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Occupational Estimates and Projections of the Omaha SMSA

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OCCUPATIONAL ESTIMATES AND PROJECTIONS
FOR THE OMAHA SMSA

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OCCUPATIONAL ESTIMATES AND PROJECTIONS FOR THE OMAHA SMSA

Introduction

Local and regional planners have long recognized the need for detailed information on past, present, and projected occupational needs. Ideally, data on: (1) the number of workers employed, (2) their years of job experience, (3) their years and type of job training, (4) the number of workers to retire in the near future, (5) the number of new workers needed due to expected expansion, and (6) the salary levels of the various occupations for each firm and industry in the local economy should be available to describe occupational patterns. Such information would also provide a sound framework for projecting changes in occupational needs. The type of information desired is not easily accessible and in many cases does not exist.

The basic source of annual employment data for Omaha is the Nebraska Department of Labor.¹ Published information on Omaha employment is largely confined to the broader two-digit industry groups such as the manufacturing and service sectors, while employment in three-digit industry groups is presented when it constitutes an important segment of the two-digit industry group. Unfortunately, Employment Service data does not cover occupational patterns. In the past, the State Employment Service bolstered its data base by engaging in selected area skill surveys. Omaha was surveyed in 1968, and the results were reported in a 1969 publication

¹Information on Omaha employment can be obtained by writing the Nebraska Department of Labor, Division of Employment at Lincoln, Nebraska. Hereafter data from the Division of Employment will be reported as Employment Service (ES) data.

entitled Manpower Outlook Survey.² The Research and Statistical division of the Employment Service sent mail questionnaires to a sample of employers subject to State unemployment insurance laws. All establishments employing 100 or more workers, 20 percent of the establishments employing 20 through 99 workers, and five percent of the establishments employing one through 19 workers were included in the sample.

Since the 1968 Manpower Outlook Survey, one other important source of occupational information has been published. The 1970 Census provides the most recent information on Omaha's occupational mix, including a detailed occupation-industry matrix for 48 industry groups and 81 occupations.³ Future occupational information will be provided by the Bureau of Labor Statistics which is currently in the process of collecting comprehensive statistical data on occupational employment by industry groups. Ten states participated in the developmental stage of the Occupational Employment Service (OES) and fifteen states were involved in the first year survey (1971-72). Nebraska did not participate. Claimed benefits from OES include the following:

...employers will be able to evaluate and adjust long-range plans to take account of changing patterns in the labor market. Also, education and public training programs can be adjusted and coordinated to better match future supply of labor to projected demand. Thus, employers will benefit from a better trained labor force. With new employees already equipped with the basic skills learned in public training programs, employers will encounter lower costs for in-plant training. In addition, higher initial productivity should result as employees will be spending less time in training and will be moving more quickly into productive work.⁴

²Nebraska Department of Labor, Division of Employment, Manpower Outlook Survey For The Omaha Metropolitan Statistical Area (Lincoln, Nebraska: Nebraska Department of Labor, 1969).

³U. S. Bureau of the Census, Census of Population: 1970, Detailed Characteristics Final Report PC(1)-D Nebraska, (Washington, D.C.: U. S. Government Printing Office, 1972).

⁴Nebraska Department of Labor, Division of Employment, "Nebraska Work Force Trends," (Lincoln, Nebraska: Nebraska Department of Labor, October, 1971).

Omaha planners are left with a 1968 study, the 1970 Census, and the knowledge that a system is being designed to provide continuous and current data on the area's occupational mix by industry. This study serves to provide occupational estimates and projections for the interim period. The methodology utilized can be inexpensively employed to revise and update projections to take account of sudden swings in economic activity and changes in industrial mix. The methodology is also consistent with the type of information to be supplied by the OES, and future studies can incorporate the OES data into the general framework for more comprehensive and reliable results.

General Methodology

The availability of an information base (the 1968 Manpower Outlook Survey and the 1970 Census) was the basic determinant of the methodology applied in this study. However, the 1968 study relied on the BES Area Skill Survey technique which is costly, time consuming, and not without its critics.⁵ The Area Skill Survey technique relies on mail questionnaires which ask employers to describe their current employee demand by occupation and also to forecast anticipated employee requirements by occupation for three and five-year periods. The questionnaire also requests the employer to estimate replacement and expansion needs. In a follow-up study to determine the merits of the procedure, a number of Wisconsin employers expressed concern

⁵For the analyst working with occupational estimates and projections, publication entitled Project Vision provides an excellent review of the possible techniques. See: Wisconsin State Employment Service, A Division of Industry Labor and Human Relations, Project Vision (Milwaukee, Wisconsin: Wisconsin State Employment Service, 1971). Another excellent source is: David Kidder, Review and Synthesis of Research on Manpower Forecasting for Vocational-Technical Education, ERIC Clearinghouse on Vocational and Technical Education, The Center for Vocational and Technical Education, (Columbus, Ohio: The Ohio State University, 1972).

that they were not capable of making such projections by occupation, and certainly not for any long period of time.⁶ Because of cost considerations, employer response problems, and the difficulty of incorporating Census information into the study, this procedure was not used. Consequently, the results of the study are not strictly comparable with the 1968 Manpower Outlook.

The desire to use 1970 Census information as the base for the estimates and the projections led to the Occupation-by-Industry Matrix technique. Similar procedures were employed in: (1) Projected Employment and Occupational Mix, Nassau-Suffolk, 1970-1985.⁷ (2) Skills Shortages; A Guide to Occupational Training Selection for Manpower Planning in the Baltimore Metropolitan Area, 1970-1975,⁸ and (3) Occupational Projections for Iowa, 1975.⁹ The Bureau of Labor Statistics has published a four-volume edition of Tomorrow's Manpower Needs which presents projections of national manpower requirements in the form of an occupation by industry matrix and a methodology for projecting area manpower requirements.¹⁰ To a large extent, procedures

⁶ *Ibid.*, pp. 80-88. According to Project VISION researchers, less than 20 percent of the responding persons indicated that they did some manpower planning. VISION researchers also found from a follow-up employer survey that the average employer had little confidence in his ability to make precise occupational projections. In fact, less than half expressed confidence in their projections.

⁷ William Hamovitch and Albert Levenson, Projected Employment and Occupational Mix, Nassau-Suffolk 1970-1985, (Hofstra University Center for Business and Urban Research, 1968).

⁸ Mayor's Office of Manpower Resources, Skills Shortages: A Guide to Occupational Training Selection for Manpower Planning in the Baltimore Metropolitan Area, 1970-1975, (Baltimore, Maryland, 1972).

⁹ Catherine A. Palomba, Occupational Projections for Iowa, 1975, (Ames, Iowa: Industrial Relations Center, Iowa State University, 1968.)

¹⁰ Bureau of Labor Statistics, Tomorrow's Manpower Needs, Bulletin No. 1606, Volumes I, II, III, and IV (revised), (Washington, D. C.: U.S. Government Printing Office, 1969).

recommended by these publications provide the methodological framework for the study.

In very general terms, the first step in the analysis was the determination of Omaha's occupational mix for each industry. The 1970 Census (see Table 171, Detailed Characteristics) presents a comprehensive report on the occupations of persons residing in the SMSA. The Census also presents an occupation-industry matrix (see Table 180, Detailed Characteristics) which shows the absolute importance of selected occupations by industry.

Each industry requires a different mixture of occupations and one would expect an area dominated by the service and government sectors to be characterized by an occupational pattern quite different from an area that is predominantly composed of manufacturing employment. In short, the final demand for a given occupation will be a function of the absolute level of employment in each industry in the area.

Since the Census matrix of occupations by industry is based on residents living in the SMSA while the employment data necessary for estimates and projections is based on persons working in the SMSA, a number of adjustments had to be made to reconcile the two concepts. Basically, the Census information can be viewed as a measure of the occupational characteristics of persons residing in Omaha whereas ES information is a measure of the total number of jobs available in the area. After adjustments were made to reconcile the two concepts, estimates of the 1970 and 1971 occupational composition of workers in the SMSA were made.

¹¹ A few examples of these differences include: (1) Dual job holders are classified by their primary job only in the Census. Employment Service counts the number employed regardless of whether an individual has one or two jobs. Consequently, ES data will tend to be larger than Census information. (2) Persons residing in but working outside the SMSA are counted by the Census, but not counted by ES data. (3) Persons working in but residing outside the SMSA are not counted by the Census but are counted by the ES data. Other differences will be explained in a later section concerned with the labor force-work force reconciliation.

Finally, occupational projections for 1980 were computed. To accomplish this, industry employment was projected and related to the occupation-industry matrix presented in Volume IV of Tomorrow's Manpower Needs prepared by the Bureau of Labor Statistics. For example, two-digit industry trends for the nation were related to similar industry trends for the Omaha SMSA. One method of accomplishing this was by trending the ratio of Omaha employment in industry X to the nation's employment in that industry over time (1980 industry employment trends for the nation have already been published). When the ratios could be projected with a high coefficient of determination, the 1980 ratio was calculated and applied to the Bureau of Labor Statistics' 1980 employment forecast for the nation to obtain future employment in Omaha's industry groups. For example, if the government sector in Omaha is trended to account for .24 percent of the nation's employment in that sector, and the Bureau projects 10,000 additional workers by 1980, we can predict that .24 percent of these will be employed in Omaha. By examining the occupational characteristics of the government sector, the increased demand for various occupations can be projected.

A number of linear regressions of Omaha's industry employment were employed to project employment of private wage and salary workers for 1980. In all cases Omaha employment was treated as the dependent variable and related to independent variables such as U.S. employment in the industry, Nebraska employment in the industry, time, and personal income. These relationships were fitted to conventional trending equations and those providing the best fit were used to project industry employment. The projections of private wage and salary workers were then corrected to include self-employed, unpaid family workers, and government workers.

Adjustments were also made to account for dual job holders.

All projected industry employment totals were then applied to an adjusted occupation-Industry matrix initially developed by the Bureau of Labor Statistics and presented in Volume IV of Tomorrow's Manpower Needs. Occupational Estimates for 1970

Employment for the April 1970 Census period was first adjusted to an annual basis.¹² Differences in employment between the month of April and the annual average as reported for the work force were distributed to similar labor force categories. Hence, the April Census civilian labor force figure was 89.88 percent of the April work force.¹³ The absolute change in the work force was multiplied by the conversion factor, 89.88 percent, to obtain the annual average labor force figure. This assumes there were no significant changes in the work force-labor force relationship during 1970. Hence, it assumes no changes in the relationship among those employed within, but living outside the SMSA; those living within, but employed outside the SMSA; those with a job, but not on the payroll; and those who were dual job holders. Table I presents average annual employment figures for the labor force.¹⁴

¹²Employment figures were obtained from the Census of Population: 1970, Detailed Characteristics Final Report PC(1)-D Nebraska, (Washington, D.C.: U.S. Government Printing Office, 1972).

¹³Work Force data were obtained from the Nebraska Department of Labor.

¹⁴Similar procedures were used to calculate the employment changes for the other categories. Labor force employment for April was 89.81 percent of the work force figure. Unemployment was obtained by subtracting employment from the civilian labor force. The conversion factor for nonagricultural wage and salary employment was 91.41 percent. The difference between total employment and nonagricultural employment (self employed, except agriculture; unpaid family workers, except agriculture; domestics, except self employed and unpaid family workers; and agriculture) amounted to 162 workers. These were prorated to the

TABLE I

OMAHA LABOR FORCE EMPLOYMENT-APRIL AND
ANNUAL AVERAGE, 1970

	April	Annual Average
Labor Force	213,230	215,207
Employment.	206,793	208,006
Unemployment.	6,437	7,201
Agriculture	4,716	4,662
All Other Nonagricultural Employment ¹	12,617	12,833
Nonagricultural Wage and Salary Employment	186,460	190,511
Construction & Mining	10,062	9,986
Manufacturing	34,492	34,028
Transportation.	14,046	14,370
Communication	4,094	4,145
Utilities	2,445	2,448
Wholesale Trade	13,579	13,598
Retail Trade.	32,403	33,338
Insurance	8,724	8,872
Finance & Real Estate	6,583	6,545
Services, Excl. Private Household	35,600	35,746
Government.	27,435	27,435

¹Includes domestics, self employed and unpaid family workers.

Work Force-Labor Force Reconciliation

After the 1970 Census data were adjusted to annual averages, it was necessary to integrate the work force-labor force concepts and reconcile the two sets of data. Table 11 presents the Census-Employment Service reconciliations for the month of April and for the average annual employment figures.

Table 186 of the Bureau's publication entitled Detailed Characteristics provided the necessary information for the self-employed, unpaid family workers, domestics, and those employed in government and agriculture.¹⁵

Net commutation was computed to eliminate work force-labor force differences due to persons residing in, but working outside the SMSA and persons working in, but residing outside the SMSA. Information for net commutation was obtained from 1960 and 1970 Census data. The 1960 Census publication entitled Journey to Work estimated 7,223 persons residing outside, but working in the SMSA and 3,129 persons residing in, but working outside the SMSA.¹⁶ In contrast, 4,198 persons resided in, but worked outside the SMSA.¹⁷ Unfortunately the 1970 Journey to Work publication is not yet published. Consequently, it was necessary to use the 1960 relationships to determine the 1970 figure for persons working in, but residing outside the SMSA.

¹⁴above mentioned categories on the basis of the relative changes as indicated by Employment Service work force statistics. Changes in the work force category, "all other nonagricultural wage and salary employment" (consisting of self employed, unpaid family workers, and domestics) were divided among the three components on the basis of their relative proportions in the April 1970 Census. Conversion factors were computed for and applied to the remaining industry sectors.

¹⁵Detailed Characteristics, Table 186.

¹⁶U.S. Bureau of the Census. U.S. Census of Population: 1960. Journey to Work Final Report PC(2)-6B, (Washington, D.C.: U.S. Government Printing Office, 1963.

¹⁷Detailed Characteristics, Table 190.

TABLE 11

WORK FORCE-LABOR FORCE RECONCILIATION FOR OMAHA

	April, 1970	Adjusted to Annual Average
Civilian Labor Force	213,230	215,207
(minus) Unemployed	6,437	7,201
Resident Employed	206,793	208,006
(minus) Agriculture (exc. gov't)	4,716	4,662
(minus) Self Employed (exc. agri.)	10,186	10,360
(minus) Unpaid Family Worker (exc. agri.)	600	610
(minus) Domestics (exc. self emp., & unpd. fam. worker)	1,831	1,863
(minus) Government	27,435	27,435
Census NON-AG Private Wage and Salary Workers	162,025	163,076
ES NON-AG Private Wage and Salary Workers	177,250	178,400
Difference	15,225	15,324
(minus) Net Commutation	5,493	5,493
(minus) Dual Jobholders	11,965	12,041
(plus) With a Job but not on Payroll	4,157	4,178
(minus) 14 & 15 yr. olds employed, exc. agri.	2,781	2,781
Discrepancy (Census-ES)	857	813

The number of dual job holders and persons "with a job but not on the payroll" were computed with the use of data for the nation. In 1970, 5.2 percent of the nation's total employed held more than one job.¹⁸ This was assumed to hold for the Omaha SMSA.

Persons "with a job, but not on payroll" were computed by multiplying 2.0 percent (the national rate) by Omaha's nonagricultural wage and salary employment for 1970.¹⁹ It was necessary to subtract these persons from Census employment figures because Employment Service reports do not count persons "with a job, but not on payroll" as employed.²⁰

A final adjustment for the work force reconciliation was made for employed 14 and 15 year olds. Employment Service reports for nonagricultural wage and salary employment include 14 and 15 year olds, while the 1970 Census generally presents employment data for persons 16 and over. Census information on 14 and 15 year olds employed outside of agriculture was used to exclude this group from Employment Service Figures. This left a discrepancy of 813 persons.

¹⁸U. S. Department of Labor, Bureau of Labor Statistics, Handbook of Labor Statistics 1971, (Washington, D.C.: U. S. Government Printing Office, 1972).

¹⁹Handbook of Labor Statistics 1969 Table 25 found in Tomorrow's Manpower Needs, Supplement No. 2, 1970, p. 14.

²⁰Work force employment data refer to persons on establishment payrolls who receive pay for any part of the reference pay period, and include workers on paid sick leave (when pay is received directly from the firm), on paid holiday or paid vacation, and those who work during a part of the pay period and are unemployed or on strike during the rest of the period. (Handbook of Labor Statistics 1971, p. 3). The Census definition of employed persons comprises all civilians 16 years old and over who were either (a) "at work"--those who did any work at all as paid employees or in their own business or profession, or on their own farm, or who worked 15 hours or more as unpaid workers on a family farm or in a family business; or (b) were "with a job but not at work"--those who did not work during the reference week but had jobs or businesses from which they were temporarily absent due to illness, bad weather, industrial dispute, vacation, or other personal reasons. Excluded from the employed are persons whose only activity consisted of work around the house or volunteer work for religious, charitable, and similar organizations.

Adjustment of Census Data to a Total Jobs Concept

Several adjustments were needed to convert 1970 Census employment data to a total jobs (work force) concept. The changes listed below were incorporated into the private nonagricultural wage and salary employment as reported in the Census and adjusted to an annual average.

(1) The estimated number of secondary jobs held by dual job holders were allocated to the industry divisions by utilizing the national distribution of secondary jobs by industry group as shown in Table III.²¹ The Census reports primary jobs only and, consequently, tends to undercount the total number of jobs available in the SMSA.

(2) To compute the occupational distribution of the area, employment by industry group must be known. Consequently, the Employment Service category "all other nonagricultural employees" consisting of self-employed, domestics, and unpaid family workers were allocated to their appropriate industry groups.

Domestics were placed in the service industry under private households. Self employed and unpaid family workers were distributed to the various industry groups on the basis of their industry employment levels as reported in the 1970 Census.²² The actual number allocated was a combination of those reported from the average annual 1970 Census data (see Table II), those calculated from dual job holders, and the remaining difference between Employment Service estimates and the 1970 census year adjusted for dual job holders.

²¹Secondary jobs by industry group are available for 1965. See: U.S. Department of Labor, Bureau of Labor Statistics, Special Labor Force Report No. 63, "Multiple Jobholders in May 1965," a Monthly Labor Review reprint from the February 1966 issue. Information from the Handbook of Labor Statistics 1971, Table 37 was used to adjust the percentages to 1970.

²²Detailed Characteristics, Table 186.

TABLE III

PERCENT DISTRIBUTION OF WORKERS WITH MORE THAN ONE JOB,
BY INDUSTRY GROUP OF SECONDARY JOBS, MAY 1970

Industry and Class of Worker	Percent
All Industries	100.0
Agriculture	18.2
Wage & Salary Workers	3.0
Self-employed Workers	15.2
Nonagricultural Industries	81.8
Wage & Salary Workers	67.9
Forestry, Fisheries & Mining	.5
Construction	4.0
Manufacturing	7.8
Durable Goods	3.7
Nondurable Goods	4.1
Transportation & Public Utilities	5.4
Wholesale & Retail Trade	16.0
Wholesale Trade	1.8
Retail Trade	14.2
Eating & Drinking Places	3.3
Other Retail Trade	10.8
Finance, Insurance & Real Estate	4.4
Services	24.0
Business & Repair Services	2.7
Private Households	3.6
Personal Services, except private households	2.0
Entertainment & Recreation	4.1
Educational Services	4.7
Professional Services, except education	6.9
Public Administration	5.8
Postal Services	1.4
Other Public Administration	4.4
Self-employed Workers	15.5

(3) Government employees were also distributed to the industries worked in. The 1970 industry distribution of government employees provided the necessary ratios for distributing additional government employees from the dual job holder, net commutation, and "with a job, but not on payroll" adjustments. The ES-Census discrepancy after these adjustments was allocated to the appropriate industry groups in a similar fashion.

(4) Dual job holders with secondary jobs in agriculture were added to the agricultural industry group, and the discrepancy between ES and adjusted Census data (559 workers) was subtracted from the total.

(5) The difference between net commutation and persons "with a job, but not on payroll" and the remaining discrepancy from private nonagricultural employment were both allocated to industry groups on the basis of the remaining ES-Census differences per industry.²³ Limited information on the industry employment characteristics of commuters and those with a job, but not on a payroll prevented other allocation methods. An attempt to prorate these workers according to industry distribution as reported in the Census resulted in a aa overstatement of the service sector, and it was necessary to place this group with the "unexplained" ES-Census discrepancy.

Table IV presents the 1970 estimates of total jobs by major industry group. Jobs in the manufacturing sector were next allocated to the component industries. Primarily, the goal was to adequately account for the shift

²³The private NON AG wage and salary discrepancy shown in Table II was not adjusted for the effects of dual job holders with secondary jobs outside the private sector. Adding 698 government employees that were dual job holders, 2,197 dual job holders in agriculture, and 1,674 dual job holders in the self employed category yields a net discrepancy of 3,756 job holders (ES employment exceeding Census employment).

TABLE IV

TOTAL JOBS IN OMAHA, 1970

Industry	Total Jobs	Private Non-agricultural Wage & Salary Employment ¹	Self-employed & Unpaid family Workers, except Agriculture. Agricultural Employment & Domestic ²	Government ³	Allocation of net commutation, minus "with a job but not on payroll," dual job holders, & the remaining ES-Census Discrepancy ⁴
Manufacturing	40,371	34,028	784	296	5,263
Mining	399	325	25	14	35
Construction	14,277	9,661	1,843	1,759	1,014
Transportation	15,344	14,370	547	461	(34)
Communications	4,613	4,145	6	61	401
Utilities	3,249	2,448	25	1,230	(454)
Wholesale Trade	15,960	13,598	630	87	1,645
Retail Trade	39,994	33,338	3,577	364	2,715
Insurance	10,122	8,872	287	49	914
Finance & Real Estate	7,779	6,545	368	444	422
Services	60,736	35,746	8,858	15,494	638
Public Administration	9,515	-	-	9,515	-
Agriculture	6,410	-	6,300	110	-
Total ⁵	228,769	163,076	23,250	29,884	12,559

¹Represents average annual employment calculated from Census information.

²The self employed and unpaid family workers category includes 10,970 from the average annual Census, 1,674 from dual job holders and the remaining discrepancy of 2,088. The figure for agriculture includes 4,662 from the average annual Census, 2,197 from dual jobs and a negative (Census exceeded ES) of 559. Domestic^s include 1,863 from the average annual Census and 355 allocated from the discrepancy between "all other non-agriculture" and the Census estimate.

(continued)

away from durable goods industries in 1970. As presented by ES data, employment in these industries dropped from 54.6 percent (April, 1970) to 53.5 percent (annual average, 1970) of total manufacturing employment. However, because the Census employment contribution of durable goods industries was only 50.98 percent of total manufacturing employment, no further adjustment was made. Attempts to account for the difference between ES and Census data on durable goods industries proved fruitless, as the allocation of government employees and self employed workers increased the importance of durable goods industries in the ES data while the allocation of dual job holders reduced the importance of such industries.

Employment in the durable and nondurable goods sectors was next allocated to the component industries. For example, chemicals and allied products accounted for 7.98 percent of total nondurable goods employment in April of 1970. This relationship was applied to prorate employment changes in the nondurable goods sector. The same procedure was used to allocate component industry groups in the transportation, retail trade, and service sectors.

³Government employment of 27,435 from the Census was distributed to the industry groups. In addition, 890 from dual job holders and net commutation minus "with a job, but not on payroll" were allocated to public administration and the remaining ES-Census discrepancy was allocated according to the Census industry distribution.

⁴Dual job holders in the private, nonagricultural sector (7,472 workers) were allocated according to the national distribution as shown in Table III. Net commutation minus "with a job, but not on payroll" (1,336 workers) and the discrepancy (3,751 workers) were allocated according to the remaining ES-Census industry discrepancies. An initial attempt to prorate the last two items by industry composition resulted in a significant overstatement of the service sector and understatement of the manufacturing sector. It is believed that differences in the two methods can be resolved when the 1970 Journey to Work data is published. First, it is likely that the estimated net commutation is low. It is also likely that commuters by industry group are weighted heavily towards the manufacturing sector.

⁵Excludes workers under 16 years of age. The 1970 Census (Detailed Characteristics, Table 184) lists 2,781 workers under 16 in industries other than agriculture. Appendix A illustrates the occupational characteristics of this group.

Table V presents the final occupational composition of total jobs in the Omaha SMSA for 1970. Differences in the sum of component occupational groups are the result of rounding.

Occupational Estimates for 1971

Table VI presents the 1971 occupational estimates by broad industry groups. The procedure used to distribute workers to industry groups and occupational categories was identical to that for the 1970 period. Changes in self-employed, domestics, unpaid family workers, and government employment were allocated to industry groups on the basis of their 1970 ratios. Then the adjusted industry changes were prorated to the occupational classifications on the basis of the 1970 ratios. Since ES data includes a partial breakdown for government employment, 1,800 workers were allocated to education. The 1970 occupational breakdown for workers in educational services was applied and added to the service sector. Other employment changes in the government sector were prorated by applying the 1970 ratios for government employment in the major industry groups.

Several assumptions were involved in the 1971 occupational computations. First, it was assumed that the distribution of occupations by industry did not change from 1970 to 1971. Second, employment changes (e.g. hiring additional workers) were assumed to occur in all occupational categories and in absolute amounts consistent with the relative importance of the occupations in 1970. Third, the occupational breakdown for the major industry groups was applied for the employment changes. To the extent employment changes within a major industry are proportionately dispersed among its component industries, use of the industry average will adequately measure change. Conversely, if employment changes are concentrated in one such industry, the major industry

TABLE V

OCCUPATIONAL ESTIMATES, 1970

Occupation	Persons 16 yrs. Old & Over	Agri- culture, Forestry & Fisheries	Mining	Con- struction	Total Manu- facturing	Furniture, Lumber, & Wood Products	Stone, Clay, & Glass Products
Total employed	228769	6410	399	14277	40371	1806	785
Professional, technical & kindred workers	33240	166	49	1241	2681	63	88
Accountants	3039	11	11	138	404	11	5
Architects	247	12	-	24	6	-	-
Computer specialists	1084	-	6	-	121	3	-
Engineers	2842	6	18	651	666	24	35
Chemical	29	-	-	-	20	-	-
Civil	984	6	-	491	57	-	20
Electrical & electronic	537	-	-	40	154	-	-
Industrial	419	-	6	-	250	11	16
Mechanical	317	-	-	74	57	-	-
Other engineers	591	-	12	46	129	13	-
Mathematical specialists	180	-	-	-	4	-	-
Life & physical scientists	258	6	-	24	76	-	-
Chemists	117	6	-	-	52	-	-
Personnel & labor relations workers	989	-	5	28	170	-	6
Social scientists	266	-	-	-	28	-	-
Engineering & science technicians	1634	5	5	239	550	6	40
Draftsman	651	-	5	78	109	6	22
Electrical & electronic engineering technicians	312	-	-	18	109	-	-
Industrial & mechanical engineering technicians	59	-	-	-	57	-	6
Technicians, except health & engineering & science	386	-	-	39	21	-	-
Writers, artists & entertainers	1979	13	6	46	375	11	-
Other professional, technical & kindred workers	20329	112	-	50	262	8	-
Managers & administrators, except farm	20976	109	60	1489	2620	107	64
Buyers, purchasing agents & sales managers	3280	-	-	77	630	25	20
Other managers & administrators	17698	109	60	1411	1990	82	44
Salaried	14803	46	47	1012	1788	76	27
Self-employed	2892	64	13	399	201	5	17
Sales workers	18353	12	20	181	1865	63	65
Clerical & kindred workers	46841	130	107	1728	4433	173	16
Bookkeepers	4989	48	7	236	561	12	5
Cashiers	2806	-	6	-	7	6	-
Examiners & inspectors, n.e.c.	877	-	-	150	57	3	3
Office machine operators	2229	-	11	46	254	-	5
Shipping & receiving clerks	1171	-	-	11	355	21	-
Stock clerks & storekeepers	1469	-	7	32	246	21	-
Other clerical & kindred workers	33190	85	75	797	2951	104	19
Craftsmen & kindred workers	29215	165	80	7347	7388	494	125
Blacksmiths, forgers, hammermen, & boilermakers	180	-	-	7	45	-	-
Brickmasons & stonemasons	415	6	-	375	16	-	-
Carpenters	2132	20	-	1712	89	29	5
Cranemen, derrickmen & hoistmen	248	6	7	50	113	-	-
Electricians	1568	-	-	713	246	-	-
Excavating, grading & road machine operators	557	24	-	410	64	-	5
Foremen, n.e.c.	3971	68	15	490	1667	77	20
Mechanics & repairmen	6639	8	53	385	889	40	30
Automobile, including body	2585	-	24	39	118	6	11
Machinists, lathe setters & toolmakers	1447	-	6	8	1013	30	4
Metal craftsmen, except mechanics & machinists	839	-	-	364	295	11	-
Painters, construction & maintenance & plasterers & paperhangers	1031	-	-	667	104	16	9
Plumbers & pipe fitters	1025	-	-	728	89	-	-
Printing craftsmen	1276	-	-	8	1086	-	-
Stationary engineers & power station operators	890	-	-	4	210	4	5
Other craftsmen & kindred workers	6989	32	-	1424	1461	274	46
Operatives, except transport	23638	6	29	725	15983	719	118
Assemblers	1862	-	-	4	1275	100	8
Checkers, examiners & inspectors; manufacturing	1235	-	-	-	1235	25	-
Filters, polishers, sanders & buffers	101	-	-	-	92	4	-
Painters, manufactured articles	180	-	-	-	52	5	-
Precision machine operatives	605	-	-	-	517	13	-
Welders & flamecutters	1440	-	6	137	933	21	13
Other specified operatives	10590	-	23	502	3656	319	13
Machine operatives, miscellaneous specified	2734	6	-	28	2305	28	42
Machine operatives, not specified	1821	-	-	15	1577	33	5
Miscellaneous operatives	2500	-	-	37	1632	60	19
Not specified operatives	774	-	-	6	605	13	14

Occupation	Persons 16 yrs. Old & Over	Agri- culture, Forestry & Fisheries	Mining	Con- struction	Total Manu- facturing	Furniture, Lumber, & Wood Products	Stone, Clay, & Glass Products
Transport equipment operatives	9599	95	34	344	1804	85	250
Deliverymen & route men	2024	-	6	6	595	4	17
Truck drivers	4834	64	28	271	751	70	195
Other transport equipment operatives	2745	32	-	64	468	10	20
Laborers, except farm	19968	708	5	1590	2555	101	60
Freight, stock, & material handlers	4452	-	5	40	944	29	12
Other specified laborers	3944	701	-	1459	392	6	16
Miscellaneous laborers	520	-	-	-	106	9	-
Not specified laborers	2041	6	-	-	1034	55	13
Farm workers	4949	4949	-	-	-	-	-
Service workers, including private household	30967	68	15	171	1946	12	17
Cleaning service workers	5944	15	7	73	604	6	12
Personal service workers	3513	-	-	13	61	5	-
Guards and watchmen	773	12	7	11	160	-	5
Other service workers, including private household	20745	41	-	74	222	-	-

TABLE V (continued)

Occupation	Primary Ferrous Industries	Primary Nonferrous Industries	Fab. Metal Industries incl. Not Specified Metal	Machinery, except Electrical	Electrical Machinery, Equipment, & Supplies	Motor Vehicles & Motor Vehicle Equipment	Aircraft & parts
Total employed	706	382	2596	4674	5650	605	15
Professional, technical & kindred workers	45	25	129	385	540	47	-
Accountants	16	5	5	28	48	5	-
Architects	-	-	6	-	-	-	-
Computer specialists	-	7	5	44	23	5	-
Engineers	23	7	29	178	211	12	-
Chemical	-	-	-	-	5	-	-
Civil	-	-	5	17	-	-	-
Electrical & electronic	-	-	-	42	112	-	-
Industrial	12	-	5	61	66	-	-
Mechanical	-	-	6	24	4	12	-
Other engineers	12	7	11	35	27	-	-
Mathematical specialists	-	-	-	5	-	-	-
Life & physical scientists	-	-	-	5	6	-	-
Chemists	-	-	-	5	6	-	-
Personnel & labor relations workers	-	-	-	12	73	-	-
Social scientists	-	-	-	6	-	-	-
Engineering & science technicians	-	5	38	84	106	13	-
Draftsmen	-	-	21	36	6	13	-
Electrical & electronic engineering technicians	-	-	-	20	86	-	-
Industrial & mechanical engineering technicians	-	-	-	8	5	-	-
Technicians, except health & engineering & science	-	-	15	4	-	-	-
Writers, artists & entertainers	-	-	4	-	16	-	-
Other professional, technical & kindred workers	5	-	24	16	55	12	-
Managers & administrators, except farm	50	-	136	261	195	59	5
Buyers, purchasing agents & sales managers	5	-	5	61	37	10	-
Other managers & administrators	45	-	131	200	158	48	5
Self-employed	45	-	113	169	152	48	5
Sales workers	18	20	114	185	58	14	-
Clerical & kindred workers	42	22	204	526	454	51	4
Bookkeepers	-	-	44	58	39	27	-
Cashiers	-	-	-	-	-	-	-
Estimators & investigators, n.e.c.	-	-	22	-	3	-	-
Office machine operators	-	-	22	23	42	-	-
Shipping & receiving clerks	-	-	23	67	41	-	-
Stock clerks & storekeepers	5	-	2	61	35	6	-
Other clerical & kindred workers	37	22	92	318	272	17	4
Craftsmen & kindred workers	203	127	638	1018	972	99	6
Blacksmiths, forgers, hammermen, & boilermakers	-	-	11	16	-	-	-
Brickmasons & stonemasons	-	15	-	-	-	-	-

Occupation	Primary Ferrous Industries	Primary Nonferrous Industries	Fab. Metal Industries Incl. Not Specified Metal	Machinery, except Electrical	Electrical Machinery, Equipment, & Supplies	Motor Vehicles & Motor Vehicle Equipment	Aircraft & parts
Carpenters	-	-	-	4	5	13	-
Cranemen, derrickmen & hoistmen	32	18	36	5	17	-	-
Electricians	-	9	17	5	104	-	-
Excavating, grading & road machine operators	-	-	3	-	-	-	-
Foremen, n.e.c.	62	39	139	247	235	28	-
Mechanics & repairmen	18	17	94	128	134	12	6
Automobile, including body	-	-	-	-	11	5	-
Machinists, job setters & toolmakers	18	13	127	320	123	16	-
Metal craftsmen, except mechanics & machinists	38	16	116	29	46	17	-
Painters, construction & maintenance, & plasterers & paperhangers	5	-	11	16	11	5	-
Plumbers & pipe fitters	-	-	7	16	25	-	-
Printing craftsmen	-	-	22	10	-	-	-
Stationary engineers & power station operators	-	-	5	4	-	7	-
Other craftsmen & kindred workers	29	-	47	19	271	-	-
Operatives, except transport	249	118	1073	2005	3021	317	-
Assemblers	5	-	95	415	551	18	-
Checkers, examiners & inspectors; manufacturing	18	-	91	183	502	7	-
Filters, polishers, sanders & buffers	-	5	11	49	-	-	-
Painters, manufactured articles	-	-	-	19	-	22	-
Precision machine operatives	27	-	52	369	18	7	-
Welders & flamecutters	56	13	255	270	64	160	-
Other specified operatives	47	45	175	157	299	37	-
Machine operatives, miscellaneous specified	25	29	152	141	556	14	-
Machine operatives, not specified	30	8	160	318	207	5	-
Miscellaneous operatives	26	16	59	44	683	7	-
Not specified operatives	13	-	71	60	160	39	-
Transport equipment operatives	5	5	129	62	100	-	-
Deliverymen & roulemen	-	5	28	8	-	-	-
Truck drivers	5	-	47	16	24	-	-
Other transport equipment operatives	-	-	53	38	77	-	-
Laborers, except farm	72	54	120	134	196	20	-
Freight, stock & material handlers	6	15	30	53	119	2	-
Other specified laborers	4	-	16	12	21	-	-
Miscellaneous laborers	17	8	20	-	-	-	-
Not specified laborers	44	30	92	69	57	10	-
Farm workers	-	-	-	-	-	-	-
Service workers, including private household	19	10	51	99	114	-	-
Cleaning service workers	19	10	40	71	23	-	-
Personal service workers	-	-	-	-	-	-	-
Guards and watchmen	-	-	-	7	73	-	-
Other service workers, including private household	-	-	11	20	18	-	-

TABLE V (continued)

Occupation	Other Transportation Equipment	Other Ordnance	Other Durable Goods	Food & Kindred Products	Textile Mill Products	Apparel & Other Fabricated Textile Products	Paper & Allied Products
Total employed	219	122	3075	10868	347	599	1034
Professional, technical & kindred workers	25	14	214	464	11	-	38
Accountants	6	7	35	168	-	-	6
Architects	-	-	-	-	-	-	-
Computer specialists	-	7	-	21	-	-	-
Engineers	13	-	29	55	4	-	-
Chemical	-	-	6	-	-	-	-
Civil	-	-	-	13	-	-	-
Electrical & electronic	-	-	-	-	-	-	-
Industrial	13	-	17	22	-	-	-
Mechanical	-	-	11	-	-	-	-
Other engineers	-	-	5	10	4	-	-
Mathematical specialists	-	-	-	-	-	-	-
Life & physical scientists	-	-	-	28	-	-	-
Chemists	-	-	-	23	-	-	-
Personnel & labor relations workers	-	-	4	34	-	-	14

Occupation	Other Transportation Equipment	Ordnance	Other Durable Goods	Food & Kindred Products	Textile Mill Products	Apparel & Other Fabricated Textile Products	Paper & Allied Products
Social scientists	-	-	-	17	-	-	-
Engineering & science technicians	5	-	58	113	6	-	-
Draftsmen	5	-	-	-	-	-	-
Electrical & electronic engineering technicians	-	-	-	-	-	-	-
Industrial & mechanical engineering technicians	-	-	27	6	-	-	-
Technicians, except health & engineering & science	-	-	-	-	-	-	-
Writers, artists & entertainers	-	-	24	-	-	-	17
Other professional, technical & kindred workers	-	-	63	26	-	-	-
Managers & administrators, except farm	27	-	174	841	6	42	79
Buyers, purchasing agents & sales managers	-	-	35	309	-	11	29
Other managers & administrators	27	-	138	532	6	30	50
Salaried	27	-	98	528	6	24	50
Self-employed	-	-	40	4	-	5	-
Sales workers	4	11	132	282	33	24	80
Clerical & kindred workers	25	13	325	1234	43	46	131
Bookkeepers	5	-	11	164	6	10	21
Cashiers	-	-	-	-	-	-	-
Estimators & investigators, n.e.c.	-	-	6	7	-	-	-
Office machine operators	-	-	13	95	-	3	5
Shipping & receiving clerks	4	-	35	77	10	17	13
Stock clerks & storekeepers	-	-	-	62	-	-	12
Other clerical & kindred workers	15	13	260	828	26	15	80
Craftsmen & kindred workers	26	18	497	1381	70	55	153
Blacksmiths, forgers, hammermen & boiler-makers	-	-	-	11	-	-	-
Brickmasons & stonemasons	-	-	-	-	-	-	-
Carpenters	-	-	5	26	-	-	-
Granemen, derrickmen & hoistmen	-	-	-	8	-	-	-
Electricians	4	-	5	96	-	-	-
Excavating, grading & road machine operators	-	-	-	17	-	-	-
Foremen, n.e.c.	-	5	50	491	7	43	35
Mechanics & repairmen	-	-	63	277	-	-	21
Automobile, including body	-	-	-	67	-	-	-
Machinists, job setters & toolmakers	15	13	23	45	-	4	14
Metal craftsmen, except mechanics & machinists	-	-	-	16	-	-	4
Painters, construction & maintenance, & plasterers & papethangers	-	-	5	16	-	-	-
Plumbers & pipe fitters	-	-	4	25	-	5	-
Printing craftsmen	-	-	13	5	-	-	74
Stationary engineers & power station operators	-	-	5	114	-	-	-
Other craftsmen & kindred workers	7	-	321	236	13	-	6
Operatives, except transport	96	59	1468	4986	189	405	417
Assemblers	27	-	180	143	14	9	8
Checkers, examiners & inspectors; manufacturing	-	8	37	214	-	10	24
Filters, polishers, sanders & buffers	-	-	18	-	-	-	5
Painters, manufactured articles	-	-	6	5	-	-	-
Precision machine operatives	-	13	6	-	-	-	-
Welders & flamecutters	45	-	5	11	-	-	-
Other specified operatives	19	11	669	2378	175	355	123
Machine operatives, miscellaneous specified	5	5	169	577	-	16	123
Machine operatives, not specified	5	21	157	203	-	-	84
Miscellaneous operatives	-	-	161	411	-	10	24
Not specified operatives	-	-	65	144	-	4	26
Transport equipment operatives	14	6	37	898	38	5	50
Deliverymen & routemen	-	-	-	495	-	-	4
Truck drivers	-	6	-	258	33	5	23
Other transport equipment operatives	14	-	37	145	4	-	23
Laborers, except farm	-	-	162	1236	5	15	75
Freight, stock, & material handlers	-	-	15	316	-	15	44
Other specified laborers	-	-	83	94	-	-	-
Miscellaneous laborers	-	-	9	116	-	-	-
Not specified laborers	-	-	60	510	5	-	32
Farm workers	-	-	-	-	-	-	-
Service workers, including private household	-	-	65	435	-	5	8
Cleaning service workers	-	-	26	259	-	5	8
Personal service workers	-	-	-	54	-	-	-
Guards and watchmen	-	-	-	42	-	-	-
Other service workers, including private household	-	-	39	80	-	-	-

Occupation	Printing Publishing & Allied Industries	Chemicals & Allied Products	Rubber & Miscel- laneous Plastic Products	Other Durable Goods, Incl. Not Spec. Mfging.	Transpor- tation Communi- cation & Util.	Transportation	Railroads & Railway Express Service
Total employed	3203	1575	490	1618	23206	12344	7889
Professional, technical & kindred workers							
Accountants	348	174	10	61	2473	701	582
Architects	16	24	-	11	409	247	209
Computer specialists	-	-	-	-	-	-	-
Engineers	5	27	5	5	288	95	91
Chemical	-	5	-	-	506	99	78
Civil	-	-	-	-	9	-	-
Electrical & electronic	-	-	-	-	83	30	30
Industrial	5	17	-	5	213	20	18
Mechanical	-	-	-	-	53	10	5
Other engineers	-	4	5	-	60	18	6
Mathematical specialists	-	-	-	-	83	22	21
Life & physical scientists	-	34	-	-	56	13	14
Chemists	-	18	-	-	25	-	-
Personal & labor relations workers	8	6	-	9	16	30	18
Social scientists	-	-	-	3	75	-	-
Engineering & science technicians	-	59	5	10	264	94	83
Draftsmen	-	-	-	-	146	74	62
Electrical & electronic engineering technicians	-	-	-	-	97	12	14
Industrial & mechanical engineering technicians	-	-	-	-	2	3	3
Technicians, except health & engineering & science	-	-	-	-	86	24	7
Writers, artists, & entertainers	294	10	-	-	355	35	30
Other professional, technical & kindred workers	19	13	-	22	258	62	52
Managers & administrators, except farm	259	135	48	125	1589	1066	553
Buyers, purchasing agents & sales managers	46	19	16	-	153	72	36
Other managers & administrators	213	116	31	125	1436	994	516
Salaried	160	116	23	116	1390	963	516
Self-employed	52	-	8	9	46	30	-
Sales workers	373	228	23	122	299	158	32
Clerical & kindred workers	590	243	87	178	6537	3754	2575
Bookkeepers	96	50	-	6	441	250	163
Cashiers	-	-	-	-	107	97	27
Estimators & investigators, n.e.c.	-	4	-	-	204	128	127
Office machine operators	35	6	-	4	480	306	294
Shipping & receiving clerks	12	28	5	-	146	133	86
Stock clerks & storekeepers	-	22	-	-	223	184	115
Other clerical & kindred workers	446	131	82	168	4938	2662	1763
Craftsmen & kindred workers	1102	177	60	221	5022	3137	2275
Blacksmiths, forgers, hammermen, & boilermakers	5	-	-	-	81	81	76
Brickmasons & stonemasons	-	-	-	-	5	5	5
Carpenters	-	-	-	-	62	69	52
Cranemen, derrickmen & hoistmen	-	-	-	-	37	27	22
Electricians	-	5	-	-	237	173	174
Excavating, grading & road machine operators	-	37	-	-	32	18	12
Foremen, n.e.c.	96	50	24	16	654	419	184
Mechanics & repairmen	22	22	6	-	1422	1197	672
Automobile, including body	6	-	-	-	429	395	8
Machinists, job setters & toolmakers	9	6	24	6	225	229	223
Metal craftsmen, except mechanics & machinists	-	-	-	-	72	72	64
Painters, construction & maintenance & plasterers & paperhangers	6	-	-	-	53	52	49
Plumbers & pipe fitters	-	6	-	-	100	61	61
Printing craftsmen	952	-	5	-	32	18	11
Stationary engineers & power station operators	-	49	-	12	259	27	16
Other craftsmen & kindred workers	12	-	-	185	1748	686	652
Operatives, except transport	387	396	218	647	778	580	394
Assemblers	5	16	4	4	32	17	-
Checkers, examiners & inspectors; manufacturing	32	-	5	78	-	-	-
Filters, polishers, sanders & buffers	-	-	7	-	-	-	-
Painters, manufactured articles	-	-	-	-	-	-	-
Precision machine operatives	-	5	8	-	28	26	24
Welders & flamecutters	-	10	8	5	194	178	172
Other specified operatives	109	171	52	496	170	89	51
Machine operatives, miscellaneous specified	65	96	66	29	44	24	19
Machine operatives, not specified	114	67	41	16	62	10	5
Miscellaneous operatives	57	17	20	12	218	202	93
Not specified operatives	4	14	5	4	30	34	29

Occupation	Printing Publishing & Allied Industries	Chemicals & Allied Products	Rubber & Miscel- laneous Plastic Products	Other Durable Goods, Incl. Not Spec- ifying.	Transpor- tation Communi- & Util.	Transportation	Railroads & Railway Express Service
Transport equipment operatives	63	34	4	36	4288	4282	772
Deliverymen & routemen	14	5	-	-	254	255	7
Truck drivers	40	18	-	-	11	2406	2510
Other transport equipment operatives	9	10	4	25	1648	1519	741
Laborers, except farm	33	129	5	153	1417	1138	441
Freight, stock & material handlers	4	56	-	18	710	689	168
Other specified laborers	-	5	5	129	229	71	24
Miscellaneous laborers	4	-	-	5	225	188	162
Not specified laborers	24	68	-	-	255	190	87
Farm workers	-	-	-	-	-	-	-
Service workers, including private household	47	54	32	72	798	525	264
Cleaning service workers	40	37	21	26	315	195	49
Personal service workers	-	-	-	-	132	146	70
Barbers and waitresses	-	13	11	7	67	38	33
Other service workers, including private household	6	5	-	39	283	185	112

TABLE V (continued)

Occupation	Trucking Service & Ware- housing	Other Transportation	Communi- cations	Utilities & Sanitary Services	Wholesale trade	Total Retail Trade	General Mfg. Retailing
Total employed	4968	2487	4613	3249	15960	39994	7380
Professional, technical & kindred workers	58	61	1067	566	636	1087	185
Accountants	26	11	98	61	141	192	49
Architects	-	-	-	-	6	-	-
Computer specialists	5	-	171	29	55	56	18
Engineers	-	20	201	154	232	32	7
Chemical	-	-	-	6	-	-	-
Civil	-	-	15	28	29	12	-
Electrical & electronic	-	2	156	34	36	-	-
Industrial	-	6	12	22	46	-	-
Mechanical	-	12	4	26	26	8	-
Other engineers	-	-	12	36	94	12	7
Mathematical specialists	-	-	122	15	-	-	-
Life & physical scientists	-	-	-	17	11	-	-
Chemists	-	-	-	16	6	-	-
Personnel & labor relations workers	6	7	89	29	23	60	26
Social scientists	-	-	11	46	4	24	-
Engineering & science technicians	6	6	90	64	36	16	-
Draftsmen	6	6	19	42	16	16	-
Electrical & electronic engineering technicians	-	-	65	18	9	-	-
Industrial & mechanical engineering technicians	-	-	-	-	-	-	-
Technicians, except health & engineering & science	11	7	35	21	19	-	-
Writers, artists & entertainers	5	-	301	30	27	180	30
Other professional, technical & kindred workers	-	11	49	104	81	532	55
Managers & administrators, except farm	310	203	360	187	2424	5367	890
Buyers, purchasing agents & sales managers	17	19	33	38	845	1212	416
Other managers & administrators	293	184	327	148	1579	4156	473
Self-employed	262	184	327	136	1386	2843	399
Sales workers	31	-	-	12	191	1312	74
Clerical & kindred workers	95	31	98	42	2894	9370	3234
Bookkeepers	640	539	2046	805	3707	6711	1678
Cashiers	61	25	81	91	699	1035	188
Estimators & investigators, n.e.c.	35	27	4	13	30	2264	368
Office machine operators	-	-	48	29	42	56	34
Shipping & receiving clerks	6	6	134	51	172	168	53
Stock clerks & storekeepers	43	6	16	5	381	240	98
Other clerical & kindred workers	38	31	13	27	281	432	164
Craftsmen & kindred workers	458	443	1748	588	2102	2515	773
Blacksmiths, forgers, hammermen & boilermakers	534	329	909	872	2285	3059	348
	-	6	-	6	6	-	-

Occupation	Trucking Service & Warehousing	Other Transportation	Communications	Utilities & Sanitary Services	Wholesale Trade	Total Retail Trade	General Mdse. Retailing
Brickmasons & stonemasons	-	-	-	-	7	-	-
Carpenters	12	5	-	-	20	96	47
Craneman, derrickmen & hoistman	6	-	-	7	23	-	-
Electricians	-	-	13	43	287	24	-
Excavating, grading & road machine operators	6	-	-	11	3	-	-
Foremen, n.e.c.	178	56	73	136	467	336	93
Mechanics & repairmen	290	236	11	208	715	1476	123
Automobile, including body	254	131	5	42	155	983	32
Machinists, job setters & toolmakers	-	6	11	4	128	12	-
Metals craftsmen, except mechanics & machinists	7	-	-	4	68	28	-
Painters, construction & maintenance, & plasterers & paperhangers	-	3	-	3	20	16	7
Plumbers & pipe fitters	-	-	-	30	12	48	6
Printing craftsmen	8	-	6	6	29	12	-
Stationary engineers & power station operators	-	12	20	144	33	20	11
Other craftsmen & kindred workers	27	6	774	270	464	1039	61
Operatives, except transport	59	128	42	137	1522	2579	121
Assemblers	7	10	12	4	188	20	-
Checkers, examiners & inspectors; manufacturing	-	-	-	-	-	-	-
Filters, polishers, sanders & buffers	-	-	-	-	9	-	-
Painters, manufactured articles	-	-	-	-	-	56	-
Precision machine operatives	-	-	-	4	30	-	-
Welders & flamecutters	-	7	-	20	78	4	-
Other specified operatives	38	-	5	55	487	2347	121
Machine operatives, miscellaneous specified	6	-	13	6	299	48	-
Machine operatives, not specified	5	-	12	28	152	24	-
Miscellaneous operatives	-	111	-	21	193	44	-
Not specified operatives	5	-	-	-	88	40	-
Transport equipment operatives	2675	836	5	232	1177	1148	163
Deliverymen & roulemen	219	29	-	-	426	552	130
Truck drivers	2440	44	5	63	603	416	32
Other transport equipment operatives	15	762	-	169	148	184	-
Laborers, except farm	550	148	28	232	1074	2208	185
Freight, stock & material handlers	478	43	5	47	771	1658	176
Other specified laborers	12	35	17	100	107	336	6
Miscellaneous laborers	12	14	-	35	35	28	-
Not specified laborers	48	56	5	50	161	172	4
Farm workers	-	-	-	-	-	-	-
Service workers, including private household	48	212	54	179	238	8419	577
Cleaning service workers	42	64	48	86	129	568	119
Personal service workers	-	75	-	-	17	148	68
Guards and watchmen	-	5	5	18	13	28	7
Other service workers, including private household	7	68	-	75	78	7674	384

TABLE V (continued)

Occupation	Food Stores	Automotive Dealers & Gasoline Stations	Eating & Drinking Places	Other Retail Trade	Finance, Insurance, & Real Estate	Insurance	Finance & Real Estate
Total employed	6140	4960	8308	13206	17901	10122	7779
Professional, technical & kindred workers	120	41	103	641	1414	1058	388
Accountants	70	31	6	36	563	437	132
Architects	-	-	-	-	5	6	-
Computer specialists	20	-	-	17	284	185	100
Engineers	8	4	-	13	39	39	-
Chemical	-	-	-	-	-	-	-
CIVIL	8	4	-	-	16	16	-
Electrical & electronic	-	-	-	-	7	7	-
Industrial	-	-	-	-	5	6	-
Mechanical	-	-	-	7	-	-	-
Other engineers	-	-	-	7	11	11	-
Mathematical specialists	-	-	-	-	73	69	5
Life & physical scientists	-	-	-	-	5	-	5

Occupation	Food Stores	Automotive Dealers & Gasoline Stations	Eating & Drinking Places	Other Retail Trade	Finance, Insurance, & Real Estate	Insurance	Finance & Real Estate
Chemists	-	-	-	-	-	-	-
Personnel & labor relations workers	11	-	12	12	127	79	49
Social scientists	-	5	-	18	24	7	19
Engineering & science technicians	-	-	-	14	4	-	3
Draftsmen	-	-	-	14	-	-	-
Electrical & electronic engineering technicians	-	-	-	-	4	-	3
Industrial & mechanical engineering technicians	-	-	-	-	-	-	-
Technicians, except health & engineering & science	-	-	-	-	5	6	-
Writers, artists & entertainers	10	-	86	53	95	76	20
Other professional, technical & kindred workers	-	-	-	477	184	135	51
Managers & administrators, except farm	717	945	900	1919	2835	1270	1550
Buyers, purchasing agents & sales managers	141	103	16	536	158	135	26
Other managers & administrators	575	842	884	1383	2678	1135	1524
Salaried	390	533	560	965	2528	1109	1403
Self-employed	186	309	325	419	150	26	122
Sales workers	771	791	140	4432	3088	2107	999
Clerical & kindred workers	1725	965	525	2219	9245	5420	3838
Bookkeepers	98	202	82	462	960	311	638
Cashiers	1094	71	356	374	116	50	66
Estimators & investigators, n.e.c.	-	-	-	24	227	121	106
Office machine operators	37	4	17	58	666	414	256
Shipping & receiving clerks	25	23	3	91	26	18	11
Stock clerks & storekeepers	158	5	4	99	47	38	9
Other clerical & kindred workers	312	258	62	1112	7209	4468	2753
Draftsmen & kindred workers	274	1080	8	1389	265	80	186
Blacksmiths, forgers, hammermen & boltermakers	-	-	-	-	5	-	6
Bricklayers & stonemasons	-	-	-	-	-	-	-
Carpenters	-	-	-	48	30	-	29
Cranemen, derrickmen & hoistmen	-	-	-	-	-	-	-
Electricians	-	-	-	24	10	6	5
Excavating, grading & road machine operators	-	-	-	-	-	-	-
Foremen, n.e.c.	53	51	4	133	50	11	39
Mechanics & repairmen	28	965	3	354	16	18	-
Automobile, including body	16	921	-	16	-	-	-
Machinists, job setters & toolmakers	-	11	-	-	-	-	-
Metal craftsmen, except mechanics & machinists	-	-	-	26	-	-	-
Painters, construction & maintenance, & plasterers & paperhangers	-	5	-	4	25	-	25
Plumbers & pipe fitters	-	-	-	42	5	-	5
Printing craftsmen	-	-	-	12	10	11	-
Stationary engineers & power station operators	7	-	-	-	55	3	51
Other craftsmen & kindred workers	186	48	-	746	58	32	26
Operatives, except transport	732	1204	36	468	68	43	23
Assemblers	-	7	-	13	-	-	-
Checkers, examiners & inspectors; manufacturing	-	-	-	-	-	-	-
Fillers, polishers, sanders & buffers	-	-	-	-	-	-	-
Painters, manufactured articles	-	54	-	-	-	-	-
Precision machine operatives	-	-	-	-	-	-	-
Welders & flamecutters	-	-	-	5	5	-	5
Other specified operatives	657	1107	40	423	22	14	8
Machine operatives, miscellaneous specified	23	4	9	12	25	18	6
Machine operatives, not specified	4	16	-	4	4	4	-
Miscellaneous operatives	27	10	-	5	11	6	5
Not specified operatives	22	4	8	4	-	-	-
Transport equipment operatives	326	114	36	510	7	-	8
Deliverymen & routemen	116	59	6	240	-	-	-
Truck drivers	165	37	4	176	7	-	8
Other transport equipment operatives	45	18	26	94	-	-	-
Laborers, except farm	1292	140	37	554	151	16	132
Freight, stock & material handlers	1232	10	25	227	7	7	-
Other specified laborers	11	81	7	232	73	4	68
Miscellaneous laborers	-	7	-	20	21	-	22
Not specified laborers	48	42	6	74	48	4	43
Farm workers	-	-	-	-	-	-	-
Service workers, including private household	184	81	6502	1073	821	148	658
Cleaning service workers	42	67	182	157	506	90	406
Personal service workers	4	-	36	41	66	-	65
Guards and watchmen	-	-	4	14	84	-	82
Other service workers, including private household	143	15	6279	861	164	58	106

Occupation	Services, Total	Business Services	Repair Services	Hotels & Lodging Places	Personal Services, Including Private Household	Entertain- ment & Rec. Services	Hospitals
Total employed	60756	4567	3548	1840	7171	2004	11765
Professional, technical & kindred workers	22023	714	133	19	154	423	4437
Accountants	935	172	-	6	5	6	66
Architects	176	-	-	-	-	-	-
Computer specialists	182	97	6	-	-	-	9
Engineers	510	38	6	-	7	-	33
Chemical	-	-	-	-	-	-	-
Civil	194	5	-	-	-	-	4
Electrical & electronic	73	7	-	-	-	-	15
Industrial	36	15	-	-	-	-	6
Mechanical	85	7	-	-	-	-	-
Other engineers	121	6	6	-	7	-	10
Mathematical specialists	30	-	-	-	-	-	5
Life & physical scientists	55	6	-	-	-	-	5
Chemists	25	-	-	-	-	-	5
Personnel & labor relations workers	273	160	7	-	-	-	41
Social scientists	73	16	-	-	-	-	20
Engineering & science technicians	394	41	7	-	-	6	10
Craftsmen	249	25	-	-	-	6	-
Electrical & electronic engineering technicians	30	5	7	-	-	-	-
Industrial & mechanical engineering technicians	-	-	-	-	-	-	-
Technicians, except health & engineering & science	79	-	10	-	13	-	-
Writers, artists & entertainers	844	145	4	14	93	237	21
Other professional, technical & kindred workers	18464	39	92	-	36	175	4228
Managers & administrators, except farm	3613	477	365	206	407	219	394
Buyers, purchasing agents & sales managers	158	27	35	4	4	11	52
Other managers & administrators	3456	449	330	202	402	208	342
Salaried	2934	336	276	135	284	177	342
Self-employed	516	113	104	67	118	31	-
Sales workers	589	221	50	13	83	62	10
Clerical & kindred workers	10671	1420	369	321	661	277	1807
Bookkeepers	898	100	79	23	91	30	44
Cashiers	346	6	23	38	9	89	93
Estimators & investigators, n.e.c.	91	64	-	6	7	-	6
Office machine operators	371	182	-	-	13	-	28
Shipping & receiving clerks	12	-	-	-	4	6	6
Stock clerks & storekeepers	176	25	27	7	13	-	87
Other clerical & kindred workers	8770	1042	240	249	526	152	1546
Craftsmen & kindred workers	3030	359	1335	79	154	157	218
Blacksmiths, forgemen, hammermen, & boilermakers	36	-	39	-	-	-	-
Brickmasons & stonemasons	-	-	-	-	-	-	-
Carpenters	85	12	6	-	13	6	10
Cranemen, derrickmen & hoistmen	6	-	-	-	-	4	-
Electricians	43	7	19	-	-	-	11
Excavating, grading & road machine operators	18	10	6	-	-	-	-
Foremen, n.e.c.	134	39	22	-	18	10	11
Mechanics & repairmen	1470	89	1231	-	16	62	30
Automobile, including body	807	11	799	-	-	6	-
Machinists, job setters & toolmakers	55	11	7	-	-	-	6
Metal craftsmen, except mechanics & machinists	-	-	-	-	-	-	-
Painters, construction & maintenance, & plasterers & paperhangers	85	19	6	7	-	-	25
Plumbers & pipe fitters	12	-	-	-	-	-	-
Printing craftsmen	79	50	-	10	-	-	-
Stationary engineers & power station operators	255	6	-	39	5	27	100
Other craftsmen & kindred workers	747	111	203	23	100	67	20
Operatives, except transport	1876	197	276	16	761	32	260
Assemblers	43	-	-	-	4	-	-
Checkers, examiners & inspectors; manufacturing	-	-	-	-	-	-	-
Filters, polishers, sanders & buffers	-	-	-	-	-	-	-
Painters, manufactured articles	73	-	75	-	-	-	-
Precision machine operatives	30	-	27	-	-	-	-
Welders & flamecutters	73	6	58	-	-	-	-
Other specified operatives	1372	91	74	16	731	25	234
Machine operatives, miscellaneous specified	79	16	18	-	15	-	5
Machine operatives, not specified	36	21	-	-	-	7	11
Miscellaneous operatives	127	38	24	-	4	-	-
Not specified operatives	25	5	-	-	7	-	10

Occupation	Services, Total	Business Services	Repair Services	Hotels & Lodging Places	Other Personal Services, Including Private Households	Entertain- ment & Rec.	Hospitals
Transport equipment operatives	540	83	158	6	174	6	10
Deliverymen & routemen	206	41	-	-	125	6	6
Truck drivers	150	27	45	-	28	-	5
Other transport equipment operatives	176	14	114	6	20	-	-
Laborers, except farm	1014	119	191	17	170	115	185
Freight, stock & material handlers	154	27	4	-	16	6	45
Other specified laborers	554	9	154	11	89	54	86
Miscellaneous laborers	25	-	-	-	-	19	-
Not specified laborers	315	83	32	6	64	38	54
Farm workers	-	-	-	-	-	-	-
Service workers, including private household	17377	778	270	1162	4606	713	4443
Cleaning service workers	5408	498	63	561	88	71	701
Personal service workers	3043	11	4	210	1918	225	97
Guards and watchmen	346	205	-	-	-	13	50
Other service workers, including private household	10580	63	202	390	2744	403	3595

TABLE V (continued)

Occupation	Health Services, Except Hospitals	Educa- tional Services Govt.	Educa- tional Services, Private	Welfare, Rel. & Non Profit Organ- izations	Other Pro- fessional & Related Services	Public Adminis- tration
Total employed	4482	10623	5236	4263	5637	9515
Professional, technical & kindred workers	1782	6856	3019	1513	2972	1470
Accountants	16	13	11	21	622	235
Architects	6	-	-	-	170	18
Computer specialists	-	15	11	-	47	92
Engineers	16	26	6	25	356	181
Chemical	-	-	-	-	-	-
Civil	6	-	6	6	171	96
Electrical & electronic	-	8	-	-	46	14
Industrial	-	-	-	4	11	22
Mechanical	-	-	-	15	64	7
Other engineers	10	18	-	-	64	43
Mathematical specialists	-	-	-	-	28	17
Life & physical scientists	9	20	-	-	17	56
Chemists	-	-	-	-	17	12
Personnel & labor relations workers	5	26	7	19	11	150
Social scientists	6	20	4	6	-	38
Engineering & science technicians	22	44	10	-	260	121
Draftsmen	-	6	-	-	214	32
Electrical & electronic engineering technicians	-	6	-	-	11	45
Industrial & mechanical engineering technicians	-	-	-	-	-	-
Technicians, except health & engineering & science	26	21	7	-	-	137
Writers, artists & entertainers	-	42	3	160	124	38
Other professional, technical & kindred workers	1679	6627	2962	1283	1335	386
Managers & administrators, except farm	94	546	291	388	227	870
Buyers, purchasing agents & sales managers	-	9	-	11	6	47
Other managers & administrators	94	537	291	377	222	823
Salaried	88	537	260	377	172	823
Self-employed	6	-	31	-	49	-
Sales workers	-	6	38	76	30	35
Clerical & kindred workers	832	1384	941	1318	1341	4022
Bookkeepers	146	36	40	153	160	104
Cashiers	-	23	34	28	6	30
Estimators & investigators, n.e.c.	-	-	6	6	-	44
Office machine operators	6	24	36	32	52	61
Shipping & receiving clerks	-	-	-	-	-	-
Stock clerks & storeroomkeepers	-	11	-	7	-	25
Other clerical & kindred workers	680	1291	826	1093	1124	3759
Craftsmen & kindred workers	146	135	65	113	71	533
Blacksmiths, forgers, hammermen & boilermakers	-	-	-	-	-	-

TABLE Y (continued)

Occupation	Health Services, Except Hospitals	Educational Services Govt.	Educational Services, Private	Welfare, Rel. & Non Profit Organizations	Other Professional & Related Services	Public Administration
Brickmasons & stonemasons	-	-	-	-	-	6
Carpenters	-	26	-	9	-	18
Cranemen, derrickmen & hoistmen	-	-	-	-	-	6
Electricians	-	6	-	-	-	8
Excavating, grading & road machine operators	-	-	-	4	-	6
Foremen, n.e.c.	10	10	-	6	10	90
Mechanics & repairmen	-	17	12	10	5	206
Automobile, including body	-	-	12	-	-	31
Machinists, job setters & toolmakers	9	11	-	4	6	-
Metal craftsmen, except mechanics & machinists	-	-	-	-	-	12
Painters, construction & maintenance, & plasterers & paperhangers	6	11	-	11	-	61
Plumbers & pipe fitters	-	-	-	10	-	31
Printing craftsmen	-	4	-	4	13	20
Stationary engineers & power station operators	-	25	31	40	5	54
Other craftsmen & kindred workers	121	27	23	15	34	16
Operatives, except transport	68	43	24	85	114	73
Assemblers	10	-	-	15	25	-
Checkers, examiners & inspectors; manufacturing	-	-	-	-	-	-
Fillers, polishers, sanders & buffers	-	-	-	-	-	-
Painters, manufactured articles	-	-	-	-	-	-
Precision machine operatives	-	-	-	-	6	-
Welders & flamecutters	-	-	-	7	6	-
Other specified operatives	58	43	9	33	59	31
Machine operatives, miscellaneous specified	-	-	-	6	6	-
Machine operatives, not specified	-	-	-	-	-	6
Miscellaneous operatives	-	-	15	28	-	36
Not specified operatives	-	-	-	6	-	-
Transport equipment operatives	12	28	16	26	28	162
Deliverymen & routemen	12	10	-	10	-	7
Truck drivers	-	11	16	16	12	130
Other transport equipment operatives	-	7	-	-	16	25
Laborers, except farm	24	57	18	58	59	336
Freight, stock & material handlers	-	4	7	21	6	173
Other specified laborers	8	53	12	14	48	113
Miscellaneous laborers	6	-	-	-	-	-
Not specified laborers	10	-	-	24	6	50
Farm workers	-	-	-	-	-	-
Service workers, including private household	1524	1569	824	687	796	2014
Cleaning service workers	141	668	276	306	29	309
Personal service workers	40	155	163	184	33	33
Guards and watchmen	-	37	25	12	5	45
Other service workers, including private household	1344	709	361	185	729	1627

TABLE VI
OCCUPATIONAL ESTIMATES, 1971

Occupation	Persons 16 yrs. Old & Over	Agriculture	Mining	Con- struction	Manu- facturing	Transpor- tation	Communi- cation
Initial employed	231119	6420	399	15975	39464	15190	4719
Professional, technical & kindred workers	34743	167	49	1210	2554	694	1093
Accountants	3071	11	11	135	385	245	101
Architects	251	12	-	23	4	-	-
Computer specialists	1108	-	6	-	116	95	175
Engineers	2779	6	18	635	635	98	206
Chemical	27	-	-	-	20	-	-
Civil	976	6	-	480	54	30	16
Electrical & electronic	533	-	-	39	146	20	160
Industrial	403	-	6	-	238	11	12
Mechanical	304	-	-	72	54	18	5
Other engineers	541	-	12	45	124	21	12
Mathematical specialists	181	-	-	-	4	13	23
Life & physical scientists	255	6	-	23	73	-	-
Chemists	114	6	-	-	50	-	-
Personnel & labor relations workers	1001	-	5	27	162	30	91
Social scientists	256	-	-	-	27	-	11
Engineering & science technicians	1614	5	5	233	524	93	92
Draftsmen	643	-	5	76	104	73	20
Electrical & electronic engineering technicians	312	-	-	18	104	12	67
Industrial & mechanical engineering technicians	56	-	-	-	54	2	-
Technicians, except health & engineering & science	398	-	-	57	20	24	36
Writers, artists & entertainers	2013	14	6	45	357	35	308
Other professional, technical & kindred workers	21808	113	-	42	250	62	50
Managers & administrators, except farm	21158	110	60	1453	2496	1055	368
Buyers, purchasing agents & sales managers	3268	-	-	75	600	72	34
Other managers & administrators	17886	110	60	1375	1892	984	334
Salaried	14981	46	47	987	1704	954	334
Self-employed	2905	64	13	390	192	30	-
Sales workers	18452	12	20	177	1777	156	101
Clerical & kindred workers	47652	131	107	1246	4223	3717	2093
Bookkeepers	4978	49	7	230	534	249	83
Cashiers	2979	-	6	-	7	90	5
Estimators & investigators, n.o.c.	876	-	-	153	54	126	49
Office machine operators	2253	-	11	45	243	302	137
Shipping & receiving clerks	1165	-	-	11	339	132	16
Stock clerks & storekeepers	1469	-	7	30	235	182	13
Other clerical & kindred workers	33939	83	75	777	2811	2635	1789
Craftsmen & kindred workers	28764	165	80	7166	7039	3106	930
Blacksmiths, forgers, hammermen & boilermakers	184	-	-	7	43	80	-
Brickmasons & stonemasons	405	6	-	366	15	5	-
Carpenters	2098	20	-	1669	84	68	-
Cranemen, derrickmen & hoistmen	239	6	7	49	108	27	-
Electricians	1532	-	-	695	235	172	13
Excavating, grading & road machine operators	542	24	-	399	61	18	-
Foremen, n.o.c.	3870	69	15	477	1588	415	75
Mechanics & repairmen	6652	8	53	376	846	1185	11
Automobile, including body	2641	-	24	36	111	390	5
Machinists, job setters & toolmakers	1417	-	6	8	365	226	11
Metal craftsmen, except mechanics & machinists	823	-	-	354	281	72	-
Painters, construction & maintenance & plasterers & paperhangers	1020	-	-	650	99	52	-
Plumbers & pipe fitters	997	-	-	710	84	60	-
Printing craftsmen	1230	-	-	9	1035	18	6
Stationary engineers & power station operators	830	-	-	4	200	27	21
Other craftsmen & kindred workers	6920	32	-	1340	1392	579	392
Operatives, except transport	22928	6	29	707	15228	574	44
Assemblers	1790	-	-	4	1500	17	12
Checkers, examiners & inspectors; manufacturing	1177	-	-	-	1177	-	-
Filters, polishers, sanders & buffers	97	-	-	-	88	-	-
Painters, manufactured articles	181	-	-	-	50	-	-
Precision machine operatives	582	-	-	-	492	25	-
Welders & flamecutters	1391	-	6	134	889	176	-
Other specified operatives	10371	-	23	490	5370	88	5
Machine operatives, miscellaneous specified	2624	-	-	27	2100	24	13
Machine operatives, not specified	1736	-	-	15	1450	10	12
Miscellaneous operatives	2215	-	-	30	1947	200	-
Not specified operatives	748	-	-	5	557	33	-

Occupation	Persons 16 yrs. Old & Over	Persons 16 yrs. Old & Over					
		Agriculture	Mining	Con- struction-	Manu- facturing	Transpor- tation	Communi- cation
Transport equipment operatives	9742	96	34	335	1719	4739	5
Deliverymen & routemen	2624	-	6	8	557	252	-
Truck drivers	4964	65	28	264	716	2485	-
Other transport equipment operatives	7757	32	-	67	446	1593	-
Laborers, except farm	10941	708	5	1464	2435	1127	30
Freight, stock & material handlers	4474	-	5	38	900	682	3
Other specified laborers	3089	703	-	1423	373	70	19
Miscellaneous laborers	510	-	-	-	177	187	-
Not specified laborers	1995	6	-	-	985	188	5
Farm workers	4956	4956	-	-	-	-	-
Service workers, including private household	31831	69	15	167	996	519	55
Cleaning service workers	6089	15	7	71	577	153	48
Personal service workers	3620	-	-	12	58	145	-
Guards and watchmen	777	12	8	11	154	38	5
Other service workers, including private household	21344	41	-	72	212	183	-

TABLE VI (continued)

Occupation	Persons 16 yrs. Old & Over						
	Utilities	Wholesale Trade	Retail Trade	Insurance	Finance & Real Estate	Service	Public Administration
Total employed	3317	15831	40700	10182	7777	63813	10382
Professional, technical & kindred workers	577	631	1107	1045	388	23623	1605
Accountants	62	139	195	440	132	957	258
Architects	-	6	-	6	-	180	20
Computer specialists	29	55	57	186	100	188	101
Engineers	157	228	33	39	-	526	198
Chemical	7	-	-	-	-	-	-
Civil	29	29	12	16	-	199	105
Electrical & electronic	34	36	-	7	-	75	16
Industrial	23	46	-	6	-	37	24
Mechanical	27	26	8	-	-	87	7
Other engineers	37	93	12	11	-	127	47
Mathematical specialists	16	-	-	70	5	31	19
Life & physical scientists	17	10	-	-	5	60	61
Chemists	12	6	-	-	-	25	14
Personnel & labor relations workers	29	22	61	80	49	283	162
Social scientists	44	4	24	7	19	78	42
Engineering & science technicians	65	36	16	-	3	410	132
Draftsmen	42	16	16	-	-	256	35
Electrical & electronic engineering technicians	18	9	-	-	3	32	49
Industrial & mechanical engineering technicians	-	-	-	-	-	-	-
Technicians, except health & engineering & science	21	19	-	6	-	85	150
Writers, artists & entertainers	30	26	183	77	20	870	42
Other professional, technical & kindred workers	106	81	542	136	51	19947	421
Managers & administrators, except farm	191	2404	5462	1278	1550	3782	949
Buyers, purchasing agents & sales managers	39	840	1233	136	26	162	51
Other managers & administrators	152	1566	4229	1143	1524	3619	898
Salaried	138	1375	2893	1116	1403	3086	898
Self-employed	12	190	1335	28	122	528	-
Sales workers	42	2870	9536	2120	999	604	38
Clerical & kindred workers	820	3677	6829	5453	3836	11133	4388
Bookkeepers	92	693	1054	313	637	925	113
Cashiers	13	29	2304	50	66	357	33
Estimators & investigators, n.e.c.	29	41	57	122	106	93	46

TABLE VI (continued)

Occupation	Utilities	Wholesale Trade	Retail Trade	Insurance	Finance & Real Estate	Service	Public Administration
Office machine operators	52	171	171	416	256	302	67
Shipping & receiving clerks	5	378	244	17	11	12	-
Stock clerks & storekeepers	27	279	440	38	9	182	27
Other clerical & kindred workers	601	2085	2560	4484	2752	9176	4101
Craftsmen & kindred workers	891	2267	3154	80	185	3120	581
Blacksmiths, forgers, hammermen & boltermakers	5	6	-	-	6	37	-
Brickmasons & stonemasons	-	7	-	-	-	-	6
Carpenters	-	20	98	-	29	90	20
Cranemen, derrickmen & hoistmen	7	23	-	-	-	6	6
Electricians	44	285	24	6	2	45	8
Excavating, grading & road machine operators	12	3	-	-	-	19	6
Foremen, n.e.c.	138	463	342	11	39	139	99
Mechanics & repairmen	214	709	1502	17	-	1506	225
Automobile, including body	42	154	1001	-	-	844	34
Machinists, job setters & toolmakers	4	127	12	-	-	58	-
Metal craftsmen, except mechanics & machinists	4	68	28	-	-	-	14
Painters, construction & maintenance & plasterers & paperhangers	3	20	16	-	25	88	67
Plumbers & pipe fitters	30	13	49	-	5	12	34
Printing craftsmen	7	29	12	11	-	82	22
Stationary engineers & power station operators	148	33	20	3	51	264	59
Other craftsmen & kindred workers	275	460	1058	31	26	267	18
Operatives, except transport	140	1510	2625	43	23	1925	80
Assemblers	4	187	20	-	-	44	-
Checkers, examiners & inspectors; manufacturing	-	-	-	-	-	-	-
Fileers, polishers, sanders & buffers	-	9	-	-	-	-	-
Painters, manufactured articles	-	-	57	-	-	74	-
Precision machine operatives	4	30	-	-	-	31	-
Welders & flamocutters	21	78	4	-	5	74	-
Other specified operatives	57	483	2389	14	8	1410	34
Machine operatives, spec. & not spec.	36	446	73	24	6	118	6
Miscellaneous operatives	21	191	45	6	5	130	40
Not specified operatives	-	87	41	-	-	25	-
Transport equipment operatives	237	1168	1168	-	8	556	127
Deliverymen & routemen	-	423	562	-	-	213	7
Truck drivers	65	598	424	-	8	164	142
Other transport equipment operatives	172	147	187	-	-	141	27
Laborers, except farm	237	1066	2247	16	152	1047	567
Freight, stock & material handlers	48	765	1697	7	-	138	189
Other specified laborers	102	106	342	4	68	555	124
Miscellaneous laborers	36	35	28	-	22	25	-
Not specified laborers	51	160	175	4	43	323	55
Farm workers	-	-	-	-	-	-	-
Service workers, including private household	183	236	8567	149	659	18020	2197
Cleaning service workers	87	128	578	91	406	3591	337
Personal service workers	-	17	151	-	65	3136	36
Guards and watchmen	18	13	28	-	82	359	49
Other service workers, including private household	77	78	7810	58	106	10932	1775

average suffices only to the extent the two are similar. Finally total employment for 1971 includes the average annual figure (450) for workers involved in labor-management disputes. No attempt was made to distribute these workers to their industry groups.

Employment and Occupational Projections for 1980

To project the occupational distribution of Omaha's work force for 1980, it was necessary to trend both employment and occupational composition changes by industry group. Employment projections were based on regression analysis while changes in the occupational composition of the industry groups were based on the adjusted BLS national occupation-industry matrix.

Employment Projections. The nature of ES employment data, the time span available for historical perspective, and the requirements of the occupation-industry matrix were influential factors in the choice of techniques and employment relationships used in the regression analysis. Since national employment for the industry groups has been projected to 1980, the primary goal of the regression analysis was to determine the relationship between national and local employment by industry group.²⁵ When good fits were found, local projections were made. Omaha employment was also related to time, with the data series beginning in 1960 and extending through 1971.

Table VII presents the final projections, equations used, and coefficients of determination for the industry groups. As can be noted most of the projections are based on the relationship between local industry employment and employment at the national level. This relationship was fairly strong in

²⁴Tomorrow's Manpower Needs, Volume IV.

²⁵ Ibid.

TABLE VII

REGRESSION EQUATIONS AND EMPLOYMENT PROJECTIONS ($Y = a + bX$)¹

Where: Y = Omaha employment in given industry
 X = time
 X_1 = U.S. employment in given industry
 a = constant
 b = coefficient of X or X_1

	<u>a</u>	<u>b</u>	<u>R²</u>	<u>Employment Projection</u>
Construction & Mining	judgement	(See Text)	-	13,900
Service	-1.3589	.003314 X_1	.989	51,900
Wholesale Trade	2.1623	.003426 X_1	.985	17,900
Retail Trade	-8.2108	.004078 X_1	.984	44,900
Manufacturing	6.6951	.001624 X_1	.642	42,300
Finance, Insurance, and Real Estate	5.2862	.003043 X_1	.990	18,300
Government	-.8928	.002487 X_1	.965	40,900
Transportation	(See footnote 27 in Text)		-	13,000
Communication	2978.03	142.483X	.87	6,000
Utilities	1306.06	61.888X	.95	2,600
Agriculture	7078.03	-130.6X	.934	4,400
All Other Nonagriculture	.0854	-.00244	.921	14,400
Total Employment	-	-	-	270,500

¹Data from 1960-1971 were used in all but two of the groups below. Regressions for manufacturing and the category "all other nonagriculture" were limited to the 1965-1971 period. Changes in the direction of manufacturing employment and changes in the classification of workers in "all other" prohibited use of data before 1965. In the latter case, the regression was computed using "all other nonagricultural" employment as a percent of nonagricultural employment over time. The projected ratio for 1980 was then applied to projected nonagricultural employment of 251,700.

most industry groups. Exceptions were manufacturing, construction and mining, transportation, communication and utilities. When high coefficients of determination were found, local industry employment was extrapolated to 1980. Consequently, many of the projections depend heavily upon the BLS industry group projections for the nation.

The BLS projections include a number of fairly important assumptions. These are: (1) a labor force size of 100.7 million; (2) Armed Forces of 2.7 million; (3) a civilian labor force of 98.0 million; (4) full employment in the target year, 1980; (5) an improved international climate; (6) no radical change in the institutional framework of the American economy; (7) a continuation of economic, social, technological, and scientific trends; (8) successful fiscal and monetary policies which achieve a satisfactory balance between low unemployment rates and relative price stability without reducing the long-term economic growth rate; (9) Congress will channel more funds to State and local governments; and (10) problems posed by air and water pollution and solid waste disposal will require an increasing amount of the nation's productive resources, but will not dampen significantly the long-run potential rate of growth.²⁶

As can be noted in Table VII, employment projections for the service; government; manufacturing; wholesale trade; retail trade; finance, insurance and real estate; and construction and mining sectors were based on projections for the nation. Several of these merit further comment.

Construction and mining employment could not be trended with any degree of confidence. The ratio of Omaha employment to U.S. employment has varied

²⁶ibid, p. 3.

from .0030 to .0027 since 1960, and has been between .0028 and .0027 since 1964. Although the variations have been fairly random, use of .0027 should provide a fair representation of the nation's growth in the sector. The BLS projection indicates a drop in mining employment (622,000 in 1970 to 550,000 in 1980) and a fairly sharp increase in construction employment (3,345,000 to 4,600,000). Since mining constitutes such a small portion of Omaha employment, it is expected that Omaha's share of total employment for the construction and mining sector should remain constant or increase in the future.

The manufacturing sector also posed significant trending problems. Much of this was caused by the sharp drop in the food and kindred products sector in the sixties. Relative to Nebraska and U.S. manufacturing employment, the downward trend appears to have abated and regression analysis over a period of time longer than six or seven years could seriously understate the importance of Omaha's manufacturing sector.

Omaha's manufacturing employment expressed as a percent of Nebraska's manufacturing employment declined yearly from 1959 through 1967. But since 1967, the ratio has remained constant with Omaha accounting for 46 percent of Nebraska's manufacturing employment. On the other hand, the ratio of Nebraska employment to U.S. employment in manufacturing has increased from .0041 in 1967 to .0044 in 1971 while Omaha employment expressed as a percent of U.S. employment has increased from .0019 to .0020. Since 1969, the ratio has remained constant at .0020.

The options open for projecting manufacturing employment were quite varied; none, however, very reliable. The optimistic view would trend Nebraska's portion of U.S. employment in manufacturing since 1965. This yields a projected ratio of .005728, R^2 of .95, and projected employment

of 116,200 for the State. Next, noting the four-year period in which Omaha's share of the State's manufacturing employment leveled off and remained constant at 46 percent, the latter relationship could be applied to yield a projected level of employment of 53,400 (as contrasted to 42,000 used in this study).

A second option would make use of the Omaha-U.S. employment ratio which has varied from .0022 to .0019 since 1960. Application of the 1969-1971 ratio of .0020 to the projected national employment yields 43,900 workers for Omaha. Use of more historical data is a third option. This would include the downturn in the early sixties. Depending on the number of years involved in the regression analysis, any number of projections are possible. In the latter case, most would present a declining position for manufacturing.

The projection finally chosen represents a compromise. Although the R^2 is relatively low (.64), Omaha-U.S. absolute employment ratios are sufficiently related to use for projections, and the results are more conservative than the first two options mentioned above, yet more optimistic than one would find if data from the early sixties were included.

The major industry group, transportation, communication, and utilities, trended poorly when treated as an aggregate. However, the component industry groups did trend over time. Consequently, individual regressions and projections were computed for: rail transportation, motor freight, and "other transportation." These were combined for the transportation projection, and the latter was combined with projections for communications and for utilities to arrive at

the industry group projection.²⁷

There are, obviously, many defensible projections of total employment and employment by industry for Omaha, and industry projections presented in this study will not necessarily be in agreement with projections presented in other studies. In fact, it would be surprising if they were. However, in light of BLS projections for the nation, employment projections presented in the study are not unreasonable. A check of population projections and projected employment/population ratios indicates the total employment projected is on target. For example, applying a projected 1980 population of 640,000 to an employment/population ratio of .40 yields an employment figure about 14,000 lower than that presented in this study.²⁸ Adjustments for dual job holders and net commutation account for the difference. Analysis of the ES employment/Census population for April of 1970 yields a ratio of .424, which would yield an employment total consistent with a population projection of 640,000.

Occupational Projections for 1980. To obtain projections for occupations by industry, two adjustments had to be made. Workers classified under government employment and "all other nonagriculture" were allocated to the industry groups in which they work. This was accomplished by using the 1970 Census ratios for government employees, self-employed, unpaid family workers,

²⁷Equations for the component industries are: (1) public utilities, $Y = 1306.06 + 61.888X$, $R^2 = .95$, (2) communications, $Y = 2978.03 + 142.483X$, $R^2 = .87$, (3) rail transportation, $Y = 9443 - 181.643X$, $R^2 = .96$, projected employment = 5,600, (4) motor freight, $Y = 3281.82 + 87.4126X$, $R^2 = .65$, projected employment = 5,100, and (5) other transportation, $Y = 2891.67 - 28.8462X$, $R^2 = .67$, employment = 2,300.

²⁸ The projected population figure of 640,000 approximates that obtained by Robert Mueller of the Metropolitan Area Planning Agency for a preliminary report on Omaha's future population. The employment/population ratio approximates the ratio found in the Census.

and domestics by industry. No attempt was made to trend changes in these ratios. Table VIII presents the revised employment projections by industry group.

TABLE VIII
INDUSTRY EMPLOYMENT ADJUSTED FOR GOVERNMENT AND
"ALL OTHER NONAGRICULTURAL" WORKERS

Industry	Employment
Agriculture	4,551
Construction	17,656
Mining	494
Manufacturing	43,471
Transportation	14,188
Communication	6,064
Utilities	4,309
Finance, Insurance, and Real Estate	19,615
Wholesale Trade	18,635
Retail Trade	48,897
Service	79,580
Public Administration	13,039

¹In 1970, 96.75 percent of the construction and mining sector were employed in construction. The same ratio was used for 1980.

The adjusted employment figures were next applied to projected occupation-industry ratios. With regard to the latter, three general alternatives exist. First, the national matrix presented in Volume IV of Tomorrow's Manpower Needs can be utilized. This requires the assumption that Omaha's occupation-industry ratios are identical with those for the U.S. Second, the local occupation-industry grid constructed for 1970 can be adjusted for changes at the national level. This requires the assumption that initial differences between the two occupational grids in 1970 will be present in 1980. Finally, information from the 1960 and 1970 Census publications can be extrapolated to obtain projected 1980 ratios.

The second alternative was chosen for several reasons. First, differences between the occupational mix for Omaha and the U.S. do exist, and they are substantial enough to merit attempts to utilize local information. However, the national matrix has been developed over a considerable period of time and the changes made in the relative importance of the occupations by industry are a result of much more historical data than could be obtained at the local level. Also, the national matrix has been adjusted for expected changes in productivity, technology, and new products. The assumption that changes in the importance of the various occupations by industry on the national level will be true for the local area is more defensible than extrapolation of local area trends, as the first utilizes BLS information on future changes while the latter relies on past changes.

After adjusting the area matrix for national changes in occupation-industry ratios, the 1980 employment projections by industry were applied and projected occupations were developed. Table IX presents the occupational projections for 1980 and Table X illustrates changes in the major occupational categories from 1960 through 1980.

TABLE IX

OCCUPATION OF EMPLOYED PERSONS BY INDUSTRY GROUP: 1980

Occupations	Total ¹	Agri- culture	Mining	Con- struction	Manu- facturing	Tran- sportation
Total employed.....	270,500	4,551	494	17,656	43,471	14,188
Professional, technical & kindred workers.....	43,992	171	77	1,787	3,817	828
Accountants	4,933	19	22	263	669	345
Architects	322	8	-	21	4	-
Engineers	3,686	4	23	819	948	89
Chemical	30	-	-	-	22	-
Civil	1,228	4	-	658	61	23
Industrial	612	-	7	-	409	11
Mechanical	304	-	-	-	74	18
Others	1,511	-	16	161	382	38
Life & physical scientists	359	7	-	30	104	-
Chemists	158	5	-	-	65	-
Personnel & Labor relations	1,766	-	8	67	265	35
Social scientists	329	-	-	-	30	-
Writers, artists & entertainers	2,149	10	7	56	322	33
Other professional, technical & kindred workers	30,424	122	17	530	1,478	326
Managers & administrators, except farm	23,901	70	71	1,668	2,947	931
Sales workers.....	22,098	14	30	235	2,291	184
Clerical and kindred workers.....	57,448	122	133	1,723	4,899	3,714
Bookkeepers	5,378	36	8	297	569	220
Cashiers	3,989	-	7	-	9	96
Office machine operatives	3,359	-	25	74	370	404
Shipping and receiving clerks	1,280	-	-	7	396	126
Others	43,445	86	93	1,345	3,556	2,869
Craftsmen & kindred workers.....	34,186	143	95	8,886	8,099	2,738
Blacksmiths, forgemen, hammermen and boilermakers	172	-	-	10	48	48

TABLE IX

OCCUPATION OF EMPLOYED PERSONS BY INDUSTRY GROUP: 1980

Occupations	Total	Agri- culture	Mining	Con- struction	Manu- facturing	Tran- sportation
Foremen, n.e.c.	4,462	66	16	616	1,808	295
Brickmasons and stonemasons	491	12	-	441	17	4
Carpenters	2,489	19	-	1,933	113	47
Cranemen, derrickmen, and hoistmen	291	4	9	65	122	24
Electricians	1,938	-	-	900	304	150
Excavating, grading, & road machine operators	677	17	-	471	87	20
Mechanics and repairmen	8,013	7	63	462	974	1,054
Machinists, job setters, & toolmakers	1,526	-	7	9	1,161	95
Painters, construction & maintenance, & plasterers & paperhangers	1,162	-	-	759	113	28
Plumbers & pipe fitters	1,215	-	-	819	126	61
Printing craftsmen	1,343	-	-	10	1,091	20
Others	10,388	20	-	2,385	2,130	894
Operatives and kindred, including transport.....	35,857	78	66	1,568	18,523	4,444
Deliverymen & routemen	2,359	-	9	9	600	213
Assemblers	2,116	-	-	5	1,795	16
Welders and flamecutters	1,816	-	8	192	1,108	292
Laborers, except farm.....	10,474	522	5	1,592	1,913	816
Farm workers.....	3,373	3,373	-	-	-	-
Service workers, including private household.....	39,102	60	17	203	978	533

¹Excludes 14 and 15 year olds. Components may not add to total due to rounding.

TABLE IX

OCCUPATION OF EMPLOYED PERSONS BY INDUSTRY GROUP: 1980

Occupations	Communi- cation	Utilities	Wholesale Trade	Retail Trade	Finance, Insurance & Real Est.	Services
Total employed.....	6,064	4,309	18,635	48,897	19,615	79,580
Professional, technical & kindred workers.....	1,540	918	1,058	1,843	2,152	27,352
Accountants	185	113	272	416	938	1,249
Architects	-	-	7	-	6	263
Engineers	277	198	315	39	37	676
Chemical	-	8	-	-	-	-
Civil	21	41	24	15	18	239
Industrial	16	30	39	-	6	56
Mechanical	6	31	50	10	-	103
Others	235	87	199	15	14	278
Life & physical scientists	-	26	15	-	18	72
Chemists	-	18	9	-	-	32
Personnel & Labor relations	198	44	45	132	196	517
Social scientists	14	49	6	29	29	119
Writers, artists & entertainers	310	20	32	269	104	939
Other professional, technical & kindred workers	556	468	367	958	824	23,492
Managers & administrators, except farm	532	242	2,711	5,232	3,370	4,934
Sales workers.....	159	48	3,354	11,139	3,697	899
Clerical and kindred workers.....	2,258	1,001	4,334	9,354	9,360	15,470
Bookkeepers	76	100	811	1,276	798	1,058
Cashiers	5	16	28	3,276	116	398
Office machine operatives	202	75	257	244	818	788
Shipping and receiving clerks	22	5	386	293	29	16
Others	1,953	806	2,853	4,264	7,599	13,210
Craftsmen & kindred workers.....	1,458	1,088	3,136	4,073	273	3,541
Blacksmiths, forgemen, hammermen and boilermakers	-	5	7	-	6	48

TABLE IX

OCCUPATION OF EMPLOYED PERSONS BY INDUSTRY GROUP: 1980

Occupations	Communi- cation	Utilities	Wholesale Trade	Retail Trade	Finance, Insurance & Real Est.	Services
Foremen, n.e.c.	93	172	662	420	53	159
Brickmasons and stonemasons	-	-	9	-	-	-
Carpenters	-	-	34	137	45	143
Cranemen, derrickmen, and hoistmen	-	13	41	-	-	8
Electricians	19	55	391	34	12	64
Excavating, grading, & road machine operators	-	21	4	-	-	48
Mechanics and repairmen	16	256	1,105	2,146	14	1,655
Machinists, job setters, & toolmakers	14	4	149	15	-	72
Painters, construction & maintenance, & plasterers & paperhangers	-	3	24	20	39	95
Plumbers & pipe fitters	-	50	15	64	6	24
Printing craftsmen	13	8	43	20	12	103
Others	1,301	500	650	1,213	82	1,122
Operatives and kindred, including transport.....	48	524	2,801	4,454	71	3,024
Deliverymen & routemen	-	-	606	670	-	247
Assemblers	-	-	220	24	-	56
Welders and flamecutters	-	24	93	5	6	88
Laborers, except farm.....	20	291	1,001	2,826	143	971
Farm workers.....	-	-	-	-	-	-
Service workers, including private household.....	50	195	238	9,975	551	23,317

TABLE IX

OCCUPATION OF EMPLOYED PERSONS BY INDUSTRY GROUP: 1980

Occupations	Public Admini- stration					
Total employed.....	13,039					
Professional, technical & kindred workers.....	2,449					
Accountants	442					
Architects	13					
Engineers	261					
Chemical	-					
Civil	124					
Industrial	38					
Mechanical	12					
Others	86					
Life & physical scientists	87					
Chemists	29					
Personnel & labor relations	259					
Social scientists	53					
Writers, artists & entertainers	47					
Other professional, technical & kindred workers	1,286					
Managers & administrators, except farm	1,193					
Sales workers.....	48					
Clerical and kindred workers.....	5,080					
Bookkeepers	129					
Cashiers	38					
Office machine operatives	102					
Shipping and receiving clerks	-					
Others	4,811					
Craftsmen & kindred workers.....	656					
Blacksmiths, forgemen, hammermen and boilermakers	-					

TABLE IX

OCCUPATION OF EMPLOYED PERSONS BY INDUSTRY GROUP: 1980

Occupations	Public Admini- stration					
Foremen, n.e.c.	102					
Brickmasons and stonemasons	8					
Carpenters	18					
Cranemen, derrickmen, and hoistmen	5					
Electricians	9					
Excavating, grading, & road machine operators	9					
Mechanics and repairmen	261					
Machinists, job setters, & toolmakers	-					
Painters, construction & maintenance, & plasterers & paperhangers	81					
Plumbers & pipe fitters	50					
Printing craftsmen	23					
Others	91					
Operatives and kindred, including transport.....	256					
Deliverymen & routemen	5					
Assemblers	-					
Welders and flamecutters	-					
Laborers, except farm.....	374					
Farm workers.....	-					
Service workers, including private household.....	2,985					

TABLE X

MAJOR OCCUPATIONAL GROUPS AS PERCENT OF TOTAL EMPLOYMENT, 1960 - 1980

Occupation	1960 ¹	1970 ²	1970 ³	1980 ⁴
Professional, technical & kindred	11.1	14.8	14.5	16.3
Managers & administrators, except farm	8.9	9.2	9.2	8.8
Sales workers	7.8	7.9	8.0	8.2
Clerical & kindred workers	19.4	20.7	20.5	21.2
Craftsmen, foremen & kindred workers	13.3	12.8	12.8	12.6
Operatives & kindred workers	15.8	14.4	14.5	13.3
Laborers, except farm	5.0	4.7	4.8	3.9
Farm Laborers & foremen	3.1	1.8	2.2	1.3
Service workers	11.2	13.7	13.5	14.5
Occupations not reported	4.5	-	-	-

¹Includes 14 and 15 year olds. Source: 1960 Census

²Excludes 14 and 15 year olds. Source: 1970 Census

³Excludes 14 and 15 year olds. Source: 1970 Occupational Estimates,
Table V

⁴From Table IX.

APPENDIX

OCCUPATIONAL CHARACTERISTICS OF 14 AND 15 YEAR OLDS¹

	Percent	Number
Professional, technical & kindred workers.....	1.03	30
Managers & administrators, except farm.....	.75	22
Sales workers.....	18.66	544
Clerical & kindred workers.....	7.00	204
Craftsmen & kindred workers.....	.65	19
Operatives, except transport.....	5.25	153
Transport equipment operatives.....	1.06	31
Laborers, except farm.....	10.91	318
Farm workers.....	3.33	97
Service workers, except private household.....	41.20	1,201
Private household workers.....	10.15	296
Total.....	100.00	2,915

¹Detailed Characteristics, Table 174

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