

Occupational Employment in Manufacturing Industries



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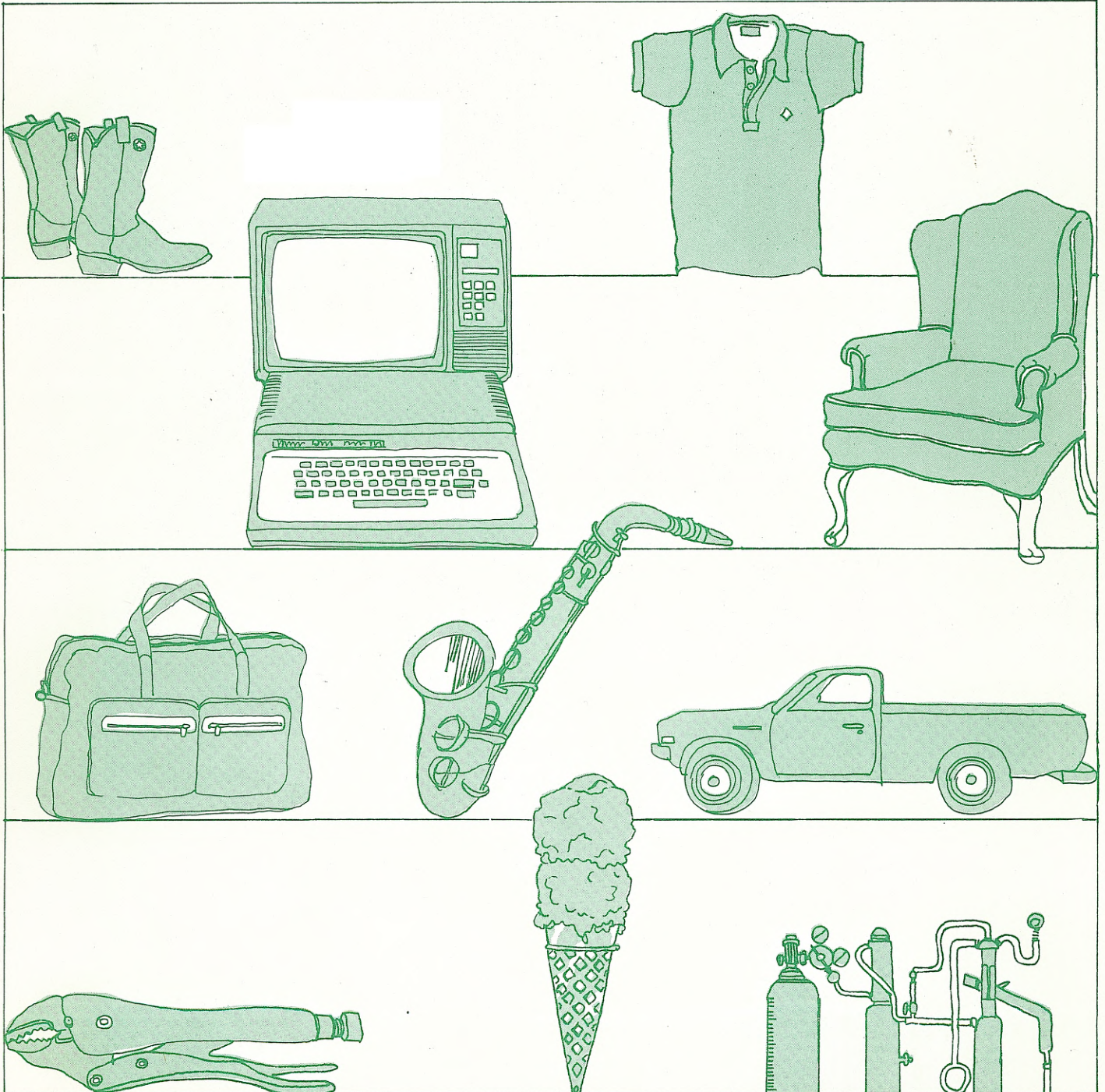
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Bulletin 2133

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Occupational Employment in Manufacturing Industries



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Bulletin 2133

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Preface

This bulletin provides data from a 1980 survey of occupational employment in manufacturing industries. Earlier surveys of manufacturing industries were conducted in 1971, 1974, and 1977. Results of the 1977 survey were published in Bulletin 2057, *Occupational Employment in Manufacturing Industries, 1977*.

The nonmanufacturing sector was surveyed in 1978 and 1979. Results were published for the mining; construction; finance, insurance, and real estate; and selected services industries in Bulletin 2088, *Occupational Employment in Selected Nonmanufacturing Industries*. Data for other nonmanufacturing industries were published in Bulletin 2116, *Occupational Employment in Transportation, Communications, Utilities, and Trade*.

These periodic surveys are part of a Federal-State cooperative program of occupational employment statistics (OES). The OES program also includes preparation of the National Industry-Occupational Matrix—a set of tables showing employment cross-classified by

occupation and industry for the Nation.

The OES program provides information for many data users, including individuals and organizations engaged in planning vocational educational programs, training programs supported by the Comprehensive Employment and Training Act, and higher education. OES data also are used to prepare information for career counseling, for job placement activities performed at State employment security offices, and for personnel planning and market research conducted by private enterprises.

This bulletin was prepared in the Office of Employment Structure and Trends, Division of Occupational and Administrative Statistics, by Wanda L. Bland and Barbara L. Keitt under the direction of Linda P. Hardy. John Shew and Warren Macurdy provided data processing support.

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The Commission on the Status of Women, established in 1946, was a significant milestone in the history of women's rights. It was the first international body dedicated to the promotion of gender equality. The Commission's work led to the adoption of the Declaration on the Equality of Rights of Men and Women in 1948, which is a cornerstone of international human rights law. The Commission also played a key role in the development of the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) in 1979. CEDAW is the most comprehensive international treaty on women's rights, and it has been ratified by over 110 countries. The Commission's efforts have been instrumental in raising awareness of women's issues and in promoting their inclusion in the global development agenda.

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Introduction

The Occupational Employment Statistics (OES) survey is designed to collect data on occupational employment of wage and salary workers by industry in non-agricultural establishments. The Bureau of Labor Statistics provides the procedures and technical assistance for the survey, State employment security agencies collect the data, and the Employment and Training Administration provides administrative support. In 1980, 49 States and the District of Columbia participated in the survey compared with 43 States in 1977, 29 States in 1974, and 16 in 1971. BLS conducted a supplemental survey in 1980, with the financial aid of the National Science Foundation, to collect data in the nonparticipating State and to develop national estimates.

This bulletin presents national data only. Data on occupational employment in each participating State are available from the State employment security agencies (appendix B).

Survey procedures

The survey is conducted over a 3-year cycle; manufacturing industries are surveyed in one year and non-manufacturing industries in the other two years. Data are collected from a sample of establishments primarily by mail; telephone followups and personal visits are made when an establishment response is critical to the survey. The survey is based on a probability sample, stratified by industry and size of employment, designed to represent the total or "universe" of establishments covered by the survey. Data are requested for the pay period including the 12th of the reference month, which is standard for all Federal agencies collecting employment data. The reference month for the 1980 survey was April, May, or June (appendix A).

For the 1980 survey, 20 separate questionnaires were used, each having detailed occupations related specifically to a particular industry's activity. For example, "pattern cutter" was surveyed in only one industry—apparel and other textile products. Cross-industry estimates, therefore, cannot be developed for most detailed occupations because not all detailed occupations were included on every survey questionnaire. This bulletin presents cross-industry data for major occupational groups.

Occupational and industrial classification

The OES classification system combines two widely used systems—the *Dictionary of Occupational Titles* (DOT) and the system used for the 1970 Census of Population. Occupational titles and descriptions in the survey are based primarily on the *Dictionary of Occupational Titles*.¹ The DOT was used to develop the definitions of occupations because it is the most detailed classification available. Summary categories and residual groups generally follow the categories used in the 1970 Census. 'Crosswalks' have been developed between the two systems so that users may integrate OES data with data from sources using the Census classification.

The industrial classification system is that described in the 1972 edition of the *Standard Industrial Classification Manual*,² whereby reporting establishments are classified into industries on the basis of major product or activity.

Concepts

An *establishment* is an economic unit which produces goods or services. Generally, it is at a single physical location and is engaged predominantly in one type of economic activity. Where a single physical location encompasses two or more distinct activities, these are treated as separate establishments if separate payroll records are available and certain other criteria are met.

Employment includes full- and part-time workers; workers on paid vacations or other types of leave; workers on unpaid short-term absences (i.e., illness, bad weather, temporary layoff, jury duty); salaried officers, executives, and staff of incorporated firms; employees temporarily assigned to other units; and employees for whom that unit is their permanent (home) duty station, regardless of whether the unit prepares their paycheck. Excluded from coverage are proprietors (owners and partners of unincorporated firms), self-employed, unpaid family workers, and workers on extended leave (i.e., pensioners and members of the Armed Forces).

Occupation refers to the occupation in which employees are working rather than the occupation for which

¹ *Dictionary of Occupational Titles*, fourth edition (U.S. Employment Service, U.S. Department of Labor, 1977.)

² *Standard Industrial Classification Manual* (Office of Management and Budget, Executive Office of the President, 1972), as amended in *Supplement*, 1977.

they may have been trained. For example, an employee trained as an engineer but working as a drafter is reported as a drafter.

Working supervisors (those spending 20 percent or more of their time at work similar to that done by workers under their supervision) are reported in the occupation most closely related to their work.

Part-time workers, learners, and apprentices are reported in the occupation in which they ordinarily work.

Multiple jobholders (employees who perform the duties of two or more occupations in an establishment) are reported in the occupation that requires the highest level of skill or in the occupation where the most time is spent if there is no measurable difference in skill requirements.

A more detailed statement describing the survey is presented in appendix A.

Data presented

This bulletin presents occupational employment for all manufacturing industries combined and for all major industry groups (2-digit SIC level) within manufacturing.³ Data are presented for each industry under the

following headings: Employment, percent of total employment, relative error, and percent of establishments reporting the occupation.

Employment is based upon survey results adjusted to reflect total industry employment. The percent of total employment refers to total employment in the industry. Relative error measures the level of confidence to be placed on each estimate. The percent of establishments reporting a particular occupation indicates the frequency of occurrence of the occupation.

Occupations with fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are not shown separately but are included in the appropriate residual categories.

Employment is rounded to the nearest ten. The relative error and the percent of respondents reporting the occupation are rounded to the nearest whole percent. The percent of total employment was computed from rounded employment data.

³ Additional occupational employment data at the more detailed 3-digit SIC level are available upon request from the Office of Employment Structure and Trends. Definitions for all occupations surveyed are also available upon request.

The Manufacturing Sector

In 1980, approximately 20.2 million workers were employed in the manufacturing sector, accounting for about 22 percent of all nonagricultural wage and salary workers in the Nation.

As shown in table 1, three-fifths of these workers were employed in manufacturing durable goods. Representing more than half of durable goods employment were the machinery, electrical and electronic equipment, and transportation equipment industries. Among the nondurable goods industries, the largest were food and kindred products, apparel and other textile products, and printing and publishing, together accounting for over half of nondurable goods employment.

Workers were classified by occupation into seven major groups: Managers and officers; professional workers; technical workers; service workers; production, maintenance, construction, repair, material handling, and powerplant workers; clerical workers; and sales workers. Tables 2 and 3 present the distribution of employment in the various industries surveyed.

The following section discusses these seven occupational groups and their distribution among the surveyed industries. Subsequent sections deal with the industry

segments within manufacturing and discuss employment in each by major occupational group. These sections also present occupational employment data by industry segment (two-digit SIC).

Managers and officers

Persons holding positions as managers and officers are primarily concerned with the policymaking, planning, organizing, staffing, directing, and controlling activities common to many types of organizations. These persons may also engage in the same activities as the workers they supervise. Occupations included in this group are plant, office, and sales managers, and corporate officers such as president, secretary, and treasurer.

In 1980, managers and officers numbered more than 1.3 million, representing nearly 7 percent of total employment in the manufacturing sector. The durable goods segment employed three-fifths of the workers in this occupational group. The largest concentrations of managers and officers were found in the machinery and electrical and electronic equipment industries.

Table 1. Employment in manufacturing industries, 1980

Industry	Employment	Percent of total manufacturing employment
Total	20,227,810	100.0
Durable goods industries, total	12,107,340	59.9
Lumber and wood products, except furniture	657,270	3.2
Furniture and fixtures	455,830	2.3
Stone, clay, glass, and concrete products	665,630	3.3
Primary metal products	1,205,100	6.0
Fabricated metal products	1,579,960	7.8
Machinery, except electrical and transportation equipment	2,497,290	12.3
Electrical and electronic machinery	2,079,640	10.3
Transportation equipment	1,835,070	9.1
Instruments and related products	709,760	3.5
Miscellaneous manufacturing industries	421,790	2.1
Nondurable goods industries, total	8,120,470	40.1
Food and kindred products	1,694,830	8.4
Tobacco products	63,600	.3
Textile mill products	870,780	4.3
Apparel and other textile products	1,271,360	6.3
Paper and allied products	698,910	3.5
Printing and publishing	1,254,300	6.2
Chemicals and allied products	1,116,820	5.5
Petroleum refining and related industries	202,690	1.0
Rubber and miscellaneous plastics products	710,990	3.5
Leather and leather products	236,190	1.2

Table 2. Employment in manufacturing industries by major occupational group, 1980

Industry	Managers and officers	Professional workers	Technical workers	Service workers	Production, maintenance, construction, repair, material handling, and powerplant workers	Clerical workers	Sales workers
All manufacturing	1,328,160	1,404,080	594,270	373,150	13,767,040	2,322,400	438,710
Food and kindred products	107,750	45,360	12,000	52,000	1,241,080	169,730	66,910
Tobacco products	3,780	2,380	1,220	2,230	46,270	6,960	760
Textile mill products	31,980	14,710	7,750	19,110	713,410	76,780	7,040
Apparel and other textile products	45,820	15,500	2,250	15,290	1,057,890	116,190	18,420
Lumber and wood products, except furniture	41,070	9,890	5,090	13,520	534,720	41,920	11,060
Furniture and fixtures	24,300	10,200	3,610	8,510	348,250	50,490	10,470
Paper and allied products	37,340	30,190	10,500	11,570	519,530	73,240	16,540
Printing and publishing	126,830	124,270	12,620	20,980	612,420	264,290	92,890
Chemicals and allied products	110,000	137,650	58,990	24,700	587,520	162,670	35,290
Petroleum refining and related industries	14,790	19,030	6,290	3,080	127,290	23,040	9,170
Rubber and miscellaneous plastics products	45,860	28,880	12,190	11,420	534,150	67,470	11,020
Leather and leather products	9,130	3,390	720	3,030	190,440	24,640	4,840
Stone, clay, glass, and concrete products	48,720	20,930	9,580	9,520	503,440	60,130	13,310
Primary metal products	47,550	46,350	22,320	23,540	956,430	98,230	10,680
Fabricated metal products	103,670	67,110	33,650	25,750	1,164,180	154,800	30,800
Machinery, except electrical and transportation equipment	195,830	234,740	134,550	39,900	1,515,640	332,490	44,140
Electrical and electronic machinery	133,520	255,880	129,720	29,310	1,254,920	255,900	20,390
Transportation equipment	106,320	240,400	72,110	40,480	1,188,110	178,180	9,470
Instruments and related products	61,500	82,460	52,840	12,130	381,320	105,970	13,540
Miscellaneous manufacturing industries	32,400	14,760	6,270	7,080	290,030	59,280	11,970

Table 3. Percent distribution of employment in manufacturing industries by major occupational group, 1980

Industry	All occupations	Managers and officers	Professional workers	Technical workers	Service workers	Production, maintenance, construction, repair, material handling, and powerplant workers	Clerical workers	Sales workers
All manufacturing	100.0	6.6	6.9	2.9	1.8	68.1	11.5	2.2
Food and kindred products	100.0	6.4	2.7	.7	3.1	73.2	10.0	3.9
Tobacco products	100.0	5.9	3.7	1.9	3.5	72.8	10.9	1.2
Textile mill products	100.0	3.7	1.7	.9	2.2	81.9	8.8	.8
Apparel and other textile products	100.0	3.6	1.2	.2	1.2	83.2	9.1	1.4
Lumber and wood products, except furniture	100.0	6.2	1.5	.8	2.1	81.4	6.4	1.7
Furniture and fixtures	100.0	5.3	2.2	.8	1.9	76.4	11.1	2.3
Paper and allied products	100.0	5.3	4.3	1.5	1.7	74.3	10.5	2.4
Printing and publishing	100.0	10.1	9.9	1.0	1.7	48.8	21.1	7.4
Chemicals and allied products	100.0	9.8	12.3	5.3	2.2	52.6	14.6	3.2
Petroleum refining and related industries	100.0	7.3	9.4	3.1	1.5	62.8	11.4	4.5
Rubber and miscellaneous plastics products	100.0	6.5	4.1	1.7	1.6	75.1	9.5	1.5
Leather and leather products	100.0	3.9	1.4	.3	1.3	80.6	10.4	2.0
Stone, clay, glass, and concrete products	100.0	7.3	3.1	1.4	1.4	75.6	9.0	2.0
Primary metal products	100.0	3.9	3.8	1.9	2.0	79.4	8.2	.9
Fabricated metal products	100.0	6.6	4.2	2.1	1.6	73.7	9.8	1.9
Machinery, except electrical and transportation equipment	100.0	7.8	9.4	5.4	1.6	60.7	13.3	1.8
Electrical and electronic machinery	100.0	6.4	12.3	6.2	1.4	60.3	12.3	1.0
Transportation equipment	100.0	5.8	13.1	3.9	2.2	64.7	9.7	.5
Instruments and related products	100.0	8.7	11.6	7.4	1.7	53.7	14.9	1.9
Miscellaneous manufacturing industries	100.0	7.7	3.5	1.5	1.7	68.8	14.1	2.8

Professional workers

Persons employed in professional positions usually deal with the theoretical or practical aspects of fields such as science, engineering, technical work, art, education, medicine, law, and business relations. Most of these occupations require substantial educational preparation, usually at the university level.

Professional workers numbered 1.4 million in 1980, representing 7 percent of total employment in the manufacturing sector. The durable goods segment employed 70 percent of the workers in this occupational group. Professional workers were concentrated in the electrical and electronic equipment and transportation equipment industries.

Technical workers

Technical occupations require knowledge of fundamental scientific, engineering, mathematical, computer programming, or draft design principles. This knowledge is acquired through study at technical schools and junior colleges, through other formal post-high school training less extensive than a 4-year college course, or through equivalent on-the-job training or experience.

In 1980, technical workers numbered nearly 600,000 or 3 percent of total employment in the manufacturing sector. Almost four-fifths of the workers in this occupational group were employed in durable goods industries. The largest concentrations of technical workers were found in the machinery and electrical and electronic equipment industries.

Service workers

Persons employed in this occupational group perform services for individuals or establishments. Service workers protect individuals and property, prepare and serve food and beverages, and clean interiors and equipment of buildings, offices, stores, and similar places.

In 1980, service workers numbered almost 400,000, representing 2 percent of total employment in the manufacturing sector. The durable goods segment employed 56 percent of the workers in this occupational group. Service workers were concentrated in the food and kindred products and transportation equipment industries.

Production, maintenance, construction, repair, material handling, and powerplant workers

Persons employed in this occupational group, referred to hereafter in the text as production and related workers, include all skilled, semiskilled, and unskilled

workers performing machine and manual tasks involving production, maintenance, construction, repair, material handling, and powerplant operations.

This occupational group, the largest of the seven major groups in the manufacturing sector, included approximately 14 million workers, representing 68 percent of total manufacturing employment in 1980. Nearly three-fifths of the workers in this occupational group were in durable goods industries. The largest concentrations of production and related workers were found in the machinery and electrical and electronic equipment industries, but they made up by far the largest proportion of workers in every industry surveyed.

Clerical workers

Persons employed in this occupational group are either office clerical workers or plant clerical workers. *Office* clerical workers are involved in preparing, transcribing, transferring, systematizing, and preserving written communications and records, as well as collecting accounts and distributing information. *Plant* clerical workers plan, coordinate, or expedite production and the flow of work. These workers are also involved in the clerical aspects of receiving, storing, issuing, or shipping of materials, merchandise, supplies, or equipment.

Clerical workers ranked second among the seven major occupational groups with 2.3 million workers, or 12 percent of total employment in the manufacturing sector in 1980. The durable goods segment employed 58 percent of the workers in this occupational group. The largest concentrations of clerical workers were found in the machinery (except electrical and transportation equipment) and printing and publishing industries.

Sales workers

Sales workers include sales representatives and sales clerks. Sales representatives (also called sales agents or sales associates) require specific knowledge of the commodity or service being sold. Sales clerks sell any of a large variety of goods or services and usually only require familiarity with the pricing of those goods and services.

In 1980, sales workers numbered approximately 439,000, representing 2 percent of total employment in the manufacturing sector. The nondurable goods segment employed three-fifths of the workers in this occupational group. Sales workers were concentrated in the printing and publishing and food and kindred products industries.

Food and Kindred Products

Establishments which manufacture or process foods, beverages, and certain related items for human consumption employed 1.7 million workers, accounting for 8 percent of manufacturing and one-fifth of nondurable goods employment in 1980. The three largest employers of these workers were: Establishments processing and packing meat, pork, poultry, and eggs, with 21 percent of industry employment; establishments manufacturing beverages, 14 percent; and establishments canning and preserving fruits and vegetables, also with 14 percent.

As shown in table 4, the 1.2 million production and related workers in the food and kindred products industry accounted for nearly three-fourths of total industry employment. Clerical workers ranked second with 10 percent. Most of these were office clerical

workers. The remaining employment was distributed as follows: Managers and officers, 6 percent; sales workers, 4 percent; service workers and professionals, 3 percent each; and technical workers, 1 percent.

The five most populous occupations in manufacturing food and kindred products are listed in the tabulation below. These jobs, which are all production occupations, made up one-fourth of total industry employment.

	<i>Employment</i>	<i>Percent of industry employment</i>
Production packager, hand or machine	164,240	9.7
Delivery and/or route worker	110,250	6.5
Cannery worker	56,420	3.3
Poultry worker and/or eviscerator	50,330	3.0
Supervisor, nonworking	48,550	2.9

Table 4. Food and kindred products: Employment, relative error, and percent of establishments reporting selected occupations, June 1980

(SIC 20)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Total	1,694,830	100.00	--	--
Managers and officers	107,750	6.36	n.a.	90
Professional occupations	45,360	2.68	n.a.	n.a.
Engineers, total	8,970	.53	n.a.	n.a.
Chemical engineer	620	.04	10	1
Industrial engineer	2,500	.15	4	8
Mechanical engineer	4,510	.27	4	14
All other engineers	1,340	.08	n.a.	n.a.
Chemist	6,040	.36	5	12
Biological scientist	1,530	.09	6	4
All other natural and mathematical scientists	870	.05	14	1
Systems analyst, electronic data processing	2,280	.13	10	5
Purchasing agent and/or buyer	5,850	.35	2	20
Accountants and auditors	11,040	.65	3	26
Nurse, professional	1,120	.07	3	4
Personnel and labor relations specialists	3,670	.22	2	13
All other professional workers	3,990	.24	n.a.	n.a.
Technical occupations	12,000	.71	n.a.	n.a.
Computer programmer	2,110	.12	4	6
Engineering technicians, total	2,180	.13	n.a.	n.a.
Drafter	920	.05	6	3
All other engineering technicians	1,260	.07	n.a.	n.a.
Biological science technician	2,830	.17	6	3
All other science technicians	2,420	.14	n.a.	n.a.
All other technicians	2,460	.15	n.a.	n.a.
Service occupations	52,000	3.07	n.a.	n.a.
Janitors, porters, and cleaners	36,390	2.15	2	40
Guards and doorkeepers	5,160	.30	3	8
Food service workers	4,510	.27	10	3
Supervisor, nonworking-service only	2,290	.14	5	6
All other service workers	3,650	.22	n.a.	n.a.
Production, maintenance, construction, repair, material handling and powerplant occupations	1,241,080	73.23	n.a.	n.a.
Mechanics and repairers, total	52,660	3.11	n.a.	n.a.
Mechanic, automotive	12,350	.73	2	21
Mechanic, maintenance	27,840	1.64	2	20
Refrigeration mechanic and/or air conditioning mechanic	3,330	.20	4	7
Coin machine servicer and/or vending machine repairer	5,280	.31	3	7
All other mechanics and repairers	3,860	.23	n.a.	n.a.
Truck driver	40,380	2.38	2	35
Carpenter	2,120	.13	6	5
Cook and/or cooker	10,290	.61	4	12
Crane, derrick, and hoist operators	530	.03	9	1
Delivery and/or route worker	110,250	6.51	1	42
Extractor operator and/or extractor plant operator	2,510	.15	7	2
Electrician	7,420	.44	3	13
Supervisor, nonworking	48,550	2.86	2	36
Industrial truck operator	36,520	2.15	2	28
Inspector	10,200	.60	6	10
Instrument repairer	1,240	.07	6	3
Machinist	7,240	.43	5	9
Maintenance repairer, general utility	32,130	1.90	2	38
Helper, trades	8,490	.50	6	8
Mixer	23,490	1.39	2	28
Millwright	2,250	.13	7	2
Oiler	2,370	.14	6	5
Order filler	19,390	1.14	3	18
Oven operator	7,370	.43	3	8

See footnotes at end of table.

Table 4. Food and kindred products: Employment, relative error, and percent of establishments reporting selected occupations, June 1980—Continued

(SIC 20)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Painter, maintenance	1,930	0.11	4	6
Plumber and/or pipefitter	1,910	.11	7	3
Production packager, hand or machine	164,240	9.69	2	46
Sheet metal worker	950	.06	8	2
Stationary boiler firer	2,640	.16	4	5
Stationary engineer	2,670	.16	4	4
Welder and/or flamecutter	2,360	.14	5	4
Drier operator	3,910	.23	5	4
Baker	8,990	.53	6	5
Baker helper	15,230	.90	5	5
Barley steeper and/or malt house operator	670	.04	15	(³)
Blanching machine operator	330	.02	14	1
Boner, meat	12,510	.74	5	5
Boner, poultry	11,500	.68	9	1
Butcher, all-around	21,550	1.27	6	6
Buttermaker	400	.02	13	1
Candy maker	3,260	.19	8	2
Carbonation equipment tender, beer	390	.02	16	(³)
Carcass splitter	4,800	.28	7	4
Casing finisher and/or stuffer	4,440	.26	8	4
Cheesemaker	2,770	.16	5	4
Cheesemaker helper	5,680	.34	6	3
Chicken cutter	12,600	.74	8	2
Cooler room worker, meat	6,960	.41	6	4
Cooling machine operator	530	.03	11	1
Dairy processing equipment operator	11,500	.68	3	9
Decorator, bakery products	1,390	.08	11	1
Dehairing machine tender	610	.04	10	1
Dividing machine operator and/or dough brake machine operator	4,900	.29	4	5
Dry curer	1,220	.07	11	1
Feed pellet mill operator	3,140	.19	6	5
Flavor room worker and/or freezer operator	2,780	.16	5	3
Grain receiver	1,920	.11	6	3
Icemaker	480	.03	23	(³)
Ingredient scaler	2,310	.14	5	4
Loader, malt house	510	.03	15	(³)
Meat grinder	4,190	.25	6	5
Miller	4,840	.29	5	6
Novelty worker	1,740	.10	9	1
Pasteurizer, margarine	260	.02	13	1
Poultry dresser and/or eviscerator	50,330	2.97	2	2
Presser and/or expeller operator	980	.06	10	1
Press operator, meat	1,400	.08	8	1
Pumper	1,480	.09	8	2
Raw cheese worker	2,790	.16	13	1
Refinery operator	1,950	.12	10	1
Retort operator	1,300	.08	6	3
Rolling machine operator	1,310	.08	15	1
Shactor	350	.02	28	(³)
Shellfish processing machine tender	1,920	.11	16	1
Shellfish shucker	5,260	.31	12	1
Skin peeling machine operator	1,010	.06	8	2
Skinner, animal	4,610	.27	7	4
Smoker	1,850	.11	7	3
Spinner, confection	580	.03	14	(³)
Sticker	670	.04	6	2
Stunner	1,140	.07	6	4
Sugar boiler	920	.05	8	1
Tester	10,170	.60	3	17
Conveyor operator or tender	4,500	.27	6	4
Cutting machine operator, food	8,680	.51	4	9
Farm equipment operator	4,150	.24	10	2
Enrobing machine operator and/or machine icer	1,790	.11	10	2

See footnotes at end of table.

Table 4. Food and kindred products: Employment, relative error, and percent of establishments reporting selected occupations, June 1980—Continued

(SIC 20)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Baling machine operator	400	0.02	14	1
Lintner machine tender	380	.02	18	(³)
Bodymaker operator, tin can	410	.02	26	(³)
Fish cleaner, hand and/or fish butcher	6,830	.40	9	2
Fermentation operator	1,760	.10	10	1
Still operator	320	.02	16	(³)
Cannery worker	56,420	3.33	3	6
Weigher, production	7,860	.46	13	6
Food shaper, hand	3,450	.20	9	3
Depositor, food	3,100	.18	8	3
Pickler, food	1,190	.07	12	2
Washer and/or separator, food	9,210	.54	8	6
Grader, food and/or skins	7,310	.43	8	4
Equipment cleaner, hand	20,980	1.24	3	15
Filter and/or filter press operator	1,300	.08	8	2
Pump operator	1,270	.07	8	2
All other skilled craft and kindred workers	11,120	.66	n.a.	n.a.
All other operatives and semiskilled workers	63,960	3.77	n.a.	n.a.
All other laborers and unskilled workers	174,260	10.28	n.a.	n.a.
Clerical occupations	169,730	10.01	n.a.	n.a.
Office clerical workers, total	118,000	6.96	n.a.	n.a.
Bookkeeping and/or billing machine operator ..	2,110	.12	3	7
Computer operator	3,640	.21	2	12
Keypunch operator	4,410	.26	3	10
All other office machine operators	1,190	.07	n.a.	n.a.
Stenographer	1,040	.06	7	3
Accounting clerk	16,120	.95	2	29
Bookkeeper, hand	8,740	.52	2	30
Cashier	2,040	.12	6	5
File clerk	1,620	.10	5	5
General office clerk	22,700	1.34	2	38
Order clerk	5,540	.33	3	15
Payroll and/or timekeeping clerk	4,900	.29	2	22
Personnel clerk	2,600	.15	2	11
Procurement clerk	1,650	.10	3	7
Receptionist	1,180	.07	3	6
Secretary	20,230	1.19	3	38
Statistical clerk	1,690	.10	5	5
Switchboard operator	880	.05	4	5
Switchboard operator/receptionist	3,180	.19	2	18
Typist	3,240	.19	4	8
Clerical supervisor, office or plant	5,470	.32	6	12
All other office clerical workers	3,830	.23	n.a.	n.a.
Plant clerical workers, total	51,730	3.05	n.a.	n.a.
Production clerk and/or coordinator	4,050	.24	5	9
Shipping packer	20,580	1.21	4	18
Shipping and/or receiving clerk	13,110	.77	2	29
Weigher, recordkeeping	2,620	.15	5	6
Stock clerk, stockroom, warehouse or storage yard	9,130	.54	3	18
All other plant clerical workers	2,240	.13	n.a.	n.a.
Sales occupations	66,910	3.95	n.a.	n.a.
Sales agent, associate, and/or representative	44,950	2.65	2	37
Sales clerk	21,960	1.30	3	16

¹ Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

² Relative standard errors apply equally to data on estimated

employment and percent of total employment; relative standard errors estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

³ Rounded to zero.

n.a. Not available.

Tobacco Products

The manufacture of tobacco products employed 63,600 workers in 1980, or only 0.3 percent of manufacturing and nearly 1 percent of nondurable goods employment. Most workers were employed either in establishments manufacturing cigarettes, which accounted for 72 percent of industry employment, or in establishments manufacturing cigars, with 12 percent.

The industry's 46,270 production and related workers accounted for 73 percent of total industry employment (table 5). Clerical workers ranked second with 11 percent. Four-fifths of these were office clerical workers. The remaining employment was distributed as follows: Managers and officers, 6 percent; professional and serv-

ice workers, 4 percent each; technical workers, 2 percent; and sales workers, only 1 percent of total industry employment.

The five most populous occupations in manufacturing tobacco products are listed below. These production occupations made up more than one-fourth of total industry employment.

	<i>Employment</i>	<i>Percent of industry employment</i>
Production packager, hand or machine	6,700	10.5
Cigarette making machine operator	4,060	6.4
Supervisor, nonworking	3,140	4.9
Machine adjuster, tobacco production	2,450	3.9
Inspector	2,130	3.3

Table 5. Tobacco products: Employment, relative error, and percent of establishments reporting selected occupations, April 1980

(SIC 21)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Total	63,600	100.00	--	--
Managers and officers	3,780	5.94	n.a.	93
Professional occupations	2,380	3.74	n.a.	n.a.
Engineers, total	360	.57	n.a.	n.a.
Industrial engineer	100	.16	17	16
Mechanical engineer	180	.28	16	22
All other engineers	80	.13	n.a.	n.a.
Chemist	250	.39	22	10
Systems analyst, electronic data processing	160	.25	20	10
Purchasing agent and/or buyer	450	.71	19	32
Accountants and auditors	450	.71	13	34
Nurse, professional	90	.14	10	19
Personnel and labor relations specialists	200	.31	13	20
All other professional workers	420	.66	n.a.	n.a.
Technical occupations	1,220	1.92	n.a.	n.a.
Computer programmer	60	.09	11	14
Engineering technicians, total	640	1.01	n.a.	n.a.
Drafter	130	.20	17	10
Electrical and electronic technicians	230	.36	18	15
All other engineering technicians	280	.44	n.a.	n.a.
Science technicians	320	.50	26	7
All other technicians	200	.31	n.a.	n.a.
Service occupations	2,230	3.51	n.a.	n.a.
Janitors, porters, and cleaners	1,370	2.15	12	46
Guards and doorkeepers	560	.88	13	27
Supervisor, nonworking-service only	80	.13	17	9
All other service workers	220	.35	n.a.	n.a.
Production, maintenance, construction, repair, material handling and powerplant occupations	46,270	72.75	n.a.	n.a.
Mechanics and repairers, total	4,190	6.59	n.a.	n.a.
Mechanic, automotive	70	.11	12	16
Mechanic, maintenance	1,350	2.12	21	25
Refrigeration mechanic and/or air conditioning mechanic	110	.17	12	8
Machine adjuster, tobacco production	2,450	3.85	14	25
Cooper, hogshhead	210	.33	16	12
Truck driver	390	.61	23	29
Carpenter	140	.22	16	14
Cook and/or cooker	120	.19	15	16
Electrician	520	.82	12	30
Supervisor, nonworking	3,140	4.94	12	46
Industrial truck operator	1,270	2.00	17	35
Inspector	2,130	3.35	21	18
Instrument repairer	60	.09	20	7
Leaf conditioner and/or caser	290	.46	26	23
Machinist	730	1.15	13	21
Maintenance repairer, general utility	250	.39	8	35
Helper, trades	230	.36	39	10
Mixer	240	.38	15	23
Millwright	90	.14	22	6
Oiler	260	.41	11	22
Order filler	160	.25	18	10
Painter, maintenance	70	.11	18	7
Plumber and/or pipefitter	280	.44	14	16
Production packager, hand or machine	6,700	10.53	11	43
Sheet metal worker	190	.30	14	10
Stationary boiler firer	220	.35	13	21
Stationary engineer	100	.16	16	8
Sorter, selector and/or grader, tobacco	250	.39	16	16
Welder and/or flamecutter	80	.13	16	13
Drier operator	250	.39	14	26

See footnotes at end of table.

Table 5. Tobacco products: Employment, relative error, and percent of establishments reporting selected occupations, April 1980—Continued

(SIC 21)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Bunch maker, machine	330	0.52	17	11
Casing machine operator	110	.17	15	15
Cigarette filter making machine operator	710	1.12	14	7
Cigarette making machine operator	4,060	6.38	18	9
Making machine catcher	1,000	1.57	19	8
Ordering machine operator	60	.09	13	15
Picker	470	.74	15	24
Shaker	130	.20	18	9
Stemmer, hand	180	.28	37	4
Stemmer, machine	390	.61	9	18
Tester	490	.77	34	24
Wrapper layer	1,410	2.22	7	18
Cutter and/or grinder operator, tobacco	260	.41	11	22
Conveyor operator or tender	120	.19	25	6
Feeder catcher, tobacco	150	.24	18	13
Cigar maker, hand	310	.49	27	9
All other skilled craft and kindred workers	490	.77	n.a.	n.a.
All other operatives and semiskilled workers	2,970	4.67	n.a.	n.a.
All other laborers and unskilled workers	10,280	16.16	n.a.	n.a.
Clerical occupations	6,960	10.94	n.a.	n.a.
Office clerical workers, total	5,550	8.73	n.a.	n.a.
Bookkeeping and/or billing machine operator ..	100	.16	17	15
Computer operator	150	.24	17	22
Keypunch operator	120	.19	11	18
All other office machine operators	90	.14	n.a.	n.a.
Stenographer	170	.27	24	15
Accounting clerk	400	.63	9	31
Bookkeeper, hand	120	.19	11	29
File clerk	110	.17	17	11
General office clerk	1,110	1.75	14	45
Order clerk	190	.30	15	18
Payroll and/or timekeeping clerk	290	.46	11	42
Personnel clerk	110	.17	9	24
Procurement clerk	80	.13	25	15
Receptionist	60	.09	23	10
Secretary	1,070	1.68	16	45
Switchboard operator/receptionist	80	.13	9	29
Typist	270	.42	13	21
Clerical supervisor, office or plant	300	.47	14	21
All other office clerical workers	730	1.15	n.a.	n.a.
Plant clerical workers, total	1,410	2.22	n.a.	n.a.
Production clerk and/or coordinator	500	.79	31	14
Shipping packer	180	.28	13	27
Shipping and/or receiving clerk	280	.44	11	32
Weigher, recordkeeping	80	.13	12	17
Stock clerk, stockroom, warehouse or storage yard	240	.38	10	29
All other plant clerical workers	130	.20	n.a.	n.a.
Sales occupations	760	1.19	n.a.	n.a.
Sales agent, associate, and/or representative	750	1.18	17	27
All other sales workers	10	.02	n.a.	n.a.

¹ Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

² Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A. n.a. Not available.

Textile Mill Products

Establishments in this industry perform any of the following operations: (1) Preparing fiber and subsequently manufacturing yarn, thread, braids, twine, and cordage; (2) manufacturing broad woven fabric, narrow woven fabric, knit fabric, and carpets and rugs from yarn; (3) dyeing and finishing fiber, yarn, fabric, and knit apparel; (4) coating, waterproofing, or otherwise treating fabric; (5) the integrated manufacture of knit apparel and other finished articles from yarn; and (6) the manufacture of felt goods, lace goods, nonwoven fabrics, and miscellaneous textiles. These establishments employed 870,780 workers, accounting for 4 percent of manufacturing and 10 percent of nondurable goods employment in 1980. The three largest employers of these workers were: Knitting mills, with 26 percent of industry employment; cotton broad woven fabric mills, with 17 percent; and yarn and thread mills, with 15 percent.

As shown in table 6, the 713,410 production and re-

lated workers in the textile mill products industry accounted for more than four-fifths of total industry employment. Clerical workers made up 9 percent. Three-fifths of these were office clerical workers. The remaining employment was distributed as follows: Managers and officers, 4 percent; service workers and professionals, 2 percent each; and technical and sales workers, 1 percent each.

The five most populous occupations in manufacturing textile mill products are listed in the tabulation below:

	<i>Employment</i>	<i>Percent of industry employment</i>
Sewing machine operator, regular equipment-garment	43,750	5.0
Weaver	33,660	3.9
Supervisor, nonworking	29,820	3.4
Spinner, frame	28,970	3.3
Inspector	26,730	3.1

Table 6. Textile mill products: Employment, relative error, and percent of establishments reporting selected occupations, April 1980

(SIC 22)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Total	870,780	100.00	--	--
Managers and officers	31,980	3.67	n.a.	95
Professional occupations	14,710	1.69	n.a.	n.a.
Engineers, total	4,120	.47	n.a.	n.a.
Industrial engineer	2,120	.24	3	21
Mechanical engineer	1,170	.13	4	13
All other engineers	830	.10	n.a.	n.a.
Chemist	800	.09	6	9
All other natural and mathematical scientists	110	.01	22	1
Systems analyst, electronic data processing	1,140	.13	9	7
Purchasing agent and/or buyer	1,210	.14	5	19
Accountants and auditors	2,950	.34	4	29
Nurse, professional	630	.07	3	12
Personnel and labor relations specialists	1,740	.20	2	24
Designer	1,240	.14	8	10
All other professional workers	770	.09	n.a.	n.a.
Technical occupations	7,750	.89	n.a.	n.a.
Computer programmer	960	.11	6	8
Engineering technicians	1,080	.12	5	9
Colorist	1,650	.19	5	15
All other science technicians	2,720	.31	n.a.	n.a.
All other technicians	1,340	.15	n.a.	n.a.
Service occupations	19,110	2.19	n.a.	n.a.
Janitors, porters, and cleaners	11,340	1.30	4	51
Guards and doorkeepers	3,330	.38	3	18
Food service workers	190	.02	11	1
Supervisor, nonworking-service only	1,160	.13	9	6
All other service workers	3,090	.35	n.a.	n.a.
Production, maintenance, construction, repair, material handling and powerplant occupations	713,410	81.93	n.a.	n.a.
Mechanics and repairers, total	53,660	6.16	n.a.	n.a.
Mechanic, automotive	490	.06	10	4
Mechanic, maintenance	9,560	1.10	4	27
Knitting machine fixer	8,770	1.01	4	18
Loom fixer	16,070	1.85	3	19
Section repairer and setter	13,060	1.50	5	15
Mechanic, sewing machine	1,480	.17	5	10
All other mechanics and repairers	4,230	.49	n.a.	n.a.
Presser, hand	670	.08	12	3
Presser, machine	990	.11	12	4
Truck driver	3,400	.39	4	22
Carpenter	1,170	.13	4	13
Crane, derrick, and hoist operators	200	.02	13	1
Delivery and/or route worker	350	.04	15	3
Drawer-in, hand	1,600	.18	5	9
Electrician	4,370	.50	2	29
Supervisor, nonworking	29,820	3.42	2	54
Industrial truck operator	9,060	1.04	4	27
Inspector	26,730	3.07	3	43
Instructor, apparel and textile machines	1,730	.20	4	10
Machinist	3,360	.39	3	20
Maintenance repairer, general utility	10,270	1.18	4	41
Helper, trades	6,160	.71	5	13
Millwright	1,180	.14	7	6
Oiler	2,440	.28	3	17
Order filler	3,970	.46	6	15
Painter, maintenance	590	.07	5	8
Plumber and/or pipefitter	730	.08	6	8
Production packager, hand, or machine	15,980	1.84	4	33

See footnotes at end of table.

Table 6. Textile mill products: Employment, relative error, and percent of establishments reporting selected occupations, April 1980—Continued

(SIC 22)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Sewing machine operator, regular equipment-garment	43,750	5.02	2	14
Sewing machine operator, special equipment and/or automatic equipment-garment	5,570	.64	12	8
Sewing machine operator, regular equipment-nongarment	14,570	1.67	7	13
Sewing machine operator, special and/or automatic equipment-nongarment	5,700	.65	9	8
Spooler operator, automatic	6,810	.78	5	8
Stationary boiler firer	1,110	.13	5	8
Stationary engineer	310	.04	9	2
Welder and/or flamecutter	510	.06	4	9
Weaver	33,660	3.87	3	21
Ager operator	370	.04	14	1
Back tender, cloth printing	1,370	.16	14	2
Battery loader	6,630	.76	5	6
Beam-dyer operators and/or package-dyeing-machine operators	1,660	.19	8	5
Beam warper tenders, automatic and/or beamers	6,360	.73	5	18
Bleach-range operator and/or knit-goods bleacher	2,020	.23	13	4
Blending machine operator	2,430	.28	5	8
Boarding machine operator, hosiery	4,880	.56	8	4
Bobbin sorter	890	.10	9	4
Bobbin winders, machine or sewing machine	2,990	.34	9	5
Boil-off machine operator, cloth	570	.07	12	2
Braiding machine operator	2,380	.27	8	3
Burler	3,500	.40	11	6
Calender operator, cloth pressing	1,290	.15	7	5
Calendering machine operator, knit goods tubing	1,010	.12	10	3
Card grinder	1,330	.15	6	8
Card tenders, comber tenders, and/or card strippers	9,360	1.07	3	19
Drawing frame tenders and/or gill box tenders	7,170	.82	3	14
Cloth feeders and/or back tenders	4,390	.50	7	10
Cloth finishing range tender, middle	1,700	.20	10	3
Cloth finishing range operator, chief	2,190	.25	7	5
Cloth printer	1,220	.14	12	3
Cloth shrinking machine operator	760	.09	8	3
Cloth trimmers, machine and/or shearing machine operators	2,760	.32	9	9
Cloth or carpet winder	2,300	.26	8	6
Coating machine operator	2,650	.30	10	5
Creeler, yarn	13,770	1.58	4	21
Cutter, portable machine	3,550	.41	8	14
Doffer	18,620	2.14	3	22
Drawing-in machine tender	1,150	.13	7	6
Dresser tender	860	.10	9	3
Dye range operator and spiral dye beck tender	4,060	.47	8	9
Dye reel operator, jigger, and/or padding machine operator	2,880	.33	8	5
Dye tank tender, nets; warp dyeing vat tender; and/or knit goods yarn dyer, vat	990	.11	10	3
Dye tub operator, random dyer, and/or spot dyeing and winding machine operator	2,780	.32	8	6
Hand sewer	430	.05	18	2
Harness builders, loom changers and/or loom starters	1,700	.20	8	7
Harness placer	2,480	.28	5	6
Knitter, full-fashioned garment	980	.11	18	1
Knitting machine operator	20,270	2.33	4	21
Laminating machine operator and/or spreader machine tender	1,120	.13	12	3
Link and link knitting machine operator	230	.03	21	1

See footnotes at end of table.

Table 6. Textile mill products: Employment, relative error, and percent of establishments reporting selected occupations, April 1980—Continued

(SIC 22)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Loom winder tender	1,920	0.22	9	2
Looper	640	.07	19	1
Mender, cloth	4,530	.52	6	10
Mercerizer operators and/or mangle tenders	710	.08	10	2
Napper tender	1,640	.19	9	5
Needle felt making machine operator and/or needle loom operator	910	.10	10	2
Opener tenders and/or waste machine tenders	2,420	.28	5	10
Picker tender	1,820	.21	6	8
Quilling machine operator, automatic or non-automatic	2,050	.24	7	7
Rope laying machine operator	540	.06	25	1
Rubber covering machine operator	950	.11	13	1
Seamless hosiery knitter	3,970	.46	10	3
Skein yarn dyer	1,050	.12	11	2
Slasher tender	3,840	.44	4	8
Slubber tender	5,100	.59	4	9
Smash hand	3,070	.35	4	10
Speeder tender	760	.09	13	1
Spinner, frame	28,970	3.33	3	17
Staple cutters and/or staple processing machine operators	580	.07	18	1
Tenter frame operator	4,820	.55	5	11
Tester	4,080	.47	5	20
Threader, knit goods	710	.08	13	2
Twister tender	14,960	1.72	4	17
Warp knitting machine operator	2,150	.25	13	2
Warp tying machine tender	3,400	.39	4	13
Washer, synthetic fibers	350	.04	12	2
Winder operator, automatic	17,360	1.99	4	19
Texturizer and/or crimp setter	4,080	.47	12	2
Yarn winder	17,340	1.99	4	18
Cloth grader	6,960	.80	5	11
Folder, hand	8,320	.96	7	8
Folding machine operator	1,530	.18	10	6
Cutter machine	4,200	.48	6	12
Autoclave operator	920	.11	9	3
Drier operator, textiles and rugs	2,820	.32	5	10
Screen or stencil printer and/or setter	2,460	.28	11	6
Mixer and/or blender, chemicals and chemical products	5,380	.62	4	19
All other skilled craft and kindred workers	6,200	.71	n.a.	n.a.
All other operatives and semiskilled workers	37,330	4.29	n.a.	n.a.
All other laborers and unskilled workers	62,100	7.13	n.a.	n.a.
Clerical occupations	76,780	8.82	n.a.	n.a.
Office clerical workers, total	46,140	5.30	n.a.	n.a.
Bookkeeping and/or billing machine operator ..	480	.06	6	6
Computer operator	1,440	.17	4	14
Keypunch operator	2,060	.24	4	13
All other office machine operators	390	.04	n.a.	n.a.
Stenographer	410	.05	10	4
Accounting clerk	3,230	.37	4	22
Bookkeeper, hand	840	.10	6	13
File clerk	960	.11	8	8
General office clerk	12,010	1.38	3	54
Order clerk	2,980	.34	6	15
Payroll and/or timekeeping clerk	2,800	.32	2	31
Personnel clerk	1,520	.17	3	22
Procurement clerk	690	.08	4	11
Receptionist	360	.04	6	7
Secretary	6,180	.71	3	49
Statistical clerk	770	.09	6	7
Switchboard operator	310	.04	6	6

See footnotes at end of table.

Table 6. Textile mill products: Employment, relative error, and percent of establishments reporting selected occupations, April 1980—Continued

(SIC 22)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Office clerical workers—Continued				
Switchboard operator/receptionist	1,120	0.13	2	22
Typist	2,080	.24	5	13
Clerical supervisor, office or plant	3,240	.37	5	16
All other office clerical workers	2,270	.26	n.a.	n.a.
Plant clerical workers, total	30,640	3.52	n.a.	n.a.
Production clerk and/or coordinator	4,000	.46	4	24
Shipping packer	11,320	1.30	3	48
Shipping and/or receiving clerk	6,430	.74	3	56
Weigher, recordkeeping	800	.09	7	6
Stock clerk, stockroom, warehouse or storage yard	5,230	.60	3	35
All other plant clerical workers	2,860	.33	n.a.	n.a.
Sales occupations	7,040	.81	n.a.	n.a.
Sales agent, associate, and/or representative	6,290	.72	6	25
Sales clerk	750	.09	10	5

¹ Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

² Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A. n.a. Not available.

Apparel and Other Textile Products

Establishments which manufacture apparel and textile house furnishings employed nearly 1.3 million workers or 6 percent of manufacturing and 16 percent of nondurable goods employment in 1980. One-third of the industry's employees produced women's, misses', and juniors' outerwear; 29 percent produced men's and boys' furnishings, work clothing, and allied garments; and 13 percent manufactured miscellaneous fabricated textile products.

As shown in table 7, approximately 1.1 million production and related workers were employed in the manufacture of apparel and other textile products, accounting for 83 percent of total industry employment. Clerical workers ranked second with 9 percent. Managers and officers accounted for 4 percent; sales, pro-

fessional, and service workers, 1 percent each; and technical workers, 0.2 percent of total industry employment.

The five most populous occupations in the industry are listed below. These production occupations accounted for more than half of total industry employment.

	<i>Employment</i>	<i>Percent of industry employment</i>
Sewing machine operator, regular equipment-garment	521,100	41.0
Sewing machine operator, special and/or automatic equipment-garment	77,530	6.1
Sewing machine operator, regular equipment-nongarment	57,360	4.5
Inspector	28,310	2.2
Supervisor, nonworking	24,900	2.0

Table 7. Apparel and other textile products: Employment, relative error, and percent of establishments reporting selected occupations, May 1980

(SIC 23)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Total	1,271,360	100.00	--	--
Managers and officers	45,820	3.60	n.a.	89
Professional occupations	15,500	1.22	n.a.	n.a.
Engineers, total	2,740	.22	n.a.	n.a.
Industrial engineer	2,050	.16	3	10
Mechanical engineer	380	.03	9	2
All other engineers	310	.02	n.a.	n.a.
Systems analyst, electronic data processing	650	.05	10	2
Purchasing agent and/or buyer	1,850	.15	5	10
Accountants and auditors	2,260	.18	5	9
Nurse, professional	140	.01	7	1
Personnel and labor relations specialists	1,120	.09	4	7
Designer	5,380	.42	6	15
Furrier	680	.05	9	1
All other professional workers	680	.05	n.a.	n.a.
Technical occupations	2,250	.18	n.a.	n.a.
Computer programmer	990	.08	7	4
Engineering technicians	780	.06	8	3
Science technicians	250	.02	18	(³)
All other technicians	230	.02	n.a.	n.a.
Service occupations	15,290	1.20	n.a.	n.a.
Janitors, porters, and cleaners	11,310	.89	2	40
Guards and doorkeepers	1,500	.12	5	4
Food service workers	260	.02	8	1
Supervisor, nonworking-service only	1,760	.14	7	4
All other service workers	460	.04	n.a.	n.a.
Production, maintenance, construction, repair, material handling and powerplant occupations	1,057,890	83.21	n.a.	n.a.
Mechanics and repairers, total	12,200	.96	n.a.	n.a.
Mechanic, maintenance	1,390	.11	5	5
Mechanic, sewing machine	10,110	.80	2	30
All other mechanics and repairers	700	.06	n.a.	n.a.
Presser, hand	22,830	1.80	3	31
Presser, machine	21,960	1.73	3	22
Truck driver	2,420	.19	4	10
Carpenter	340	.03	8	2
Crane, derrick, and hoist operators	190	.01	40	(³)
Delivery and/or route worker	760	.06	13	3
Electrician	450	.04	9	2
Supervisor, nonworking	24,900	1.96	2	39
Industrial truck operator	1,520	.12	7	3
Inspector	28,310	2.23	2	28
Instructor, apparel and textile machines	3,250	.26	5	8
Machinist	710	.06	8	3
Maintenance repairer, general utility	2,470	.19	4	10
Helper, trades	860	.07	12	2
Millwright	170	.01	28	(³)
Order filler	6,950	.55	6	10
Painter, maintenance	140	.01	16	1
Production packager, hand or machine	13,610	1.07	4	17
Sewing machine operator, regular equipment-garment	521,100	40.99	1	66
Sewing machine operator, special equipment and/or automatic equipment-garment	77,530	6.10	3	39
Sewing machine operator, regular equipment-nongarment	57,360	4.51	5	14
Sewing machine operator, special and/or automatic equipment-nongarment	17,230	1.36	7	8
Welder and/or flamecutter	130	.01	22	1
All-around tailor	2,100	.17	33	2

See footnotes at end of table.

Table 7. Apparel and other textile products: Employment, relative error, and percent of establishments reporting selected occupations, May 1980—Continued

(SIC 23)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Bundler	15,400	1.21	3	29
Cap maker	2,890	.23	15	(³)
Cloth printer	870	.07	15	1
Cutter, portable machine	11,040	.87	4	27
Die cutter and/or clicking machine operator	2,500	.20	5	7
Draper	800	.06	11	2
Fur cutter	150	.01	38	(³)
Fur finisher	230	.02	17	1
Fusing machine operator	4,770	.38	9	9
Garment repairer	4,560	.36	4	13
Hand blocker, caps and hats	640	.05	8	1
Hand sewer	10,150	.80	8	12
Knitter, full-fashioned garment	160	.01	45	(³)
Knitting machine operator	1,150	.09	13	1
Belt maker, apparel	1,500	.12	16	1
Milliner	530	.04	19	(³)
Pattern cutter	1,690	.13	7	7
Patternmaker	3,870	.30	7	12
Pleating machine operator	1,330	.10	16	1
Sample maker	7,920	.62	6	15
Shaper and presser	5,260	.41	7	8
Shuttler, embroidery	1,250	.10	15	1
Slitting machine operator	1,420	.11	6	5
Spot cleaner	1,680	.13	6	8
Spreader	13,000	1.02	3	29
Tester	1,100	.09	10	3
Thread trimmer	19,590	1.54	3	28
Work distributor	15,860	1.25	3	25
Marker	4,430	.35	4	15
Cutter, hand	10,800	.85	5	23
Turner	9,970	.78	3	23
Folder, hand	17,240	1.36	3	17
Folding machine operator	2,480	.20	9	3
Ultrasonic machine operator	310	.02	14	1
Soabar operator	3,580	.28	4	13
Gluer and/or cementer, hand	1,650	.13	12	2
Cutter machine	6,770	.53	5	13
Screen or stencil printer and/or setter	2,010	.16	12	3
All other skilled craft and kindred workers	2,090	.16	n.a.	n.a.
All other operatives and semiskilled workers	12,700	1.00	n.a.	n.a.
All other laborers and unskilled workers	33,060	2.60	n.a.	n.a.
Clerical occupations	116,190	9.14	n.a.	n.a.
Office clerical workers, total	64,750	5.09	n.a.	n.a.
Bookkeeping and/or billing machine operator ..	1,100	.09	7	4
Computer operator	1,510	.12	5	7
Keypunch operator	2,470	.19	5	6
All other office machine operators	700	.06	n.a.	n.a.
Stenographer	320	.03	9	2
Accounting clerk	5,920	.47	5	18
Bookkeeper, hand	5,970	.47	4	26
File clerk	1,270	.10	6	5
General office clerk	13,430	1.06	3	31
Order clerk	4,070	.32	5	9
Payroll and/or timekeeping clerk	7,500	.59	2	35
Personnel clerk	1,180	.09	4	8
Procurement clerk	800	.06	10	4
Receptionist	850	.07	6	6
Secretary	5,890	.46	4	23
Statistical clerk	370	.03	8	2
Switchboard operator	430	.03	9	3
Switchboard operator/receptionist	1,440	.11	4	11
Typist	1,670	.13	6	6
Clerical supervisor, office or plant	4,710	.37	4	12
All other office clerical workers	3,150	.25	n.a.	n.a.

See footnotes at end of table.

Table 7. Apparel and other textile products: Employment, relative error, and percent of establishments reporting selected occupations, May 1980—Continued

(SIC 23)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Plant clerical workers, total	51,440	4.05	n.a.	n.a.
Production clerk and/or coordinator	4,200	.33	5	13
Shipping packer	21,730	1.71	3	41
Shipping and/or receiving clerk	12,380	.97	4	36
Stock clerk, stockroom, warehouse or storage yard	8,040	.63	4	18
Shade ticket marker	3,470	.27	4	11
All other plant clerical workers	1,620	.13	n.a.	n.a.
Sales occupations	18,420	1.45	n.a.	n.a.
Sales agent, associate, and/or representative	15,130	1.19	4	20
Sales clerk	3,290	.26	13	5

¹ Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

² Relative standard errors apply equally to data on estimated

employment and percent of total employment; relative standard errors estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

³ Rounded to zero.

n.a. Not available.

Lumber and Wood Products, Except Furniture

Logging camps; sawmills, lath mills, shingle mills, cooperage stock mills, planing mills, and plywood mills and veneer mills; and establishments manufacturing certain finished articles made entirely or mainly of wood or wood substitutes employed 657,270 workers or only 3 percent of manufacturing and 5 percent of durable goods employment in 1980. Sawmills and planing mills accounted for 31 percent of industry employment; establishments manufacturing fabricated millwork, veneer, plywood, and structural wood members, 29 percent; and logging camps and logging contractors, 12 percent.

The 534,720 production and related workers in the lumber and wood products industry accounted for more than four-fifths of total industry employment (table 8).

Clerical workers and managers and officers each accounted for 6 percent. The remaining employment was distributed as follows: Service workers, 2 percent; sales and professional workers, nearly 2 percent each; and technical workers, 1 percent.

The five most populous occupations in manufacturing lumber and wood products, except furniture, are listed in the tabulation below:

	<i>Employment</i>	<i>Percent of industry employment</i>
Assembler	45,780	7.0
Truck driver	26,080	4.0
Chain bearer, lumber	22,540	3.4
Faller and/or buckler	20,350	3.1
Supervisor, nonworking	19,820	3.0

Table 8. Lumber and wood products, except furniture: Employment, relative error, and percent of establishments reporting selected occupations, May 1980

(SIC 24)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Total	657,270	100.00	--	--
Managers and officers	41,070	6.25	n.a.	70
Professional occupations	9,890	1.50	n.a.	n.a.
Engineers, total	1,230	.19	n.a.	n.a.
Industrial engineer	470	.07	6	2
Mechanical engineer	340	.05	6	2
All other engineers	420	.06	n.a.	n.a.
Agricultural scientist	830	.13	7	1
All other natural and mathematical scientists	110	.02	31	(³)
Systems analyst, electronic data processing	300	.05	11	1
Purchasing agent and/or buyer	1,740	.26	3	8
Accountants and auditors	3,650	.56	3	14
Nurse, professional	90	.01	9	1
Personnel and labor relations specialists	680	.10	4	3
All other professional workers	1,260	.19	n.a.	n.a.
Technical occupations	5,090	.77	n.a.	n.a.
Computer programmer	390	.06	9	1
Engineering technicians, total	1,930	.29	n.a.	n.a.
Drafter	1,660	.25	5	5
All other engineering technicians	270	.04	n.a.	n.a.
Timber cruiser	1,810	.28	8	5
All other science technicians	220	.03	n.a.	n.a.
All other technicians	740	.11	n.a.	n.a.
Service occupations	13,520	2.06	n.a.	n.a.
Janitors, porters, and cleaners	8,220	1.25	3	20
Guards and doorkeepers	4,150	.63	3	9
Food service workers	220	.03	15	1
Supervisor, nonworking-service only	500	.08	14	1
All other service workers	430	.07	n.a.	n.a.
Production, maintenance, construction, repair, material handling and powerplant occupations	534,720	81.35	n.a.	n.a.
Mechanics and repairers, total	11,700	1.78	n.a.	n.a.
Mechanic, automotive	2,970	.45	4	7
Engineering equipment mechanic	1,530	.23	6	3
Mechanic, maintenance	6,340	.96	4	11
All other mechanics and repairers	860	.13	n.a.	n.a.
Truck driver	26,080	3.97	2	46
Cabinetmaker	14,610	2.22	3	10
Carpenter	11,490	1.75	4	10
Crane, derrick, and hoist operators	970	.15	6	2
Delivery and/or route worker	2,110	.32	5	4
Electrician	3,740	.57	3	6
Supervisor, nonworking	19,820	3.02	2	30
Glazier	300	.05	15	(³)
Heavy equipment operator	3,390	.52	6	5
Rigger	80	.01	18	(³)
Industrial truck operator	18,800	2.86	1	31
Inspector	3,530	.54	4	8
Machinist	1,320	.20	5	3
Maintenance repairer, general utility	9,020	1.37	2	24
Helper, trades	8,980	1.37	4	12
Millwright	3,350	.51	6	3
Oiler	950	.14	4	3
Order filler	760	.12	7	2
Painter, maintenance	240	.04	13	1
Plumber and/or pipefitter	980	.15	4	2
Production packager, hand or machine	5,500	.84	4	7
Stationary boiler firer	2,210	.34	4	4
Stationary engineer	440	.07	9	1
Logging tractor operator	14,410	2.19	3	25
Welder and/or flamecutter	1,910	.29	8	3

See footnotes at end of table.

Table 8. Lumber and wood products, except furniture: Employment, relative error, and percent of establishments reporting selected occupations, May 1980—Continued

(SIC 24)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Power barker operator	4,450	0.68	2	15
Band scroll saw operator	510	.08	9	1
Boring machine operator, wood	840	.13	7	2
Carrier driver	1,460	.22	5	2
Wood carving machine operator	140	.02	31	(³)
Chain offbearer, lumber	22,540	3.43	2	17
Chaser	1,820	.28	7	3
Chipper	3,270	.50	3	11
Choker setter, lumber	5,060	.77	5	5
Automatic clipper, veneer	1,940	.30	5	3
Cut off saw operator, lumber	10,400	1.58	2	23
Cut off sawyer, log	1,340	.20	8	3
Dado operator	350	.05	9	1
Dowel machine operator	300	.05	11	1
Edge gluer	830	.13	7	1
Edger, automatic and/or pony	5,850	.89	2	18
Faller and/or buckler	20,350	3.10	2	26
Gang sawyer	660	.10	9	2
Gluing machine operator	960	.15	7	2
Head loader	790	.12	10	2
Head sawyer	6,770	1.03	2	22
Hook tender	1,340	.20	7	2
Hot plate plywood press operator	1,330	.20	5	2
Hydraulic press operator, veneer	290	.04	12	1
Lay-out marker, wood	320	.05	11	1
Kiln operator	850	.13	6	3
Kiln transfer operator	370	.06	8	1
Lathe operator, wood	660	.10	12	1
Loader, car and truck	6,430	.98	3	12
Loader engineer	3,660	.56	4	9
Log handling equipment operator	8,100	1.23	3	18
Log inspectors, graders, and/or scalers	3,540	.54	3	12
Lumber grader	5,990	.91	3	13
Lumber straightener	5,270	.80	4	9
Machine setter, woodworking	2,900	.44	4	7
Wood machinist	8,110	1.23	5	9
Mortising machine operator	260	.04	10	1
Nailing machine operator	7,690	1.17	3	11
Off bearer, wooden parts	12,720	1.94	3	13
Pond worker, lumber	940	.14	7	1
Power screwdriver operator	910	.14	9	1
Resawyer	3,860	.59	3	11
Rigging slinger	1,490	.23	7	2
Ripsaw operator	6,800	1.03	3	16
Rubber	740	.11	12	1
Sander, wood	6,360	.97	4	9
Saw filer	4,340	.66	2	12
Second loader	590	.09	11	1
Shaper and/or router operator	1,380	.21	7	2
Kiln stacker operator	1,250	.19	6	3
Tenoner operator	960	.15	6	2
Tester	420	.06	10	1
Transfer controller, sawmill	630	.10	9	1
Treating engineer	650	.10	8	1
Trim saw operator	6,670	1.01	2	17
Variety saw operator	3,960	.60	4	8
Veneer drier	2,000	.30	7	2
Veneer grader	4,800	.73	6	3
Veneer lathe operator	1,050	.16	6	2
Veneer repairer, machine	1,740	.26	10	1
Veneer sander	570	.09	7	1
Woodworking machine operator	8,750	1.33	4	13
Yarder engineer	1,780	.27	7	4
Painter, production	6,020	.92	4	9

See footnotes at end of table.

Table 8. Lumber and wood products, except furniture: Employment, relative error, and percent of establishments reporting selected occupations, May 1980—Continued

(SIC 24)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Conveyor operator or tender	660	0.10	8	1
Veneer drier feeder	3,260	.50	5	2
Veneer jointer operator	470	.07	9	1
Veneer repairer, hand	1,400	.21	9	1
Core feeder	1,760	.27	7	1
Core layer and/or sheet turner	3,080	.47	6	2
Planer operator	3,940	.60	3	12
Sorter operator, green lumber	880	.13	8	2
Sawyer, tail	520	.08	12	1
Gluer and/or cementer, hand	970	.15	9	1
Assembler	45,780	6.97	3	20
Mixer and/or blender, chemicals and chemical products	540	.08	6	2
All other skilled craft and kindred workers	4,390	.67	n.a.	n.a.
All other operatives and semiskilled workers	19,800	3.01	n.a.	n.a.
All other laborers and unskilled workers	51,460	7.83	n.a.	n.a.
Clerical occupations	41,920	6.38	n.a.	n.a.
Office clerical workers, total	32,260	4.91	n.a.	n.a.
Bookkeeping and/or billing machine operator ..	170	.03	8	1
Computer operator	450	.07	6	2
Keypunch operator	580	.09	8	2
All other office machine operators	80	.01	n.a.	n.a.
Stenographer	130	.02	11	(³)
Accounting clerk	3,370	.51	3	12
Bookkeeper, hand	5,900	.90	2	25
File clerk	220	.03	7	1
General office clerk	8,870	1.35	3	27
Order clerk	620	.09	6	2
Payroll and/or timekeeping clerk	970	.15	3	5
Personnel clerk	440	.07	5	3
Procurement clerk	330	.05	6	2
Receptionist	360	.05	6	2
Secretary	6,800	1.03	3	26
Statistical clerk	280	.04	8	1
Switchboard operator	140	.02	8	1
Switchboard operator/receptionist	690	.10	3	4
Typist	480	.07	6	2
Clerical supervisor, office or plant	800	.12	8	3
All other office clerical workers	580	.09	n.a.	n.a.
Plant clerical workers, total	9,660	1.47	n.a.	n.a.
Production clerk and/or coordinator	960	.15	5	3
Shipping packer	4,800	.73	3	12
Shipping and/or receiving clerk	1,480	.23	4	5
Stock clerk, stockroom, warehouse or storage yard	1,330	.20	4	4
Tally clerk, sawmill	700	.11	6	2
All other plant clerical workers	390	.06	n.a.	n.a.
Sales occupations	11,060	1.68	n.a.	n.a.
Sales agent, associate, and/or representative	10,370	1.58	3	21
Sales clerk	690	.10	18	2

¹ Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

² Relative standard errors apply equally to data on estimated

employment and percent of total employment; relative standard errors estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

³ Rounded to zero.

n.a. Not available.

Furniture and Fixtures

Establishments which manufacture household, office, public building, and restaurant furniture; and office and store fixtures employed 455,830 workers in 1980, accounting for 2 percent of manufacturing and 4 percent of durable goods employment. Establishments manufacturing household furniture employed 64 percent of the industry's workers; those manufacturing partitions, shelving, lockers, and office and store fixtures, 14 percent; and those manufacturing office furniture, 11 percent.

As shown in table 9, the 348,250 production and related workers in the furniture and fixtures industry accounted for more than three-fourths of total industry employment. Clerical workers ranked second with 11

percent. Managers and officers accounted for 5 percent; sales workers, professionals, and service workers, 2 percent each; and technical workers, 1 percent of total industry employment.

The five most populous occupations in manufacturing furniture and fixtures are listed below:

	<i>Employment</i>	<i>Percent of industry employment</i>
Assembler	43,250	9.5
Sewing machine operator, regular equipment-nongarment	16,420	3.6
Upholsterer	15,840	3.5
Supervisor, nonworking	15,600	3.4
Cabinetmaker	13,960	3.1

Table 9. Furniture and fixtures: Employment, relative error, and percent of establishments reporting selected occupations, June 1980

(SIC 25)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Total	455,830	100.00	--	--
Managers and officers	24,300	5.33	n.a.	91
Professional occupations	10,200	2.24	n.a.	n.a.
Engineers, total	2,610	.57	n.a.	n.a.
Industrial engineer	1,390	.30	5	11
Mechanical engineer	640	.14	8	5
All other engineers	580	.13	n.a.	n.a.
Systems analyst, electronic data processing	450	.10	12	4
Purchasing agent and/or buyer	1,880	.41	3	24
Accountants and auditors	2,330	.51	5	24
Nurse, professional	260	.06	14	3
Personnel and labor relations specialists	930	.20	5	12
Designer	1,170	.26	8	9
All other professional workers	570	.13	n.a.	n.a.
Technical occupations	3,610	.79	n.a.	n.a.
Computer programmer	800	.18	8	7
Engineering technicians, total	2,530	.56	n.a.	n.a.
Drafter	2,010	.44	5	14
All other engineering technicians	520	.11	n.a.	n.a.
All other technicians	280	.06	n.a.	n.a.
Service occupations	8,510	1.87	n.a.	n.a.
Janitors, porters, and cleaners	4,860	1.07	3	35
Guards and doorkeepers	1,560	.34	5	8
Food service workers	170	.04	17	1
Supervisor, nonworking-service only	1,300	.29	10	4
All other service workers	620	.14	n.a.	n.a.
Production, maintenance, construction, repair, material handling and powerplant occupations	348,250	76.40	n.a.	n.a.
Mechanics and repairers, total	2,530	.56	n.a.	n.a.
Mechanic, automotive	480	.11	6	5
Mechanic, maintenance	1,810	.40	6	9
All other mechanics and repairers	240	.05	n.a.	n.a.
Truck driver	5,790	1.27	4	33
Cabinetmaker	13,960	3.06	6	25
Carpenter	3,390	.74	11	10
Crane, derrick, and hoist operators	150	.03	12	1
Delivery and/or route worker	1,460	.32	9	8
Electrician	870	.19	5	8
Filers, grinders, buffers, chippers, cleaners, and/or polishers	1,630	.36	9	5
Supervisor, nonworking	15,600	3.42	2	46
Industrial truck operator	5,920	1.30	4	25
Inspector	6,560	1.44	3	23
Laminating machine operator, furniture	1,730	.38	13	11
Machinist	1,050	.23	6	7
Mattress maker	3,580	.79	11	9
Maintenance repairer, general utility	3,160	.69	4	20
Helper, trades	6,550	1.44	11	17
Millwright	470	.10	15	2
Oiler	190	.04	9	3
Order filler	1,770	.39	6	7
Painter, maintenance	180	.04	24	2
Plumber and/or pipefitter	150	.03	12	2
Production packager, hand or machine	8,030	1.76	4	22
Sewing machine operator, regular equipment- nongarment	16,420	3.60	4	28
Sewing machine operator, special and/or automatic equipment-nongarment	2,600	.57	8	12
Sheet metal worker	1,280	.28	14	2
Stationary boiler firer	640	.14	7	4
Stationary engineer	100	.02	18	1
Tool and die maker	1,400	.31	8	7

See footnotes at end of table.

Table 9. Furniture and fixtures: Employment, relative error, and percent of establishments reporting selected occupations, June 1980—Continued

(SIC 25)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Welder and/or flamecutter	8,190	1.80	5	13
Furniture finisher	3,490	.77	7	10
Band scroll saw operator	1,650	.36	5	11
Boring machine operator, wood	2,550	.56	4	13
Wood carving machine operator	470	.10	12	3
Cut off saw operator, lumber	4,240	.93	5	27
Dado operator	380	.08	9	3
Dowel machine operator	510	.11	8	5
Drill press and/or boring machine operator	880	.19	9	4
Gluing machine operator	1,220	.27	6	7
Grinding and/or abrading machine operator, metal	1,090	.24	9	4
Hot plate plywood press operator	390	.09	10	2
Hydraulic press operator, veneer	330	.07	10	3
Lay-out marker, wood	820	.18	8	6
Lathe operator, wood	1,060	.23	7	7
Machine setter, woodworking	2,550	.56	6	9
Machine tool operator, combination	1,320	.29	11	3
Machine tool operator, numerical control	350	.08	13	2
Machine tool operator, toolroom	230	.05	12	2
Machine tool setter, metalworking	450	.10	9	3
Wood machinist	3,190	.70	8	13
Mortising machine operator	480	.11	7	4
Nailing machine operator	1,450	.32	9	6
Off bearer, wooden parts	7,030	1.54	6	9
Patternmaker	360	.08	8	3
Plastic top installer	1,610	.35	12	9
Power screwdriver operator	2,400	.53	7	5
Rip and groove machine operator	380	.08	22	3
Ripsaw operator	4,810	1.06	5	24
Rubber	5,920	1.30	12	11
Sander, wood	13,400	2.94	4	27
Shaper, hand	880	.19	6	6
Shaper and/or router operator	3,020	.66	5	14
Sorter, upholstery parts	1,140	.25	7	6
Spring machine operator	1,360	.30	21	2
Springer	3,380	.74	6	14
Stapler, mattress and bedspring	690	.15	20	3
Tenoner operator	1,630	.36	5	10
Tester	530	.12	11	4
Upholstery trimmer	2,700	.59	8	9
Variety saw operator	1,880	.41	6	12
Woodworking machine operator	6,480	1.42	6	24
Painter, production	10,820	2.37	3	36
Riveter, light	1,050	.23	15	2
Punch press operator, metal	6,370	1.40	5	15
Punch press setter, metal	860	.19	8	5
Shear and/or slitter operator, metal	1,230	.27	6	7
Upholsterer	15,840	3.47	4	21
Upholstery cutter	5,760	1.26	5	21
Power brake and/or bending machine operator, metal	4,140	.91	7	12
Gluer and/or cementer, hand	2,950	.65	7	10
Cushion maker	2,990	.66	5	14
Assembler	43,250	9.49	3	48
Decorator, hand	740	.16	12	2
All other skilled craft and kindred workers	4,940	1.08	n.a.	n.a.
All other operatives and semiskilled workers	13,420	2.94	n.a.	n.a.
All other laborers and unskilled workers	29,840	6.55	n.a.	n.a.
Clerical occupations	50,490	11.08	n.a.	n.a.
Office clerical workers, total	31,610	6.93	n.a.	n.a.
Bookkeeping and/or billing machine operator ..	560	.12	7	7
Computer operator	880	.19	5	10

See footnotes at end of table.

Table 9. Furniture and fixtures: Employment, relative error, and percent of establishments reporting selected occupations, June 1980—Continued

(SIC 25)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Office clerical workers—Continued				
Keypunch operator	1,110	0.24	5	8
All other office machine operators	340	.07	n.a.	n.a.
Stenographer	490	.11	12	3
Accounting clerk	2,330	.51	5	19
Bookkeeper, hand	2,510	.55	5	33
File clerk	770	.17	7	7
General office clerk	5,650	1.24	4	38
Order clerk	2,150	.47	5	14
Payroll and/or timekeeping clerk	1,710	.38	4	19
Personnel clerk	670	.15	6	9
Procurement clerk	730	.16	7	8
Receptionist	370	.08	8	6
Secretary	4,400	.97	4	40
Statistical clerk	380	.08	13	3
Switchboard operator	170	.04	8	3
Switchboard operator/receptionist	960	.21	5	16
Typist	1,220	.27	6	9
Clerical supervisor, office or plant	2,070	.45	9	10
All other office clerical workers	2,140	.47	n.a.	n.a.
Plant clerical workers, total	18,880	4.14	n.a.	n.a.
Production clerk and/or coordinator	3,140	.69	5	17
Shipping packer	7,700	1.69	4	33
Shipping and/or receiving clerk	4,670	1.02	4	39
Stock clerk, stockroom, warehouse or storage yard	2,640	.58	5	15
All other plant clerical workers	730	.16	n.a.	n.a.
Sales occupations	10,470	2.30	n.a.	n.a.
Sales agent, associate, and/or representative	10,020	2.20	5	36
Sales clerk	450	.10	17	3

¹ Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

² Relative standard errors apply equally to data on estimate employment and percent of total employment; relative standard error estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A. n.a. Not available.

Paper and Allied Products

Establishments which manufacture paper and allied products employed 698,910 workers, accounting for nearly 4 percent of manufacturing and 9 percent of nondurable goods employment in 1980. Establishments manufacturing paper and paperboard into converted products (except containers and boxes) employed nearly one-third of the industry's workers; those producing paperboard containers and boxes, 30 percent; and paper mills (except building paper mills), 25 percent.

The industry's 519,530 production and related workers accounted for nearly three-fourths of total industry employment (table 10). Clerical workers ranked second with 10 percent. Managers and officers consti-

tuted 5 percent; professionals, 4 percent; sales workers, over 2 percent; and service and technical workers, about 2 percent each.

The tabulation below lists the five most populous occupations in manufacturing paper and allied products:

	<i>Employment</i>	<i>Percent of industry employment</i>
Supervisor, nonworking	29,880	4.3
Production packager, hand or machine	22,650	3.2
Industrial truck operator	21,810	3.1
Sales agent, associate, and/or representative	15,900	2.3
Mechanic, maintenance	14,390	2.1

Table 10. Paper and allied products: Employment, relative error, and percent of establishments reporting selected occupations, April 1980

(SIC 26)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Total	698,910	100.00	--	--
Managers and officers	37,340	5.34	n.a.	96
Professional occupations	30,190	4.32	n.a.	n.a.
Engineers, total	9,470	1.35	n.a.	n.a.
Chemical engineer	1,860	.27	6	8
Electrical and electronic engineers	940	.13	7	9
Industrial engineer	1,480	.21	4	18
Mechanical engineer	2,810	.40	5	17
All other engineers	2,380	.34	n.a.	n.a.
Chemist	2,110	.30	13	9
All other natural and mathematical scientists	650	.09	22	1
Systems analyst, electronic data processing	970	.14	8	8
Purchasing agent and/or buyer	2,600	.37	2	34
Accountants and auditors	4,890	.70	4	38
Commercial artist	1,170	.17	5	10
Nurse, professional	610	.09	4	8
Personnel and labor relations specialists	2,270	.32	4	26
Designer	1,280	.18	7	13
All other professional workers	4,170	.60	n.a.	n.a.
Technical occupations	10,500	1.50	n.a.	n.a.
Computer programmer	1,010	.14	5	10
Engineering technicians, total	2,570	.37	n.a.	n.a.
Drafter	1,100	.16	9	10
All other engineering technicians	1,470	.21	n.a.	n.a.
Science technicians	2,660	.38	21	4
All other technicians	4,260	.61	n.a.	n.a.
Service occupations	11,570	1.66	n.a.	n.a.
Janitors, porters, and cleaners	7,060	1.01	3	47
Guards and doorkeepers	2,310	.33	5	10
Food service workers	340	.05	26	1
Supervisor, nonworking-service only	1,140	.16	7	7
All other service workers	720	.10	n.a.	n.a.
Production, maintenance, construction, repair, material handling and powerplant occupations	519,530	74.33	n.a.	n.a.
Mechanics and repairers, total	18,530	2.65	n.a.	n.a.
Mechanic, automotive	1,860	.27	4	13
Mechanic, maintenance	14,390	2.06	4	35
All other mechanics and repairers	2,280	.33	n.a.	n.a.
Truck driver	8,180	1.17	2	40
Carpenter	1,130	.16	5	8
Compositor and/or typesetter	470	.07	9	5
Crane, derrick, and hoist operators	1,590	.23	6	6
Delivery and/or route worker	2,020	.29	5	13
Electrician	7,640	1.09	3	23
Supervisor, nonworking	29,880	4.28	2	57
Heavy equipment operator	1,420	.20	7	5
Rigger	440	.06	14	1
Industrial truck operator	21,810	3.12	2	52
Inspector	5,670	.81	5	15
Instrument repairer	2,560	.37	4	9
Machinist	5,080	.73	5	19
Maintenance repairer, general utility	7,760	1.11	5	31
Helper, trades	10,820	1.55	5	16
Millwright	8,080	1.16	5	9
Oiler	2,390	.34	3	15
Order filler	3,520	.50	5	14
Painter, maintenance	1,220	.17	4	8
Plumber and/or pipefitter	4,860	.70	5	8
Press operator and/or plate printer	14,020	2.01	3	28
Production packager, hand or machine	22,650	3.24	3	29
Scrapper and/or stripper, hand or machine	4,030	.58	4	13
Sheet metal worker	510	.07	8	3

See footnotes at end of table.

Table 10. Paper and allied products: Employment, relative error, and percent of establishments reporting selected occupations, April 1980—Continued

(SIC 26)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Stationary boiler firer	2,530	0.36	4	10
Stationary engineer	2,710	.39	4	10
Tool and die maker	500	.07	8	4
Welder and/or flamecutter	2,140	.31	5	8
Automatic assembly machine attendant	1,210	.17	11	3
Back tender	5,680	.81	3	13
Bag machine operator	8,150	1.17	7	8
Bag sewer	920	.13	14	2
Power barker operator	670	.10	15	3
Beater engineer	2,290	.33	5	9
Beater	2,570	.37	4	8
Bleacher operator, pulp	1,080	.15	6	4
Bottoming machine operators, paper bag press operators, and/or valving machine operators ..	890	.13	13	2
Box maker, paperboard	4,100	.59	8	11
Carton forming machine operator	2,150	.31	8	5
Chemical operator A	990	.14	7	4
Chemical operator B	960	.14	11	3
Chemical operator helper	710	.10	7	3
Chipper	940	.13	9	4
Coater operator, off-machine	3,600	.52	6	7
Coating mixer tender	1,370	.20	7	5
Combiner operator	1,940	.28	8	6
Convolute tube and/or spiral tube winder	2,120	.30	9	6
Corner cutter	610	.09	8	6
Corrugator knife operator	1,670	.24	3	13
Corrugator operator	3,180	.45	6	15
Cut off machine operator, tubing	600	.09	12	3
Cutting and creasing press operator	3,930	.56	4	14
Cylinder machine tender	1,090	.16	6	5
Decker operator	470	.07	6	2
Die cutter and/or clicking machine operator	6,190	.89	3	26
Paper die maker	1,460	.21	4	11
Die mounter	1,680	.24	4	18
Digester operator	1,090	.16	4	5
Digester operator helper	1,070	.15	6	4
Ending machine operator	1,300	.19	9	5
Envelope machine operator	5,980	.86	9	4
Etcher and/or engraver	520	.07	8	4
Evaporator operator, papermaking	620	.09	6	3
Flexo folder gluer operator	4,480	.64	5	15
Folding machine feeder	970	.14	12	3
Folding machine operator, paper	3,100	.44	9	5
Four corners stayer machine operator	640	.09	10	4
Fourdrinier machine tender	4,500	.64	3	10
Wood grinder operator	1,240	.18	11	2
Layboy tender	1,170	.17	7	4
Log inspectors, graders, and/or scalers	590	.08	8	3
Envelope finishing machine operator	660	.09	11	2
Machine setter, paper goods	10,300	1.47	9	18
Panel machine operators, patch machine operators, and/or sealing machine operators ..	740	.11	15	2
Paper cup machine operator	1,130	.16	23	1
Paper reel operator and/or rewinder operator	7,040	1.01	4	16
Power press tender	940	.13	13	3
Printer-slotter operator	3,990	.57	3	19
Printer-slotter feeder	4,280	.61	5	16
Pulp refiner operator	1,310	.19	5	5
Pulper	3,110	.44	6	9
Recovery operator, papermaking	1,240	.18	6	4
Scorer	1,040	.15	6	9
Slitter creaser slotter operator	1,910	.27	5	11
Slitter scorer cut-off operator	1,330	.19	7	9
Slitting machine operator	7,190	1.03	6	23

See footnotes at end of table.

Table 10. Paper and allied products: Employment, relative error, and percent of establishments reporting selected occupations, April 1980—Continued

(SIC 26)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Slotter operator	1,080	0.15	6	9
Stapling machine operator	1,700	.24	6	11
Supercalender operator	1,260	.18	10	3
Taping machine operator	3,480	.50	4	21
Tester	5,910	.85	3	13
Tube machine operator, bags	620	.09	13	2
Waxing machine operator	1,020	.15	6	8
Wet machine tender	980	.14	10	3
Winder, paper machine	4,720	.68	3	12
Wrapping machine operator	2,220	.32	7	6
Punch press operator, metal	560	.08	14	2
Punch press setter, metal	130	.02	21	1
Conveyor operator or tender	2,350	.34	5	10
Brown stock washer and/or blow pit operator	730	.10	6	3
Fourth hand and/or fifth hand, paper machine	7,670	1.10	3	12
Baling machine operator	4,120	.59	2	38
Chief operator	540	.08	9	2
Cutter machine	4,060	.58	5	18
Screen or stencil printer and/or setter	730	.10	17	3
Embossing, stamping, and/or marking machine operator	2,590	.37	7	8
Bindery worker, assembly	630	.09	16	2
Bindery worker, stitching	200	.03	20	1
All other bindery workers	810	.12	n.a.	n.a.
Extruder operator, plastics or rubber	3,000	.43	10	5
Extruder operator helper, plastics or rubber	2,290	.33	12	3
Assembler	7,920	1.13	7	8
Mixer and/or blender, chemicals and chemical products	2,020	.29	6	10
All other skilled craft and kindred workers	9,860	1.41	n.a.	n.a.
All other operatives and semiskilled workers	43,250	6.19	n.a.	n.a.
All other laborers and unskilled workers	72,220	10.33	n.a.	n.a.
Clerical occupations				
Office clerical workers, total	73,240	10.48	n.a.	n.a.
Office clerical workers, total	50,080	7.17	n.a.	n.a.
Bookkeeping and/or billing machine operator ..	1,100	.16	4	15
Computer operator	1,610	.23	4	20
Keypunch operator	1,970	.28	6	15
All other office machine operators	520	.07	n.a.	n.a.
Stenographer	1,090	.16	7	8
Accounting clerk	5,120	.73	2	38
Bookkeeper, hand	1,700	.24	4	22
File clerk	800	.11	5	11
General office clerk	5,510	.79	4	34
Order clerk	4,440	.64	3	33
Payroll and/or timekeeping clerk	2,600	.37	2	39
Personnel clerk	1,330	.19	3	21
Procurement clerk	910	.13	3	14
Receptionist	570	.08	5	9
Secretary	9,480	1.36	8	51
Statistical clerk	690	.10	5	9
Switchboard operator	370	.05	6	7
Switchboard operator/receptionist	2,120	.30	2	41
Typist	2,450	.35	3	20
Clerical supervisor, office or plant	2,690	.38	5	23
All other office clerical workers	3,010	.43	n.a.	n.a.
Plant clerical workers, total				
Plant clerical workers, total	21,410	3.06	n.a.	n.a.
Production clerk and/or coordinator	4,860	.70	3	41
Shipping packer	4,870	.70	4	22
Shipping and/or receiving clerk	5,320	.76	2	52
Weigher, recordkeeping	500	.07	8	3
Stock clerk, stockroom, warehouse or storage yard	4,030	.58	3	27
All other plant clerical workers	1,830	.26	n.a.	n.a.

See footnotes at end of table.

Table 10. Paper and allied products: Employment, relative error, and percent of establishments reporting selected occupations, April 1980—Continued

(SIC 26)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Sales occupations	16,540	2.37	n.a.	n.a.
Sales agent, associate, and/or representative	15,900	2.27	2	58
Sales clerk	640	.09	6	6

¹ Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

² Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A. n.a. Not available.

Printing and Publishing

Establishments in this industry perform any of the following operations: (1) Letterpress, lithography, gravure, or screen printing; (2) bookbinding, typesetting, engraving, photoengraving, and electrotyping; and (3) publishing newspapers, books, and periodicals, whether or not they do their own printing. These establishments employed nearly 1.3 million workers, or 6 percent of manufacturing and 15 percent of nondurable goods employment in 1980. One-third of the workers were in establishments publishing (or publishing and printing) newspapers; another one-third worked in establishments engaged in commercial printing; and less than one-tenth worked in establishments which publish (or publish and print) books and pamphlets.

Although still the largest occupational group in the printing and publishing industry, the 612,420 production and related workers accounted for less than half of total industry employment (table 11), a smaller pro-

portion than in any other manufacturing industry surveyed. Clerical workers accounted for 21 percent. Most of these were office clerical workers. Managers and officers made up 10 percent of industry employment; professional workers, another 10 percent; sales workers, 7 percent; service workers, 2 percent; and technical workers, 1 percent.

The five most populous occupations in printing and publishing are listed below:

	<i>Employment</i>	<i>Percent of industry employment</i>
Offset lithographic press operator, sheet, roll, or web fed	80,560	6.4
Sales agent, associate, and/or representative	73,730	5.9
Writer and/or editor	42,160	3.4
Reporters and correspondents	37,840	3.0
Typist	33,180	2.7

Table 11. Printing and publishing: Employment, relative error, and percent of establishments reporting selected occupations, May 1980

(SIC 27)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Total	1,254,300	100.00	--	--
Managers and officers	126,830	10.11	n.a.	89
Professional occupations	124,270	9.91	n.a.	n.a.
Engineers, total	2,010	.16	n.a.	n.a.
Electrical and electronic engineers	310	.02	14	1
Industrial engineer	900	.07	11	2
Mechanical engineer	500	.04	11	1
All other engineers	300	.02	n.a.	n.a.
Statistician	340	.03	12	1
Chemist	290	.02	27	(³)
Social scientist	160	.01	28	(³)
Systems analyst, electronic data processing	2,090	.17	6	3
Photographer	5,250	.42	2	7
Purchasing agent and/or buyer	2,390	.19	3	8
Accountants and auditors	4,630	.37	3	10
Commercial artist	11,480	.92	3	12
Writer and/or editor	42,160	3.36	2	24
Lawyer	280	.02	15	1
Librarian, professional	1,680	.13	7	3
Nurse, professional	190	.02	15	(³)
Personnel and labor relations specialists	1,750	.14	3	5
Reporters and correspondents	37,840	3.02	2	14
Designer	2,850	.23	7	3
Estimator, printing services	3,940	.31	3	9
All other professional workers	4,940	.39	n.a.	n.a.
Technical occupations	12,620	1.01	n.a.	n.a.
Computer programmer	4,250	.34	5	7
Engineering technicians, total	7,350	.59	n.a.	n.a.
Drafter	5,430	.43	6	7
Electrical and electronic technicians	1,600	.13	7	3
All other engineering technicians	320	.03	n.a.	n.a.
All other technicians	1,020	.08	n.a.	n.a.
Service occupations	20,980	1.67	n.a.	n.a.
Janitors, porters, and cleaners	15,570	1.24	2	26
Guards and doorkeepers	1,890	.15	7	2
Food service workers	740	.06	18	1
Supervisor, nonworking-service only	710	.06	7	2
All other service workers	2,070	.17	n.a.	n.a.
Production, maintenance, construction, repair, material handling and powerplant occupations	612,420	48.83	n.a.	n.a.
Mechanics and repairers, total	4,800	.38	n.a.	n.a.
Mechanic, automotive	640	.05	10	1
Mechanic, maintenance	3,530	.28	4	4
All other mechanics and repairers	630	.05	n.a.	n.a.
Developer and/or projection printer	1,460	.12	7	2
Truck driver	5,920	.47	7	6
Carpenter	550	.04	9	1
Crane, derrick, and hoist operators	130	.01	33	(³)
Delivery and/or route worker	29,310	2.34	6	25
Electrician	1,830	.15	5	3
Supervisor, nonworking	22,270	1.78	3	23
Industrial truck operator	4,700	.37	6	3
Inspector	4,530	.36	7	3
Machinist	2,060	.16	6	2
Maintenance repairer, general utility	3,460	.28	4	6
Helper, trades	3,030	.24	7	2
Oiler	220	.02	12	1
Order filler	4,930	.39	16	2
Painter, maintenance	250	.02	10	1
Plumber and/or pipefitter	260	.02	12	(³)
Production packager, hand or machine	15,470	1.23	5	5
Stationary engineer	280	.02	12	(³)

See footnotes at end of table.

Table 11. Printing and publishing: Employment, relative error, and percent of establishments reporting selected occupations, May 1980—Continued

(SIC 27)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Offset lithographic press operator, sheet, roll or web fed	80,560	6.42	1	52
Platemaker	12,190	.97	2	23
Stripper	23,240	1.85	2	25
Camera operator, printing	21,010	1.68	2	40
Strike-on machine operator	750	.06	12	1
Photolettering machine operator	1,430	.11	13	2
Bag machine operator	850	.07	15	1
Etcher and/or engraver	1,240	.10	11	1
Layboy tender	2,800	.22	12	1
Tester	410	.03	13	1
Vulcanizer, rubber plate	250	.02	22	(³)
Conveyor operator or tender	400	.03	18	(³)
Copy marker	2,260	.18	5	4
Copy cutter	600	.05	10	1
Hand compositor	15,610	1.24	4	17
Imposer and makeup arranger	6,290	.50	5	8
Linecasting machine operator	6,660	.53	6	9
Linecasting machine keyboard operator	3,430	.27	11	4
Linecasting machine tender	2,080	.17	8	3
Ludlow machine operator	410	.03	12	1
Monotype casting machine operator	350	.03	25	(³)
Monotype keyboard operator	960	.08	12	1
Pasteup worker	21,900	1.75	2	15
Phototypesetting machine keyboard operator	7,230	.58	4	6
Phototypesetting machine monitor	2,500	.20	6	3
Phototypesetter operator	5,270	.42	4	7
Proofreader, composed copy	14,680	1.17	2	22
Retoucher	1,680	.13	7	2
Electrotyper	280	.02	20	(³)
Photoengraver	7,070	.56	6	6
Stereotypers	810	.06	21	(³)
Flexographic press operator	1,630	.13	13	1
Gravure press operator, rotogravure or sheet fed	2,120	.17	13	1
Ink worker	970	.08	10	2
Letter press operator, sheet, roll or web fed	31,700	2.53	3	25
Letterset press operator, sheet, roll or web fed	2,690	.21	10	1
Proof press operator	930	.07	10	1
Steel die press operator	2,420	.19	11	1
Press assistants and feeders	25,960	2.07	3	16
Setter, bindery machines	5,500	.44	4	7
Mailer	15,960	1.27	5	10
Cutter machine	5,320	.42	4	7
Screen or stencil printer and/or setter	4,450	.35	9	3
Screen cutter and/or maker, non-photographic	640	.05	16	1
Screen maker, photographic process	860	.07	13	1
Bookbinder, hand	5,300	.42	6	5
Bookbinder, machine	22,950	1.83	3	18
Bindery worker, assembly	29,950	2.39	3	18
Bindery worker, stitching	8,290	.66	5	7
All other bindery workers	33,380	2.66	n.a.	n.a.
All other skilled craft and kindred workers	7,010	.56	n.a.	n.a.
All other operatives and semiskilled workers	17,900	1.43	n.a.	n.a.
All other laborers and unskilled workers	35,830	2.86	n.a.	n.a.
Clerical occupations	264,290	21.07	n.a.	n.a.
Office clerical workers, total	228,710	18.23	n.a.	n.a.
Addressing machine operator	710	.06	8	2
Bookkeeping and/or billing machine operator	1,870	.15	4	4
Computer operator	3,570	.28	4	6
Keypunch operator	4,650	.37	4	5
Peripheral EDP equipment operator	530	.04	11	1
Inserting and/or labeling machine operator	3,700	.29	10	2
All other office machine operators	1,250	.10	n.a.	n.a.

See footnotes at end of table.

Table 11. Printing and publishing: Employment, relative error, and percent of establishments reporting selected occupations, May 1980—Continued

(SIC 27)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Office clerical workers—Continued				
Stenographer	1,540	0.12	10	2
Accounting clerk	10,420	.83	3	15
Bookkeeper, hand	21,680	1.73	2	47
Cashier	1,350	.11	7	3
File clerk	4,610	.37	5	6
General office clerk	32,780	2.61	4	31
Order clerk	8,060	.64	4	6
Payroll and/or timekeeping clerk	3,110	.25	3	9
Personnel clerk	1,390	.11	3	4
Procurement clerk	780	.06	10	2
Receptionist	1,710	.14	4	5
Secretary	31,280	2.49	2	42
Statistical clerk	1,340	.11	7	2
Switchboard operator	1,920	.15	3	4
Switchboard operator/receptionist	3,190	.25	2	11
Messenger	5,590	.45	3	6
Typist	33,180	2.65	3	36
Clerical supervisor, office or plant	7,540	.60	3	8
Circulation clerk	9,250	.74	4	7
Classified-ad clerk, newspaper	3,170	.25	5	4
Customer service representative, printing and publishing	8,370	.67	4	8
Telephone ad-taker, newspaper	10,210	.81	5	5
All other office clerical workers	9,960	.79	n.a.	n.a.
Plant clerical workers, total	35,580	2.84	n.a.	n.a.
Production clerk and/or coordinator	6,480	.52	3	9
Shipping packer	8,510	.68	4	7
Shipping and/or receiving clerk	13,320	1.06	2	25
Stock clerk, stockroom, warehouse or storage yard	3,930	.31	7	6
All other plant clerical workers	3,340	.27	n.a.	n.a.
Sales occupations	92,890	7.41	n.a.	n.a.
Sales agent, associate, and/or representative	73,730	5.88	2	52
Sales clerk	2,960	.24	13	2
All other sales workers	16,200	1.29	n.a.	n.a.

¹ Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

² Relative standard errors apply equally to data on estimated

employment and percent of total employment; relative standard errors estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

³ Rounded to zero.

n.a. Not available.

Chemicals and Allied Products

Establishments which produce basic chemicals and manufacture products by predominantly chemical processes employed 1.1 million workers, accounting for 6 percent of manufacturing and 14 percent of nondurable goods employment in 1980. Of these workers, 19 percent worked in establishments producing plastics materials and synthetic resins, synthetic rubber, and synthetic and other manmade fibers, except glass; 18 percent worked in establishments manufacturing, fabricating, or processing medicinal chemicals and pharmaceutical products; and 16 percent worked in establishments manufacturing industrial organic chemicals.

As shown in table 12, the 587,520 production and related workers in the chemical and allied products industry accounted for just over half—53 percent—of total industry employment. Clerical workers ranked sec-

ond with 15 percent. Four-fifths of these were office clerical workers. The remaining employment was distributed as follows: Professional workers, 12 percent; managers and officers, 10 percent; technical workers, 5 percent; sales workers, 3 percent; and service workers, 2 percent.

The five most populous occupations in manufacturing chemicals and allied products are listed in the tabulation below:

	<i>Employment</i>	<i>Percent of industry employment</i>
Production packager, hand or machine	60,600	5.4
Supervisor, nonworking	49,050	4.4
Chemical operator A	47,800	4.3
Secretary	37,570	3.4
Sales agent, associate, and/or representative	33,700	3.0

Table 12. Chemicals and allied products: Employment, relative error, and percent of establishments reporting selected occupations, June 1980

(SIC 28)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Total	1,116,820	100.00	--	--
Managers and officers	110,000	9.85	n.a.	95
Professional occupations	137,650	12.33	n.a.	n.a.
Engineers, total	41,490	3.72	n.a.	n.a.
Chemical engineer	19,050	1.71	4	23
Civil engineer	1,020	.09	9	4
Electrical and electronic engineers	2,970	.27	7	8
Industrial engineer	3,990	.36	5	12
Mechanical engineer	8,630	.77	6	18
Safety engineer	1,600	.14	4	11
All other engineers	4,230	.38	n.a.	n.a.
Mathematical scientists	2,080	.19	9	4
Chemist	32,880	2.94	3	50
Agricultural scientist	480	.04	16	1
Biological scientist	6,120	.55	7	6
Medical scientist	1,950	.17	14	2
All other natural and mathematical scientists	1,840	.16	17	2
Social scientist	130	.01	26	(³)
Systems analyst, electronic data processing	5,880	.53	6	10
Purchasing agent and/or buyer	5,590	.50	3	30
Accountants and auditors	12,800	1.15	4	35
Commercial artist	1,190	.11	12	4
Writer and/or editor	1,260	.11	8	4
Lawyer	1,660	.15	9	4
Nurse, professional	1,410	.13	3	10
Personnel and labor relations specialists	5,240	.47	4	20
Designer	1,150	.10	10	3
All other professional workers	14,500	1.30	n.a.	n.a.
Technical occupations	58,990	5.28	n.a.	n.a.
Computer programmer	4,050	.36	5	11
Engineering technicians, total	13,450	1.20	n.a.	n.a.
Drafter	3,500	.31	10	11
Electrical and electronic technicians	2,390	.21	8	4
Industrial engineering technician	770	.07	11	3
All other engineering technicians	6,790	.61	n.a.	n.a.
Physical science technician	16,660	1.49	5	10
Biological science technician	8,520	.76	9	5
All other science technicians	9,100	.81	n.a.	n.a.
All other technicians	7,210	.65	n.a.	n.a.
Service occupations	24,700	2.21	n.a.	n.a.
Janitors, porters, and cleaners	13,860	1.24	3	33
Guards and doorkeepers	6,710	.60	5	11
Food service workers	1,260	.11	12	2
Supervisor, nonworking-service only	1,190	.11	6	5
All other service workers	1,680	.15	n.a.	n.a.
Production, maintenance, construction, repair, material handling and powerplant occupations	587,520	52.61	n.a.	n.a.
Mechanics and repairers, total	34,580	3.10	n.a.	n.a.
Mechanic, automotive	2,060	.18	5	7
Mechanic, maintenance	27,070	2.42	3	23
Refrigeration mechanic and/or air conditioning mechanic	1,090	.10	8	3
All other mechanics and repairers	4,360	.39	n.a.	n.a.
Truck driver	10,550	.94	3	30
Asbestos and insulation workers	1,170	.10	13	1
Boilermaker	1,230	.11	10	2
Carpenter	3,190	.29	5	8
Crane, derrick, and hoist operators	1,400	.13	10	3
Delivery and/or route worker	1,940	.17	8	6
Extractor operator and/or extractor plant operator	1,920	.17	12	2
Electrician	11,630	1.04	3	18
Supervisor, nonworking	49,050	4.39	2	43

See footnotes at end of table.

Table 12. Chemicals and allied products: Employment, relative error, and percent of establishments reporting selected occupations, June 1980—Continued

(SIC 28)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Rigger	1,550	0.14	11	2
Industrial truck operator	15,150	1.36	3	27
Inspector	11,890	1.06	5	16
Instrument repairer	8,630	.77	4	11
Loader, tank cars and/or trucks	4,260	.38	6	8
Machinist	8,230	.74	5	13
Maintenance repairer, general utility	17,660	1.58	3	36
Helper, trades	3,470	.31	5	8
Millwright	6,840	.61	7	4
Oiler	1,130	.10	5	5
Order filler	7,740	.69	5	16
Painter, maintenance	2,720	.24	5	8
Plumber and/or pipefitter	10,580	.95	5	7
Press operator and/or plate printer	900	.08	11	2
Production packager, hand or machine	60,600	5.43	3	38
Sandblaster and/or shotblaster	190	.02	25	(³)
Sheet metal worker	1,680	.15	8	3
Stationary boiler firer	2,180	.20	5	5
Stationary engineer	3,580	.32	8	5
Animal caretaker	1,220	.11	11	2
Welder and/or flamecutter	4,550	.41	5	8
Ampule filling, sealing and/or washing operators .	1,850	.17	9	2
Beam warper tenders, automatic and/or beamers	2,240	.20	15	(³)
Bobbin sorter	500	.04	28	(³)
Calciner operator	460	.04	12	1
Carbon black maker	540	.05	19	(³)
Chemical operator A	47,800	4.28	3	20
Chemical operator B	22,720	2.03	4	14
Chemical operator helper	14,870	1.33	4	16
Coater, pill	1,180	.11	21	2
Compressor, tablet	1,140	.10	8	2
Bath maker	200	.02	26	(³)
Creeler, yarn	2,070	.19	13	1
Doffer	3,140	.28	18	(³)
Draw machine operator	6,490	.58	13	1
Evaporator operator, chemical	1,190	.11	13	2
Fireworks maker	840	.08	27	(³)
Furnace and/or burner tender	1,170	.10	11	1
Glue or gelatin maker	150	.01	26	(³)
Graining press operator	520	.05	40	(³)
Granulator machine operator	1,320	.12	8	2
Kettle operator, adhesive	1,030	.09	13	1
Kettle worker, soap	190	.02	13	1
Molder, machine	1,230	.11	30	1
Sampler and/or test preparer	770	.07	10	2
Sheeter operator, plastics	380	.03	29	(³)
Spinner, synthetic filaments	10,250	.92	11	1
Sterilizer	790	.07	10	1
Still operator, batch or continuous	2,980	.27	22	2
Tester	7,850	.70	5	11
Twister tender	920	.08	19	(³)
Varnish maker	450	.04	11	1
Texturizer and/or crimp setter	1,010	.09	18	(³)
Yarn winder	960	.09	16	(³)
Conveyor operator or tender	1,390	.12	12	2
Drier operator, chemicals, plastic resins, and rubber	3,010	.27	13	3
Chief operator	13,180	1.18	5	12
Waste treatment plant operator, chemicals	1,630	.15	5	4
Electrolytic cell maker and/or repairer	600	.05	13	1
Staple cutter	1,460	.13	18	(³)
Purification operator and/or monomer purification operator	810	.07	12	1
Weigher, production	2,090	.19	7	5

See footnotes at end of table.

Table 12. Chemicals and allied products: Employment, relative error, and percent of establishments reporting selected occupations, June 1980—Continued

(SIC 28)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Cutter machine	1,130	0.10	13	1
Grinder operator, chemicals, plastics, rubber, and related materials	5,380	.48	5	12
Calender operator, plastics or rubber	370	.03	23	1
Extruder operator, plastics or rubber	2,980	.27	7	3
Extruder operator helper, plastics or rubber	700	.06	12	1
Filter and/or filter press operator	1,670	.15	8	2
Pump operator	1,520	.14	7	5
Pulverizer and drier tender	150	.01	15	(³)
Tinter	2,820	.25	5	11
Mixer and/or blender, chemicals and chemical products	24,130	2.16	2	46
All other skilled craft and kindred workers	10,330	.92	n.a.	n.a.
All other operatives and semiskilled workers	38,000	3.40	n.a.	n.a.
All other laborers and unskilled workers	43,560	3.90	n.a.	n.a.
Clerical occupations	162,670	14.57	n.a.	n.a.
Office clerical workers, total	130,470	11.68	n.a.	n.a.
Bookkeeping and/or billing machine operator ..	820	.07	7	4
Computer operator	3,250	.29	4	15
Keypunch operator	4,230	.38	4	14
Peripheral EDP equipment operator	1,120	.10	7	4
All other office machine operators	1,470	.13	n.a.	n.a.
Stenographer	4,590	.41	8	8
Accounting clerk	14,240	1.28	3	40
Bookkeeper, hand	2,600	.23	4	19
Cashier	440	.04	7	4
File clerk	1,850	.17	6	9
General office clerk	17,500	1.57	4	38
Order clerk	7,750	.69	3	32
Payroll and/or timekeeping clerk	2,550	.23	2	21
Personnel clerk	2,320	.21	3	16
Procurement clerk	2,210	.20	3	15
Receptionist	850	.08	5	6
Secretary	37,570	3.36	4	61
Statistical clerk	1,210	.11	6	5
Switchboard operator	1,010	.09	4	7
Switchboard operator/receptionist	1,910	.17	2	23
Typist	7,550	.68	3	25
Clerical supervisor, office or plant	5,230	.47	4	14
All other office clerical workers	8,200	.73	n.a.	n.a.
Plant clerical workers, total	32,200	2.88	n.a.	n.a.
Production clerk and/or coordinator	5,070	.45	4	17
Shipping packer	8,160	.73	6	22
Shipping and/or receiving clerk	8,290	.74	3	41
Weigher, recordkeeping	350	.03	8	2
Stock clerk, stockroom, warehouse or storage yard	7,480	.67	3	26
All other plant clerical workers	2,850	.26	n.a.	n.a.
Sales occupations	35,290	3.16	n.a.	n.a.
Sales agent, associate, and/or representative	33,700	3.02	4	46
Sales clerk	1,590	.14	8	4

¹ Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

² Relative standard errors apply equally to data on estimated

employment and percent of total employment; relative standard errors estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

³ Rounded to zero.

n.a. Not available.

Petroleum Refining and Related Industries

Establishments which refine petroleum, manufacture paving and roofing materials, and compound lubricating oils and greases from purchased materials employed 202,640 workers in 1980 or only 1 percent of manufacturing and 3 percent of nondurable goods employment. Nearly four-fifths of these workers were engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, and other products from crude petroleum and its fractionation products.

The 127,290 production and related workers in this industry (table 13) accounted for 63 percent of total industry employment. Clerical workers ranked second with 11 percent. Most of these were office clerical workers. Professionals accounted for 9 percent; man-

agers and officers, 7 percent; sales workers, 5 percent; technical workers, 3 percent; and service workers, 2 percent of total industry employment.

The five most populous occupations in manufacturing refined petroleum and related products are listed in the tabulation below:

	<i>Employment</i>	<i>Percent of industry employment</i>
Refinery operator, petroleum	13,710	6.8
Supervisor, nonworking	12,790	6.3
Sales agent, associate, and/or representative	8,690	4.3
Refinery operator helper, petroleum	6,000	3.0
Plumber and/or pipefitter	5,570	2.8

Table 13. Petroleum refining and related industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1980

(SIC 29)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Total	202,690	100.00	--	--
Managers and officers	14,790	7.30	n.a.	93
Professional occupations	19,030	9.39	n.a.	n.a.
Engineers, total	9,160	4.52	n.a.	n.a.
Chemical engineer	3,710	1.83	11	18
Civil engineer	450	.22	16	7
Electrical and electronic engineers	440	.22	12	10
Industrial engineer	520	.26	19	8
Mechanical engineer	2,310	1.14	11	16
Petroleum engineer	460	.23	24	3
Safety engineer	400	.20	12	12
All other engineers	870	.43	n.a.	n.a.
Chemist	2,140	1.06	10	28
Geologists and geophysicists	320	.16	40	2
All other natural and mathematical scientists	80	.04	31	1
Systems analyst, electronic data processing	740	.37	25	8
Purchasing agent and/or buyer	810	.40	6	26
Accountants and auditors	2,300	1.13	12	30
Lawyer	200	.10	23	3
Nurse, professional	200	.10	11	6
Personnel and labor relations specialists	1,230	.61	22	17
All other professional workers	1,850	.91	n.a.	n.a.
Technical occupations	6,290	3.10	n.a.	n.a.
Computer programmer	380	.19	17	8
Engineering technicians, total	2,840	1.40	n.a.	n.a.
Drafter	780	.38	10	12
Electrical and electronic technicians	280	.14	19	5
All other engineering technicians	1,780	.88	n.a.	n.a.
Science technicians	1,950	.96	13	14
All other technicians	1,120	.55	n.a.	n.a.
Service occupations	3,080	1.52	n.a.	n.a.
Janitors, porters, and cleaners	840	.41	8	21
Guards and doorkeepers	1,060	.52	10	11
Food service workers	140	.07	46	1
Supervisor, nonworking-service only	100	.05	18	3
All other service workers	940	.46	n.a.	n.a.
Production, maintenance, construction, repair, material handling and powerplant occupations	127,290	62.80	n.a.	n.a.
Mechanics and repairers, total	5,650	2.79	n.a.	n.a.
Mechanic, automotive	1,080	.53	8	20
Engineering equipment mechanic	220	.11	14	5
Mechanic, maintenance	3,490	1.72	12	17
All other mechanics and repairers	860	.42	n.a.	n.a.
Truck driver	4,840	2.39	6	34
Asbestos and insulation workers	740	.37	12	6
Boilermaker	1,890	.93	15	5
Carpenter	990	.49	12	11
Crane, derrick, and hoist operators	510	.25	16	7
Delivery and/or route worker	410	.20	15	8
Extractor operator and/or extractor plant operator	420	.21	43	1
Electrician	2,610	1.29	8	20
Supervisor, nonworking	12,790	6.31	7	45
Gager	1,160	.57	12	8
Heavy equipment operator	1,880	.93	7	22
Rigger	310	.15	19	3
Industrial truck operator	2,510	1.24	6	20
Inspector	830	.41	12	13
Instrument repairer	2,260	1.12	11	11
Loader, tank cars and/or trucks	1,640	.81	7	19
Machinist	3,890	1.92	11	14
Maintenance repairer, general utility	3,320	1.64	10	28

See footnotes at end of table.

Table 13. Petroleum refining and related industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1980—Continued

(SIC 29)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Helper, trades	2,700	1.33	15	12
Millwright	260	.13	16	2
Oiler	180	.09	10	6
Order filler	730	.36	12	8
Painter, maintenance	800	.39	17	8
Plumber and/or pipefitter	5,570	2.75	11	13
Production packager, hand or machine	2,970	1.47	9	15
Stationary boiler firer	690	.34	10	9
Stationary engineer	760	.37	17	4
Welder and/or flamecutter	2,580	1.27	10	21
Asphalt blender	430	.21	11	9
Asphalt mixing machine tender	200	.10	13	7
Asphalt plant drier operator	160	.08	13	5
Asphalt-plant operator	960	.47	9	20
Chemical operator A	4,100	2.02	22	6
Chemical operator B	1,470	.73	18	5
Chemical operator helper	870	.43	20	4
Compounder	1,630	.80	9	19
Control panel operator, petroleum	2,200	1.09	14	7
Dispatcher, refinery	430	.21	18	5
Firer, petroleum refining	510	.25	38	3
Greasemaker	250	.12	15	4
Instrument fitter	330	.16	24	2
Roof cement and paint maker	170	.08	14	4
Sampler and/or test preparer	220	.11	12	5
Slitting machine operator	90	.04	23	2
Refinery operator, petroleum	13,710	6.76	8	17
Refinery operator helper, petroleum	6,000	2.96	11	11
Still operator, asphalt	490	.24	10	8
Tester	2,650	1.31	9	14
Treater	530	.26	13	4
Coater, roofing felt	1,270	.63	11	8
Chief operator	2,410	1.19	15	7
Cutter machine	190	.09	12	4
Winder, roofing felt	270	.13	9	6
Filter and/or filter press operator	170	.08	21	1
Pump operator	1,740	.86	12	11
Pump operator helper	830	.41	23	4
All other skilled craft and kindred workers	1,900	.94	n.a.	n.a.
All other operatives and semiskilled workers	5,540	2.73	n.a.	n.a.
All other laborers and unskilled workers	9,680	4.78	n.a.	n.a.
Clerical occupations	23,040	11.37	n.a.	n.a.
Office clerical workers, total	19,720	9.73	n.a.	n.a.
Bookkeeping and/or billing machine operator ..	260	.13	17	9
Computer operator	460	.23	13	12
Keypunch operator	790	.39	19	10
Peripheral EDP equipment operator	160	.08	20	3
All other office machine operators	260	.13	n.a.	n.a.
Stenographer	840	.41	20	8
Accounting clerk	2,660	1.31	11	30
Bookkeeper, hand	410	.20	15	14
File clerk	290	.14	17	7
General office clerk	3,410	1.68	18	33
Order clerk	520	.26	8	15
Payroll and/or timekeeping clerk	600	.30	9	22
Personnel clerk	380	.19	13	11
Procurement clerk	310	.15	10	10
Receptionist	180	.09	11	9
Secretary	3,370	1.66	12	42
Statistical clerk	430	.21	17	7
Switchboard operator	180	.09	12	7
Switchboard operator/receptionist	350	.17	5	20
Typist	840	.41	12	13

See footnotes at end of table.

Table 13. Petroleum refining and related industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1980—Continued

(SIC 29)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Office clerical workers —Continued				
Clerical supervisor, office or plant	600	0.30	8	17
All other office clerical workers	2,420	1.19	n.a.	n.a.
Plant clerical workers, total	3,320	1.64	n.a.	n.a.
Production clerk and/or coordinator	540	.27	14	15
Shipping packer	250	.12	19	5
Shipping and/or receiving clerk	540	.27	8	16
Weigher, recordkeeping	150	.07	13	5
Stock clerk, stockroom, warehouse or storage yard	1,260	.62	9	19
Dispatcher, vehicle, service or work	390	.19	10	13
All other plant clerical workers	190	.09	n.a.	n.a.
Sales occupations	9,170	4.52	n.a.	n.a.
Sales agent, associate, and/or representative	8,690	4.29	12	40
Sales clerk	480	.24	18	6

¹ Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

² Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A. n.a. Not available.

Rubber and Miscellaneous Plastics Products

This industry includes establishments which manufacture tires, rubber footwear, mechanical rubber goods, heels and soles, flooring, and rubber sundries; establishments which engage in molding primary plastics for the trade; and those manufacturing miscellaneous finished plastics products. The industry employed 710,990 workers in 1980, or 4 percent of manufacturing and 9 percent of nondurable goods workers. Of the industry's employees, 62 percent worked in establishments molding primary plastics or fabricating miscellaneous finished plastics products. Establishments manufacturing tires and inner tubes employed 17 percent; establishments manufacturing industrial and mechanical rubber goods, rubberized fabrics and vulcanized rubber clothing, and miscellaneous rubber specialties and sundries employed 14 percent.

As shown in table 14, the industry's 534,150 production and related workers accounted for three-fourths of

total industry employment. Clerical workers, mostly office workers, ranked second with 10 percent. The remaining employment was distributed as follows: Managers and officers, 7 percent; professional workers, 4 percent; and technical, service, and sales workers, about 2 percent each.

The five most populous occupations in manufacturing rubber and miscellaneous plastics products are listed in the tabulation below. These jobs, all production occupations, made up one-fourth of total industry employment.

	<i>Employment</i>	<i>Percent of industry employment</i>
Compression and/or injection molding		
machine operator, plastics	62,430	8.8
Assembler	36,520	5.1
Supervisor, nonworking	29,680	4.2
Production packager, hand or machine	23,110	3.3
Inspector	22,780	3.2

Table 14. Rubber and miscellaneous plastics products: Employment, relative error, and percent of establishments reporting selected occupations, June 1980

(SIC 30)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Total	710,990	100.00	--	--
Managers and officers	45,860	6.45	n.a.	96
Professional occupations	28,880	4.06	n.a.	n.a.
Engineers, total	11,810	1.66	n.a.	n.a.
Chemical engineer	1,980	.28	24	7
Electrical and electronic engineers	800	.11	16	5
Industrial engineer	2,570	.36	5	15
Mechanical engineer	3,860	.54	14	18
All other engineers	2,600	.37	n.a.	n.a.
Mathematical scientists	120	.02	22	1
Chemist	2,700	.38	21	10
Systems analyst, electronic data processing	1,510	.21	30	5
Purchasing agent and/or buyer	2,780	.39	6	28
Accountants and auditors	4,900	.69	3	33
Nurse, professional	400	.06	6	4
Personnel and labor relations specialists	1,780	.25	7	18
Designer	990	.14	8	7
All other professional workers	1,890	.27	n.a.	n.a.
Technical occupations	12,190	1.71	n.a.	n.a.
Computer programmer	1,380	.19	21	8
Engineering technicians, total	5,400	.76	n.a.	n.a.
Drafter	1,740	.24	8	13
Industrial engineering technician	760	.11	14	5
All other engineering technicians	2,900	.41	n.a.	n.a.
Science technicians	2,860	.40	9	7
All other technicians	2,550	.36	n.a.	n.a.
Service occupations	11,420	1.61	n.a.	n.a.
Janitors, porters, and cleaners	8,460	1.19	4	40
Guards and doorkeepers	1,500	.21	7	5
Food service workers	80	.01	27	1
Supervisor, nonworking-service only	460	.06	13	3
All other service workers	920	.13	n.a.	n.a.
Production, maintenance, construction, repair, material handling and powerplant occupations	534,150	75.13	n.a.	n.a.
Mechanics and repairers, total	12,960	1.82	n.a.	n.a.
Mechanic, automotive	410	.06	10	3
Mechanic, maintenance	11,390	1.60	4	22
All other mechanics and repairers	1,160	.16	n.a.	n.a.
Truck driver	4,030	.57	5	23
Carpenter	710	.10	13	5
Compositor and/or typesetter	130	.02	25	1
Crane, derrick, and hoist operators	140	.02	19	1
Delivery and/or route worker	820	.12	16	4
Electrician	4,190	.59	5	15
Supervisor, nonworking	29,680	4.17	3	56
Industrial truck operator	12,640	1.78	5	23
Inspector	22,780	3.20	3	44
Instrument repairer	870	.12	20	2
Machinist	7,970	1.12	5	25
Maintenance repairer, general utility	11,060	1.56	4	41
Helper, trades	2,220	.31	8	8
Millwright	1,330	.19	12	2
Oiler	960	.14	7	5
Order filler	4,190	.59	10	12
Painter, maintenance	300	.04	12	2
Plumber and/or pipefitter	1,720	.24	11	3
Press operator and/or plate printer	1,730	.24	16	3
Production packager, hand or machine	23,110	3.25	5	21
Sewing machine operator, regular equipment- nongarment	5,930	.83	10	4
Sewing machine operator, special and/or automatic equipment-nongarment	2,010	.28	16	1

See footnotes at end of table.

Table 14. Rubber and miscellaneous plastics products: Employment, relative error, and percent of establishments reporting selected occupations, June 1980—Continued

(SIC 30)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Sheet metal worker	520	0.07	15	2
Stationary boiler firer	740	.10	9	4
Stationary engineer	560	.08	12	2
Skiver	300	.04	19	1
Tool and die maker	6,340	.89	5	21
Welder and/or flamecutter	1,090	.15	8	6
Trimmer, machine	2,430	.34	7	5
Band builder	970	.14	29	(³)
Bead flipper	1,060	.15	12	1
Bead forming machine operator	730	.10	16	1
Belt builder	1,400	.20	25	1
Bias machine operator	1,780	.25	11	2
Braiding machine tender	980	.14	10	1
Buffer, shoe parts	250	.04	17	1
Chemical operator A	1,240	.17	20	2
Chemical operator B	660	.09	25	1
Chemical operator helper	1,140	.16	25	2
Curer, rubber goods	1,790	.25	9	3
Die cutter and/or clicking machine operator	2,020	.28	11	5
Dipping machine operator	980	.14	13	1
Fabricator, plastics	4,980	.70	9	7
Pilling machine operator	530	.07	21	2
Finisher, hand	9,490	1.33	7	13
Finisher, machine	1,150	.16	14	3
Hose loader	500	.07	18	(³)
Hose maker	670	.09	15	1
Inker, hand or machine	190	.03	35	1
Lead press operator	120	.02	17	(³)
Lead stripping machine operator	110	.02	16	(³)
Rubber mill operator	4,980	.70	6	10
Patternmaker, plastics	530	.07	13	3
Press operator, devulcanized scrap rubber	250	.04	24	(³)
Refiner operator, rubber	380	.05	19	1
Plastics repairer	830	.12	18	2
Roller builder, rubber	330	.05	26	1
Rubber goods cutter finisher	3,640	.51	7	6
Rubber grinder finisher	1,000	.14	17	1
Sawyer, plastics	960	.14	16	2
Slitting machine operator	3,600	.51	10	10
Splicer	1,270	.18	13	1
Splitting machine tender	150	.02	21	1
Stripper	1,060	.15	10	2
Tester	2,230	.31	7	8
Thermalasting machine operator	200	.03	29	(³)
Tire bagging machine tender	210	.03	33	(³)
Tire builder	16,740	2.35	8	1
Tire finisher	1,360	.19	19	1
Tire layer and extractor	1,220	.17	15	1
Tire repairer	1,030	.14	10	1
Trimmer, plastics	2,090	.29	12	3
Splicer	1,420	.20	19	1
Vulcanizer, footwear	280	.04	20	(³)
Watchcase vulcanizer tender	730	.10	22	(³)
Press tender, rubber goods	9,020	1.27	4	8
Painter, production	4,030	.57	12	7
Compression and/or injection molding machine operator, plastics	62,430	8.78	3	34
Conveyor operator or tender	1,270	.18	15	2
Setter, plastic molding machine	6,900	.97	5	17
Punch press operator, plastics	2,350	.33	12	3
Drier operator, chemicals, plastic resins, and rubber	1,190	.17	24	3
Mold cleaner, tire	800	.11	10	2
Chief operator	660	.09	15	2

See footnotes at end of table.

Table 14. Rubber and miscellaneous plastics products: Employment, relative error, and percent of establishments reporting selected occupations, June 1980—Continued

(SIC 30)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Weigher, production	2,420	0.34	7	9
Cutter machine	2,620	.37	11	6
Embossing, stamping, and/or marking machine operator	2,290	.32	12	4
Grinder operator, chemicals, plastics, rubber, and related materials	4,300	.60	7	15
Calender operator, plastics or rubber	2,660	.37	7	7
Extruder operator, plastics or rubber	19,580	2.75	5	24
Extruder operator helper, plastics or rubber	11,220	1.58	7	13
Heat sealer	2,310	.32	13	3
Pipe and tank liner	190	.03	33	(³)
Assembler	36,520	5.14	5	23
Calender operator helper, plastics or rubber	2,350	.33	9	4
Mixer and/or blender, chemicals and chemical products	7,300	1.03	5	24
Bagger plastics	600	.08	32	1
Blow molding machine operator	5,930	.83	9	5
Caster, plastics	640	.09	17	1
Laminator, preforms	6,460	.91	10	7
Press operator, plastics	4,860	.68	10	6
Rotation molding machine operator	1,130	.16	17	1
Vacuum plastic forming machine operator	3,990	.56	10	5
All other skilled craft and kindred workers	6,000	.84	n.a.	n.a.
All other operatives and semiskilled workers	25,720	3.62	n.a.	n.a.
All other laborers and unskilled workers	53,720	7.56	n.a.	n.a.
Clerical occupations	67,470	9.49	n.a.	n.a.
Office clerical workers, total	42,540	5.98	n.a.	n.a.
Bookkeeping and/or billing machine operator ..	480	.07	9	5
Computer operator	1,520	.21	13	12
Keypunch operator	1,700	.24	12	9
All other office machine operators	280	.04	n.a.	n.a.
Stenographer	1,050	.15	35	4
Accounting clerk	3,910	.55	5	24
Bookkeeper, hand	1,070	.15	5	12
File clerk	540	.08	10	5
General office clerk	7,500	1.05	4	41
Order clerk	2,390	.34	5	15
Payroll and/or timekeeping clerk	1,910	.27	4	21
Personnel clerk	1,110	.16	3	15
Procurement clerk	820	.12	5	10
Receptionist	510	.07	7	6
Secretary	9,500	1.34	4	50
Statistical clerk	720	.10	14	6
Switchboard operator	350	.05	8	5
Switchboard operator/receptionist	1,500	.21	2	22
Typist	2,180	.31	13	11
Clerical supervisor, office or plant	1,620	.23	6	12
All other office clerical workers	1,880	.26	n.a.	n.a.
Plant clerical workers, total	24,930	3.51	n.a.	n.a.
Production clerk and/or coordinator	4,000	.56	4	23
Shipping packer	9,800	1.38	6	35
Shipping and/or receiving clerk	6,290	.88	2	48
Weigher, recordkeeping	170	.02	13	2
Stock clerk, stockroom, warehouse or storage yard	3,640	.51	4	20
All other plant clerical workers	1,030	.14	n.a.	n.a.
Sales occupations	11,020	1.55	n.a.	n.a.
Sales agent, associate, and/or representative	10,280	1.45	3	38
Sales clerk	740	.10	15	4

¹ Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

² Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

³ Rounded to zero.

Leather and Leather Products

Establishments which tan, curry, and finish hides and skins or manufacture finished leather and artificial leather products employed 236,190 workers in 1980, or only 1 percent of manufacturing and 3 percent of non-durable goods employment. Establishments manufacturing footwear (except rubber) employed 62 percent of the industry's workers, compared with 13 percent in establishments manufacturing handbags and other personal leather goods, and 8 percent in establishments engaged in tanning, currying, and finishing leather.

The 190,440 production and related workers in the industry (table 15) accounted for four-fifths of total industry employment. Clerical workers accounted for 10 percent. The remaining employment was distributed as follows: Managers and officers, 4 percent; sales workers,

2 percent; professional and service workers, 1 percent each; and technical workers, 0.3 percent.

The five most populous occupations in the industry, all production jobs, are listed in the tabulation below. These occupations made up more than one-fourth of total industry employment.

	<i>Employment</i>	<i>Percent of industry employment</i>
Stitcher, standard machine	20,590	8.7
Sewing machine operator, regular equipment-nongarment	16,990	7.2
Die cutter and/or clicking machine operator	9,690	4.1
Assembler	7,880	3.3
Sewing machine operator, special and/or automatic equipment-nongarment	5,820	2.5

Table 15. Leather and leather products: Employment, relative error, and percent of establishments reporting selected occupations, April 1980

(SIC 31)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Total	236,190	100.00	--	--
Managers and officers	9,130	3.87	n.a.	89
Professional occupations	3,390	1.44	n.a.	n.a.
Engineers, total	600	.25	n.a.	n.a.
Industrial engineer	450	.19	6	12
Mechanical engineer	150	.06	10	5
Systems analyst, electronic data processing	180	.08	13	4
Purchasing agent and/or buyer	660	.28	4	21
Accountants and auditors	820	.35	7	22
Personnel and labor relations specialists	320	.14	5	12
Designer	600	.25	5	15
All other professional workers	210	.09	n.a.	n.a.
Technical occupations	720	.30	n.a.	n.a.
Computer programmer	270	.11	11	6
Engineering technicians	300	.13	26	5
All other technicians	150	.06	n.a.	n.a.
Service occupations	3,030	1.28	n.a.	n.a.
Janitors, porters, and cleaners	2,020	.86	2	40
Guards and doorkeepers	440	.19	6	7
Food service workers	100	.04	10	3
Supervisor, nonworking-service only	330	.14	11	4
All other service workers	140	.06	n.a.	n.a.
Production, maintenance, construction, repair, material handling and powerplant occupations	190,440	80.63	n.a.	n.a.
Mechanics and repairers, total	1,030	.44	n.a.	n.a.
Mechanic, maintenance	860	.36	5	13
All other mechanics and repairers	170	.07	n.a.	n.a.
Presser, hand	70	.03	20	1
Presser, machine	260	.11	13	4
Truck driver	550	.23	5	13
Carpenter	180	.08	10	5
Delivery and/or route worker	120	.05	13	4
Electrician	230	.10	7	8
Supervisor, nonworking	5,800	2.46	3	48
Industrial truck operator	520	.22	5	9
Inspector	4,430	1.88	3	33
Machinist	760	.32	5	14
Maintenance repairer, general utility	1,680	.71	4	25
Helper, trades	430	.18	9	6
Order filler	1,250	.53	8	12
Production packager, hand or machine	4,150	1.76	4	34
Sewing machine operator, regular equipment-nongarment	16,990	7.19	4	44
Sewing machine operator, special and/or automatic equipment-nongarment	5,820	2.46	8	21
Stationary boiler firer	120	.05	8	2
Skiver	2,780	1.18	3	33
Trimmer, machine	2,250	.95	4	22
Assembler for puller-over, hand or machine	1,920	.81	5	15
Bed laster	950	.40	6	9
Bottom filler	610	.26	6	12
Buffer, hides or skins	500	.21	7	6
Buffer, shoe parts	1,370	.58	5	15
Burnisher	450	.19	7	10
Case maker	1,000	.42	14	7
Cementer, machine joiner	2,450	1.04	5	15
Perforator operator	1,130	.48	5	15
Cobbler	830	.35	6	10
Die cutter and/or clicking machine operator	9,690	4.10	2	57
Flamer	550	.23	6	13
Floor worker, footwear	4,770	2.02	4	26

See footnotes at end of table.

Table 15. Leather and leather products: Employment, relative error, and percent of establishments reporting selected occupations, April 1980—Continued

(SIC 31)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Folder, machine	910	0.39	7	10
Glove turner and former	200	.08	7	3
Glue spreading machine operator, luggage	630	.27	9	8
Harness maker	160	.07	20	2
Heel attacher	810	.34	4	14
Heel builder, hand or machine	350	.15	12	4
Heel seat laster, machine	620	.26	4	13
Heel seat fitter, machine	380	.16	8	6
Inker, hand or machine	1,040	.44	5	16
Laster, hand	1,350	.57	7	11
Lasting machine operator, hand method	290	.12	11	4
Belt maker, apparel	260	.11	30	1
Leather stamper, hand	160	.07	13	3
Leather worker	240	.10	27	2
Limer	220	.09	13	3
Tanning liquor maker	130	.06	10	3
Luggage maker	2,620	1.11	12	5
Measuring machine operator, leather	440	.19	9	6
Molder, fiberglass luggage	110	.05	13	1
Patternmaker	400	.17	8	8
Puller-over	410	.17	7	7
Repairer, finish	2,260	.96	4	19
Rough rounder, machine	660	.28	5	11
Saddle maker	130	.06	19	1
Seam rubbing machine operator	650	.28	5	12
Seasoner, machine	260	.11	9	3
Seasoning mixer	110	.05	10	2
Shoe parts sewer, hand	2,370	1.00	12	7
Shank piece tacker	470	.20	5	11
Side laster	970	.41	4	13
Sole leveler, machine	510	.22	10	8
Sorter, leather	1,700	.72	4	23
Splitting machine feeder	620	.26	6	7
Sprayer, hand and/or machine	1,600	.68	5	19
Stainer	550	.23	7	9
Staker, machine	470	.20	9	5
Stitcher, special machine	1,600	.68	8	11
Stitcher, standard machine	20,590	8.72	3	29
Stitcher, utility	3,120	1.32	6	17
Tacker, toggler, and paster	1,340	.57	6	6
Tanning drum operator and/or colorer, hides or skins	860	.36	5	7
Tester	140	.06	17	2
Thermalasting machine operator	420	.18	12	5
Toe laster	780	.33	5	10
Treer	1,590	.67	4	14
Vulcanizer, footwear	380	.16	17	2
Wringer machine operator	520	.22	6	6
Riveter, light	1,810	.77	7	17
Compression and/or injection molding machine operator, plastics	720	.30	12	4
Conveyor operator or tender	670	.28	5	11
Vamp creaser	370	.16	9	7
Splitter, machine	870	.37	5	17
Fastener, machine	1,490	.63	5	17
Cementer, paster, backer, or fitter, hand	5,640	2.39	3	26
Eyelet machine operator	1,200	.51	5	24
Molder, shoe parts	530	.22	11	6
Pulling and lasting machine operator	750	.32	7	10
Cutter, hand	2,930	1.24	6	29
Gluer and/or cementer, hand	2,920	1.24	6	23
Instructor, leather or footwear machinery	320	.14	8	6
Handbag framer	550	.23	9	5

See footnotes at end of table.

Table 15. Leather and leather products: Employment, relative error, and percent of establishments reporting selected occupations, April 1980—Continued

(SIC 31)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Embossing, stamping, and/or marking machine operator	2,620	1.11	3	33
Assembler	7,880	3.34	5	33
Beamer, hand or machine	500	.21	7	5
All other skilled craft and kindred workers	1,330	.56	n.a.	n.a.
All other operatives and semiskilled workers	8,590	3.64	n.a.	n.a.
All other laborers and unskilled workers	16,710	7.07	n.a.	n.a.
Clerical occupations	24,640	10.43	n.a.	n.a.
Office clerical workers, total	15,710	6.65	n.a.	n.a.
Bookkeeping and/or billing machine operator ..	220	.09	6	7
Computer operator	420	.18	8	10
Keypunch operator	610	.26	11	8
All other office machine operators	190	.08	n.a.	n.a.
Stenographer	240	.10	17	6
Accounting clerk	1,560	.66	13	20
Bookkeeper, hand	960	.41	6	35
File clerk	300	.13	7	8
General office clerk	3,160	1.34	10	38
Order clerk	1,130	.48	7	15
Payroll and/or timekeeping clerk	1,380	.58	3	31
Personnel clerk	280	.12	4	12
Procurement clerk	240	.10	8	7
Receptionist	160	.07	6	7
Secretary	1,420	.60	5	35
Statistical clerk	140	.06	16	3
Switchboard operator	100	.04	9	4
Switchboard operator/receptionist	410	.17	3	19
Typist	750	.32	12	12
Clerical supervisor, office or plant	1,390	.59	7	18
All other office clerical workers	650	.28	n.a.	n.a.
Plant clerical workers, total	8,930	3.78	n.a.	n.a.
Production clerk and/or coordinator	1,030	.44	5	17
Shipping packer	3,830	1.62	4	48
Shipping and/or receiving clerk	2,070	.88	4	46
Weigher, recordkeeping	70	.03	31	2
Stock clerk, stockroom, warehouse or storage yard	1,670	.71	7	22
All other plant clerical workers	260	.11	n.a.	n.a.
Sales occupations	4,840	2.05	n.a.	n.a.
Sales agent, associate, and/or representative	4,380	1.85	7	30
Sales clerk	460	.19	13	6

¹ Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

² Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A. n.a. Not available.

Stone, Clay, Glass, and Concrete Products

Establishments manufacturing flat glass and other glass products, cement, structural clay products, pottery, concrete and gypsum products, cut stone, abrasive and asbestos products, and miscellaneous nonmetallic mineral products employed 665,630 workers, accounting for 3 percent of manufacturing and nearly 6 percent of durable goods employment in 1980. Employing 31 percent of these workers were establishments producing concrete, gypsum, and plaster products; employing 21 percent were establishments manufacturing abrasive, asbestos, and miscellaneous nonmetallic mineral products; and employing 19 percent were establishments producing pressed or blown glass and glassware.

As shown in table 16, the 503,440 production and related workers in this industry accounted for

three-fourths of total industry employment. Clerical workers ranked second with 9 percent. Most of these were office clerical workers. The remaining employment was distributed as follows: Managers and officers, 7 percent; professionals, 3 percent; sales workers, 2 percent; and technical and service workers, 1 percent each.

The five most populous occupations in manufacturing stone, clay, glass, and concrete products are listed in the tabulation below:

	<i>Employment</i>	<i>Percent of industry employment</i>
Truck driver	56,470	8.5
Supervisor, nonworking	23,300	3.5
Selector, glassware	21,130	3.2
Industrial truck operator	19,910	3.0
Production packager, hand or machine	18,480	2.8

Table 16. Stone, clay, glass, and concrete products: Employment, relative error, and percent of establishments reporting selected occupations, May 1980

(SIC 32)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Total	665,630	100.00	--	--
Managers and officers	48,720	7.32	n.a.	89
Professional occupations	20,930	3.14	n.a.	n.a.
Engineers, total	8,840	1.33	n.a.	n.a.
Chemical engineer	450	.07	11	2
Civil engineer	610	.09	8	3
Electrical and electronic engineers	540	.08	9	3
Industrial engineer	2,210	.33	7	10
Mechanical engineer	2,350	.35	10	7
Ceramic engineer	1,060	.16	7	4
All other engineers	1,620	.24	n.a.	n.a.
Chemist	1,270	.19	9	4
All other physical scientists	160	.02	n.a.	n.a.
Systems analyst, electronic data processing	920	.14	12	3
Purchasing agent and/or buyer	1,740	.26	3	11
Accountants and auditors	3,800	.57	3	17
Nurse, professional	410	.06	5	3
Personnel and labor relations specialists	1,410	.21	4	8
Designer	620	.09	10	2
All other professional workers	1,760	.26	n.a.	n.a.
Technical occupations	9,580	1.44	n.a.	n.a.
Computer programmer	850	.13	6	4
Engineering technicians, total	5,570	.84	n.a.	n.a.
Drafter	2,740	.41	5	10
Electrical and electronic technicians	700	.11	12	2
Mechanical engineering technician	650	.10	22	1
Industrial engineering technician	420	.06	13	2
All other engineering technicians	1,060	.16	n.a.	n.a.
Science technicians	1,820	.27	13	3
All other technicians	1,340	.20	n.a.	n.a.
Service occupations	9,520	1.43	n.a.	n.a.
Janitors, porters, and cleaners	7,040	1.06	3	25
Guards and doorkeepers	1,560	.23	5	4
Food service workers	130	.02	17	(³)
Supervisor, nonworking-service only	320	.05	18	1
All other service workers	470	.07	n.a.	n.a.
Production, maintenance, construction, repair, material handling and powerplant occupations	503,440	75.63	n.a.	n.a.
Mechanics and repairers, total	22,000	3.31	n.a.	n.a.
Mechanic, automotive	7,960	1.20	2	28
Engineering equipment mechanic	890	.13	9	2
Mechanic, maintenance	10,980	1.65	3	15
All other mechanics and repairers	2,170	.33	n.a.	n.a.
Truck driver	56,470	8.48	2	54
Carpenter	1,430	.21	11	4
Concrete rubber	1,960	.29	6	5
Crane, derrick, and hoist operators	2,910	.44	3	10
Delivery and/or route worker	5,420	.81	4	11
Driller, machine	1,050	.16	10	3
Electrician	4,630	.70	3	10
Supervisor, nonworking	23,300	3.50	2	36
Heavy equipment operator	5,980	.90	4	14
Rigger	720	.11	8	2
Industrial truck operator	19,910	2.99	2	38
Inspector	11,950	1.80	4	11
Instrument repairer	680	.10	8	2
Machinist	2,580	.39	6	6
Maintenance repairer, general utility	15,250	2.29	3	29
Helper, trades	3,060	.46	6	5
Millwright	1,670	.25	10	2
Oiler	1,820	.27	4	7
Order filler	3,030	.46	6	9

See footnotes at end of table.

Table 16. Stone, clay, glass, and concrete products: Employment, relative error, and percent of establishments reporting selected occupations, May 1980—Continued

(SIC 32)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Painter, maintenance	530	0.08	7	3
Panelboard operator and/or grinding mill panelboard operator	1,520	.23	8	3
Pipe stripper	1,620	.24	7	4
Plumber and/or pipefitter	860	.13	11	2
Production packager, hand or machine	18,480	2.78	5	12
Refractory materials repairer	750	.11	9	3
Sheet metal worker	850	.13	15	1
Stationary boiler firer	350	.05	9	1
Stationary engineer	350	.05	13	1
Tool and die maker	1,710	.26	11	2
Welder and/or flamecutter	5,820	.87	9	12
Weaver	180	.03	28	(³)
Abrasive grinder	1,020	.15	28	1
Belt maker, sanding drums	990	.15	31	(³)
Beveler	1,250	.19	13	1
Blockmaking machine operator	3,840	.58	4	11
Braiding machine operator	160	.02	29	(³)
Breaker	430	.06	13	1
Brick and tile making machine operator	2,130	.32	7	4
Cage maker, hand or machine	1,570	.24	5	5
Calender machine operator	300	.05	20	(³)
Caster, pottery and porcelain	4,690	.70	8	3
Chopped strand operator	350	.05	43	(³)
Concrete pipe maker	3,520	.53	7	6
Concrete stone fabricator	6,280	.94	6	6
Concrete stone finisher	650	.10	12	1
Contour grinder	180	.03	23	1
Cylinder machine tender	160	.02	30	(³)
Decal applier	460	.07	15	1
Dipper	490	.07	18	1
Drill press and/or boring machine operator	1,240	.19	20	1
Etcher and/or engraver	350	.05	20	1
Finisher, pottery and porcelain	4,080	.61	8	3
Forming machine operator, glass container	5,790	.87	5	2
Forming-machine maintainer, glass	2,870	.43	7	2
Furnace combustion analyst	550	.08	12	1
Gatherer	660	.10	13	1
Glass blower, glassware and/or laboratory apparatus	870	.13	15	1
Glass blowing lathe operator	700	.11	21	1
Glass cut-off machine operator and/or cutting machine operator	1,420	.21	9	2
Glass cutter, machine	1,030	.15	10	2
Glass grinder and/or watch crystal edge grinder ..	1,410	.21	11	2
Glazier, stained glass and/or joiner	760	.11	18	1
Grinding and/or abrading machine operator, metal	1,880	.28	13	2
Hand edger and/or belt seamer	920	.14	12	1
Jigger operator	680	.10	15	1
Lathe operator, grinding wheels	680	.10	27	1
Lathe and/or turning machine operator, metal	810	.12	15	1
Machine tool operator, combination	970	.15	16	1
Machine tool setter, metalworking	410	.06	20	1
Milling and/or planing machine operator	290	.04	23	(³)
Refractory molder, hand	740	.11	15	1
Molding machine operator and/or presser	1,120	.17	15	1
Patternmaker, stone cutting	120	.02	18	(³)
Planer, stone	190	.03	19	1
Polisher, glass and/or blocker	1,090	.16	11	1
Polisher, mold	950	.14	6	1
Power press tender	2,120	.32	15	1
Refractory grinder operator	510	.08	18	1
Sandblaster, stone	750	.11	10	3

See footnotes at end of table.

Table 16. Stone, clay, glass, and concrete products: Employment, relative error, and percent of establishments reporting selected occupations, May 1980—Continued

(SIC 32)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Sawyer, stone	1,410	0.21	8	3
Screener operator	700	.11	15	1
Second cutter, hand	960	.14	11	2
Selector, glassware	21,130	3.17	5	3
Setter and/or drawer	6,160	.93	5	5
Slitter creaser slotter operator	290	.04	17	1
Slitting machine operator	930	.14	17	1
Sliver forming and winding operator and/or fiber machine tender	3,260	.49	18	(³)
Sorter	2,440	.37	7	2
Spinner, frame	1,500	.23	33	(³)
Splitter	620	.09	10	2
Spray machine operator	1,300	.20	8	2
Stone carver, hand	120	.02	21	1
Stone cutter, hand	680	.10	8	2
Stone cutter, machine	400	.06	18	1
Stone polisher	1,080	.16	7	3
Tester	2,970	.45	5	5
Clay turner	450	.07	22	1
Press operator	6,000	.90	9	4
Painter, production	1,690	.25	9	3
Conveyor operator or tender	3,310	.50	5	9
Mixer, stone, clay, glass and related products	4,720	.71	6	9
Concrete vault maker	2,770	.42	8	4
Floor worker, glass	6,500	.98	10	2
Mill and/or grinder operator, minerals	3,790	.57	6	7
Screen or stencil printer and/or setter	960	.14	14	1
Screen maker, photographic process	90	.01	17	(³)
Ware finisher, footcaster and/or handler	890	.13	18	1
Filter and/or filter press operator	210	.03	28	(³)
Assembler	11,380	1.71	8	5
Decorator, hand	1,590	.24	13	2
Model and/or mold maker	3,920	.59	6	7
Furnace, kiln, drier, or oven operator/tender	11,010	1.65	3	15
Batch plant operator	6,580	.99	2	32
Clay maker	670	.10	8	2
Miller, clay	700	.11	10	2
Mixer and/or blender, chemicals and chemical products	1,220	.18	10	2
All other skilled craft and kindred workers	7,200	1.08	n.a.	n.a.
All other operatives and semiskilled workers	36,030	5.41	n.a.	n.a.
All other laborers and unskilled workers	62,540	9.40	n.a.	n.a.
Clerical occupations	60,130	9.03	n.a.	n.a.
Office clerical workers, total	42,280	6.35	n.a.	n.a.
Bookkeeping and/or billing machine operator ..	390	.06	11	2
Computer operator	770	.12	5	4
Keypunch operator	1,090	.16	10	4
All other office machine operators	190	.03	n.a.	n.a.
Stenographer	670	.10	13	2
Accounting clerk	3,970	.60	4	18
Bookkeeper, hand	6,700	1.01	2	40
File clerk	440	.07	16	2
General office clerk	7,980	1.20	3	33
Order clerk	1,890	.28	6	7
Payroll and/or timekeeping clerk	2,190	.33	7	12
Personnel clerk	770	.12	8	5
Procurement clerk	600	.09	5	4
Receptionist	260	.04	8	2
Secretary	7,180	1.08	5	30
Statistical clerk	420	.06	9	2
Switchboard operator	220	.03	6	2
Switchboard operator/receptionist	1,140	.17	4	9
Typist	1,400	.21	5	6

See footnotes at end of table.

Table 16. Stone, clay, glass, and concrete products: Employment, relative error, and percent of establishments reporting selected occupations, May 1980—Continued

(SIC 32)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Office clerical workers—Continued				
Clerical supervisor, office or plant	1,720	0.26	9	6
All other office clerical workers	2,290	.34	n.a.	n.a.
Plant clerical workers, total	17,850	2.68	n.a.	n.a.
Production clerk and/or coordinator	2,240	.34	7	7
Shipping packer	5,400	.81	5	12
Shipping and/or receiving clerk	2,620	.39	4	10
Weigher, recordkeeping	540	.08	18	1
Stock clerk, stockroom, warehouse or storage yard	2,470	.37	7	9
Dispatcher, vehicle, service or work	4,030	.61	2	23
All other plant clerical workers	550	.08	n.a.	n.a.
Sales occupations	13,310	2.00	n.a.	n.a.
Sales agent, associate, and/or representative	12,430	1.87	5	33
Sales clerk	880	.13	12	2

¹ Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

² Relative standard errors apply equally to data on estimated

employment and percent of total employment; relative standard errors estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

³ Rounded to zero.
n.a. Not available.

Primary Metal Products

Establishments which manufacture primary metal products employed 1.2 million workers in 1980, or 6 percent of manufacturing and 10 percent of durable goods employment. Of these workers, blast furnaces, steel works, and rolling and finishing mills employed 45 percent; iron and steel foundries, 19 percent; and establishments engaged in rolling, drawing, and extruding nonferrous metals, 18 percent.

As shown in table 17, the primary metal products industry employed nearly 1 million production and related workers, who accounted for 79 percent of total industry employment. Clerical workers ranked second with 8 percent. The remaining employment was distributed

as follows: Managers and officers, 4 percent; professional workers, also 4 percent; service and technical workers, 2 percent each; and sales workers, 1 percent.

The five most populous occupations in manufacturing primary metal products are listed below:

	<i>Employment</i>	<i>Percent of industry employment</i>
Supervisor, nonworking	72,140	6.0
Crane, derrick, and hoist operators	36,070	3.0
Mechanic, maintenance	31,030	2.6
Filers, grinders, buffers, chippers, cleaners, and/or polishers	25,580	2.1
Industrial truck operator	25,550	2.1

Table 17. Primary metal products: Employment, relative error, and percent of establishments reporting selected occupations, April 1980

(SIC 33)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Total	1,205,100	100.00	--	--
Managers and officers	47,550	3.95	n.a.	94
Professional occupations	46,350	3.85	n.a.	n.a.
Engineers, total	21,910	1.82	n.a.	n.a.
Chemical engineer	690	.06	6	5
Civil engineer	900	.07	11	5
Electrical and electronic engineers	2,540	.21	7	13
Industrial engineer	4,660	.39	4	24
Mechanical engineer	4,870	.40	5	22
Metallurgists and metallurgical engineers	4,410	.37	4	23
Safety engineer	900	.07	5	11
All other engineers	2,940	.24	n.a.	n.a.
Chemist	2,430	.20	4	13
All other natural and mathematical scientists	250	.02	14	1
Systems analyst, electronic data processing	2,400	.20	5	12
Purchasing agent and/or buyer	3,850	.32	2	40
Accountants and auditors	6,870	.57	3	34
Nurse, professional	1,570	.13	3	13
Personnel and labor relations specialists	3,970	.33	3	29
All other professional workers	3,100	.26	n.a.	n.a.
Technical occupations	22,320	1.85	n.a.	n.a.
Computer programmer	1,970	.16	5	13
Engineering technicians, total	13,660	1.13	n.a.	n.a.
Drafter	3,700	.31	4	22
Electrical and electronic technicians	2,180	.18	10	8
Radiographer	680	.06	10	4
Mechanical engineering technician	800	.07	9	5
Tool programmer, numerical control	390	.03	12	3
Spectroscopist	1,140	.09	6	8
Industrial engineering technician	1,820	.15	7	9
All other engineering technicians	2,950	.24	n.a.	n.a.
Science technicians	4,290	.36	6	12
All other technicians	2,400	.20	n.a.	n.a.
Service occupations	23,540	1.95	n.a.	n.a.
Janitors, porters, and cleaners	13,150	1.09	5	43
Guards and doorkeepers	7,850	.65	5	16
Food service workers	430	.04	12	2
Supervisor, nonworking-service only	1,230	.10	7	7
All other service workers	880	.07	n.a.	n.a.
Production, maintenance, construction, repair, material handling and powerplant occupations	956,430	79.37	n.a.	n.a.
Mechanics and repairers, total	41,620	3.45	n.a.	n.a.
Mechanic, automotive	5,250	.44	7	14
Mechanic, maintenance	31,030	2.57	2	23
All other mechanics and repairers	5,340	.44	n.a.	n.a.
Truck driver	10,120	.84	5	34
Blacksmith	610	.05	6	5
Boilermaker	3,070	.25	11	2
Braker, train	2,720	.23	10	4
Carpenter	3,480	.29	5	14
Crane, derrick, and hoist operators	36,070	2.99	3	21
Delivery and/or route worker	780	.06	7	7
Electrician	24,800	2.06	5	31
Filers, grinders, buffers, chippers, cleaners, and/or polishers	25,580	2.12	3	29
Supervisor, nonworking	72,140	5.99	1	58
Heater, metal	3,470	.29	7	6
Rigger	5,520	.46	9	4
Industrial truck operator	25,550	2.12	3	37
Inspector	24,630	2.04	4	36
Instrument repairer	3,100	.26	7	6
Machinist	15,670	1.30	5	24

See footnotes at end of table.

Table 17. Primary metal products: Employment, relative error, and percent of establishments reporting selected occupations, April 1980—Continued

(SIC 33)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Maintenance repairer, general utility	16,660	1.38	4	46
Helper, trades	15,840	1.31	6	22
Millwright	22,660	1.88	7	10
Dinkey operator	1,360	.11	12	2
Oiler	3,680	.31	6	15
Order filler	3,520	.29	9	8
Painter, maintenance	1,660	.14	5	9
Panelboard operator and/or grinding mill panelboard operator	1,230	.10	15	2
Pourer, metal	12,110	1.00	3	31
Electroplater	1,560	.13	8	4
Plumber and/or pipefitter	9,050	.75	7	10
Production packager, hand or machine	7,880	.65	5	12
Refractory materials repairer	7,570	.63	7	12
Sandblaster and/or shotblaster	3,900	.32	6	16
Sheet metal worker	1,340	.11	9	4
Stationary boiler firer	1,200	.10	7	4
Stationary engineer	3,060	.25	8	5
Tool and die maker	5,320	.44	6	15
Welder and/or flamecutter	22,850	1.90	5	27
Briquetting machine operator	350	.03	16	2
Carbon setter	1,230	.10	12	1
Catcher	1,020	.08	10	2
Caster, finished or semifinished products	1,070	.09	12	2
Caster, ingots and pigs	3,380	.28	6	6
Centrifugal casting machine operator	730	.06	15	1
Coiler, winder and/or spooler	7,460	.62	6	8
Coremaker, hand, bench and/or floor	6,970	.58	10	21
Coremaker, machine	5,170	.43	9	14
Die polisher, wire and/or tubes	1,390	.12	7	6
Die setter	520	.04	12	2
Die sinker	270	.02	31	1
Draw bench operator and/or tube drawer	3,710	.31	12	4
Drill press and/or boring machine operator	5,020	.42	6	12
Dust operator and/or ore crushing dust collector	620	.05	8	3
Insulating extruding machine operator and/or insulating lead press operator	6,090	.51	8	4
Extrusion press operator, hot billets	2,670	.22	10	5
Forging press operator	990	.08	20	2
Forging and/or straightening-roll operator	2,100	.17	7	4
Grinding and/or abrading machine operator, metal	12,030	1.00	5	21
Guide setter	920	.08	8	2
Hammersmith, open die	330	.03	18	1
Heat treater, annealer, and/or temperer	10,330	.86	4	20
Heater, coke production	560	.05	11	1
Lathe and/or turning machine operator, metal	5,500	.46	7	9
Lay-out marker, metal	1,100	.09	9	4
Machine tool operator, combination	5,320	.44	7	7
Machine tool operator, numerical control	1,180	.10	11	3
Machine tool operator, toolroom	1,820	.15	11	5
Machine tool setter, metalworking	1,550	.13	15	4
Mill hand, plate mill	300	.02	12	1
Milling and/or planing machine operator	1,720	.14	10	5
Mixer operator, hot metal	670	.06	9	2
Molder, bench and/or floor	7,070	.59	4	21
Molder, machine	10,210	.85	3	22
Molder, pattern	940	.08	17	2
Patternmaker, metal	2,100	.17	11	7
Patternmaker, wood	2,090	.17	5	10
Pickler, continuous pickling line	1,860	.15	7	6
Plater helper	970	.08	11	3
Pot liner	1,170	.10	10	2
Pot tender	4,320	.36	7	4

See footnotes at end of table.

Table 17. Primary metal products: Employment, relative error, and percent of establishments reporting selected occupations, April 1980—Continued

(SIC 33)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Pump operator, by-products	620	0.05	12	1
Roll builder	1,090	.09	9	2
Sampler and/or test preparer	2,040	.17	6	7
Sawyer, metal	3,480	.29	6	9
Setter, molding and coremaking machine	1,280	.11	10	5
Shakeout worker, foundry	7,400	.61	3	25
Shell mold and/or shell core machine operator	2,790	.23	6	8
Slab depiler operator	270	.02	14	1
Slime press and filter operator	370	.03	13	1
Steel pourer helper	2,560	.21	7	5
Stranding machine operator	5,350	.44	8	5
Stretcher leveler operator	1,640	.14	7	4
Striping machine operator, insulated wire	450	.04	16	2
Tester	6,270	.52	6	12
Stove tender and/or blast furnace keeper	1,530	.13	9	2
Wax pattern worker	4,790	.40	13	3
Wire drawer	10,440	.87	6	9
Painter, production	1,910	.16	8	7
Die casting machine operator and/or setter, metal	8,050	.67	5	8
Punch press operator, metal	6,420	.53	5	10
Punch press setter, metal	950	.08	12	3
Shear and/or slitter operator, metal	6,410	.53	6	10
Shear and/or slitter setter	1,310	.11	12	4
Conveyor operator or tender	1,990	.17	10	4
Manipulator, table and/or bed operator	2,450	.20	10	3
Core assembler, paster and/or finisher	3,330	.28	5	9
Dip plater, nonelectrolytic	1,800	.15	10	3
Furnace operator and/or cupola tender	12,150	1.01	3	42
Wire weaver	670	.06	27	(³)
Mixer, ore and metals	960	.08	10	3
Furnace charger	5,250	.44	5	14
Heating pit charger	1,330	.11	8	3
Furnace operator helper or heater helper	7,160	.59	4	19
Insulation wrapping or braiding machine operator	2,740	.23	9	3
Yard engineer	2,080	.17	9	4
Precipitator operator	730	.06	16	2
Scrap sorter	2,380	.20	8	8
Power brake and/or bending machine operator, metal	1,740	.14	10	4
Mill and/or grinder operator, minerals	2,280	.19	7	5
Sinter press setter and/or operator	1,050	.09	24	1
Coke oven pusher and/or door operator	1,660	.14	12	1
Water treatment plant operator, smelting	570	.05	13	3
Weigher, production	2,230	.19	7	8
Mold closer, core setter and/or weight and jacket setter	3,210	.27	10	8
Tapper, metal	1,880	.16	7	5
Pump operator	1,630	.14	9	3
Sand cutter, mixer and/or slinger	2,860	.24	4	16
Assembler	11,460	.95	14	8
Rolling mill operator and/or attendant, rough or finished	9,590	.80	5	11
Rolling mill operator helper, rough or finished	4,710	.39	6	7
All other skilled craft and kindred workers	17,650	1.46	n.a.	n.a.
All other operatives and semiskilled workers	87,940	7.30	n.a.	n.a.
All other laborers and unskilled workers	117,330	9.74	n.a.	n.a.
Clerical occupations	98,230	8.15	n.a.	n.a.
Office clerical workers, total	62,750	5.21	n.a.	n.a.
Bookkeeping and/or billing machine operator ..	1,020	.08	6	8
Computer operator	1,930	.16	4	17
Keypunch operator	3,010	.25	4	15
All other office machine operators	790	.07	n.a.	n.a.

See footnotes at end of table.

Table 17. Primary metal products: Employment, relative error, and percent of establishments reporting selected occupations, April 1980—Continued

(SIC 33)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Office clerical workers — Continued				
Stenographer	2,040	0.17	6	8
Accounting clerk	6,440	.53	5	30
Bookkeeper, hand	1,950	.16	4	23
File clerk	1,170	.10	6	9
General office clerk	9,420	.78	6	35
Order clerk	2,400	.20	5	14
Payroll and/or timekeeping clerk	4,100	.34	3	32
Personnel clerk	1,860	.15	4	20
Procurement clerk	1,310	.11	4	15
Receptionist	490	.04	5	8
Secretary	9,630	.80	3	49
Statistical clerk	1,290	.11	9	6
Switchboard operator	560	.05	5	7
Switchboard operator/receptionist	1,720	.14	2	28
Typist	4,400	.37	3	21
Clerical supervisor, office or plant	3,900	.32	6	16
All other office clerical workers	3,320	.28	n.a.	n.a.
Plant clerical workers, total	35,480	2.94	n.a.	n.a.
Production clerk and/or coordinator	10,260	.85	5	35
Shipping packer	6,720	.56	4	29
Shipping and/or receiving clerk	5,530	.46	3	39
Weigher, recordkeeping	1,400	.12	8	7
Stock clerk, stockroom, warehouse or storage yard	6,510	.54	5	26
All other plant clerical workers	5,060	.42	n.a.	n.a.
Sales occupations				
Sales agent, associate, and/or representative	9,860	.82	3	36
Sales clerk	820	.07	8	6

¹ Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

² Relative standard errors apply equally to data on estimated

employment and percent of total employment; relative standard errors estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

³ Rounded to zero.
n.a. Not available.

Fabricated Metal Products, Except Machinery and Transportation Equipment

This industry, which includes establishments which fabricate ferrous and nonferrous metal products, except machinery and transportation equipment, employed nearly 1.6 million workers, or 8 percent of manufacturing and 13 percent of durable goods employment in 1980. The three largest employers of these workers were: Establishments fabricating structural metal products, with 32 percent of industry employment; those manufacturing metal forgings or metal stampings, 16 percent; and those fabricating miscellaneous metal products, also with 16 percent.

The fabricated metal products industry employed nearly 1.2 million production and related workers, who accounted for 74 percent of total industry employment (table 18). Clerical workers accounted for 10 percent.

Most of these were office clerical workers. The remaining employment was distributed as follows: Managers and officers, 7 percent; professional workers, 4 percent; technical and sales workers, 2 percent each; and service workers, nearly 2 percent.

The tabulation below lists the five most populous occupations in the industry:

	<i>Employment</i>	<i>Percent of industry employment</i>
Assembler	114,350	7.2
Welder and/or flamecutter	84,700	5.4
Punch press operator, metal	75,310	4.8
Supervisor, nonworking	57,670	3.7
Lathe and/or turning machine operator, metal	35,330	2.2

Table 18. Fabricated metal products, except machinery and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1980

(SIC 34)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Total	1,579,960	100.00	--	--
Managers and officers	103,670	6.56	n.a.	93
Professional occupations	67,110	4.25	n.a.	n.a.
Engineers, total	27,450	1.74	n.a.	n.a.
Chemical engineer	330	.02	9	1
Civil engineer	1,510	.10	9	2
Electrical and electronic engineers	1,520	.10	9	3
Industrial engineer	8,380	.53	3	13
Mechanical engineer	11,680	.74	3	20
Metallurgists and metallurgical engineers	790	.05	8	2
All other engineers	3,240	.21	n.a.	n.a.
Chemist	890	.06	10	2
Systems analyst, electronic data processing	1,960	.12	5	5
Purchasing agent and/or buyer	8,020	.51	1	27
Accountants and auditors	10,400	.66	2	26
Cost estimator, engineering	5,980	.38	2	15
Nurse, professional	980	.06	3	4
Personnel and labor relations specialists	4,060	.26	2	14
Designer	2,870	.18	5	5
All other professional workers	4,500	.28	n.a.	n.a.
Technical occupations	33,650	2.13	n.a.	n.a.
Computer programmer	2,740	.17	4	7
Engineering technicians, total	27,110	1.72	n.a.	n.a.
Drafter	18,800	1.19	3	25
Electrical and electronic technicians	1,490	.09	9	2
Mechanical engineering technician	2,250	.14	7	3
Tool programmer, numerical control	1,120	.07	5	3
All other engineering technicians	3,450	.22	n.a.	n.a.
Science technicians	1,530	.10	14	2
All other technicians	2,270	.14	n.a.	n.a.
Service occupations	25,750	1.63	n.a.	n.a.
Janitors, porters, and cleaners	18,010	1.14	2	36
Guards and doorkeepers	4,740	.30	4	5
Food service workers	350	.02	12	1
Supervisor, nonworking-service only	1,630	.10	7	2
All other service workers	1,020	.06	n.a.	n.a.
Production, maintenance, construction, repair, material handling and powerplant occupations	1,164,180	73.68	n.a.	n.a.
Mechanics and repairers, total	29,490	1.87	n.a.	n.a.
Mechanic, automotive	1,940	.12	5	5
Mechanic, maintenance	25,330	1.60	3	26
All other mechanics and repairers	2,220	.14	n.a.	n.a.
Truck driver	15,040	.95	2	31
Automatic spring coiling machine operator	2,960	.19	11	1
Blacksmith	600	.04	14	1
Boilermaker	2,050	.13	16	1
Carpenter	2,010	.13	9	4
Crane, derrick, and hoist operators	6,850	.43	4	7
Delivery and/or route worker	1,900	.12	6	4
Electrician	9,160	.58	4	12
Filers, grinders, buffers, chippers, cleaners, and/or polishers	24,080	1.52	3	16
Supervisor, nonworking	57,670	3.65	1	52
Glazier	1,630	.10	12	1
Heater, metal	1,920	.12	11	1
Rigger	1,850	.12	9	2
Industrial truck operator	25,600	1.62	3	26
Inspector	32,420	2.05	3	27
Machinist	13,670	.87	4	12
Maintenance repairer, general utility	12,890	.82	2	18
Helper, trades	31,200	1.97	3	22
Metal fabricator	11,530	.73	6	4

See footnotes at end of table.

Table 18. Fabricated metal products, except machinery and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1980—Continued

(SIC 34)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Millwright	5,930	0.38	6	5
Oiler	1,300	.08	4	4
Order filler	6,420	.41	4	7
Painter, maintenance	1,100	.07	6	3
Pourer, metal	820	.05	12	1
Electroplater	17,760	1.12	4	13
Plumber and/or pipefitter	3,310	.21	9	2
Press operator and/or plate printer	2,600	.16	10	2
Production packager, hand or machine	25,970	1.64	3	22
Refractory materials repairer	320	.02	14	1
Roll forming machine operator	4,380	.28	7	4
Sandblaster and/or shotblaster	3,300	.21	5	6
Sheet metal worker	23,020	1.46	5	9
Stationary boiler firer	420	.03	9	1
Stationary engineer	750	.05	8	1
Structural steel worker	4,040	.26	12	1
Tool and die maker	28,780	1.82	4	23
Welder and/or flamecutter	84,700	5.36	2	36
Coremaker, hand, bench and/or floor	440	.03	13	1
Coremaker, machine	500	.03	16	1
Die setter	2,430	.15	7	2
Die sinker	1,120	.07	12	1
Drill press and/or boring machine operator	24,080	1.52	3	19
Etcher and/or engraver	930	.06	17	1
Forging press operator	3,750	.24	8	2
Forging and/or straightening-roll operator	1,740	.11	11	1
Grinding and/or abrading machine operator, metal	22,370	1.42	3	18
Hammersmith, open die	2,710	.17	12	1
Header operator	3,820	.24	7	1
Heat treater, annealer, and/or temperer	3,790	.24	4	4
Lathe and/or turning machine operator, metal	35,330	2.24	3	18
Lay-out marker, metal	7,760	.49	4	11
Machine tool operator, combination	33,340	2.11	3	18
Machine tool operator, numerical control	6,870	.43	7	5
Machine tool operator, toolroom	6,140	.39	5	6
Machine tool setter, metalworking	11,080	.70	4	11
Milling and/or planing machine operator	6,930	.44	5	5
Molder, bench and/or floor	780	.05	13	1
Molder, machine	1,130	.07	11	1
Patternmaker, metal	660	.04	15	1
Patternmaker, wood	410	.03	13	1
Plater helper	16,690	1.06	4	11
Power screwdriver operator	1,380	.09	12	1
Sawyer, metal	4,050	.26	5	7
Shakeout worker, foundry	650	.04	11	1
Tester	4,390	.28	4	5
Wire drawer	1,820	.12	13	1
Woodworking machine operator	1,240	.08	14	1
Painter, production	20,210	1.28	3	25
Die casting machine operator and/or setter, metal	1,620	.10	15	1
Riveter, heavy	530	.03	18	(³)
Riveter, light	2,250	.14	9	2
Punch press operator, metal	75,310	4.77	3	31
Punch press setter, metal	8,920	.56	5	8
Shear and/or slitter operator, metal	11,800	.75	3	18
Shear and/or slitter setter	2,280	.14	6	4
Compression and/or injection molding machine operator, plastics	2,470	.16	11	1
Conveyor operator or tender	2,280	.14	7	2
Loading machine operator	810	.05	17	(³)
Dip plater, nonelectrolytic	3,860	.24	7	5
Furnace operator and/or cupola tender	1,250	.08	8	2

See footnotes at end of table.

Table 18. Fabricated metal products, except machinery and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1980—Continued

(SIC 34)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Fitter, structural metal	14,440	0.91	5	8
Multi-slide machine operator	2,310	.15	11	2
Bodymaker operator, tin can	3,350	.21	9	1
Wire weaver	2,410	.15	14	1
Furnace operator helper or heater helper	800	.05	12	1
Power brake and/or bending machine operator, metal	17,770	1.12	4	18
Assembler	114,350	7.24	2	31
All other skilled craft and kindred workers	18,980	1.20	n.a.	n.a.
All other operatives and semiskilled workers	59,400	3.76	n.a.	n.a.
All other laborers and unskilled workers	89,010	5.63	n.a.	n.a.
Clerical occupations				
Office clerical workers, total	154,800	9.80	n.a.	n.a.
Office clerical workers, total	110,940	7.02	n.a.	n.a.
Bookkeeping and/or billing machine operator ..	1,310	.08	4	5
Computer operator	3,280	.21	3	11
Keypunch operator	3,490	.22	2	8
All other office machine operators	1,330	.08	n.a.	n.a.
Stenographer	2,130	.13	10	4
Accounting clerk	8,150	.52	2	17
Bookkeeper, hand	10,330	.65	2	33
File clerk	2,090	.13	4	6
General office clerk	23,100	1.46	2	42
Order clerk	4,270	.27	3	9
Payroll and/or timekeeping clerk	5,450	.34	2	18
Personnel clerk	2,160	.14	2	9
Procurement clerk	1,890	.12	3	7
Receptionist	1,020	.06	5	5
Secretary	22,020	1.39	2	45
Statistical clerk	930	.06	6	3
Switchboard operator	740	.05	4	3
Switchboard operator/receptionist	3,780	.24	2	19
Typist	5,750	.36	3	10
Clerical supervisor, office or plant	4,120	.26	3	9
All other office clerical workers	3,600	.23	n.a.	n.a.
Plant clerical workers, total				
Plant clerical workers, total	43,860	2.78	n.a.	n.a.
Production clerk and/or coordinator	10,640	.67	3	18
Shipping packer	10,660	.67	3	14
Shipping and/or receiving clerk	10,300	.65	2	25
Stock clerk, stockroom, warehouse or storage yard	9,920	.63	2	17
All other plant clerical workers	2,340	.15	n.a.	n.a.
Sales occupations				
Sales agent, associate, and/or representative	30,800	1.95	n.a.	n.a.
Sales agent, associate, and/or representative	29,210	1.85	2	36
Sales clerk	1,590	.10	6	4

¹ Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

² Relative standard errors apply equally to data on estimated

employment and percent of total employment; relative standard errors estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

³ Rounded to zero.
n.a. Not available.

Machinery, except Electrical and Transportation Equipment

Manufacturers of machinery and equipment, other than electrical or transportation equipment, employed 2.5 million workers in 1980, or 12 percent of manufacturing and 20 percent of durable goods employment. The three largest employers of these workers were: Establishments manufacturing office, computing, and accounting machines, with 17 percent of industry employment; establishments manufacturing construction, mining, and materials handling equipment, 16 percent; and establishments manufacturing metalworking machinery and equipment, 15 percent.

As shown in table 19, the 1.5 million production and related workers accounted for 61 percent of total industry employment. Clerical workers ranked second with 13 percent. Most of these were office clerical

workers. The remaining employment was distributed as follows: Professional workers, 9 percent; managers and officers, 8 percent; technical workers, 5 percent; and sales and service workers, 2 percent each.

The five most populous occupations in the industry are listed in the tabulation below:

	<i>Employment</i>	<i>Percent of industry employment</i>
Machine assembler	125,350	5.0
Welder and/or flamecutter	106,320	4.3
Machine tool operator, combination	78,310	3.1
Supervisor, nonworking	74,270	3.0
Lathe and/or turning machine operator, metal	72,020	2.9

Table 19. Machinery, except electrical and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1980

(SIC 35)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Total	2,497,290	100.00	--	--
Managers and officers	195,830	7.84	n.a.	89
Professional occupations	234,740	9.40	n.a.	n.a.
Engineers, total	124,620	4.99	n.a.	n.a.
Chemical engineer	1,090	.04	10	1
Civil engineer	1,560	.06	11	1
Electrical and electronic engineers	34,220	1.37	1	12
Industrial engineer	32,320	1.29	6	20
Mechanical engineer	36,590	1.47	3	23
Metallurgists and metallurgical engineers	1,510	.06	7	2
All other engineers	17,330	.69	n.a.	n.a.
Chemist	980	.04	19	1
All other natural and mathematical scientists	440	.02	28	(³)
Systems analyst, business	6,830	.27	10	6
Systems analyst, scientific and technical	4,540	.18	13	2
Purchasing agent and/or buyer	16,870	.68	2	25
Accountants and auditors	23,250	.93	5	27
Commercial artist	2,050	.08	5	3
Cost estimator, engineering	5,300	.21	4	9
Writer and/or editor	4,310	.17	6	4
Nurse, professional	1,590	.06	3	4
Personnel and labor relations specialists	8,760	.35	6	13
Designer	9,940	.40	5	7
Contract administrator	2,520	.10	5	4
All other professional workers	22,740	.91	n.a.	n.a.
Technical occupations	134,550	5.39	n.a.	n.a.
Computer programmer, business	15,140	.61	12	8
Computer programmer, scientific and technical	13,310	.53	14	3
Engineering technicians, total	98,290	3.94	n.a.	n.a.
Drafter	35,750	1.43	2	30
Electrical and electronic technicians	33,310	1.33	6	9
Mechanical engineering technician	9,040	.36	8	5
Tool programmer, numerical control	4,380	.18	4	7
Industrial engineering technician	5,680	.23	7	5
All other engineering technicians	10,130	.41	n.a.	n.a.
Science technicians	2,140	.09	13	1
All other technicians	5,670	.23	n.a.	n.a.
Service occupations	39,900	1.60	n.a.	n.a.
Janitors, porters, and cleaners	28,890	1.16	2	38
Guards and doorkeepers	5,330	.21	5	4
Food service workers	860	.03	11	1
Supervisor, nonworking-service only	2,060	.08	9	2
All other service workers	2,760	.11	n.a.	n.a.
Production, maintenance, construction, repair, material handling and powerplant occupations	1,515,640	60.69	n.a.	n.a.
Mechanics and repairers, total	30,480	1.22	n.a.	n.a.
Mechanic, automotive	3,260	.13	10	3
Mechanic, maintenance	16,950	.68	3	11
Office machine servicer and/or cash register servicer	500	.02	29	(³)
Refrigeration mechanic and/or air conditioning mechanic	1,540	.06	10	1
Data processing machine repairer	1,890	.08	40	(³)
All other mechanics and repairers	6,340	.25	n.a.	n.a.
Truck driver	7,460	.30	3	13
Blacksmith	350	.01	34	1
Boilermaker	2,080	.08	31	(³)
Carpenter	3,260	.13	9	4
Crane, derrick, and hoist operators	5,450	.22	5	3
Delivery and/or route worker	1,570	.06	7	4

See footnotes at end of table.

Table 19. Machinery, except electrical and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1980—Continued

(SIC 35)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Electrician	13,130	0.53	4	10
Filers, grinders, buffers, chippers, cleaners, and/or polishers	26,820	1.07	3	15
Supervisor, nonworking	74,270	2.97	2	41
Gear cutting, gear grinding and/or gear shaping machine operator	8,550	.34	6	4
Heater, metal	750	.03	17	(³)
Rigger	1,660	.07	14	1
Industrial truck operator	25,950	1.04	3	18
Inspector	54,030	2.16	3	22
Instrument repairer	1,030	.04	12	1
Machinist	54,450	2.18	2	27
Maintenance repairer, general utility	15,020	.60	4	14
Helper, trades	17,190	.69	5	7
Millwright	11,260	.45	6	6
Oiler	1,750	.07	6	3
Order filler	9,590	.38	6	5
Painter, maintenance	1,940	.08	7	3
Pourer, metal	1,250	.05	9	1
Electroplater	1,910	.08	8	2
Plumber and/or pipefitter	4,760	.19	8	2
Production packager, hand or machine	9,740	.39	5	5
Refractory materials repairer	370	.01	15	(³)
Sandblaster and/or shotblaster	3,080	.12	6	4
Sheet metal worker	20,310	.81	4	9
Stationary boiler firer	420	.02	10	1
Stationary engineer	790	.03	9	1
Tool and die maker	61,860	2.48	2	30
Welder and/or flamecutter	106,320	4.26	2	39
Coremaker, hand, bench and/or floor	1,330	.05	13	1
Coremaker, machine	660	.03	14	(³)
Die setter	660	.03	11	1
Die sinker	430	.02	30	(³)
Drill press and/or boring machine operator	58,070	2.33	3	28
Etcher and/or engraver	1,800	.07	12	1
Forging press operator	1,470	.06	15	1
Grinding and/or abrading machine operator, metal	58,870	2.36	3	23
Heat treater, annealer, and/or temperer	6,320	.25	5	4
Lathe and/or turning machine operator, metal	72,020	2.88	2	33
Lay-out marker, metal	5,190	.21	7	4
Machine tool operator, combination	78,310	3.14	2	30
Machine tool operator, numerical control	45,220	1.81	2	23
Machine tool operator, toolroom	14,190	.57	5	8
Machine tool setter, metalworking	19,640	.79	5	13
Milling and/or planing machine operator	36,920	1.48	3	21
Molder, bench and/or floor	2,160	.09	8	1
Molder, machine	2,390	.10	11	1
Patternmaker, metal	3,860	.15	11	2
Patternmaker, wood	3,740	.15	9	2
Plater helper	930	.04	11	1
Power screwdriver operator	2,330	.09	21	(³)
Sawyer, metal	4,800	.19	4	7
Shakeout worker, foundry	960	.04	10	1
Tester	14,380	.58	6	6
Woodworking machine operator	1,200	.05	13	1
Painter, production	17,240	.69	2	20
Die casting machine operator and/or setter, metal	1,520	.06	15	1
Riveter, heavy	270	.01	28	(³)
Riveter, light	920	.04	10	1
Punch press operator, metal	24,870	1.00	3	15
Punch press setter, metal	3,610	.14	7	4
Shear and/or slitter operator, metal	4,930	.20	5	5

See footnotes at end of table.

Table 19. Machinery, except electrical and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1980—Continued

(SIC 35)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Shear and/or slitter setter	1,660	0.07	8	2
Coil winder	2,260	.09	15	1
Compression and/or injection molding machine operator, plastics	3,060	.12	11	1
Balancing machine operator	1,110	.04	7	2
Conveyor operator or tender	930	.04	13	1
Dip plater, nonelectrolytic	940	.04	11	1
Furnace operator and/or cupola tender	1,630	.07	8	2
Furnace operator helper or heater helper	530	.02	11	1
Power brake and/or bending machine operator, metal	10,270	.41	4	7
Sand cutter, mixer and/or slinger	630	.03	15	1
Machine assembler	125,350	5.02	2	26
Electromechanical equipment assembler	36,530	1.46	4	5
Electrical and electronic assembler	48,940	1.96	2	7
All other assemblers	48,590	1.95	n.a.	n.a.
All other skilled craft and kindred workers	23,320	.93	n.a.	n.a.
All other operatives and semiskilled workers	62,510	2.50	n.a.	n.a.
All other laborers and unskilled workers	77,320	3.10	n.a.	n.a.
Clerical occupations				
Office clerical workers, total	332,490	13.31	n.a.	n.a.
Office clerical workers, total	229,120	9.17	n.a.	n.a.
Bookkeeping and/or billing machine operator ..	1,910	.08	5	4
Computer operator	8,910	.36	9	10
Keypunch operator	8,100	.32	4	9
Peripheral EDP equipment operator	2,030	.08	7	2
All other office machine operators	3,570	.14	n.a.	n.a.
Stenographer	4,720	.19	5	4
Accounting clerk	18,950	.76	2	17
Bookkeeper, hand	3,550	.14	4	9
File clerk	4,430	.18	4	6
General office clerk	47,590	1.91	4	46
Order clerk	7,650	.31	3	9
Payroll and/or timekeeping clerk	6,880	.28	2	15
Personnel clerk	3,810	.15	2	9
Procurement clerk	4,140	.17	3	8
Receptionist	1,750	.07	5	5
Secretary	53,240	2.13	4	50
Statistical clerk	1,990	.08	7	3
Switchboard operator	1,420	.06	5	3
Switchboard operator/receptionist	4,500	.18	2	16
Typist	13,000	.52	3	12
Clerical supervisor, office or plant	7,450	.30	5	7
All other office clerical workers	19,530	.78	n.a.	n.a.
Plant clerical workers, total				
Production clerk and/or coordinator	103,370	4.14	n.a.	n.a.
Production clerk and/or coordinator	30,890	1.24	4	23
Shipping packer	14,510	.58	3	13
Shipping and/or receiving clerk	15,070	.60	2	21
Stock clerk, stockroom, warehouse or storage yard	35,900	1.44	3	31
All other plant clerical workers	7,000	.28	n.a.	n.a.
Sales occupations				
Sales agent, associate, and/or representative	44,140	1.77	n.a.	n.a.
Sales agent, associate, and/or representative	42,390	1.70	2	31
Sales clerk	1,750	.07	6	2

¹ Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

² Relative standard errors apply equally to data on estimated

employment and percent of total employment; relative standard errors estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

³ Rounded to zero.

n.a. Not available.

Electrical and Electronic Machinery, Equipment, and Supplies

Manufacturers of electrical and electronic machinery, equipment, and supplies employed nearly 2.1 million workers, or 10 percent of manufacturing and 17 percent of durable goods employment in 1980. Establishments manufacturing electronic components and accessories employed 27 percent of the industry's workers; establishments manufacturing communications equipment, 26 percent; and those manufacturing electrical industrial apparatus, 11 percent.

The industry employed nearly 1.3 million production and related workers, accounting for three-fifths of total industry employment (table 20). Professional workers accounted for 12 percent; most of these were engineers. Clerical workers, primarily office clerical workers, also

accounted for 12 percent. The remaining employment was distributed as follows: Managers and officers, 6 percent; technical workers, also 6 percent; and service and sales workers, 1 percent each.

The five most populous occupations in manufacturing electrical and electronic machinery, equipment, and supplies are listed in the tabulation below:

	<i>Employment</i>	<i>Percent of industry employment</i>
Electrical and electronic assembler	190,660	9.2
Electrical and electronic engineer	82,620	4.0
Inspector	62,670	3.0
Electrical and electronic technician	61,980	3.0
Supervisor, nonworking	59,090	2.8

Table 20. Electrical and electronic machinery, equipment, and supplies: Employment, relative error, and percent of establishments reporting selected occupations, June 1980

(SIC 36)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Total	2,079,640	100.00	--	--
Managers and officers	133,520	6.42	n.a.	94
Professional occupations	255,880	12.30	n.a.	n.a.
Engineers, total	153,150	7.36	n.a.	n.a.
Chemical engineer	2,160	.10	15	5
Electrical and electronic engineers	82,620	3.97	2	46
Industrial engineer	28,310	1.36	9	32
Mechanical engineer	18,680	.90	7	28
Metallurgists and metallurgical engineers	710	.03	12	3
All other engineers	20,670	.99	n.a.	n.a.
Mathematician	900	.04	31	1
Statistician	600	.03	16	2
Chemist	1,100	.05	8	5
Physicist	2,120	.10	23	2
All other natural and mathematical scientists	1,030	.05	42	1
Systems analyst, business	6,370	.31	13	12
Systems analyst, scientific and technical	4,020	.19	13	5
Purchasing agent and/or buyer	13,120	.63	3	54
Accountants and auditors	17,710	.85	6	40
Commercial artist	2,570	.12	11	8
Cost estimator, engineering	3,670	.18	9	15
Writer and/or editor	4,230	.20	10	10
Lawyer	1,430	.07	18	3
Nurse, professional	1,680	.08	5	12
Personnel and labor relations specialists	8,200	.39	6	31
Designer	5,040	.24	7	12
Contract administrator	4,440	.21	12	11
All other professional workers	24,500	1.18	n.a.	n.a.
Technical occupations	129,720	6.24	n.a.	n.a.
Computer programmer, business	7,220	.35	14	16
Computer programmer, scientific and technical	5,620	.27	12	7
Engineering technicians, total	107,420	5.17	n.a.	n.a.
Drafter	19,800	.95	4	38
Electrical and electronic technicians	61,980	2.98	5	39
Mechanical engineering technician	8,340	.40	8	11
Tool programmer, numerical control	1,300	.06	8	6
Industrial engineering technician	3,310	.16	10	11
All other engineering technicians	12,690	.61	n.a.	n.a.
Science technicians	2,620	.13	13	4
All other technicians	6,840	.33	n.a.	n.a.
Service occupations	29,310	1.41	n.a.	n.a.
Janitors, porters, and cleaners	17,120	.82	4	42
Guards and doorkeepers	6,510	.31	6	10
Food service workers	1,190	.06	17	2
Supervisor, nonworking-service only	2,430	.12	8	7
All other service workers	2,060	.10	n.a.	n.a.
Production, maintenance, construction, repair, material handling and powerplant occupations	1,254,920	60.34	n.a.	n.a.
Mechanics and repairers, total	29,130	1.40	n.a.	n.a.
Mechanic, automotive	810	.04	11	3
Electric motor repairer	2,280	.11	12	4
Electrical instrument repairer	3,370	.16	19	5
Mechanic, maintenance	17,860	.86	4	22
All other mechanics and repairers	4,810	.23	n.a.	n.a.
Truck driver	4,860	.23	6	17
Carpenter	1,910	.09	7	9
Crane, derrick, and hoist operators	1,260	.06	12	3
Delivery and/or route worker	1,430	.07	9	6
Electrician	10,120	.49	6	19
Filers, grinders, buffers, chippers, cleaners, and/or polishers	6,740	.32	9	8

See footnotes at end of table.

Table 20. Electrical and electronic machinery, equipment, and supplies: Employment, relative error, and percent of establishments reporting selected occupations, June 1980—Continued

(SIC 36)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Supervisor, nonworking	59,090	2.84	4	50
Gear cutting, gear grinding and/or gear shaping machine operator	1,300	.06	13	3
Heater, metal	630	.03	28	1
Rigger	250	.01	27	(³)
Industrial truck operator	14,200	.68	4	18
Inspector	62,670	3.01	4	36
Instrument repairer	1,940	.09	18	4
Machinist	13,030	.63	8	19
Maintenance repairer, general utility	11,390	.55	6	28
Helper, trades	4,300	.21	7	10
Millwright	4,010	.19	10	5
Oiler	930	.04	7	5
Order filler	8,270	.40	9	11
Painter, maintenance	1,230	.06	10	5
Pourer, metal	640	.03	11	2
Electroplater	7,060	.34	9	10
Plumber and/or pipefitter	2,910	.14	10	5
Press operator and/or plate printer	1,190	.06	12	4
Production packager, hand or machine	15,710	.76	6	16
Sheet metal worker	5,330	.26	6	9
Stationary boiler firer	360	.02	10	2
Stationary engineer	1,400	.07	11	3
Tool and die maker	17,040	.82	5	22
Welder and/or flamecutter	15,110	.73	8	18
Die setter	1,090	.05	10	2
Drill press and/or boring machine operator	10,650	.51	6	15
Etcher and/or engraver	3,120	.15	12	5
Forging press operator	410	.02	26	1
Grinding and/or abrading machine operator, metal	6,590	.32	9	9
Heat treater, annealer, and/or temperer	1,310	.06	10	4
Lathe and/or turning machine operator, metal	10,730	.52	6	13
Lay-out marker, metal	1,460	.07	19	3
Machine tool operator, combination	15,150	.73	9	12
Machine tool operator, numerical control	6,140	.30	8	9
Machine tool operator, toolroom	3,950	.19	8	8
Machine tool setter, metalworking	7,920	.38	10	9
Milling and/or planing machine operator	4,160	.20	7	8
Molder, bench and/or floor	630	.03	26	1
Molder, machine	2,170	.10	13	2
Patternmaker, metal	270	.01	15	1
Plater helper	3,560	.17	9	6
Power screwdriver operator	3,610	.17	18	2
Sawyer, metal	1,210	.06	18	4
Tester	35,680	1.72	5	25
Painter, production	9,650	.46	5	22
Die casting machine operator and/or setter, metal	2,810	.14	7	4
Wired, electronic	28,760	1.38	6	16
Impregnator, electronic	2,010	.10	10	5
Riveter, light	2,670	.13	16	4
Punch press operator, metal	20,810	1.00	5	20
Punch press setter, metal	3,980	.19	7	10
Shear and/or slitter operator, metal	2,300	.11	8	8
Shear and/or slitter setter	620	.03	10	3
Coil winder	25,640	1.23	5	17
Coil taper, hand or machine	3,510	.17	11	4
Encapsulator	5,870	.28	22	7
Compression and/or injection molding machine operator, plastics	12,170	.59	7	8
Coil finisher	12,720	.61	11	8
Balancing machine operator	660	.03	10	2
Conveyor operator or tender	4,070	.20	20	2

See footnotes at end of table.

Table 20. Electrical and electronic machinery, equipment, and supplies: Employment, relative error, and percent of establishments reporting selected occupations, June 1980—Continued

(SIC 36)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Dip plater, nonelectrolytic	2,640	0.13	11	5
Furnace operator and/or cupola tender	830	.04	9	2
Furnace operator helper or heater helper	280	.01	17	1
Power brake and/or bending machine operator, metal	4,140	.20	9	9
Screen or stencil printer and/or setter	3,470	.17	11	6
Machine assembler	29,110	1.40	7	9
Instrument maker and/or assembler	7,440	.36	14	3
Electromechanical equipment assembler	41,600	2.00	7	12
Electrical and electronic assembler	190,660	9.17	2	34
All other assemblers	147,350	7.09	n.a.	n.a.
Mixer and/or blender, chemicals and chemical products	2,460	.12	10	6
All other skilled craft and kindred workers	23,170	1.11	n.a.	n.a.
All other operatives and semiskilled workers	118,570	5.70	n.a.	n.a.
All other laborers and unskilled workers	119,700	5.76	n.a.	n.a.
Clerical occupations	255,900	12.31	n.a.	n.a.
Office clerical workers, total	180,820	8.69	n.a.	n.a.
Bookkeeping and/or billing machine operator ..	1,100	.05	7	7
Computer operator	6,300	.30	7	22
Keypunch operator	6,510	.31	4	20
Peripheral EDP equipment operator	2,050	.10	11	7
All other office machine operators	2,850	.14	n.a.	n.a.
Stenographer	3,440	.17	10	8
Accounting clerk	15,510	.75	4	39
Bookkeeper, hand	4,080	.20	6	25
File clerk	4,060	.20	7	13
General office clerk	23,230	1.12	6	32
Order clerk	6,730	.32	6	20
Payroll and/or timekeeping clerk	5,920	.28	4	33
Personnel clerk	4,460	.21	6	24
Procurement clerk	4,260	.20	7	19
Receptionist	1,750	.08	6	13
Secretary	41,880	2.01	7	56
Statistical clerk	1,940	.09	12	6
Switchboard operator	1,220	.06	5	8
Switchboard operator/receptionist	3,720	.18	3	34
Typist	13,620	.65	4	28
Clerical supervisor, office or plant	8,410	.40	9	17
All other office clerical workers	17,780	.85	n.a.	n.a.
Plant clerical workers, total	75,080	3.61	n.a.	n.a.
Production clerk and/or coordinator	23,660	1.14	5	37
Shipping packer	11,460	.55	4	31
Shipping and/or receiving clerk	12,060	.58	3	48
Stock clerk, stockroom, warehouse or storage yard	21,670	1.04	4	40
All other plant clerical workers	6,230	.30	n.a.	n.a.
Sales occupations	20,390	.98	n.a.	n.a.
Sales agent, associate, and/or representative	18,660	.90	4	35
Sales clerk	1,730	.08	8	6

¹ Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

² Relative standard errors apply equally to data on estimated

employment and percent of total employment; relative standard errors estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

³ Rounded to zero.
n.a. Not available.

Transportation Equipment

Establishments which manufacture transportation equipment employed 1.8 million workers, or 9 percent of manufacturing and 15 percent of durable goods employment in 1980. Employers of these workers included establishments manufacturing motor vehicles and motor vehicle equipment, with 40 percent of industry employment; those manufacturing aircraft and parts, 36 percent; and those engaged in ship and boat building and repair, 12 percent.

As shown in table 21, the transportation equipment industry employed nearly 1.2 million production and related workers, who accounted for 65 percent of total industry employment. Professionals ranked second with 13 percent. Fifty-five percent of these were engineers.

The remaining employment was distributed as follows: Clerical workers, 10 percent; managers and officers, 6 percent; technical workers, 4 percent; service workers, 2 percent; and sales workers, less than 1 percent of total industry employment.

The five most populous occupations in manufacturing transportation equipment are listed below:

	<i>Employment</i>	<i>Percent of industry employment</i>
Welder and/or flamecutter	87,770	4.8
Inspector	67,680	3.7
Supervisor, nonworking	67,600	3.7
Aircraft structure and surfaces assembler ...	34,880	1.9
Machine assembler	34,600	1.9

Table 21. Transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1980

(SIC 37)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Total	1,835,070	100.00	--	--
Managers and officers	106,320	5.79	n.a.	92
Professional occupations	240,400	13.10	n.a.	n.a.
Engineers, total	131,830	7.18	n.a.	n.a.
Aeronautical engineer	26,660	1.45	7	6
Chemical engineer	1,040	.06	26	3
Civil engineer	1,660	.09	21	3
Electrical and electronic engineers	14,250	.78	18	10
Industrial engineer	21,760	1.19	10	26
Mechanical engineer	19,550	1.07	9	25
Metallurgists and metallurgical engineers	1,520	.08	15	6
All other engineers	45,390	2.47	n.a.	n.a.
Mathematician	960	.05	39	1
Statistician	1,860	.10	17	4
All other mathematical scientists	360	.02	n.a.	n.a.
Chemist	980	.05	15	4
All other physical scientists	5,600	.31	n.a.	n.a.
Economist	680	.04	44	(³)
Systems analyst, business	4,210	.23	14	9
Systems analyst, scientific and technical	2,020	.11	16	4
Purchasing agent and/or buyer	13,570	.74	9	53
Accountants and auditors	15,610	.85	10	33
Commercial artist	3,150	.17	16	6
Writer and/or editor	4,120	.22	15	6
Nurse, professional	1,660	.09	5	13
Personnel and labor relations specialists	8,270	.45	10	28
Designer	6,420	.35	16	9
All other professional workers	39,100	2.13	n.a.	n.a.
Technical occupations	72,110	3.93	n.a.	n.a.
Computer programmer, business	3,930	.21	11	14
Computer programmer, scientific and technical	1,550	.08	15	4
Engineering technicians, total	55,280	3.01	n.a.	n.a.
Drafter	12,810	.70	14	29
Electrical and electronic technicians	12,220	.67	25	8
Mechanical engineering technician	10,840	.59	21	8
Tool programmer, numerical control	2,090	.11	19	7
Industrial engineering technician	3,970	.22	22	9
All other engineering technicians	13,350	.73	n.a.	n.a.
Science technicians	1,700	.09	20	2
All other technicians	9,650	.53	n.a.	n.a.
Service occupations	40,480	2.21	n.a.	n.a.
Janitors, porters, and cleaners	25,320	1.38	4	44
Guards and doorkeepers	10,200	.56	7	15
Food service workers	980	.05	23	2
Supervisor, nonworking-service only	1,660	.09	9	7
All other service workers	2,320	.13	n.a.	n.a.
Production, maintenance, construction, repair, material handling and powerplant occupations	1,188,110	64.74	n.a.	n.a.
Mechanics and repairers, total	64,190	3.50	n.a.	n.a.
Mechanic, aircraft	24,490	1.33	2	4
Mechanic, automotive	6,790	.37	8	19
Marine mechanic and/or repairer	4,140	.23	12	4
Mechanic, maintenance	19,440	1.06	5	21
All other mechanics and repairers	9,330	.51	n.a.	n.a.
Truck driver	7,260	.40	6	29
Boilermaker	1,920	.10	18	2
Carpenter	13,330	.73	6	25
Crane, derrick, and hoist operators	6,430	.35	7	12
Delivery and/or route worker	1,080	.06	9	7
Electrician	25,970	1.42	7	29

See footnotes at end of table.

Table 21. Transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1980—Continued

(SIC 37)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Filers, grinders, buffers, chippers, cleaners, and/or polishers	18,410	1.00	7	19
Supervisor, nonworking	67,600	3.68	5	53
Gear cutting, gear grinding and/or gear shaping machine operator	3,990	.22	9	5
Heater, metal	550	.03	11	1
Rigger	4,470	.24	10	5
Industrial truck operator	23,230	1.27	4	27
Inspector	67,680	3.69	3	33
Instrument repairer	1,160	.06	16	4
Machinist	15,780	.86	9	19
Maintenance repairer, general utility	6,780	.37	6	21
Helper, trades	11,150	.61	6	20
Millwright	10,370	.57	6	9
Oiler	2,180	.12	5	9
Order filler	2,740	.15	10	7
Painter, maintenance	3,680	.20	7	10
Pourer, metal	260	.01	19	1
Electroplater	2,510	.14	10	4
Plumber and/or pipefitter	19,220	1.05	9	15
Production packager, hand or machine	3,340	.18	8	7
Sewing machine operator, regular equipment-nongarment	2,560	.14	16	4
Sewing machine operator, special and/or automatic equipment-nongarment	740	.04	24	2
Sheet metal worker	16,950	.92	7	17
Stationary boiler firer	420	.02	13	2
Stationary engineer	1,540	.08	8	5
Shiprigger	2,570	.14	15	2
Tool and die maker	25,530	1.39	12	21
Welder and/or flamecutter	87,770	4.78	3	50
Coremaker, hand, bench and/or floor	560	.03	23	(³)
Coremaker, machine	400	.02	38	(³)
Die setter	480	.03	14	2
Drill press and/or boring machine operator	23,080	1.26	7	20
Fabricator, plastics	5,350	.29	20	2
Forging press operator	1,280	.07	14	2
Grinding and/or abrading machine operator, metal	17,780	.97	7	18
Heat treater, annealer, and/or temperer	3,810	.21	7	7
Lay-out marker, wood	180	.01	27	1
Lathe and/or turning machine operator, metal	23,080	1.26	7	20
Lay-out marker, metal	1,810	.10	9	6
Machine tool operator, combination	25,600	1.40	4	19
Machine tool operator, numerical control	10,050	.55	8	10
Machine tool operator, toolroom	10,040	.55	10	10
Machine tool setter, metalworking	15,140	.83	7	13
Milling and/or planing machine operator	14,740	.80	10	14
Molder, bench and/or floor	410	.02	20	1
Molder, machine	480	.03	14	1
Patternmaker, metal	1,190	.06	17	2
Patternmaker, wood	1,070	.06	28	3
Plater helper	720	.04	13	2
Power screwdriver operator	640	.03	15	1
Sawyer, metal	2,420	.13	20	6
Shipfitter	15,420	.84	8	6
Shipwright	2,830	.15	25	2
Tester	7,110	.39	10	9
Woodworking machine operator	1,730	.09	15	6
Painter, production	28,150	1.53	5	40
Die casting machine operator and/or setter, metal	720	.04	13	1
Riveter, heavy	3,200	.17	45	2
Riveter, light	2,440	.13	12	4

See footnotes at end of table.

Table 21. Transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1980—Continued

(SIC 37)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Punch press operator, metal	18,530	1.01	6	19
Punch press setter, metal	2,290	.12	9	6
Shear and/or slitter operator, metal	2,320	.13	8	8
Shear and/or slitter setter	1,150	.06	14	4
Compression and/or injection molding machine operator, plastics	2,440	.13	13	3
Conveyor operator or tender	4,100	.22	10	3
Dip plater, nonelectrolytic	660	.04	20	3
Furnace operator and/or cupola tender	350	.02	14	2
Power brake and/or bending machine operator, metal	6,860	.37	8	12
Driver, assembly line	760	.04	20	2
Aircraft structure and surfaces assembler	34,880	1.90	6	3
Machine assembler	34,600	1.89	5	14
Electromechanical equipment assembler	5,860	.32	12	4
Electrical and electronic assembler	12,740	.69	15	5
All other assemblers	96,410	5.25	n.a.	n.a.
Laminator, preforms	10,930	.60	9	11
All other skilled craft and kindred workers	23,830	1.30	n.a.	n.a.
All other operatives and semiskilled workers	103,890	5.66	n.a.	n.a.
All other laborers and unskilled workers	80,240	4.37	n.a.	n.a.
Clerical occupations	178,180	9.71	n.a.	n.a.
Office clerical workers, total	113,440	6.18	n.a.	n.a.
Bookkeeping and/or billing machine operator ..	430	.02	6	5
Computer operator	3,150	.17	7	18
Keypunch operator	4,170	.23	6	18
Peripheral EDP equipment operator	1,480	.08	16	5
All other office machine operators	4,530	.25	n.a.	n.a.
Stenographer	4,270	.23	15	9
Accounting clerk	6,660	.36	5	29
Bookkeeper, hand	2,360	.13	6	15
File clerk	2,710	.15	21	8
General office clerk	21,700	1.18	8	43
Order clerk	1,800	.10	9	11
Payroll and/or timekeeping clerk	3,980	.22	5	29
Personnel clerk	2,600	.14	13	18
Procurement clerk	2,320	.13	12	12
Receptionist	790	.04	9	10
Secretary	22,610	1.23	9	56
Statistical clerk	2,060	.11	23	5
Switchboard operator	880	.05	9	8
Switchboard operator/receptionist	1,300	.07	3	22
Typist	6,290	.34	11	18
Clerical supervisor, office or plant	5,330	.29	19	14
All other office clerical workers	12,020	.66	n.a.	n.a.
Plant clerical workers, total	64,740	3.53	n.a.	n.a.
Production clerk and/or coordinator	24,080	1.31	13	31
Shipping packer	4,610	.25	7	16
Shipping and/or receiving clerk	8,420	.46	5	31
Stock clerk, stockroom, warehouse or storage yard	22,230	1.21	9	33
All other plant clerical workers	5,400	.29	n.a.	n.a.
Sales occupations	9,470	.52	n.a.	n.a.
Sales agent, associate, and/or representative	8,640	.47	5	35
Sales clerk	830	.05	10	5

¹ Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

² Relative standard errors apply equally to data on estimated

employment and percent of total employment; relative standard errors estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

³ Rounded to zero.
n.a. Not available.

Instruments and Related Products

In 1980, establishments which manufacture instruments, ophthalmic goods, photographic equipment and supplies, and watches and clocks employed 709,760 workers, accounting for 4 percent of manufacturing and 6 percent of durable goods employment. Workers in establishments producing measuring and controlling instruments constituted 34 percent of industry employment; establishments manufacturing surgical, medical, and dental instruments and supplies, 22 percent; and those manufacturing photographic equipment and supplies, 19 percent.

The industry's 381,320 production and related workers accounted for 54 percent of total industry employment (table 22). Clerical workers ranked second

with 15 percent. Most of these were office clerical workers. Professional workers accounted for 12 percent; managers and officers, 9 percent; technical workers, 7 percent; and sales and service workers, 2 percent each.

The tabulation below lists the five most populous occupations in the industry:

	<i>Employment</i>	<i>Percent of industry employment</i>
Electrical and electronic assembler	32,360	4.6
Instrument maker and/or assembler	21,470	3.0
Electrical and electronic engineer	18,850	2.7
Electrical and electronic technician	18,160	2.6
Inspector	17,510	2.5

Table 22. Instruments and related products: Employment, relative error, and percent of establishments reporting selected occupations, April 1980

(SIC 38)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Total	709,760	100.00	--	--
Managers and officers	61,500	8.66	n.a.	93
Professional occupations	82,460	11.62	n.a.	n.a.
Engineers, total	40,330	5.68	n.a.	n.a.
Chemical engineer	1,010	.14	12	5
Electrical and electronic engineers	18,850	2.66	8	30
Industrial engineer	5,870	.83	11	19
Mechanical engineer	6,040	.85	6	21
All other engineers	8,560	1.21	n.a.	n.a.
Chemist	1,680	.24	8	8
All other natural and mathematical scientists	1,130	.16	14	3
Systems analyst, electronic data processing	2,600	.37	9	11
Purchasing agent and/or buyer	5,790	.82	4	47
Accountants and auditors	5,800	.82	6	26
Cost estimator, engineering	1,400	.20	15	10
Writer and/or editor	1,390	.20	11	8
Nurse, professional	400	.06	6	6
Personnel and labor relations specialists	2,390	.34	5	19
Designer	1,930	.27	7	9
All other professional workers	17,620	2.48	n.a.	n.a.
Technical occupations	52,840	7.44	n.a.	n.a.
Computer programmer	2,940	.41	6	15
Engineering technicians, total	36,500	5.14	n.a.	n.a.
Drafter	7,180	1.01	4	35
Electrical and electronic technicians	18,160	2.56	7	31
Mechanical engineering technician	2,700	.38	7	12
Tool programmer, numerical control	510	.07	8	5
Industrial engineering technician	1,210	.17	14	7
All other engineering technicians	6,740	.95	n.a.	n.a.
Science technicians	2,750	.39	11	6
Prosthetist-orthotist	730	.10	26	3
All other technicians	9,920	1.40	n.a.	n.a.
Service occupations	12,130	1.71	n.a.	n.a.
Janitors, porters, and cleaners	6,930	.98	5	35
Guards and doorkeepers	1,420	.20	8	5
Food service workers	440	.06	21	2
Supervisor, nonworking-service only	680	.10	8	6
All other service workers	2,660	.37	n.a.	n.a.
Production, maintenance, construction, repair, material handling and powerplant occupations	381,320	53.73	n.a.	n.a.
Mechanics and repairers, total	5,250	.74	n.a.	n.a.
Mechanic, automotive	170	.02	21	1
Mechanic, maintenance	3,840	.54	7	12
All other mechanics and repairers	1,240	.17	n.a.	n.a.
Truck driver	720	.10	10	7
Carpenter	1,030	.15	24	6
Delivery and/or route worker	470	.07	14	7
Electrician	1,640	.23	6	11
Filers, grinders, buffers, chippers, cleaners, and/or polishers	3,060	.43	10	8
Supervisor, nonworking	15,730	2.22	3	41
Gear cutting, gear grinding and/or gear shaping machine operator	310	.04	13	2
Industrial truck operator	2,130	.30	11	7
Inspector	17,510	2.47	4	35
Instrument repairer	2,550	.36	13	8
Lens grinder	4,620	.65	12	6
Machinist	6,750	.95	7	23
Maintenance repairer, general utility	4,480	.63	6	25
Helper, trades	1,040	.15	10	7
Millwright	460	.06	14	3
Oiler	100	.01	12	1

See footnotes at end of table.

Table 22. Instruments and related products: Employment, relative error, and percent of establishments reporting selected occupations, April 1980—Continued

(SIC 38)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Order filler	2,960	0.42	8	14
Painter, maintenance	370	.05	12	4
Electroplater	720	.10	11	4
Plumber and/or pipefitter	560	.08	11	3
Production packager, hand or machine	10,830	1.53	8	17
Sewing machine operator, regular equipment-nongarment	4,400	.62	15	5
Sewing machine operator, special and/or automatic equipment-nongarment	1,190	.17	24	2
Sheet metal worker	2,660	.37	10	8
Stationary boiler firer	150	.02	11	1
Stationary engineer	270	.04	13	1
Tool and die maker	4,680	.66	7	16
Welder and/or flamecutter	3,350	.47	8	14
Optician, dispensing and/or optical mechanic	8,690	1.22	9	11
Chemical operator A	1,120	.16	11	2
Chemical operator B	1,020	.14	13	1
Chemical operator helper	560	.08	21	1
Drill press and/or boring machine operator	3,850	.54	6	12
Grinding and/or abrading machine operator, metal	3,880	.55	8	12
Heat treater, annealer, and/or temperer	280	.04	16	2
Lathe and/or turning machine operator, metal	4,210	.59	7	13
Lay-out marker, metal	190	.03	32	1
Machine tool operator, combination	6,720	.95	8	17
Machine tool operator, numerical control	2,640	.37	8	10
Machine tool operator, toolroom	1,150	.16	14	5
Machine tool setter, metalworking	2,610	.37	11	11
Milling and/or planing machine operator	1,740	.25	9	.9
Plater helper	490	.07	12	2
Power screwdriver operator	470	.07	38	1
Sawyer, metal	130	.02	24	1
Tester	7,510	1.06	6	18
Painter, production	2,220	.31	8	14
Die casting machine operator and/or setter, metal	510	.07	18	1
Wired, electronic	8,960	1.26	8	13
Punch press operator, metal	4,190	.59	11	12
Punch press setter, metal	710	.10	14	5
Shear and/or slitter operator, metal	240	.03	15	2
Shear and/or slitter setter	120	.02	21	1
Compression and/or injection molding machine operator, plastics	4,550	.64	11	6
Conveyor operator or tender	560	.08	32	1
Dip plater, nonelectrolytic	630	.09	16	2
Chief operator	400	.06	28	1
Adhesive bandage machine operator	640	.09	29	(³)
Power brake and/or bending machine operator, metal	600	.08	18	3
Clock, watch, and chronometer assembler	7,270	1.02	27	3
Instrument maker and/or assembler	21,470	3.02	10	17
Electromechanical equipment assembler	15,420	2.17	7	15
Electrical and electronic assembler	32,360	4.56	7	19
All other assemblers	34,300	4.83	n.a.	n.a.
Mixer and/or blender, chemicals and chemical products	950	.13	12	4
All other skilled craft and kindred workers	21,510	3.03	n.a.	n.a.
All other operatives and semiskilled workers	46,940	6.61	n.a.	n.a.
All other laborers and unskilled workers	29,520	4.16	n.a.	n.a.
Clerical occupations	105,970	14.93	n.a.	n.a.
Office clerical workers, total	75,440	10.63	n.a.	n.a.
Bookkeeping and/or billing machine operator ..	540	.08	8	6
Computer operator	2,000	.28	5	17

See footnotes at end of table.

Table 22. Instruments and related products: Employment, relative error, and percent of establishments reporting selected occupations, April 1980—Continued

(SIC 38)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Office clerical workers—Continued				
Keypunch operator	2,430	0.34	5	14
Peripheral EDP equipment operator	370	.05	9	3
All other office machine operators	810	.11	n.a.	n.a.
Stenographer	1,410	.20	8	7
Accounting clerk	6,770	.95	4	38
Bookkeeper, hand	2,310	.33	6	32
File clerk	1,720	.24	7	13
General office clerk	11,000	1.55	5	44
Order clerk	4,080	.57	5	21
Payroll and/or timekeeping clerk	1,600	.23	3	22
Personnel clerk	1,200	.17	3	17
Procurement clerk	1,700	.24	6	17
Receptionist	420	.06	17	7
Secretary	15,360	2.16	4	52
Statistical clerk	520	.07	10	5
Switchboard operator	580	.08	8	7
Switchboard operator/receptionist	1,190	.17	3	23
Typist	4,890	.69	4	29
Clerical supervisor, office or plant	2,590	.36	6	12
All other office clerical workers	11,950	1.68	n.a.	n.a.
Plant clerical workers, total	30,530	4.30	n.a.	n.a.
Production clerk and/or coordinator	6,500	.92	5	24
Shipping packer	4,580	.65	5	22
Shipping and/or receiving clerk	5,990	.84	4	49
Stock clerk, stockroom, warehouse or storage yard	8,650	1.22	6	27
All other plant clerical workers	4,810	.68	n.a.	n.a.
Sales occupations	13,540	1.91	n.a.	n.a.
Sales agent, associate, and/or representative	12,780	1.80	5	38
Sales clerk	760	.11	12	4

¹ Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

² Relative standard errors apply equally to data on estimated

employment and percent of total employment; relative standard errors estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

³ Rounded to zero.
n.a. Not available.

Miscellaneous Manufacturing Industries

Establishments which manufacture products other than those previously discussed employed 421,790 workers in 1980, or 2 percent of manufacturing and 4 percent of durable goods employment. Of these workers, 32 percent worked in establishments manufacturing brooms and brushes, signs and advertising displays, burial caskets, and other miscellaneous products; 28 percent worked in establishments manufacturing toys and amusement, sporting, and athletic goods; and 13 percent worked in establishments producing jewelry, silverware, and plated ware.

As shown in table 23, the largest occupational group in miscellaneous manufacturing industries, consisting of 290,030 production and related workers, accounted for 69 percent of total industry employment. Clerical workers ranked second with 14 percent. Most of these

were office clerical workers. The remaining employment was distributed as follows: Managers and officers, 8 percent; professional workers, 4 percent; sales workers, 3 percent; and service and technical workers, 2 percent each.

The five most populous occupations in miscellaneous manufacturing industries are listed in the tabulation below:

	<i>Employment</i>	<i>Percent of industry employment</i>
Assembler	47,010	11.2
Production packager, hand or machine	17,000	4.0
Sales agent, associate, and/or representative	10,820	2.6
Supervisor, nonworking	10,180	2.4
Bench hand, jewelry	7,460	1.8

Table 23. Miscellaneous manufacturing industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1980

(SIC 39)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Total	421,790	100.00	--	--
Managers and officers	32,400	7.68	n.a.	90
Professional occupations	14,760	3.50	n.a.	n.a.
Engineers, total	3,270	.78	n.a.	n.a.
Industrial engineer	1,310	.31	6	8
Mechanical engineer	1,350	.32	6	7
All other engineers	610	.14	n.a.	n.a.
Chemist	400	.09	7	3
Systems analyst, electronic data processing	450	.11	6	3
Purchasing agent and/or buyer	2,270	.54	3	21
Accountants and auditors	2,560	.61	4	17
Nurse, professional	170	.04	8	2
Personnel and labor relations specialists	800	.19	4	8
Designer	3,600	.85	4	18
All other professional workers	1,240	.29	n.a.	n.a.
Technical occupations	6,270	1.49	n.a.	n.a.
Computer programmer	750	.18	6	5
Engineering technicians, total	4,060	.96	n.a.	n.a.
Drafter	1,690	.40	8	9
Electrical and electronic technicians	1,370	.32	9	4
Tool programmer, numerical control	160	.04	13	1
All other engineering technicians	840	.20	n.a.	n.a.
Science technicians	410	.10	11	1
All other technicians	1,050	.25	n.a.	n.a.
Service occupations	7,080	1.68	n.a.	n.a.
Janitors, porters, and cleaners	3,950	.94	2	23
Guards and doorkeepers	870	.21	5	4
Food service workers	370	.09	29	1
Supervisor, nonworking-service only	440	.10	13	2
All other service workers	1,450	.34	n.a.	n.a.
Production, maintenance, construction, repair, material handling and powerplant occupations	290,030	68.76	n.a.	n.a.
Mechanics and repairers, total	3,380	.80	n.a.	n.a.
Mechanic, automotive	300	.07	10	2
Mechanic, maintenance	2,440	.58	7	6
All other mechanics and repairers	640	.15	n.a.	n.a.
Truck driver	1,660	.39	5	10
Cabinetmaker	2,260	.54	10	4
Carpenter	1,640	.39	10	5
Compositor and/or typesetter	830	.20	6	5
Crane, derrick, and hoist operators	740	.18	11	3
Delivery and/or route worker	1,030	.24	8	6
Electrician	2,220	.53	7	9
Filers, grinders, buffers, chippers, cleaners, and/or polishers	5,330	1.26	5	10
Supervisor, nonworking	10,180	2.41	2	30
Rigger	190	.05	26	(³)
Industrial truck operator	2,830	.67	6	7
Inspector	6,590	1.56	4	13
Jeweler and/or silversmith	3,420	.81	6	8
Machinist	1,710	.41	5	7
Maintenance repairer, general utility	2,780	.66	3	15
Helper, trades	2,840	.67	5	9
Millwright	380	.09	12	1
Oiler	160	.04	12	1
Order filler	3,420	.81	4	12
Painter, maintenance	580	.14	10	3
Electroplater	1,050	.25	7	5
Plumber and/or pipefitter	170	.04	14	1
Press operator and/or plate printer	1,460	.35	8	3
Production packager, hand or machine	17,000	4.03	4	17

See footnotes at end of table.

Table 23. Miscellaneous manufacturing industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1980—Continued

(SIC 39)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Sewing machine operator, regular equipment-garment	1,620	0.38	13	2
Sewing machine operator, special equipment and/or automatic equipment-garment	770	.18	20	1
Sewing machine operator, regular equipment-nongarment	6,210	1.47	6	7
Sewing machine operator, special and/or automatic equipment-nongarment	1,680	.40	14	2
Sheet metal worker	2,480	.59	7	8
Stationary boiler firer	150	.04	10	1
Stationary engineer	120	.03	11	1
Tool and die maker	3,010	.71	5	9
Welder and/or flamecutter	3,140	.74	6	9
Bench hand, jewelry	7,460	1.77	6	9
Boring machine operator, wood	360	.09	15	2
Wood carving machine operator	370	.09	26	1
Caster	1,030	.24	8	5
Caster, finished or semifinished products	270	.06	13	1
Centrifugal casting machine operator	160	.04	16	1
Chain maker, hand	240	.06	16	1
Cut off saw operator, lumber	610	.14	8	3
Drill press and/or boring machine operator	1,410	.33	8	4
Etcher and/or engraver	1,630	.39	7	6
Fabricator, plastics	2,190	.52	10	6
Finisher, hand	1,280	.30	10	3
Gem cutter	350	.08	24	1
Grinding and/or abrading machine operator, metal	4,210	1.00	6	8
Heat treater, annealer, and/or temperer	260	.06	11	1
Jewel bearing lathe operator	210	.05	31	(³)
Lathe operator, wood	370	.09	15	1
Lathe and/or turning machine operator, metal	900	.21	9	3
Lay-out marker, metal	180	.04	17	1
Machine setter, woodworking	500	.12	11	2
Machine tool operator, combination	1,310	.31	8	4
Machine tool operator, numerical control	520	.12	12	2
Machine tool operator, toolroom	510	.12	9	2
Machine tool setter, metalworking	860	.20	9	3
Metal mold maker	410	.10	16	1
Milling and/or planing machine operator	380	.09	13	1
Wood machinist	1,230	.29	15	3
Plater helper	1,110	.26	7	4
Ripsaw operator	470	.11	9	2
Rubber mold maker	350	.08	9	2
Sander, wood	1,730	.41	8	4
Sawyer, metal	250	.06	11	2
Stone setter	1,820	.43	6	6
Tester	810	.19	10	3
Trimmer, plastics	670	.16	13	2
Tumbler operator, plastics	150	.04	12	1
Vulcanizer, rubber plate	430	.10	10	3
Wax pattern worker	2,090	.50	8	5
Woodworking machine operator	1,240	.29	8	3
Painter, production	5,080	1.20	4	16
Die casting machine operator and/or setter, metal	530	.13	15	1
Punch press operator, metal	5,740	1.36	5	11
Punch press setter, metal	970	.23	7	5
Compression and/or injection molding machine operator, plastics	4,970	1.18	8	4
Conveyor operator or tender	500	.12	14	1
Dip plater, nonelectrolytic	460	.11	15	2
Setter, plastic molding machine	720	.17	11	3
Casket coverer and/or casket liner	1,010	.24	11	2

See footnotes at end of table.

Table 23. Miscellaneous manufacturing industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1980—Continued

(SIC 39)

Occupation	Employment ¹	Percent of total employment	Relative error (in percentage) ²	Percent of establishments reporting the occupation
Production, maintenance, construction, repair, material handling and powerplant occupations—Continued				
Gluer and/or cementer, hand	2,110	0.50	7	6
Screen or stencil printer and/or setter	2,620	.62	6	9
Screen cutter and/or maker, non-photographic ...	420	.10	11	3
Screen maker, photographic process	720	.17	9	4
Assembler	47,010	11.15	4	25
Decorator, hand	1,940	.46	7	4
Bagger plastics	100	.02	21	(³)
Blow molding machine operator	590	.14	19	1
Caster, plastics	400	.09	19	1
Laminator, preforms	620	.15	15	1
Press operator, plastics	760	.18	11	2
Rotation molding machine operator	270	.06	26	(³)
Tube molder, fiberglass	250	.06	36	(³)
Vacuum plastic forming machine operator	890	.21	16	3
All other skilled craft and kindred workers	5,850	1.39	n.a.	n.a.
All other operatives and semiskilled workers	29,330	6.95	n.a.	n.a.
All other laborers and unskilled workers	42,810	10.15	n.a.	n.a.
Clerical occupations	59,280	14.05	n.a.	n.a.
Office clerical workers, total	40,140	9.52	n.a.	n.a.
Bookkeeping and/or billing machine operator ..	870	.21	5	7
Computer operator	1,160	.28	3	9
Keypunch operator	1,160	.28	4	6
Peripheral EDP equipment operator	350	.08	9	2
All other office machine operators	250	.06	n.a.	n.a.
Stenographer	560	.13	7	4
Accounting clerk	3,380	.80	3	20
Bookkeeper, hand	3,410	.81	3	30
File clerk	1,210	.29	5	8
General office clerk	6,280	1.49	3	29
Order clerk	3,020	.72	3	15
Payroll and/or timekeeping clerk	1,810	.43	4	15
Personnel clerk	630	.15	4	7
Procurement clerk	730	.17	4	7
Receptionist	750	.18	5	8
Secretary	6,000	1.42	3	34
Statistical clerk	380	.09	7	3
Switchboard operator	300	.07	5	3
Switchboard operator/receptionist	1,190	.28	3	15
Typist	2,480	.59	4	15
Clerical supervisor, office or plant	2,250	.53	4	13
All other office clerical workers	1,970	.47	n.a.	n.a.
Plant clerical workers, total	19,140	4.54	n.a.	n.a.
Production clerk and/or coordinator	3,410	.81	4	17
Shipping packer	7,000	1.66	3	26
Shipping and/or receiving clerk	4,140	.98	2	28
Stock clerk, stockroom, warehouse or storage yard	3,240	.77	4	15
All other plant clerical workers	1,350	.32	n.a.	n.a.
Sales occupations	11,970	2.84	n.a.	n.a.
Sales agent, associate, and/or representative	10,820	2.57	3	34
Sales clerk	1,150	.27	8	6

¹ Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

² Relative standard errors apply equally to data on estimated

employment and percent of total employment; relative standard errors estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

³ Rounded to zero.

n.a. Not available.

Appendix A. Survey Methods and Reliability of Estimates

Scope of survey

The survey covered private manufacturing establishments in Standard Industrial Classification (SIC) codes 20 through 39. The reference date of the survey was the week that included April 12, May 12, or June 12, 1980, depending on the SIC of the sampled unit as shown below:

<i>SIC</i>	<i>Reference date</i>
20.....	June 12
21.....	April 12
22.....	April 12
23.....	May 12
24.....	May 12
25.....	June 12
26.....	April 12
27.....	May 12
28.....	June 12
29.....	May 12
30.....	June 12
31.....	May 12
32.....	May 12
33.....	June 12
34.....	June 12
35.....	June 12
36.....	June 12
37.....	June 12
38.....	April 12
39.....	May 12

The survey covered all 50 States and the District of Columbia.

Method of collection

Survey schedules were mailed to most sample establishments; personal visits were made to some larger companies. Two additional mailings were sent to nonrespondents at approximately 6-week intervals. Nonrespondents considered critical to the survey (due to size) were followed up by telephone or personal visit.

Sampling procedure

The sampling frame for this survey was the list of units (excluding government units) in the specified SIC's as reported to State unemployment insurance agencies. Because each cooperating State selected its own sample, the reference date of the sampling frame varied depending on when the last updates to the frame were made

and when sampling took place. The reference date for the frame used for sampling in the supplemental State was the first quarter of 1979.

The universe was stratified into SIC and size classes. The size classes were determined by employment as follows:

<i>Size class</i>	<i>Employees</i>
1	0-3
2	4-9
3	10-19
4	20-49
5	50-99
6	100-249
7	250-499
8	500-999
9	1,000 and over

Reporting units with 0-3 employees were not sampled in all States, but units with 4-9 employees were given larger weights to represent the employment in the smaller size class. Reporting units with 250 or more employees were included in the sample with certainty. Sample sizes intended to produce State estimates with target relative errors of 10 to 15 percent at one standard deviation were developed for the noncertainty size classes. This was done for groups of SIC's based on averages of occupational rates and coefficients of variation (CV's) from the previous survey for a set of typical occupations. This SIC sample size was allocated to the size classes in proportion to size class employment. The sample was selected systematically with equal probability within each State/SIC/size class cell.

States were given the option of two target relative errors in designing their samples. Some States varied the target relative error by SIC to allow reductions in sample size for cost reasons.

The sample size for the supplemental State was developed by first determining the sample size required for national estimates in each two-digit SIC with a target relative error of 10 percent at one standard deviation. This was done by averaging CV's and occupational rates for a set of occupations from the previous survey. Establishments with 1,000 or more employees were included with certainty. This national SIC sample size was then allocated to the noncooperating State/size class cells in proportion to employment.

Response

There were 159,672 final eligible units in the sample (i.e., excluding establishments that were out of business, out of scope, etc.). Usable responses were obtained from 111,860 units, producing a response rate of 70.1 percent based on units and 70.6 percent based on weighted employment. Subsequent to the national estimates, States received additional data to prepare State estimates. Response rates in most States were significantly higher than the response rate used to develop national estimates.

Estimation

A weight was determined for each sample unit from which a usable response was received. Each weight was composed of two factors. The first factor was the inverse of the probability of selection. The second was the nonresponse adjustment factor, used to correct for questionnaires that were not returned or not usable. For each of the three-digit SIC/State/size class sampling cells, a nonresponse factor was calculated that was equal to:

$$\frac{\text{Weighted sample employment of all eligible units in sample}}{\text{Weighted sample employment of all responding eligible units}}$$

Sample employment was taken from the sampling frame. If the factor in a cell was greater than a predetermined maximum factor, which increased as the number of respondents in a cell increased, the cell was collapsed with other homogeneous cells within the SIC until the factor for the combined cells was not greater than the appropriate maximum factor. If the collapsing procedure terminated (i.e., no more cells were available for collapse) before satisfying the above constraint, then the appropriate maximum factor was used. For size classes 1-6, homogeneous cells were determined to be other *size* cells within the SIC and State. For size classes 7-9, homogeneous cells were determined to be other *State* cells within the SIC and size class. The weight for each establishment was the product of the two factors.

A combined ratio estimate of occupational employment was used to develop the national estimates. The auxiliary variable used was total employment. The estimating formula is:

$$\hat{p} = \sum_i \left[\frac{\sum_j \sum_k w_{ijk} P_{ijk}}{\sum_j \sum_k w_{ijk} e_{ijk}} \cdot M_i \right]$$

Where: \hat{p} = 2-digit industry occupational employment estimate

- i = 3-digit industry within a 2-digit industry
- j = size class
- k = establishment
- w_{ijk} = weight after nonresponse adjustment in i -th industry, j -th size class and k -th establishment
- P_{ijk} = occupational employment in i -th industry, j -th size class and k -th establishment
- e_{ijk} = total employment in i -th industry, j -th size class and k -th establishment
- M_i = population total employment in i -th industry

The population value of total employment (M_i) was obtained from the BLS monthly survey of nonagricultural establishments.

The standard form for the sampling variance for a combined ratio estimate is:

$$V(\hat{p}) = \sum_i \sum_j \frac{N_{ij}^2 (1 - f_{ij})}{n_{ij}} \cdot A_{ij}$$

- Where: $V(\hat{p})$ = variance of \hat{p}
- i = 3-digit industry within a 2-digit industry
 - j = size class
 - N_{ij} = total number of units in the i -th industry and j -th size class
 - f_{ij} = sampling fraction in the i -th industry and j -th size class
 - n_{ij} = number of sample units in the i -th industry and j -th size class
 - S_{pij} = standard deviation of p within the i -th industry and j -th size class
 - S_{eij} = standard deviation of e within the i -th industry and j -th size class
 - K_{ij} = correlation coefficient between p and e within the i -th industry and j -th size class.

The variances for the occupational estimates were estimated from the following formula:

$$\begin{aligned} \text{Var}(\hat{P}) &= \sum_i \sum_j T_{ij} V_{ij}^2 \\ T_{ij} &= [B_{ij}] \cdot [D_{ij}] \cdot [F_{ij}]^2 \\ B_{ij} &= (M_{ij} - e_{ij}) / (M_{ij}) \\ D_{ij} &= (G_{ij}) / (H_{ij}) \\ G_{ij} &= \left(\sum_k w_{ijk}^2 \right) \left(\sum_k w_{ijk} \right) \\ H_{ij} &= \left(\sum_k w_{ijk} \right)^2 - \left(\sum_k w_{ijk}^2 \right) \\ F_{ij} &= (M_i) / \left(\sum_j \sum_k w_{ijk} e_{ijk} \right) \end{aligned}$$

$$V_{ij}^2 = \sum_k w_{ijk} \cdot L_{ijk}^2$$

$$L_{ijk} = (P_{ijk} - R_i e_{ij}) - (\bar{P}_{ij} - R_i \bar{e}_{ij})$$

Where:

M_{ij} = benchmark total employment in the i -th industry and j -th size class

$$R_i = \left(\sum_j \sum_k w_{ijk} P_{ijk} \right) / \left(\sum_j \sum_k w_{ijk} e_{ij} \right)$$

$$e_{ij} = \sum_k w_{ijk}$$

All other terms are as defined above. This formula is almost a computational form of the standard formula given above. One simplifying assumption has been made:

$$W_{ijk} = C_{ij} \text{ for all } k \text{ in a given } ij \text{ cell}$$

That is, the weights are equal to a constant C within a given three-digit industry/size class cell. At this time, the total effect of this assumption on the variance estimates has not been measured.

Reliability of estimates

Estimates developed from the sample may differ from the results of a complete survey of all the establishments in the sampled lists. Two types of errors, sampling and nonsampling, are possible in an estimate based on a sample survey. Sampling error occurs because observations are made only on a sample, not on the entire population. Nonsampling error can be attributed to many sources, e.g., inability to obtain information about all cases in the sample; differences in the respondents' interpretation of questions; inability of respondents to provide correct information; errors in recording, coding, or processing the data; errors in estimating values for missing data; and failure to represent all units in the population.

The particular sample used in this survey is one of a large number of all possible samples of the same size that could have been selected using the same sample design. Estimates derived from the different samples would differ from each other; the difference between a sample estimate and the average of all possible sample estimates is called the sampling deviation. The standard or sampling error of a survey estimate is a measure of the variation among the estimates from all possible samples. The relative standard error is defined as the standard error of the estimate divided by the value being estimated; the variance is defined as the standard error squared.

The sample estimate and an estimate of its standard error enable one to construct interval estimates with prescribed confidence that the interval includes the average result of all possible samples that could be ob-

tained from the sample design for the survey.

To illustrate, if all possible samples were selected, and if each of these were surveyed under essentially the same conditions and an estimate and its estimated sample error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below to one standard error above the derived estimate would include the average value of all possible samples. This interval is called a 68-percent confidence interval.
2. Approximately 90 percent of the intervals from 1.6 standard errors below to 1.6 standard errors above the derived estimate would include the average of all possible samples. This interval is called a 90-percent confidence interval.
3. Approximately 95 percent of the intervals from two standard errors below to two standard errors above the derived estimate would include the average of all possible samples. This interval is called a 95-percent confidence interval.
4. Almost all intervals from three standard errors below to three standard errors above the derived estimate would include the average of all possible samples.

An inference that the complete coverage value would be within the indicated ranges would be correct in approximately the relative frequencies shown.

For example, suppose an estimated total is shown as 5,000 with an associated relative error of 2 percent. Then the standard error is 100 (2 percent of 5,000) and there is a 68-percent chance that the average of all possible sample totals would be between 4,900 and 5,100, and it is almost certain that the average of all possible sample totals would be between 4,700 and 5,300.

The relative errors provided primarily indicate the magnitude of the sampling error, but do not measure biases in the data due to nonsampling error. Efforts were made to reduce the biases due to errors in recording, coding, and processing the data. The adjustment made for nonrespondents assumed that the characteristics of the nonrespondents were the same as those of the respondents at a given level. To the extent this is not true, bias is introduced in the data. The magnitude of these biases is not known.

Particular care should be exercised in the interpretation of small estimates, estimates based on a small number of cases, or small differences between estimates because the sampling errors are relatively large and the magnitude of the biases is unknown.

Appendix B. OES Survey Data Available from State Agencies

State data on occupational employment in manufacturing are available as indicated in the following table. These reports may be obtained from the State employ-

ment security agencies listed on the inside back cover of this publication.

Table B-1. OES survey data available by State and year

State	1971	1974	1977	1980	State	1971	1974	1977	1980
Alabama		X	X	X	Montana				X
Alaska	X	X	X	X	Nevada	X	X	X	
Arizona			X	X	New Hampshire			X	X
Arkansas			X	X	New Jersey	X	X	X	X
California			X		New Mexico			X	X
Colorado	X	X	X	X	New York		X	X	X
Connecticut			X	X	North Carolina		X	X	X
Delaware		X	X	X	North Dakota			X	X
District of Columbia		X	X	(¹)	Nebraska				X
Florida	X	X	X	X	Ohio				X
Georgia		X	X	X	Oklahoma	X	X	X	X
Hawaii			X	X	Oregon	X	X	X	
Idaho			X		Pennsylvania		X	X	X
Illinois			X	X	Rhode Island			X	X
Indiana	X	X	X	(¹)	South Carolina	X	X	X	X
Iowa				X	South Dakota				X
Kansas				X	Tennessee			X	X
Kentucky		X	X	X	Texas		X	X	X
Louisiana			X	X	Utah	X	X	X	X
Maine		X	X	X	Vermont				X
Maryland		X	X	X	Virginia	X	X	X	X
Massachusetts	X	X	X	X	Washington				
Michigan			X	X	West Virginia	X	X	X	X
Minnesota	X	X	X	X	Wisconsin	X	X	X	X
Mississippi		X	X	X	Wyoming			X	X
Missouri	X	X	X	X					

¹ Report in progress.

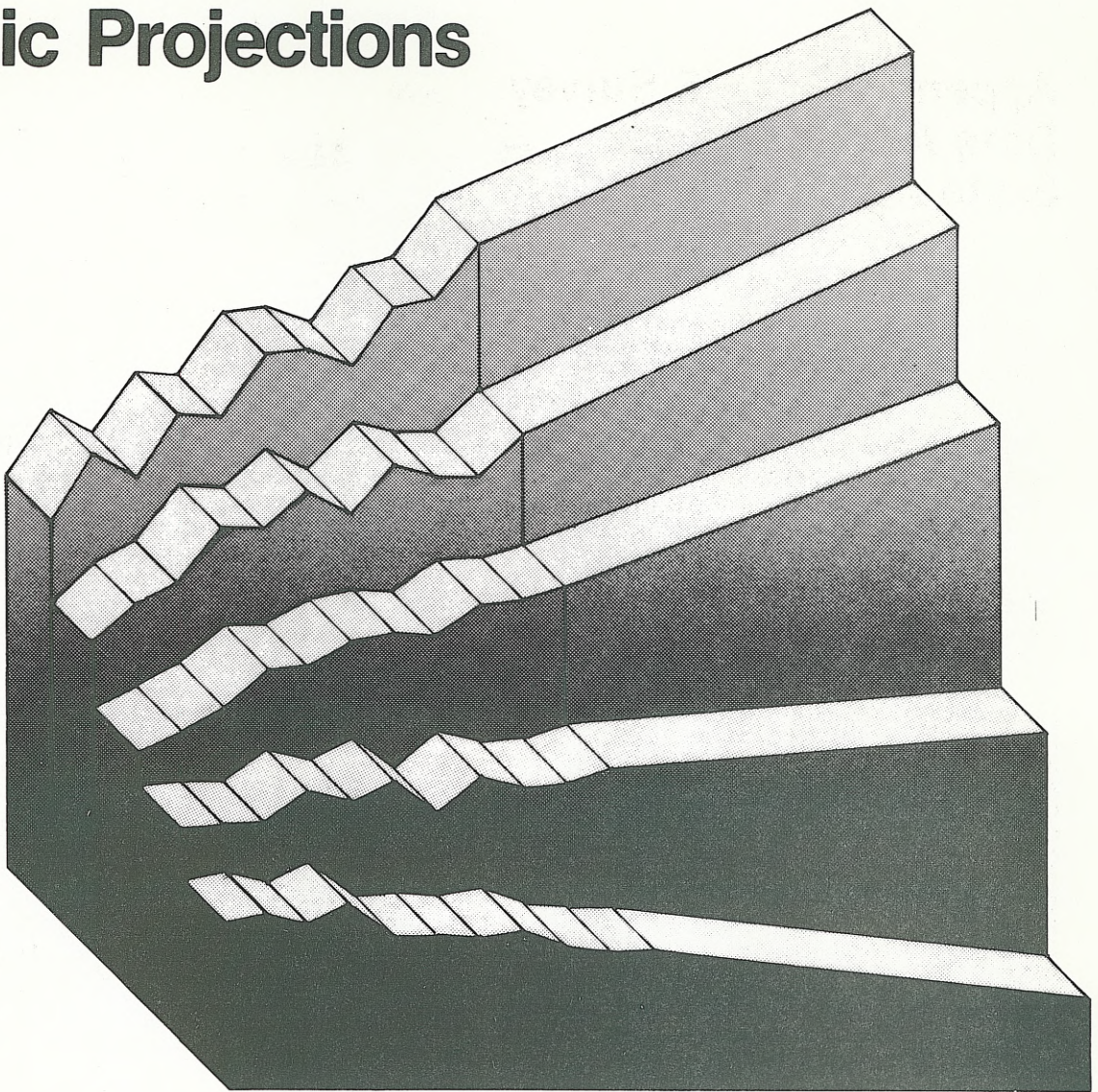
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X ALASKA	-Department of Labor, Employment Security Division, P.O. Box 1149, Juneau 99802
IX ARIZONA	-Department of Economic Security, Labor Market Information, P.O. Box 6123, Phoenix 85005
VI ARKANSAS	-Department of Labor, Employment Security Division, P.O. Box 2981, Little Rock 72203
IX CALIFORNIA	-Employment Development Department, P.O. Box 1679, Sacramento 95808
VIII COLORADO	-Department of Labor, Division of Employment and Training, 251 East 12th Avenue, Denver 80203
I CONNECTICUT	-Labor Department, Employment Security Division, 200 Folly Brook Boulevard, Wethersfield 06109
III DELAWARE	-Department of Labor, University Plaza Office Complex, Bldg. D, Chapman Rd., Route 273, Newark 19713
III DIST. OF COL.	-D.C. Department of Labor, Division of Labor Market Information, Research, and Analysis, 605 G Street, N.W., Washington 20001
IV FLORIDA	-Department of Labor and Employment Security, Caldwell Bldg., Tallahassee 32301
IV GEORGIA	-Department of Labor, Labor Information Systems, 254 Washington Street, S.W., Atlanta 30334
IX HAWAII	-Department of Labor and Industrial Relations, P.O. Box 3680, Honolulu 96811
X IDAHO	-Department of Employment, Research and Analysis Division, P.O. Box 35, Boise 83707
V ILLINOIS	-Bureau of Employment Security, Research and Analysis Division, 910 South Michigan Avenue, 12th Floor, Chicago 60605
V INDIANA	-Employment Security Division, 10 North Senate Avenue, Indianapolis 46204
IV KENTUCKY	-Department of Human Resources, 275 E. Main Street, 2nd Floor West, Frankfort 40621
VI LOUISIANA	-Department of Labor, P.O. Box 44094, Capitol Station, Baton Rouge 70804
I MAINE	-Department of Manpower Affairs, Employment Security Commission, 20 Union Street, Augusta 04330
III MARYLAND	-Department of Human Resources, 1100 North Eutaw Street, Baltimore 21201
I MASSACHUSETTS	-Division of Employment Security, Research and Statistics Division, Charles F. Hurley Bldg., Boston 02114
V MICHIGAN	-Employment Security Commission, Research and Statistics Division, 7310 Woodward Avenue, Detroit 48202
V MINNESOTA	-Department of Economic Security, Research and Statistical Services Office, 390 North Robert Street, St. Paul 55101
IV MISSISSIPPI	-Employment Security Commission, P.O. Box 1699, Jackson 39205
VII MISSOURI	-Department of Labor and Industrial Relations, Division of Employment Security, P.O. Box 59, Jefferson City 65101
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