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## MANPOWER PROJECTIONS TO 1980



by

INDUSTRY *and* OCCUPATION

MAINE DEPARTMENT OF MANPOWER AFFAIRS



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BY INDUSTRY AND OCCUPATION

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## FOREWORD

Of late, it has become fashionable to demand that education and training be made relevant to the real world. Unfortunately, those who contend for this increase in relevance seldom state with precision how it is to be achieved. One reasonable interpretation of their desires might be that some, at least, of the courses in educational programs and virtually all training material ought to be aimed at preparation of workers for useful, dignified and financially rewarding places in the labor force. It seems almost self-evident that progress toward such an end could be speeded if information was made available on the probable course of demand for workers in particular occupations. This report is designed as a step toward such information for Maine.

In which direction is demand for workers with certain specific skills likely to move? Will more or fewer bakers or butchers or cabinet makers be needed by 1975 or 1980? Is time and money devoted to education or training as watchmaker, meatcutter or draftsman wisely invested on the part of individuals? Shall State funds and instructional resources be devoted to the training of more or fewer mathematicians, air-traffic controllers, nurses or veterinarians? Will a sufficient number of electricians or machine tool operators or machinists be on hand to meet the needs of enterprises brought into the State by hard-working industrial developers? These are some of the knotty questions confronting economic development specialists as well as guidance counselors and educational planners concerned with occupational or career education.

Since 1947, a joint State-Federal program has provided Maine's citizenry with monthly estimates of the volume of employment in the State's principal industries and major population centers. This has proved indispensable for a myriad of uses. Answers of sufficient precision have been provided in response to the question, "How many people are working at present or are likely to be working in the State's industries at some future date?" But these industrial employment data have provided only indirect clues to the accompanying puzzle--"For what jobs will the people be needed?"

Provision of occupational information of this latter kind was called for by the Vocational Education Act of 1963 and its subsequent amendments, but accomplishment of the task was slowed by the need to compete for scanty resources with other and equally pressing statistical needs. Unavoidable interruptions have intervened from time to time and, over the Nation, only a minority of states--among whom Maine now assumes a place--have yet published findings. While the United States Department of Labor's Bureau of Labor Statistics and Manpower Administration each have furnished modest technical assistance to states engaged in research upon occupational demands, the main weight of the burden has fallen upon the hard-pressed statistical workers in the state agencies--the Maine Department of Manpower Affairs, Employment Security Commission in the present instance. To them, sincere thanks and congratulations are extended.

It is to be hoped that this publication of State data is but a beginning. Much more remains to be done--even greater occupational detail is needed, more geographical coverage should be established and above all, since the work submitted herewith treats only the occupational demand for workers, research into their supply should be undertaken in order to more adequately fill the informational tool kit of planners in education and manpower training.

The report by no means provides "the answer" to the question of future occupational patterns--rather it is a tool which, intelligently applied, will aid perceptive enquirers in charting more effective courses of action.

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Ray A. Fongemie, Director  
Manpower Research Division





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## INTRODUCTION

The decade of the 1960's saw significant expansion in manpower training and vocational education programs designed to provide youths, the disadvantaged, and other workers with occupational skills needed to compete for meaningful careers in tomorrow's job market. Much of the legislation enacted during the decade, including the Manpower Development and Training Act of 1962 and the Vocational Education Act of 1963, stipulated that training be conducted for occupations that are realistic in light of actual or anticipated opportunities for employment. To achieve this goal, educators and other training program planners require reliable information regarding future occupational manpower needs.

In order to complement the available national data with more local information on occupational needs, and to provide educators and manpower planners with an additional tool, the Manpower Research Division of the Maine Department of Manpower Affairs undertook the task of developing this report. The projections were made following the research methodology outlined in the U. S. Bureau of Labor Statistics' four volume publication entitled Tomorrow's Manpower Needs, and with the assistance and cooperation of the U. S. Manpower Administration and the U. S. Bureau of Labor Statistics.

The industry and occupational projections contained in this study were made under the following economic assumptions:

1. The international climate will improve. The United States will no longer be fighting a war, but, on the other hand, a still guarded relationship between the major powers will permit no major reductions in armaments. This would still permit some reduction from the peak levels of defense expenditures during the Vietnam conflict.
2. Armed Forces strength will drop back to about the same level that prevailed in the pre-Vietnam escalation period.
3. The institutional framework of the American economy will not change radically.
4. Economic, social, technological, and scientific trends will continue, including values placed on work, education, income and leisure.
5. Fiscal and monetary policies will be able to achieve a satisfactory balance between low unemployment rates and relative price stability without reducing the long-term economic growth rate.

6. All levels of government will join efforts to meet a wide variety of domestic requirements, but Congress will channel more funds to State and local governments.
7. Efforts to solve the problems posed by air and water pollution and solid waste disposal, although they may preempt an increasing amount of the Nation's productive resources, will not lead to a significant dampening of our long-run potential rate of growth.
8. Fertility rates will be lower than they have been in the recent past.

It should be remembered that the forecasts are not predictions but projections or approximations achieved by applying national assumptions and relationships to the Maine economy. Therefore, this study should be used in combination with other sources of occupational information, and as one more input that hopefully will improve our assessment of Maine's manpower needs.

## HIGHLIGHTS AND SUMMARY

Employment in the State of Maine is projected to rise from an average of 372,050 workers in 1969 to 417,600 in 1980, an increase of 45,550, or 12.2 percent. In addition to the demand for new workers created by industrial growth, a very important determinant of future job openings is replacement demand (see Figure A, page 4). During the 1969-1980 forecast period, 136,340 job opportunities are expected to become available because of workers retiring or otherwise separating from the State's work force. The total manpower need in 1980, then, is estimated at 181,890, or 16,536 annually.

Since World War II, a nationwide trend has developed toward white-collar jobs. In 1956, for the first time in the Nation's history, white-collar workers (professional, managerial, clerical and sales employees) outnumbered blue-collar workers (craftsmen, operatives, and laborers).<sup>1</sup> In the past, Maine has not reflected this occupational distribution. There have been significantly greater numbers of persons employed in blue-collar than white-collar occupations throughout the history of this State. However, the large percentage increase expected for white-collar workers from 1969 to 1980, in conjunction with the much smaller percentage gain projected for blue-collar workers, should mean a near-equalization of the numbers of workers in these two major occupational categories by 1980. Each category is expected to comprise slightly more than 43 percent of the total State employment. (See Figure B, page 5.)

Within the nine basic occupational categories, the largest percentage gains in employment from 1969 to 1980 are expected in professional, technical, and kindred workers (33.6%), and clerical and kindred workers (23.1%). Substantial increases should also be noted in service workers (17.6%) and craftsmen, foremen, and kindred workers (17.5%). Smaller percentage gains are expected in sales workers (11.9%), managers, officials, and proprietors (7.9%), and operatives and kindred workers (5.0%). Losses are anticipated for nonfarm laborers (-7.0%) and for farmers and farm workers (-48.5%).

The major shift in occupational trends within the last few years indicates a greater need for formal education and specialization (see Figure C, page 6). As a whole, the market supply adjusts slowly to the increasing demands of those occupations which require longer training periods. Thus, if acquired skills are to be used effectively, training programs should be geared toward these future manpower needs.





Openings are Determined by Growth Plus Replacement  
 (Workers Needed, 1969-1980, in thousands)

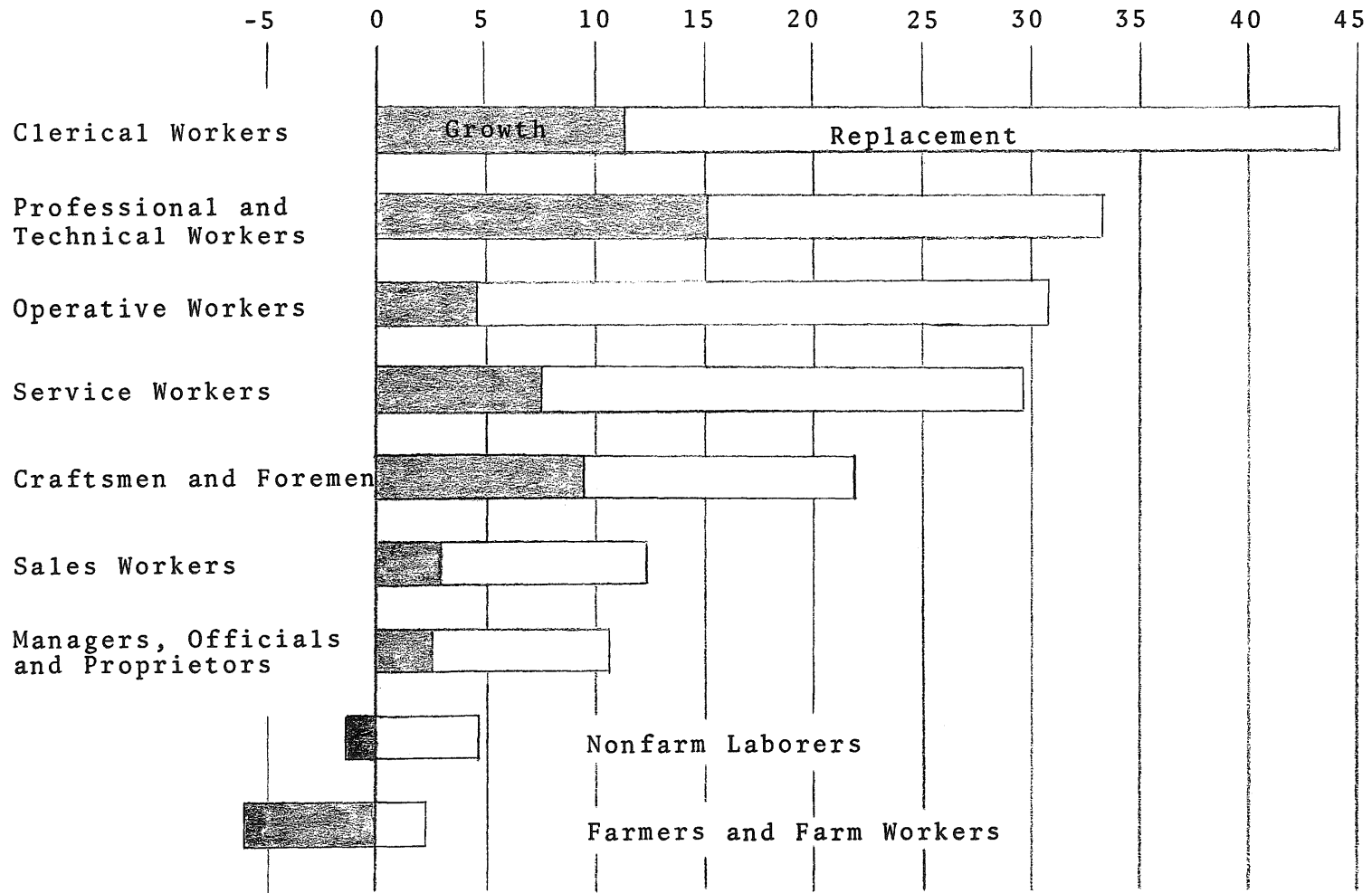


Figure A.



The Trend Toward Equal Numbers of White- and Blue-Collar Workers in Maine

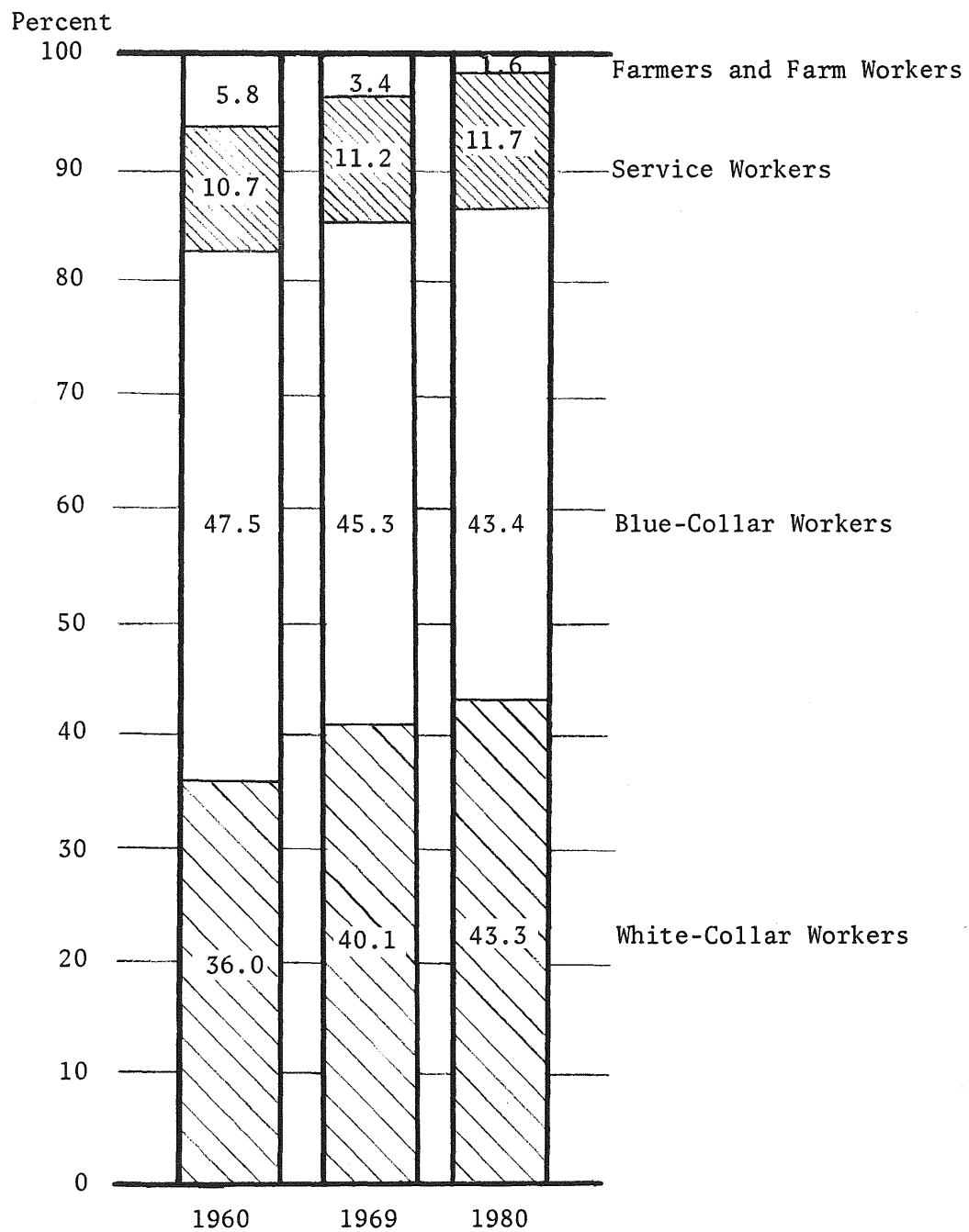


Figure B



More Jobs Will Require Extensive Education and Training

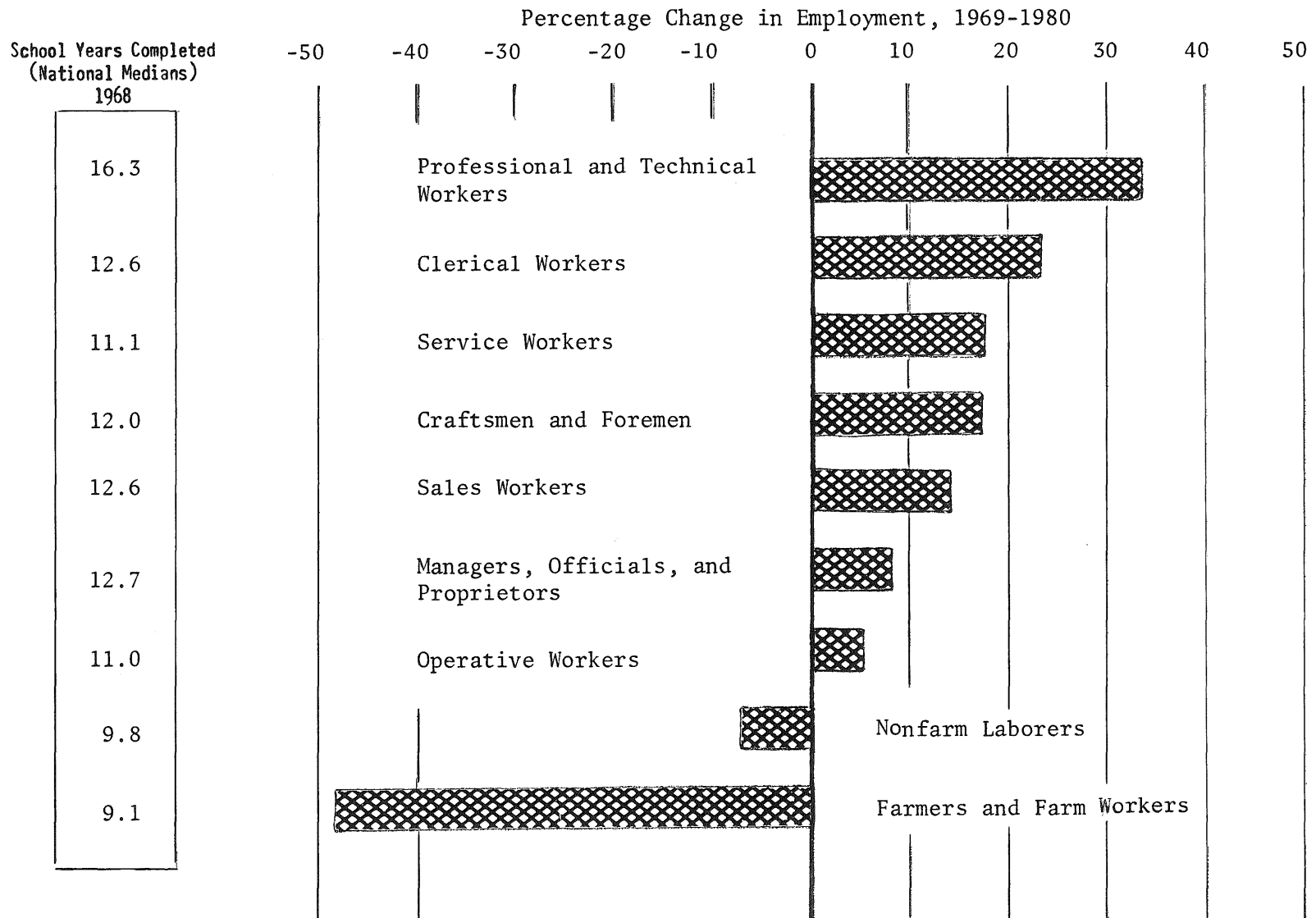


Figure C.



PART I

INDUSTRIAL MANPOWER NEEDS

1960-1980





## INDUSTRIAL DETAILS AND EXPLANATORY NOTES

Part I of this study analyzes trends of employment by industry for the State of Maine. The arrangement and definition of these industries are based on the text of the 1967 Standard Industrial Classification Manual. To maintain homogeneity, however, three departures from the Standard Industrial Classification system were implemented: Workers at the Portsmouth Naval Shipyard in Kittery, who are classified under government in the SIC system, were grouped with transportation equipment workers for the purposes of this report; public school teachers, who are separated from educators in private and parochial schools under the SIC system, were joined with them under educational services in this study; and medical services personnel who are segmented into the government and services divisions by the SIC system, are grouped together under medical services in the services division in this study. These changes were made to avoid duplication and confusion, and to insure the analysis of groups by activity rather than form of organizational control.

Included are ten major industry divisions and eighteen major groups, two of which are subgroups of agriculture and sixteen which are subgroups of manufacturing. The analyses begin with a description of each industry division, group, or subgroup, and end with a discussion of trends, developments, and future expectations within these categories. Industries which are virtually nonexistent in Maine such as tobacco and petroleum refining have been excluded.

### A. AGRICULTURE, FORESTRY, AND FISHERIES

The agriculture group is divided into two general categories. The first, agricultural production, includes farms which grow vegetables and fruits, and which keep all kinds of livestock. The second, agricultural services, includes establishments engaged in supplying agricultural services such as horticultural and animal husbandry, and establishments primarily engaged in hunting, trapping, and game propagation. The forestry group covers timber tracts, forest nurseries, reforestation and the gathering of gums and barks. Fisheries includes commercial fishing for shellfish and finfish, fish farms, fish hatcheries, and the gathering of seaweed.

#### 1. Agricultural Production and Agricultural Services

This State has experienced a rapid decline in its agricultural work force in the past few years. Agricultural employment in Maine is expected to decrease from 15,510 in 1969 to 7,514 in 1980. Nationwide, the trend of employment in agriculture has also been downward, a pattern expected to endure, but the rate

of decline is expected to be greater in Maine. This general downward trend is a result of the nationwide pattern of increased mechanization, larger farms, and the substitution of capital investment for labor.

Most of Maine's agricultural employment is in potato production, an industry which is experiencing restructuring, changes in inputs, and mechanization. In 1960 there were relatively few mechanical potato harvesters operating in Aroostook County, the State's major potato-producing area. During the 1970 and 1971 harvests, however, a survey revealed that 70 percent of the crop was harvested mechanically.<sup>2</sup>

Dairy, egg, poultry, apple, and blueberry farmers are also expected to decrease in number in years to come, although not as rapidly as potato farmers. The cost-price squeeze in agriculture has been a major factor contributing towards increasing farm size. This trend towards larger farms is expected to continue.

## 2. Forestry and Fisheries

Nationwide projections indicate little change of employment in forestry and fisheries to 1980. By contrast, employment in this segment in Maine is expected to decrease from 2,897 to 2,401 or by 17 percent between 1969 and 1980. Most of the decline in this group is likely to be felt in the fisheries industry, since the demand for forest services is expected to remain relatively stable.

Shellfish and finfish catches have fallen in recent years, and some evidence indicates that replacement of retiring full-time fishermen has been at a slow rate. The offshore fish catch, which totalled 218.7 million pounds in 1968 fell to 142.6 million in 1971 after three years of steady decline.<sup>3</sup> The contraction of the seafoods industry, however, might be reversed if better conservation practices could be enforced by interstate and international fishing agreements. At present, foreign ships which fish Maine's coast have been reported to use improper ocean management practices, failing to allow replenishment by regulating the size of fish caught. This problem is prevalent in the lobster industry as well, since interstate and international boats which fish Maine's waters are governed by more liberal rules. If these problems are resolved, it is estimated that the fish supply would increase and that the seafood industry would rebound.

## B. MINING

The mining division includes all establishments engaged in the extraction of minerals occurring naturally: solids such as limestone and ores; liquids such as petroleum; and gases such as natural gas. Mining also includes quarrying, well operation, milling, and other prep-

aration needed to render the material marketable. Conversion processes such as concrete production are considered to be manufacturing and are classified under stone, clay, glass, and concrete products.

Total employment in mining has been declining nationally for about two decades. Since 1963 the rate of decline has slowed appreciably, and in 1969 a small upturn transpired. Improvement, however slight, has continued into the 1970's.

Although Maine is not a mining state, there has been limited mining activity here in recent years, and geological evidence indicated that new ore deposits may be discovered. During the late 1960's and in the 1970's the search for minerals has been conducted in Aroostook, Hancock, Knox, Lincoln, Penobscot, Piscataquis, Somerset, Waldo, and Washington counties. Zinc, copper, granite, limestone, and clay are some of the minerals extracted in Maine.

In terms of employment the mining industry in the State is comparatively small, but has appreciable growth potential. A major discovery could cause a substantial rise in the employment position which mining holds. State employment in this division has been following the national secular decline and current projections indicate continuing attenuation in the next decade. As previously mentioned, however, exploratory activity is underway and a major strike could completely change the forecast. Mining employment is dispersed randomly across the State and no clear concentration appears in any county.

#### C. CONTRACT CONSTRUCTION

The contract construction industry includes establishments primarily engaged in building roads, new structures, additions, alterations, and repairs. Three broad types of construction activity are covered: (1) building construction by general contractors, (2) other construction by general contractors, and (3) construction by special trade contractors.

General building contractors are engaged in the construction of all types of buildings. Other general contractors, also known as heavy construction contractors, are primarily engaged in the construction of roads, bridges, piers, dams, and sewage treatment facilities. Special trade contractors are primarily engaged in specialized construction activities such as plumbing, painting, electrical work, and carpentry.

Construction employment is distributed throughout the State, being most intensive in Cumberland, the most populous Maine county. Employment in this industry increased from 22,039 workers in 1960 to 25,774 in 1969, an increase of 16.9 percent. By 1975, projections indicate that industry employment will reach 31,802, an increase of 44.3 percent over 1960; by 1980, an estimated 34,575 workers should be employed, an increase of 56.9 percent over the 1960 figure.

Nationally, clerical and blue-collar workers account for 83 percent of the construction industry's employment with approximately the same proportion in each of the division's three major industry groups.<sup>4</sup>

Building construction accounted for 39 percent of the industry's average 1971 employment in Maine as opposed to about 29 percent nationwide; Maine's special trade contractors totalled 38 percent statewide and 50 percent nationally; and 23 and 21 percent were employed in heavy construction in Maine and the Nation, respectively. The construction industry accounts for 10 percent of nonmanufacturing employment in the State, but employs a very small proportion of women.

Nationally, manpower requirements in construction are expected to rise by nearly one fourth between 1965 and 1975.<sup>5</sup> Activity should be stimulated by an increase in population, higher levels of personal and corporate income, population shifts from cities to suburbs, along with an increase in government expenditures for highways and schools, and rising expenditures for new industrial and commercial facilities.

This national employment rise is expected to bring job increases to all three construction groups. Rapid gains are expected among heavy construction contractors, largely because of the Federal Government's long range highway development program. A rapid increase in employment also is expected in special trades because of multi-bathroom homes, air-conditioning, and more extensive wiring systems required by the growing use of electrical appliances and machines. A moderate increase is expected among general building contractors due to more residential building.

A variety of new technological developments are expected to change the occupational structure of the construction industry. Increases in size, capacity, speed, and mobility of machinery will decrease requirements for operators. New construction methods should increase worker efficiency. These labor-saving changes should reduce the proportion of craftsmen and laborers, and modify the rates and direction of change within individual occupations. For example, the proportion of carpenters is expected to decline significantly due to the use of prefabricated components.<sup>6</sup>

On the brighter side, the ratio of mechanics should increase in response to the growing use of scrapers, concrete paving machines, and other mechanical equipment. A greater demand for engineers is expected to increase the proportion of professional and technical construction workers. Also, the proportion of machinery operators should rise due to an increase in heavy construction activity. The ranks of laborers performing material handling jobs are expected to diminish due to a greater use of forklift trucks, conveyors, cranes, and hoists.

Clark's projections for construction in Maine include a slight increase in the proportion of professional workers, a decline in craftsmen and laborers, and an increase in the demand for operatives.<sup>7</sup>

## D. MANUFACTURING

Maine's manufacturing differs sharply in composition from that of the Nation. About 60 percent of national manufacturing employment engages in production of durables, an activity accounting for only about 40 percent of the State's manufacturing workers. In contrast, nondurables accounted for about 40 percent of national manufacturing employment as opposed to about 60 percent in Maine.

The State's three largest employing industries--leather, lumber, and paper--together comprise about 50 percent of Maine's manufacturing employment as compared with only nine percent nationally. A comparison of the State and national employment distribution of wage and salary workers is presented on Figure 3, page 56.

Over the past 24 years, the State's wage and salary employment in manufacturing has undergone a secular decline, the trend falling 11 percent during that period. For individual years, values have fluctuated cyclically around the trend line, hitting peaks in the war years, 1952 and 1968, and troughs in 1949, 1954, 1958, and 1971. These trends are depicted on Figure 1, page 54. On the other hand, the value of the gross product from manufacturing increased substantially during these years. Even when adjusted for inflation, it rose from \$670 million in 1950 to a 1970 level of \$987 million (1967 dollars).<sup>9</sup>

Historically, manufacturing in Maine has been greatly influenced by national trends. Total manufacturing employment in the Nation is expected to rise from 20.1 million in 1968 to 22.4 million in 1980, a rate of 0.9 percent annually.<sup>10</sup> The State's manufacturing sector, correspondingly, is expected to expand from 125.3 thousand workers in 1969 to 134.9 thousand in 1980, at an average rate of 0.7 percent per year.

Manufacturing employment is dispersed across the State. Cumberland, Androscoggin, York, and Penobscot counties, (in that order) are the four leading counties, and account for about half of all manufacturing jobs.

### 1. Food and Kindred Products

The food industry includes establishments manufacturing products for human consumption and prepared feeds for animals. It consists of meat, dairy, fruit, vegetable, seafood, grain, bakery, and confectionery processing establishments; and beverage and syrup producers.

Employment in the food industry in Maine is expected to rise slightly to 12,418 in 1975, and to 12,498 by 1980, increases of 1.5 and 2.2 percent, respectively, over 1969. The occupational outlook for Maine is for increases in the operative, craftsmen, and office and clerical occupations. A slight rise

is expected in the number of professional and technical workers, while the number of laborers should remain unchanged.

The food and kindred products industry, accounting for approximately ten percent of the State's manufacturing employment, has food processing plants widely distributed throughout Maine. The greatest employment concentration is in Aroostook County because of its large potato industry. Cumberland County, which accounts for the second largest number of employed, has a variety of food processing establishments which produce bread, baked beans, dairy products, and clam chowders. Seafood processing plants are located along the coast in Knox, Lincoln, and Waldo counties; vegetable, poultry, and berry canning plants are located farther inland in Kennebec and Penobscot counties.

The two largest segments of the industry totalled 7,750 wage and salary workers, or nearly 67 percent of the food and kindred products workers in 1971. Meat packing employees accounted for 21.5 percent, while 45 percent were engaged in canning and preserving fruits, vegetables and seafoods. The remaining workers served in establishments producing dairy products, bakery goods, beverages, grain mill products and other miscellaneous foods.

Especially notable within this group between 1960 and 1970 were changes in frozen foods, which doubled its employment; in poultry processing, which added 200 workers; and in canned foods, which declined.

Nationally, production workers account for about 66 percent of the total employment in food and kindred products, while Maine's proportion of production workers is substantially higher, an estimated 82 percent.

The number of professional and technical workers in the Maine food industry has remained static since 1960, while the proportion of managers, salesworkers, office workers, and craftsmen has declined considerably. This may be attributed to the fact that the larger industries, including meat and canned and preserved food producers, employ a very high proportion of production workers. Moreover, a recent drop in the total number of firms has decreased the number of jobs for officials, managers, and clerical workers.

Nationally, this industry is expected to experience a slight decline in manpower requirements. Nationwide employment in meat processing is expected to fall mainly because of the use of new labor-saving devices. Gains are anticipated in the canned and preserved food group due to the increasing consumer demand for dietetic and other specialty foods.

## 2. Textile Mill Products

The textile industry includes establishments engaged in any of

the following functions: (1) preparation of fiber and manufacture of yarn, thread, braids, twine, and cordage; (2) manufacturing broad and narrow woven fabric, knit fabric, carpets, and rugs from yarn; (3) dyeing and finishing fiber, yarn, fabric, and knit apparel; (4) coating, waterproofing, or otherwise treating fabric; (5) the integrated manufacture of knit apparel and other articles from yarn; and (6) the manufacture of felt and lace goods, bonded-fiber fabrics, and miscellaneous textiles.

Two types of mills are included in the industry: (1) the integrated mill, which produces textiles within the establishment and sells the finished products; and (2) the contract or commission mill which processes materials owned by others.

The textile industry in Maine includes four major categories: the broad woven fabric mills, wool; the broad woven fabric mills, cotton; the dyeing and finishing textiles; and the yarn and thread mills industries. In 1970 broad woven wool fabric mills represented the largest segment accounting for about 40 percent of total employment in textiles. The other three account for 38, 11, and 9 percent of the industry employment, respectively.

The textile industry has been an important part of the central and southern Maine industrial structure for many years. The prosperity of factories in the early 1900's resulted in the construction of huge textile mills in the Augusta, Lewiston-Auburn, and Biddeford-Saco areas. These firms became mainstays of their communities and a vital part of the State's economy.

The long-term decline in the Maine textile industry continued through the 1960's. Employment fell from 13,863 in 1960 to 11,683 in 1969. Correspondingly, employment in the industry as a percentage of total manufacturing employment in the State declined from 11.9 percent in 1960 to 9.3 percent in 1969.

While Maine textiles registered a 15.7 percent drop in employment from 1960 to 1969, national employment in the industry increased by about four percent. Current projections, however, suggest that textiles nationally may begin a general downward course, at least through the 1970's. Projections for Maine also indicate a general downward trend throughout the 1970's to 1980. By 1975, employment is expected to drop to 9,875, accounting for only 7.6 percent of manufacturing workers; by 1980, the number of textile jobs will be about 8,893 or 6.6 percent of total manufacturing employment.

With the expected decline in textile employment to 1975 and 1980, the need for laborers and operatives who now comprise 87 percent of the industry's labor force should decrease markedly. On the other hand, the number of white-collar workers is expected to increase slightly by 1975 and 1980, and consequently to comprise a higher percentage of employment.

### 3. Apparel and Other Finished Products Made from Fabrics and Similar Materials

The apparel industry includes establishments which produce clothing and fabricate other products by cutting and sewing woven or knit textile fabrics and related materials, such as leather, rubberized fabrics, plastics, and furs.

Included in the apparel industry are three types of establishments: (1) the inside factories, (2) contract factories, and (3) apparel jobbers. The inside factories perform all of the usual manufacturing functions within their own plant; the contract factories manufacture apparel from materials owned by others; and apparel jobbers perform the entrepreneurial functions of an apparel company, such as buying raw materials, designing and preparing samples, arranging for the manufacture of the garments from their materials, and selling the finished products.

Employment in Maine's apparel industry rose from 2,624 workers in 1960 to 3,283 in 1969, an increase of 25 percent. Approximately 45 percent of the employment is in men's and boys' furnishings, while the remainder is in women's and misses' and children's outerwear, hats, caps and millinery, miscellaneous apparel, and miscellaneous fabricated textile products.

The apparel industry accounts for about three percent of the State's total manufacturing employment. Most of the industry's workers are located in Kennebec, Cumberland, York, and Knox counties. Production workers account for about 95 percent of the total employment, as compared to the national average of nearly 89 percent.<sup>11</sup>

By 1975, about 3,750 workers should be employed in the apparel industry, and by 1980 employment should increase to 4,100. Increased consumer demands in a growing and more affluent population will no doubt cause considerable expansion in this industry.

Unsolved engineering problems, however, have inhibited the spread of technological innovations in the apparel industry. Therefore, it appears technical improvements should have little effect on employment requirements in the near future. The trend toward larger firms should result in few changes in occupational structure. The "semiskilled operatives" group, which now comprises over three quarters of apparel employment, should undergo a moderate increase in employment during the decade ahead.

### 4. Lumber and Wood Products, except Furniture

The lumber industry includes logging camps engaged in cutting timber and pulpwood; merchant sawmills, lathe mills, shingle



mills, plywood mills and veneer mills engaged in producing basic lumber and wood materials; and establishments engaged in manufacturing finished articles made entirely or mainly of wood or wood substitutes.

Although the lumber industry is geographically dispersed throughout every county of the State, industry employment is concentrated in Oxford, Aroostook, Somerset, and Franklin counties, in that order. As would be expected, lumber employment is most extensive in the most sparsely populated, heavily forested areas of Maine.

Lumber and wood products is the third largest manufacturing industry in Maine. One third of the workers in this industry group are engaged in logging, including pulpwood logging; one fifth work in sawmills and planing mills; and one tenth are involved in the production of plywood and veneer. The remaining 35 percent are employed in the manufacture of miscellaneous wood products such as dowels, pallets and particle board. There were 16,358 workers in the industry group in 1969, with production workers comprising about 90 percent of the total employment.

In the past, employment in this group has been falling as a result of the decline in logging, sawmills, and establishments producing wooden containers. Recently, however, this contraction has virtually ceased both nationwide and in Maine, and no significant change is expected in the State between 1969 and 1980.

The occupational structure of lumber and wood products may experience some change due to mechanization and the enlargement of firms. Mechanical tree harvesting is expected to decrease the need for chain saw operators and related occupations, while increasing the demand for mechanically-skilled workers to operate tree harvesting and other new equipment.

##### 5. Furniture and Fixtures

The furniture group includes establishments engaged in manufacturing household, office, public building, and restaurant furniture and fixtures. It is comprised of manufacturers of wood, metal, and upholstered chairs, tables, bureaus, beds, desks, lockers, and venetian blinds.

The furniture industry in Maine employed nearly 900 persons in 1960. During the next three years employment dropped to about 800, and then returned to 900 in 1964. In the first quarter of 1965 and again at the end of 1967, a large plywood firm experienced changes of ownership and product mix. The firm's reclassification from plywood to cabinet production swelled furniture employment from 900 in 1964 to 1,400 in 1967.

Following the second reclassification in 1968, employment reached 1,000 workers. Since that time the industry has employed between 900 and 1,100 persons annually.

In 1969, furniture firms employed about 1,076 workers. By 1975 and 1980, employment is predicted to increase to 1,581 and 1,779 persons, respectively. Presently, the four largest firms are located in Piscataquis, Waldo, Oxford, and York counties.

Nationally, employment in this industry grew from approximately 385,000 in 1960 to about 485,000 in 1969. Current projections indicate that 535,000 furniture workers will be needed by 1975 and 620,000 by 1980. The demand for furniture will undoubtedly be stimulated by continued increases in population, in new family formation, and in disposable personal income.

The application of new technology should have a significant impact on this industry's occupational structure. The proportion of upholsterers is expected to decline as the use of power equipment such as nailers, staplers, tackers, and clippers becomes more widespread. Technology is also expected to reduce the need for cabinetmakers. As the requirements for craftsmen decrease, however, the need for foremen, mechanics, and repairmen should rise. Consequently, the number of occupational requirements in the furniture industry is not expected to change.

#### 6. Paper and Allied Products

The paper industry includes establishments which manufacture pulps from rags, wood, and other cellulose fibers; which produce paper and paperboard; and which fabricate paper and paperboard into other products, such as bags, boxes, and envelopes.

Paper employment is greater in Penobscot and Cumberland counties, respectively, with lesser concentrations in Kennebec and Oxford counties. It is distributed rather evenly over the rest of the State, except in the coastal counties of Knox and Waldo where little or no paper employment is recorded.

Calendar year 1971 was a difficult one for the paper industry. A sharp decline in the demand for market pulps throughout the world as the result of a recessionary trend, coupled with excessive industry inventories accumulated during 1970, were responsible for a disappointing period for paper manufacturers.<sup>12</sup>

Maine's paper industry historically has been one of the largest and most stable industries in the State. Paper mill wage and salary employment averaged between 17,700 and 18,800 workers

from 1965 through 1970. In 1971, this employment dropped by 1,000 persons, but nearly 500 were involved in strikes lasting two or three months in three large firms. The wage and salary employment estimate for January 1972 was 16,800 persons, 400 below the previous January. Over the past decade, very large capital investment programs have been completed in certain paper mills.

If the national economy continues to grow in 1973 as predicted, the paper industry could improve substantially and induce a moderate employment growth during this decade. Current projections concur with this forecast, and total paper employment is expected to rise to 18,754 in Maine by 1980, a 5.8 percent gain over 1969.

#### 7. Printing, Publishing, and Allied Industries

The printing industry includes establishments engaged in printing and those performing services for the printing trade. Printing may be performed by letterpress, lithography, gravure, or screen. Printing services may include bookbinding, typesetting, engraving, photoengraving, and electrotyping. Other establishments included in the printing industry are publishers of books, newspapers, and periodicals, regardless of whether or not they do their own printing.

Printing employment in Maine is dispersed widely throughout the State, a result of local newspaper employment. Cumberland County, however, has a higher concentration of employment in this group than any other county.

Printing and publishing is a leading national industry. In 1968, it provided employment for more than one million Americans, and it is expected to grow nationally at an annual rate of about 1.4 percent during the next decade.<sup>13</sup> Approximately 70 percent of Maine's printing and publishing workers are employed by newspapers, the remainder by commercial printers. Printing and publishing also includes magazines, books, advertising matter, business forms, greeting cards, typesetting, photoengraving, platemaking and printing services. The expansion of the United States economy and the increased use of printed matter should effect a moderate rise in activity in this industry.

Printing and publishing is not a key industry in the State, but has grown moderately in recent years. Gains in total employment in printing and publishing have been projected at about 16 percent between 1969 and 1980.

#### 8. Chemicals and Allied Products

The chemical industry includes establishments producing basic chemicals or establishments manufacturing products by predomi-

nantly chemical processes. Three classes of products are included in this group:

- (1) Basic chemicals such as acids, salts, alkalies, and organic chemicals
- (2) Chemical products used for manufacturing such as plastic materials, pigments, and synthetic fibers
- (3) Chemical products used for final consumption, as drugs, cosmetics, paints, fertilizers, and explosives

The chemical industry which is important nationwide, employing over one million workers and accounting for six percent of manufacturing employment, is expected to grow moderately in the next decade. Statewide growth in chemicals employment should parallel that of the Nation. However, since Maine's chemical industry is small, accounting for less than one percent of statewide manufacturing employment, the national rate of increase will not have a material impact upon the State's job trend.

Most chemical plants in Maine are small establishments which produce fertilizer or basic chemicals, usually for ultimate consumption. Geographically, chemical employment is unevenly distributed throughout the State. Concentrations occur in Aroostook, Knox, and York counties, and lesser employment occurs in other counties.

#### 9. Rubber and Miscellaneous Plastics Products

The rubber and plastics industry includes establishments manufacturing products derived from natural, synthetic or reclaimed rubber, gutta percha, balata, or gutta siak; establishments manufacturing or rebuilding retreaded tires; and establishments engaged in molding primary plastics and manufacturing finished plastic products.

The recent increase in rubber footwear production has metamorphosed the structure of the Maine rubber and plastics products industry. In past years the bulk of the industry's employment was in plastic products. Recent records, however, show that half of this industry employment is in plastics, while 45 percent is in rubber footwear. The remaining five percent are engaged in producing tires and other fabricated rubber products.

The rubber and plastics industry, with its largest firms located in Androscoggin, Aroostook, and York counties, seems to be at an early stage of growth in Maine. A near fifty percent rise in employment has been projected between 1969 and 1980,

an increase from 3,137 to 4,648. In the same period, national rubber and plastics employment is expected to increase by around 30 percent. Because of the labor requirements of the industry in Maine, there should be a growing demand for production workers. As a result, their relative importance is expected to increase in coming years.

10. Leather and Leather Products - *Not accurate*

The leather industry includes establishments engaged in tanning, currying, and finishing hides and skins, establishments manufacturing finished real and artificial leather products, and leather converters.

Leather industry employment is most intensive in Androscoggin, Cumberland, and Penobscot counties, in that order, and is dispersed fairly evenly throughout the rest of the State, except in Hancock, Washington, and Lincoln counties, which have little recorded employment.

Leather and leather products accounts for more workers than any other manufacturing industry group. During most of the 1960's it registered strong gains in employment. From a low of 24,060 in 1960, the number of wage and salary workers surged to a high of 30,762 in 1968. At the same time, national employment in the industry declined from 363,400 in 1960 to 355,200 in 1968.

Leather and leather products employment in Maine, despite an unsettling recent decline, is expected to show substantial increases in the next five to ten years. According to projections, the total number of leather industry employees should increase to 32,171 by 1975, and to 34,430 by 1980. Although these projections may seem optimistic in the light of recent events, several factors are gradually emerging which lend weight to the projected figures. There seems to be a growing tendency toward corporations owned and/or operated by management teams who possess the marketing expertise necessary to develop small businesses into dynamic enterprises. The apparent infusion of a greater diversity of talents may help meet the challenges in the industry.

Most of the leading shoe firms in the State now diversify their production lines to keep abreast of the rapidly changing consumer preferences in shoes. As a result of this increased sensitivity for the market, Maine shoe manufacturers are regaining their positions as style setters in American footwear. Besides marketing more aggressively, many of the leading shoe manufacturers in this State are seeking to improve their competitive position vis-a-vis their foreign counterparts by incorporating many of the latest technological developments into their production lines. Such equipment as the injection molding, thermolasting, and geometric lasting machines hopefully will boost productivity

and lower costs, giving the domestic producers a competitive edge.

The introduction of new equipment will eliminate some occupations and reduce the need for others, but future demand for stitchers, who make up about one third of the shoe industry's labor force should remain great. Also indicated for the future is an increased need for maintenance workers and other mechanics to service the ever more complex machinery. Blue-collar workers still comprise 85 to 90 percent of the industry's labor force and despite technological advances, leather and leather products should remain an extremely labor-intensive industry, both nationally and statewide.

#### 11. Stone, Clay, Glass, and Concrete Products

This group includes establishments engaged in manufacturing glass products, cement, structural clay products, pottery, concrete, gypsum products, cut stone, abrasive, and asbestos, from materials taken principally from the earth in the form of stone, clay, and sand.

The industry accounts for a very small portion of the State's total work force estimate: annual average employment in 1969 was only 1,289. Employment in these businesses fluctuates according to seasonal demands for their products, such as Christmas tree ornaments. Seasonality also characterizes the manufacture of concrete blocks and bricks because of the summertime demands of construction firms.

From 1970 to 1975, total nationwide employment is expected to increase by 5.1 percent, and from 1975 through 1980, by 17.8 percent. Within the State, employment in the industry rose by 14.7 percent from 1960 to 1969. Projections for 1969 through 1975 indicate an increase of 23.7 percent and for 1975 through 1980, an additional rise of 11.1 percent.

The greatest geographical concentration of employment in this industry occurs in Knox, Androscoggin, York, and Cumberland counties, in that order. Employment is dispersed rather evenly throughout the rest of the State.

Stone, clay, and glass is one of the smaller industries, both nationwide and statewide in terms of employment. It accounts for about three percent of national manufacturing employment and one percent in the State. Although substantial increases are anticipated in the future, they are not expected to have a truly major impact on Maine's economy.

#### 12. Primary Metal Industries

The primary metal industry includes establishments engaged in

the smelting and refining of metals from ore, pig or scrap; the rolling, drawing, and alloying of finished metals; the manufacture of nails, spikes, and insulated wire and cable; and the production of coke.

Nationwide employment in this industry increased by 6.8 percent from 1960 through 1970. During the 1970 to 1975 period, however, a slowdown is predicted which should limit the employment gain to about two percent. Two factors are expected to contribute to this slackening--automation, which has entered an industry already plagued with excess capacity; and imports, which have flooded the domestic market.<sup>14</sup>

This industry is not a large supplier of jobs in the State, its employment comprising barely one percent of manufacturing employment compared with seven percent nationally. It has grown rapidly, however, experiencing a 159 percent increase from 1960 to 1969. This growth was centered in one large plant; therefore, the surge may not continue as strongly in the future. Statewide projections call for a gain of about 36 percent from 1969 to 1975 and an increase of about 21 percent from 1975 to 1980.

Geographically, industry employment is concentrated in Androscoggin, Cumberland, Kennebec, Penobscot, and York counties. Other Maine counties have very little employment in this industry.

13. Fabricated Metals, excluding Machinery and Transportation Equipment<sup>15</sup>

The fabricated metals industry includes establishments engaged in the production of metal products such as metal cans, tinware, hand tools, cutlery, hardware, nonelectric heating apparatus, fabricated structural metal products, metal stampings, and other metal products.

Employment in fabricated metals in Maine is expected to increase substantially from 1969 to 1980, from 3,565 to 4,300, or by 20.6 percent. Located primarily in the industrialized southern part of the State, this relatively new industry has fast developed into a potentially significant source of job opportunities. Currently, however, it employs only about one percent of the State's working population. Anticipated growth in this industry on a national basis will be about 12 percent over the forecast period.

The demand for fabricated metal products should grow concomitantly with increased activity in the building and construction trades, with expansion in the demand for consumer durables, and with the increasing needs of complementary industries. A potentially strong retarding influence may come from the concerns

of environmentalists over the proliferation of disposable metal goods, especially packaging materials. Also of concern are the needs of several firms involved in the production of armaments and shipbuilding materials. Any significant decline in public spending may cause severe setbacks in employment for them.

Approximately 70 to 75 percent of each firm's work force is comprised of production workers. This proportion should remain nearly the same over the next ten years. However, the relative occupational composition within the production worker group will turn from operatives and skilled machinists toward more maintenance and supervisory personnel. Widened use of mechanical operators and automated production-related systems will inhibit any expansion in the employment levels of machine operators. Expanded operations will require more persons trained in repair work and in floor management and it is these groups which will experience the greatest growth.

14. Machinery, except Electrical

The nonelectrical machinery group includes establishments engaged in manufacturing machinery and equipment. Machines powered by built-in or detachable motors and portable tools, both electric and pneumatic, are contained in this division, with the exception of household appliances and hand tools. This consists specifically of engines, turbines, farm machinery, construction machinery, metalworking machinery, office machines, and other general machinery and equipment.

Establishments engaged in this group are predominantly located in southern Maine with employment concentrated in York County. The rate of growth in the nonelectrical machinery industry is closely tied to trends in the national economy and a moderate rate of growth in employment is expected in the next decade. Employment in the nonelectrical machinery industry in Maine is not large in comparison to other manufacturing industries; a few employers account for most of the employment in the industry.

In view of present economic trends, projections of large additions to manpower needs in the nonelectrical machinery industry would be unrealistic. However, the number of jobs in this industry could increase substantially if new firms were to relocate in Maine. The success of new machinery plants in the State indicates that the machinery industry has substantial potential.

15. Electrical Machinery and Equipment

The electrical machinery group includes establishments engaged in manufacturing machinery, apparatus, and supplies for the



generation, storage, transmission, transformation, and utilization of electrical energy. It consists of industrial electrical equipment, household appliances, lighting and wiring equipment, and other electrical machinery.

Employment in this category is centralized in York and Cumberland counties, while lesser numbers of workers are employed in the other counties. Maine's comparatively young electrical machinery industry has developed rapidly since 1960 and will undoubtedly continue to grow during the decade of the seventies. Currently, the majority of activity is concentrated in the southern Maine counties and perhaps a half dozen firms constitute the major employers. Employment is expected to rise from 5,332 in 1969 to 5,931 in 1980, an increase of 11.2 percent. This growth rate is about four percentage points less than that expected for the Nation as a whole. Maine's share of the total nationwide employment in this industry is less than 0.3 percent, a proportion not expected to change over the forecast period. Despite tremendous expansion in the past few years, the percentage of Maine employment involved in electrical machinery is approximately 1.4 percent.

Employment in the electrical machinery trades will be affected by several developing trends. The primary factors causing growth will be the boom in computer-based technology and its ever-widening applications, increased consumer demand for electrical appliances, and burgeoning needs for all forms of communications. Over the next ten years the number of computers in use is expected to double and, as leisure time and individual incomes increase, people will require more electrical appliances, televisions, radios, and various types of sound systems.

The biggest detriments to employment expansion will be a projected decline in defense spending, and imports of both parts and finished products.

Currently, about 85 percent of the work force employed by Maine's electrical machinery producers is composed of production workers. This percentage, while far above the national figure, reflects the specific nature of the industry in Maine. Most of the work involves benchwork and assembly operations and does not require many technically skilled people. Within the coming decade the proportion of laborers and nontechnical workers will decrease as mechanized processes become more prevalent. Conversely, the need for floor supervisors, inspectors, and managers is expected to increase.

#### 16. Transportation Equipment

The transportation equipment industry includes establishments engaged in manufacturing or repairing equipment for the trans-

portation of passengers or cargo by land, air, and water. These products include motor vehicles, aircraft, ships, and railroad equipment.

Geographically, York and Sagadahoc counties, in that order, have the most intensive transportation industry employment, due to the location in these counties of the two largest shipyards in the State. Over 90 percent of transportation equipment workers are engaged in shipbuilding, and 75 percent of these are employed in these two shipyards. In 1960, it had declined to 13,408 partly as a result of layoffs in the shipbuilding industry.

Current projections indicate further declines in this industry group in Maine. By 1975 employment in transportation equipment is expected to drop to 10,409 or to 8.1 percent of total manufacturing employment. By 1980, this figure should level at about 10,537, or 7.8 percent of manufacturing workers in the State.<sup>16</sup> This anticipated decrease will probably have the greatest effect on skilled tradesmen and other blue-collar workers since they make up about 80 percent of the industry's manpower needs.

Evaluation of projections in the transportation equipment group must consider that government policy is a major determinant of the direction of this industry, especially of shipbuilding. Although current sentiment and policy in government seems to lean toward reduction of defense expenditures, events may alter this mood. Consequently, the projected decline in the industry could become an expansion should a shift occur in the ordering of national priorities.

#### E. TRANSPORTATION, COMMUNICATIONS, ELECTRIC, GAS, AND SANITARY SERVICE

This utilities division includes enterprises engaged in passenger and freight transportation by railway, highway, water, or air, and those which furnish services related to transportation. It also includes: petroleum pipeline transportation; warehousing; telephone and telegraph communication services; radio and television broadcasting; electricity, gas, steam, water; and sanitary services establishments.

As expected, the largest single concentration of utilities employment is located in Cumberland County because of the facilities at Portland and Brunswick. Penobscot and Kennebec counties have the second and third largest employment concentrations, respectively. Otherwise, utilities employment is distributed quite evenly throughout the rest of the State.

Employment in these industries is expected to remain fairly constant over the coming decade as the number of workers rises slightly, from 18,996 in 1969 to 20,129 by 1980, an increase of six percent. The

trucking, railroad, telephone, and power industries comprise the largest segments in this major group, each employing from 2,500 to 4,500 persons. Maine workers now comprise about 0.5 percent of nationwide employment in this division.

The small change in employment in this group obscures the divergent trends of constituent industries. Railroads are expected to experience declining demands for their services. Road hauling and warehousing employment should increase in order to meet the growing needs of Maine's economy. The growth will be especially marked around the larger cities and distribution centers.

The communications industry will experience both expansion and contraction. With ever-increasing demands on the media, television and radio stations may be expected to enlarge their operations. On the other hand, the number of persons working in the telephone industry should decline slightly as electronic computers assume more duties. Communications in general will see a decreasing demand for the unskilled and operative occupations while the need for managers and technicians rises.

The electric, gas, and sanitary services industry is expected to grow moderately. Despite growing needs for various sources of power, the impact of technical innovations may act to retard employment growth in these areas. Fastest expansion may well occur in the service of refuse and sewage disposal, and in air and water treatment. In both of these industries the primary demand will be for professional-technical personnel, although there will exist some replacement demand in the less skilled occupations.

#### F. WHOLESALE AND RETAIL TRADE

The trade group includes two major industries. Wholesale trade includes establishments primarily engaged in selling merchandise to retailers; to industrial, commercial, institutional, or professional users; or to other wholesalers. It also includes those establishments which act as agents in buying or selling merchandise to such persons or companies. Retail trade includes establishments engaged in selling merchandise for personal, household, or farm consumption, and rendering services incidental to the sale of goods.

Employment in the wholesale and retail trade group increased from 62,454 persons in 1960 to 72,612 in 1969. The greatest growth in this group occurred in eating and drinking places which expanded from 6,394 persons in 1960 to 9,893 in 1969. Part of the trade gain is attributable to the intensification of tourism and the resulting proliferation of new seasonal eating places and gift shops. Tourism is also largely responsible for much of the growth of general merchandise employment from 7,244 in 1960 to 9,170 in 1969. General merchandise accounts for about 12 percent of the trade group employment. Food stores, which accounts for about 15 percent of trade employment, swelled from 9,107 workers in 1960 to 11,130 in 1969.

Retail apparel declined from 3,282 in 1960 to 2,906 jobs in 1969, accounting for four percent of trade employment.

Nationally, wholesale trade employment is expected to increase more rapidly than retail employment. In Maine, however, the opposite is true. Wholesale trade in the State is stable, whereas retail trade is rising. This is believed to be a result of the shift in buying patterns among retailers. As the larger retail outlets become predominant, the shift to centralized out-of-state wholesalers is reflected in employment patterns. Since Maine is not in a central geographic location relative to large domestic markets, few inter-state wholesalers may be expected to locate here. Projections indicate that Maine's wholesale trade employment will fall slightly, from 15,723 workers in 1969 to 15,703 in 1975, and again to 15,286 in 1980.

Statewide wholesale and retail trade employment is expected to expand at a slower rate during the next decade than during the 1960's. Historically, the strength of trade employment has been influenced by earnings and population growth. Unfortunately, the State has been victimized by net outmigration of population and by low personal income per capita, trends which are expected to continue during the forthcoming decade. The development of shopping centers during the past ten years has effected a substantial boost in trade employment throughout the State. In the 1970's, as in the past, a number of smaller retail outlets which cannot compete with shopping centers may be forced out of business. The combined influence of these factors may well result in a smaller rise in employment (from 72,612 workers in 1969 to 75,986 in 1980) than the 10,000-person increase in the previous decade.

Projections indicate that employment will increase during the next decade in general merchandise, food stores, automotive, eating and drinking, and miscellaneous retail stores. Declines are expected, however, in wholesale trade, building materials, apparel and furniture retailers.

Nationally, one out of four trade workers are managers, officials, or proprietors. The consolidation of facilities into centralized outlets, however, is expected to reduce the proportion considerably. Wholesale and retail trade is an important industry in the Nation and the State. For both, it accounts for about one fifth of total employment and is generally considered a barometer of economic activity.

Geographically, trade employment is concentrated in the southernmost part of the State. Thirty-three percent of wholesale and retail trade employment is in Cumberland County, whereas approximately 14 percent is in Penobscot County. Seventy-six percent of trade employment is in five of the State's sixteen counties: York, Cumberland, Androscoggin, Kennebec, and Penobscot.

#### G. FINANCE, INSURANCE, AND REAL ESTATE

This group is comprised of establishments operating primarily in the fields of finance, insurance, and real estate. Finance includes banks and trust companies, credit agencies other than banks, holding (but not predominantly operating) companies, other investment companies, brokers and dealers in securities and commodity contracts, and security and commodity exchanges. Insurance encompasses carriers of all types of insurance, and insurance agents and brokers. Real estate includes owners, lessors, lessees, buyers, sellers, agents, and developers of real estate. Although most Maine businesses in this category are engaged in specialized activities, there are some small establishments involved in combinations of finance, insurance, and real estate, no one of which is the principal activity.

National wage and salary employment in this group increased 38 percent from 1960 through 1970, and projections indicate that it will rise by an additional 15 percent by 1980. Percentage gains in statewide employment have almost equalled national increases, and projections suggest that this trend will continue. From 1960 to 1970, State wage and salary employment in the industry increased by 36 percent. Most workers in finance, insurance, and real estate are white-collar workers, including a large number of female clericals. In Maine, these persons constituted only 3.2 percent of all wage and salary workers in 1960, and in 1969, an estimated 3.5 percent. By 1975, the industry's employment should be 3.6 percent of the wage and salary employment in Maine, and by 1980, its share should be 3.7 percent.

Geographically, the industry is dispersed throughout the State, with the greatest number of employees located in the Portland Standard Metropolitan Statistical Area.

#### H. SERVICES

The services group includes establishments primarily engaged in rendering a wide variety of services to individuals and business establishments. It includes hotels as well as establishments providing personal, business, repair, amusement, medical, legal, engineering, and other professional services. It also includes nonprofit institutions, government medical services, and public educational services. Services employment is most intensive in Cumberland, Kennebec, and Penobscot counties.

Services is a major industry division which has had considerable employment growth in the past. This division employed 60,843 persons in 1960, and 81,670 in 1969. Of the 20,827 net job additions between these years, 12,787 were in schools and colleges; 4,852 were in medical and other health services; 1,610 in nonprofit membership organizations; and 1,200 in miscellaneous business services. Smaller gains were recorded in hotels and motels, personal services, auto and other repair services, entertainment and recreational services, legal services, and miscellaneous services. Private household workers decreased

in number from 10,460 in 1960 to 9,000 in 1969.

Private medical and health service jobs rose from 8,500 in 1960 to 14,500 in 1970. Moderate annual increments of 200 to 300 jobs occurred in hospital services in each of the first three years of the decade, and also between 1965 and 1966. In the remaining years at least 500 new jobs were added annually, and from 1968 to 1971 increases ranged from 900 to 1,200.

Workers in private schools numbered approximately 3,200 at the start of the decade, and 5,400 at its close. Annual additions of about 100 workers occurred in each of the first few years, and in more recent years increases have ranged from 300 to 500.

Seasonality and tourism have a significant effect on jobs in the services division. In 1970 and 1971, services employed 40,000 to 42,000 workers in January, and 46,000 to 47,000 in mid-summer.<sup>17</sup> Approximately half of the added summer workers were employed in hotels.

A factor which may augment future employment is increased Federal aid to education. Court decisions in California and New Jersey have held that property tax financing of education is unconstitutional. Since State and local governments in most sections of the country have already utilized their other tax sources heavily, reliance upon massive Federal aid may increase to help states meet school costs. If this occurs, the infusion of new money may manifest itself in increased educational services employment. Maine, with its low educational expenditure per pupil,<sup>18</sup> should qualify for a considerable share of these funds. Other expansions in this employment division are expected to be continuations of the trends of the past decade with the largest numerical additions are expected in medical services with a projected increase of about 40 percent by 1980.

Nationally, miscellaneous business services--including such diverse activities as part-time and temporary-help agencies, military-civilian researchers and building, cleaning, and maintenance agencies--are expected to double in employment in the next decade. In Maine, although this group rose from slightly over 1,047 workers in 1960 to 2,247 in 1969, it may be optimistic to predict another doubling in the next ten years.

Statements have been published recently indicating a slowdown of the last decade's expansion in religious organizations. Many small private schools and colleges report financial difficulties and uncertain futures; church-affiliated elementary and secondary schools are also currently retrenching.

Besides the net changes in employment resulting from industrial expansion, there are also job opportunities created by turnovers. A good example of this is prevalent in the summer tourist industry where

high employment turnover and seasonality have been persistent problems. As a result, this industry usually has a high availability of jobs for new entrants to the work force.

## I. GOVERNMENT

Government employment, comprising an estimated four percent of the Maine work force, is expected to grow moderately in the next decade as a result of increases in demand for government services.

The largest group, local public administration, includes city, town, and county workers and is expected to increase an average three percent per year until 1980.<sup>19</sup> This sector will tend to change its employment composition away from unskilled workers to skilled communications and data processing workers in the projected period.

State public administration is expected to grow more slowly.<sup>20</sup> Much of the increased demand in this category will be met by centralization and automation, and will therefore require smaller infusions of new workers in the years ahead. During the forecast period, employment will increase in this group at the rate of 2.2 percent compounded annually.

Federal employment is expected to grow at about half the rate of State employment during the decade. About 60 percent of Federal employees are employed by Postal Services. This group is also expected to be affected by automation and centralization, which will retard employment growth over the projection period.

Factors which could change the growth rates of government employment in the future are now being debated in Washington. One is revenue sharing, a proposal which would allocate flat grants to State and local governments. Such grants would fund sewerage projects, highways or whatever else local governments feel is necessary. Its over-all effect would probably boost government employment, and perhaps employment in other industry groups as well. A second influence on government employment is a comprehensive manpower program aimed at placing unemployed persons in State and local jobs. Such a program as the Emergency Employment Act, if extended beyond fiscal year 1973, would boost both State and local public administration employment by more than present projections.

Government employment is distributed across the State as a result of the influence of county and local government employment. Kennebec County, including Augusta, the State capital, has the highest concentration because of State employment.





PART II

OCCUPATIONAL MANPOWER NEEDS

1969-1980



## OCCUPATIONAL DETAILS AND EXPLANATORY NOTES

The U. S. Census Bureau, for statistical purposes, divides the range of occupations into nine basic categories:

1. Professional, Technical, and Kindred Workers.
2. Managers, Officials, and Proprietors.
3. Clerical and Kindred Workers.
4. Sales Workers.
5. Craftsmen, Foremen, and Kindred Workers.
6. Operatives and Kindred Workers
7. Service Workers.
8. Laborers, except Farm.
9. Farmers and Farm Workers.

Part II of this study defines and states employment estimates for these nine broad categories, indicating trends or significant changes in occupations within each group. The general training necessary for each category accompanies its description.<sup>21</sup>

A more detailed list of occupations may be found on Table 4, page 45. Employment estimates for the years 1960, 1969, and projections for 1980 are listed for each occupation. Total manpower needs are obtained by adding the replacement needs and expansion needs for the forecast period. Also noted in this table is the average annual number of openings anticipated for each occupation.

For further occupational divisions see Table 5, page 46, which provides employment estimates for 1960, 1969, and 1980; expansion demands; replacement demands; and total manpower needs during the projection period from 1969 to 1980.

### 1. Professional, Technical, and Kindred Workers

Subgroup	Average Employment			1969-1980		
	1960	1969	1980	Expansion	Replacement	Total
TOTAL	30,730	44,730	59,750	15,020	18,310	33,330
Engineers, Technical.....	2,160	3,060	3,890	830	610	1,440
Medical and Other Health Workers.....	6,740	8,600	12,110	3,510	4,450	7,960
Teachers.....	10,680	16,940	18,680	1,740	7,230	8,970
Natural Scientists.....	470	650	830	180	120	300
Social Scientists*.....	100	100	150	50	30	80
Technicians, except Medical and Dental..	1,820	2,620	3,580	960	470	1,430
All Other.....	8,760	12,760	20,510	7,750	5,400	13,150

\*Includes economists, statisticians and actuaries, sociologists, political scientists, geographers, historians, anthropologists, and other professionals working in a purely social scientific capacity.

Professional, technical and kindred workers include such highly trained personnel as teachers, engineers, dentists, accountants, and clergymen. Nationally in 1968, persons in this category had completed an average of 16.3 years of schooling, a figure which probably has increased in recent years.

Professional workers usually acquire their specialized education in a college or university; most need a bachelor's degree to enter their occupations. Others--including physicians, dentists and architects--must complete more than four years of college in order to qualify for their professions. Technical workers, such as draftsmen and engineering and science technicians, may complete two years of post-secondary training in a junior college, technical institute, or specialized school.

Some professional and technical workers qualify for their jobs through on-the-job training rather than formal schooling. The length of this training varies for different occupations. For example, many medical laboratory assistants complete several months of on-the-job training, whereas engineering technicians have usually had several years of on-the-job training and experience.

Licenses or certificates are required for work in many professions that affect the health, safety or welfare of the general public, such as medicine, dentistry, pharmacy, architecture, and teaching. Generally, licensing requirements specify the completion of a recognized training program and a passing grade on an examination given by a State examining board.

Of the nine broad occupational categories, the professional group is the fastest growing, with employment projected to increase by 33.6 percent, or from 44,730 to 59,750 between 1969 and 1980. Replacements for persons leaving the work force will add 18,310 jobs to the 15,020 new ones, for a total of 33,330 openings over the forecast period. This averages to 3,030 job opportunities annually.

One major contributor to this expansion is medical and health workers, which include professional nurses, physicians, surgeons, and medical and dental technicians. These workers, comprising approximately one fifth of the professional and technical category, are expected to add about 3,510 new jobs in addition to 4,450 replacement opportunities, more than half of which are nurses. This category should increase at a more rapid rate in the 1970's than it did in the 1960's.

The once-overwhelming demand for school teachers has declined in recent years. Elementary schools, major contributors to this decrease, are expected to add only about 50 positions during the forecast period. (See Table 5, page 46.) However, replacements for those leaving the work force will be fairly high (an estimated 4,140) because of the large percentage of female teachers, who have a higher separation rate than males. Secondary, college, and other teaching occupations (such as those in special schools and technical instructors for job-related training) have relatively high demands due to both expansion and replacement.

The number of engineers seems to be increasing at a fairly high and steady rate, with the greatest demands in the civil, electrical, industrial and mechanical fields.

Employment of technicians outside the medical and dental fields, such as draftsmen, surveyors, and primarily engineering technicians and workers specializing in the use of various electronic or electrical devices, is expected to increase at a substantial and steady rate from 1969 to 1980. However, the replacement demand for the same period is expected to be low, totalling only 470 workers. Sizable increases along with higher replacement demands are anticipated for workers and teachers in the arts and entertainment; lawyers and judges; librarians; accountants; and auditors, the last registering the greatest total manpower needs from 1969 to 1980.

The number of clergymen decreased in the 1960's, but should remain nearly constant in the next decade, with about 180 openings created by retirements. (See Table 5, page 46.)

## 2. Managers, Officials, and Proprietors

Average Employment and Worker Needs						
	Average Employment			1969-1980		
	1960	1969	1980	Expansion	Replacement	Total
TOTAL	28,180	30,760	33,180	2,420	8,160	10,580

This occupational group of managers, officials and proprietors includes such jobs as railroad conductor, creditman, purchasing agent, postmaster and assistant, and a vast range of salaried managers and proprietors not elsewhere classified. These persons acquire training in a variety of ways. Large numbers of salaried managers complete bachelor's degree programs in business administration, and receive degrees in accounting, economics, or finance. Others have backgrounds in engineering, science, or liberal arts. Many managers who have less than a bachelor's degree qualified for their positions through experience in related work in sales and clerical jobs.

Many large organizations place beginners in management trainee programs for a year or more. Such programs often include job rotation and formal classroom instruction, and acquaint prospective managers and officials with the organization's activities and policies, as well as their specific job functions.

Employment in these occupations is expected to rise by a moderate 7.9 percent or 2,420 persons from 1969 to 1980. However, 8,160 job opportunities are expected in replacement demands for a total manpower need estimate of 10,580, resulting in an annual average of 962 job openings.

## 3. Clerical and Kindred Workers

Average Employment and Worker Needs in Subgroups						
Subgroup	Average Employment			1969-1980		
	1960	1969	1980	Expan- sion	Replac- ement	Total
TOTAL.....	37,510	48,910	60,200	11,290	32,740	40,030
Stenographers, Typists, and Secretaries.....	7,480	10,300	13,280	2,980	6,630	9,610
Office Machine Operators.	620	870	1,340	470	520	990
All Other.....	29,410	37,740	45,580	7,840	25,590	33,430

Clerical and kindred workers include persons with various kinds of training who operate computers and office machines, keep records, type and take dictation. Large numbers complete business courses in high school. Some high school students train for clerical jobs in cooperative work-study programs which enable them to acquire practical work experience under trained supervision. Many clerical workers prepare for their jobs through post-secondary training in business schools and junior colleges. Some clerical workers are trained in programs operated under provisions of the Manpower Development and Training Act of 1962. The ranks of this fairly large group of workers are increasing at the second highest rate of the nine occupational categories by 23.1 percent or 11,290 workers. A substantially high replacement need of 32,740 reflects the large number of women in the group, as the female separation rate is considerably above that of male employment. The total manpower need of 44,030 or 4,003 yearly job opportunities is the highest of all the categories.

Especially favorable employment opportunities are expected for stenographers, typists, secretaries, accounting clerks, bookkeepers, bank tellers and cashiers, because of both expansion and replacement demands.

4. Sales Workers

Average Employment and Worker Needs						
	Average Employment			1969-1980		
	1960	1969	1980	Expan- sion	Replac- ement	Total
TOTAL	22,850	24,630	27,560	2,930	9,210	12,140

Sales workers are found primarily in retail stores, wholesale firms, insurance companies, and real estate agencies. Additional job opportunities are available in door-to-door selling. The methods of acquiring training for sales work, like the work itself, vary. Over-the-counter salesclerks, whose sole job is to sell standardized merchandise, seldom need specialized training. They usually learn their duties on the job by

working with experienced salesclerks. In some large stores, new workers may attend brief training courses.

Sales workers who market complex products or services, such as computers and their application, chemicals, or industrial machinery, sometimes receive several months of specialized training from their employers. Salesmen who must discuss technical aspects of a product often receive the required background through college programs in engineering or some other related field. Those dealing in specialized services and products may acquire the necessary technical knowledge through courses offered by colleges and universities or by manufacturers. Still others gain know-how through years of on-the-job experience, often supplemented by home study.

Employment in sales occupations is expected to rise from 24,630 to 27,560, an increase of 11.9 percent or 2,930 new jobs. A need to replace 9,210 workers who retire or otherwise leave the work force, coupled with the 2,930 new jobs, results in a total manpower need of 12,140 workers or 1,104 annually. The number of persons in this category does not seem to vary significantly in relation to total employment. In 1960, it comprised a low 6.9 percent of State employment, 6.6 percent in 1969, and is projected to remain at the 6.6 percent level in 1980.

#### 5. Craftsmen, Foremen, and Kindred Workers

Average Employment and Worker Needs in Subgroups

Subgroup	Average Employment			1969-1980		
	1960	1969	1980	Expan- sion	Replac- ment	Total
TOTAL.....	47,560	53,610	62,980	9,370	12,560	21,930
Construction Craftsmen.	15,570	15,930	19,790	3,860	4,390	8,250
Foremen n.e.c. ....	6,890	8,470	9,760	1,290	2,070	3,360
Metalworking Craftsmen.	4,710	5,320	5,980	660	1,330	1,990
Mechanics and Repairmen.	11,970	15,480	18,260	2,780	2,950	5,730
Printing Trades Repair- men.....	970	960	1,010	50	210	260
Transportation and Pub- lic Utility Craftsmen.	1,850	1,940	2,520	580	340	920
All Other.....	5,600	5,510	5,660	150	1,270	1,420

Craftsmen, foremen, and kindred workers include carpenters, tool and die makers, instrument makers, all-round machinists, electricians and type-setters. Most persons employed in these occupations undergo extensive training to qualify for their jobs. Many of these workers acquire occupational skills through a formal apprenticeship program of systematic on-the-job training supplemented by formal classroom instruction. Apprenticeship programs generally last four years, but range from three to six years. Some skilled workers also learn their trade through formal training programs other than apprenticeship offered by employers. These

programs also provide on-the-job training and may include supplementary classroom instruction.

Many skilled workers acquire their training by moving from a semiskilled job through a career ladder over a period of years. In these cases, new workers begin on the simplest task under the direction of a foreman or experienced worker and gradually progress to more difficult work. Others learn skills in vocational, trade, and technical schools. Some workers in semiskilled or unskilled jobs qualify for more skilled work by completing correspondence courses, manufacturers' training programs, or by attending evening vocational classes. In addition, workers being trained or retrained for skilled occupations constitute one of the largest groups to receive training in programs operated under the Manpower Development and Training Act of 1962.<sup>22</sup>

Still other workers acquire training in the Armed Forces. This may qualify them for such skilled jobs in civilian life as auto mechanic, electrician, or office machine repairman, etc.

Employment for craftsmen, foremen, and kindred workers is anticipated to rise from 53,610 persons in 1969 to 62,980 in 1980, a substantial increase of 17.5 percent. Replacements for persons leaving the work force should add 12,560 jobs to the 9,370 new ones for a total of 21,930 openings during the forecast period--an average of 1,994 workers annually.

Projections indicate a sizable future need for construction craftsmen, especially carpenters, electricians, painters and paperhangers, and plumbers and pipefitters, who are expected to average a gain of about 24 percent from 1969 to 1980. An even larger percentage gain is projected for transportation and public utilities craftsmen (predominantly telephone and power linemen and servicemen). Smaller but still significant percentage increases are expected for foremen, metalworking craftsmen (especially machinists), and mechanics and repairmen (especially motor vehicle mechanics). These occupations are also expected to provide many job opportunities resulting from workers retiring or otherwise leaving the work force.

#### 6. Operatives and Kindred Workers

Average Employment and Worker Needs in Subgroups

Subgroup	Average Employment			1969-1980		
	1960	1969	1980	Expansion	Replacement	Total
TOTAL.....	85,510	94,080	98,820	4,740	26,110	30,850
Drivers and Deliverymen.....	14,290	13,930	15,670	1,740	2,040	3,780
Semiskilled Metalworking Occupations.....	1,580	2,170	2,310	140	330	470
Selected Transportation and Public Utilities Operatives....	1,000	880	970	90	190	280
Semiskilled Textile Occupations..	10,080	10,790	10,250	-540	4,690	4,150
All Other.....	58,560	66,310	69,620	3,310	18,860	22,170



Operatives and kindred workers are engaged in assembling goods in factories; driving trucks, buses and taxis; and operating machinery. These semiskilled workers generally learn their jobs by completing brief periods of on-the-job training. The repetitive and routine tasks performed by these workers can be learned quickly and mastered in a few weeks. Even those jobs that require a higher degree of skill, such as truck driver, can be learned in a few months. In general, new workers are told exactly what to do and their work is supervised closely.

Employment for operatives and kindred workers is expected to register only a small gain of five percent, from 94,080 in 1969 to 98,820 in 1980. However, because of the large numbers employed in this category, accounting for about one fourth of all Maine's employment, there should be a substantial number of persons needed to fill positions created by workers retiring or otherwise leaving the work force. Thus, the 4,740 new jobs plus the replacement need of 26,110 equals 30,850 openings--an average of 2,805 annually.

Employment opportunities for drivers and deliverymen, showing the highest percentage gain in this occupational category during the forecast period, should be favorable, providing 1,740 new jobs and about 2,040 openings created by retirements. A six percent increase is anticipated for the semiskilled metalworking occupations, mostly in the welding and flame-cutting fields.

The market for semiskilled textile workers is narrowing, and is projected to decrease by five percent during the 1969-1980 time interval. Despite this lack of growth, a fairly large number of persons will be needed to replace many workers who retire or otherwise leave the work force during the period, especially sewers and stitchers in manufacturing.

Other operatives not elsewhere classified--laundry and dry cleaning operatives, sawyers, graders, sorters, oilers and milliners, etc.--register a mild five percent increase, but again because of the large numbers involved, retirement replacements will provide a substantial number of job opportunities during the forecast period.

#### 7. Service Workers

Average Employment and Worker Needs in Subgroups

Subgroup	Average Employment			1969-1980		
	1960	1969	1980	Expan- sion	Replace- ment	Total
TOTAL.....	35,420	41,730	49,090	7,360	22,510	29,870
Private Household Workers..	9,010	7,910	6,470	-1,440	4,660	3,220
Protective Service Workers..	3,410	3,900	4,860	960	1,250	2,210
Food Service Workers.....	7,830	11,260	13,270	2,010	5,720	7,730
All Other.....	15,170	18,660	24,490	5,830	10,880	16,710

Service workers include men and women who maintain law and order, assist professional nurses in hospitals, administer haircuts and beauty treatments, serve food and clean and care for homes. Because of the many different occupations that comprise this group, the workers train in a variety of ways. Many occupations, including general maid, waiter, waitress, elevator operator, and hotel bellman, do not generally require formal education; workers in these occupations usually receive only short-term on-the-job instruction. Other service workers such as barbers and beauty operators acquire their training in vocational schools. Some service occupations, such as FBI agent, require college or university training. Policemen and firemen receive intensive on-the-job training and classroom instruction. Nurse's aides experience on-the-job training that may last from a few weeks to a few months and generally includes some formal training. Some are trained in vocational schools.

A large employment increase of 17.6 percent is projected for service workers, from 41,730 workers in 1969 to 49,090 in 1980. In addition, 22,510 persons will be needed to replace persons leaving the work force. Thus, there will be 29,870 job opportunities during the projection period, or 2,715 annually.

It must be cautioned that one fairly large group in services, private household workers, does not follow this upward trend. These jobs have been declining in number for the past several years, and the downward trend is expected to continue during the forecast period. Because of a high separation rate, there will be a substantial number of jobs created by workers retiring, more than counterbalancing the loss of jobs from industry contraction.

Large employment increases combined with a high replacement demand indicate excellent job opportunities for service workers of all kinds. All of the following have high rates of increase and offer many replacement opportunities: protective service workers, especially policemen, detectives, etc.; food service workers such as cooks, counter and fountain workers, waiters and waitresses; and other service workers such as attendants in hospitals and other institutions, janitors, sextons, practical nurses, barbers, cosmetologists, busboys, etc. Since tourism is a large, profitable, and expanding industry in Maine, service occupations are numerous as well as vital to the State economy.

#### 8. Nonfarm Laborers

Average Employment and Worker Needs						
	Average Employment			1969-1980		
	1960	1969	1980	Expansion	Replacement	Total
TOTAL	24,180	20,990	19,520	-1,470	4,620	3,150

For the most part, nonfarm laborers move, lift and carry materials and tools in the Maine's workplaces. A great amount of this work performed

requires little special training since it involves only simple tasks. For this work, brief instruction combined with a few hours of on-the-job training is sufficient. However, since work processes are becoming more and more mechanized, many laborers need longer periods of on-the-job experience and instruction to operate various types of power-operated equipment and to learn new techniques.

Although the number of nonfarm laborers is expected to show a slight decline of 1,470 workers from 1969 to 1980, this will be more than offset by the 4,620 persons who will be needed to replace those workers who retire or for some other reason leave the labor force. During the projection period, 3,150 openings are expected--an average of 286 annually. An eventual over-all loss of laborer jobs is inevitable in all industries; in the future job market, the acquisition of special skills will be a basic requirement that few employable workers will be able to avoid.

#### 9. Farmers and Farm Workers

Average Employment and Worker Needs						
	Average Employment			1969-1980		
	1960	1969	1980	Expansion	Replacement	Total
TOTAL	19,130	12,610	6,500	-6,110	2,120	-3,990

This occupational group includes farmers, farm managers, laborers, and foremen. Many farm workers obtain their skills by living on a farm. Many farmers also acquire vocational training available under federally assisted programs. Such training is offered (1) in full-time programs supervised by teachers who are agricultural college graduates, (2) in short courses for young farmers offered during the day on subjects such as farm planning, farm layout, farm structure, plant breeding and pest control, and (3) in adult evening classes (or day classes in off seasons) that provide instruction in areas such as conservation and crop and livestock production. Organized groups such as the Future Farmers of America and the 4-H clubs also train young farm people.

The long downward trend for farm employment is expected to continue, but at a somewhat lesser rate. Farm jobs lost are projected at 6,110 and the relatively small replacement demand of 2,120 will not counterbalance this drop.



TABLES ON  
INDUSTRIAL AND OCCUPATIONAL EMPLOYMENT  
AND  
MANPOWER NEEDS 1969-1980



Statewide Total Employment by Industry for the Years 1960, 1969,  
and Projected 1975 and 1980 <sup>1/</sup>

Industry	1960	1969	Projected	
			1975	1980
Agriculture and Agricultural Services.....	22,595	15,510	9,177	7,514
Forestry and Fisheries.....	3,157	2,897	2,465	2,401
Mining.....	267	251	239	221
Construction.....	22,039	25,774	31,802	34,575
Food Products.....	11,525	12,231	12,418	12,498
Textile-Mill Products.....	13,863	11,683	9,875	8,893
Apparel.....	2,624	3,283	3,743	4,116
Logging and Sawmills.....	20,460	16,358	16,001	16,012
Furniture and Fixtures.....	910	1,076	1,581	1,779
Paper and Allied Products.....	17,803	17,721	18,303	18,754
Printing and Publishing.....	2,442	2,809	3,053	3,267
Chemicals and Petroleum Products.....	769	1,364	1,607	1,863
Rubber and Plastic Products.....	1,088	3,137	3,843	4,648
Leather and Leather Products.....	23,687	27,683	32,171	34,430
Stone, Clay, Glass and Concrete Products.....	1,124	1,289	1,594	1,771
Primary Metal Industry.....	282	731	992	1,199
Fabricated Metals except Machinery and Transportation Equipment.....	1,981	3,565	3,856	4,300
Machinery, except Electrical.....	1,549	2,524	3,147	3,573
Electrical Machinery.....	1,238	5,332	5,437	5,931
Transportation Equipment <sup>2/</sup> .....	14,768	13,408	10,409	10,537
Miscellaneous Manufacturing Industries.....	859	1,084	1,240	1,289
Railroad Transportation.....	4,509	3,351	3,198	3,016
Local Transit and Interurban Bus and Taxis.....	1,063	1,182	1,264	1,388
Trucking and Warehousing.....	4,326	4,806	4,910	5,207
Water, Air, Pipelines and Transportation Services.....	1,428	975	1,023	958
Communication.....	4,068	4,292	4,409	4,630
Electric, Gas, and Sanitary Services.....	4,190	4,390	4,632	4,930
Wholesale Trade.....	15,753	15,723	15,703	15,286
Retail Trade.....	46,701	56,889	58,244	60,700
Building Materials, Hardware and Farm Equipment Dealers .	3,529	3,739	3,645	3,693
Retail Trade-General Merchandise.....	7,244	9,170	9,298	9,784
Food Stores.....	9,107	11,130	11,829	12,542
Automotive Dealers and Gasoline Service Stations.....	8,561	9,845	10,336	10,933
Apparel and Accessory Stores.....	3,282	2,906	2,557	2,310
Furniture, Furnishings, and Appliances.....	2,062	2,125	2,044	2,048
Eating and Drinking Places.....	6,394	9,893	10,005	10,232
Miscellaneous Retail Stores.....	6,522	8,081	8,530	9,158
Banks and Credit Agencies.....	3,815	5,139	5,704	6,409
Stock Brokers and Investment Companies.....	303	411	463	502
Insurance.....	3,869	4,937	5,324	5,979
Real Estate.....	1,555	1,764	1,767	1,844
Hotels and Other Lodging Places.....	4,600	5,010	6,150	6,531
Personal Services.....	4,559	4,718	4,833	4,901
Miscellaneous Business Services.....	1,047	2,247	3,125	3,924
Auto and Other Repair Services.....	2,472	2,636	2,720	2,797
Entertainment and Recreation.....	1,622	1,794	2,104	2,289
Medical and Other Health Services <sup>3/</sup> .....	12,780	17,632	20,928	24,599
Legal Services.....	886	1,194	1,375	1,540
Educational Services <sup>4/</sup> .....	16,068	28,855	36,290	42,978
Nonprofit Membership Organizations.....	5,193	6,803	7,078	7,555
Private Households.....	10,460	9,000	8,000	7,000
Miscellaneous Services.....	1,156	1,781	1,963	2,224
Postal Services.....	3,278	3,722	4,070	4,320
Other Federal Public Administration <sup>5/</sup> .....	3,175	2,839	3,125	3,195
State Public Administration <sup>5/</sup> .....	3,150	4,367	5,025	5,571
Local Public Administration <sup>5/</sup> .....	4,015	5,880	6,882	7,750
TOTAL.....	331,071	372,047	393,262	417,594

<sup>1/</sup> Includes wage and salary employees, self-employed and unpaid family workers on a one-man, one-job basis.

<sup>2/</sup> Includes Portsmouth Naval Shipyard.

<sup>3/</sup> Includes public and private medical services.

<sup>4/</sup> Includes public and private educational services.

<sup>5/</sup> Includes public administration employment only. Government agencies engaged in educational and medical services and in activities commonly carried on also by private enterprises such as transportation and manufacturing, are classified in the appropriate industrial category.





TABLE 2

Statewide Total Employment for the Years 1960, 1969, and Projected 1975 and 1980 by Industry 1/

Industry	Employment				Percent Change 1960-1969	Percent Change 1960-1975	Percent Change 1969-1980	Percent Change 1969-1975	Percent Change 1969-1980
	1960	1969	Projected						
			1975	1980					
Total Manufacturing.....	116,972	125,278	129,270	134,860	7.1	10.5	15.3	3.2	7.6
Durable Goods.....	43,171	45,367	44,257	46,391	5.1	2.5	7.5	-2.4	2.3
Lumber and Wood Products.....	20,460	16,358	16,001	16,012	-20.0	-21.8	-21.7	-2.2	-2.1
Metals and Machinery <u>2/</u> .....	5,050	12,152	13,432	15,003	140.6	166.0	197.1	10.5	23.5
Other Durable Goods.....	17,661	16,857	14,824	15,376	-4.6	-16.1	-12.9	-12.1	-8.8
Nondurable Goods.....	73,801	79,911	85,013	88,469	8.3	15.2	19.9	6.4	10.7
Food and Kindred Products.....	11,525	12,231	12,418	12,498	6.1	7.7	8.4	1.5	2.2
Textile-Mill Products.....	13,863	11,683	9,875	8,893	-15.7	-28.8	-35.9	-15.5	-23.9
Apparel.....	2,624	3,283	3,743	4,116	25.1	42.6	56.9	14.0	25.4
Paper and Allied Products.....	17,803	17,721	18,303	18,754	-0.5	2.8	5.3	3.3	5.8
Leather and Leather Products.....	23,687	27,683	32,171	34,430	16.9	35.8	45.4	16.2	24.4
Other Nondurable Goods.....	4,299	7,310	8,503	9,778	70.0	97.8	127.4	16.3	33.8
Total Nonmanufacturing.....	214,099	246,769	263,992	282,734	15.3	23.3	32.1	7.0	14.6
Contract Construction.....	22,039	25,774	31,802	34,575	16.9	44.3	56.9	23.4	34.1
Transportation and Public Utilities..	19,584	18,996	19,436	20,129	-3.0	-0.8	2.8	2.3	6.0
Wholesale and Retail Trade.....	62,454	72,612	73,947	75,986	16.3	18.4	21.7	1.8	4.6
Finance, Insurance, and Real Estate..	9,542	12,251	13,258	14,734	28.4	38.9	54.4	8.2	20.3
Services and Other Nonmanufacturing <u>3/</u> Government and Postal Services	64,267	84,818	97,270	108,960	32.0	51.4	69.5	14.7	28.5
(Administrative).....	13,618	16,808	19,102	20,836	23.4	40.3	53.0	13.6	24.0
Agriculture <u>4/</u> .....	22,595	15,510	9,177	7,514	-31.4	-59.4	-66.7	-40.8	-51.6
TOTAL EMPLOYMENT.....	331,071	372,047	393,262	417,594	12.4	18.8	26.1	5.7	12.2

1/ This includes wage and salary employees, self-employed and unpaid family workers on a one-man, one-job basis.2/ This category includes ordnance.3/ Both public and private employment in education are included in this category. Other nonmanufacturing consists of forestry, fisheries, and mining.4/ This category includes agricultural services.



TABLE 3

Average Employment by Broad Occupational Groups and Major Divisions,  
1960, 1969, and 1980, and Worker Needs, 1969-1980

Occupational Category	1960	1969	1980	1969-1980 Expansion	1969-1980 Replacement	Total Manpower Needs
Professional, Technical, and Kindred Workers...	30,730	44,730	59,750	15,020	18,310	33,330
Managers, Officials, and Proprietors.....	28,180	30,760	33,180	2,420	8,160	10,580
Clerical and Kindred Workers.....	37,510	48,910	60,200	11,290	32,740	44,030
Sales Workers.....	22,850	24,630	27,560	2,930	9,210	12,140
Craftsmen, Foremen, and Kindred.....	47,560	53,610	62,980	9,370	12,560	21,930
Operatives and Kindred Workers.....	85,510	94,080	98,870	4,740	26,110	30,850
Service Workers.....	35,420	41,730	49,090	7,360	22,510	29,870
Laborers, except Farm...	24,180	20,990	19,520	-1,470	4,620	3,150
Farmers and Farm Workers.	19,130	12,610	6,500	-6,110	2,120	-3,990
TOTAL.....	331,070	372,050	417,600	45,550	136,340	181,890

Major Division

White-collar Workers <u>1/</u> .	119,270	149,030	180,690	31,660	68,420	100,080
Blue-collar Workers <u>2/</u> ..	157,250	168,680	181,320	12,640	43,290	55,930
Service Workers.....	35,420	41,730	49,090	7,360	22,510	29,870
Farmers and Farm Workers.	19,130	12,610	6,500	-6,110	2,120	-3,990

1/ White-collar workers include Professional, Technical, and Kindred; Managers, Officials, and Proprietors; Clerical and Kindred; and Sales Workers

2/ Blue-collar workers include Craftsmen, Foremen, and Kindred; Operatives and Kindred; and Laborers, except Farm.



TABLE 4

1960, 1969 and Projected 1980 Employment Estimates and Total and Annual Worker Needs by Occupation

Occupation	1960 Employment	1969 Employment	1980 Employment	TOTAL WORKER NEEDS			ANNUAL WORKER NEEDS		
				1969-1980 Expansion	1969-1980 Replacement	Total Needs	Due to Expansion	Due to Replacement	Total
Professional, Technical, and Kindred Workers.....	30,730	44,730	59,750	15,020	18,310	33,330	1,365	1,665	3,030
Engineers.....	2,160	3,060	3,890	830	610	1,440	76	55	131
Medical and Other Health Workers.....	6,740	8,600	12,110	3,510	4,450	7,960	319	405	724
Teachers.....	10,680	16,940	18,680	1,740	7,230	8,970	158	657	815
Natural Scientists.....	470	650	830	180	120	300	16	11	27
Social Scientists.....	100	100	150	50	30	80	4	3	7
Technicians, except Medical and Dental.....	1,820	2,620	3,580	960	470	1,430	87	43	130
Other Professional, Technical, and Kindred Workers.....	8,760	12,760	20,510	7,750	5,400	13,150	705	491	1,196
Managers, Officials, and Proprietors.....	28,180	30,760	33,180	2,420	8,160	10,580	220	742	962
Clerical and Kindred Workers.....	37,510	48,910	60,200	11,290	32,740	44,030	1,027	2,976	4,003
Stenographers, Typists, and Secretaries.....	7,480	10,300	13,280	2,980	6,630	9,610	271	603	874
Office Machine Operators.....	620	870	1,340	470	520	990	43	47	90
Other Clerical and Kindred Workers.....	29,410	37,740	45,580	7,840	25,590	33,430	713	2,326	3,039
Sales Workers.....	22,850	24,630	27,560	2,930	9,210	12,140	267	837	1,104
Craftsmen, Foremen, and Kindred Workers.....	47,560	53,610	62,980	9,370	12,560	21,930	852	1,142	1,994
Construction Craftsmen.....	15,570	15,930	19,790	3,860	4,390	8,250	351	399	750
Foremen, n.e.c.....	6,890	8,470	9,760	1,290	2,070	3,360	117	188	305
Metalworking Craftsmen.....	4,710	5,320	5,980	660	1,330	1,990	60	121	181
Mechanics and Repairmen.....	11,970	15,480	18,260	2,780	2,950	5,730	253	268	521
Printing Trades Craftsmen.....	970	960	1,010	50	210	260	5	19	24
Transportation and P.U. Craftsmen.....	1,850	1,940	2,520	580	340	920	53	31	84
Other Craftsmen and Kindred Workers.....	5,600	5,510	5,660	150	1,270	1,420	13	116	129
Operatives and Kindred Workers.....	85,510	94,080	98,820	4,740	26,110	30,850	431	2,374	2,805
Drivers and Deliverymen.....	14,290	13,930	15,670	1,740	2,040	3,780	158	186	344
Semiskilled Metalworking Occupations.....	1,580	2,170	2,310	140	330	470	13	30	43
Selected Transportation and P.U. Operatives.....	1,000	880	970	90	190	280	8	17	25
Semiskilled Textile Occupations.....	10,080	10,790	10,250	-540	4,690	4,150	-49	426	377
Other Operatives.....	58,560	66,310	69,620	3,310	18,860	22,170	301	1,715	2,016
Service Workers.....	35,420	41,730	49,090	7,360	22,510	29,870	669	2,046	2,715
Private Household Workers.....	9,010	7,910	6,470	-1,440	4,660	3,220	-131	423	292
Protective Service Workers.....	3,410	3,900	4,860	960	1,250	2,210	87	114	201
Food Service Workers.....	7,830	11,260	13,270	2,010	5,720	7,730	183	520	703
Other Service Workers.....	15,170	18,660	24,490	5,830	10,880	16,710	530	989	1,519
Laborers, except Farm.....	24,180	20,990	19,520	-1,470	4,620	3,150	-134	420	286
Farmers and Farm Workers.....	19,130	12,610	6,500	-6,110	2,120	-3,990	-556	193	-363
TOTAL, ALL OCCUPATIONS.....	331,070	372,050	417,600	45,550	136,340	181,890	4,141	12,395	16,536



Statewide Average Employment in All Occupations, 1960, 1969, and 1980,  
and Manpower Needs, 1969 - 1980

Occupation	Employment			Worker Needs		Total Manpower Needs
	1960 Estimates	1969 Estimates	1980 Projections	1969-1980 Expansion	1969-1980 Replacement	
EMPLOYMENT TOTAL.....	331,070	372,050	417,600	45,550	136,340	181,890
PROFESSIONAL, TECHNICAL & KINDRED....	30,730	44,730	59,750	15,020	18,310	33,330
Engineers, technical.....	2,160	3,060	3,890	830	610	1,440
Engineers, aeronautical.....	70	90	100	10	10	20
Engineers, chemical.....	70	90	100	10	10	20
Engineers, civil.....	590	700	910	210	140	350
Engineers, electrical.....	490	830	1,010	180	150	330
Engineers, industrial.....	210	320	460	140	50	190
Engineers, mechanical.....	350	450	520	70	140	210
Other engineers, technical.....	380	580	790	210	110	320
Medical & other health workers.....	6,740	8,600	12,110	3,510	4,450	7,960
Dentists.....	330	460	630	170	190	360
Dietitians & nutritionists.....	100	120	140	20	70	90
Nurses, professional.....	3,520	4,250	5,990	1,740	2,520	4,260
Optometrists.....	90	120	150	30	40	70
Osteopaths.....	90	160	190	30	50	80
Pharmacists.....	410	530	560	30	230	260
Physicians and surgeons.....	880	1,130	1,680	550	430	980
Psychologists.....	30	50	100	50	10	60
Tech., medical and dental.....	680	1,130	2,030	900	720	1,620
Medical lab technologists.....	NA	200	340	140	120	260
Medical lab technician & aides.....	NA	280	520	240	180	420
Dental hygienists.....	NA	70	170	100	60	160
Dental lab technicians.....	NA	140	210	70	80	150
Radiological technol. & tech.....	NA	350	540	190	210	400
Inhalation therapy technicians.....	NA	40	110	70	30	100
EKG technicians.....	NA	40	90	50	30	80
EEG technicians.....	NA	10	50	40	10	50
Veterinarians.....	80	110	120	10	30	40
Other medical and health wkrs.....	530	540	520	-20	160	140
Teachers.....	10,680	16,940	18,680	1,740	7,230	8,970
Teachers, elementary.....	5,910	7,910	7,960	50	4,140	4,190
Teachers, secondary.....	2,920	5,130	5,500	370	1,740	2,110
Teachers, college.....	810	2,260	2,910	650	600	1,250
Teachers, other.....	1,040	1,640	2,310	670	750	1,420
Natural scientists.....	470	650	830	180	120	300
Chemists.....	180	220	320	100	50	150
Agricultural scientists.....	150	170	190	20	30	50
Biological scientists.....	100	150	190	40	20	60
Geologists & geophysicists.....	20	50	50	0	10	10
Other natural scientists.....	20	60	80	20	10	30
Social scientists.....	100	100	150	50	30	80
Economists.....	30	30	50	20	10	30
Statisticians and actuaries.....	50	50	70	20	10	30
Other social scientists.....	20	20	30	10	10	20
Tech., except medical & dental.....	1,820	2,620	3,580	960	470	1,430
Draftsmen.....	340	460	550	90	120	210
Surveyors.....	180	210	260	50	30	80
Air traffic controllers.....	30	30	40	10	10	20
Radio operators.....	80	100	130	30	20	50
Technicians, other.....	1,190	1,820	2,600	780	290	1,070
Other prof., tech. & kindred.....	8,760	12,760	20,510	7,750	5,400	13,150
Accountants and auditors.....	1,410	1,470	2,360	890	530	1,420
Airplane pilots & navigators.....	70	160	320	160	40	200
Architects.....	40	60	90	30	40	70
Clergymen.....	1,010	720	740	20	180	200
Designers, exc. design draftsmen.....	140	190	240	50	50	100
Editors and reporters.....	430	480	540	60	210	270
Lawyers and judges.....	780	1,070	1,400	330	430	760
Librarians.....	460	730	1,040	310	650	960
Medical record librarians.....	NA	50	80	30	50	80
Other librarians.....	NA	680	960	280	600	880
Personnel & Labor relations workers.....	350	510	810	300	170	470
Photographers.....	170	210	200	-10	50	40
Social & welfare workers.....	300	400	580	180	180	360
Workers & teachers in the arts & entertainment.....	1,470	2,280	2,840	560	950	1,510
Prof., tech., & kindred, n.e.c....	2,130	4,480	9,350	4,870	1,920	6,790
MANAGERS, OFFICIALS & PROPRIETORS....	28,180	30,760	33,180	2,420	8,160	10,580
Conductors, railroad.....	300	290	320	30	140	170
Officers, pilots, engineers, ship..	280	200	160	-40	50	10
Creditmen.....	190	240	350	110	60	170
Purchasing agents.....	420	590	630	40	130	170
Postmasters & assistants.....	680	560	520	-40	250	210
Managers, officials & proprietors n.e.c.....	26,310	28,880	31,200	2,320	7,530	9,850





TABLE 5 (cont'd.)

Statewide Average Employment in All Occupations, 1960, 1969, and 1980,  
and Manpower Needs, 1969 - 1980

Occupation	Employment			Worker Needs		Total Manpower Needs
	1960 Estimates	1969 Estimates	1980 Projections	1969-1980 Expansion	1969-1980 Replacement	
CLERICAL & KINDRED WORKERS.....	37,510	48,910	60,200	11,290	32,740	44,030
Stenographers, typists, secretaries..	7,480	10,300	13,280	2,980	6,630	9,610
Office machine operators.....	620	870	1,340	470	520	990
Other clerical & kindred wkrs.....	29,410	37,740	45,580	7,840	25,590	33,430
Accounting clerks.....	1,730	2,020	2,130	110	1,040	1,150
Bookkeepers, hand.....	3,010	3,630	3,980	350	1,770	2,120
Bank tellers.....	810	1,310	2,040	730	720	1,450
Cashiers.....	2,050	3,710	4,800	1,090	1,890	2,980
Mail carriers.....	1,240	1,400	1,650	250	400	650
Postal clerks.....	1,200	1,360	1,610	250	400	650
Shipping & receiving clerks.....	1,390	1,520	1,700	180	310	490
Telephone operators.....	1,690	1,670	1,860	190	1,020	1,210
Clerical and kindred, n.e.c.....	16,290	21,120	25,810	4,690	18,040	22,730
SALES WORKERS.....	22,850	24,630	27,560	2,930	9,210	12,140
CRAFTSMEN, FOREMEN & KINDRED.....	47,560	53,610	62,980	9,370	12,560	21,930
Construction craftsmen.....	15,570	15,930	19,790	3,860	4,390	8,250
Carpenters.....	6,420	6,150	7,490	1,340	2,040	3,380
Brickmasons, stone, tile setters..	620	700	910	210	150	360
Cement & concrete finishers.....	20	30	50	20	10	30
Electricians.....	1,980	2,260	2,800	540	490	1,030
Excavating, grade & road mach. opr	1,220	1,530	2,060	530	280	810
Painters and paperhangers.....	2,130	1,890	2,330	440	630	1,070
Plasterers.....	90	60	80	20	10	30
Plumbers and pipefitters.....	2,020	2,230	2,890	660	550	1,210
Roofers and slaters.....	220	280	350	70	70	140
Structural metalworkers.....	850	800	830	30	160	190
Foremen, n.e.c.....	6,890	8,470	9,760	1,290	2,070	3,360
Metalworking craftsmen.....	4,710	5,320	5,980	660	1,330	1,990
Machinists.....	2,620	3,000	3,140	140	770	910
Blacksmiths, forgemen, hammermen..	240	180	200	20	80	100
Boilermakers.....	80	70	70	0	10	10
Heat treaters, annealers, temperers	40	60	70	10	10	20
Millwrights.....	800	930	1,160	230	200	430
Molders, metal (exc. cormkrs).....	80	120	150	30	30	60
Patternmakers, metal & wood.....	120	120	150	30	30	60
Rollers & roll hands.....	20	30	50	20	10	30
Sheet metal workers.....	520	540	630	90	110	200
Toolmakers, diemakers, setters....	190	270	360	90	80	170
Mechanics and repairmen.....	11,970	15,480	18,260	2,780	2,950	5,730
Airplane mech. & repairmen.....	250	280	380	100	10	110
Motor vehicle mechanics.....	4,590	5,270	6,180	910	730	1,640
Office machine mechanics.....	100	120	170	50	20	70
Radio & TV mechanics.....	480	560	620	60	100	160
RR & car shop mechanics.....	160	140	150	10	50	60
Other mechanics & repairmen.....	6,390	9,110	10,760	1,650	2,040	3,690
Printing trades craftsmen.....	970	960	1,010	50	210	260
Compositors & typesetters.....	710	660	650	-10	150	140
Engravers except photoengravers...	50	50	60	10	10	20
Photoengravers & lithographers...	40	60	80	20	10	30
Pressmen & plate printers.....	170	190	220	30	40	70
Transportation & P.U. craftsmen....	1,850	1,940	2,520	580	340	920
Line & servmen. telp. & power....	1,520	1,700	2,250	550	180	730
Locomotive engineers.....	200	190	220	30	150	180
Locomotive firemen.....	130	50	50	0	10	10
Other craftsmen & kindred wkrs.....	5,600	5,510	5,660	150	1,270	1,420
Bakers.....	610	690	780	90	140	230
Cabinetmakers.....	240	240	240	0	80	80
Cranemen, derrickmen, hoistmen....	490	540	690	150	80	230
Glaziers.....	40	50	70	20	10	30
Jewelers & watchmakers.....	180	180	190	10	60	70
Loom fixers.....	540	420	300	-120	70	-50
Opticians, lens ginders, polishers	30	40	50	10	10	20
Inspectors, log and lumber.....	370	360	390	30	100	130
Inspectors, other.....	430	420	320	-100	110	10
Upholsterers.....	190	200	210	10	50	60
Craftsmen & kindred wkrs. n.e.c....	2,480	2,370	2,420	50	560	610
OPERATIVES & KINDRED WORKERS.....	85,510	94,080	98,820	4,740	26,110	30,850
Drivers & deliverymen.....	14,290	13,930	15,670	1,740	2,040	3,780
Drivers, bus, truck, tractors....	11,580	10,740	12,000	1,260	1,430	2,690
Delivery, routemen, cab drivers...	2,710	3,190	3,670	480	610	1,090
Semiskilled metalworking occupations	1,580	2,170	2,310	140	330	470
Furnacemen, smeltermen, pourers...	30	60	80	20	10	30
Welders and flame-cutters.....	1,550	2,110	2,230	120	320	440



Statewide Average Employment in All Occupations, 1960, 1969, and 1980,  
and Manpower Needs, 1969 - 1980

Occupation	Employment			Worker Needs		Total Manpower Needs
	1960 Estimates	1969 Estimates	1980 Projections	1969-1980 Expansion	1969-1980 Replacement	
Selected transportation and						
Public Utilities operatives.....	1,000	880	970	90	190	280
Brakemen, switchmen RR.....	540	470	530	60	80	140
Power station operators.....	330	340	380	40	100	140
Sailors and deck hands.....	130	70	60	-10	10	0
Semiskilled textile occupations...	10,080	10,790	10,250	-540	4,690	4,150
Knitters, loopers, & toppers....	40	40	30	-10	10	0
Spinners, textile.....	1,340	1,060	720	-340	320	-20
Weavers, textile.....	1,330	1,050	720	-330	240	-90
Sewers & stitchers mfg.....	7,370	8,640	8,780	140	4,120	4,260
Other operatives & kindred wkrs...	58,560	66,310	69,620	3,310	18,860	22,170
Asbestos, insulation workers....	150	180	210	30	40	70
Auto attendants gas & parking...	1,590	1,730	1,750	20	220	240
Laundry & dry cleaning oper.....	1,620	1,670	1,750	80	800	880
Mine oper., laborers, n.e.c.....	160	120	90	-30	20	-10
Meat cutters, exc. meat packing.	1,010	1,100	1,150	50	220	270
Oper. & kindred workers, n.e.c...	54,030	61,510	64,670	3,160	17,560	20,720
SERVICE WORKERS.....	35,420	41,730	49,090	7,360	22,510	29,870
Private household workers.....	9,010	7,910	6,470	-1,440	4,660	3,220
Protective service Workers.....	3,410	3,900	4,860	960	1,250	2,210
Firemen.....	750	840	1,200	360	200	560
Policemen, detectives, etc.....	1,240	1,690	2,290	600	410	1,010
Guards, watchmen, doorkeepers...	1,420	1,370	1,370	0	640	640
Food service workers.....	7,830	11,260	13,270	2,010	5,720	7,730
Bartenders.....	300	320	360	40	110	150
Cooks, exc. private household...	2,940	4,150	4,990	840	2,070	2,910
Counter & Fountain workers.....	660	1,370	1,890	520	760	1,280
Waiters and waitresses.....	3,930	5,420	6,030	610	2,780	3,390
Other service workers.....	15,170	18,660	24,490	5,830	10,880	16,710
Attendants, hospital & other institutions.....	2,080	3,040	5,180	2,140	1,740	3,880
Occupational therapy assistants	NA	30	80	50	20	70
Physical therapy assistants...	NA	40	100	60	30	90
Surgical technicians.....	NA	100	150	50	50	100
Other attendants.....	NA	2,870	4,850	1,980	1,640	3,620
Charwomen and cleaners.....	880	1,290	1,440	150	770	920
Janitors and sextons.....	2,570	3,130	3,990	860	1,870	2,730
Nurses, practical.....	1,640	2,300	3,920	1,620	1,930	3,550
Other service workers, n.e.c....	8,000	8,900	9,960	1,060	4,570	5,630
LABORERS, EXCEPT FARM.....	24,180	20,990	19,520	-1,470	4,620	3,150
FARMERS AND FARM WORKERS.....	19,130	12,610	6,500	-6,110	2,120	-3,990

NA denotes Not Available

N.E.C. denotes Not Elsewhere Classified



TABLE 6

Percent Distribution of Employment in Broad Occupational Categories  
and Major Divisions, 1960, 1969, and 1980

Occupational Category	1960	1969	1980
Professional, Technical, and Kindred...	9.3	12.0	14.3
Managers, Officials, and Proprietors...	8.5	8.3	7.9
Clerical and Kindred Workers.....	11.3	13.1	14.4
Sales Workers.....	6.9	6.6	6.6
Craftsmen, Foremen, and Kindred.....	14.4	14.4	15.1
Operatives and Kindred Workers.....	25.8	25.3	23.7
Service Workers.....	10.7	11.2	11.7
Laborers, except Farm.....	7.3	5.7	4.7
Farmers and Farm Workers.....	5.8	3.4	1.6
TOTAL.....	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>
<u>Major Division</u>			
White-collar Workers.....	36.0	40.1	43.3
Blue-collar Workers.....	47.5	45.3	43.4
Service Workers.....	10.7	11.2	11.7
Farmers and Farm Workers.....	5.8	3.4	1.6



TABLE 7

## Employment and Annual Needs by Broad Occupational Categories

Occupation	1969 Employ- ment	1980 Employ- ment	Annual Expansion Needs	Annual Replacement Needs	Total Annual Manpower Needs
Professional, Technical, and Kindred.....	44,730	59,750	1,365	1,665	3,030
Managers, Officials, and Proprietors.....	30,760	33,180	220	742	962
Clerical and Kindred Workers.....	48,910	60,200	1,027	2,976	4,003
Sales Workers.....	24,630	27,560	267	837	1,104
Craftsmen, Foremen, and Kindred.....	53,610	62,980	852	1,142	1,994
Operatives and Kindred.....	94,080	98,820	431	2,374	2,805
Service Workers.....	41,730	49,090	669	2,046	2,715
Laborers, except Farm.....	20,990	19,520	-134	420	286
Farmers and Farm Workers...	12,610	6,500	-556	193	-363
TOTAL.....	372,050	417,600	4,141	12,395	16,536





TABLE 8

Distribution of Jobs to be Filled, by Broad Occupational Category,  
for the Period 1969-1980

Occupational Category	Percent Distribution
Professional, Technical, and Kindred Workers.....	18.3
Managers, Officials, and Proprietors.....	5.8
Clerical and Kindred Workers.....	24.2
Sales Workers.....	6.7
Craftsmen, Foremen, and Kindred Workers.....	12.1
Operatives and Kindred Workers.....	17.0
Service Workers.....	16.4
Laborers, Nonfarm.....	1.7
Farmers and Farm Workers.....	-2.2
TOTAL.....	100.0%



TABLE 9

Percent Changes in Employment by Broad Occupational Categories and Major Divisions, 1960, 1969, and 1980; Percent of Total Manpower Needs Due to Expansion and Replacement Demands

Occupational Category	Percent Change 1960-1969	Percent Change 1969-1980	Percent Change 1960-1980	TOTAL MANPOWER NEEDS 1969-1980		
				Number	% Due to Expansion	% Due to Replacement
Professional, Technical, and Kindred Workers.....	45.6	33.6	94.4	33,330	45.1	54.9
Managers, Officials, and Proprietors.....	9.2	7.9	17.7	10,580	22.9	77.1
Clerical and Kindred Workers..	30.4	23.1	60.5	44,030	25.6	74.4
Sales Workers.....	7.8	11.9	20.6	12,140	24.1	75.9
Craftsmen, Foremen, and Kindred.....	12.7	17.5	32.4	21,930	42.7	57.3
Operatives and Kindred Workers.....	10.0	5.0	15.6	30,850	15.4	84.6
Service Workers.....	17.8	17.6	38.6	29,870	24.6	75.4
Laborers, except Farm.....	-13.2	-7.0	-19.3	3,150	-46.7	146.7
Farmers and Farm Workers.....	-34.1	-48.5	-66.0	-3,990	153.1	-53.1
TOTAL.....	12.4	12.2	26.1	181,890	25.0	75.0
<u>Major Division</u>						
White-collar Workers.....	25.0	21.2	51.5	100,080	31.6	68.4
Blue-collar Workers.....	7.3	7.5	15.3	55,930	22.6	77.4
Service Workers.....	17.8	17.6	38.6	29,870	24.6	75.4
Farmers and Farm Workers.....	-34.1	-48.5	-66.0	-3,990	153.1	-53.1



I N D U S T R I A L   G R A P H S



Wage and Salary Employment in Manufacturing  
1947-1971 and Projected 1975, 1980  
(in thousands)

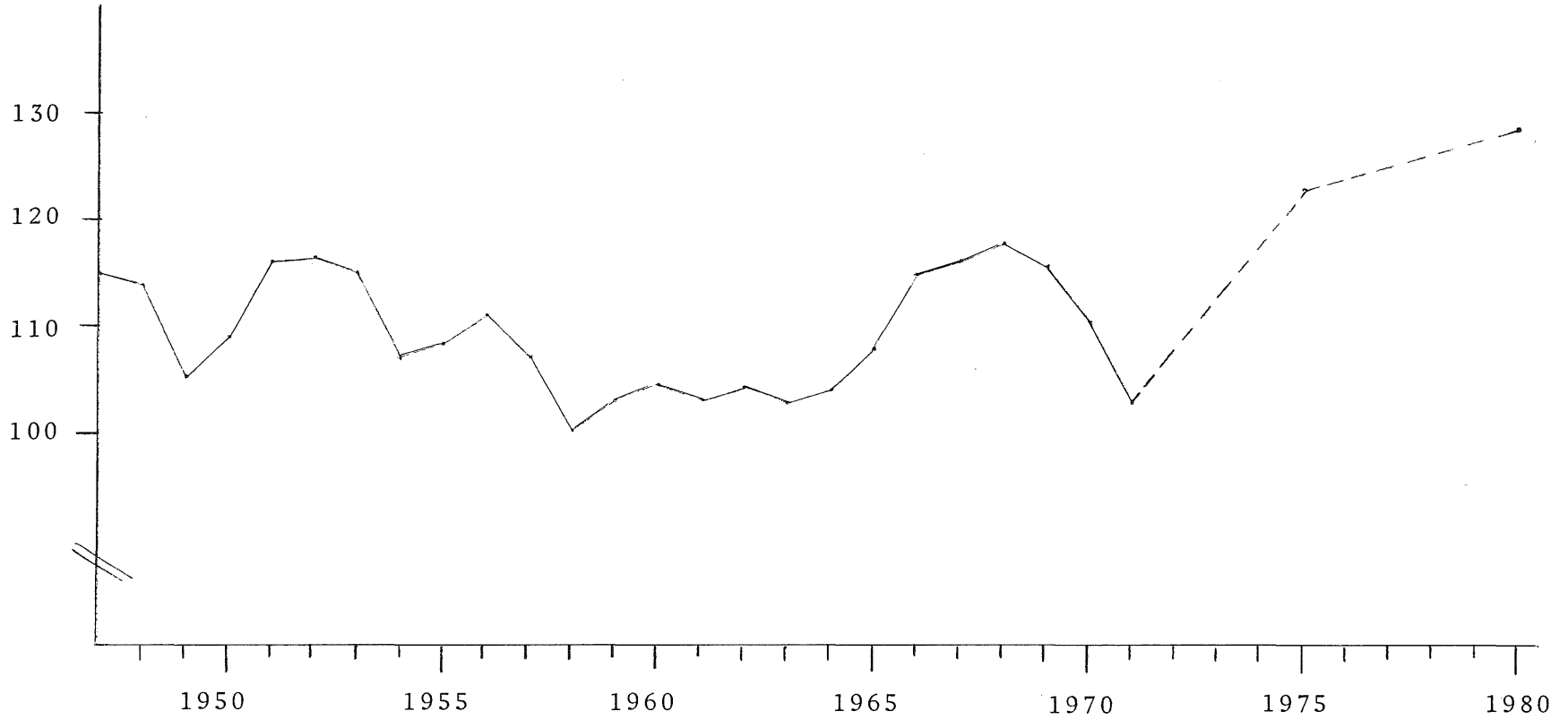
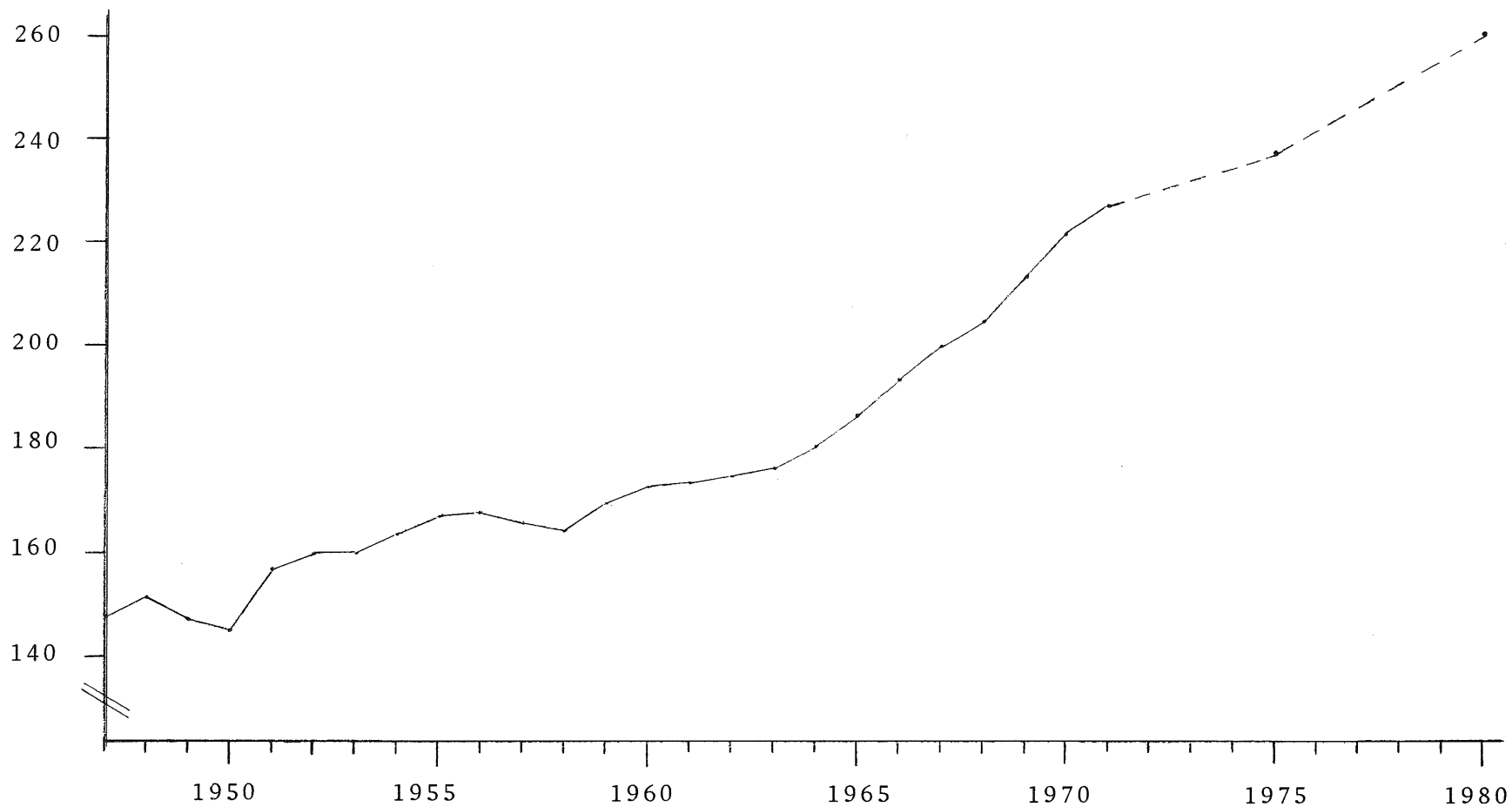


Figure 1





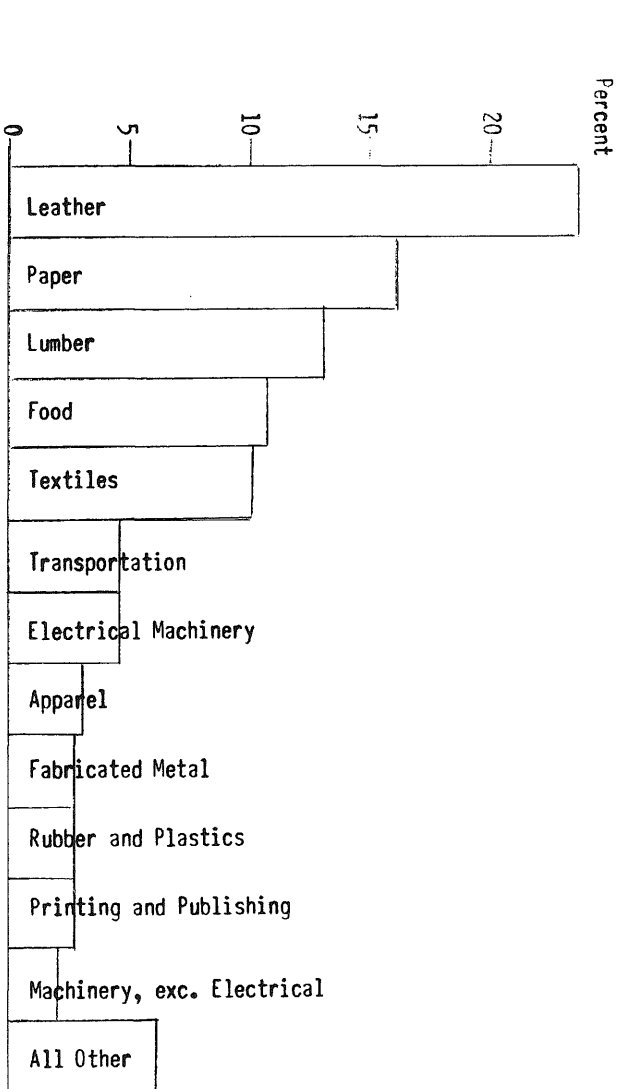
Wage and Salary Employment in Nonmanufacturing\*  
1947-1971 and Projected 1975, 1980  
(in thousands)



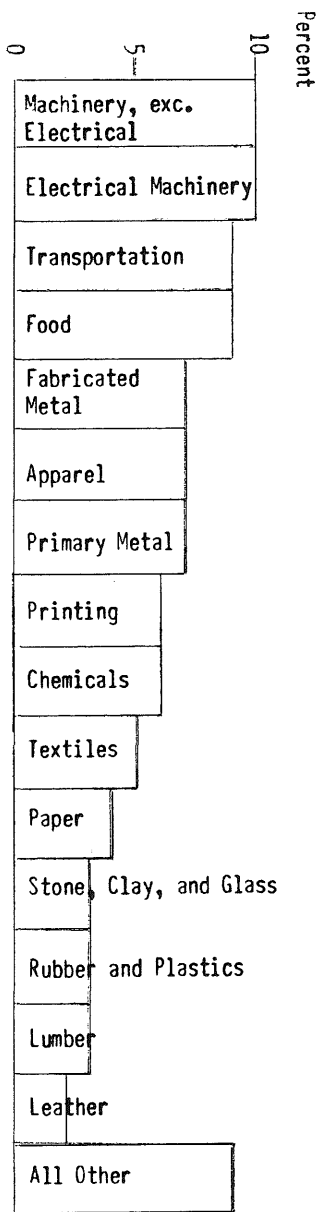
\*Excludes Agriculture.

Figure 2





MAINE



UNITED STATES

MANUFACTURING

Percentage Distribution of Wage and Salary Employment  
by Industry  
1970

Figure 3



Employment Trends of Maine's Wage and Salary Workers by  
Selected Industries, Five-Year Intervals, 1960-1980

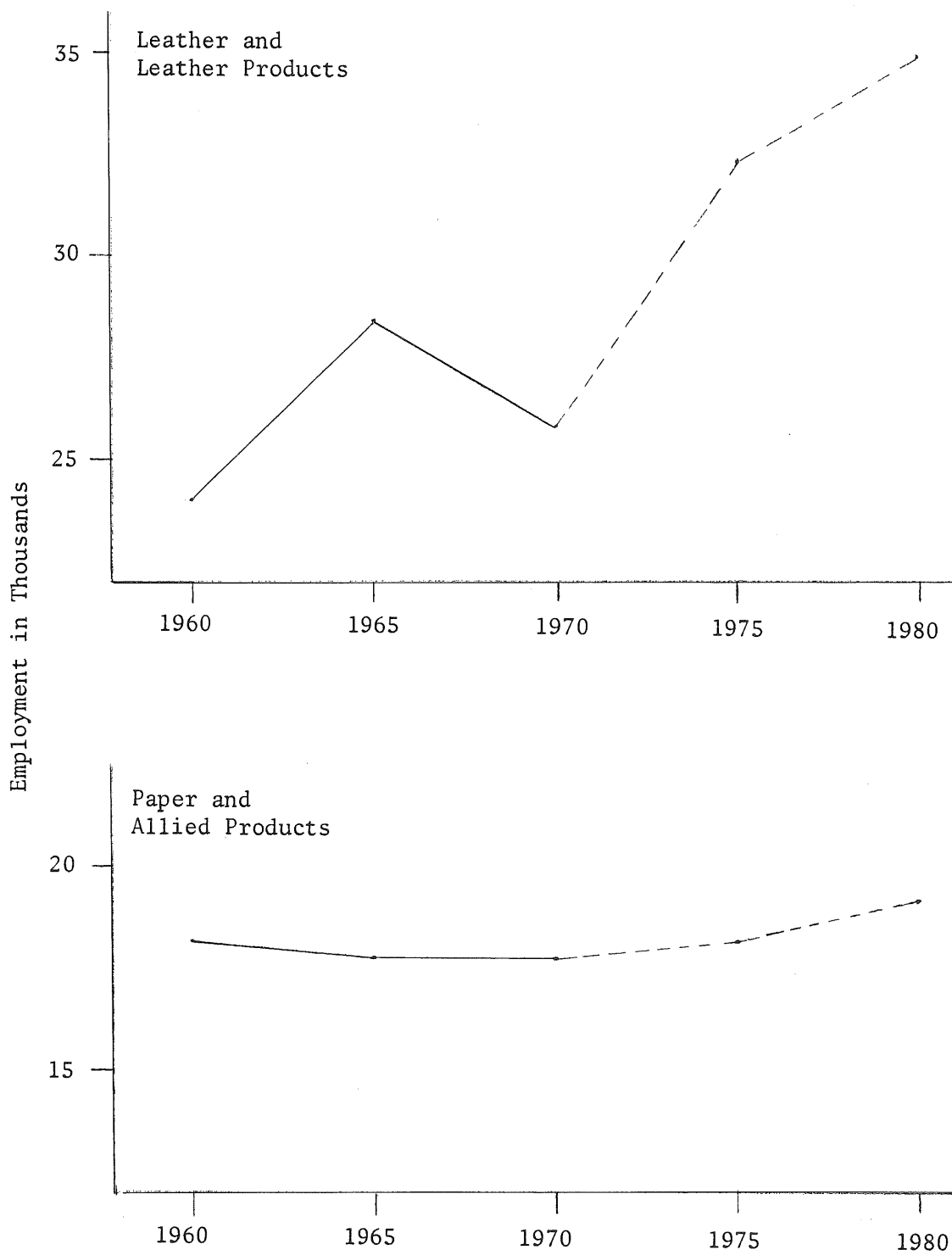


Figure 4



Figure 4 (continued)

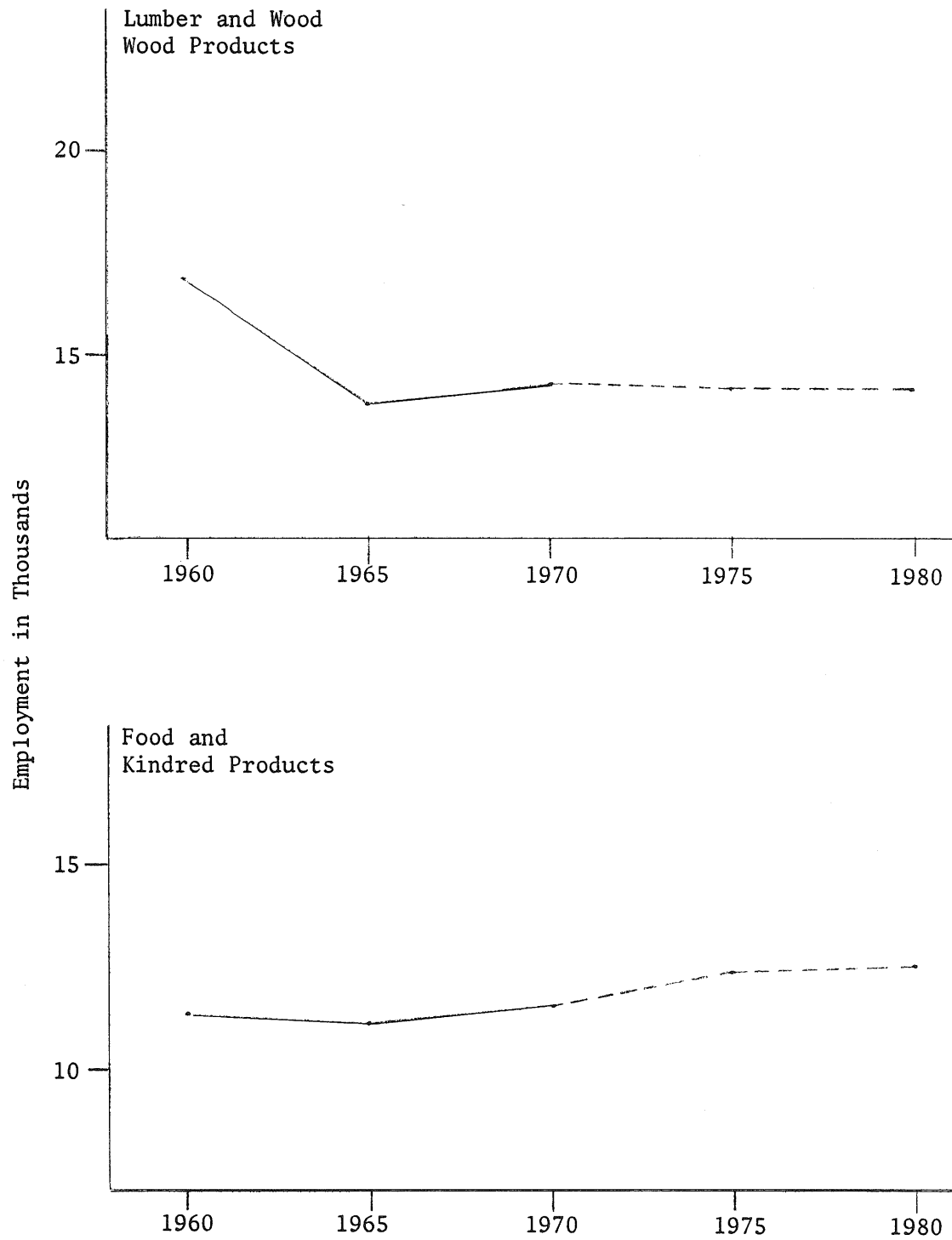






Figure 4 (continued)

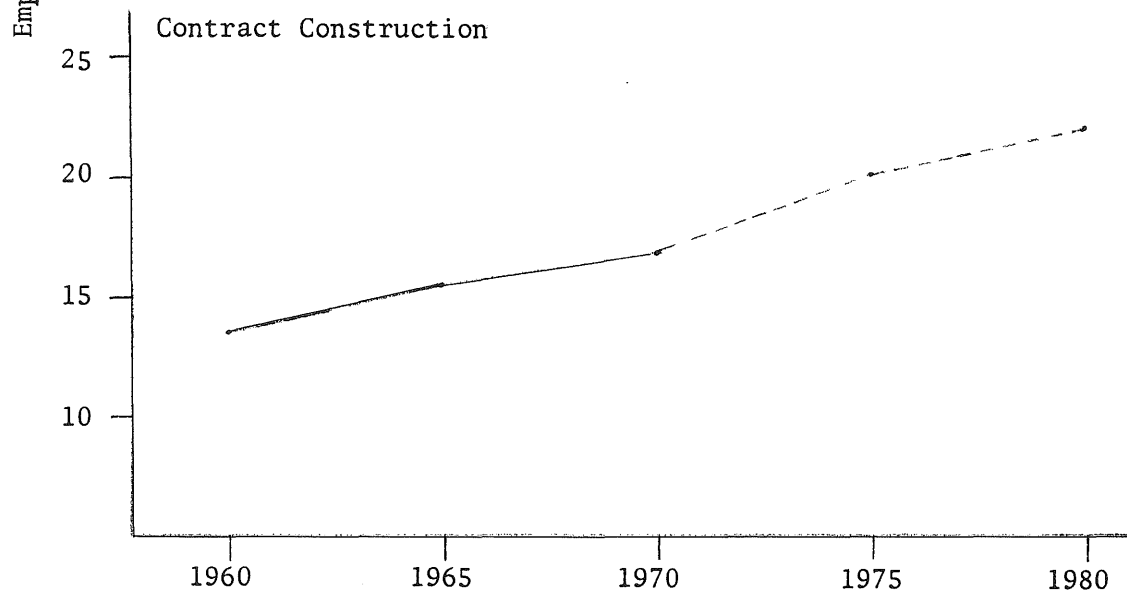
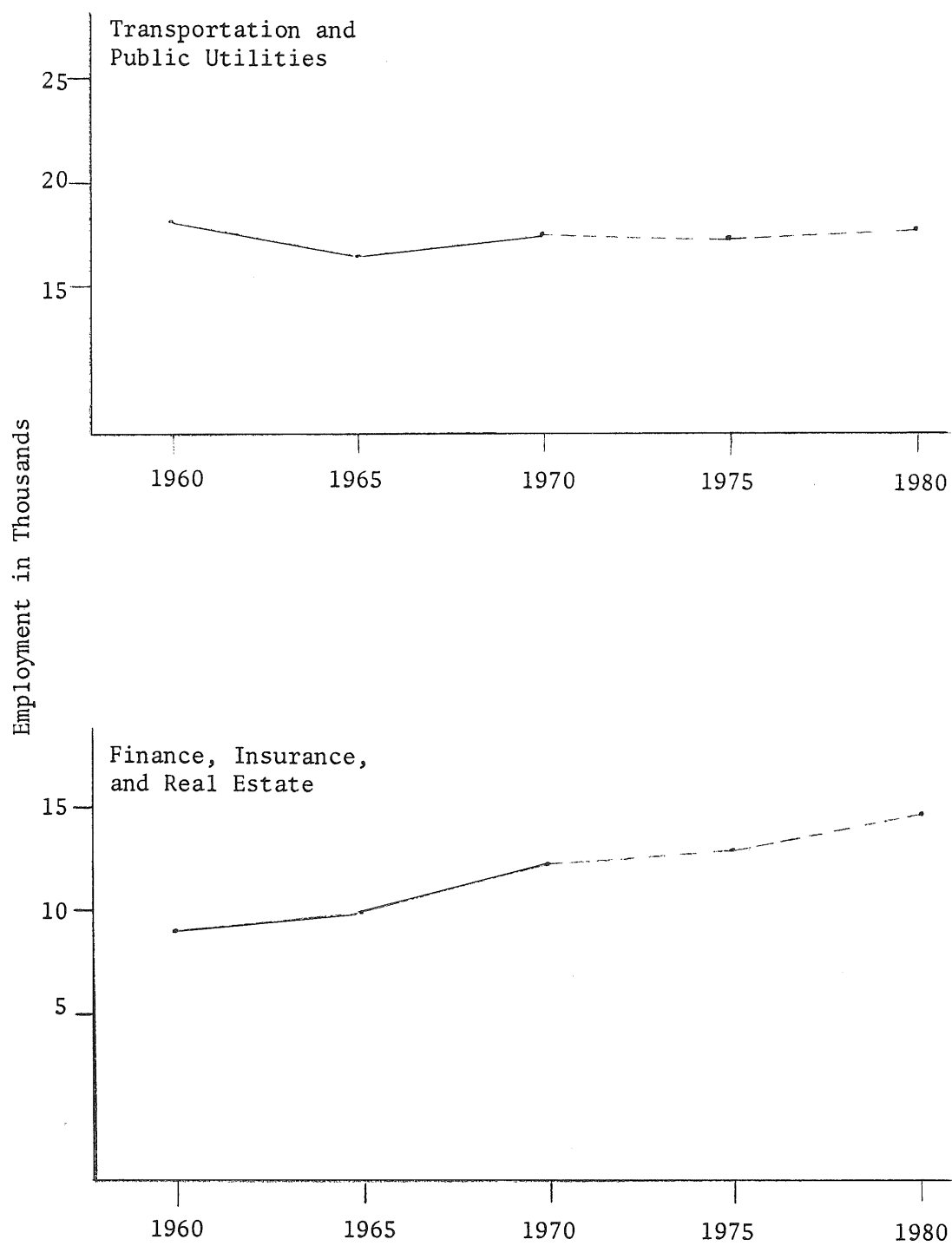




Figure 4 (continued)





## METHODOLOGY

### Industry Projections

Industrial projections to the years 1975 and 1980 were based on mathematical linear regression models with two independent and one dependent variable. The independent variables were (1) national historical wage and salary employment data by industry for the years 1958 through 1969, and (2) time. The dependent variable was the State's historical wage and salary employment data corresponding to the 116 industries given for national data for the same period of time. State employment figures were derived from Current Employment Statistics, a State-Federal cooperative program under the technical direction of the Bureau of Labor Statistics. The regressions and the projected 1975 and 1980 wage and salary employment figures were carefully reviewed by area analysts familiar with the State and its industries. Employment time series and mathematically computed projections by industry were then graphically illustrated and evaluated for consistency with empirical knowledge and reasonableness. In some cases, economic models were defined and statistically measured without the input of national data. When industry projections were thought to be influenced by atypical situations, they were discussed with industry analysts and suitably modified.

### Occupational Projections

This portion of the study involved transforming industrial employment to employment by occupation. The first step was to make industry employment estimates for 1960, 1969, and 1980 the target year for the projections, consistent with the total employment concept on which the national industry-occupational matrix is based. Private wage and salary employment by industry was modified to include the other three classes of workers, i.e., self-employed, unpaid family workers, and government workers. Government workers involved in activities unique to government were classified in public administration. Government workers in agencies engaged in activities also carried on by private enterprise were classified in their appropriate industry category. The estimated and projected agricultural employment was added to further the development of the total employment concept.

An additional refinement was made to the wage and salary employment. In order to adhere to a one-man, one-job concept, the secondary jobs of multiple job holders were deducted according to national percentages published in Tomorrow's Manpower Needs, Supplement Number 2. Therefore, job holders were reflected only in the industries in which they hold primary jobs.

After the industry employment estimates on the total employment concept were developed for 1960, 1969, and 1980, projected occupational employment requirements were then derived through the following method: Estimates of occupational requirements for Maine were made by applying 1960, 1969, and 1980, national industry-occupational patterns to the appropriate industry employment estimate for each year; computing the 1960-1969, 1969-1980 change factors (percent change) for each occupation; and applying the change factor to the separately estimated 1960 Maine occupational employment profile. The 1960 Census (table 121) supplied the basic data needed for these estimates.

#### Replacement Demand

Projected occupational employment levels are important determinants of future labor requirements. The number of workers needed to satisfy the expected growth in an occupation equals the difference between the levels of employment in a given occupation in the base and terminal years. Equally important, and in most occupational groups in Maine even more important than expansion demands, are the replacement needs created by workers who withdraw from the labor force because of death, retirement or reasons other than geographic and occupational mobility. Estimates of replacement demand were obtained through the application of separation rates based on the sex and age distribution of Maine's labor force by occupation as specified in the 1960 Census. Use of separation rates by sex was especially important in occupations where a large proportion of women were employed because women tend to have higher separation rates than men. Total labor requirements for the future are represented by the sum of workers needed for both expansion and replacement.

#### FOOTNOTES

1. U. S. Department of Labor, Occupational Manpower and Training Needs, Bulletin 1701 (Washington, D. C.: Government Printing Office, 1971), p. 8.
2. University of Maine, Potato Harvest Survey (Presque Isle, Maine: Agricultural Extension Service, 1970 and 1971).
3. Information obtained from the Department of Sea and Shore Fisheries (State of Maine, July 1972).
4. The source of national statistics in this paragraph was Tomorrow's Manpower Needs, Volume I (U. S. Department of Labor, February 1969), p. 14.
5. Ibid., Supplement Number 2, p. 4.
6. Ibid., Volume II, p. 11.
7. David Clark, Maine's Occupational Needs to 1975 (Orono, Maine: University of Maine Press, August 1969), p. 12.
8. Tomorrow's Manpower Needs, Volume II, p. 15., also see Table 2.
9. Federal Reserve Bank of Boston, New England Economic Almanac (Boston, Massachusetts: Federal Reserve Bank, December 1971), p. 140.
10. U. S. Department of Labor, Bureau of Labor Statistics, The U. S. Economy in 1980, Bulletin 1673 (Washington, D. C.: Government Printing Office, 1970) p. 49.
11. Tomorrow's Manpower Needs, Volume II, p. 27.
12. William R. Galeota, "On the Rebound-Paper Companies Come Out of Their Slump," Wall Street Journal, May 11, 1972, p. 36.
13. The U. S. Economy in 1980, p. 50.
14. Moody's Stock Survey, "Aluminum Producers: Some Good Signs After A Discouraging Year," Volume 64, Number 14 (April 3, 1972), 686; "Hard Times Are Far From Over, But.....Steel Stocks are Starting To Look Overpriced," Volume 64, Number 19 (May 8, 1972), 645.

15. Includes ordnance, consisting of a few plants employing a small number of workers.
16. These figures include employment at the Portsmouth Naval Shipyard which was excluded in Figure 3, p. 80.
17. These figures exclude employment in public medical and educational services, since they are not significantly affected by seasonality.
18. U. S. Department of Commerce, Bureau of the Census, Statistical Abstract of the United States, 1971 (Washington, D. C.: Government Printing Office, 1971), p. 121.
19. This group excludes workers employed in educational or medical services.
20. Same as above.
21. Training requirements were extracted from "National Trends and Outlook: Occupational Employment," Tomorrow's Manpower Needs, III (U. S. Department of Labor, Bureau of Labor Statistics, February 1969).
22. Ibid.



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## GLOSSARY

- blue-collar workers--craftsmen, operatives, and laborers
- expansion needs--number of persons needed to fill jobs created by industrial growth
- n.a.--not available
- n.e.c.--not elsewhere classified
- one-man, one-job--the concept of employment in which a person is counted at his primary job only
- operative--a person engaged in semiskilled work
- projection--a future estimate inferred from historical data and empirical knowledge
- replacement need--number of persons needed to fill jobs created by persons leaving the work force
- seasonality--regular contractions and expansions in employment due to seasonal influences
- separation rate--terminations of employment expressed as a rate per 100 employees
- total employment--total number of persons employed in the State on a one-man, one-job basis; this includes the self-employed and unpaid family workers
- wage and salary employment--total number of jobs paying wages or salaries; this excludes the self-employed and unpaid family workers
- white-collar workers--professional, managerial, clerical and sales employees
- work force--the sum of total employment, unemployment, and those involved in labor-management disputes

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