in each industry attributable in 1958 to outside and to local markets.
2. The market outlook was explored for each industry and estimates made of the employment that each industry's outside market would probably generate by 1970 and by 1980.
3. In 1958 there were approximately 1.8 persons employed in meeting local demands for each person employed in supplying outside markets. This ratio was applied to the 1970 and 1980 estimates of outside-market employment to obtain corresponding estimates of local-market employment; the sum of these estimates for each year gave total employment (for discussion of this ratio see page 44).

4. Population was estimated from total employment by -

a. Calculating the total labor force from employment.

This computation was based on the assumption that both 1970 and 1980 would be years of high employment with only about 4 per cent of the labor force unemployed.

b. Computing from the labor-force estimate the probable number of persons 14 years of age and older in 1970 and 1980.

This estimate was computed from the trend of the ratio of the labor force to number of persons 14 years of age and older which has been slowly rising as more women are employed.

c. Calculating total population from population 14 years of age and older.

This estimate assumed that the ratio of persons 14 years of age and older to total population would decline with another peak in the birth cycle some time in the late 1960's or early 1970's.

The employment projections from which population was estimated are presented together with some evaluations in Part II. ECONOMIC BASE.

Projections Based Upon Components. Population grows as a result of an excess of births over deaths and by an excess of in-migration over out-migration. Therefore, it is possible to estimate growth by projecting the trend of natural increase and of net migration. Difficulties arise, however, because there are a number of plausible assumptions that can be made about the trend of both birth rates and of migration. Some of these assumptions lead to vastly different population estimates for Maricopa County by 1980.

For this analysis, the assumption was made that birth rates for Maricopa County would decline from their recent level in excess of 28.0 per thousand population to 24.5 in 1968 and then rise to 26.5 by the end of 1980. The

upturn in the rate after 1968 reflects the predominance in the child-bearing ages of the women born in the recent high birth years. This assumed behavior of the birth rate for Maricopa County was based on the Series III projection of the U. S. Bureau of the Census.^{1/}

The Series III projection was followed because it provided a "middle ground" between opposing views on the future trend of birth rates. There is the view that even higher birth rates than those recently experienced are in the offing because of a combination of favorable economic and cultural changes. There is the contrary view that the recent high level of birth rates was an aftermath of the war period, and other temporary influences, and that the long-term downward trend, which had persisted for generations prior to the 1940's, will soon be resumed.

For death rates, a decline was assumed from the recent level of around 7.4 per thousand to 7.25 by the end of 1980. This decline is in line with expected lengthening of the average life span resulting from advances in the health sciences.

The Migration Outlook

During the 1940's, net migration averaged 10,000 persons per year for Maricopa County and in the 1950's, around 24,000. From an examination of the past growth of the population of the County by decades, it is evident that the 1950's saw the highest volume of migration that the County has thus far experienced. Moreover, this increase was part of a national trend.

Between April 1, 1950, and July 1, 1957, more than 5,800,000

^{1/} "Illustrative Projections of the Population of the United States, by Age and Sex, 1960 to 1980" Current Population Reports, Series P-25, No. 187, (November 10, 1958), U. S. Bureau of the Census.

persons moved from one state to another, or to a state from outside the country.^{2/} Of this number, 57 per cent migrated to the mild winter climates of Arizona, California, Florida and Texas.

If the desire to live in an area with a mild winter climate continues to have strong pulling-power, even to young families, and industry continues to put stress upon attractive living conditions in its location of new facilities, especially those employing engineers and scientists, then it is reasonable to assume that climate-oriented migration may move at an accelerated rate over the next twenty years. The decade just closing is the first in the history of the country in which the climatic factors influencing migration have had a chance for full play under peacetime, prosperous conditions. Neither population nor industry were really climate-oriented in the prosperous, peaceful 1920's and cross-country automobile travel was still something of an adventure.

Migration Estimates Based On Local Experience. It is common practice in estimating future migration for a geographic area to assume some average that has been attained in the past. If the decade of the 1950's, however, was only the beginning of climate-oriented migration on a national scale, then the average annual net migration to Maricopa County during this period may be too conservative an estimate of future migration. The trend during the 1950's could be more indicative of the future. It happens, however, that there has not been one clearly defined trend throughout the 1950's. Migration to Maricopa County has tended to increase one year and decline another rather than steadily growing from year to year.

^{2/} Calculated from "Estimates of the Population of States and Selected Outlying Areas of the United States: July 1, 1957 and 1956," Current Population Reports, Series P-25, No. 186, (October 27, 1958), U. S. Bureau of the Census.

As shown in Table II, an upward trend in migration to Maricopa County has been evident since 1955. This behavior could foreshadow a strong, rising trend that will persist for some years in light of the forces which seem to be stimulating migration to the County. Nevertheless, this evidence covers too short a period to be used as anything more than a rough indication of what could happen if migration to the County were to follow a rising trend in the years ahead. To provide such a rough indication, a curve was fitted to the actual migration during the 1950's and projected to 1980, giving a migration value for that year of over 83,000.

TABLE II
NET MIGRATION TO MARICOPA COUNTY, 1950 - 1959

Period July 1 - June 30	Number of Persons	
	Actual	Three-Year Moving Average
1950-51	18,000	
1951-52	19,000	21,000
1952-53	26,000	19,000
1953-54	12,000	19,000
1954-55	18,000	17,000
1955-56	20,000	23,000
1956-57	30,000	25,000
1957-58	25,000	34,000
1958-59	46,000	
<u>Average</u>	23,800	

Source: Estimated by Western Business Consultants, Inc. See Appendix to Part I for description of method.

Migration Estimates Based on Population Growth. Another approach to the estimation of future migration is to base the estimate on the anticipated behavior of some other factor to which migration bears some relation. For example, it is reasonable to assume that, given the forces now appearing to stimulate migration, an increase in the population of the United States should mean an increase in the migration to Maricopa County. During the 1950's, migration to Maricopa County averaged about 0.00014 per cent of the population of the United States. If this ratio is applied to the Series III projection which the Bureau of the Census has made of the population of the United States,^{3/} it results in an estimated annual migration to the County of 34,700 by 1980.

Migration Estimates Based on Rise in Real Income. Migration may be related in the long run to the rise in the real income of the economy - perhaps even more so than to population growth. If living in milder winter climates is coming to be one of the many satisfactions for which families in the United States are striving, then it is reasonable to assume that the generally predicted substantial rise in the average real income of families during the 1960's and 1970's would result in further increase in migration to Maricopa County even if national population were to remain stable.

Study of the past relationship between migration to Maricopa County and the per capita real output of the national economy^{4/} revealed only a limited relationship (correlation of 0.44) but this result could have been influenced by the short period for which annual migration data were available. Moreover, it is possible that increasing national productivity will provide much more stimulus to migration in the future for reasons of climate than it has in the past.

^{3/} Current Population Reports, Series P-25, No. 187, U. S. Bureau of the Census.

^{4/} Gross national product per capita, with product expressed in constant dollars. This ratio determines in the long-run the trend of the real income of families.

Some experimental calculations were made of what migration to Maricopa County might be if it were to increase in ratio to gross national product per capita. The basis for the projection was the relationship between changes in national output per capita and those in migration to the County during the 1950's. Even the calculations using the more conservative predictions that have been made of national output per capita indicated an annual migration figure for Maricopa County of more than 145,000 by 1980.

Tempering Considerations. There is a tremendous spread between the average annual migration actually experienced during the 1950's of 23,800 and a figure of 145,000. Yet, just after the close of the twelve months which has seen migration reach an estimated 46,000, still higher figures for the future - even substantially higher - do not seem wholly unreasonable. There are some considerations, however, which suggest that annual migration on the order of 100,000 or more per year may not be reached within the next twenty years even though real income per capita and other national factors may be favorable.

First, an accelerated migration to milder winter climates does not automatically mean an accelerated migration to Maricopa County. There are many competitive locations blessed with winter sunshine. The whole desert area of Southern California and the Yuma Area of Arizona is from 150 to 300 miles closer to the consumer and industrial markets of Metropolitan Los Angeles which, in size, may rival those of Metropolitan New York even before 1980.

Second, the very growth of Maricopa County may reduce some of its advantages to the firms that are seeking pleasant living conditions for their employees. It could happen that smaller communities in both Southern Arizona and California would be favored over a large metropolitan center by many industrialists, especially when the interstate highway system is fully developed, linking the smaller communities with the large centers.

Third, internal deterrents to growth (such as traffic congestion, increasing land costs, and water and sanitary problems) may slow population growth to a rate lower than that which external factors would make possible.

Fourth, net migration at the rate of more than 100,000 persons per year would mean growth on the scale of the Los Angeles-Long Beach Area, thus far the largest community in the whole mild-winter climate belt from coast to coast. Annual migration to this Area since 1950 has been running in the 100,000 to 200,000 range.^{5/}

Population Estimates Based Upon Migration Outlook

In the preceding analysis of the outlook for migration, four different assumptions were considered for estimating the trend of migration to Maricopa County over the next two decades:

1. The average annual rate will be no higher than that during the 1950's - in other words, the trend will be horizontal, with high years offset by low.
2. The trend will be an extension of that experienced during the 1950's, meaning higher migration during the 1960's and 1970's.
3. The trend of migration to the County will follow the growth of national population.
4. The trend of migration to the County will follow that of real national income as indicated by real output per capita.

^{5/} Monthly Summary of Business Conditions in Southern California, (February 1959) Security First National Bank of Los Angeles, and Los Angeles - 1957, The Market, Its Newspapers, The Times-Mirror Company Market Research Department, p. M-9.

As is shown by Table III, the experimental population estimates which result from applying these assumptions about migration differ widely as is to be expected from the great differences in the assumptions themselves.

TABLE III
EXPERIMENTAL POPULATION ESTIMATES FOR MARICOPA COUNTY
BASED UPON FOUR DIFFERENT ASSUMPTIONS ABOUT TREND OF
NET MIGRATION TO THE COUNTY, SELECTED YEARS 1959 TO 1980

Year	Experimental Estimates of Population, Assuming for Migration:			
	Same Average Annual Rate as for the 1950's	Increase in Proportion to Increase in National Population	Increase at Same Overall Rate as the Trend of the 1950's	Increase in Proportion to Increase in Real National Output Per Capita
1959	637,000	637,000	637,000	637,000
1965	850,000	870,000	960,000	980,000
1970	1,100,000	1,100,000	1,300,000	1,400,000
1975	1,300,000	1,400,000	1,800,000	2,100,000
1980	1,500,000	1,700,000	2,400,000	3,000,000

Method: Population at beginning of period plus estimated natural increase (estimated births minus estimated deaths) plus estimated migration during period. Resulting population estimates have been rounded to two significant figures. Same birth and death trends assumed for all four sets of calculations. These trends described in preceding discussions of "Projections Based Upon Components."

Source: Western Business Consultants, Inc.

Why the Population Estimates Differ. The population estimates given in Table III provide an interesting and significant contrast with that derived independently from the projection of employment trends. This latter projection resulted in a population figure of 1,400,000 for Maricopa County by 1980.

Why should the population estimate based upon employment prospects be lower than any of those based upon the outlook for migration?

The reasons are to be found in the nature of employment projections that were made for Maricopa County. If the employment prediction is to provide a basis for projecting population that is independent of assumptions about the trend of a community's population, itself, the employment estimate has to be based upon the outlook for the outside market - the possibilities of increasing the production of goods and services for purchasers living outside of the County.

In the case of Maricopa County, the most important outside markets in terms of employment potential are those supplied by the manufacturing industries, and particularly by those industries which have a scientific-engineering orientation such as electronics. Estimates of the employment potential were based, (see Part III for details), upon reports from local manufacturers as to the employment they anticipated over the next two decades and upon the national outlook for each manufacturing industry now operating or expected to operate in the County.

It might be assumed that this procedure would result in very optimistic estimates of employment growth, but the reverse appears to be true of the estimates resulting for Maricopa County. Some manufacturers, particularly those running the smaller operations, would only project their employment for five years ahead; and, among those who gave projections farther into the future, there was some tendency to project little or no change after the first five years. These manufacturers were in effect stating that they couldn't see much beyond five years and were therefore adopting the safe course of assuming no change in employment beyond the five-year anticipation.

Employment anticipation of local manufacturers were, of course, only part of the data taken into account in making the employment projections. As already mentioned, national trends in each industry were considered and,

in addition, factors were evaluated which might cause local plants to expand or additional plants to be established here. Nevertheless, this procedure probably gives conservative projections of the industrial growth of Maricopa County.

Relatively new locational factors such as climate and general attractiveness to executive and professional employees are playing a major part in the County's industrial growth. Unlike locational decisions based upon availability of production materials or markets, those based upon climate and living conditions are much more likely to be influenced by the personal preferences of management. Consequently, the safest course for the estimator is to be conservative in weighing how much climate and living conditions may influence the growth of a given industry in Maricopa County.

Another limitation of employment projections which are built up from analyzing the outlook for a community's outside markets is that allowance is not made for the possible "lead" effect of population growth, itself. To the extent that living conditions in Maricopa County attract migrants without jobs, such migrants themselves help to increase the local market, as well as increase the local labor supply, and thereby help induce the growth of industry.

Furthermore, the retired and other migrants who do not need jobs may exert an even greater "lead" effect upon employment than those migrants who are seeking employment. It is, of course, not possible to make an allowance for this impact upon local employment and at the same time produce an employment estimate that is independent of population trends.

Use of Two Sets of Population Estimates

If the estimation of the population growth of Maricopa County from employment trends results in a lower value than that from migration prospects, which figure is the more valid indicator of future population? The answer is

that both figures should be taken into account. The estimate based upon employment indicates the population for which a future economic base can be envisaged at this time. The estimate based upon migration prospects indicates the impact which the broad-scale population movements that now appear to be under way in the United States could have upon local growth.

Both sets of estimates have been considered in arriving at the population projections presented for Maricopa County in this report. For example, the population projection of 1,400,000 is given for the period 1975-80. The analysis of employment prospects indicated that the 1,400,000 figure might not be reached until about 1980, but consideration of the migration tide now running indicated that the 1,400,000 level could be reached before 1980 - possibly by 1975.

Population Projections For The Phoenix Urban Area

Outlook for 1980

The population of the territory which comprised the City of Phoenix and adjoining unincorporated areas in May 1959 may be close to 1,000,000 by 1975-80, if present growth patterns persist and the population of the County increases to 1,400,000. In addition, approximately 100,000 persons will probably live within the May 1959 corporate limits of the neighboring cities of Glendale, Mesa, Scottsdale, and Tempe.

Most of the population growth anticipated for the Phoenix Urban Area will probably occur in what are now unincorporated sections surrounding Phoenix and its immediate neighbors. As shown in Table IV, a population of 1,400,000 for the County by 1975-80 would mean an increase of more than 760,000 over the 1959 population. It is estimated that this increase would be distributed geographically as follows: nearly 100,000 within the May 1959 boundaries of the City of Phoenix; over 410,000 within adjoining unincorporated areas; about 30,000 within the May 1959 boundaries of neighboring cities; and about 220,000 in the remainder of the County.

Basis of Projection

The geographic projections given in Table IV are largely an extension of the growth patterns which have been developing within the County, particularly since 1950. The reasons for assuming that these patterns will probably persist for at least one to two more decades are discussed under the next topic "Reasons for Expecting Continued Suburban Growth."

Knowledge of recent and current growth patterns has been gained through analyzing the increase of population in Maricopa County since 1950 by elementary school districts. These districts are the smallest geographic unit with unchanged boundaries for which reasonably reliable population estimates

TABLE IV
 POPULATION OF THE PHOENIX URBAN AREA
 AND OF MARICOPA COUNTY, 1959 AND 1975-80

Areas	1959 Estimate*	1975-80 Projection	Increase 1959 to 1975-80
<u>Phoenix Urban Area</u>			
City of Phoenix (May 1959 Boundaries)	366,000	465,000	99,000
Unincorporated Sections**	<u>113,000</u>	<u>525,000</u>	<u>412,000</u>
Total	479,000	990,000	511,000
Neighboring Cities*** (May 1959 Boundaries)	69,000	100,000	31,000
Total	<u>548,000</u>	<u>1,090,000</u>	<u>542,000</u>
<u>Remainder of County</u>	89,000	310,000	221,000
<u>Maricopa County</u>	637,000	1,400,000	763,000

* Population estimate as of April 1959 for May 1959 municipal boundaries.

** Adjoining May 1959 boundaries of the City of Phoenix and of neighboring cities; includes unincorporated portions of following elementary public school districts: Alhambra, Cartwright, Creighton, Glendale, Isaac, Madison, Mesa (Western portion), Roosevelt, Scottsdale (West of Pima Road), Sunnyside (South of Bell Road), and Tempe.

*** Cities of Glendale, Mesa, Scottsdale, and Tempe.

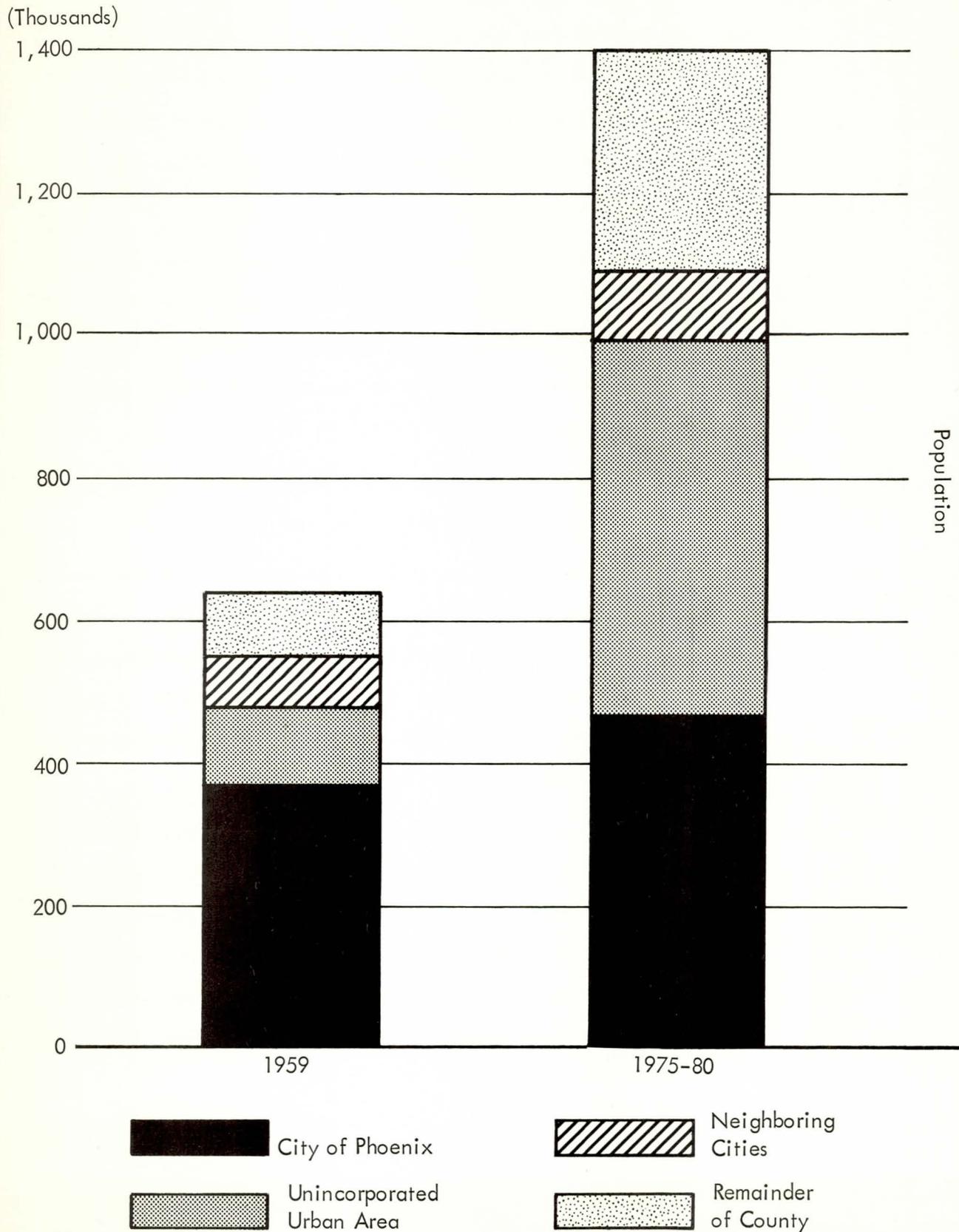
Source: Estimates and projections prepared by Western Business Consultants, Inc.

could be developed for both 1950 and 1959. The growth of the Phoenix Area since 1950 has been characterized by the following developments:

1. The sections which were already well built-up in 1950 have shown little increase. For example, the population density of School District No. 1 (Phoenix Elementary), which is the heart of the City of Phoenix, is estimated to have only increased from 6100 to 6200 persons per square mile.
2. The areas adjacent to the Phoenix core, which were building up in 1950, have, with one or two exceptions, continued to grow. For example, the density of District No. 8 (Osborn), which includes the "Park Central Area" increased from about 3600 to 4900 persons per square mile between 1950 and 1959.
3. The growth in the immediate Phoenix Area has been most vigorous in three directions: west-northwest, north, and northeast.
4. The great bulk of the population growth in Maricopa County between 1950 and 1959 occurred in territory which was unincorporated in 1950. The annexation of what were unincorporated growth areas has accounted for most of the increase in the population of the City of Phoenix from 107,000 in 1950 to 366,000 in 1959. Even in 1950 these subsequently annexed areas had a population of over 100,000.
5. The population growth since 1950 has so far resulted in relatively low density per square mile as compared with old Phoenix. For example, District 8 (Osborn) and District 14 (Creighton) represent newer established areas that have probably passed their period of rapid growth. Yet in 1959, their ratios were still only 4900 and 3800 respectively as compared with over 6200 persons per square miles for District 1 (Phoenix Elementary).

FIGURE 3

POPULATION GROWTH IN THE PHOENIX URBAN AREA



All of these patterns were taken into account in developing the geographic projections of population growth which are given in Table IV. In addition, note was taken of the distribution of water resources within the general Phoenix Area (see Part VII), availability of sewer service, topographical features, the highway network, and the location of industry.

Reasons for Expecting Continued Suburban Growth

Geographically, there are several ways in which the expected explosive population growth in Maricopa County could be distributed: (1) widespread increase throughout the County rather than spreading outward from Phoenix and its immediate incorporated neighbors; (2) increase largely confined within present boundaries of Phoenix and neighboring cities and their immediate fringe by filling-up vacant land passed over during initial development and by substantial increase in apartment and other forms of multiple housing; and (3) increase continuing in large part to spread out from Phoenix and its neighbors into surrounding territory that is now unincorporated.

It is possible that wholly new communities may be established in Maricopa County which are not an extension of the Phoenix Urban Area and that the outlying existing communities may experience more growth than anticipated in the projections offered here. There are several reasons, however, for believing that the greater portion of the population of the County during the next ten to twenty years will occur as part of the growth of the Phoenix Area, particularly as an extension of the area.

Most important is the fact that a community with the reputation for growth attracts more growth. There is a decided national trend toward urban living and only now is the Phoenix Area reaching the size where it is beginning to offer the advantages of a true metropolitan community. Of course there are accompanying disadvantages, such as rising land costs and increasing traffic congestion but these influences are more likely to push developers and industrialists to the suburban fringe of the Phoenix Area than to cause them to pioneer

locations in the outlying communities of the County. Furthermore, much of the general Phoenix Area has greater water resources than any other part of the County by virtue of rights to the flow of the Salt and Verde Rivers (see Part VII).

Some of the expected population growth, as suggested in Table IV, will occur within the existing boundaries of Phoenix and neighboring cities. Parcels of land that were passed up during initial development are beginning to fill up, particularly with multiple dwellings ranging from duplexes to full-fledged apartment structures. Nevertheless, there are several influences that will probably result in the major housing construction occurring beyond present city limits.

First, the demand for single homes will probably continue to dominate the local market for some years if the price for such homes can be held to a level that prospective buyers can afford. If the increase in population occurs that is expected, a very large proportion will consist of families that move here to work in local industry, and recent experience suggests that most of these families will have children and will want single homes.

There are, of course, indications that there may be a greater number of young persons seeking apartment accommodations in the 1960's and early 1970's than has been true in recent years because persons born during the sharp rise in birth cycle that occurred in the late 1940's and early 1950's will be then seeking jobs and forming households. The migration of retired persons should also increase the demand for apartments and mobile-home sites except that the development of retirement communities featuring single homes may reduce this demand. Such developments, for reasons of land cost, are probably more likely to be outside than inside present city boundaries. Furthermore, many of the young people who seek apartment accommodations when they first set up their own households are likely to be in the market for single homes when children come.

Second, it appears probable that builders will continue to hold down the prices of single homes by opening the sub-divisions farther and farther out from

the center of the Phoenix Area. The farther out that the builders go, the less their initial land costs, and the greater their opportunity for getting large parcels suited to the volume-construction operations which characterize much of the home building in the Phoenix Area.

The residential development of the Area would doubtless be much more closely knit if home builders were dependent upon municipal water and sewer services. The ground water supply, however, has generally been sufficient that private water companies could be set up to service a new development. In addition, the prevalence of favorable soil conditions, as well as single-home construction, has made it possible to use individual underground systems on each lot for sewage disposal.

These conditions will probably change with the additional growth that is in prospect. The ground water table may drop to levels in many areas where pumping on a small scale by private water companies is not economical. Then the availability of new houses in sub-divisions with sewer connections may increase the sales effort required to market houses in other sub-divisions without municipal sewer service. It does not follow, however, that builders will be forced to build within corporate limits.

Most municipalities in the Area that provide either water or sewer services or both have extended service beyond their corporate limits and some are planning substantial extensions of such service. Very possibly the territory to which such extensions are made will ultimately be annexed but in the meantime the extension will facilitate the residential development of the territory.

Third, among the influences favoring the continued extension of suburban development is the recent tendency for some of the large industrial establishments to locate beyond existing residential areas. The interstate-highway system which is planned for the Phoenix Area may lend added impetus to the outward spreading of both industrial and residential development.

Significance for Planning

The continued spread of population to unincorporated areas is not necessarily a desirable development for the community, if it takes the form of unrelated subdivisions leap-frogging each other and leaving vacant lands adjacent to incorporated communities, and between subdivisions. Such scattered development is almost certain to increase the cost of providing a satisfactory level of governmental services and it can not be counted upon to provide the needed open spaces for schools, parks, and other public facilities.

Furthermore land prices are probably pushed up more by scattered than by orderly developments. As soon as an isolated subdivision is announced prices in the general vicinity of the development are almost certain to rise, and the greater the rise, the more likelihood that farming will be discouraged, potential plant sites will become too high-priced for industry, and only speculators will be left as the current market.

Of course, it is often the search for lower-priced land that leads a developer to set-up a "free-standing" subdivision at some distance from existing subdivisions. Yet this very act may well set in motion a chain of repercussions upon land values that will force the next developer to seek land even farther out if he is to offer houses at competitive prices.

Urbanization must inevitably increase land values but at any given time the increase will probably be spread over a much wider area, and the rate of increase will probably be more rapid if the urbanization is scattered rather than closely-knit. For scattered subdividing to have this impact upon prices, there must be a strong growth tide running in the community. But it is in the rapidly expanding areas that development is likely to be most scattered unless growth is guided by sound planning into logical urban patterns.

APPENDIX TO PART I
POPULATION ESTIMATES FOR 1950-1959

The population of Maricopa County on July 1st of each year between 1950 and 1959 was initially estimated by applying the procedure which the U. S. Bureau of the Census has designated "Component Method II." Meanwhile, a method based upon an indirect count of households was used for estimating the population of Maricopa County as of April 1959.

It was necessary to use the household method for estimating 1959 population in order to obtain estimates for particular cities and unincorporated areas within the County. The component method is applicable only to the smallest civil division for which birth and death data are regularly available and that happens to be the county in Arizona. On the other hand it was not practicable to use the household method for estimating population by years between 1950 and 1959 for purposes of deriving the trend of migration to the County.

The Annual Estimates

The estimate by the household method gave a population of 637,000 for the County as of April 1959 while the estimate by the component method was 614,000 for July 1, 1959. For reasons that are discussed later, it was decided that the estimate by the household method gave a more reliable figure. Accordingly, adjustments were made in the annual estimates between 1950 and 1959 to bring them into line with those for the terminal year.

The revised annual estimates of the population of Maricopa County on July 1st for 1950-1959 are given in Table V, together with estimates of the components - natural increase, migration, and net loss to the armed forces.

TABLE V
ESTIMATES OF THE COMPONENTS OF CHANGE
IN THE CIVILIAN POPULATION OF MARICOPA COUNTY,
1950-1959

Twelve Months Beginning July 1	Civilian Population Beginning of Period	Total Change	Natural Increase	Net Civilian Migration	Net Loss to Armed Forces
1950	336,600				
1951	359,400	22,800	6,600	18,000	-1,800
1952	383,800	24,400	6,900	19,000	-1,500
1953	417,800	34,000	8,300	26,000	- 300
1954	438,300	20,500	8,900	12,000	- 400
1955	465,700	27,400	9,600	18,000	- 200
1956	496,100	30,400	10,400	20,000	*
1957	537,200	41,100	11,000	30,000	+ 100
1958	574,000	36,800	11,600	25,000	+ 200
1959	632,400**	58,400	12,300	46,000	+ 100

* Less than 50.

** Civilian population for April 1959 is estimated to have been over 630,000, and total population (as mentioned previously) 637,000, the difference being members of the Armed Forces stationed in Maricopa County. Only a minor increase in civilian population is estimated between April and July because of the seasonal out-migration of winter visitors and of out-of-county residents attending school in the County. The strike in the construction industry also served to increase out-migration during the May-June period.

Source: Estimates prepared by Western Business Consultants, Inc., from following information: (a) Natural Increase - births adjusted for underregistration less deaths based on data from Arizona State Department of Health and rounded to hundreds; (b) Net Civilian Migration - derived from changes in number of persons enrolled in elementary schools per Component Method II of the Bureau of the Census (see Current Population Report, Series P-25, No. 133) modified by results of population estimate for April 1959 based upon household method of estimating population; (c) Net Loss to Armed Forces - based on data from Selective Service System rounded to hundreds.

Estimation of Migration by Component Method II

The basic feature of Component Method II is the estimation of total migration by calculating the migration rate for elementary school children over a given period and multiplying this rate by a specified factor to obtain the migration rate for total population. The reason for estimating the migration of elementary school children is that the necessary data for such estimation are more readily available for this age group than for any other.

The procedure followed was to compare the reported number of elementary school children for the close of any school year (close-of-year membership of public, parochial, and private elementary schools for grades 2 to 8) with the expected number of children of elementary school age surviving from the appropriate age group in the last decennial census. The complete procedure is outlined in No. 133, of Series P-25, Current Population Reports, U. S. Bureau of the Census.

The factor provided by the Bureau for converting the migration rate for elementary school-age children is the ratio of the migration of all ages to the migration rate of the actual school-age group over the period since the last decennial census for which the estimate is being made. The Bureau has developed this ratio from its Current Population Survey. It was 1.27 for the estimating period April 1, 1950 to July 1, 1951 and declined to an estimated 0.87 for the period April 1, 1950 to July 1, 1959.

As explained by the Bureau of the Census "the decline in the ratio results from the fact that progressively younger children are included in the school-age group as the period lengthens." For example, the current estimating period 1950 to 1959 includes not only school children not in school at the time of the 1950 Census but also some not yet born. Such young children would have a much higher migration rate in relation to that of the total population than would children included in the 1950-51 period, the bulk of whom would be in school at the end of the 1951 period.

The same factor is recommended by the Bureau of the Census for converting the rate of elementary school age migration to the rate for total population regardless of locality. So far, not enough reliable evidence has been developed that geographic differences are both sufficient and consistent enough to warrant the calculation of different factors for each region or state.

It appears probable, however, that in the case of Maricopa County, this factor would tend to underestimate the relation between the rate of in-migration of elementary school-age children and that of the total population. This conclusion appeared warranted after the use of the household method gave a much higher figure for April 1, 1959 than did the component method for July 1, 1959, even after allowing for the possibility of temporary net out-migration as explained in the footnote to Table V. The household method, of course, could have produced an over-estimate but there is probably more chance for producing an under-estimate by use of this method (see the discussion of this method which follows).

Use of the results of the household estimate to adjust the results of the component method indicates that the factor used to derive total migration from that of children of elementary school age should have declined from 1.27 to 0.98 from April 1, 1950 to July 1, 1959 instead of to 0.87 - at least to give the same results for Maricopa County in 1959 as obtained by the household method.

Household Method

The basic feature of this method is to use some measure of the number of households in existence at a given time and then multiply by an estimate of the average size of household to obtain an estimate of population. For this purpose, households have to be divided into kinds - regular and quasi-households. The latter are made up of persons living in hotels, institutions and the like. For each, a different estimation procedure must be used. Population estimates for these two categories of households, as of April 1959 are given in Table VI for Maricopa County and for the City of Phoenix.

Regular Households. For this study, the number of residential electric customers served by local utilities was used to represent the number of regular households with two modifications that are mentioned later. Figures were developed in cooperation with local utilities showing the number of households served in each census tract and the average number of persons per household. According to this information the average size of household in the Phoenix Area varied from 2.6 in some localities to 3.9 in others, and averaged about 3.43 for the Area as a whole.

TABLE VI
ESTIMATED POPULATION OF MARICOPA COUNTY
AND OF THE CITY OF PHOENIX BY KIND OF HOUSEHOLD, APRIL 1959

Kind of Household	Maricopa County	City of Phoenix *
REGULAR HOUSEHOLDS		
<u>With Electricity</u>		
Single household per meter	585,500	338,100
Multiple household per meter**	4,900	4,500
<u>Without Electricity</u>	<u>10,800</u>	<u>1,400</u>
	601,200	344,000
QUASI-HOUSEHOLDS		
In hotels, motels, lodging houses	22,600	15,900
In institutions, schools, *** etc.	<u>12,900</u>	<u>6,500</u>
	35,500	22,400
ALL HOUSEHOLDS	636,700	366,400

* Boundaries as of May 1, 1959.

** Public-housing projects.

*** Out-of-county students.

Source: Estimates by Western Business Consultants, Inc.

The average of 3.43 presumes some increase in the average size of household since 1950 because the Census for that year reported an average of 3.20. It is reasonable to assume that some increase has occurred in the average size of household in the Phoenix Urbanized Area in light of the high birth-rate, although it must be kept in mind that the number of households with two, and even one member, has probably also grown because of the migration of older persons to the County.

In evaluating the estimate used of average size of household, it should be kept in mind that the average size of family may be higher if a family is considered to be a group of two or more persons residing together related by blood, marriage or adoption. A household, in contrast, is defined here as the persons occupying a dwelling unit regardless of whether or not they are related. For this reason, this estimate of 3.43 as the average size of household in the Phoenix Urbanized Area at the present time may be entirely consistent with estimates of 3.75 for average size of family. The Bureau of the Census, for example, estimated the average size of household to be 3.35 in 1958 for the nation as a whole, and the average size of family to be 3.65.

Is the number of residential electric customers in a census tract always the same as the number of regular households in that tract? Not always, because there may be a few families in certain tracts that, for economic or other reasons, do not have electric service. According to the 1950 census of Housing, there were 3,125 occupied dwellings in that year without electricity. The same number of households without electricity has been assumed in preparing the estimates given here because preliminary check with informed persons in welfare and farm employment work indicated that it was reasonable to believe that the number could still be this large.

Another limitation of estimating population from residential electric customers is that one meter may serve more than one family. Probably this factor has not produced serious understatement in the estimates at hand because:

1. Apartment house operators and others who rent dwelling units tend to have separate meters for each dwelling unit including mobile homes.

2. Some allowance for "doubled-up" families is contained in the figures of average size of household because all persons living in a dwelling served by one meter were counted as part of the household.

There are, however, several public-housing projects in the County which are served by one meter. These were located and account taken of the households served by such master meters.

Quasi-Households. In addition to persons living in regular households there are always a significant number in a metropolitan area who live in hotels or motels as distinct from apartments. Most of these persons will be transients but some are permanent residents. For the Phoenix Urban Area, data were developed on the number of hotel-motel units by census tracts. The population occupying these units in April was estimated by assuming an occupancy rate of 82 per cent and an average of 2.36 persons per occupied unit based on a random telephone survey of hotels and motels in the County.

The number of out-of-county residents living in school dormitories and the number of persons living in rest homes, long-treatment hospitals and penal institutions was obtained by canvassing the schools and institutions involved. Account was also taken of persons living at military posts who were not electric customers.

Evaluation. Probably the household method for estimating population as used in this study is more likely to under-estimate than over-estimate population. First consider persons living in regular households. There is little reason to believe that the utilities would have more customers than there were households in a given area except as one household was served by two meters - say one for regular electric service and the other for an electric hot water heater. The local utilities have indicated that such cases were eliminated from the counts used for these population estimates.

There is a good chance, however, that there will be more households in some areas than customers. Even though it may be fairly common practice, as

mentioned earlier, for apartments and other rental units to be on separate meters, there are doubtless some cases of one meter serving more than one household. Such cases could be fairly numerous in the older neighborhoods where small rental units have been placed on residential property. The only offset to these cases in the estimates offered here is the probability that the number of households without electricity in the County may have been over-estimated by assuming the same number as found in the 1950 Census of Housing.

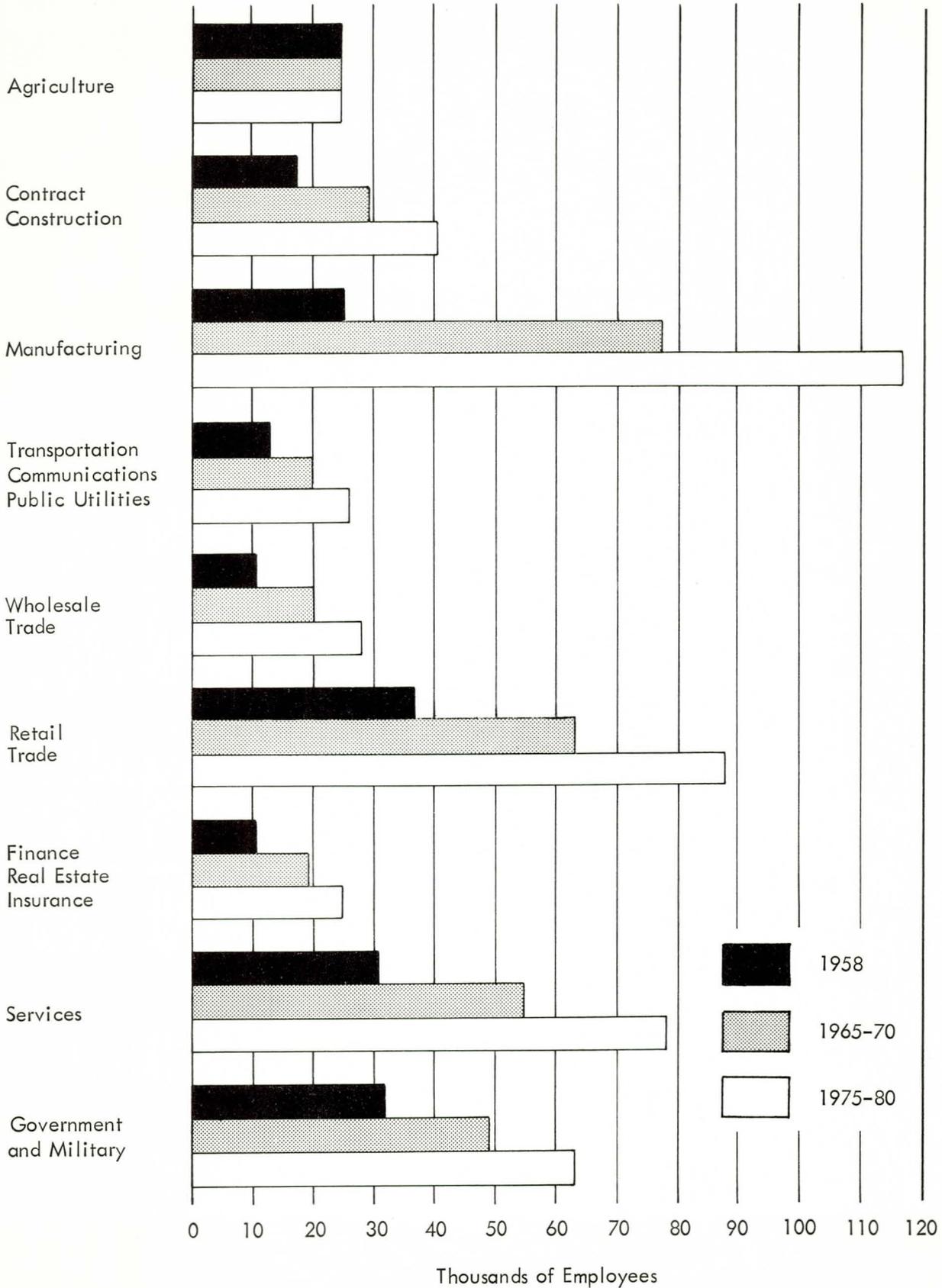
As for the estimates of persons in quasi-households, they also are more subject to under than over-statement. It is hardly possible in a telephone survey based on the institutions, rest homes and schools which can be identified from directories, and have telephones, to cover all of the places of these kinds that may exist in the County. Likewise, by the same procedure one cannot locate all of the hotels, motels, guest ranches, lodging houses, boarding houses, and the like that are in the County and obtain number of units as a basis for estimating number of guests. Nevertheless, it is doubtful that the estimates made here seriously understate the number of persons who were living in quasi-households in April 1959.

At the time of the 1950 Census, 3.4 per cent of the total population of Maricopa County was living in quasi-households. For April 1959, the estimated number living in such households amounted to 5.6 per cent of the County's population. This variance is in part explained by difference in definition. It is Census practice to enumerate persons at their usual place of residence, and therefore the only guests at hotels and the like who would be classified in the "quasi-household" category by the Census would be those persons for whom a hotel, motel, or lodging house is their usual place of abode. The estimates given here include all guests of hotels, motels, and the like, regardless of whether they are temporary or permanent residents. From the point of view of measuring the need for municipal and community services at any given time, population estimates which include all residents, whether temporary or permanent, are a useful yardstick.

FIGURE 4

EMPLOYMENT IN MARICOPA COUNTY
1958, 1965-70, 1975-80

Industry



PART II

ECONOMIC BASE

The questions to be answered about the economic base of Maricopa County were stated as follows in the plan of study:

"Maricopa County, and the Phoenix-Urban Area in particular, is moving from an agricultural-tourist economy to a multi-function metropolitan community. What stage has this evolution now reached? How much employment is now provided by producing goods and services for persons who live outside the County as contrasted with the employment provided by production for local residents? What further changes can be expected in the economic structure of the County and the Area as urbanization increases?"

Trends In The Local Economy

Two trends characterize the economy of Maricopa County, and in particular, the economy of the general Phoenix Area. One is the marked economic growth of the County and the Area and the other is the quickening pace of industrialization.

The average number of persons employed in the County increased from around 55,000 in 1940 to over 200,000 in 1958, and prospects now indicate that average employment should reach 490,000 between 1975 and 1980. In other words, the very substantial economic growth of the past 18 years will probably be eclipsed by even greater growth during the next 20 years - about 150,000 new jobs were added between 1940 and 1958 but nearly double this number, or around 290,000 may be added between 1958 and 1980. Growth of this dimension in the time indicated is of course dependent upon

TABLE VII
 EMPLOYMENT BY MAJOR ECONOMIC ACTIVITY, MARICOPA COUNTY
 FOR SELECTED YEARS 1940, 1950, 1958, 1965-70, 1975-80

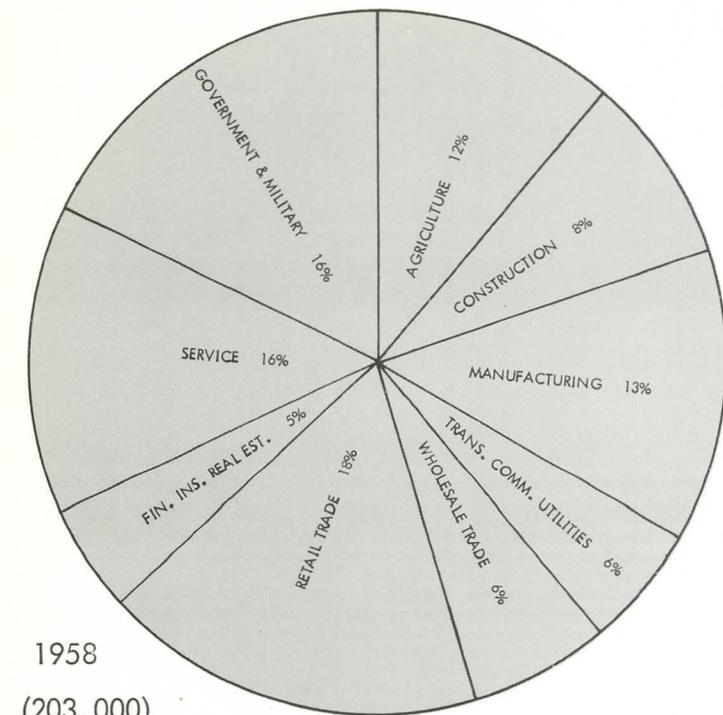
Economic Activity*	1940 Census	1950 Census	1958 Estimated	1965-70 Projected	1975-80 Projected
Agriculture (incl. seasonal workers)	12,200	13,800	25,000	25,000	25,000
Contract Const. & Mining	3,700	9,900	17,000	29,000	41,000
Manufacturing	3,900	10,000	26,000	77,000	117,000
Trans. & Public Utilities	3,300	8,500	13,000	20,000	26,000
Wholesale Trade	3,200	6,300	11,000	20,000	28,000
Retail Trade	10,000	21,200	37,000	63,000	88,000
Finance, Ins. & Real Est.	1,800	4,500	11,000	19,000	25,000
Service	10,600	21,500	31,000	55,000	78,000
Government (incl. military)	5,100	13,900	32,000	49,000	63,000
Industry Not Reported	700	2,100	-	-	-
Total	54,500	111,700	203,000	357,000	491,000

* The 1940 & 1950 figures are for April; the estimate and projections are monthly averages.

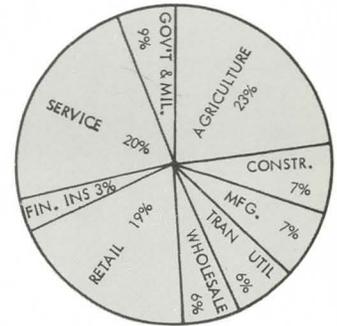
Sources: 1940 & 1950 - U.S. Bureau of the Census; estimates for 1958 - Western Business Consultants, Inc. with the aid of the Employment Security Commission of Arizona (see Appendix D to Part IV); projections - Western Business Consultants, Inc.

FIGURE 5

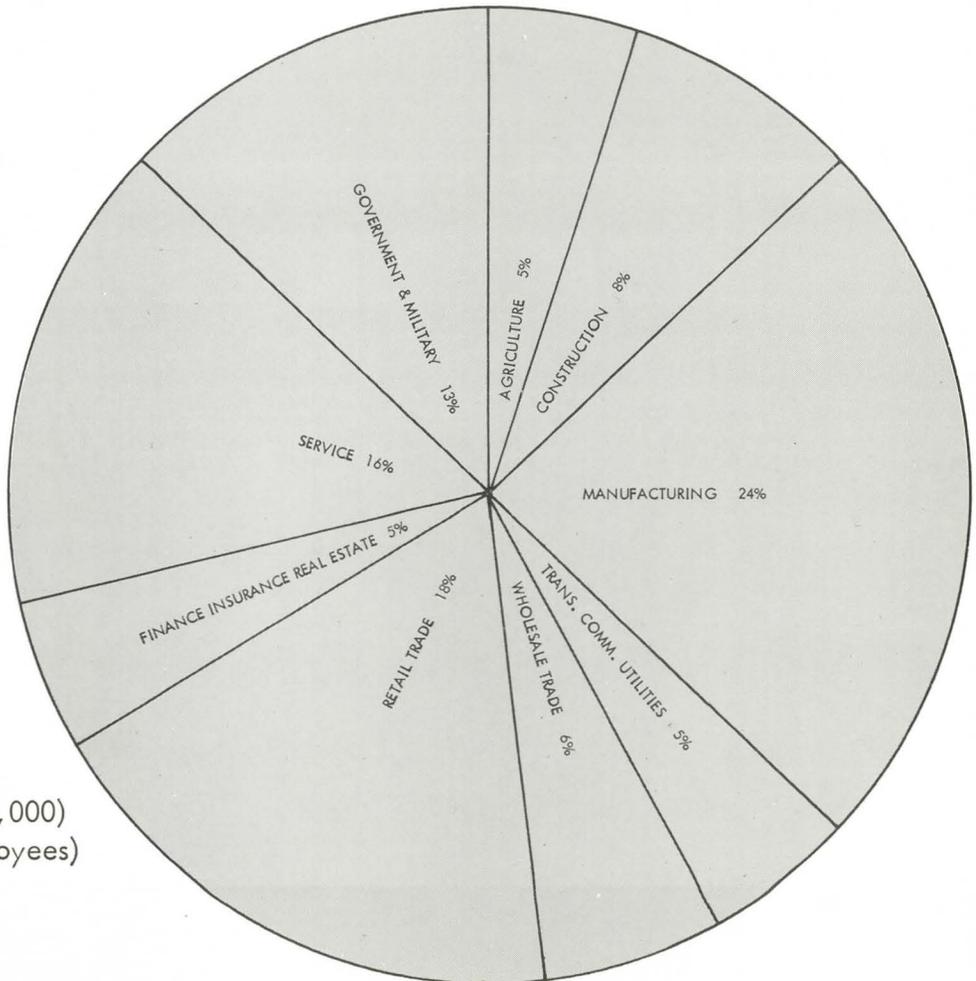
EMPLOYMENT IN MARICOPA COUNTY
Percentage Distribution by Industry



1958
(203,000)
(Employees)



1940 (54,500)
(Employees)



1980 (491,000)
(Employees)

both favorable national and local conditions. The nature of these conditions is discussed in Part III "Industrial Growth Potential."

The economic growth experienced and that in prospect is largely a result of the very rapid expansion of manufacturing. Maricopa County and the general Phoenix Area are in the process of shifting from an agricultural-commercial to an industrial-commercial economy. This shift is now in full swing and should be completed before 1980.

Twenty years ago agriculture was the leading source of employment. By 1958, as is shown in Table VII, employment in manufacturing had slightly exceeded that in agriculture despite the doubling of average farm employment. Meanwhile, employment in retail trade, service, and government had increased to higher levels than those in manufacturing and agriculture. Prospects now indicate, however, that even before 1980 manufacturing will provide more employment than any other industry in the County.

Analysis Of The Economic Base

Employment depends upon markets. The employed persons within a metropolitan area (as noted in Part I under population projection) may be classified into two groups: (1) those primarily engaged in producing goods or services for residents of the area - the local market; and (2) those primarily engaged in producing goods or services for non-residents - the outside markets. This segregation of employment by markets is useful not only for projecting employment and population but also for analyzing the economic structure of an area.

Employment Ratio Based On Markets Served.

In 1958, it is estimated that approximately 73,000 persons out of the 203,000 employed on the average during that year in Maricopa County were engaged in producing goods or services for markets outside of the County, and

130,000 for the local market. In other words, there were 1.78 persons employed in serving local needs for each person employed in serving outside markets.

The distinction between local and outside-market employment was made primarily by the residence of the purchaser. Thus, the employment of precision machine shops performing sub-contract operations for local holders of prime military contracts was considered to be "local-market" employment. In contrast, the employment of firms catering wholly to tourists and other non-residents, such as hotels and motels, was considered to be "outside-market" employment.

The ratio of 1.78 persons engaged in local-market employment for each person engaged in outside market employment is in line with ratios of this general type which have been computed for other metropolitan areas. It falls between 1.0 and 2.0 which so far seems to be characteristic of larger areas. However, ratios of local to outside-market employment are subject to change. It was assumed that any permanent change in the ratio for Maricopa County would be an increase. As an area grows in population, it becomes economical to produce locally more and more of the products and services which are consumed locally, a development which tends to increase the ratio of local to outside-market employment. Therefore, the employment and population projections based upon the 1.78 ratio are believed to be conservative.^{1/}

^{1/} For a discussion of the employment-multiplier theory as applied to community growth, and of the ratios for other cities, see Edgar Z. Palmer, Editor, The Community Economic Base and Multiplier, Business Research Bulletin No. 63, University of Nebraska, 1958, particularly pp. 30-40. In this Bulletin, as in most area studies, outside-market employment is referred to as "basic" and local-market employment as "derivative" or "secondary." Such terms seem to over-rate the employment that is dependent upon outside markets, and under-rate that dependent upon local markets. Therefore, a more specific market terminology has been used in this report.

Distribution Of Employment By Markets Served.

The estimated distribution of employment in 1958 by markets is given in Table VIII for each major line of economic activity in the County. Agriculture and manufacturing, it may be noted, primarily supply outside markets while contract construction, in contrast, is almost wholly a local business.

The distinction between "local" and "outside" markets is applied here in the broad sense of needs. Therefore, a substantial portion of government employment is also classed in the "outside-market" category because of those federal employees in the County who work for the Defense Department or other agencies of the federal government primarily serving national needs, and the state employees based in the County who serve state-wide needs.

Mining is included with contract construction because in Maricopa County it now consists almost wholly of quarrying and the working of sand and gravel deposits, activities which are directly associated with the construction industry. It seems likely that these activities will continue to provide most of the mining employment within the County.

Supplying the needs of winter visitors and other transients and of Arizona residents living outside of Maricopa County is estimated to have accounted for about 19 per cent of the retail and 15 per cent of the service employment within the County during 1958. These two percentages combined represented about 11,500 employees engaged in serving out-of-county residents. The great majority of these persons were primarily engaged in serving tourists and other transients.

Though Phoenix is a wholesale-trade center, a good share of the business transacted is within Maricopa County which is in line with the County's high percentage of the State's population. In 1958, the out-of-county trade of local wholesale houses is estimated to have employed 41 per cent of the trade's total.

TABLE VIII

EMPLOYMENT IN MARICOPA COUNTY
BY ECONOMIC ACTIVITY AND BY MARKET, 1958

Economic Activity	Estimated Monthly Average			Percentage Distribution by Market	
	Total	By Market		Local	Outside
		Local	Outside		
Agriculture*	25,000	5,000	20,000	20	80
Contract Const. & Mining	17,000	16,000	1,000	94	6
Manufacturing	26,000	8,500	17,500	33	67
Transportation & Pub. Util.	13,000	10,500	2,500	81	19
Wholesale Trade	11,000	6,500	4,500	59	41
Retail Trade	37,000	30,000	7,000	81	19
Finance, Ins. & Real Estate	11,000	9,000	2,000	82	18
Service	31,000	26,500	4,500	85	15
Government**	32,000	18,000	14,000	56	44
Total	203,000	130,000	73,000	64	36

* Including seasonal workers.

** Including members of Armed Forces stationed in Maricopa County.

Source: Estimates by Western Business Consultants, Inc., derived in part from special survey of employers; classification by market based upon per cent of sales to users within Maricopa County.

In the transportation field, the air lines, motor freight and motor-passenger carriers and the railroads all have a number of employees who are primarily concerned with moving passengers or freight through the County and even the State, but who are based in Phoenix. In addition, two of the major utilities manage state-wide operations from Phoenix, and therefore a portion of their Phoenix employment is assignable to out-of-county business. The transportation and utility personnel based in the County but primarily dealing with out-of-county business is estimated to have been 19 per cent of the total transportation, communication, and utility employment within the County during 1958.

Of the total employment in the finance and related activities, 18 per cent is estimated to have been created by out-of-county business. Such business consists of the additional employment required in Phoenix to manage branch operations outside of the County, and of the employment required to service out-of-county customers in the case of financial institutions, clients in the case of realtors, and policyholders in the case of insurance firms.

Were information available for an analysis of the economic base of Maricopa County in terms of personal income as well as employment, it is possible that a different picture of the relative importance of the various activities which make up the base might be obtained. For example, it is possible that the employment analysis overstates the economic importance of agriculture in relation to say, manufacturing, particularly because the employment figures used for agriculture include the average employment of seasonal workers. Presumably, the value of the output and of the income of the seasonal agricultural workers tends to be less than that of the average employee in manufacturing.

TABLE IX
EMPLOYMENT BY MAJOR ECONOMIC ACTIVITY AND BY MARKET,
MARICOPA COUNTY, 1958, 1965-70, 1975-80

Economic Activity	1958 Estimate			1965-70 Projection			1975-80 Projection		
	Total	Market		Total	Market		Total	Market	
		Local	Outside		Local	Outside		Local	Outside
Agriculture*	25,000	5,000	20,000	25,000	5,000	20,000	25,000	5,000	20,000
Cont. Const. & Mining	17,000	16,000	1,000	29,000	27,500	1,500	41,000	39,000	2,000
Manufacturing	26,000	8,500	17,500	77,000	19,000	58,000	117,000	26,500	90,500
Trans. & Pub. Util.	13,000	10,500	2,500	20,000	16,500	3,500	26,000	21,500	4,500
Wholesale Trade	11,000	6,500	4,500	20,000	14,000	6,000	28,000	20,000	8,000
Retail Trade	37,000	30,000	7,000	63,000	52,000	11,000	88,000	72,000	16,000
Fin., Ins. & Real Est.	11,000	9,000	2,000	19,000	16,000	3,000	25,000	21,000	4,000
Service	31,000	26,500	4,500	55,000	48,000	7,000	78,000	68,000	10,000
Government**	32,000	18,000	14,000	49,000	32,000	17,000	63,000	43,000	20,000
Total	203,000	130,000	73,000	357,000	230,000	127,000	491,000	316,000	175,000

* Including seasonal workers.

** Including members of Armed Forces stationed in Maricopa County.

Source: Estimates and projections prepared by Western Business Consultants, Inc.

Changes In The Economic Base

By 1975-1980, it is anticipated that outside-market employment in Maricopa County may equal 175,000. If the 1958 ratio were to prevail of 1.78 persons employed in serving local markets per person employed in serving outside markets, local-market employment would be around 316,000. The adding of this figure to outside-market employment of 175,000 gives a county total of over 490,000 for 1975-80.

These projections for 1975-80, and for 1965-70 are given in Table IX by major economic activity. The estimation procedure followed was to analyze the outside-market prospects for each line of activity and project outside-market employment on the basis of the analysis. In the case of manufacturing, each of 29 manufacturing industries was analyzed and separate projections made of their probable outside-market employment. (See Part IV for these projections.)

Projection Procedure.

Local-market employment was for the most part projected on the basis of the expected increase in the population of the County. For this purpose, population had been estimated from the total employment projection as outlined in Part I. Exceptions to this procedure were made in the case of any local-market employment which clearly depended upon the outside-market employment in some industry or group of industries. For example, local-market employment in precision-machine shop industry was projected on the basis of the outlook for outside-market employment in the electronic and other local industries which are the customers of these machine shops.

The preliminary projections obtained by this procedure were examined for their reasonableness in light of known trends and adjustments made where warranted. One test applied was to compute the ratio of projected employment per 10,000 population for a given activity or industry and compare it with

similar ratios computed for a recent year for larger metropolitan areas in the mild-winter climate belt, ranging from Miami to Los Angeles and including Dallas, Houston, and San Diego. Such comparisons were not always a trustworthy indicator. Some of the conditions which produced a certain size ratio for a given larger community were peculiar to that area and did not exist in Phoenix and Maricopa County. In addition most of the comparisons were limited by the available data to ratios^{2/} based upon wage and salary employment in private industry.

Shift To Manufacturing.

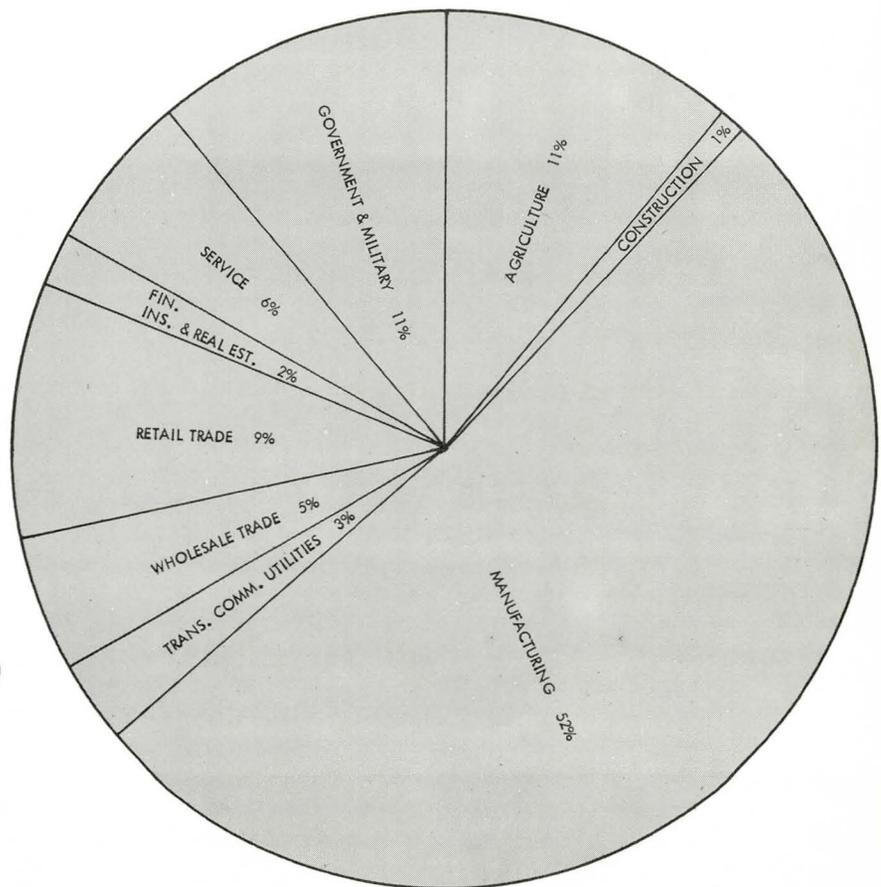
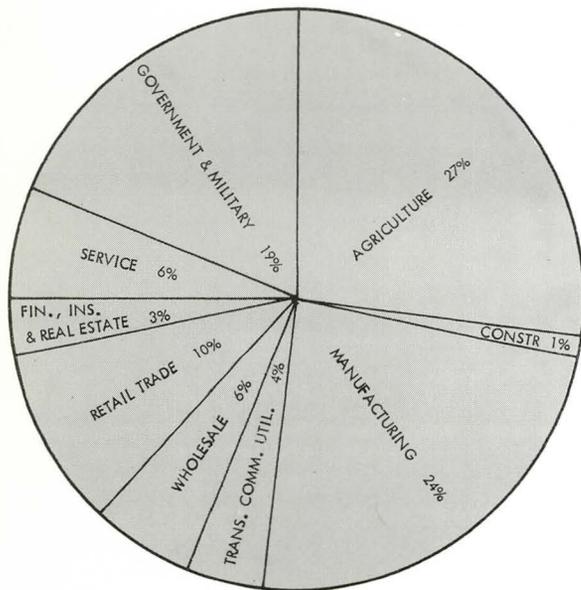
The economy of Maricopa County, in terms of outside-market employment, rested in 1958 upon agriculture, manufacturing, government activities (mainly federal), and the tourist trade. The percentages of total outside-market employment were roughly - agriculture, 27 per cent; manufacturing, 24 per cent; government, 19 per cent; and tourist and other out-of-county trade, 16 per cent (10 retail and 6 service).

By 1980, manufacturing is expected to be the dominant source of outside-market employment (see Table IX). Though employment to serve the tourist and other out-of-county trade will increase as will federal and state government employment, these increases will be vastly overshadowed by the projected increase in manufacturing employment producing goods for outside markets. On the other hand, increases are not anticipated in the employment that produces agricultural products for outside-markets. In other words, by 1980, the economy of the County, measured by the employment dependent upon outside markets, will be primarily an industrial economy if present prospects are realized.

^{2/} County Business Patterns, First Quarter 1956, a cooperative report of the U.S. Bureau of the Census and U.S. Bureau of Old Age and Survivors Insurance, U.S. Government Printing Office, Washington, D. C., 1958.

FIGURE 6

EMPLOYMENT DEPENDENT UPON OUT-OF-COUNTY MARKETS
Percentage Distribution by Industry



Some of the factors which may determine the industrial future of the County and of the Phoenix Area in particular are discussed in Part III and the outlook for the tourist industry is the subject of Part VI A. A few comments may be warranted here about the outlook for employment in government and in agriculture.

Government Employment

It is estimated that there were about 14,000 persons employed by the federal and state government in Maricopa County in 1958 whose duties were either national or regional in the case of the federal and statewide in the case of the state employees. More than 9,600 of these persons were employed by the Department of Defense, including both civilians and members of the Armed Forces stationed in Maricopa County.

The trend of employment by the Department of Defense even at the national level is at best unclear. Presumably our nation will have to maintain a very substantial and increasingly science-oriented defense posture for some decades as the backbone of its foreign policy. But it does not follow that manpower requirements will increase - they could even decrease overall if uniformed and civilian personnel alike became almost wholly professional technicians.

In the light of the prospective future of Maricopa County as a center for electronics manufacturing (and probably research), and of the growing importance of electronics in military technology, it was assumed that the Defense Department would maintain about the same employment within Maricopa County as at present. It is probable, however, that the maintenance of the present level of employment would require changes in the missions to which the major military establishments in the County are now assigned, and possibly the proportion of civilian to uniformed personnel might change substantially.

As for the civilian employment of the other federal agencies in the County, it was assumed that such employment, other than that tied directly to local population such as post office employment, would increase in line with the outlook for federal-government employment generally. Employment by the state agencies was expected to follow the growth of population within the state. It is these projected increases in federal and state employment that are responsible for increasing the estimated "outside-market" government employment from 14,000 in 1958 to 20,000 in 1975-80.

Agriculture.

The casual observer of the continued replacement of cotton and vegetable fields with sub-divisions in the general Phoenix Area might assume that the days of agriculture in Maricopa County were numbered. The Phoenix Area, however, even if generously defined, is still in square miles much the smaller part of the County.

The western portion of the county, which includes the Aguila, Gila Bend, Tonopah, and Harquahala Plains areas, has in recent years become a relatively important agricultural section and promises to become even more important as agricultural operations decrease in the Phoenix Area. In 1958, it is estimated that there were about 90,000 acres under cultivation in Western Maricopa County.^{3/}

Additional agricultural development in Western Maricopa County is dependent upon several factors, one of which is the availability of water for

^{3/} This estimate of 1958 agricultural land use and other agricultural information in this section was derived from interviews with a number of informed persons in the following agencies and organizations: U.S. Soil Conservation Service, Maricopa County Agricultural Extension Service, Southern Pacific Railroad, Santa Fe Railroad, Salt River Valley Water Users Association, Arizona Public Service Company, Arizona State Employment Service, and the Department of Agriculture, Arizona State University.

irrigation purposes. This section is dependent upon ground water. The full extent of its ground water resources can not be determined from available information. One study has indicated, however, that the quantity of water in storage beneath the Harquahala Plains is on the order of several million acre feet ^{4/} and is within a reasonable distance of the ground surface and therefore economical to pump for agricultural irrigation. It is estimated that this water supply would permit an additional 100,000 acres to be brought under cultivation. However, one probable limitation should be kept in mind. The extent of potential recharge is not known. The present underground supply and potential recharge may not be sufficient to sustain wide-spread cultivation in Western Maricopa County indefinitely. It is even possible that the peak of agricultural development may be reached in this area before 1980 if the area is heavily and continuously pumped for a number of years.

Another major factor in the agricultural future of Western Maricopa County is the availability of transportation facilities. Agricultural development would be much more extensive, particularly in the Harquahala Plains area, if the area were to be served by both a paved highway and a railroad.

If the withdrawal of land from agriculture were to continue in the Phoenix Area at the rate of recent years, somewhere between 50,000 and 60,000 acres of agricultural land will probably be put to other uses by 1980. This withdrawal of land from agriculture in the general Phoenix Area could be offset by new land being brought into cultivation in Western Maricopa County if the transportation facilities serving this section of the County are improved, and its water supply proves sufficient to sustain large-scale farming through 1980.

It is assumed that both of these conditions will be realized, and that,

^{4/} D. G. Metzger, Geology and Ground Water Resources of the Harquahala Plains Area, Maricopa and Yuma Counties, Arizona, Geological Survey, U.S. Department of the Interior, September, 1957, p. 2.

with no net reduction in the land under cultivation within the County as a whole, no significant change will occur in the average number of persons employed in agriculture between 1958 and 1980.

This projection also rests on the assumption that the crops which require large labor input will continue to be important in the County and that changes in technology between 1958 and 1980 will not reduce labor requirements. In discussions with persons informed on the subject, no one was found who visualized any practicable possibility for reducing the present labor requirements of many of the crops grown in the County.

One could expect employment to grow in the dairy, poultry, feed lot, and other farm operations primarily carried on to supply the local population. No increase was projected, however, despite the anticipated increase in population because it was assumed that the expansion of at least the dairy and poultry industries might well occur in neighboring counties - for example, the dairy industry in such locations as the Chino Valley in Yavapai County.

PART III

INDUSTRIAL-GROWTH POTENTIAL

The scope of the analysis of the industrial-growth potential was stated as follows in the plan of study:

"As population increases in Maricopa County and the Phoenix Urban Area, it is generally assumed that manufacturing, directly and indirectly, will provide most of the required additional employment. Do the prospects warrant this assumption? What industries will provide the new jobs? What is the outlook for service activities associated with manufacturing and wholesale-distribution?"

The employment projections based upon this analysis of the industrial-growth potential of Maricopa County are given for major lines of economic activity in Part II, and for manufacturing industries and selected lines of non-manufacturing, in Part IV.

Why Manufacturing Has Grown in Maricopa County

Accessibility to markets, availability of production materials, and a supply of labor are among the basic requirements for the development of an industrial economy. Without at least one of these attributes, an area can hardly expect to attract manufacturing. Before World War II, the Phoenix Area and Maricopa County would have rated low on all three of these locational requirements, but it also had little manufacturing. In 1940, about 7 per cent of the County's employed population worked in manufacturing plants as compared with about 13 per cent in 1958. What has happened since 1940 to change the situation?

New Locational Requirements

New products and new processes have been developing which have tended to change traditional concepts of what constitutes a good labor supply. In some lines of manufacturing, the availability of persons who can be readily trained for repetitive tasks takes second place to the availability of engineers and scientists for control and development work. Industry's new emphasis upon mental as contrasted with manual skills has also been accompanied by a new locational trend - that of placing a new facility where living conditions would aid in the recruitment of scientists and engineers.

Increased Lure of Mild-Winter Climate

In part, the emphasis which industry is placing upon living conditions in choosing new locations is a reflection of an apparently general desire for pleasant living that seems to be growing throughout the country - for example, the increased migration to areas of mild winter climate which was discussed in Part I. The same interest shows up in the job inquiries received by the Arizona Employment Service from out-of-state residents. The volume and diversity of these inquiries (diversity in terms of both state of origin and experience represented) indicate that a plant in Arizona is no longer limited in its labor supply to nearby residents but, if it chooses, can draw upon a large portion of the national labor market.

Reduction of Travel Time Between Phoenix and Elsewhere

More was needed, however, to make Phoenix an industrial center, than its pleasant winter climate, open spaces, and status as the trade, financial, and governmental center of the state. Had it remained as far away from the rest of the country in 1959 as in 1939, its industrial development would have probably proceeded at a slower rate and the outlook for the future would surely not be as bright.

In miles, Phoenix is the same distance from other parts of the nation in 1959 as in 1939. But the time required to travel between Phoenix and other parts of the country has been greatly shortened by the improvement of air transportation. Not only has the time interval been shortened, but also the public generally has become increasingly accustomed to air travel. In addition, the movement of motor vehicles to and from Phoenix has been greatly facilitated by highway improvements not only in Arizona but throughout the country.

Though travel time between Phoenix and other parts of the country has been shortened, costs of transportation for both incoming materials and outgoing products has still served to limit manufacturing, with some exceptions, to goods for which transportation is not an important element of cost.

Nearness to Southern California

An added factor in the industrial growth of the Phoenix Area since 1940 has been its relative nearness to the Los Angeles Metropolitan Area and the aircraft industry of Southern California. Though 400 miles to the southeast, the Phoenix Area is still the nearest urban area to Los Angeles outside of Southern California. This fact probably contributed to the establishment of three major defense plants in the Phoenix Area during World War II, all of which are operating today, one in a different location, and another, under different management.

Moreover, the population of Southern California has more than doubled since 1940 - the 14 counties in the southern half of the state from 3,993,000 in 1940 to 8,829,000 in 1958.^{1/} No doubt this growth helps explain why a number of Phoenix plants reported that California

^{1/} Monthly Summary of Business Conditions in Southern California
(Security-First National Bank Research Department), December, 1958.

was one of their important markets in 1958. For 1958, it is estimated that more than 30 percent of all Phoenix manufacturing firms did some business in California, and for about 10 percent of these firms, California sales accounted for 25 percent or more of total sales. Firms making 25 percent or more of total sales in California were in the apparel, agricultural chemical, machine shop, cooling and refrigeration machinery, other non-electrical machinery, electronic, and aircraft component industries.^{2/}

It is worth noting that in some instances the Phoenix plant with business in California is a branch of the California firm. The cases of this kind are not yet sufficient to indicate that there is a definite trend for Southern California plants to migrate to Arizona but they do suggest that such a trend may be in the making.

Reasons for Growth Re-Stated

To recapitulate, several developments have occurred outside the state since 1940 which have helped the industrial growth of Maricopa County and the Phoenix Area. These developments have included:

1. The increase in the number of "foot-loose" industries, such as electronics, which do not have to locate near markets or sources of supply, and some of which manufacture products having a high engineering content.
2. The tendency to locate new plants producing goods with high engineering content where living conditions aid the recruitment of engineers and scientists.

^{2/} Based upon returns received in Industrial Land Use and Employment Survey for the Planning Commissions of Phoenix and Maricopa County, 1959 which was conducted for this study by Western Business Consultants, Inc.

3. The increasing migration of population from areas of cold to those of mild winter climate.
4. The improvements in transportation that have tended to expedite travel between Phoenix and other parts of the country, and especially the growing acceptance of air travel.
5. The establishment of several defense plants in the Phoenix Area during World War II as part of the defense-industry decentralization program.
6. The continued growth of the Southern California market for a wide variety of products.

Why Is a Much Greater Industrial Growth Anticipated

If the developments outlined were largely responsible for manufacturing employment in Maricopa County increasing from 3,900 in 1940 to 26,000 in 1958, what developments or factors are expected to support a projected increase to 117,000 by 1975-80? This projection is based on the following five assumptions:

1. That technological and market developments will cause market growth in the science-oriented industries.
2. That industrial decentralization and migration will continue, and that emphasis will continue to be placed upon living conditions in locating new facilities.
3. That the population of the Pacific Southwest, and particularly Southern California, will grow very substantially from migration as well as from natural increase.
4. That the market within Maricopa County will increasingly reach the volume in product after product that will justify local manufacture.

5. That Maricopa County and the Phoenix Area will continue to attract new migrants and new plants, and that steps will be taken to minimize the deterrents to future growth that further growth itself may create.

Technological and Market Developments

The 1960's and 1970's should see the greatest outpouring of new processes and new products that our economy has ever experienced. This conclusion is based upon the assumption that there will be a high degree of correlation between the increasing expenditures for research and development and the subsequent adoption of new processes and the introduction of new products. By 1960, private industry is expected to be spending more than \$10 billion per year for research and development as compared with about \$2 billion in 1950, and substantially less than \$1 billion before World War II.^{3/}

These research-generated processes and products will have widespread effects because they are expected to include new metallic, plastic, and ceramic materials; new systems of propulsion; new sources of energy generation; and highly sophisticated electronic systems of communication and control ranging in application from space flight to mundane factory operations.

Stories about these developments may be found in almost any magazine or other news source reporting the progress of research.^{4/}

^{3/} McGraw-Hill Department of Economics, The American Economy: Prospects for Growth to 1965 and 1975, McGraw-Hill Publishing Co., 1958.

^{4/} For example, a discussion of the scientific and technical achievements in prospect for the 1960's may be found in "The 1960's; A Forecast of the Technology" by Francis Bello, Fortune, January, 1959, p. 74.

These anticipated technological developments should have far-reaching effects upon industrial growth. If realized on the scale expected, they will surely quicken the rate of equipment and plant obsolescence in many industries to the point where present equipment and even structures may have to be replaced; and, for cost or other reasons, the replacement may not be made at the present location. Furthermore, the new processes will probably mean in many industries that far more product will be obtained than at present for a given work force - in other words that production will increase at a much faster rate than employment.

Finally, there are some industries which will probably have a spectacular growth, both in volume of output and employment. There may even be cases of wholly new industries developing. It is more likely, however, that the "new" industry will come by fission from an existing industry - that the new ideas will become products under the wing of some established firm because only such a firm will usually have the research talent, production know-how, and marketing skill, as well as financial resources, to transform an idea into an accepted industrial or consumer product.

At the present writing, all signs point to the electrical-electronic group of industries as the one likely to have the largest increase in both production and employment over the next twenty years of any group of manufacturing industries. By 1975, it has been estimated that the national output of the electrical-machinery industry (including electronics) will be more than two and one-half times that of 1957.^{5/}

^{5/} McGraw-Hill Department of Economics, op. cit., p. 13.

The employment prospects in manufacturing over the next decade have been described by an official of the U. S. Department of Labor as follows:

"...Rapid gains in employment are expected in the electrical machinery industry, which includes plants producing electronic equipment for civilian and military uses. Employment in plants producing other machinery, chemicals, and paper products also will grow rapidly. The petroleum production and refining, iron, and steel, printing and publishing, and automobile industries will grow (in employment) only moderately."

"...In some industries such as automobile manufacturing and railroads, a major influence on employment will be new technological improvements, including automation, that may moderate employment growth." 6/

Probably the recent sales trend of the transistor branch of the electronic industry is indicative of the rate of growth that a new product can experience in this field. Unit sales of transistors increased in round figures from 1,300,000 in 1954 to 47,000,000 in 1958 - more than 35 times in four years. 7/

It is a combination of at least the following four prospective developments that promise to give the electric-electronic industries the greatest percentage increase in both output and employment of any group of manufacturing industries:

1. The spread of automation throughout manufacturing and into most non-manufacturing activities with the attendant requirement of electronic controls actuated by electronic information-gathering, processing, and decision-making devices.

6/ James J. Treires, "A New Look at the Outlook," Occupational Outlook Quarterly, September, 1959, p. 4 (published by the Bureau of Labor Statistics of the U. S. Department of Labor in cooperation with the Veterans Administration).

7/ Electronics Industry Fact Book 1959, Marketing Data Department, Electronic Industries Association, p. 39.

2. The tripling of the production of electrical distribution equipment to keep pace with the needs of the electric power industry.
3. Very substantial increases in the production of conventional power generating equipment coupled with research and development on means of converting energy in various forms (chemical, nuclear, and solar) directly to electric power.
4. The prospect that virtually all electrical appliances and devices now used by both consumers and industry may be rendered totally obsolete by the wholly new appliances and devices that may reach commercial acceptance within the next five to fifteen years - for example, the refrigerator without moving parts, the mural TV screen, the ultra-sonic clothes washer.

The prospective growth of the electric-electronics industry which has just been outlined possesses special significance for Maricopa County and the Phoenix Area because of the plants in the electronics field which have located here in recent years. The employment increases which the executives of these firms anticipate reflect the extremely favorable outlook for the industry, and their own confidence that the local plants can share in this growth.

Moreover, the very existence of these plants is a demonstration of the advantages of a location in the Phoenix Area to other firms in both the electronic and other industries that may be seeking a location for a new plant. The existence of these plants also means that there is a nucleus of engineering and scientific personnel in the community which will no doubt help industry attract still more engineers and scientists to the area.

The Phoenix Area also has recognition in two other fields of technology which should contribute substantially to industrial growth. One is in the development and production of gas turbines, and the other is in the field of solar-energy research. A Phoenix firm is reported to have produced more small gas turbines than all other producers in the world

combined.^{8/} This status and experience should make the Phoenix Area an important center of gas turbine development and production as the use of these turbines widens for propulsion purposes and industrial uses. In the solar-energy field, Phoenix is already known as an information center through the work of the Association for Applied Solar Energy, and plans are underway for the establishment of a center for solar energy research.^{9/}

Industrial Decentralization and Migration

Since World War II, there has been a noticeable tendency for manufacturing firms to invest in new plants at new locations rather than to expand, rehabilitate, or convert existing facilities. The result has been that industrial growth has tended to take place in the suburbs of established industrial centers rather than in the old industrial areas of those centers and in communities that have heretofore had little or no manufacturing. One important phase of this industrial decentralization has been the southward and westward movement of manufacturing.

Maricopa County has already been a beneficiary of industrial decentralization. It should continue to benefit - in fact very substantially - as long as it provides a productive labor supply, lower building costs, and other locational advantages because the County is at once near and a part of one of the fastest growing consumer and industrial markets in the United States.

^{8/} "Turbines from Arizona - 7000 of Them!" Arizona Engineer and Scientist, April, 1958, p. 1.

^{9/} Richard A. Duff, "Valley is Solar Energy Capital," Phoenix Action, May, 1959, p. 1.

Manufacturing executives predicted in a recent national survey that industry will continue to move to the South, the Southwest, and the Pacific Coast. The following reasons for this continued shift were cited in the survey report:

"...good productive labor supply, lower building costs, and better business climate. But the most important reason is simply the development of new, untended markets in these areas.

"In addition, to the profit opportunities in moving closer to fast-growing markets, plants generally move for two other reasons: the need for expansion room and a desire to flee from an unhealthy labor situation."^{10/}

Moreover, the technological developments in prospect should accelerate industrial decentralization and therefore the industrial growth of Maricopa County. For reasons discussed under "Technological and Market Developments," whole plants are probably more likely to be out-moded during the next ten to twenty years than has happened in the same space of time before. In addition, new products and new research activities, particularly in the electrical machinery-electronic group of industries, are going to require the construction of a great number of new and specially designed facilities.

Industrial decentralization should be accelerated not only by the sheer volume of plant construction which technological developments may require, but also by the reduction in operating scale which these same developments may make possible. In numerous cases the manpower required for a given volume of output will probably be substantially reduced even if the ground area covered by the plant structure remains about the same.

^{10/} "Planning Tomorrow's Plants," Dun's Review and Modern Industry, March, 1959, p. 111.

Furthermore, decentralization will doubtless be stimulated by the upgrading of personnel which may be required by the technology which is in prospect. One observer has made this comment on the prospects of personnel being upgraded:

"All companies, even those outside of manufacturing will have to upgrade their technical resources. They will require higher-caliber brain power (specifically in the field of solid-state physics) and the latest scientific instrumentation." ^{11/}

The more that a given operation depends upon mental rather than it does upon manual skills, the less the location is tied to a mass labor market. In competing for personnel with technical and professional training pleasant living conditions will doubtless be emphasized in locating new facilities.

As mentioned earlier, pleasant winter living conditions have been one of the major inducements which have caused some industry to come to Maricopa County. Climate will undoubtedly continue to be a major inducement. The problem will be, as discussed later, to minimize the drawbacks that may develop with the explosive population growth that is in prospect.

Growth Outlook for the Pacific Southwest

It has been estimated that Southern California will have a population of over 17,000,000 by 1980. ^{12/} During the same period the State of Arizona may attain a population of well over 2,500,000. In other words, within 20 years there is in prospect a total population for Southern California and Arizona combined of 20,000,000 or more. One indication of the size

^{11/} Dun's Review and Modern Industry, May, 1959, p. 58.

^{12/} Monthly Summary of Business Conditions in Southern California, (Published by Security-First National Bank) December, 1958, p. 2. "Southern California" is defined as the fourteen southern counties.

of this potential market is that it would exceed in size the 1959 population of any state. That of New York, the largest, has been estimated at approximately 16,700,000.^{13/} In 1958, Southern California had a population of approximately 8,800,000 and Arizona, of around 1,200,000. Thus, a combined population of 20,000,000 by 1980 would mean the doubling of the present total.^{14/}

Still another picture of the growth potential of the Pacific Southwest is provided by the forecast of electrical energy requirements which has been made by the Federal Power Commission.^{15/} According to this forecast, the use of electrical energy for non-farm residential purposes may increase 3.5 times between 1957 and 1980 in Region VIII (comprises the states of Arizona, Nevada, virtually all of California, and a very small portion of New Mexico). Within Power Supply Area 48 (Arizona, Southern Nevada, and small portions of Southern California and New Mexico) non-farm residential use is expected to increase about 4.6 times.

It is significant that these projected increases in the use of residential power are more than twice the anticipated increase in population. This fact of course reflects the anticipated increase in the use of electrical appliances within the home. It also reminds us that the market potential of an area, whether of region or community, may increase much faster

^{13/} "Survey of Buying Power," Sales Management, May 10, 1959, p. 192.

^{14/} Estimate for Southern California, Monthly Summary of Business Conditions, op. cit., p. 2; and for Arizona, Western Business Consultants, Inc.

^{15/} "New Estimates by FPC Staff Indicate Nation's Electric Utility Power Loads Will Require 421 Million Kilowatts of Installed Generating Capacity in 1980," Release No. 10,480, (Federal Power Commission), July 17, 1959; and correspondence with the Commission.

than population - that the consumer markets of the Pacific Southwest and of Arizona will probably be much larger than population forecasts alone would indicate .

The effect of this anticipated growth of the Pacific Southwest upon the industrial future of Maricopa County should be felt in at least two ways . It will mean that the Phoenix Area has long since lost the disadvantage of remoteness from markets . Instead, it will be on the periphery of what will probably be one of the largest consumer and industrial markets in the United States . Moreover, by being on the periphery, Maricopa County should present some of the advantages of a suburban location to firms established in the Los Angeles Area that may seek sites free from the major disadvantages of a Los Angeles location .

Developments in Northwest Mexico should also contribute to the industrial growth of the Phoenix Area, both in manufacturing and in wholesaling . When account is taken of the varied and extensive resources of this section of Mexico and the great market potential that population growth promises in the Pacific Southwest, the conclusion follows that one will surely react on the other - that major economic developments are in store for Northwest Mexico . Such developments could well mean increased sales south of the border for Phoenix manufacturers, but the economic influence is likely to be more widespread . For example, Arizona communities nearer the border may play a more direct part than the Phoenix Area but the growth of these communities could be expected to have a favorable chain reaction upon business in Maricopa County .

Local-Market Manufacturing

The larger a metropolitan area grows, the more opportunity there is for local manufacture because of local demand reaching threshold volume

in one class of product after another - that is, volume sufficient to support local production. Several examples can be cited among the plants which are being established in the Phoenix Area. One is the steel plant in the Kyrene industrial area, which illustrates supply as well as demand reaching a volume sufficient to warrant local production - the supply in this case being steel scrap originating within the state. Another instance is a corrugated board plant which is being constructed to supply board for a local box firm. Still another is the announcement of a new plastic extruding venture.

The growth experience of other industrial centers as well as the local pattern of industrial development to date gives every indication that the establishment of plants to supply local needs - both consumer and industrial - will play a very significant part in the future industrial expansion of the County. An additional basis for this expectation are the number of different products and services which local manufacturers and wholesalers report that they would prefer to procure from local producers if available.^{16/}

As would be anticipated, the product and services which local firms expressed an interest in buying from local producers varied with the kind of business. Among the firms in food manufacturing, packaging materials was the most frequently mentioned item, and particularly paper containers.

The comments of executives in the apparel business illustrate the limitation imposed by volume of local demand. They stated that the local use of fabrics was not sufficient at present to justify local production; that a textile mill located in Maricopa County would have to sell a substantial volume in California in order to operate. One apparel manufacturer thought that a cotton mill would eventually be established in the County.

^{16/} Reported in Industrial Land Use and Employment Survey for the Planning Commissions of Phoenix and Maricopa County, 1959, which was made for this study by Western Business Consultants, Inc.

Hardware items were mentioned by producers of millwork, of cabinets, and of furniture. Curiously enough, one furniture manufacturer specified "good, clean cotton at a reasonable price."

Both a chemical manufacturer and a battery producer would like to buy locally produced sulphuric acid or at least that produced nearby. To the question "Out of what?", the belief was expressed that this acid might be recovered from natural gas produced in the Four Corners Area.

Manufacturers of fabricated metal building specialties listed special steel items, sheet aluminum, nylon molded products, and fiber glass items such as shower stalls.

Executives in the machinery field mentioned electric motors, electric cords, and sheet steel. One respondent may have been expecting too much from local suppliers at the present time but he at least gave one measure of the local-market potential that may lie ahead. He wrote "Over 100 different services available in Chicago and Los Angeles but missing from the Phoenix Telephone Directory. Frankly, the services available are limited."

The longest potential shopping lists were submitted by the larger firms in the electronic and aircraft-equipment fields. Their lists included the following:

1. Castings made from magnesium and aluminum alloys by investment, permanent, sand, and shell-molding methods; also, die castings.
2. Electronic components such as relays, solenoids, potentiometers, pulse transformers, and magnetic-core materials; also, printed circuit boards, capacitors, and resistors.
3. Precision sheet-metal work, including that made by drop-hammer presses.

4. Precision gear cutting, military-quality screw machine products, and precision bearings.
5. Contract processing, including dip-brazing for aluminum and magnesium items, heat-treating, certified x-ray facilities, graphite plating, and chemical-removal of metal.

Some of these products and services are now available in Maricopa County but on a limited scale. Their range indicates the scope of the supporting industry that can reasonably be expected to grow up in the County as existing producers of electronic apparatus, aircraft equipment and other precision machinery expand operations and additional producers locate in the County.

Facing the Deterrents to Growth

There is a danger in reviewing the industrial growth prospects for the Phoenix Area and Maricopa County because of the very brightness of these prospects. The danger is that this brightness will blind one to the conditions produced by growth, itself, that could prevent the prospects from being realized.

The signs are already evident - not only in the experience of larger metropolitan areas but also in present-day Phoenix and Maricopa County. The local manufacturers and non-manufacturers who participated in the survey of present and future land requirements for industrial purposes expressed concern about a number of factors which they felt could limit their growth and that of a local industry and business generally. Their response is summarized in Table X.

General Deterrents Foreseen by Local Industry

Rising land costs and transportation problems were mentioned more frequently than any other conditions as potential deterrents to future growth by both manufacturers and non-manufacturers. Labor supply problems ranked third in frequency of those mentioned by manufacturers, but taxes were in third position for non-manufacturers. Both air pollution and water problems were mentioned as deterrents by manufacturers, but less than a third as frequently as taxes. Non-manufacturers relatively indicated about twice as much concern about water problems as manufacturers but curiously enough did not even mention air pollution.

The transportation problems cited, as noted in Table X, were both local and interstate in nature. "Traffic congestion" was the most frequently mentioned local problem which respondents thought would or could limit growth. One manufacturer did express concern over the lack of small airports. At the interstate level, the most frequently mentioned growth handicaps were the freight-rate structure coupled with roundabout routing, and the lack of reciprocal truck-licensing agreements.

Among the respondents mentioning specific labor problems, 45 percent were engaged in apparel manufacturing. They are concerned about lack of skilled operators, high turnover, and the growth of unionism. One apparel producer did state that "once workers were trained, they got results." There was no significant concentration by industry of the firms that mentioned "labor supply" without being specific.

The respondents who mentioned a specific tax which they thought could limit growth were usually referring to property taxes. In addition the city sales tax and the year-end inventory tax were cited by wholesalers.

TABLE X
 CONDITIONS WHICH COULD RETARD FUTURE INDUSTRIAL GROWTH
 OF PHOENIX AREA AND MARICOPA COUNTY
 AS FORESEEN BY RESPONDENTS TO INDUSTRIAL SURVEY

Condition	Per Cent of Total Number of Adverse Conditions Mentioned	
	By Manufacturers	By Non-Manufacturers*
Rising Land Costs (including building & rents)	25	29
Transportation Problems		
Local	13	17
To and from Phoenix Area	<u>11</u>	<u>15</u>
	24	32
Labor Supply Problems		
Specific	10	3
Not Specific	<u>9</u>	<u>0</u>
	19	3
Taxes		
Specific	6	9
Not Specific	<u>9</u>	<u>12</u>
	15	21
Air Pollution	5	0
Water Problems (including drainage)	4	9
Miscellaneous	8	6
	<u> </u>	<u> </u>
	100	100

* Non-Manufacturers such as utilities, wholesale firms, and other businesses having locational requirements similar to manufacturers (see page 81 of Part IV).

Source: Tabulations from Industrial Land Use and Employment Survey for the Planning Commissions of Phoenix and Maricopa County, 1959, a special survey made for this study by Western Business Consultants, Inc.

In the case of air pollution, it is interesting to note that two manufacturers expressed concern over the possibility that regulations might be adopted which would affect their business adversely. But another respondent expressed concern that increased contamination of the air might make the area much less desirable for electronics manufacture.

It should, of course, be recognized that the response reported here to the question of what conditions are foreseen that may limit future growth is only a rough indication of current local industrial opinion. No effort was made to have respondents weight the importance of each condition cited where more than one was mentioned. Furthermore, it is possible that some of the executives who responded "none" were really saying, "I really haven't given the matter any thought."

It is probable that two equally significant interpretations should be placed upon the fact that more than 50 per cent of both manufacturers and non-manufacturers participating in the survey responded "none" to this question of potential growth deterrents which was asked as follows: "Are there any anticipated local conditions which might limit your future growth, i.e., water, labor supply, congestion, land cost, etc.?"^{17/} One interpretation is that most of the respondents see good reasons in their own line of business for being highly optimistic about the future. The other is that most industrialists in the County and Phoenix Area haven't so far encountered any significant deterrent to the growth of their own business and they are too busy keeping up with day-to-day growth to look into the future.

^{17/} Of the 278 manufacturers participating in the survey, the response to the question, "Are there any anticipated local conditions which might limit your future growth, i.e., water, labor supply, congestion, land cost, etc.?" was as follows: "None" - 58 per cent; One or more conditions mentioned - 36 per cent; answer left blank - 6 per cent. Similar percentages for the 122 non-manufacturers who responded are: "None" - 59; one or more conditions mentioned - 34; and no answer - 7.

The probability that some businessmen may get too pre-occupied with current problems to look into the future suggests another qualification that should be placed upon the survey results given in Table X. The fact that some potential deterrent to growth was not mentioned frequently enough to warrant a category for it in Table X does not necessarily mean that it may not be or may not come to have a significant retarding influence. For this reason it is worth noting the conditions which might possibly have widespread effect that are included in the "other" category in Table X.

1. Shortage of risk capital.
2. Insufficient supporting industry.
3. Shortage of in-state trained engineers and scientific personnel.
4. Loss of the original character of Arizona which helped precipitate the boom in the first place.

Growth Deterrents Faced by Particular Industries or Firms

In considering the outlook for industrial growth, it should also be kept in mind that some firms will face difficulties which are peculiar to their line of business or even to their location. Seven per cent of the manufacturers participating in the survey reported that the growth of their business might be hampered by decrease in their market or their supply, or both; and five per cent said that lack of space, zoning, or traffic problems would hinder growth at their present location.

Most of the firms anticipating market or supply difficulties were either selling to the agricultural market or dependent upon local farms and ranches for their materials. In this case the general industrial growth that is associated with the population spreading over the country-side is serving to limit growth in some of the first lines of manufacturing that were established in the County.

Nine per cent of the non-manufacturers reported that they might have market or supply problems which would limit their growth, and five per cent, that expansion was limited by their present site. The expected decline of agricultural production was for non-manufacturers, as for manufacturers, the most common reason given for concern over future market.

PART IV

EMPLOYMENT PROJECTIONS

The scope of Part IV was described as follows in the study plan laid out at the beginning of the project.

"Employment trends will be estimated for the next two decades by broad classification of employment such as manufacturing, trade, government, and the like. In addition, the employment in specific lines of manufacturing and wholesaling will be estimated to the extent that differences exist between one line and another in land-area requirements per employee."

Projections of employment by major lines of economic activity have already been provided in Part II, Economic Base. Therefore, Part IV is devoted to the probable trend of employment "in specific lines of manufacturing" and in other lines of business that have similar locational requirements to manufacturing. It is these employment projections which have been used to estimate the probable future requirements for industrial land that are presented in Part V, Industrial-Land Requirements.

Employment Trends In Manufacturing

Outlook Summary

By 1975-80, total employment in the manufacturing industries of Maricopa County may reach approximately 117,000 as compared with about 26,000 in 1958. At this level of employment, manufacturing would be providing more jobs than any other economic activity in the County according to the projections given in Part II, Economic Base.

In 1958, the aircraft-equipment industry had the largest employment of any manufacturing industry in the County. By 1975-80, it is anticipated that the electronic and electrical-products industry will rank first in employment with the aircraft-equipment industry in second place.

In 1958, the newly established electronic industry accounted for slightly more than 13 per cent of the total employment in manufacturing within Maricopa County. By 1975-80, 35 per cent of the County's manufacturing jobs will be furnished by the electronic and electrical products industry, if the projections made for this study are realized.

Other shifts in employment position may be studied in Table XI. Here the projected employment for twenty-nine manufacturing industries in 1965-70 and 1975-80 is compared with the estimated employment of these industries in 1958, with the industries ranked according to their 1958 employment.

The data given in Table XI are for total number of persons employed on all shifts. It is necessary to multiply the typical ratios of land used per employee (see Part V, Table XVIII) by the number of employees on day shift to obtain the land use estimates and projections given in Part V. The estimated number of manufacturing employees on day shift by industry is given in Appendix A, page 83.

Projection Basis

The employment projections given in Table XI are based upon the anticipations of local industrialists and an appraisal of the market outlook in each industry. Each manufacturing establishment in the County was invited to provide information on current and anticipated employment and land use for use in this study. Replies were received from establishments having 86 per cent of the estimated average monthly employment in manufacturing during 1958.

TABLE XI
 MANUFACTURING EMPLOYMENT IN MARICOPA COUNTY BY INDUSTRY
 1958, 1965-70 AND 1975-80
 (Ranked by 1958 Employment)

Industry	1958* Estimate	1965-70* Projection	1975-80* Projection
Aircraft Equipment	5,480	9,850	11,950
Electronic & Electrical Products	3,500	26,250	40,350
Primary Metals	2,670	3,850	4,500
Dairy Products	1,410	2,300	3,200
Publishing, With or Without Printing	1,220	2,150	3,000
Concrete, Clay, Gypsum & Rel. Prod.	1,110	2,350	3,000
Fab. Metal Prod. (Exc. Bldg. Spec.)	1,040	2,600	3,850
Cooling, Ref. & Air-Moving Equip.	1,010	2,100	2,600
Machine & Tool & Die Shops	860	3,150	4,450
Millwork & Other Wood Prod. (Exc. Furn.)	840	1,500	2,000
Miscellaneous Food Industries	830	1,450	1,800
Bakery Products	800	1,300	1,800
Other Apparel & Fab. Textile Prod.	730	1,400	1,700
Women's Apparel	680	2,450	3,450
Meat Products	650	1,050	1,450
Commercial Printing	510	900	1,250
Beverage Products	470	1,000	1,400
Cottonseed-Oil Mills	420	450	450
Household Furniture	300	550	700
Service Ind. for the Printing Trade	250	450	650
Miscellaneous Manufacturing	240	350	500
Chem. & Allied Prod. (Exc. Ag. Chem.)	220	550	850
Fabricated Metal Bldg. Specialties	210	450	600
Agricultural Chemicals	180	250	300
Other Non-Electrical Machinery	170	350	500
Coating, Plating, & Allied Services	150	450	600
Misc. Transportation Equip.	110	200	300
Professional Equip. & Related Prod.	100	450	700
Paperboard Containers & Paper Prod.	80	500	700
Allowance for New Industries		6,000	18,000
Total Manufacturing	26,240	76,650	116,600

* Monthly averages: 1958 rounded to nearest 10, and projections to nearest 50.

Source: Both estimates and projections were made by Western Business Consultants, Inc.

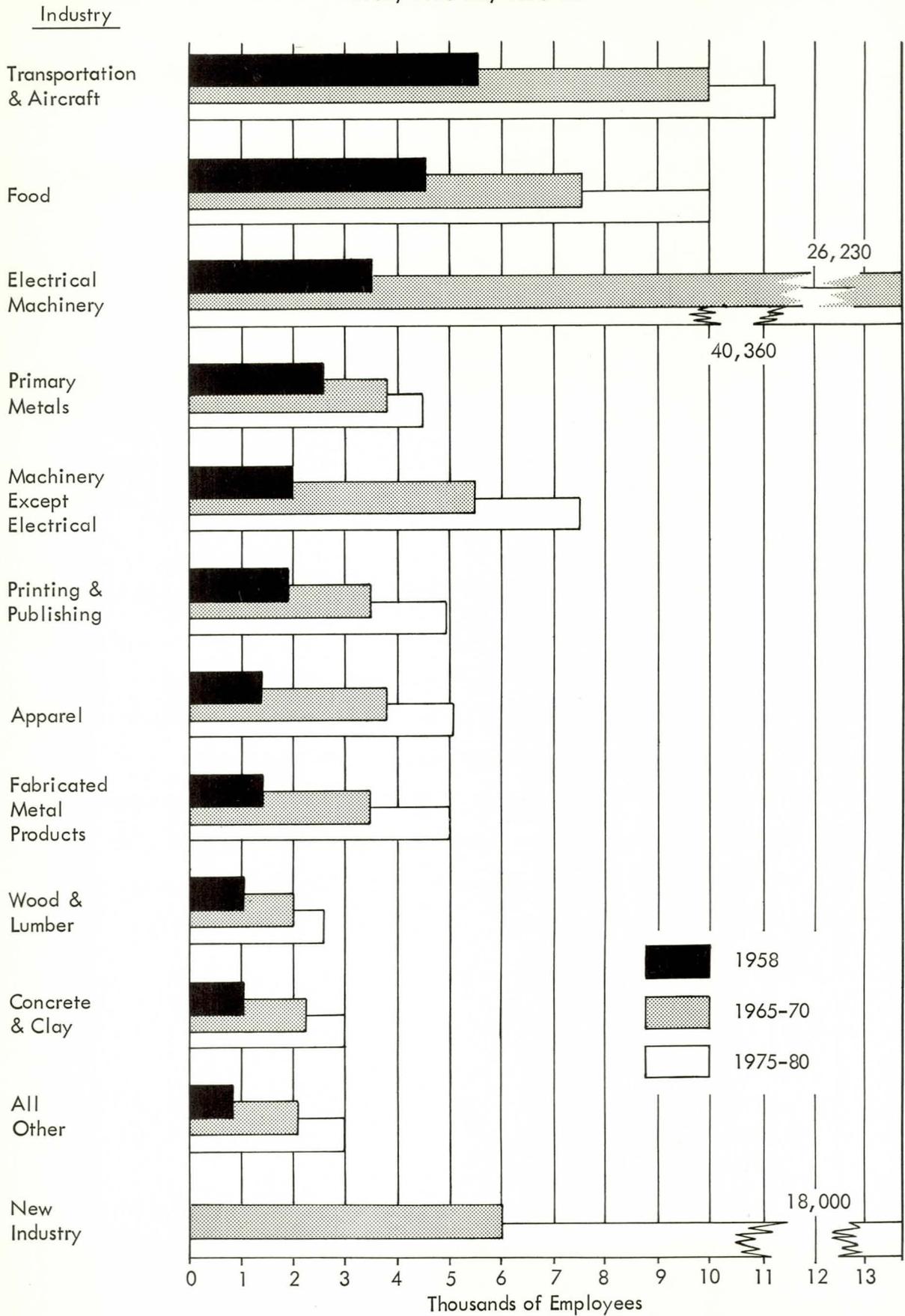
Each manufacturing industry was analyzed, as noted in Part II. Economic Base, in terms of the out-of-county and the local in-county markets which it served. Each establishment was asked to report per cent of sales to customers in Maricopa County, California, and other Arizona Counties and elsewhere.

The employment provided in an industry by out-of-county markets was projected by taking into account both the employment increases anticipated by reporting establishments having such markets and the national and regional trends in these markets. In the case of the employment provided by the local markets the expected increases which manufacturers reported were combined with estimates of increases in local markets based upon population projections and other pertinent data. In the projections for each industry, allowance was made for not only the expansion of existing but also for the establishment of new manufacturing enterprises in the County.

In addition to the projections for industries now existing in the County, an allowance was made for the plants of industries which are not now represented in the County. These include industries already established elsewhere, which because the local or regional market is not yet large enough, or for other reasons, have not yet located in the County. It also includes wholly new industries manufacturing products which have not yet reached the commercial stage, or which may not yet even be in the laboratory stage of development. It is assumed, for reasons discussed in Part III, that these wholly new industries will be science-oriented and that their local growth pattern will resemble that of the electronic industry.

FIGURE 7

EMPLOYMENT IN MANUFACTURING
1958, 1965-70, 1975-80



Employment Trends In Selected Non-Manufacturing Industries

Employment estimates and projections were made for the following six non-manufacturing industries which tend to have locational requirements similar to manufacturing: wholesalers, trucking firms, public warehouses, laundries and dry cleaning plants, contractors engaged in heavy construction with storage yards, and major utilities.

Outlook Summary

These six selected non-manufacturing industries provided jobs, it is estimated, for nearly 25,000 persons in 1958. By 1975-80, it is anticipated that these same industries will employ over 58,000. Details are given in Table XII. In 1958, wholesale trade was the largest employer, providing about 11,000 jobs. The next most important industry in terms of employment was utilities with 7,700 employees. In the wholesale trade group, the whole-sale grocers ranked first in employment with 2800 employees.

By 1975-80, it is expected that wholesale trade will still be the largest employer among this group of six industries with approximately 28,000 employees. The estimate of 12,000 for utilities puts this industry in second place. Within wholesale trade, it is anticipated that the wholesalers of machinery and related products, with an estimated employment of 9,250, will have the largest employment.

Projection Basis

The 1958 estimates and the 1965-70 and the 1975-80 projections of employment for these six selected industries were made in the same manner as those for manufacturing industries.

TABLE XII
 EMPLOYMENT IN SIX SELECTED NON-MANUFACTURING INDUSTRIES,
 MARICOPA COUNTY, 1958, 1965-70 AND 1975-80
 (Ranked by 1958 Employment)

Industry	1958* Estimated	1965-70* Projected	1975-80* Projected
Wholesale Trade	11,000	20,000	27,600
Groc. & Related Prod.	2,800	3,400	4,000
Mach., Equip. & Supplies; Metals & Minerals	2,140	6,100	9,250
Miscellaneous	1,910	3,200	4,400
Lumber & Const. Materials	1,040	1,850	2,600
Hardware, Plmb. & Htg. Equip. & Supplies	770	1,300	1,650
Motor Veh. & Automotive Equip.	700	1,250	1,700
Electrical Goods	590	1,050	1,450
Drugs, Chem., & Allied Prod.	510	850	1,150
Beer, Wine, & Distilled Alcoholic Bev.	390	700	950
Dry Goods, Apparel, & Gen. Merchandise	150	300	450
Major Utilities	7,700	9,750	12,000
Laundry, Dry Cleaning & Rel. Services	1,750	3,000	4,150
Contractors, Engaged in Heavy Const., with Storage Yards	1,530	2,400	3,250
Trucking, Without Storage	1,300	4,750	7,250
Public Warehousing & Freight Forwarding	960	1,650	2,300
Trucking, With Storage	600	1,150	1,550
Total	24,840	42,700	58,100

* Monthly averages: 1958 rounded to nearest 10, and projections to nearest 50.

Source: Both estimates and projections were made by Western Business Consultants, Inc.

APPENDIX A TO PART IV
TABLE XIII

DAY-SHIFT EMPLOYMENT IN MANUFACTURING BY INDUSTRY,
MARICOPA COUNTY, 1958, 1965-70, AND 1975-80
(Ranked by 1958 Total Employment)

Industry	1958* Estimate	1965-70* Projection	1975-80* Projection
Aircraft Equipment	3,180	5,700	6,900
Electronic & Electrical Products	3,430	25,700	39,500
Primary Metals	1,420	2,050	2,400
Dairy Products	1,390	2,250	3,100
Publishing, With or Without Printing	890	1,550	2,200
Concrete, Clay, Gypsum & Rel. Prod.	900	1,900	2,450
Fab. Struct. Metal Prod. (Exc. Bldg. Spec.)	1,040	2,600	3,850
Cooling, Ref. & Air-Moving Equip.	760	1,600	2,000
Machine & Tool & Die Shops	680	2,450	3,500
Millwork & Other Wood Prod. (Exc. Furn.)	740	1,300	1,750
Miscellaneous Food Industries	610	1,050	1,350
Bakery Products	610	1,000	1,400
Other Apparel & Fab. Textile Prod.	730	1,400	1,700
Women's Apparel	680	2,450	3,450
Meat Products	530	850	1,150
Commercial Printing	410	700	1,000
Beverage Products	460	1,000	1,350
Cottonseed-Oil Mills	320	350	350
Household Furniture	300	550	700
Service Ind. for the Printing Trade	180	300	450
Miscellaneous Manufacturing	230	350	450
Chem. & Allied Prod. (Exc. Ag. Chem.)	200	500	750
Fabricated Metal Bldg. Specialties	210	450	600
Agricultural Chemicals	130	150	200
Other Non-Electrical Machinery	130	300	400
Coating, Plating, & Allied Services	100	300	400
Misc. Transportation Equip.	100	200	300
Professional Equip. & Related Prod.	100	450	700
Paperboard Containers & Paper Prod.	70	450	600
Allowance for New Industries		4,800	14,400
Total Manufacturing	20,530	64,700	99,350

* Monthly averages: 1958 rounded to nearest 10, and projections to nearest 50.

Source: Estimates and projections prepared by Western Business Consultants, Inc. on the basis of reports received from establishments in each industry.

APPENDIX B TO PART IV
TABLE XIV

DAY-SHIFT EMPLOYMENT IN SELECTED NON-MANUFACTURING
INDUSTRIES, MARICOPA COUNTY, 1958, 1965-70, AND 1975-80
(Ranked by 1958 Total Employment)

Industry	1958* Estimate	1965-70* Projection	1975-80* Projection
Wholesale Trade	10,880	19,800	27,300
Groc. & Related Prod.	2,680	3,200	3,700
Mach., Equip. & Supplies; Metals & Minerals	2,140	6,100	9,250
Miscellaneous	1,910	3,200	4,400
Lumber & Const. Materials	1,040	1,850	2,600
Hardware, Plmb. & Htg. Equip. & Supplies	770	1,300	1,650
Motor Veh. & Automotive Equip.	700	1,250	1,700
Electrical Goods	590	1,050	1,450
Drugs, Chem., & Allied Prod.	510	850	1,150
Beer, Wine, & Distilled Alcoholic Bev.	390	700	950
Dry Goods, Apparel, & Gen. Merchandise	150	300	450
Major Utilities	6,850	8,780	10,800
Laundry, Dry Cleaning & Rel. Services	1,750	3,000	4,150
Contractors, Engaged in Heavy Const., with Storage Yards	1,530	2,400	3,250
Trucking, Without Storage	870	2,400	3,750
Public Warehousing & Freight Forwarding	960	1,650	2,300
Trucking, With Storage	600	1,150	1,550
Total	23,440	39,180	53,100

* Monthly averages: 1958 rounded to nearest 10, and projections to nearest 50.

Source: Both estimates and projections were made by Western Business Consultants, Inc. on the basis of reports received from establishments in each industry.

APPENDIX C TO PART IV
RELATION OF INDUSTRIAL CLASSIFICATIONS USED IN THIS STUDY
TO THE STANDARD INDUSTRIAL CLASSIFICATIONS

The industrial classifications used in this study differ in some instances from the Standard Industrial Classification, the most commonly used system.^{1/} For the most part the differences have been caused by adopting the Standard Industrial Classification to the local economic structure, in some cases because there were too few establishments in a given classification to show data separately for this classification, and in others to emphasize a local pattern. The following table gives all of the industrial classifications used in this report and the Standard Industrial Classification counterparts.

TABLE XV
COMPARISON OF INDUSTRIAL CLASSIFICATIONS

Report Classification	Standard Industrial Classification Counterpart
Agriculture	Major Groups 01, 02 and 07
Contract Construction & Mining	Major Groups 14, 15, 16 and 17
Manufacturing	
Food & Kindred Products	
Meat Products	2011 and 13
Dairy Products	2020, 24, 25 and 26
Bakery Products	2037 and 51
Beverage Products	2082, 86 and 87
Cottonseed Oil Mills	2091
Miscellaneous Food In- dustries	2037, 41, 94, 97 and 99

^{1/} The Standard Industrial Classification is used by the U. S. Bureau of the Census and most other agencies of the Federal Government. For details see United States Bureau of the Budget, Standard Industrial Classification Manual, 1957, (Washington: Government Printing Office, 1957).

Appendix C to Part IV - Table XV
 Comparison of Industrial Classifications - Continued

Report Classification	Standard Industrial Classification Counterpart
Manufacturing (Cont'd)	
Apparel & Fabricated Textile Products	
Women's Apparel	2331, 35, 39 and 41
Other Apparel & Fabricated Textile Products	2311, 21, 22, 23, 28, 87, 89, 91, 92, 97, 99 and 3141
Lumber & Wood Products	
Millwork & Other Wood Products, Except Furniture	2429, 31, 42, 44 and 2541
Household Furniture	2511, 12, 14 and 15
Paper & Allied Products	
Paperboard Containers & Other Paper Products	2642, 49, 51, 52 and 53
Printing, Publishing & Allied Industries	
Publishing, With or Without Printing	2711, 21 and 31
Commercial Printing	2751, 52 and 61
Service Industries for the Printing Trade	2789, 91 and 93
Chemicals and Allied Products	
Chemicals & Allied Products, Except Agricultural Chemicals	2813, 19, 34, 42, 44, 51, 93, 99, 2951 and 52
Agricultural Chemicals	2872, 73 and 79
Concrete, Clay, Gypsum & Related Products	
Concrete, Clay, Gypsum & Related Products	3231, 41, 51, 53, 69, 71, 72, 73, 75, 95, 96 and 99
Primary Metals	
Primary Metals	3312, 17, 21, 22, 39, 41, 52, 56, 61, 69 and 92

Appendix C to Part IV - Table XV
 Comparison of Industrial Classifications - Continued

Report Classification	Standard Industrial Classification Counterpart
Manufacturing (Cont'd)	
Fabricated Metal Products	
Fabricated Structural Metal Products, Except Machinery, Transportation Equipment, and Building Specialties	3411, 23, 31, 41, 43, 81, 94 and 99
Fabricated Metal Building Specialties	3442, 43, 44 and 49
Coating, Plating & Allied Services	3471 and 79
Machinery, Except Electrical Machine & Tool & Die Shops	3451, 52, 99, 3532, 41, 44, 45, 91, 99, 3679 and 3729
Cooling, Refrigeration & Air Moving Equipment	3564 and 85
Other Non-electrical Machinery	3522, 35, 51, 55, 61, 64, 69 and 89
Electrical Machinery Electronic & Electrical Products	3571, 3613, 42, 43, 61, 62, 79, 91, 92, 94 and 3729
Transportation Equipment Aircraft Equipment	3729 and 3811
Miscellaneous Transportation Equipment	3519, 3713, 14, 32, 91 and 99
Professional Equipment & Related Products Professional Equipment & Related Products	3811, 42 and 51
Miscellaneous Manufacturing Miscellaneous Manufacturing	3079, 3171, 3911, 13, 41, 42, 49, 53, 61, 81, 88, 93 and 99

Appendix C to Part IV - Table XV
 Comparison of Industrial Classifications - Continued

Report Classification	Standard Industrial Classification Counterpart
Transportation, Communication & Public Utilities	Utilities
Transportation	
Trucking, Without Storage	4213
Trucking, With Storage	4214
Public Warehousing & Freight Forwarding	4222, 23, 25 and 4712
Other Transportation	Major Groups 45, 46 and 47
Communication	Major Group 48
Public Utilities	
Major Utilities	4811, 4931 and 71
Wholesale Trade	
Motor Vehicles & Automotive Equipment	5012, 13 and 14
Drugs, Chemicals & Allied Products	5022, 28 and 29
Dry Goods, Apparel & General Merchandise	5032, 35 and 99
Groceries & Related Products	5042, 43, 44, 47 and 48
Electrical Goods	5062, 63, 64 and 65
Hardware & Plumbing & Heating Equipment & Supplies	5072 and 74
Machinery, Equipment & Supplies; Metals & Minerals	5082, 83 and 91
Beer, Wine & Distilled Alcoholic Beverages	5095
Lumber & Construction Materials	5098
Miscellaneous	5092, 93, 96, 97 and 99
Retail Trade	Major Groups 52, 53, 54, 55, 56, 57, 58 and 59
Finance, Insurance & Real Estate	Major Groups 60, 61, 62, 63, 64, 65, 66 and 67
Service	Major Groups 70, 72, 73, 75, 76, 78, 79, 80, 81, 84, 86, 88 and 89
Government	Major Groups 91 (including military), 92 and 93

APPENDIX D TO PART IV
EMPLOYMENT STATISTICS FOR 1958

There are three major reasons for the differences between the employment figures given in this report for 1958 and those published by the Employment Security Commission of Arizona.

1. Variations in coding. There are certain firms which, for purposes of this report, were classified as manufacturers but which were classed in a non-manufacturing group by the Employment Security Commission. This difference in coding also affects other industrial groups.
2. Variation in basis of reporting. The statistics of the Employment Security Commission are based upon actual employment records while the information provided by employers for this study may in some cases have been an estimate of the firm's average monthly employment for 1958.
3. Variation in classification. Employment data published by the Employment Security Commission contain the category "All Other Nonagriculture"; in some reports "Miscellaneous". This category includes unpaid family workers, proprietors, and self employed. For purposes of this report, the industrial composition of this category of employment was estimated and distributed to appropriate industrial classifications.

PART V

INDUSTRIAL-LAND REQUIREMENTS

This analysis of the future requirements for industrial land was guided by the following question:

"How much land area will be used by manufacturing and wholesaling in 1980? Many existing plants will increase their land use; even if they do not expand the physical plant, they may choose to move, and the chances favor using more land in a new than in an old location. Probably an even greater demand for industrial land will come from the manufacturers and wholesalers who will be establishing facilities in Maricopa County for the first time."

Total Requirements

Manufacturing industries will probably be using more than 7,000 acres of land in Maricopa County by 1980. In addition, around 4,500 acres will probably be used by those non-manufacturing industries which tend to have similar locational requirements to manufacturing such as the wholesale trade, public utility, and motor-freight transportation industries. Together these uses total over 11,500 acres. In 1958, these same land uses totaled nearly 4,800 acres. In other words, prospects indicate that the land required for industrial purposes by 1980 may be 2.4 times present use.

Two qualifications should be kept in mind: these estimates and projections refer only to acreage utilized; and, they do not include land used by railroads or by proving grounds. In 1958 railroads were using, it is estimated, about 4,300 acres for right-of-way, yards, and other purposes; and, proving grounds,

separate from manufacturing facilities, were using about 6,500 acres.

Table XVI provides a summary of 1958 and projected land use for manufacturing and for the non-manufacturing industries with similar locational requirements. These estimates and projections are based upon the special industrial survey of land requirements and employment which was made for this study by Western Business Consultants, Inc. and which was described in Part IV.

Two comments are pertinent to the land use estimates and projections given in this report. First, the projections were built up from employment

TABLE XVI
LAND USE BY MANUFACTURING AND SELECTED
NON-MANUFACTURING INDUSTRIES IN MARICOPA COUNTY
1958, 1965-70 AND 1975-80

Industry In Order of 1958 Land Use	Land Use in Acres		
	1958* Estimated	1965-70* Projected	1975-80* Projected
Manufacturing	2,456	5,015	7,105
Major Utilities	1,108	1,275	1,400
Wholesale Trade	465	935	1,350
Contractors, Engaged in Heavy Const., with Storage Yards	351	480	605
Public Warehousing	266	455	635
Motor Freight Transportation	93	265	400
Laundry, Dry Cleaning & Rel. Services	24	40	60
Total	4,763	8,465	11,555

* 1958 - rounded to nearest acre; 1965-70 & 1975-80 - rounded to nearest 5 acres.

Source: Estimates and projections prepared by Western Business Consultants, Inc.

projections, and therefore required an assumption to be made about the future distribution of employment by shifts. It was assumed that the 1958 ratio would prevail industry by industry. Overall, approximately 80 per cent of the persons engaged in manufacturing in 1958 were employed on the day shift. Were all plants to be on a single-shift basis throughout manufacturing by 1980, then 1500 more acres would be required than allowed for in Table XVI, or a total of 8,605 instead of 7,105.

Second, the figures for any given industry refer only to the acreage actually in use by the industry at the time of the survey and not to the total number of acres owned or leased. In other words, land held for future use, or not employed in any way in current operations has been excluded in so far as such a distinction could be obtained from respondents.

Land Use by Manufacturing Industries

In 1958 the manufacturing industries of Maricopa County were using approximately 2,456 acres of land. The concrete, clay, gypsum and related products industry was the largest user with around 558 acres. Ranked next was the aircraft equipment group with approximately 500 acres, followed by cottonseed oil mills with about 376 acres. The primary metals and electronic and electrical products industries were next in line with 260 and 177 acres respectively.

By 1975-80, it is significant to note that a considerable change is projected in the relative position of these major manufacturing industries. The electronic and electrical products plants, which in 1958 were using the least amount of land of the five industries mentioned, will need 2,085 acres by 1975-80, the most of any industry. This increase is more than 11 times the acreage used in 1958. It is anticipated that the concrete, clay, gypsum, and related products industry will be utilizing approximately 1,485 acres; aircraft equipment, 645 acres; primary metals, 410 acres; and cottonseed oil mills, 380 acres. Table XVII gives the complete list of major manufacturing industries with their estimated 1958 land use and their projected 1965-70 and 1975-80 land use.

TABLE XVII

LAND USE BY MANUFACTURING INDUSTRIES IN MARICOPA COUNTY,
1958, 1965-70, 1975-80

Industry	Land Use in Acres*		
	1958 Estimated	1965-70 Projected	1975-80 Projected
Meat Products	62	115	160
Dairy Products	70	110	150
Bakery Products	24	35	45
Beverage Products	16	30	45
Cottonseed-Oil Mills	376	380	380
Miscellaneous Food Industries	105	75	90
Women's Apparel	5	30	40
Other Apparel & Fab. Textile Prod.	21	25	30
Millwork & Other Wood Prod.	47	95	125
Household Furniture	10	20	25
Paperboard Containers & Paper Prod.	5	25	35
Publishing, With or Without Printing	3	5	5
Commercial Printing	7	10	15
Service Ind. for the Printing Trade	5	5	10
Chem. & Allied Prod. (Exc. Ag. Chem.)	9	25	35
Agricultural Chemicals	43	50	60
Concrete, Clay, Gypsum & Rel. Prod.	558	1,150	1,485
Primary Metals	260	350	410
Fab. Struct. Metal Prod. (Exc. Bldg. Spec.)	56	130	190
Fabricated Metal Bldg. Specialties	6	10	15
Coating, Plating, & Allied Services	4	10	15
Machine & Tool & Die Shops	24	80	110
Cooling, Ref. & Air-Moving Equip.	35	70	85
Other Non-Electrical Machinery	14	20	25
Electronic and Electrical Products	177	1,355	2,085
Aircraft Equipment	500	530	645
Misc. Transportation Equipment	4	5	10
Professional Equip. & Related Prod.	2	5	10
Miscellaneous Manufacturing	8	10	10
Allowance for New Industries		255	760
Total Manufacturing	2,456	5,015	7,105

*1958 - rounded to nearest acre; 1965-70, 1975-80 - rounded to nearest 5 acres. The 1958 estimates include firms using land at rates not considered typical of future use; see page 95.

Source: Estimates and projections prepared by Western Business Consultants, Inc.

New Industry Land Use

By 1975-80 it is anticipated that 18,000 persons will be employed by industries that did not exist in Maricopa County in 1958. How much land will these new industries be utilizing? To arrive at an estimate of future land use by these new and unknown industries, several assumptions were made.

First, it was assumed that the shift pattern in these future industries would be approximately the same as it was in the 1958 manufacturing industries; that is, 80 per cent of total employment on the major shift. This assumption means that 4,800 of the 6,000 employees projected for the new industries would be on the major shift in 1965-70; and 14,400 in 1975-80.

Second, it was assumed that the new industries would use 2300 square feet of land area per employee. This ratio was selected because the new industries are expected to have land requirements similar to those of the local electronic and electrical industry. The typical ratio for these plants is 2300 square feet of land area per employee, or approximately 19 employees per acre. This ratio is very much in line with that used elsewhere to project future industrial land use.

For example, a panel of the Urban Land Institute in the report Industrial Development Study of Alameda County, California suggested that 20 employees per acre would be a reasonable density figure to use for the types of industries that were most likely to settle in Alameda County.^{1/} The panel also suggested that the industries most likely to settle in Alameda County would be:

" ... Final assembly or processing plants for metal products, synthetics, plastics, foods, textiles, etc. Manufacturers of electronic devices, instruments, small appliances, etc. Metal stamping, furniture, construction materials, etc. Research laboratories." ^{2/}

^{1/} Industrial Development Study of Alameda County, California, by a Panel of the Urban Land Institute, Alameda County Board of Supervisors, Alameda County, California, 1957, p. 11.

^{2/} Ibid.

FIGURE 8

LAND USE IN MANUFACTURING
1958, 1965-70, 1975-80

Industry

Food

Concrete
& Clay

Aircraft

Primary
Metals

Electrical

Machinery Except
Electrical

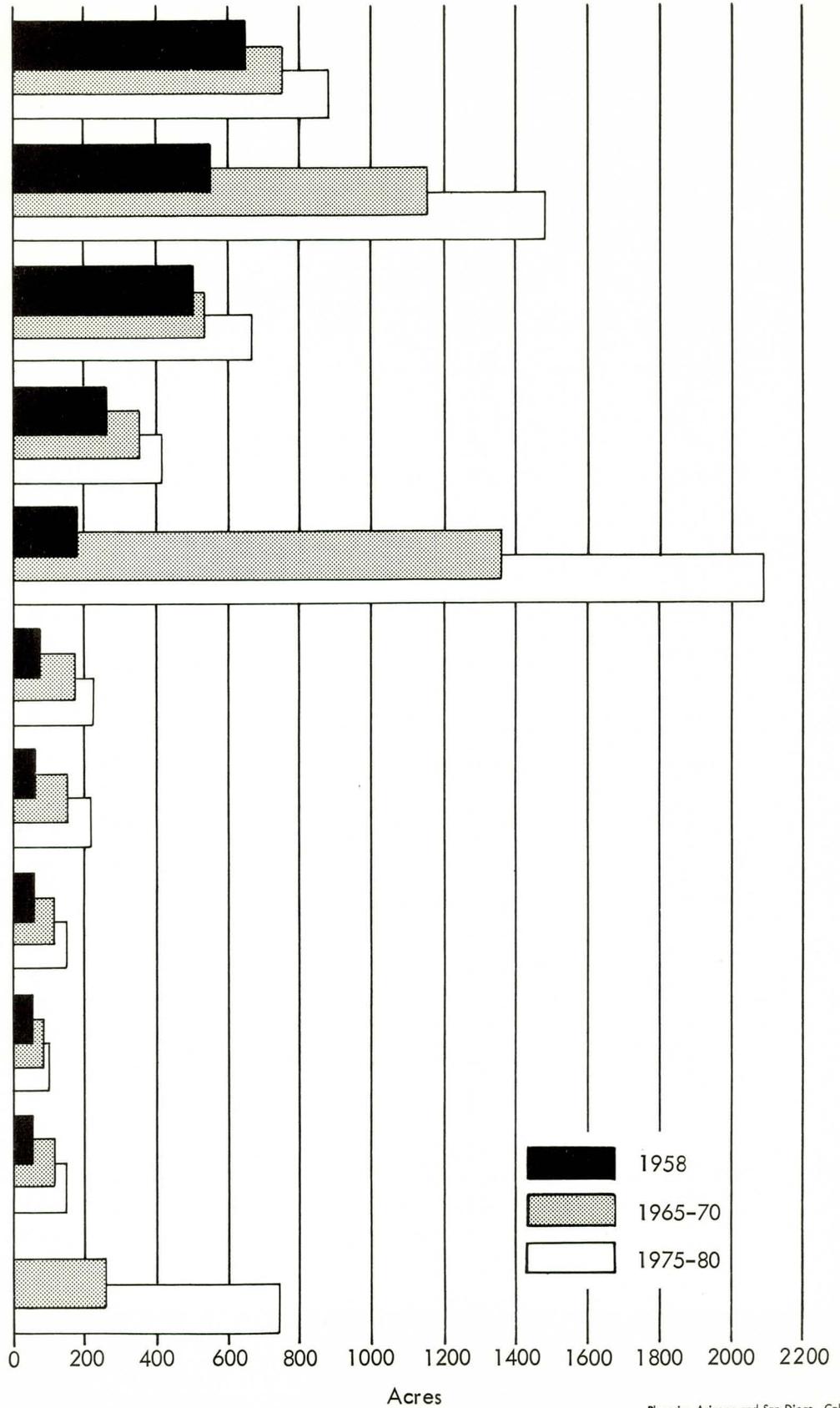
Fabricated
Metal Products

Lumber
Wood

Chemical

All
Other

New Industries



Typical Land Use Ratios

Ratios of land used per employee were developed for the purpose of estimating the future land requirements of manufacturing industries based upon employment projections. As the first step, the ratio for each manufacturer in a group was computed and ranked with other manufacturers in that group. After considering each establishment, that figure which seemed most typical for the group was chosen.

These individual ratios from which the typical figure was selected were adjusted in two ways. First, they were adjusted to represent only the major shift employment. That is, if the particular manufacturer had two shifts, the ratio was based not upon his total employment but upon his major or largest shift employment. Second, the ratios were adjusted to show any changes that the manufacturers, themselves, feel might come about in the future. For example, if a manufacturer indicated that his ratio of total land area utilized per employee would be reduced in the future, consideration was given to this change in selecting the typical ratio for that group. This procedure was followed in analyzing the future information given by each firm and, although certain firms indicated that there would be some change in their land use ratios in the future, not enough firms within any one group indicated enough of a change to affect significantly that group's typical ratio.

Table XVIII gives the typical ratios for manufacturing industries. The classification of the manufacturing industries has been expanded slightly in the presentation of the typical ratios. For example, in the bakery-products group a distinct difference was seen between those firms having fewer than 20 employees and those firms having 20 or more employees. Consequently, a ratio is presented for both of these sub-groups.

The most common basis, however, for sub-group ratios was not size of firm, but product. For example, the concrete, clay, gypsum and related products group was readily divisible into two sub-groups on the basis of product,

TABLE XVIII
TYPICAL LAND USE RATIOS FOR
MANUFACTURING INDUSTRIES IN MARICOPA COUNTY, 1958

Industry	Typical Ratio Square Feet Per Major Shift Employee
Meat Products	6,000
Dairy Products	2,100
Bakery Products	
Firms with less than 20 employees	300
Firms with 20 or more employees	1,600
Beverage Products	1,500
Cottonseed-Oil Mills	50,000
Miscellaneous Food Industries	3,000
Women's Apparel	500
Other Apparel & Fab. Textile Prod.	700
Millwork & Other Wood Prod.	
Cabinet shops	900
Millwork plants	4,400
Household Furniture	1,500
Paperboard Containers & Paper Prod.	2,500
Publishing, With or Without Printing	100
Commercial Printing	600
Service Ind. for the Printing Trade	850
Chem. & Allied Prod. (Exc. Ag. Chem.)	
Chemicals except industrial gases	1,100
Industrial gases	3,600
Agricultural Chemicals	13,000
Concrete, Clay, Gypsum & Rel. Prod.	
Pottery & related products	6,600
Block, pipe & related construction materials	33,400
Primary Metals	7,500
Fab. Struct. Metal Prod. (Exc. Bldg. Spec.)	2,200
Fabricated Metal Bldg. Specialties	1,100
Coating, Plating, & Allied Services	1,400
Machine & Tool & Die Shops	1,400
Cooling, Ref. & Air-Moving Equip.	1,900
Other Non-Electrical Machinery	2,900
Electronic and Electrical Products	2,300
Aircraft Equipment	
Firms using large areas for testing or safety purposes	40,000
Firms not using large areas for testing or safety purposes	1,400
Misc. Transportation Equipment	1,500
Professional Equip. & Related Products	500
Miscellaneous Manufacturing	1,000

Source: Information derived from Industrial Land Use and Employment Survey which was conducted by Western Business Consultants, Inc. for this study.

the pottery and related products' sub-group having a much smaller ratio than the block, pipe, and related construction materials' sub-group.

Employee Density by Industry

Another way of expressing the land area requirements of industry is to speak of employee density, which is generally expressed in terms of employee per acre. For Maricopa County manufacturing, the employee density ranges from approximately one employee per acre for cottonseed-oil mills, block, pipe, and related-products plants, and the segment of the aircraft equipment industry that uses large areas for testing or safety purposes, to over 400 employees per acre in the case of publishing, with or without printing. Most of the process industries and those manufacturing heavy or bulky products have an employee density of under 25 per acre. Nearly all the so-called "light" manufacturing industries have an employee density above 25. The classification of all manufacturing industries in Maricopa County is given in Table XIX.

This classification of manufacturing industries by employee density agrees in most part with Dorothy A. Muncy's classification of 220 modern manufacturing plants. Several variations occur, however, and a major exception for light industry is the manufacture of electronic and electrical products for which the employee ratio is under 25. The plants in the electric-electronic category that were analyzed by Dr. Muncy had higher densities, falling either within the class of 25-49 or 50-74 employees per acre.^{3/} Doubtless the emphasis upon a landscaped setting, which characterizes local plants in the electronic field, accounts for their lower employee density.

Another comparison may be made with the report of the Philadelphia City Planning Commission on Industrial Land Use Plans. In this report employee densities

^{3/} Dorothy A. Muncy, "Space for Industry An Analysis of Site and Location Requirements." Urban Land Institute Technical Bulletin No. 23, (Washington, D.C.: Urban Land Institute, 1954), p. 16.

TABLE XIX

CLASSIFICATION OF MANUFACTURING INDUSTRIES BY EMPLOYEE DENSITY, MARICOPA COUNTY, 1958

Employees Per Acre							
Under 5	5 - 9	10 - 14	15 - 24	25 - 49	50 - 74	75 - 99	Over 100
Concrete, Block, Pipe, etc. Cottonseed Mills Agri. Chem. Aircraft Equipment (using large test or safety areas)	Meat Prod. Primary Metals Pottery & Related Prod.	Millwork Plants Industrial Gases	Paper Containers, etc. Electronic & Elect. Prod. Misc. Food Prod. Fab. Struct. Metal Prod. (Exc. Bldg. Spec.) Other Non- Elect. Machinery Dairy Prod. Cooling, Ref. & Air Moving Equip.	Bev. Prod. Misc. Mfg. Mach. & Tool & Die Shops Aircraft Equip. (not using large test or safety areas) Household Furniture Bakery Prod. (20 or more empl.) Fab. Metal Bldg. Spec. Chemicals (Exc. Ag. Chem. & Ind. Gases) Cabinet Shops Coating, Plat. etc. Misc. Trans. Equip.	Other Apparel & Fab. Tex. Prod. Com. Printing Serv. Ind. for the Print. Trade	Prof. Equip. & Rel. Prod. Women's Apparel	Pub. With or Without Print. Bakery Prod. (Less than 20 empl.)

Source: Information derived from Industrial Land Use and Employment Survey, which was conducted by Western Business Consultants, Inc. for this study.

were combined into three broad classifications: intensive manufacturing with 50 or more workers per gross acre; intermediate manufacturing with an average of 10 workers per gross acre; and extensive manufacturing with 6 or less workers per gross acre.^{4/} Intensive manufacturing is characterized by multi-storied factory and loft buildings that are generally used by light industry. Historically, this group is typified by the garment industry. It is interesting, however, that the fabricated textile products industry in Maricopa County, even though mostly housed in single-story buildings, still falls in the density class above 50 employees per acre.

Intermediate manufacturing is characterized in the Philadelphia area by relatively large plants that utilize modern production methods. Some of the industries in Maricopa County that fall into this range of employee density do not have large plants. Other industries, however, do meet these qualifications. For example, the electronic and electrical products group in Maricopa County includes relatively large plants, utilizing modern production techniques.

Extensive manufacturing is characterized by industries which normally require large amounts of space per employee, such as heavy chemicals, primary metals, brickyards, and cement works. As noted in Table XIX these same types of industries have similar employee densities in Maricopa County.

Land Area Used for Buildings

The percentage of site area used for buildings varies greatly among manufacturing establishments in Maricopa County. Some of the variation is explained by differences in process and other technical factors causing differences in requirements among industries. But even within the same industry substantial differences

^{4/} Herbert D. Smith, "How Much Industrial Zoning for Metropolitan Indianapolis?" A Planning Report of the Metropolitan Planning Department of Marion County, Indiana, (Indianapolis, Indiana: 1957), pp. 7-8, citing Industrial Land Use Plan, Philadelphia City Planning Commission, (Philadelphia: 1950), p. 7.

TABLE XX
 BUILDING AREA AS A PER CENT OF SITE AREA, MANUFACTURING
 INDUSTRIES, MARICOPA COUNTY, 1958

Industry	Number of Establishments Reporting Building and Site Areas By Per Cent of Area Used For Buildings					
	1-20	21-40	41-60	61-80	81-100	Total
Meat Products	2	1				3
Dairy Products	4	1	1	2		8
Bakery Products						
Firms with less than 20 employees			1		1	2
Firms with 20 or more employees		1				1
Beverage Products		1	4	1		6
Cottonseed Oil Mills	2					2
Miscellaneous Food Industries	2	2	3		1	8
Women's Apparel		3	1		2	6
Other Apparel & Fab. Textile Prod.		2	2		2	6
Millwork & Other Wood Prod. (Exc. Furn.)						
Cabinet Shops		2	4	4		10
Millwork Plants		2	2			4
Household Furniture	1	1	2	2	2	8
Paperboard Containers & Paper Products				1	1	2
Publishing, With or Without Printing			1	2	1	4
Commercial Printing		4	2	5	4	15
Service Ind. for the Printing Trade	1			4		5
Chem. & Allied Prod. (Exc. Ag. Chem.)						
Chem. Exc. Ind. Gases	3	1	2			6
Ind. Gases	2					2
Agricultural Chemicals	3			2	1	6
Concrete, Clay, Gypsum & Rel. Prod.						
Pottery & Rel. Prod.	3	1	2	1	1	8
Block, Pipe, & Rel. Const. Materials	7	1				8

Table XX
 Building Area As A Per Cent Of Site Area, Manufacturing Industries,
 Maricopa County, 1958 - Continued

Industry	Number of Establishments Reporting Building and Site Areas By Per Cent of Area Used For Buildings					
	1-20	21-40	41-60	61-80	81-100	Total
Primary Metals	5	2				7
Fab. Struct. Metal Prod. (Exc. Bldg. Spec.)	2	4	1			7
Fab. Metal Bldg. Spec.	1	2	3	1	4	11
Coating, Plating, & Allied Services	2		2	1	1	6
Machine & Tool & Die Shops	8	15	1	3	1	28
Cooling, Ref. & Air- Moving Equip.		2	2			4
Other Non-Electrical Mach- inery	2	6	1		2	11
Electronic & Elect. Prod.	6	4	2	1	1	14
Aircraft Equipment						
Those firms using large areas for testing or safety purposes	1					1
Those firms not using large areas for testing or safety purposes		2	1			3
Misc. Transportation Equip.	2			2	1	5
Professional Equip. & Related Products	1	1				2
Misc. Manufacturing	3	5	2	3	3	16
Total	<u>63</u>	<u>66</u>	<u>42</u>	<u>35</u>	<u>29</u>	<u>235</u>

Source: Information derived from Industrial Land Use and Employment Survey, which was conducted by Western Business Consultants, Inc. for this study. Of all manufacturers interviewed, approximately 84 per cent answered the question concerning building area.

existed in 1958 as is shown by Table XX. This table is based upon the reports of establishments which provided information on both total site area and site area covered by buildings.

More than half of the establishments providing information on both site and building area reported that they were using less than 40 per cent of their site areas for buildings. In contrast, only 12 per cent of the respondents used 80 to 100 per cent of their site area for buildings.

The segregation of the plants in the same general industry by some product characteristics helps in some cases to explain the differences in proportion of site area used for buildings. For example, if the concrete and related products industry is divided into plants manufacturing the heavier construction materials, such as block and pipe, as opposed to pottery and lighter products, it is found that all of the plants making the heavier products use less than 40 per cent of their site area for buildings while 3 of the 7 plants in the pottery and lighter products group use more than 40 per cent of their site area for buildings.

It is interesting also to contrast the low building-to-site ratios of the concrete construction products group with the high building-to-site ratios of commercial printing. This difference is at least partially explained by differences in kind of product. The construction materials group produces items the majority of which can be stored outside without being harmed by the weather. Such storage, however, is not required for space reasons or is even possible in the case of commercial printing. Other product characteristics also cause differences in site ratios. Size and shape of the product and type of process used are all factors that influence building-to-site ratios in any specific industry.

In several industries there is some relationship between size of plant (measured by the number of persons employed) and building-to-site ratios. In the two apparel groups, women's apparel and other apparel and fabricated

textile products, the large plants are using a small portion of their total land area for buildings while the small plants are using a large portion of their total land area for buildings. Several of the small firms use between 90 and 100 per cent of their total site area for buildings. In the household furniture industry, however, the relationship is exactly the reverse; the smallest plants use the least amount of their sites for buildings while the larger plants use the greater portion of their site area for buildings.

In general, it is felt that factors peculiar to each establishment are responsible for the wide variation of building-to-site ratios within many of the local industries. These may include age of buildings, location, price of land at time of purchase, and personal wishes of management. Some of the low ratios of building-to-site may be those firms that included land in site area which is being held for future building expansion but which is nevertheless being put to some temporary use in the meantime. On the other hand, some of the high ratios may be those of firms that failed to anticipate their growth when acquiring present sites and so have had to skimp on parking or some other use in order to expand building.

Ratio of Floor Area to Building Area

More than 90 per cent of all manufacturing firms that responded to the question concerning floor area indicated that in 1958 they were using single-story facilities. The firms using multi-story buildings were spread out fairly evenly among all the industries with 12 of the 29 manufacturing industries having one or more multi-storied plants and no one industry having a preponderance of these plants.

Several other comments can be made concerning the floor to building ratios. Three-fourths of those plants reporting the use of multi-story buildings have more than 20 employees with almost 35 per cent of these firms having more than 250 employees. Size of plant, therefore, has some relation to the use of multi-storied facilities.

It is also interesting to note that almost 70 per cent of all those manufacturers that use multi-story buildings are within approximately four miles of downtown Phoenix. This fact gives some substance to the thought that, among other things, land values exert an influence upon type of structure built. It is equally interesting, however, to note that 25 per cent of all manufacturing multi-storied plants are located at a distance greater than 8 miles from downtown Phoenix. These plants are all relatively new structures and certain factors, other than land values, which are peculiar to each of these plants, are no doubt responsible for these plants being multi-storied.

Parking Area

The land area used for parking was analyzed on the basis of the number of square feet of parking area per day-shift employee for each of the reporting plants. These ratios ranged from less than 50 square feet per employee to over 3,000 square feet per employee. Several generalizations can be made concerning these parking-area ratios.

In the first place, there is a relationship between location and amount of parking area per employee. Table XXI, which gives the distribution of the plants by parking ratios and median ratios for each classification, shows that firms within 2 miles of downtown Phoenix have relatively smaller amounts of parking space per employee than do plants more than 2 miles from downtown Phoenix. This relationship is indicated by the smaller median ratios of the firms within 2 miles of the downtown. The majority of the plants located within 2 miles of downtown Phoenix have parking areas ranging from less than 50 to about 300 square feet per employee while most of the plants over 2 miles from downtown Phoenix have parking areas from 300 square feet per employee and up with the amount of space per employee increasing as the distance from downtown increases. There are several reasons for this relationship.

TABLE XXI

PARKING RATIOS OF THE MANUFACTURING INDUSTRIES,
MARICOPA COUNTY, 1958

Industry	Number of Establishments By Distance From Downtown And Parking Ratios				Total Report- ing
	Under 2 Miles		More Than 2 Miles		
	Under 300 sq. ft./ emp.	Over 300 sq. ft./ emp.	Under 300 sq. ft./ emp.	Over 300 sq. ft./ emp.	
Meat Products	0	0	2	2	4
Dairy Products	1	2	1	2	6
Bakery Products	0	1	1	1	3
Beverage Products	2	0	0	2	4
Cottonseed Oil Mills	0	0	0	1	1
Misc. Food Industries	2	1	0	2	5
Women's Apparel	0	0	4	1	5
Other Apparel & Fab. Textile Prod.	0	0	2	1	3
Millwork & Other Wood Prod. (Exc. Furn.)	1	1	6	2	10
Household Furn.	1	0	0	3	4
Paperboard Containers & Paper Prod.	0	1	0	1	2
Publishing, With or Without Printing	1	0	1	0	2
Commercial Printing	5	0	2	2	9
Service Ind. for the Printing Trade	2	3	0	0	5
Chem. & Allied Prod. (Exc. Ag. Chem.)	1	2	1	2	6
Agricultural Chemicals	0	0	0	1	1
Concrete, Clay, Gypsum & Related Prod.	0	1	4	9	14
Primary Metals	0	1	2	3	6
Fab. Struct. Metal Prod. (Exc. Bldg. Spec.)	1	0	2	0	3
Fab. Metal Bldg. Specialties	1	0	2	3	6
Coating, Plating & Allied Serv.	0	1	1	2	4
Machine & Tool & Die Shops	2	1	7	13	23
Cooling, Ref. & Air-Mov. Equip.	0	0	1	2	3
Other Non-Elect. Machinery	1	0	2	4	7
Electronic & Elect. Products	0	1	4	6	11
Aircraft Equipment	0	0	1	3	4
Misc. Transportation Equip.	1	0	1	1	3
Prof. Equip. & Related Prod.	0	1	0	1	2
Misc. Manufacturing	1	0	5	4	10
Total	23	17	52	74	166
Median Ratio, All Industries	132	526	148	786	

Source: Information derived from Industrial Land Use and Employment Survey which was conducted by Western Business Consultants, Inc. for this study.

It is possible that plants near the business center have less parking area per employee because the plant is better served by public transportation. It is also possible that a certain amount of on-street parking is available for those plants located near the business center. Furthermore, many of the plants nearer the downtown area were established before parking became a major problem.

Another possible explanation for variation in the parking ratio is the use to which the parking areas are put. For example, is parking provided only for employees, for employees and company vehicles, or for employees, company vehicles and customers? If the nature of the business is such that space must be provided for company vehicles and customers as well as for employees, then the parking area per employee is going to be greater than if space for only employee parking must be provided. The concrete and related products industry, with a median ratio of about 500 square feet per employee, is an example of an industry which requires a larger amount of space for the parking of company vehicles. The same is true of plants that also perform a retail or wholesale function. If the plant has frequent customers or visitors, then it must provide adequate parking. Thus the number of employees, the amount and type of company transportation that must be provided, and the number and frequency of customers or visitors all have an effect upon the amount of parking.

Some variation can also be explained by considering the efficiency of the parking-area layout which may depend upon the extent to which a plant has land not needed for other purposes at any given time. If, for example, a plant has land reserved for expansion which it presently uses for parking, it is most likely that fewer cars are being parked per acre at this plant than would be the case if permanent parking facilities were provided. Thus, the existence of land not needed for other purposes at present will affect the parking-area ratios.

Landscaping and Outdoor Storage

A special analysis was made of the manufacturing firms that were personally interviewed and that gave information concerning their land use for landscaping and outdoor storage. This information is necessarily limited because the personnel interviewing was restricted to firms having 50 or more employees and also because some of the firms interviewed did not give complete information. Table XXII shows the per cent of landscaping of site area utilized and outdoor storage by selected manufacturing industries.

TABLE XXII
LAND USE FOR LANDSCAPING AND OUTDOOR STORAGE
SELECTED MANUFACTURING INDUSTRIES, MARICOPA COUNTY, 1958

Industry	Per Cent of Site Area	
	Landscaping	Outdoor Storage
Women's Apparel	9	0
Concrete, Clay, Gypsum & Related Products	*	59
Primary Metals	3	21
Fabricated Structural Metal Products, Except Building Specialties	*	46
Electronic & Electrical Products	16	*

* Less than 1 per cent

Source: Information derived from Industrial Land and Employment Survey which was conducted by Western Business Consultants, Inc. for this study.

Age of plant seems to affect the amount of space used for landscaping. Four of the five firms in the electronic and electrical products group and four of the seven firms in women's apparel indicated that they had been in Maricopa County 5 years or less while two of the three firms in the concrete, clay,

gypsum, and related products group have been here more than 5 years and three out of three firms in the fabricated structural metal products (except building supplies) group have been here more than 5 years. Thus, the majority of those firms that have been here 5 years or more have little or no landscaping while the majority of those firms here less than 5 years do have landscaping.

The amount of outdoor storage utilized would seem to be primarily dependent upon whether or not materials or products could be stored outside without being damaged by the weather. Those industries which can store items outside are utilizing large amounts of outdoor storage space; for example the following: concrete, clay, gypsum, and related products; primary metals; and fabricated structural metal products, except building specialties. In contrast, the women's apparel, machine and tool and die shops, and electronic and electrical products industries are using little or no outdoor storage because such storage would be detrimental to either their raw materials or their finished products.

Plants Using Railroad Sidings

Of the 276 plants that answered the question concerning the use of a railroad siding, approximately 25 per cent replied that they were using one or more sidings in 1958. Of those respondents not using a siding in 1958, 21 firms stated that they would use a siding, and 3 said that they could use a siding if one were available. The remainder answered that they would either not use a siding or gave no answer.

Those industries which used sidings in 1958 were primarily those that produced heavy, bulky, or large items or that required large quantities of raw materials. For example, almost one-half of all plants with sidings are in the cottonseed oil mills, miscellaneous food, agricultural chemicals, concrete, clay and gypsum products, primary metals, and paper products

industries. Other industries, such as electronic and electrical products, coating, plating, and allied services, and professional equipment have little or no use for sidings as is evidenced by the fact that only 1 firm out of about 30 in these industries reported using a siding. Thus, the transportation characteristics of heavy or bulky (1) inbound raw materials and (2) outbound finished products are the prime factors in the use of rail sidings.

Plants Having Landing Strips

In 1958 only 4 out of almost 60 firms interviewed having more than 50 employees indicated that they had a private landing strip. Three of those four firms are in the aircraft-equipment industry while the fourth is in the electronic and electrical products group. Of those firms having no landing strip in 1958 all of them answered either in the negative or gave no answer at all for the future.

Land Use By Selected Non-Manufacturing Industries

This section deals with the land use of six non-manufacturing industries that tend to have locational requirements similar to manufacturing: namely - wholesale houses, trucking firms, public warehouses, laundries and dry cleaning plants, contractors engaged in heavy construction with storage yards, and major utilities. In 1958 these six industries are estimated to have been using approximately 2307 acres of land, including both land in industrial and other zones.

Among these six industries, major utilities ranked first in land use with over 1100 acres of the 2307 total. Wholesale trade was second with 465 acres followed by contractors engaged in heavy construction utilizing storage yards with 351 acres and public warehousing with 266 acres. In the case of wholesaling the machinery, supplies, and metals trade lead the list with 152 acres. Next in line is the lumber and construction materials group with 98

acres followed by the miscellaneous wholesale group with 63 acres and the hardware group with 36 acres. The dry goods wholesalers were at the bottom of the list with 5 acres.

By 1980 it is significant to note that little change in the rank of these industries is projected. The major utilities will still be the largest user with about 1400 acres followed closely by wholesale trade with 1350 acres. These industries will be followed by public warehousing with 635 acres and contractors engaged in heavy construction with storage yards having about 605 acres.

Within wholesale trade, the rank remains much as it was in 1958, with the machinery, supplies, and metals trade leading the list with approximately 595 acres, lumber and construction materials second with 240 acres followed by miscellaneous wholesale with 155 acres, and the hardware group and grocery group both with 75 acres. The dry goods wholesalers remain at the bottom of the group with 15 acres. Table XXIII gives the complete list of selected non-manufacturing industries with their estimated 1958 land use and their projected 1965-70 and 1975-80 land use.

TABLE XXIII
 LAND USE BY SELECTED NON-MANUFACTURING INDUSTRIES,
 MARICOPA COUNTY, 1958, 1965-70, 1975-80

Industry	Land Use In Acres*		
	1958 Estimated	1965-70 Projected	1975-80 Projected
Contractors Engaged in Heavy Const. With Storage Yards	351	480	605
Trucking Without Storage	63	205	320
Trucking With Storage	30	60	80
Public Warehousing & Freight Forwarding	266	455	635
Major Utilities	1,108	1,275	1,400
Wholesale Trade	465	935	1,350
Motor Vehicles & Automotive Equip.	25	40	60
Drugs, Chemicals, & Allied Products	23	35	50
Dry Goods, Apparel, & Gen. Merch.	5	10	15
Groceries & Related Products**	33	60	75
Electrical Goods	19	35	45
Hardware, Plmb. & Htg. Equip. & Supp.	36	60	75
Mach., Equip. & Supp.; Metals & Min- erals	152	390	595
Beer, Wine & Distilled Alcoholic Bev.	11	30	40
Lumber & Construction Materials	98	170	240
Miscellaneous	63	105	155
Laundry, Dry Cleaning & Related Services	24	40	60
Total Selected Non-Manufacturing	2,307	3,450	4,450

* 1958 - rounded to nearest acre; 1965-70 & 1975-80 - rounded to nearest 5 acres.

** Wholesale groceries & related products does not include packing sheds & other facilities used in grading and packing farm products. It is difficult to distinguish commercial facilities used for these purposes from facilities at farm sites. It is estimated that commercial facilities used more than 60 acres in 1958.

Source: Estimates and projections prepared by Western Business Consultants, Inc.

Typical Land-Use Ratios

The typical ratios for the selected non-manufacturing industries are presented in Table XXIV. These were computed by following the same procedure used for the manufacturing industries. These ratios represent the 1958 land-use pattern for each industry with adjustments for any changes

TABLE XXIV
TYPICAL LAND USE RATIOS FOR SELECTED
NON-MANUFACTURING INDUSTRIES, MARICOPA COUNTY, 1958

Industry	Typical Ratio Square feet/ Major Shift Employee
Contractors, Engaged in Heavy Const., With Storage Yards	2,100
Trucking, Without Storage	2,500
Trucking, With Storage	2,200
Public Warehousing & Freight Forwarding	12,000
Wholesale Trade:	
Motor Vehicles & Automotive Equip.	1,500
Drugs	400
Chemicals & Allied Products	2,600
Dry Goods, Apparel, & General Merchandise	1,300
Groceries & Related Products	2,000
Electrical Goods	1,400
Hardware, Plmb. & Htg. Equip. & Supplies	2,000
Mach., Equip. & Supplies; Metals & Minerals	2,800
Beer, Wine & Distilled Alcoholic Beverages	1,800
Lumber & Construction Materials	4,000
Miscellaneous	2,300
Laundry, Dry Cleaning & Related Services	600

Source: Information derived from Industrial Land Use and Employment Survey, which was conducted by Western Business Consultants, Inc. for this study.

that the firms in the industry feel might occur between now and 1980. Continuance of the 1958 distribution of employment by shifts has been assumed.

Here again, as in manufacturing, the classification of certain industries has been expanded. For example, the wholesale drugs, chemicals and allied products group has been split into two categories because such a wide variation of ratios existed within the group. Wherever this wide variation occurs, a separate ratio is presented for each sub-group.

Employee Density by Industry

The non-manufacturing industries have also been classified according to employee density or number of employees per acre. The employee densities for the selected non-manufacturing industries in Maricopa County are given in Table XXV and they range from under 5 employees per acre in public warehousing to over 100 employees per acre in wholesale drugs, with the majority of the industries falling within the 15 - 24 employees per acre group.

TABLE XXV
 CLASSIFICATION OF SELECTED NON-MANUFACTURING INDUSTRIES
 BY EMPLOYEE DENSITY

Employees Per Acre						
Under 5	5-9	10-14	15-24	25-49	50-74	75 & Over
Public Ware- housing & Freight Forward- ing	Major Utilities	Whole- sale Lumber & Const. Materials	Trucking With & Without Storage	Whlse. Motor Veh. & Automotive Equip.	Laundry, Dry Clean- ing & Related Services	Wholesale Drugs
			<u>Wholesale:</u> Beer, Wine Etc. Mach., Equip., Supplies, Etc. Hardware, Plmb., Etc. Groc. & Related Prod. Chemi- cals, Etc. Misc. Contrac- tors, Engaged in Heavy Const., with Storage Yds.			

Source: Information derived from Industrial Land Use and Employment Survey, which was conducted by Western Business Consultants, Inc. for this study.

PART VI A
FUTURE OF THE TOURIST INDUSTRY

When this study was planned, the analysis of the outlook for the tourist industry and for mobile home parks were considered as one major phase. It developed in the investigation, however, that a sufficient number of families were becoming permanent residents of mobile homes in Maricopa County to warrant analyzing the prospects for mobile home parks separate from those of the tourist industry. The outlook for mobile home parks is therefore discussed in Part VI B

The study plan included these questions about the future of the tourist industry:

"How important will the tourist trade be in the Phoenix economy of 1980? What kind of facilities will probably be required? Will the winter-visitor business increase at a faster or slower pace than it has been growing?"

Growth Potential Of The Tourist Industry

Prospects for 1980

Sales to tourists in Maricopa County amounted in 1958 to an estimated 165 million dollars or 35 per cent of Arizona's 470 million-dollar tourist industry. Assuming that the population and productivity of the nation continue to rise as predicted by most economists today, the Arizona tourist industry could have a volume of more than 1.1 billion dollars by 1980. Maricopa's share would be approximately 400 million dollars at the 1958 ratio of 35 per cent. In other words, the tourist business of Maricopa County, measured in current dollars, could be nearly 2 1/2 times the 1958 volume by 1980.

TABLE XXVI
TOURISM IN MARICOPA COUNTY - PROJECTED VOLUME THROUGH 1980

	Base Year Estimate 1958	Projections	
		1965-70	1975-80
<u>Dollar Volume (Million)</u>			
Arizona	470 ^{1/}	750	1,100
Maricopa County	165	260	390
<u>Maricopa Employment (including self-employed)</u>			
Hotels and Motels	3,000	4,800	7,100
Retail Trade	4,800	7,700	11,300

Source: Estimates and projections, except as noted, prepared by Western Business Consultants, Inc.

Basis of Estimates

The estimate of the 1958 value of the tourist industry in Arizona is based on recent studies by the Bureau of Business and Public Research at the University of Arizona, which indicate that Arizona's tourist industry has generally been underestimated as a result of insufficient allowance for the per diem expenditure and length of stay of Arizona's tourists. ^{1/}

The Bureau also estimates that Maricopa County's portion of the tourist business is approximately 35%. This percentage is consistent with the County's proportion of hotel-motel employment (in excess of 40 per cent) after allowances have been made for approximately 20 per cent commercial business in the County.

The distribution of tourist dollars to retail, hotel-motel, services and other industries is derived from the estimates of tourist expenditures prepared by the Research Department of the Valley National Bank. ^{2/} The portion of

^{1/} Robert E. Waugh, "A Billion Dollar Tourist Business for Arizona?", Arizona Business and Economic Review, University of Arizona, Tucson, April 1959.

^{2/} Arizona Statistical Review, (October 1959) Valley National Bank, p. 28.

Maricopa County's employment in retail trade which could be attributed to tourists was assumed to be the same as the per cent of sales, or 17 per cent. Hotel-motel employment for 1958 was based upon data from the Employment Security Commission of Arizona plus allowance for self-employed engaged in this business. The projections are based on the assumption that State and County tourist business will increase in proportion to the expansion of the national economy as measured by gross national product.

Several gross national product projections for 1980 are available, ranging from 800 to 1,170 billion dollars, expressed in 1958 dollars. The projection used here assumes a trillion-dollar economy in 1980, based on the Bureau of the Census Series III population estimate and a 2.5 per cent increase per year in output per man-hour. It has also been assumed that Maricopa County will retain its present proportion of the state tourist business and that the distribution of the tourist dollar by kind of business will remain unchanged.

Factors Influencing The Growth Of The Tourist Industry

National Factors

Expansion of tourism nationally is explainable in terms of such factors as increasing population, the rising average real income per family, and the near universality of paid vacations.

Winter tourism in central and southern Arizona is affected additionally by: (1) the trend toward longer vacations; (2) the increasing popularity of winter vacations - not just among the wealthy, but also among families of more modest means; (3) the increased availability and safety of air travel; (4) weather conditions in other winter resort areas; and (5) the rise in the proportion of the population most likely to take a winter vacation - those over fifty years of age who have no school age children to tie them down.

In considering the future of the local tourist industry, it is also of interest to note the areas from which winter tourists are drawn. Seven states - Illinois, Iowa, Michigan and Minnesota in the North Central-Midwest region; and, California, Colorado and Montana in the West have accounted for almost 50 per cent of the winter visitors to Central and Southern Arizona. ^{3/}

The fact that substantial numbers of winter vacationers have been attracted from industrial states bordering the Great Lakes suggests that even greater numbers can be expected in the future because this industrial heart of the nation will surely continue to expand with the national economy, especially in view of the new stimulus to growth which will be given by the St. Lawrence Seaway. Furthermore, it is probable that we have yet to feel the full impact of what is still but a growing realization in the severe winter states of the North Central and Midwest regions, that Arizona offers an attractive alternative to Florida for a winter vacation.

It is also significant for the future growth of tourism in the state that Arizona is drawing an appreciable number of winter tourists from the western states and particularly from California. Except for the desert in Southern California and Southern Nevada, Arizona offers the nearest opportunity, in the Continental United States, for the large population centers of the Pacific coast to enjoy a winter vacation. Furthermore, these Pacific Coast centers will probably experience a larger growth than almost any other urban area in the United States during the next 10 to 20 years. The U. S. Bureau of the Census has projected a greater growth for the Pacific Coast between 1960 and 1970 than for any other geographic division - an increase of approximately 6,000,000 persons for the Pacific Coast States as compared with

^{3/} Report on Winter and Summer Visitors in Arizona, Arizona Development Board, 1955.

the next largest increase of 5,800,000 for the East North Central States, the other major market for the tourist industry of Central and Southern Arizona. ^{4/}

Local Factors

The continued growth of Maricopa County will doubtless have an impact upon tourism. For some visitors the industrial development of the Phoenix Urban Area, with attendant population increases, may make the area less attractive for a winter vacation. Resorts in the Phoenix area, for example, could lose their appeal to visitors who want more exclusive facilities, and create demand for luxury accommodations farther removed from population centers in places such as Cave Creek or the Superstition Mountains. Climate will be here regardless of industrialization, but less industrialized communities, such as Tucson or Yuma, could become relatively more important.

On the other hand, dust has been a major source of irritation to some winter visitors. ^{5/} This deterrent should be much less of a problem as agriculture in the metropolitan area gives way to urbanization. However, urbanization, itself, creates new irritations for the tourist, as mentioned earlier, that could offset the alleviation of the dust problem. Nevertheless, a substantial segment of the winter-tourist market has been made up of families in the middle income group, many of them from farms and ranches, for whom the city is an added attraction. ^{5/} For these people, increasing urbanization may well enhance the appeal of the area.

^{4/} Based on Series II Projection in "Illustrative Projections of the Population, by States, 1960, 1965, and 1970," Current Population Reports, Series P-25, No. 160, August 1957, U. S. Bureau of the Census.

^{5/} Arizona Development Board, op. cit.

Factors Affecting Growth And Location Of Accommodations

If the tourist trade of Maricopa County does more than double between 1958 and 1975-80, as projected in Table XXVI, a substantial increase in accommodations will be required. It is estimated that the accommodations now provided within the County by hotels, motels, resorts, and guest ranches total more than 12,000 rooms or units. In addition, a varying number of tourists are accommodated in apartments, lodging and rooming houses, guest houses on residential property, and in private homes. The qualification "varying number" is used because the availability of these accommodations in the winter season depends upon the extent to which they may have been leased by year-around tenants.

Assuming that the tourist trade of Maricopa County develops as projected, it is probable that the number of all types of facilities will be increased. At least four different trends may accompany this growth that would have special significance for planning: (1) added impetus to the building of garden-type apartments designed to attract both winter tourists and year-around tenants; (2) increased activity by residential property owners in older sections of Phoenix to provide rental housing within limits permitted by zoning; (3) development of guest ranches and other resort facilities in those parts of the County that have scenic attractions and that are beyond at least the immediate range of urban growth; and (4) some shift in hotel-motel operations under the impact of the interstate highway system.

The new highway system may affect the location of some motels and the class of trade to which others cater. In considering these effects, a distinction should be made between "travelers" and "tourists" or "visitors." Summer drivers just "passing through" want facilities near highways; winter visitors would doubtless prefer more seclusion. Motels catering to both groups cannot provide maximum satisfaction to both. Developers in the industry, however,

have tended to favor highway locations, as is evident by the build-up of facilities along Apache Boulevard, East and West Van Buren and Grand Avenue.

Certainly, planners must anticipate development near the new interstate routes of some service facilities for through-traffic, but connecting roads between the interstate system and present highways will make present accommodations available for overnights and could well increase their attractiveness to the winter visitors. The reduction of trans-Phoenix traffic on the present highway could cause some motels now located on streets such as Van Buren to re-establish elsewhere and induce other enterprises to develop facilities that cater primarily to winter tourism. In this manner more cohesive visitor-oriented areas could evolve.

PART VI B
THE OUTLOOK FOR MOBILE HOMES

The study plan provided for the following analysis of the future of mobile homes in Maricopa County:

"Trailers have become fixed, permanent homes for many families in the Salt River Valley. Is this style of living likely to become more popular in the Phoenix Area? At what rate can the use of land for trailer parks be expected to grow?

"The probable demand for permanent trailer homes will be evaluated by identifying the more important factors now influencing the demand for such homes in the Phoenix area, and weighing the probable strength of these factors in the future. Identification of the factors now stimulating the trailer market will include interviews with selected trailer dealers and trailer-park operators."

Even during initial field work it became clear that the term "trailer" was no longer an appropriate name for the class of housing under study. Because of trade usage the term "mobile home" was adopted but not without some reservation as to its general applicability in view of the somewhat permanent placement of many mobile homes.

The Mobile Home Population of Maricopa County by 1980

Maricopa County can expect a minimum mobile home population of 70,000 persons by 1975-1980, and a potential mobile home population of 140,000. The realization of the potential figure depends primarily on the extent and quality of new park construction, which in part will be determined by public policy regulating mobile homes and parks and the availability of favorable financing for parks. Table XXVII outlines the implications of these projections for 1965-1970 and 1975-1980 in terms of homes, spaces, parks and acreage requirements.

TABLE XXVII
PROJECTIONS OF THE MOBILE HOME POPULATION
OF MARICOPA COUNTY

Item	1959 Survey Estimate	Projections			
		1965-1970		1975-1980	
		Min- imum	Poten- tial	Min- imum	Poten- tial
Total Maricopa County Population	637,000	1,000,000		1,400,000	
Mobile Home Population	22,000	40,000	60,000	70,000	140,000
Per Cent of Maricopa Population	3.5	4.0	6.0	5.0	10.0
Mobile Homes	9,800	18,000	27,000	31,000	64,000
Persons Per Mobile Home	2.2	2.2	2.2	2.2	2.2
Spaces	11,700	20,000	30,000	35,000	70,000
Per Cent Occupancy	84	90	90	90	90
Parks	310	400	520	550	1,000
Spaces Per Park	38	50	58	64	70
Acres Utilized	880	1,700	2,900	3,200	6,700
Spaces Per Acre	13	12	11	11	10

Source: Estimates and projections prepared by Western Business Consultants, Inc. The 1958 estimates are based upon a special survey of mobile home parks made for this study.

The requirements for parks and land assume that new parks will average 75 spaces per park (average of 11 western states) and run 10 spaces per acre. Operators of present parks have stated that they can add 5300 spaces on the 512 acres presently owned or leased but not used. It has been assumed that half of these additions will have been made by 1965-1970 and the rest by 1975-1980.

The potential mobile home population which might be conceivably attained in Maricopa County by 1980 is based on a study of national trends in which the conclusion was reached that 10 per cent of the population might be living in mobile homes by 1970.^{1/} This ratio would imply an unrealistic growth for Phoenix by 1970 in view of the present 3.5 ratio, but it could be realized by 1980. The minimum is based on a slow rise in the ratio to 5 per cent in 1975-80 or one-half the predicted national figure. The average winter occupancy rate of 90 per cent, (determined from the survey) was assumed for projecting space requirements. The 84 per cent occupancy rate in Table XXVII reflects conditions at the particular time of the survey in March, 1959.

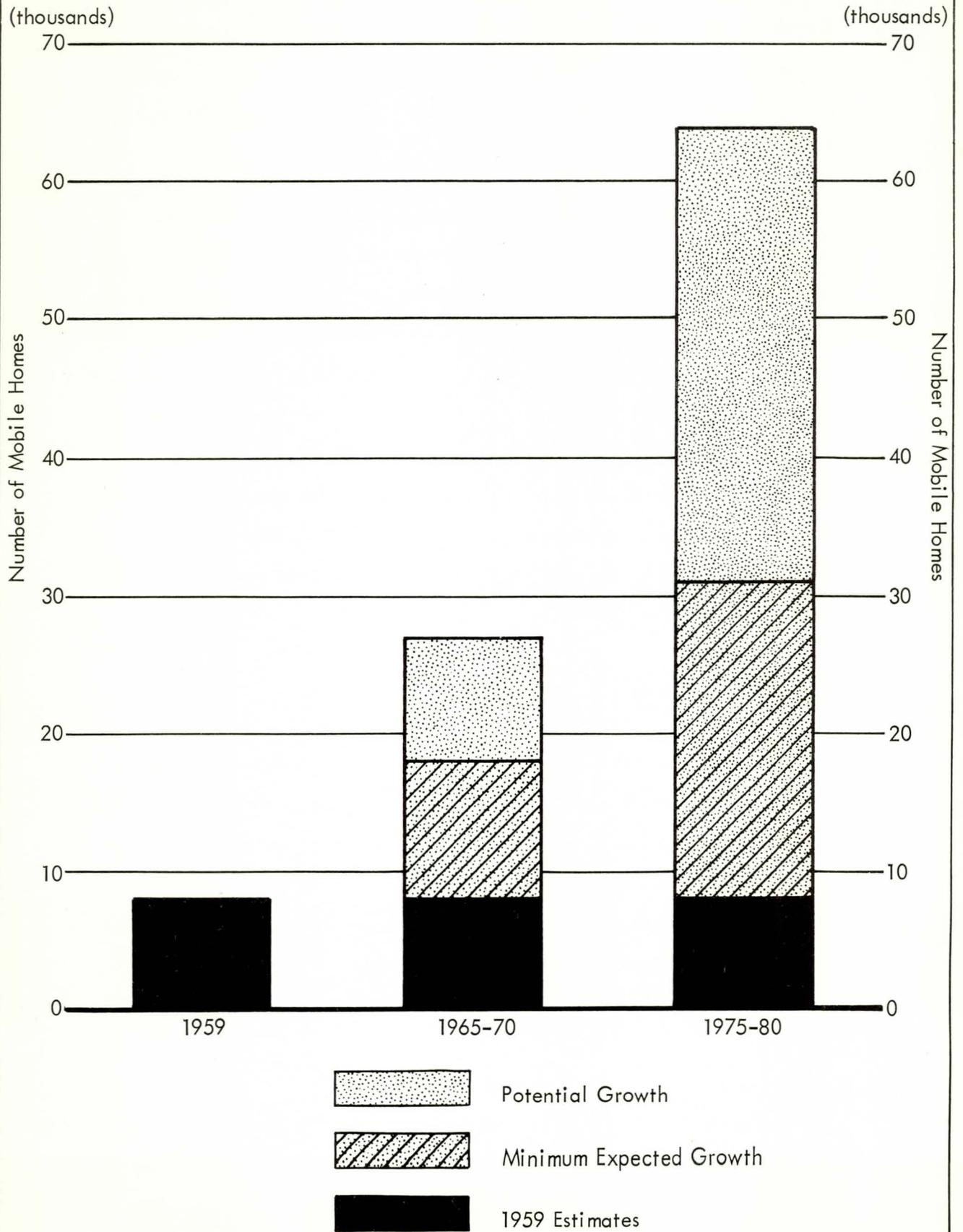
Survey of Mobile Home Parks in Maricopa County

In order to secure comprehensive information regarding mobile home parks and residents, a questionnaire was mailed by Western Business Consultants to the operators of the 310 parks in Maricopa County, of whom 52 per cent responded. Based upon this response and information from park directories and other sources the survey results were expanded to cover all parks within the County. A summary follows.

^{1/} "West's Third Largest City", a booklet issued by the Trailer Coach Association.

FIGURE 9

MOBILE HOMES IN MARICOPA COUNTY
1959, 1965-70, 1975-80



The Mobile Home Parks

Spaces. The 310 mobile home parks in Maricopa County contain approximately 11,700 spaces - or an average of about 38 spaces per park. This figure is considerably below the 95-space average reported for Florida and the 75-space average that prevails in the 11 western states.

Acreage and Rental. Parks utilize an estimated 880 acres. While spaces rent for an average of \$21 per month, the range of rentals is \$12 to \$50 per month.

Occupancy Rate. At the time of the survey in March 1959, the mobile home parks of Maricopa County had 11,700 spaces available, of which approximately 9,770 were in use - an occupancy rate of 84 per cent. On an average the occupancy rate for the six months, November through April, is 90 per cent; and, for May through October, 63 per cent.

When the parks are classified according to quality, as evidenced by the price charged for space rental, significant variation in occupancy rate is clearly evident. The better parks are more fully occupied.

TABLE XXVIII
PARK OCCUPANCY BY RENTAL CHARGE, MARICOPA COUNTY,
MARCH 1959

Rental Charge Per Month	Per Cent of Spaces Occupied	
	Nov.-April	May - Oct.
Under \$15	85	56
\$15 - \$19	86	56
\$20 - \$24	88	58
\$25 - \$29	92	69
\$30 & Over	97	71
Average for all parks	90	63

Source: Survey by Western Business Consultants, Inc.

Age of Mobile Homes. As the following table indicates, two out of every five mobile homes in the County were less than three years old, and one out of every four was more than five years old.

TABLE XXIX
AGE DISTRIBUTION OF MOBILE HOMES, MARICOPA COUNTY,
MARCH, 1959

Age	Per Cent
Under 1 yr.	15
1 - 2 yrs.	24
3 - 5 yrs.	35
Over 5 yrs.	26
Total	100

Source: Survey by Western Business Consultants, Inc.

Almost 40 per cent of the parks maintain mobile homes for rent but on a county-wide basis they average little more than one mobile home per park.

The Mobile Home Families

Number. Total mobile home population at the time of the survey was estimated to be 22,000, or about 3.5 per cent of the estimated county population. The average family contained 2.2 persons, which is a smaller average than the 2.4 reported for the 11 western states and the 2.9 estimated national average, but larger than the 2.07 reported for Florida.

Children. Of the total mobile home population of 22,000, 15.6 per cent or 3,414 were children - an average of 0.35 children per family. Although the average number of children per home is small, it is significant that a rather high proportion of the parks - 4 out of 5 - accept children.

Age Distribution. Approximately 40 per cent of the mobile home population consists of adults over 50 years of age and about half of these are over 65.

TABLE XXX
AGE DISTRIBUTION OF MOBILE HOME DWELLERS, MARICOPA COUNTY,
MARCH 1959

Age	Per Cent of Population
<u>Children</u>	
Under School Age	6.1
School Age	<u>9.5</u>
Total Children	15.6
<u>Adults</u>	
Under 35	17.4
36 - 50	26.8
51 - 65	20.6
Over 65	<u>19.6</u>
Total Adults	<u>84.4</u>
All Ages	100.0

Source: Survey by Western Business Consultants, Inc.

Employment. Over 45 per cent of the heads of the mobile home families living in Maricopa County were reported employed.

TABLE XXXI
 DISTRIBUTION OF HEADS OF MOBILE HOME FAMILIES BY EMPLOYMENT
 STATUS, MARICOPA COUNTY, MARCH 1959

Employment Status	Per Cent of Total
Employed	46.9
Winter Vacationers	24.3
Retired Residents	23.8
Armed Services	0.9
All Other	<u>4.1</u>
Total	100.0

Source: Survey by Western Business Consultants, Inc.

These percentages vary considerably from those reported by national sources. ^{2/} The latter report 20-25 per cent of mobile home dwellers in the United States are affiliated with the armed services, compared with less than 1 per cent in Maricopa County. Nationally, retired folks account for only 10-15 per cent of the total; in Maricopa County, over 23 per cent. Vacationers comprise less than 5 per cent of the national total but, as might be expected, over 24 per cent of the mobile home dwellers in Maricopa County were winter vacationers.

It should be noted that had the local survey been conducted during the summer months a different population composition would likely have been disclosed.

^{2/} See page 131.

Tenure. More than one-third of the families had been residing at their present location for less than six months; almost one-fourth had been there over 24 months. The first figure is a reflection of the high proportion of winter vacationers and of the substantial number of parks recently opened. The long-tenure residents are primarily the permanently retired.

TABLE XXXII
DISTRIBUTION OF FAMILIES BY LENGTH OF RESIDENCE IN PRESENT
PARKS, MARICOPA COUNTY, MARCH 1959

Length of Residence	Per Cent of Families
Less than 6 months	36.9
6-12 months	24.4
12-24 months	14.8
Over 24 months	<u>23.9</u>
	100.0

Source: Survey by Western Business Consultants, Inc.

The Growth of Mobile Home Parks

The growth of mobile home parks in Maricopa County can be measured through inspection of various issues of Woodall's Mobile Home Park Directory, published by Trailer Travel Magazine. Although it does not list all facilities now in existence, comparison of back issues with the present does give a rough indication of park expansion.

The parks listed for Maricopa County in the 1950 edition of Woodall had a total of 5132 spaces for mobile homes; in the 1954 edition, 6774 spaces, and in the 1959 edition, 8784 spaces. From 1950 to 1954 the number of available spaces in Maricopa County increased an average of 410 spaces per year. Between

1954 and 1959 the annual increase was 402 spaces. The average increase for the entire period from 1950 to 1959 was 406 spaces per year.

Returns from the survey conducted by Western Business Consultants, Inc. reveal that during the three year period, 1956 to 1958 inclusive, available spaces increased at the rate of approximately 10 per cent per year.

Of course the growth of the industry is not unique to Maricopa County. In 1946 there were only 3500 parks in the entire United States. By 1955 there were 12,000^{3/} and current estimates range from 15,000 to 20,000. (Marked variation in national estimates results from the lack of a complete tabulation.)

Expansion in number of parks and spaces is a reflection of the steady increase in sales of mobile homes. Nationally, an industry that was in its infancy only 15 years ago now reports total annual sales exceeding \$600 million, and the growth rate in the last few years is little short of phenomenal. In 1958, for example, 130,000 new mobile-homes were sold. Since there were about 1,200,000 conventional housing starts in 1958, one out of every 10 new homes was a mobile home. There are now more than 3 million Americans - nearly two per cent of the population of the United States - living in more than 1 million mobile homes.^{4/} Maricopa County has had more than its share of the expansion. Over three per cent of its population reside in mobile homes, although about one-fourth of them are only temporary residents of the County.

Factors Influencing the Demand for Mobile Homes

Characteristics of Families Living in Mobile Homes

There are at least three misconceptions about mobile home dwellers: first, that people live in mobile homes primarily because they cannot afford

^{3/} Barrons, September 26, 1955.

^{4/} Newsweek, February 16, 1959.

something else; second, the people were forced into mobile homes by a housing shortage; third, that they are almost without exception people in mobile occupations or temporary dwellers. The available evidence seems to indicate that people who live in mobile homes are above national average in income, that people continue to live in mobile homes long after housing shortages no longer exist, and finally, that many people are turning to mobile home dwelling as a way of life.

A variety of factors determines the current demand for mobile homes and will affect the future demand. Not the least of these are the nature and type of families now living in mobile homes.

The Mobile Home Manufacturers' Association conducted a survey in 1956 and reported the following occupations of mobile home dwellers:

Craftsmen and other skilled workers	63%
Retired	10%
Military personnel	20%
Vacationers	4%
Business, professional and other	3%

The same source indicates that: (1) the average mobile home family has 2.9 members; (2) there is one school-age child for each three mobile homes; and (3) the average income of mobile home dwellers is \$5100 a year compared with a median income in the United States of \$4200.^{5/}

Another recent report^{6/} classified mobile home dwellers in the following manner:

Transient skilled workers	50%
Military personnel	25%
Retired	15%
Young marrieds and miscellaneous	10%

^{5/} Letter from Marshal K. Powers, Director of Park Division, Mobile Home and Manufacturers' Association, Jan. 27, 1959.

^{6/} "The Mobile Home Isn't So Mobile Anymore" Business Week, March 16, 1957.

As indicated earlier, Maricopa County's mobile home population differs from the national population in several significant respects. Our mobile home dwellers are somewhat older on an average and have a smaller number of persons per home. And, as might be expected, the winter vacationers and retired account for almost half of the total in Maricopa County but only about 15 per cent nationally. On the other hand, military personnel constitute 20-25 per cent of the mobile home population in the entire United States, but less than 1 per cent of the county total.

As average length of life is extended through advances in medical science, the proportion of the population in the "winter vacation" and "retired" brackets will expand. According to the United States Census Bureau there were 12 1/2 million people in the United States age 65 and over in 1950 and the Bureau expects over 24 million in that bracket by 1980.^{7/} Here is Maricopa County's prime source of future mobile home dwellers.

Limitations on space and the high age of occupants make it unlikely that the size of the mobile home family in Maricopa County will increase beyond its present dimensions.

Improvements in Mobile Homes

A second major influence on the demand for mobile homes has been the improvement in the homes and the accommodations they provide. Of course not all trailer-type vehicles are suitable for permanent or semi-permanent dwellings and hence are not significant for purposes of our investigation.

^{7/} "Illustrative Projection of the Population of the United States by Age and Sex, 1960 to 1980", Current Population Reports, Series P-25, No. 187, (Nov. 1958) U. S. Bureau of the Census.

Types. There are four major types of trailers, or mobile homes: first, the camping trailer, which ranges in length from 12 to 30 feet and has a selling price of between \$1200 and \$2500; second, the travel trailer, ranging in length from 20 to 27 feet and selling from \$2000 to \$3500; third, the mobile homes, which come in 8 and 10 foot widths and range in length from 27 to 50 feet and over, selling from \$3,700 to \$10,000; finally, a recent development, the expandable, which travels at a width of 8 feet but is expandable to a width of 15 feet when it is parked in a trailer space. The expandables range in length from 18 to 45 feet and sell from \$7,000 to more than \$11,000.

The first two types, the camping trailer and the travel trailer, can legitimately be called "trailers", but for purposes of understanding the impact of the mobile home industry on a community, only the latter two should be considered. Travel and camping trailers, incidentally, account for less than 2 per cent of the total sales volume of the industry.

Trend in Size of Mobile Homes. Prior to 1952, the average mobile home was 30 feet in length, and fewer than 50 per cent of the mobile homes in the United States were 35 feet or over. During the next two years, the biggest innovation in mobile home accommodations was the installation of showers and toilets with running water. The extra 4 or 5 feet needed for these appointments caused the overall length of mobile homes to increase to 45 feet and over. By 1954, 61 per cent, and by 1955, 76 per cent of the homes were 35 feet and over.

Sixty-one per cent of total sales in 1957 were in units of 40 feet and over and 82 per cent were 35 feet and over. In interviews with local dealers, national trends were clearly manifested and the dealers of quality homes report that they are currently selling more of the 50 foot mobile homes than of any other length.

TABLE XXXIII
MOBILE HOMES BY SIZE

Size of Mobile Homes	Per Cent of Mobile Homes	
	1956	1957
24 ft. and under	15	11
25 - 29 ft.	8	3
30 - 34 ft.	7	4
35 - 39 ft.	20	21
40 - 44 ft.	25	20
45 ft. and over	<u>25</u>	<u>41</u>
Total	100	100

Sources: 1956 - "Market Study of the Mobile Home Park Industry" prepared by Trailer Park Management.

1957 - "Market Study of the Mobile Home Industry" prepared by Trailer Dealer Magazine.

Mobile homes have been getting wider as well as longer. A recent innovation, the "ten-wide", is only three years old. The "expandable", only four years old, is becoming more and more popular. It compresses to 8 feet for travel purposes but when parked it is expanded to 15 feet. A number of local dealers report that all of their sales are ten-wides or expandables, and many others reveal that they sell more ten-wides than anything else.

The increasing length and width of mobile homes is making them increasingly immobile. Trailer Dealer Magazine, in a market study of the industry, reported that almost 90 per cent of the mobile homes purchased today are to be used for permanent residences. The average mobile home dwellers stay in one place for almost two years; and fully 75 per cent of the mobile homes purchased today are never more than 50 miles from their point of purchase. Most states prohibit the movement of

ten-wides except by licensed haulers, and the 45 to 50 foot homes are increasingly cumbersome for hauling by ordinary automobile.

Local dealers who are selling the better class of mobile homes report an increase in the average unit price commensurate with the increasing length, width and appointments of the homes. In 1955 for example, their average unit sale was about \$4000, but by 1958, their average sale ranged from \$6000 to \$6500. It should be emphasized that these prices refer to the true mobile home and not to the travel or camping-type trailers mentioned earlier.

Improvements in Parks

Space Allocation. Increasing lengths and widths of modern mobile homes and the accompanying improvement in appointments are reflected in the increasing amount of space allocated per mobile-home. Older parks catering to the older and smaller trailers can and do park from 16 to 18 per acre. The April, 1958, issue of American City, reports parks with spaces only 25 x 30 feet.

On the other hand, newer parks and/or those catering to the de luxe type of home are allocating spaces 35 x 60 feet and larger, while the Arizona Mobile Home Association recommends that new parks be planned with a minimum of 50 x 70 feet per unit. Along with the other facilities needed for an up-to-date park, this would permit the de luxe parks to accommodate no more than 8 homes per acre.

Appointments. New parks are providing additional extras, such as underground wiring, submerged garbage containers, and the like. As a result, a good medium-quality park with swimming pool must be figured at a cost of about \$1500 per space. Many operators are discovering that it is not feasible to plan a modern park for less than 50 spaces and they anticipate a total outlay of \$75,000 to \$100,000.

Woodall's Guide provides significant historical perspective on the improve-

ment of accommodations offered by the parks. In 1950 the Guide carried park information on such matters as the availability of electrical connections and running water, the number of toilets - and whether they were of the flush type, or "other", and the number of baths or showers, whether they were wood, tile, concrete and so on.

The 1954 Guide still carried data on electricity and running water, toilets and baths, but it also included information on sewer connections. Built-in toilets and showers were available in the new models and many mobile home dwellers were most interested in sewer connections.

By 1959 information on electricity, water and toilets was no longer carried; sewer connections were the only utility listed in the Guide. Apparently, community toilets and baths were no longer significant, and running water and electricity were assumed to be available.

The upgrading of appointments in mobile home parks is reflected in Woodall's rating system. In 1950, three stars was the maximum rating given for the most luxurious appointments. Very few parks in the entire United States were listed with a maximum of three stars, and there was not a single three-star park in the state of Arizona. Most parks in the state carried no stars, or at the most, one star, and there were only eight two-star parks in Maricopa County. In 1954 a maximum of four-stars was used. Maricopa County had several in the top category.

By 1958, a five-star park represented the ultimate in mobile home living. Most of these parks have cost over one-half million dollars to build. The current Guide lists only two parks with 5 stars in Maricopa County, 13 with 4 stars, 24 with 3, and 33 with two.

Although the upgrading of parks is observable in Maricopa County as well as in other parts of the country, local improvements have not kept pace with those in California and Florida. The relative standing of Maricopa County's mobile home parks is reflected to some degree in the rental charge for spaces.

The average monthly rental is \$21. The maximum is \$50, but few parks charge over \$35. In other parts of the country, \$40 and \$50 charges are frequent and some of the more exclusive parks charge as much as \$60 and \$70 per month.

Liberalization of Financing

A fourth major influence on mobile home demand has been the liberalization of financing.

National trends. The most complete study of mobile home financing was conducted in 1954 by Ralph M. Natale^{8/}. At that time Natale reported that 235 financial institutions, over 80% of them commercial banks, were lending on mobile homes. When one remembers that there are more than 14,000 commercial banks in the United States, it is realized what a very minor percentage of the total financial community was involved in mobile home financing.

As the mobile home industry expanded and unit sales were larger, the size of the average loan increased and loans were extended for longer terms. Consequently, various consumer finance agencies tended to drop out of the field, and the commercial banks have remained the major source for financing purchases of mobile homes.

Natale noted the increasing willingness of financial institutions to lend, even on homes that were being moved out of the immediate trade area. Here was recognition of the tendency toward greater immobility of dwellers, for the average mobile home dweller moves only once every 24 months. He observed that buyers were meeting payments of about \$100 per month on their mobile homes, and that these people were definitely not the lower income groups. In brief, the new mobile homes were not being bought by poor people.

Local Trends. The financing of mobile homes in Maricopa County was pioneered by the Valley National Bank in 1936. At that time the Valley would not finance more than \$3000 and required a one-third down payment, 24 months to pay the balance at a 6 per cent discount rate. (Nationally, rates at this time ranged up to 12 per cent discount.)

^{8/}Ralph M. Natale, Mobile Home Financing, School of Consumer Banking, Washington, D.C., 1955.

In the post World War II period, the Valley National began extending contract periods. It still required one-third down, but gave up to 36 months for amortizing the balance, and established absolute upper limits on the amount it would finance.

The next breakthrough came in 1952. The one-third down was still required, but contracts were extended to 48 months and in some cases even 60 month contracts were accepted. A basic "rule of thumb" was to permit a one year period for each \$1000 of value. Hence, a \$5000 mobile home could be financed over a five year period, although very few \$5000 units were being sold at that time.

In June, 1958, further liberalizing of terms occurred. For the first time, as little as one-fourth of the purchase price was accepted as a minimum down payment, and if the trailer was valued at more than \$5000, the contract could run for as much as seven years.

Extension of the time payment contract and reduction in down payments are reflections of several factors. First, the increasing cost per unit, and the necessity for an individual to have some financial resources before thinking of buying a \$5000, \$6000 or \$8000 mobile home. Second, since the average payment on a time contract runs \$100 per month and over, there is increasing recognition that poor people are not buying the expensive homes, and that the mobile home is no longer an alternate for emergency or substandard housing.

The decrease in down payments and lengthening of the contract period are reflections also of the increasing tendency of the finance people to look upon a mobile home as being more like a home and less like an automobile. The Mobile Home Manufacturers' Association, in its survey of consumer financing in 1954, reported that an increasing proportion of lenders believed that mobile-home paper was better than automobile paper. Forty-four per cent said mobile home paper was better than automobile paper, and 52 per cent

said it was equal to automobile paper; that is, 96 per cent of those financing mobile homes said mobile home paper was equal to or better than automobile paper.

Local dealers of the higher quality mobile homes report that Phoenix banks permit financing up to a seven year period. They report further that from one-half to two-thirds of their new sales are financed, and interestingly enough, that the higher the price, the less likely that the home is financed. Only people with steady incomes tend to finance their homes, and it is the retired people who tend to buy the more expensive home.

Other Considerations

Certain other factors must be considered when aggregating the total demand for mobile homes. It is not possible, however, to gauge their influence precisely.

Apartment Living Plus. Undoubtedly mobile home dwelling offers many of the advantages that accrue to apartment living, such as increased mobility and lack of responsibility for upkeep of a single family dwelling. But in addition, mobile home parks provide the opportunity for development of a community life and intimate associates not characteristic of the usual apartment existence. Many of the better quality parks have community-center buildings, which provide a site for group recreation and for residents to entertain their guests.

Operating Costs. Cost factors also enter the picture. Mobile homes utilize space with maximum efficiency so that a mobile home with 500 square feet of space offers the equivalent of an apartment with 600 to 700 square feet. Household operating costs are thus less than they would be for comparable apartment quarters.

Taxes. There is also a question of possible tax advantage or disadvantage accruing to the mobile home dweller as compared with the owner of a conventional

dwelling. The owner of a mobile home has an option; he may elect to have it taxed as a vehicle or as personal property. The advantage of this option depends upon the tax rate of the school district in which the mobile home is located.

For example, consider a new mobile home that is 50 feet in length for which the factory list price is \$5,000. If this mobile home were declared a vehicle for tax purposes, it would be assessed the first year at 60 per cent of the list price, or at \$3,000. As a vehicle, it would be taxed at the lieu rate of \$4.00 per \$100 of assessed valuation. The tax would be \$120 plus a \$4.00 vehicle-registration fee.

If this same mobile home were declared as unsecured personal property, its base value for tax purposes would be determined by its length. The yardstick is \$100 per foot of length but beginning in 1960 homes 10 feet wide and over will be valued at \$150 per foot of length. The base value of our example would be \$5,000 (50 feet x \$100). It would be possible, however, for a new mobile home of 50-foot length to have a factory list price of more than \$5,000.

As unsecured personal property, this \$5,000 home would still be assessed at 60 per cent of base value. This assessed valuation, however, would be halved before computing the tax in order to compensate for the fact that the average property tax rate in Maricopa County tends to be about twice the special \$4.00-per-\$100 lieu rate for vehicles. Suppose that the total tax rate of the school district in which the mobile home is located is \$8.00 per \$100. Then, the tax would be \$120, or the same as if the mobile home has been declared as a vehicle.

Assume, however, that the total tax rate of the school district in which the mobile home is located is \$10.00 per \$100. Then, the tax on the home, if declared as unsecured personal property, would be \$150 but still only \$120 as a vehicle. Conversely, if the total district rate were

only \$6.00 per \$100, the tax on the home as personal property would be only \$90. In other words, it is a tax advantage to the mobile home owner to declare his home for tax purposes as a vehicle if he is located in a school district with a tax rate higher than \$8.00 per \$100, and as unsecured personal property if he is in a district with a rate lower than \$8.00 per \$100.

The assessment of mobile homes is reduced by 25 per cent each year whether they are declared as vehicles or as unsecured personal property, except that the minimums differ. As vehicles, the minimum assessed valuation is \$15 and, as unsecured personal property, \$100.

Owners of conventional homes, of course, continue to pay on original assessments. However, the owners of mobile home parks pay property taxes and doubtless these are shifted to mobile home owners who rent space in much the same manner that property taxes on apartment buildings are passed on to renters.

Factors Influencing Size and Quality of Parks

As indicated in the preceding section, mobile homes are getting longer and wider, hence the need for more space per unit.

In the medium and higher priced parks most homes are 35 to 45 feet and over and either ten-wides or "expandables." Necessarily, the 25 x 30 feet of space formerly allocated for each unit is no longer adequate, and modern parks are devoting spaces 35 x 60 feet and more per unit.

While the older parks catering to older "homes" could crowd 18 or 20 per acre, more modern parks handle only 10 or 12, and de luxe parks only 8 per acre.

To accommodate the same number of mobile homes as formerly, individual parks necessarily will have to be larger. Such a trend is observable in other parts of the country, but Maricopa County parks are substantially the same average size as they were in 1950.

Acreage devoted to a mobile home park is dependent also on other accommodations offered. Community recreation buildings and swimming pools are space users. And replacing the traditional perpendicular parking with angle parking, and more recently, with planned "random" parking, utilizes additional space.

A de luxe park with all conceivable extras can now handle eight homes per acre and it is doubtful if this figure will be reduced in the foreseeable future. It should be noted for comparison purposes that sub-divisions devoted to moderately priced conventional dwellings are usually figured at four lots per acre.

The average mobile home park in Maricopa County has approximately 38 spaces and takes up 2.83 acres. By national standards, they are small parks. In fact, Maricopa County has no large parks. Only two have 200 spaces or more, only 12 have more than 100.

Florida's parks average 95 spaces; the eleven western states, 75 spaces. Bradentown, Florida has a park with over 1100 spaces; Sarasota, 950 spaces, and several other communities claim parks with 200-500 spaces. A park is being completed with 3000 spaces on 400 acres, accepting only retired couples with mobile homes 10 feet wide or greater. ^{9/} California, too, has a considerable number of parks with 200 or more spaces.

It would appear that larger sized parks have much to commend them. A park of less than 50 or 60 spaces is probably a part-time or marginal enterprise for the operator, and apparently many parks in the County fall in this category. In addition, the more mobile homes are dispersed in small parks throughout a community, the more conflicts arise between mobile homes and other land uses.

^{9/} Guernsey Park in Tampa, Florida, announced in the 1959 edition of Woodail's Mobile Home Park Directory.

In contemplating the growth of the mobile home industry, planning authorities might well consider the possibility of mobile home "communities" or "sub-divisions." A planned community of even two or three thousand homes, with complete shopping and other facilities, could conceivably be developed within 30 minutes driving time of downtown Phoenix.

PART VII
WATER SOURCES AND USES

The scope of the analysis of water sources and uses was outlined as follows in the study plan:

"How much water will be required by the urban growth projected for 1980? How do these requirements compare with estimates of the supply that will be available? To what extent may the geographical distribution of water resources in the Salt River Valley affect the direction and intensity of urban growth?"

A special analysis of the water-supply outlook was made for this economic study by Samuel F. Turner, of Turner and Associates, Consulting Geologists, Phoenix, Arizona. This analysis is summarized here and its significance evaluated for planning purposes. The full report by Turner and Associates is published separately under the title Available Water for Urban Development in the Phoenix Area.

The Overall Water-Supply Outlook

Prospects now indicate that Maricopa County and the Phoenix Area will have sufficient water on an overall basis to supply the needs of the population growth and industrial expansion which is projected in this report for 1975-80. This conclusion is based upon the following study and assumption:

1. An appraisal of the water resources of the general Phoenix Area, which was especially prepared for this economic study by Samuel F. Turner, of Turner and Associates, Consulting Geologists.
2. The assumption that irrigated land will continue to be withdrawn from agriculture in the general Phoenix Area and thereby make available much of the water supply formerly used for irrigation for domestic and industrial purposes.

3. The assumption that an average daily water production of 200 gallons per capita will be sufficient to meet non-agricultural needs and that the industrial growth will continue to be in lines of production that do not have extremely high rates of water consumption.

But this conclusion that the total water supply will probably be sufficient to support the growth that is forecast for the immediate future does not mean that the general Phoenix Area will not have water problems.

According to the Turner appraisal, wells in some parts of the general Phoenix Area may be producing water of such high salinity by the late '70s that desalting will be necessary. In other sections, the water table may have fallen to such depths by 1980 that pumping costs will have become excessive; and, the underground supply may have even been exhausted to bed rock in some sections of the general Phoenix Area.

The favorable, overall picture results in large part from the supply of surface water provided by the watersheds of the Salt and Verde Rivers. This supply, however, is restricted by virtue of prior appropriation and court decree to what may be described as the central portion of the general Phoenix Area, usually referred to as the Salt River Project Area.

The water-supply problems of the general Phoenix Area are of such potential dimension that Turner recommends in his report that a cooperative water-development program should be undertaken as soon as possible. This conclusion is underscored by the decrease in overall water supply which is projected for the general Phoenix Area between now and 1980.

Ground-Water Supply

Ground and surface water use is now estimated to average 1,830 million gallons per day for the following sub-areas combined (see accompanying map for location): Salt River Project, Apache Junction, Beardsley, Deer Valley, Litchfield Park, and Paradise Valley. By 1980, Turner estimates that the supply available to these combined areas may drop to 1,050 million gallons per day. This projected decrease is based upon the declining trend in ground-water levels that has been generally evident since 1941. In other words, ground water is being "mined." Though this underground supply may be tremendous, it is, from all available evidence, eventually exhaustible. Before that point is reached, the costs of pumping and of processing to reduce salinity may become prohibitive.

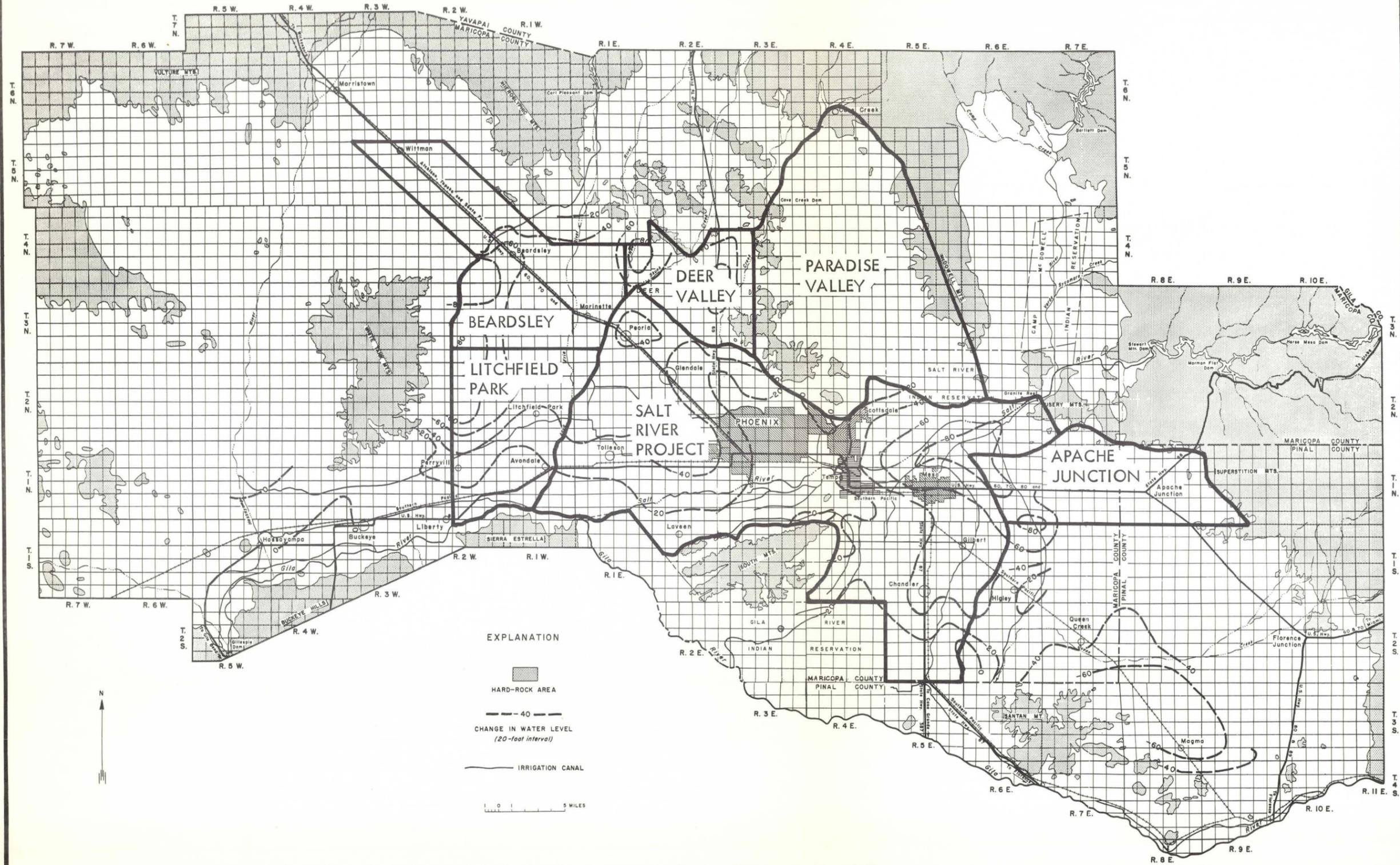
The expected withdrawal of land from agriculture for urban purposes, resulting in much lower water consumption per acre, is the reason why it would be possible for the water supply to drop by over 40 per cent (from 1,830 to 1,050 million gallons per day), and still be sufficient to support the urban growth anticipated by 1980. Nevertheless, a drop of the dimension projected underlines the fact that our ground-water resources are being exhausted and that eventually the growth limit of the whole Phoenix Area will be determined by the water supply which can be obtained from surface sources.

Surface-Water Supply

Theoretically, it would be possible for the watersheds of the Salt and Verde Rivers to produce enough surface water to supply a substantially larger population than the 1,400,000 projected in this report for the whole of Maricopa County in 1975-80. Turner estimates that these watersheds might produce 475 million gallons per day in 1980 on the basis of present water conservation practices and allowing for some increase in up-stream consumption. This supply, he indicates, could support a population of 2,375,000, assuming that none of the water was

FIGURE 10

MAP OF SALT RIVER VALLEY SHOWING SUB-AREAS COVERED BY THIS WATER STUDY



Note: Adaptation of Figure 9 of Annual Report on Ground Water in Arizona, Spring 1957 to Spring 1958, Arizona State Land Department, 1958, showing change in ground water level from 1953 to 1958.

used for commercial irrigation, and that consumption averaged 200 gallons per capita.

Nevertheless, the indicated excess of potential supply over potential consumption does not give any grounds for complacency because a substantial reserve is needed in the case of surface water supplies to sustain a community over a long period of drought. Furthermore, it is probably unrealistic (and probably an undesirable development) to assume that all land would be withdrawn from commercial agriculture by 1980 or even later. Finally, the criticalness of the water supply-consumption ratio in the general Phoenix Area must be measured on a sub-area as well as on an overall basis. Only about half of the gross acreage within the Area has rights to the water flow of the Salt and Verde Rivers. The remainder of the acreage is now, with some exceptions, wholly dependent upon ground-water production, a considerable portion of which will some day have excessive pumping costs, or near exhaustion of underground supply.

Water-Development Program

In light of the water-supply outlook for the general Phoenix Area, Turner recommends that a cooperative area-wide program of water development should now be undertaken which would include the following steps:

1. The construction of an electrical model of the ground-water reservoir which underlies the Salt River Valley in order to obtain precise predictions of the impact of varying degrees of urban and industrial development upon the underground water sources.
2. Research on the removal of salt from water and the application of this research in improving water quality of both ground water and of spring and surface waters produced by certain upstream areas along the Salt and Verde Rivers.

3. Research and the rapid application of this research to the control of water-loving vegetation along stream banks; and control of non-beneficial vegetation which reduces the run-off of the up-stream watersheds.
4. Detailed studies of the possibilities for increasing the flow of the Salt and Verde Rivers through upstream development, including such possibilities as lowering the outlets of artesian springs, and driving tunnels or drilling deep wells to recover more of the natural recharge from underneath the Mogollon Rim. As soon as possible practical work on these means of supplementing supplies of surface water should be underway.

Water Requirements

As noted in Table XXXIV, it has been assumed that water for non-agricultural purposes would be used at the average daily rate of 200 gallons per capita. This rate of use is based upon the recent experience of the Water Department of the City of Phoenix. ^{1/}

It is possible that the average per capita use for non-agricultural purposes may be higher by 1980. At least the following influences should be closely watched and periodic measurements taken covering both public and private water production for non-agricultural purposes to note what trends may be developing:

1. Industrial use: manufacturing employment in Maricopa County is expected to increase percentage wise much more rapidly than population over the next two decades. Hence a higher proportion of the

^{1/} Report of the Water Works Survey of Phoenix, Arizona, 1956
Headman, Ferguson, and Carollo, p. 11.

water produced for non-agricultural purposes would go for industrial use in the future than has been true of the recent experience upon which the rate of 200 gallons per capita is based. Therefore this relatively greater expansion of industrial use should tend to raise the overall per capita rate.

2. Household and commercial use: the trend toward waterless refrigeration systems for summer cooling should reduce per capita consumption for household and commercial purposes, except as the water discharged from evaporative coolers is now used for irrigating lawns and gardens. There could also be an actual increase in the per capita use of metered water for watering lawns and gardens if the practice of using flood irrigation for lawns and gardens declines.
3. Costs: the cost of water could have a substantial influence upon volume used. If the cost of producing water increases (as may happen because of the necessity of pumping from greater depths and processing to reduce salinity), the resulting rise in water rates would doubtless tend to hold down per capita use by encouraging more efficient use.

Water Supply By Sub-Areas

The general Phoenix Area was divided into six sub-areas for purposes of analyzing the water-supply outlook. These areas consisted of the following: Salt River Project, Apache Junction, Litchfield Park, Beardsley, Deer Valley, and Paradise Valley. The scope of such sub-area is delineated on the accompanying map.

According to the Turner Appraisal, each of these six sub-areas will probably experience some adverse modification of their water supply by 1980. Present use, kind of modification anticipated, and estimate of water available by 1980 are summarized in Table XXXIV.

How the water resources of each sub-area could affect its growth and development for urban purposes is indicated by estimates which Turner has prepared showing the approximate density per acre which the probable water supply available to each sub-area would support by 1980. These estimates assume that additional water is not brought into the sub-area from new supplies developed elsewhere. In order of the population density which their anticipated water supply would support in 1980, the sub-areas rank as follows:

Litchfield Park	8.6 persons per acre
Salt River Project	8.2 " " "
Deer Valley	6.0 " " "
Beardsley	5.0 " " "
Apache Junction	1.6 " " "
Paradise Valley	0.6 " " "

These density potentials assume that all available water is used for urban purposes at the rate of 200 gallons per day per capita and that no water is used for commercial irrigation, or flood irrigation of lawns.

TABLE XXXIV
WATER AVAILABLE FOR URBAN DEVELOPMENT
PHOENIX AREA BY SUB-AREAS, 1959 AND 1980

Area	Use in 1959					1980 Outlook					
	Irrigated Area (acres)	Annual Water Use (acre-feet)	Average Daily Use		Population Supported at 200 g.p.d. (in thous.)	Modification Expected	Water Available (m.g.d.)	Population Supported at 200 g.p.d. (in thous.)	Gross Area (acres)	Population Density (per acre)	Area
			(acre-feet)	(m.g.d.)							
Litchfield Park	61,000	276,000 GW	750	245	1,225	Max. pumping lift of 750-800' in 1980. Well capacity satisfactory and economic for urban or ind. use. High salt content delete 1/2 area by 1980.	120 GW	600	70,000	8.6	Litchfield Park
Beardsley	50,000	225,000 GW SW	600	196	980	Max. pumping lift of 925-1000' in 1980. Well capacity only fair; lift too great in higher parts of area. Quality satisfactory.	100 GW SW	500	99,000	5.0	Beardsley
Deer Valley	27,000	120,000 GW	330	108	540	Max. pumping lift of 950-1000' in 1980. 1/4 area unwatered to bedrock. Well capacity satisfactory but lift too great another 1/4 area. Quality satisfactory.	50 GW	250	42,000	6.0	Deer Valley
Paradise Valley	10,000	45,000 GW	120	39	195	Pumping lifts excessive (800'+) in north. and west. part of area in 1980. Phx. Mtn. area unwatered. Quality satisfactory.	20 GW	100	170,000	0.6	Paradise Valley
Apache Junction (1/2 irrigated area has both surface water and ground water.)	7,500	34,000 GW	140	46	230	Pumping lifts excessive in all east. part of area (east of R.W.C.D.) by 1980. Part of area near mountains unwatered to bedrock. Quality satisfactory.	10 GW	50	68,000	1.6	Apache Junction
	7,500	17,000 GW 17,000 SW	46	15	75		12 SW	60			
Salt River Project (has both surface water and ground water.)	Avg. GW - Available for use	500,000 GW	1,370	447	2,235	Pumping lifts and well production economic through 1980. Part of area near mountains unwatered to bedrock. Quality unsatisfactory for dom. and most ind. use in 1/2 area by 1980.	200 GW	1,000	452,000	8.2	Salt River Project
Roosevelt Irr. Dist. (pumped within S.R. Proj.)		600,000 SW	1,650	538-38* = 500	2,500		475 SW	2,375			
Municipal and Private Water Systems in Phoenix Metropolitan Area		150,000 GW	410	134	670		All salty				
			100 SW GW	500		38 SW 25 GW	190 125	3,690			
Totals		1,984,000	5,416	1,830	9,150		1,050	5,250	901,000	5.8	

* Included in use of municipal and private water systems of Phoenix Metropolitan Area.
Source: Prepared by Turner and Associates, Consulting Geologists.

GW - Ground Water.
m.g.d. - Million gallons per day.

SW - Surface water.
g.p.d. - Gallons per day.

PART VIII
GROWTH POTENTIAL OF THE
CENTRAL BUSINESS DISTRICT

When this study was planned it was agreed that the economic future of the present Central Business District should be considered, even though the budget available would permit only a limited analysis. The following four questions were selected to guide the analysis:

1. If the Phoenix Central Business District were to maintain its present proportion of retail trade and office facilities, how much space would be required for selling, service, and office purposes by 1980?
2. What are the prospects of the Central District maintaining its present proportion of the shopping trade?
3. What are the prospects of the Central District maintaining its present proportion of offices?
4. Are there new functions for the downtown? Or, old functions that may be revitalized?

The Phoenix Central Business District, for purposes of this study, is essentially the area bounded on the west by 5th Avenue, on the north by Roosevelt Street, on the east by 5th Street, and on the south by Jackson Street. Specifically, this area comprises those 1957 Traffic Study zones which lie within the Central Business District as defined by the Bureau of the Census in their 1948 and 1954 reports. This definition permits the use of both statistics compiled by the 1957 Traffic Study zones and benchmark data reported by the Bureau of Census.

The Retail Potential Of The
Phoenix Central Business District

Retail Sales in 1980

Retail sales in Maricopa County could be around \$2 billion at current prices if the population of the County were to reach 1,400,000 sometime between 1975 and 1980. Retail sales in the Phoenix Business District were 18 per cent of the County in 1958. To maintain this proportion with County sales at \$2 billion, the District would have to sell about \$360 million worth of merchandise, or nearly 2.8 times the 1958 volume of \$130 million.

In light of the shopping preferences of consumers, the probable growth of competing regional shopping centers, and other considerations, it is not realistic to assume that the growth of retail trade in the Central Business District will keep pace with that in the County as a whole. Yet it may be possible that the retail business of the District could grow at a very substantial rate if improvements were made in the District and surrounding area that would cause consumers to regard the District as an outstanding shopping center. What such improvements might be, how much business they might attract, and whether the additional business obtained would be sufficient to warrant the cost and effort involved is beyond the scope of this report.

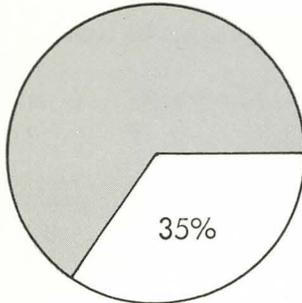
Unless the shopping appeal of the Central Business District is somehow substantially increased for consumers generally in the Phoenix Urban Area, it seems probable that the retail trade of the District will be made up of: (1) persons working in the District, (2) consumers living nearby, including residents of hotels and motels, for whom the District is the most convenient "shopping center"; and (3) other shoppers who can be induced occasionally to come past the outlying regional shopping centers because of something special that is offered downtown.

FIGURE 11

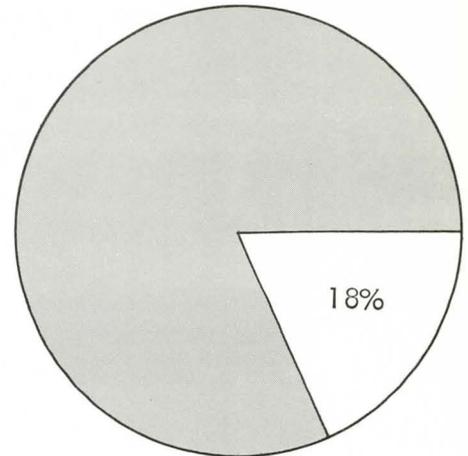
RETAIL SALES IN MARICOPA COUNTY

Percentage of Sales in the Phoenix Central Business District

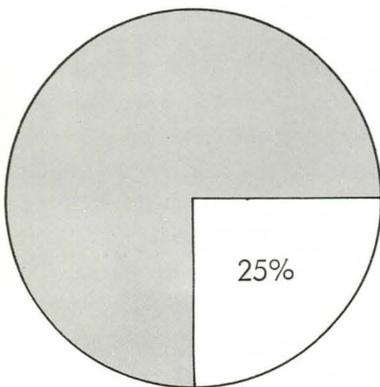
1948 (Census)
(\$307 Million)



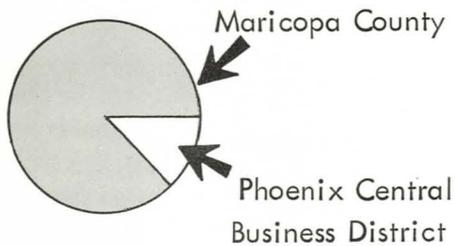
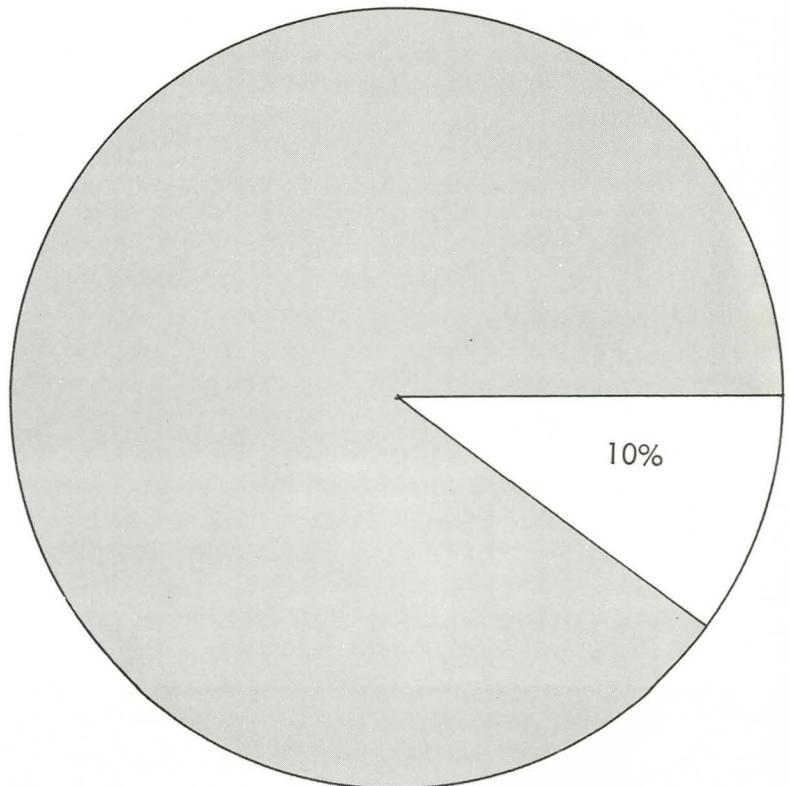
1958 (Estimate)
(\$708 Million)



1954 (Census)
(\$486 Million)



1980 (Projection)
(\$2,035 Million)



A rough estimate of this composite market suggests that it might provide retail sales of around \$200 million for the Central Business District in 1980 at current prices, if retail sales in Maricopa County as a whole were to reach the already mentioned figures of \$2 billion. Although some improvements would probably have to be made in downtown retailing to attain even sales of \$200 million, this estimate assumes that there would be no comprehensive redevelopment of the Central Business District to increase its attractiveness to shoppers, and that accessibility to the District from outlying residential areas would not be greatly improved.

If retail sales in the Central Business District were to total \$200 million in 1980, it is estimated that about 3.50 million square feet of gross floor space would be required as compared with 2.35 million square feet in 1958. This estimate of space is based on the assumption of the same ratio of sales to gross space as in 1958.

Factors Affecting Downtown Retailing

As a background for evaluating the retail-sales estimates given here it is important to review recent trends in the retail sales of the Central Business District and to consider such factors as the shopping preference of consumers, the residential-growth patterns that are developing in the Phoenix Urban Area, and the establishment of additional regional shopping centers.

Recent Trends. Between 1948 and 1958, retail sales in Maricopa County increased by 130 per cent, and in the Phoenix Central Business District by 21 per cent. But the average increase in retail prices for this period was around 20 per cent. So even the modest increase registered by the downtown stores was apparently largely caused by inflation and not by an increase in the physical volume of business.

Lack of growth, however, has been characteristic of retailing in central business districts throughout the country. For 24 major metropolitan areas as a group, retail sales in the central business districts increased less than 1% between 1948 and 1954 and yet the total retail sales of these areas increased over 32 per cent during the same period. ^{1/}

In many metropolitan areas, the failure of retail sales in the central business district to keep pace with the growth of the metropolitan area has been associated with the customers of the downtown stores moving to the suburbs. In contrast, the growth sections of the Phoenix Metropolitan Area have been populated to a large extent by migrants from out of the county. This fact suggests, when coupled with the sales trend, that the downtown stores have not been particularly successful in attracting the newcomers.

It is of interest also to consider sales trends by kinds of retail businesses which are shown in Table XXXV. Although sales in most lines of retailing in the Central Business District did show an increase between 1948 and 1958, all lines lost ground as compared with their counterparts in the rest of Maricopa County. For example, downtown department and other general merchandise stores did 82 per cent of the total business in the entire County in this line of retailing in 1948. By 1954 their percentage had dropped to 75 per cent, and by 1958 it is estimated to have dropped to 52 per cent. Outlying shopping centers featuring shopping-goods stores have largely come into the local picture since 1954.

^{1/} Samuel C. McMillan, "Changing Position of Retail Trade in Central Business Districts", Traffic Quarterly, July, 1957.

TABLE XXXV
 RETAIL SALES IN THE PHOENIX CENTRAL BUSINESS DISTRICT,
 1948, 1954 AND 1958

Kind of Business	Retail Sales (millions of \$)			Per Cent of County Retail Sales		
	1948	1954	1958	1948	1954	1958
Food Stores	3.4	2.4	2	5	2	1
Eating & Drinking Places	7.7	7.5	8	29	20	15
General Merchandise	29.8	32.7	35	82	75	52
Apparel	15.6	18.5	22	87	69	63
Furniture	8.0	8.4	9	40	27	19
Automotive	25.3	30.6	30	49	36	25
Gas Stations	1.7	2.5	3	10	7	4
Lumber & Hardware	2.8	2.5	2	8	6	3
Drugs	3.9	3.7	4	32	20	14
Other Retail	9.1	10.5	15	33	23	30
Total	107.3	119.3	130	35	25	18

Sources: 1948 & 1954 - Central Business District Statistics, Bulletin CBD-52.,
 Bureau of the Census, 1956.

1958 - Estimates by Western Business Consultants, Inc.

Consumer Preference. For shopping other than groceries, consumers have increasingly reported a preference for shopping centers over stores in the Central Business District in the annual consumer surveys of the Arizona Republic and Phoenix Gazette. In the first survey conducted in 1954 more than 70 per cent of the consumers interviewed indicated that they did most of their shopping downtown for items other than groceries. By January 1959, this percentage had dropped to less than 40 per cent.

TABLE XXXVI

WHERE FAMILIES OF THE PHOENIX AREA SHOP
FOR ITEMS OTHER THAN GROCERIES BY REASON AND DISTANCE
FROM CENTRAL BUSINESS DISTRICT, JANUARY 1959

Distance from Central & Van Buren	Percentage Distribution of Families by Distance	Percentage Distribution of Families by Place of Shopping Preference and Reason for Preference						
		All Places	Central Business District		Newer Shopping Centers		Outlying Older Centers	
			Conv. Loc. *	Other	Conv. Loc. *	Other	Conv. Loc. *	Other
Within:								
2 miles	7	100.0	50	22	22	4	1	1
3 miles	13	100.0	29	32	34	3	1	1
4 miles	21	100.0	19	26	48	5	1	1
6 miles	25	100.0	14	25	52	6	2	1
8 miles	12	100.0	9	19	56	7	8	1
10 miles	12	100.0	5	17	24	7	41**	6
12 miles	4	100.0	5	20	34	9	26	6
16 miles	6	100.0	1	6	2	3	79***	9
All Families	100	100.0	17	23	40	6	12	2

Source: Prepared by Western Business Consultants, Inc. from special tabulation made for this study by the Phoenix Newspapers, Inc. from the 1959 Consumer Analysis of the Arizona Republic and the Phoenix Gazette.

* Also easier parking

** Glendale, Scottsdale, Tempe and Sunnyslope included in this ring

*** Mesa included in this ring

If consumer preference is analyzed by residence, it is interesting to discover that there is a rather direct relationship between the distance consumers live from the Central Business District and the place where they prefer to buy shopping goods. For example, as is shown on Table XXXVI, more than 70 per cent of the consumers living within 2 miles of Central and Van Buren preferred to shop in the District. In contrast, only about 30 per cent of the consumers living between 10 and 16 miles from Central and Van Buren preferred the District stores for shopping.

Although more than 60 per cent of the consumers interviewed in January 1959 placed primary emphasis upon convenient location and easier parking as the reasons for shopping where they do, it is still significant that 23 per cent of all those interviewed preferred the Central Business District because of such considerations as better selection, quality, price and other reasons that have been traditionally associated with downtown shopping.

Population Distribution. Some increase in population could occur within two to three miles of the Central Business District if single-residence and vacant areas were converted to apartment-house developments on a substantial scale.

Nevertheless, the outlook is for the major growth in the population of the Phoenix Urban Area to occur at some distance from the Central Business District, and even considerably beyond existing and currently projected regional shopping centers. The current emphasis which consumers are placing upon convenience even when purchasing shopping goods underlines the task ahead of downtown merchants as population growth moves even farther away from the Central Business District.

Character of Population. Out-of-state migrants have been responsible for most of the recent population growth in the Phoenix Urban Area, and such migration will continue to be a major source of growth. Out-of-state migrants have no tradition of downtown shopping in the Phoenix Area. Moreover, many of these newcomers will want a suburban-type of life. Studies of consumer expenditures indicate that families in suburban areas spend significantly less on

clothing and accessories and more on home operation and improvement, particularly automotive expenditures, than do those families that live within the central city.^{2/}

These characteristics of the new population have special significance for the Central Business District because of the great importance of department-store and apparel-type merchandise in downtown retailing. It is possible, however, that downtown stores with branches in outlying shopping centers will have some opportunity of developing store loyalty which can be transferred from the branch to the downtown unit, given the appropriate kind of merchandising.

New Centers. Prospects point to the fact that stores in the Central Business District will have more competition from shopping centers, particularly regional centers, than they have had in the past.

Close to 60 per cent of the space in the new, larger shopping centers in the Phoenix Urban Area is devoted to shopping goods and around 40 per cent to convenience merchandise. About the same ratios prevail in the Central Business District. In this comparison, the "shopping-goods" stores include department stores, apparel, specialty shops, shoe stores, lumber and hardware; and the "convenience-goods" outlets include super-markets, variety stores, and drug stores.

The gross space now occupied by shopping-goods stores in shopping centers alone (exclusive of strip retailing and stores in the outlying communities of Maricopa County) totals in excess of 500,000 sq. ft. as compared with about 1,250,000 in the Central Business District. Further developments now planned will more than double the space devoted to shopping goods in the shopping centers.

^{2/} Life Study of Consumer Expenditures, Time, Inc., 1957

Implications. In the face of competition from a number of neighborhood and community shopping centers, and one regional center, the retail stores of the Central Business District have not been able in recent years to keep pace with the trend of retail sales in Maricopa County as a whole. More regional centers are in prospect and presumably the new smaller centers that are established will continue to offer some shopping goods. Therefore, it hardly seems possible that the stores in the Central Business District will have much share in the growth of retail sales that is in prospect for Maricopa County unless the District and the stores within it are made sufficiently attractive to draw a substantial number of consumers past the shopping centers that will lie between most consumers and the downtown district.

It could be that the retail sales potential for the Central Business District is not the mass market, but the more limited high-quality, high-fashion market for which there is not sufficient volume to warrant stocks of this kind being carried in most of the regional shopping centers. Possibly a nucleus of this trade would be provided by neighborhoods near the District and by winter and other visitors if the area in and around the District were to be redeveloped into an attractive and smart residential section, including rental accommodations for both transient and year-around living.

How Estimates Were Made for Retail Trade

The figures reported by the U. S. Bureau of the Census on retail sales in the Central Business District for 1954 were used as the base. The change in sales from 1954 to 1958 was estimated from the change in receipts from the privilege sales tax for this period. ^{3/} Retail sales for 1958 were initially broken down by type of business according to trends observed between 1954 and 1958, based upon reports of the Bureau of Census. Subsequently, these estimates were modified

^{3/} Arizona State Tax Commission

and adjusted as a result of the survey of space utilized, analysis of employment data, personal interviews with major retailers, and other sources.

The floor space requirements were initially derived from 1957 land-use survey maps of the Planning Department of the City of Phoenix and subsequently verified by a field survey of all downtown establishments, making adjustments as visual observation indicated. The employment estimates are based on 1957 statistics by traffic zones.^{4/} However, adjustments were made on the basis of sales estimates and the field survey.

The first set of projections given in Table XXXVII is based on the assumption that the downtown would retain its 1958 proportion of county sales. The second set assumes that buying habits will generally follow the pattern suggested by the 1959 Consumer Analysis of the Phoenix Newspapers, Inc.; and that population growth between 1959 and 1980 will largely occur in the outlying section of the Phoenix Urban Area.

In making both sets of retail-sales projections for the Central Business District, consideration was given to national and regional trends in retailing, including the changes in retail sales per capita and the shifts in sales by kinds of merchandise that have been predicted for the next two decades.^{5/} Also basic to both projections is the assumption of an increase in the population of Maricopa County from 580,000 in 1958 to 1,400,000 between 1975 and 1980.

^{4/} Arizona State Employment Security Commission

^{5/} "How to Figure Twenty Years Ahead," Hector Lazo, Sales Management May 1, 1959, Vol. 82, No. 9, p. 33.

TABLE XXXVII
 RETAIL TRADE OF THE PHOENIX CENTRAL BUSINESS DISTRICT,
 1958 AND 1980

Year	Sales (millions \$)	Gross Floor Space (million sq. ft.)	Employment
1958	130	2.35	5,100
1980			
Projection #1	360	6.50	14,000
Projection #2	200	3.50	8,000

Projection #1: If stores of Central Business District were to maintain 1958 percentage of County retail sales, and county sales reached \$2 billion in 1980

Projection #2: If stores of Central Business District became primarily dependent upon the following customers and are successful in attracting their trade: (i) shopping of nearby residents; (2) persons working in the district; (3) regional shoppers occasionally induced downtown by a sale, or seeking particular goods not available elsewhere.

Source: Estimates and projections prepared by Western Business Consultants, Inc.

Space and employment requirements were increased proportionally to sales by type of business. However, it should be noted that these requirements are very much dependent upon the type of merchandising methods adopted by the downtown retailers. Increased efficiencies in sales per sq. ft. and per employee can be expected and yet certain modern retailing methods tend toward expanded sales area. In view of these considerations, the employment projections should be regarded as maximum and the space estimates conservative.

No physical limitations would appear to prevent the expansion in facilities required by these projections. There are still residential areas remaining within the Central Business District and numerous marginal establishments which could be absorbed by productive retailers.

The Office Potential Of The
Phoenix Central Business District

Use of Office Space by Private Business in 1980

Were office employment by private industry in the Phoenix Central Business District to keep pace with the growth in population that has been projected for Maricopa County, such employment could approach 18,000 persons by 1980 as compared with an estimated 7,500 in 1958. To accommodate this number of office employees close to 3,000,000 square feet of gross floor area would have to be provided, or about two and one-half times the space used in 1958.

It is probably unrealistic, however, to assume that private business will expand office employment within the boundaries of the present Central Business District at a rate equal to the expansion in population. There is already a substantial office development outside the District boundaries but it is still centrally located with respect to most of the Phoenix Area. It is possible too that the limited land area of the present District will mean that neither prospective tenants nor prospective builders of office buildings will always find what is attractive to them in the way of price or location within the present District boundaries.

Moreover, it should be kept in mind that some of the offices within the Central Business District are headquarters operations for managing state-wide or regional operations, and are likely to experience a slower rate of employment growth than offices engaged primarily in serving the population of Maricopa County. It is also possible that some firms with offices in the District may find that advances in office technology make it advantageous to move personnel

engaged in routine data-processing operations to less costly locations outside the District and maintain either a limited headquarters or sales staff within the District.

In the light of these considerations it is believed that office employment by private industry in the present Phoenix Central Business District may not exceed 15,000 by 1980, even if the population of Maricopa County should increase to over 1,400,000. In fact, this estimate may be generous unless sufficient building is done within the District to provide office space competitive with that available outside of the boundaries of the present District. If office employment by private industry reaches 15,000 by 1980, about 2,500,000 square feet of gross floor area will be required, assuming present ratios of usable space per employee, and of usable space to gross space.

Current Trends in Office Location

The major new office buildings have all been built outside of the Central Business District in recent years, with one exception, and only two new major office structures are planned for the downtown area as of the summer of 1959. When the buildings now under construction along and near North Central are completed, the total office space in what may be described as the "North Central" Area will roughly equal that of the District. This area, for purposes of comparison with the District, has been defined as extending from Roosevelt to Camelback on North Central, and from 7th Street to 7th Avenue.

A good many factors have undoubtedly contributed to the construction of office buildings outside of the Central Business District. Apparently the basic factor was a substantial need for additional space that was not being met by existing structures, particularly for firms located downtown that wanted more space efficiently arranged. The existence of this demand and the availability of larger parcels of land outside the Central Business District at prices which would permit parking to be provided were no doubt among the major influences that have caused the recent and current construction of office buildings outside of the District.

Nevertheless, the Central Business District still has some inherent advantages as an office location. Some of the firms that moved to North Central locations have indicated that they would have preferred to have stayed in the District had they been able to secure the accommodations desired, and the executive of one firm stated that he would move back if appropriate space could be found because the great bulk of his business is transacted within the District. Therefore, the future of the Central Business District as an office center for private industry depends in part upon adequate space and parking being provided for those firms that would prefer a downtown location.

How Estimates Were Made of Office Space Requirements in 1980

Office space requirements are derived from office employment. Thus basically the projections for 1980 reflect anticipated future trends in the downtown office population.

Office employment by private business in the Central Business District was estimated for 1958 by taking into account the following data:

1. Employment by type of business within the Central Business District, September 1957.
2. Listing of tenants in major office buildings.
3. Estimates of members from professional organizations.
4. 1954 Census of Business.
5. Ratios of employment in particular businesses to total population for Phoenix, Los Angeles, Miami and other standard metropolitan areas.
6. Listings of businesses from the 1959 telephone directory.
7. Information from selected employers.

TABLE XXXVIII
OFFICE EMPLOYMENT AND SPACE REQUIREMENTS OF
PRIVATE INDUSTRY, PHOENIX CENTRAL BUSINESS DISTRICT
1958 AND 1980

Kind of Business	1958 Estimates	1980 Projections	
		(1)	(2)
<u>Employment (Number of Persons)</u>			
Services	3,000	7,300	6,500
Finance Insurance & Real Estate	3,500	8,500	6,500
Wholesale Trade	500	1,200	1,100
Miscellaneous	500	1,000	900
	7,500	18,000	15,000
<u>Space (Square Feet)</u>			
Gross Space	1,250,000*	3,000,000	2,500,000

Projection #1: If Central Business District were to maintain its present proportion of the office employment (private industry) in Maricopa County, and population of County reached 1,400,000 between 1975 and 1980.

Projection #2: If Central Business District were to offer competitive office space for those tenants wanting to be downtown even if the Central Business District itself were not completely redeveloped, and population of Maricopa County reaches 1,400,000 between 1975 and 1980 (See discussion at beginning of office section of this report).

* Gross space being used and under construction by the Spring of 1959.

Source: Estimates and projections by Western Business Consultants, Inc.

The definitions of the four types of business listed in Table XXXVIII are as follows:

1. Services - medical, legal, and all other professional services; advertising and miscellaneous business services; non-profit organizations; trade schools and employment agencies.
2. Finance, Insurance and real estate - banks, finance companies, brokers, insurance companies and agents, and all real estate employment.
3. Wholesale trade - manufacturer's agents and wholesale firms which rent office space, but does not include those which have offices connected with a warehouse or other storage and distribution area.
4. Miscellaneous - agricultural firms, mining companies, contractors, manufacturers, railroads, airlines, and utilities that rent office space but does not include the offices of those firms which utilize a portion of their plant for their office space requirements, such as the telephone company.

The office-employment projections are based on a population of 1,400,000 for Maricopa County between 1975 and 1980. However, the growth potential of each of 20 kinds of businesses was considered in arriving at the projection totals.

The gross floor area of the buildings used for offices in 1958 was estimated from a field survey of the Phoenix Central Business District to locate the name, number and approximate size of all buildings. The managers of most buildings were contacted to verify the field survey.

The projections for 1980 are based on an estimated office employment of 15,000 to which the average 1958 ratio of gross office space per employee was applied. There is considerable variance in the definition of the terms, "gross floor area," "net rentable area," and "area per employee." For purposes of this study "gross floor area" was defined to include all the floor area within the outside walls of the building, and the ratio of gross floor area per employee was used for the projections.

Outlook For The Central Business District

The future of the Phoenix Central Business District may lie in specializing in those functions for which it has distinct superiority over other locations within the Phoenix Urban Area, rather than trying to continue all of the functions which the District has performed in the past. One example may be sufficient to make the point. At one time the Union Railroad Station adjacent to the District was the hub of passenger transportation for Phoenix and Central Arizona. Yet it would now be wasted effort to try to move Sky Harbor to the vicinity of Central and Van Buren.

For what functions does the Central Business District have a clear advantage? If appropriate space were available, there is good reason to believe that many business and professional firms would prefer a location within the District to any place else within the Phoenix Urban Area. Surely it is worth finding out what has to be done to provide the kind of space and other accommodations that would enhance the natural advantage of the Central Business District for many kinds of office activities.

Though the shopping centers may be doing a thriving business in shopping goods, it does not follow that there is no longer any place for retailing in the Central Business District. As the Phoenix Area grows, there will surely be an increasing demand for high quality and high fashion merchandise. This potential market should provide a major opportunity for downtown merchants, but a concerted private-municipal program will doubtless be necessary to create this kind of a retail center in the District.

Additional opportunities for the Central Business District and the surrounding neighborhood may also lie in the development of rental housing for transients and winter visitors and for year-around residents. There is a tendency for a "blight" belt to develop around the downtown business district. By appropriate municipal and private planning and investment it may be possible not only to prevent the development of a blight zone but also to create a prestige apartment and hotel area around the Business District that would lend distinction to the District itself.