

Occupational employment projections through 1995

During 1982–95, health care will continue to be an expanding field of work, typists are apt to decline due to word processors, and high technology should spur the growth of occupations such as engineers and computer personnel but dim the outlook for others, especially drafters

GEORGE T. SILVESTRI, JOHN M. LUKASIEWICZ,
AND MARCUS E. EINSTEIN

The most recent occupational projections by the Bureau of Labor Statistics suggest that a wide range of job skills will be needed in 1995. Employment in jobs requiring a college education or specialized post-secondary technical training are expected to increase significantly between 1982 and 1995. However, many jobs that do not require post-secondary training are also expected to expand significantly. For example, the projected rapid increase in demand for medical services will require large numbers of nursing aides and orderlies in addition to highly trained medical practitioners.

On the other hand, employment growth in many occupations will be affected by technological change through the mid-1990's. For example, word processing equipment will slow the employment growth of typists, and industrial robots will reduce the growth in employment of welders, production painters, and material moving occupations. However, despite widespread technological advances, employment will continue to advance in most traditional fields from 1982 to 1995. More workers will be needed to drive trucks to deliver goods, to clean a growing number of buildings, to perform health and personal services and provide police and fire

protection for our increasing population, and to maintain and repair a larger stock of automobiles, appliances, and factory equipment.

Rapid expansion of high technology will spur the growth of scientists, engineers, technicians, and computer specialists. They will be required to design, develop, and use high-technology products such as computers, scientific and medical instruments, communication equipment, and robots. Employment in these occupations has generally grown faster than the economy as a whole and most are expected to continue to do so. However, even in some of these fields, technological advances will have an impact on reducing employment needs. For example, advances in computer-aided design technology are expected to severely limit the employment growth of drafters.

The pattern of industrial employment growth also has an important impact on expected changes in occupational structure, because many occupations are concentrated by industry. Therefore, the information on occupational growth patterns presented in this article cannot be fully understood apart from the data and analyses dealing with economic and industry growth trends presented elsewhere in this issue of the *Review*. Indeed, the methodologies used to develop both the industry and occupational projections are very closely related.¹

The authors are economists in the Division of Occupational Outlook, Bureau of Labor Statistics.

Table 1. Civilian employment in occupations with 25,000 workers or more, actual 1979, 1982, and projected 1995

Occupation	Total employment (in thousands)					Percent change					
	1979	1982	1995			1979-95			1982-95		
			Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Total, all occupations	101,206	101,510	124,846	127,110	129,902	23	26	28	23	25	28
Professional, technical, and related workers	15,758	16,584	21,545	21,775	22,325	37	38	42	30	31	35
Engineers	1,177	1,204	1,787	1,788	1,831	52	52	56	48	49	52
Aero-astronautic engineers	44	44	65	62	62	47	39	41	49	41	42
Chemical engineers	58	56	79	80	82	37	40	43	41	43	47
Civil engineers	156	155	226	228	236	45	46	51	45	47	52
Electrical engineers	300	320	531	528	540	77	76	80	66	65	69
Industrial engineers	171	160	226	227	232	32	32	36	41	42	45
Mechanical engineers	216	209	314	318	327	45	47	51	50	52	56
Petroleum engineers	16	26	31	32	30	95	98	89	19	22	16
Life and physical scientists	247	271	343	342	348	39	38	41	27	26	29
Biological scientists	47	52	71	70	73	50	48	53	38	36	41
Chemists	87	89	107	108	111	22	24	27	21	22	25
Geologists	38	49	60	60	59	60	60	57	24	24	21
Mathematical specialists	48	48	63	62	63	31	29	32	31	29	32
Engineering and science technicians	1,227	1,243	1,649	1,661	1,705	34	35	39	33	34	37
Civil engineering technicians	32	35	56	58	60	77	82	88	59	64	69
Drafters	307	302	309	318	327	1	3	7	2	5	8
Electrical and electronic technicians	350	366	585	589	602	67	68	72	60	61	64
Industrial engineering technicians	33	27	36	35	37	9	7	11	31	29	33
Mechanical engineering technicians	47	48	72	72	74	54	55	58	51	52	55
Surveyors	55	44	61	62	64	11	13	17	40	43	47
Medical workers, except technicians	2,231	2,463	3,471	3,491	3,600	56	56	61	41	42	46
Chiropractors	22	25	33	32	32	46	45	45	28	27	27
Dentists	161	173	213	213	218	32	33	36	23	24	27
Dietitians	41	44	61	62	64	48	50	55	38	40	44
Nurses, registered	1,165	1,312	1,943	1,954	2,022	67	68	74	48	49	54
Optometrists	32	28	35	34	35	9	8	9	26	25	26
Pharmacists	143	151	188	192	196	31	34	37	24	27	30
Physicians	436	479	640	642	663	47	47	52	34	34	38
Therapists	186	202	291	294	302	56	58	62	44	45	50
Respiratory therapists	42	46	67	67	70	61	62	68	44	45	50
Occupational therapists	22	25	40	40	41	85	86	92	58	60	64
Physical therapists	37	43	68	69	70	84	85	89	57	58	62
Speech pathologists and audiologists	40	42	53	54	55	31	33	36	27	29	32
Veterinarians	34	36	48	48	48	42	41	43	31	30	32
Health technologists and technicians	574	627	891	898	932	55	57	62	42	43	49
Clinical laboratory technologists and technicians	195	209	291	292	303	49	50	55	39	40	45
Medical laboratory technicians	60	57	70	71	73	16	18	22	22	23	28
Medical laboratory technologists	92	103	150	150	156	63	64	70	46	46	52
Dental hygienists	58	69	97	99	104	69	72	81	40	43	50
Physical therapy assistants	27	33	55	55	56	103	104	109	67	68	72
Radiologic technologists	97	110	156	157	164	61	63	69	42	43	49
Radiologic technologists and nuclear medicine technicians	32	36	50	50	52	60	60	66	40	39	45
X-ray technicians	65	74	106	107	111	62	64	70	43	45	51
Surgical technicians	31	35	48	49	51	58	58	65	39	40	45
Technicians, excluding health, science, and engineering	338	364	451	453	465	33	34	38	24	24	28
Airplane pilots	78	80	102	103	104	31	32	34	28	29	31
Library technicians	28	29	32	32	33	15	16	19	9	10	13
Computer specialists	447	521	935	943	960	109	111	115	79	81	84
Programmers	231	266	465	471	480	101	104	107	75	77	80
Systems analysts	216	254	469	471	480	118	119	123	85	85	89
Social scientists	175	206	267	267	273	52	52	56	30	30	33
Economists	29	30	39	38	39	35	32	36	29	27	30
Psychologists	69	83	109	110	112	59	60	63	32	33	36
Teachers	3,967	3,980	4,612	4,706	4,806	16	19	21	16	18	21
Adult education teachers	107	125	164	165	170	53	54	58	31	32	36
College and university faculty	686	744	619	632	646	-10	-8	-6	-17	-15	-13
Dance instructors	23	27	35	35	36	51	52	57	31	32	36
Graduate assistants	138	140	122	124	127	-12	-10	-8	-13	-11	-9
Preschool, kindergarten, elementary schoolteachers	1,668	1,647	2,226	2,274	2,322	33	36	39	35	38	41
Preschool teachers	285	281	387	397	404	36	39	42	38	41	44
Kindergarten and elementary schoolteachers	1,383	1,366	1,839	1,877	1,918	33	36	39	35	37	40
Secondary schoolteachers	1,083	1,024	1,128	1,152	1,177	4	6	9	10	13	15
Vocational education teachers	99	98	139	143	146	41	45	48	42	46	49
Selected writers, artists, and entertainers	251	301	398	406	417	58	62	66	32	35	38
Actors	(1)	34	48	49	52	(1)	(1)	(1)	40	43	51
Commercial and graphic artists and designers	119	133	166	167	169	40	41	42	25	26	27
Designers	166	180	247	253	258	49	52	55	38	41	44
Musicians	134	124	153	155	160	15	16	19	23	25	28
Painters, artistic	21	25	29	29	29	43	42	42	17	16	16
Photographers	86	86	101	102	104	18	18	21	18	18	21
Public relations specialists	85	90	14	115	118	35	36	39	27	29	32
Radio and TV announcers and newscasters	48	55	70	70	70	46	47	48	27	28	29
Announcers	40	46	58	58	58	44	45	46	25	26	27
Reporters and correspondents	49	51	64	66	67	30	34	36	26	29	31
Sports instructors	(1)	53	63	64	66	(1)	(1)	(1)	20	21	25
Writers and editors	114	120	160	162	165	40	42	45	34	35	38

Table 1. Continued—Civilian employment in occupations

Occupation	Total employment (in thousands)					Percent change					
	1979	1982	1995			1979-95			1982-95		
			Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Other professional and technical workers	4,389	4,636	5,778	5,850	5,999	32	33	37	25	26	29
Accountants and auditors	830	856	1,181	1,200	1,229	42	44	48	38	40	44
Architects	75	84	116	118	121	55	57	61	38	40	43
Assessors	29	28	30	31	32	3	4	7	9	11	14
Buyers, retail and wholesale trade	251	256	321	331	336	28	32	34	26	30	31
Clergy	(1)	317	327	332	344	(1)	(1)	(1)	3	5	8
Cost estimators	94	92	131	134	137	39	42	46	41	45	48
Counselors	140	148	159	163	167	13	16	19	7	10	12
Directors, religious education and activities	36	43	44	45	46	22	24	28	3	5	9
Employment interviewers	59	57	85	86	87	44	45	47	51	52	55
Foresters and conservationists	29	31	35	34	36	20	15	21	14	9	15
Law clerks	35	40	55	56	59	60	63	70	37	39	45
Lawyers	393	465	618	624	638	57	59	62	33	34	37
Legal assistants	34	45	85	88	91	150	158	168	88	94	102
Librarians	147	151	167	170	174	13	15	18	11	13	15
Personnel and labor relations specialists	187	203	249	250	257	33	34	38	23	23	27
Purchasing agents and buyers	178	177	225	225	232	26	26	30	27	27	31
Group recreation workers	122	122	148	150	154	20	22	26	21	23	27
Social workers	328	345	409	416	428	25	27	30	19	21	24
Caseworkers	275	292	348	353	364	26	28	32	19	21	24
Community organization workers	53	52	61	63	65	15	18	22	17	20	24
Special agents, insurance	23	31	44	44	45	90	92	95	43	45	48
Tax examiners, collectors, and revenue agents	48	47	54	52	54	13	8	13	16	10	16
Tax preparers	28	32	45	46	49	60	65	75	38	43	52
Underwriters	73	76	90	92	93	24	26	28	19	21	23
Managers, officials, and proprietors	9,152	9,532	12,008	12,212	12,467	31	33	36	26	28	31
Auto parts department managers	48	44	61	63	64	27	31	34	37	42	45
Auto service department managers	60	54	76	78	80	27	31	34	39	44	47
Construction inspectors, public administration	41	39	46	46	47	12	12	15	17	17	21
Health and regulatory inspectors	103	101	111	108	113	8	5	10	9	7	11
Postmasters and mail superintendents	28	28	23	24	25	-20	-14	-12	-20	-14	-12
Railroad conductors	35	27	17	18	20	-50	-47	-43	-36	-32	-27
Restaurant, cafe, and bar managers	528	574	706	711	715	34	35	35	23	24	25
Sales managers, retail trade	271	271	352	362	365	30	34	35	30	33	35
Assistant principals	37	38	44	45	46	18	21	23	15	18	20
Principals	81	82	93	95	97	15	17	20	14	16	19
Store managers	938	971	1,218	1,262	1,285	30	35	37	26	30	32
Wholesalers	241	247	298	302	303	23	25	26	20	22	23
Salesworkers	6,780	6,967	8,535	8,771	8,911	26	29	31	23	26	28
Real estate agents and brokers	332	337	449	450	453	35	36	37	33	33	34
Real estate brokers	39	42	53	53	53	37	37	38	28	28	29
Sales agents, sales representatives, real estate	293	296	396	396	400	35	35	37	34	34	35
Real estate appraisers	31	32	47	47	48	53	54	56	48	49	51
Sales agents and brokers, insurance	316	361	447	452	458	42	43	45	24	25	27
Sales representatives, nontechnical	573	583	724	743	749	26	30	31	24	27	28
Sales representatives, technical	1,329	1,320	1,652	1,707	1,730	24	28	30	25	29	31
Salesclerks	2,867	2,916	3,472	3,601	3,670	21	26	28	19	23	26
Security salesworkers	60	78	106	107	109	77	78	81	36	36	39
Travel agents	50	62	86	88	88	74	78	78	40	43	43
Clerical workers	18,497	19,049	23,533	23,998	24,538	27	30	33	24	26	29
Adjustment clerks	38	36	48	49	50	26	30	33	34	38	40
Bank tellers	466	539	686	693	703	47	49	51	27	29	30
New accounts tellers	51	67	79	80	81	55	57	59	18	19	21
Tellers	415	471	607	613	622	46	48	50	29	30	32
Bookkeepers and accounting clerks	1,717	1,713	1,943	1,985	2,027	13	16	18	13	16	18
Accounting clerks	722	756	861	876	895	19	21	24	14	16	18
Bookkeepers, hand	996	957	1,081	1,109	1,132	9	11	14	13	16	18
Cashiers	1,518	1,570	2,235	2,314	2,362	47	52	56	42	47	50
Claims adjusters	67	66	99	98	101	47	47	51	49	49	53
Claims clerks	66	66	94	93	95	42	41	45	41	40	44
Claims examiners, insurance	39	47	61	62	63	56	59	62	29	31	34
Clerical supervisors	434	467	618	628	641	42	45	47	32	35	37
Collectors, bill and account	88	94	133	135	137	51	53	55	42	44	46
Court clerks	28	27	29	29	30	2	3	6	6	8	11
Credit clerks, banking and insurance	50	50	76	76	78	52	54	57	53	54	57
Customer service representatives	86	89	120	124	125	40	44	45	35	39	40
Desk clerks, except bowling floor	82	88	107	107	109	31	32	34	22	23	25
Dispatchers, police, fire, and ambulance	51	48	52	53	55	4	6	8	10	12	14
Dispatchers, vehicle service or work	87	90	111	113	116	27	30	33	23	26	29
Eligibility workers, welfare	34	32	32	32	33	-7	-5	-3	0	2	5
File clerks	293	295	316	321	329	8	10	12	7	9	12
General clerks, office	2,377	2,348	2,990	3,044	3,113	26	28	31	27	30	33
Insurance clerks, medical	78	86	137	139	145	77	79	86	60	62	69
Library assistants	80	81	94	96	98	17	19	22	16	18	21
Loan closers	(1)	45	63	64	65	(1)	(1)	(1)	40	41	44
Mail carriers and postal clerks	539	541	439	474	485	-19	-12	-10	-19	-12	-10
Postal mail carriers	234	234	206	223	228	-12	-5	-3	-12	-5	-3
Postal service clerks	306	307	233	252	257	-24	-18	-16	-24	-18	-16

Table 1. Continued—Civilian employment in occupations

Occupation	Total employment (in thousands)					Percent change					
	1979	1982	1995			1979-95			1982-95		
			Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Mail clerks	88	100	132	131	135	51	50	54	33	31	35
Messengers, except bank	42	47	60	61	63	42	45	48	28	31	34
Meter readers, utilities	29	31	37	38	38	30	31	33	22	24	26
Office machine operators	893	936	1,179	1,196	1,220	32	34	37	26	28	30
Bookkeeping, billing machine operators	174	172	218	223	227	25	28	31	26	29	32
Proof machine operators	46	47	59	59	60	26	29	31	24	25	27
Computer operating personnel	548	580	727	737	752	33	34	37	25	27	30
Computer operators	190	211	366	371	378	93	95	99	74	76	79
Data entry operators	319	320	282	286	292	-12	-10	-8	-12	-11	-9
Peripheral EDP equipment operators	40	49	79	80	82	99	102	106	61	63	66
Duplicating machine operators	31	38	44	45	46	41	43	46	16	17	19
Order clerks	258	265	329	337	342	28	31	33	24	27	29
Payroll and timekeeping clerks	175	202	265	269	277	51	54	58	31	34	37
Personnel clerks	98	103	132	131	135	35	34	38	29	28	32
Policy change clerks	25	28	30	31	31	18	20	22	8	10	12
Procurement clerks	49	47	60	60	62	23	22	27	27	26	31
Production clerks	212	201	260	262	268	23	24	27	29	30	33
Raters	53	53	68	69	70	28	30	32	29	31	33
Receptionists	362	387	565	576	594	56	59	64	46	49	54
Reservation agents and transportation ticket clerks	112	108	108	110	112	-4	-2	-1	0	2	4
Reservation agents	55	53	54	55	56	-2	0	1	2	4	5
Ticket agents	52	49	48	49	50	-7	-5	-3	-3	-1	1
Secretaries and stenographers	2,624	2,711	3,355	3,410	3,498	26	30	33	24	26	29
Secretaries	2,342	2,441	3,108	3,161	3,243	33	35	38	27	29	33
Stenographers	283	270	247	250	256	-13	-12	-10	-8	-7	-5
Typists	980	990	1,136	1,145	1,175	16	17	20	15	16	19
Shipping and receiving clerks	380	365	420	431	439	11	13	16	15	18	20
Shipping packers	356	340	394	403	410	11	13	15	16	19	21
Statement clerks	32	34	44	44	45	39	40	42	30	32	34
Statistical clerks	83	98	112	114	116	36	37	41	15	16	18
Stock clerks, stockroom and warehouse	831	831	961	987	1,005	16	19	21	16	19	21
Survey workers	42	53	78	78	79	86	87	89	46	46	48
Switchboard operators/receptionists	217	107	279	285	292	29	32	35	35	38	41
Teachers' aides	442	463	579	593	606	31	34	37	25	28	31
Telephone operators	319	318	337	343	349	5	8	9	6	8	10
Switchboard operators	175	172	211	213	218	20	22	24	23	24	27
Central office operators	107	109	84	87	87	-21	-19	-18	-23	-20	-20
Directory assistance operators	37	38	42	43	43	13	17	17	11	15	16
Town clerks	28	26	29	29	30	3	5	7	10	12	14
Craft and related workers	12,359	11,591	14,476	14,769	15,099	17	20	22	25	27	30
Construction craftworkers	3,163	2,895	3,725	3,777	3,841	18	19	21	29	30	33
Insulation workers	43	47	66	67	68	53	56	59	41	44	46
Bricklayers	150	111	148	150	153	-1	0	2	34	36	38
Carpenters	1,008	863	1,095	1,110	1,128	9	10	12	27	29	31
Cement masons	107	87	122	125	127	14	17	19	41	44	46
Dry wall applicators	53	53	73	74	75	36	39	41	36	39	41
Electricians	556	542	704	715	730	27	29	31	30	32	35
Floor covering installers	80	79	100	101	103	25	27	29	26	29	30
Carpet cutters, carpet layers	54	53	66	67	68	23	25	26	25	28	29
Floor layers	26	26	33	34	35	30	32	35	28	30	33
Glaziers	37	41	53	55	56	44	48	51	31	35	37
Ironworkers	105	93	126	130	133	20	23	26	35	39	42
Reinforcing-iron workers	34	33	44	45	46	29	32	35	33	36	39
Structural steel workers	71	61	83	85	87	16	19	22	36	40	44
Painters, construction and maintenance	369	362	443	444	449	20	21	22	22	23	24
Plumbers and pipefitters	398	388	512	518	528	29	30	33	32	34	36
Roofers	111	102	128	129	131	15	16	18	25	27	28
Mechanics, repairers, and installers	4,039	3,936	5,004	5,107	5,223	24	26	29	27	30	33
Air conditioning, refrigeration, and heating mechanics	175	168	220	223	228	25	27	30	31	33	36
Aircraft mechanics	107	108	132	128	131	23	19	22	22	19	21
Gas and electric appliance repairers	61	62	71	72	74	17	20	23	14	17	20
Automotive body repairers	159	155	191	196	201	20	23	26	23	26	30
Automotive mechanics	871	844	1,134	1,168	1,195	30	34	37	34	38	42
Coin machine servicers and repairers	27	31	38	39	40	43	47	52	24	28	32
Central office repairers	49	50	47	49	49	-4	-1	0	-6	-2	-2
Computer service technicians	(1)	55	106	108	108	(1)	(1)	(1)	93	97	98
Diesel mechanics	175	173	216	222	226	24	27	30	25	28	31
Cable splicers	47	48	59	60	61	26	28	30	24	25	27
Line installers, repairers	113	127	154	157	159	37	39	41	21	23	25
Engineering equipment mechanics	77	83	93	94	96	21	22	24	12	13	15
Farm equipment mechanics	25	26	27	27	28	8	10	10	4	5	6
Instrument repairers	40	41	50	51	53	25	27	31	22	24	27
Industrial machinery repairers	366	330	416	425	438	14	16	20	26	29	33
Maintenance repairers, general utility	733	694	870	887	908	19	21	24	25	28	31
Marine mechanics and repairers	26	26	36	36	36	36	36	36	35	35	36
Millwrights	108	91	118	121	124	10	12	15	30	33	36
Office machine repairers	53	56	94	95	96	78	82	83	68	72	73

Table 1. Continued—Civilian employment in occupations

Occupation	Total employment (in thousands)					Percent change					
	1979	1982	1995			1979-95			1982-95		
			Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Radio and television service technicians	71	80	101	102	105	42	45	48	25	27	30
Installers, repairers, section maintainers	73	75	97	100	100	33	37	38	28	32	33
Station installers	58	59	69	72	72	20	24	25	18	21	22
Metalworking craftworkers, except mechanics	941	818	995	1,019	1,051	6	8	12	22	25	29
Boilermakers	45	40	42	43	44	-6	-5	-2	6	8	11
Machinists	239	220	271	278	287	13	16	20	23	26	30
Machine tool setters, metalworking	65	55	67	68	70	2	4	7	22	25	28
Molders, metal	34	25	29	29	30	-14	-12	-9	13	16	20
Sheet-metal workers and tinsmiths	213	188	248	252	260	16	18	22	32	34	38
Tool and die makers	176	152	179	184	190	2	5	8	18	21	25
Printing trades craftworkers	382	393	429	447	457	12	17	20	9	14	16
Bookbinders	29	30	34	36	37	16	22	24	14	20	23
Typesetters and compositors	103	104	99	97	99	-9	-6	-4	-10	-7	-5
Lithographers and photoengravers	66	67	83	87	89	26	33	35	23	29	32
Letter press operators	33	34	34	36	37	4	9	11	1	6	8
Offset lithographic press operators	86	88	107	113	115	24	30	33	22	28	31
Press operators and plate printers	37	42	44	45	47	19	23	27	5	8	12
Other craft and related workers	3,833	3,549	4,324	4,419	4,527	13	15	18	22	24	28
Bakers	64	65	73	76	78	15	19	22	12	17	19
Supervisors of blue-collar workers	1,295	1,200	1,482	1,519	1,553	15	17	20	24	27	30
Cabinetmakers	79	78	95	96	99	20	22	25	22	24	27
Crane, derrick, and hoist operators	127	105	128	132	134	1	4	6	22	25	27
Dental lab technicians	48	51	63	64	65	31	32	35	25	26	28
Opticians, dispensing and optical mechanics	35	31	38	39	40	9	12	15	22	25	29
Furniture upholsterers	30	37	40	40	42	33	34	39	7	8	12
Heavy equipment operators	443	384	480	490	500	8	11	13	25	28	30
Inspectors	468	410	520	529	543	11	13	16	27	29	32
Jewelers	26	30	33	34	35	26	29	32	11	13	17
Locomotive engineers	49	38	37	39	42	-26	-21	-15	-4	3	10
Merchandise displayers and window trimmers	27	27	37	38	39	38	43	45	39	43	46
Stationary engineers	61	58	60	61	62	-2	-1	2	3	4	7
Alteration tailors	55	54	72	75	77	31	36	40	32	37	41
Testers	119	116	151	152	157	27	28	31	30	31	35
Sewage plant operators	40	38	41	42	43	2	4	7	9	10	13
Water treatment plant operators	30	28	30	31	32	2	4	7	9	10	13
Operatives	14,039	12,995	15,044	15,419	15,809	7	10	13	16	19	22
Assembler occupations	1,459	1,313	1,625	1,646	1,702	11	13	17	24	25	30
Aircraft structure assemblers	33	33	28	26	26	-14	-19	-20	-15	-21	-21
Assemblers	361	307	363	379	398	1	5	10	18	23	30
Electrical machinery equipment assemblers	99	99	131	133	137	32	34	38	33	34	38
Electrical and electronic assemblers	281	286	365	362	371	30	29	32	28	27	30
Instrument assemblers	29	29	43	43	44	48	49	52	45	46	49
Machine assemblers	202	170	210	214	222	4	6	10	23	25	30
Writers, electronic	38	37	50	50	52	33	31	35	36	34	39
Bindery workers, assembly	37	38	39	41	42	8	13	15	5	10	12
Laundry operators, small establishment	38	38	44	44	45	17	17	19	16	17	18
Pressers, hand	30	27	30	31	31	2	4	3	13	14	14
Pressers, machine	54	50	51	52	54	-6	-4	0	2	4	8
Pressers, machine laundry	70	64	68	69	74	-3	-1	5	5	7	14
Washers, machine and starchers	54	58	78	79	82	45	47	52	35	37	42
Meatcutters and butchers	59	57	62	63	64	5	6	8	9	10	12
Metalworking operatives	1,726	1,492	1,767	1,813	1,874	2	5	9	18	21	26
Electroplaters	36	32	34	35	36	-4	-1	2	7	11	13
Machine tool operators	1,070	914	1,088	1,114	1,153	2	4	8	19	22	26
Drill press and boring machine operators	136	115	137	139	144	1	3	6	19	21	25
Grinding and abrading machine operators, metal	138	118	126	129	133	-9	-7	-4	7	10	13
Lathe machine operators, metal	159	137	155	159	164	-2	0	3	14	16	20
Milling and planing machine operators	68	61	68	69	71	-1	1	4	12	13	17
Machine tool operators, combination	193	169	217	220	229	13	14	19	29	31	36
Machine tool operators, numerical control	73	66	94	95	99	28	30	35	42	44	49
Machine tool operators, tool room	41	34	43	44	45	6	8	11	25	27	31
Punch press operators, metal	181	147	167	173	180	-8	-5	-1	14	18	22
Power brake and bending machine operators, metal	49	42	51	53	55	4	8	12	22	27	32
Shear and slitter operators, metal	32	27	32	33	34	-2	2	6	18	23	27
Welders and flamecutters	548	490	579	595	615	6	8	12	18	21	26
Roustabouts	67	94	78	80	80	17	20	19	-16	-14	-15
Baggers	224	242	219	229	234	-2	2	4	-9	-5	-4
Production packagers	560	548	616	637	654	10	14	17	12	16	19
Painters, automotive	41	36	51	53	55	24	28	32	41	46	51
Painters, production	118	101	115	118	122	-3	0	3	14	17	21
Sawyers	89	75	91	93	96	2	4	8	21	24	28
Sewers and stitchers	902	804	869	882	873	-4	-2	-3	8	10	9
Sewing machine operatives, regular equipment, garment	594	533	561	567	556	-5	-4	-6	5	7	4
Sewing machine operatives, special equipment, garment	88	78	84	85	83	-4	-3	-5	8	9	7
Sewing machine operatives, regular equipment, nongarment	145	128	152	155	158	4	7	8	19	22	24
Sewing machine operatives, special equipment, nongarment	47	42	48	50	51	4	7	9	16	19	21

Table 1. Continued—Civilian employment in occupations

Occupation	Total employment (in thousands)					Percent change					
	1979	1982	1995			1979-95			1982-95		
			Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Textile operatives	368	312	345	352	359	-6	-5	-3	11	13	15
Spinners, frame	31	26	25	25	25	-21	-20	-18	-5	-4	-2
Weavers	36	30	31	31	31	-14	-13	-12	3	4	6
Transport equipment operatives	3,694	3,551	4,181	4,287	4,387	13	16	19	18	21	24
Ambulance drivers and ambulance attendants	26	28	34	35	36	29	32	38	23	26	32
Busdrivers	443	473	537	551	572	21	24	29	13	17	21
Busdrivers, local and intercity	216	229	249	257	271	15	19	25	9	12	18
Busdrivers, school	226	244	288	295	301	27	30	33	18	21	23
Chauffeurs	42	48	61	63	65	44	48	53	27	30	34
Forklift and tow motor operatives	421	376	433	445	458	3	6	9	15	18	22
Parking attendants	36	37	37	38	40	3	6	10	1	4	8
Railroad brake operators	78	60	50	54	58	-35	-31	-26	-16	-10	-4
Sailors and deckhands	33	32	33	34	35	0	3	5	3	7	8
Taxi drivers	72	64	52	52	53	-28	-28	-26	-20	-19	-17
Truckdriving occupations	2,506	2,402	2,909	2,980	3,035	16	19	21	21	24	26
Delivery and route workers	813	797	924	951	967	14	17	19	16	19	21
Truckdrivers	1,693	1,604	1,985	2,029	2,068	17	20	22	24	26	29
All other operatives	4,145	3,805	4,413	4,544	4,666	6	10	13	16	19	23
Dressmakers, except factory	54	61	66	66	66	23	22	23	8	8	9
Filers, grinders, buffers, and chippers	130	107	134	137	142	3	6	9	26	29	33
Fuel pump attendants and lubricators	406	388	430	451	462	6	11	14	11	16	19
Stationary boiler firers	46	44	45	45	47	-2	-1	2	1	2	6
Miscellaneous machine operatives, meat and dairy products	45	42	39	40	41	-14	-11	-9	-9	-6	-3
Miscellaneous machine operatives, all other food products	73	71	75	78	80	3	7	9	6	10	13
Miscellaneous machine operatives, lumber and furniture	47	39	49	50	52	4	6	10	25	28	32
Miscellaneous machine operatives, paper and allied products	99	92	97	100	105	-2	1	6	5	9	14
Miscellaneous machine operatives, chemicals and allied products	153	146	172	178	183	13	16	20	18	22	25
Chemical operators-A	55	54	64	66	68	16	19	22	19	23	26
Chemical operators-B	27	26	31	31	32	14	17	21	18	22	25
Miscellaneous machine operatives, rubber and miscellaneous plastics	213	190	251	267	277	18	25	30	32	40	45
Extruder operators, rubber or plastics	28	26	35	37	39	25	34	39	36	46	51
Compression and injection mold machine operators, plastics	101	93	131	140	144	29	38	42	41	50	55
Miscellaneous machine operatives, stone, clay, and glass	50	41	49	51	53	-3	2	6	20	25	31
Miscellaneous machine operatives, primary metals	86	69	82	85	88	-5	-1	2	18	22	26
Miscellaneous machine operatives, manufacturing, nec.	90	83	99	102	104	11	13	16	20	23	26
Miscellaneous machine operatives, nonmanufacturing	40	39	42	44	45	6	10	12	7	11	13
Miscellaneous operatives, nec, durable goods	102	86	103	108	112	1	5	10	19	25	30
Miscellaneous operatives, nec, nondurable goods	229	218	231	238	242	1	4	6	6	9	11
Poultry dressers, eviscerators	50	48	50	50	51	0	1	3	4	6	8
Press assistants and feeders	25	26	30	31	32	16	23	25	14	20	22
Mixing operatives	43	41	43	45	46	2	6	8	5	9	12
Oilers	43	36	44	45	46	3	5	8	21	24	27
Photographic process workers	70	67	77	78	80	9	11	14	15	17	20
Rotary drill operators	22	28	27	28	28	24	26	27	-2	-1	0
Rotary drill operator helpers	31	33	29	29	30	-6	-4	-3	-14	-12	-11
Shoemaking machine operators	60	52	34	36	34	-43	-40	-43	-33	-30	-34
Surveyor helpers	50	40	61	63	65	22	26	30	54	59	64
Tire changers	60	60	83	86	88	39	45	48	39	45	48
Coil winders	28	27	32	32	33	13	13	18	19	19	24
Service workers	15,660	16,241	20,416	20,706	21,113	30	32	35	26	27	30
Building custodians	2,796	2,828	3,554*	3,606	3,682	27	29	32	26	28	30
Food service workers	5,906	6,204	8,113	8,221	8,322	37	39	41	31	33	34
Bakers, bread and pastry	35	36	46	46	47	31	32	33	27	28	30
Bartenders	364	384	500	505	511	37	39	40	30	32	33
Butchers and meatcutters	184	191	173	179	182	-6	-3	-1	-9	-6	-5
Cooks and chefs	1,161	1,211	1,591	1,613	1,636	37	39	41	31	33	35
Cooks, institutional	406	423	527	536	549	30	32	35	25	27	30
Cooks, restaurant	330	351	494	500	505	50	51	53	41	42	44
Cooks, short order and specialty fast foods	424	437	570	578	582	34	36	37	31	32	33
Food preparation and service workers, fast food restaurants	757	809	1,092	1,106	1,113	44	46	47	35	37	38
Hosts/hostesses, restaurant, lounge, coffee shop	110	113	152	154	155	38	40	41	34	36	37
Kitchen helpers	822	850	1,139	1,155	1,174	39	41	43	34	36	38
Pantry, sandwich, and coffee makers	77	84	111	112	114	43	45	47	32	34	36
Waiters and waitresses	1,599	1,665	2,199	2,227	2,249	38	39	41	32	34	35
Waiters assistants	283	302	384	388	394	36	37	39	27	29	30
All other food service workers	515	559	726	734	748	41	43	45	30	31	34
Selected health service workers	1,980	2,240	3,038	3,066	3,166	53	55	60	36	37	41
Dental assistants	129	153	218	218	229	65	69	77	39	42	49
Licensed practical nurses	524	594	813	815	841	54	55	60	36	37	41

Table 1. Continued—Civilian employment in occupations

Occupation	Total employment (in thousands)					Percent change					
	1979	1982	1995			1979-95			1982-95		
			Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Medical assistants	88	100	809	148	154	65	67	74	45	47	53
Nursing aides, orderlies, and attendants	1,087	1,218	146	1,642	1,690	50	51	55	34	35	39
Pharmacy helpers	29	33	1,628	46	47	56	57	62	38	38	43
Psychiatric aides	115	132	45	185	192	60	60	66	40	41	46
Selected personal service workers	1,518	1,632		1,961	2,010	27	29	32	18	20	23
Barbers	110	115	1,930	127	129	14	15	17	9	10	12
Bellhops, bag porters, and doorkeepers	26	26	126	29	29	7	9	11	9	10	13
Child-care attendants	39	47	28	57	58	43	45	48	20	21	24
Child-care workers	396	414	56	499	504	25	26	27	19	20	22
Cosmetologists/women's hairstylists	483	491	495	589	604	19	22	25	17	20	23
Flight attendants	54	54		69	70	26	27	29	27	29	30
Game and ride operators and concession workers	(1)	53	68	63	66	(1)	(1)	(1)	17	19	24
Housekeepers, hotel and motel	(1)	101	62	130	133	(1)	(1)	(1)	29	29	32
Recreation facility attendants	64	72	130	88	92	35	37	42	21	23	27
Reducing instructors	24	35	87	46	51	88	96	114	29	34	46
Ushers, lobby attendants, and ticket takers	41	40	44	39	41	-6	4	1	-4	-2	4
Welfare service aides	92	93	38	119	122	27	29	33	26	28	32
Protective service workers	1,752	1,707		2,146	2,194	21	22	25	24	26	29
Correction officials and jailers	112	111	2,121	147	150	30	31	35	31	33	36
Crossing or bridge tenders	28	27	145	29	30	3	5	8	6	8	11
Crossing guards, school	40	38	29	42	43	3	5	7	10	12	14
Firefighters	213	201	42	217	223	0	2	4	7	8	11
Fire officers	49	46	214	52	53	3	5	7	10	12	14
Guards and doorkeepers	645	635	51	935	950	44	45	47	46	47	50
Lifeguards	(1)	34	925	44	46	(1)	(1)	(1)	29	31	36
Police and detectives, public service	578	549		592	608	1	2	5	7	8	11
Police detectives	62	59	586	68	71	12	9	14	17	14	19
Police officers	102	97	69	107	110	4	5	8	10	10	14
Police patrolmen/women	383	363	106	390	400	0	2	4	6	7	10
Private household workers	1,088	1,023	383	850	864	-25	-22	-21	-20	-17	-16
Supervisors, nonworking, service	205	210	275	279	285	35	37	39	31	33	36
Laborers, except farm	6,257	5,861	6,884	7,052	7,215	10	13	15	17	20	23
Animal caretakers	91	105	119	120	123	31	33	35	14	15	17
Cannery workers	61	56	67	69	71	10	12	16	20	23	27
Cleaners, vehicle	119	100	133	138	143	11	16	20	32	38	43
Conveyor operators and tenders	51	46	53	54	56	3	6	8	14	18	21
Garbage collectors	115	110	127	129	133	11	12	16	15	17	20
Gardeners and groundskeepers, except farm	646	661	732	744	759	13	15	17	11	13	15
Helpers, trades	1,023	608	777	798	819	-24	-22	-20	28	31	35
Highway maintenance workers	173	165	172	175	179	0	1	4	4	6	9
Line service attendants	29	30	41	41	42	39	41	42	36	38	39
Pipelayers	47	42	56	57	58	18	21	23	32	35	37
Riggers	30	27	33	33	34	11	12	15	23	24	27
Stock handlers	938	962	1,111	1,150	1,171	18	23	25	15	20	22
Order fillers	356	355	420	430	435	18	21	22	18	21	23
Stock clerks, sales floor	581	608	691	721	736	19	24	27	14	19	21
Fallers and buckers	45	39	35	35	36	-23	-22	-20	-10	-9	-7
Farmers and farmworkers	2,704	2,691	2,404	2,407	2,424	-11	-11	-10	-11	-11	-10
Farmers and farm managers	1,447	1,448	1,370	1,357	1,359	-5	-6	-6	-5	-6	-6
Farm owners and tenants	1,405	1,407	1,319	1,304	1,305	-6	-7	-7	-6	-7	-7
Farm managers	42	40	51	52	53	21	24	26	27	30	32
Farm supervisors and laborers	1,257	1,243	1,034	1,050	1,065	-18	-16	-15	-17	-16	-14
Farm supervisors	33	33	31	31	32	-7	-5	-3	-6	-4	-2
Farm laborers	1,224	1,211	1,003	1,019	1,033	-18	-17	-16	-17	-16	-15

¹Data not available.

The growth of occupations concentrated in the construction and manufacturing industries, which was severely affected by the 1980-82 recession, includes recovery from the trough of that period. As a result, the data on growth patterns of occupations must be interpreted very carefully. For this reason, the data on growth presented in table 1 include employment data for 1979 (pre-recessionary) and 1979-95 growth rates.²

Alternative sets of projections

The Bureau has developed three alternative sets of occupational employment projections that are tied to the eco-

nomics and industry alternatives presented elsewhere in this issue of the *Review*. Although the assumptions and analyses that differentiate these scenarios result in different rates of growth for most occupations, the basic changes in the occupational composition from 1982 to 1995 are similar in all versions. Thus, although this article focuses on the "moderate" scenario, the discussion would be very similar if any of the other scenarios were highlighted. However, the major differences in trends between the alternate scenarios are reported in the final section of this article. The alternative projections are also shown in table 1 for all detailed occupations.

Differences in the occupational projections among the three alternatives should not be considered as the potential range within which the projections are likely to fall because the range for most occupations is much wider than that shown. The majority of occupations are sensitive to a wide variety of assumptions and economic factors and all of these could not be considered in the three scenarios.

One should keep in mind that the development of projections is not a precise statistical process. Despite the use of sophisticated economic models and the use of data in those models that are carefully developed by statistical techniques, the future cannot be precisely predicted. Too many factors can alter economic activity over the 1982–95 period to assure that the projections provide an exact picture of the future. This is very evident if one reviews previous employment projections developed by the Bureau or any other organization.³

The projections developed by the Bureau reflect very detailed analyses of the factors that are expected to affect occupational trends in addition to those factors built into the model. Thus, the occupational projections presented in this article reflect the analyses and judgments of Bureau staff who are involved in this development. Some of these judgments are fairly subjective, and therefore, open to question. For example, in developing projected occupational staffing patterns for automobile manufacturing, judgments had to be made about the actual use of robots and other production processes in the industry during 1982–95. Clearly, at this stage of the development and use of robots in automobile manufacturing, such judgments are highly subjective.

Despite these analytical problems in developing precise projections of the future, our experience has indicated that basic trends in occupational structure can be approximated through the types of analyses described. Growth trends have proved to be correct for most occupations in previous sets of projections. We are hopeful that our experience and improved techniques and data bases will result in projections that present the general trends in employment by occupation during 1982–95.

Broad structural changes

The impact of technological change, differences in industrial growth patterns, and other factors that have a significant impact on occupations will result in changes in the broad occupational structure between 1982 and 1995. However, the direction of these changes will be very similar to changes that have occurred over the past several decades. Professional and technical workers will continue to increase faster than total employment and account for a greater share of total employment in 1995 than in 1982. Service workers, excluding private household workers, also will continue to grow faster than average. Managers, salesworkers, and craftworkers will continue to increase at about average rates and

maintain their relative share of total employment, a share which has not changed significantly over the past two decades. On the other hand, operatives and laborers should continue their long-term decline as a proportion of total employment, as their growth is impacted by the effects of technological change and the relatively faster growth of the service sector. Private household workers are expected to continue to decline numerically as well as in proportion to total employment.

Major changes in long-term trends in the broad occupational structure, however, are expected in clerical and in farming occupations. Although the number of clerical workers is expected to continue to increase, the effects of office automation should result in average growth rather than in the faster than average growth which has occurred over the past two decades. Farming occupations which have declined significantly throughout the century are expected to continue to decrease but somewhat more slowly than in the past. However, farming occupations should drop significantly as a proportion of total employment between 1982 and 1995.

Broad occupational trends tend to mask much of the dynamic changes in occupational structures that have occurred and are expected to occur over the projections period. Within each broad occupational group, detailed occupational trends will be affected by technological changes and by alterations in the basic structure of industrial growth. The latter changes are extremely important because occupational growth is very closely related to changes in employment of industries in which they are concentrated. The following sections of this article discuss the growth of individual occupations and highlight many of the basic changes in occupational employment that are anticipated over the period.

Detailed occupations

The economy is expected to generate an additional 25.6 million jobs between 1982 and 1995. About one-half of this job growth is projected to occur in only 40 of the 1,700 occupations (see table 2) for which projections were developed. Several points should be kept in mind in reviewing these occupations which will account for the greatest number of additional jobs. In general, the occupations are numerically large and all had more than 250,000 workers in 1982. Occupations that require extensive training are not found to any greater extent in table 2 than are those requiring little formal training. Only one-fourth of the occupations generally require a college degree.

Several of the occupations on the list reflect recovery from very low 1982 employment levels caused by the recession. For example, helpers, trade; supervisors of blue-collar workers; and carpenters are on the list only because of the sharp drop in employment experienced from 1979 to 1982. Most of the employment growth reflects recovery to pre-recessionary levels.

A list of the fastest growing occupations from 1982 to

Table 2. Forty occupations with largest job growth, 1982-95

Occupation	Change in total employment (in thousands)	Percent of total job growth	Percent change
Building custodians	779	3.0	27.5
Cashiers	744	2.9	47.4
Secretaries	719	2.8	29.5
General clerks, office	696	2.7	29.6
Salesclerks	685	2.7	23.5
Nurses, registered	642	2.5	48.9
Waiters and waitresses	562	2.2	33.8
Teachers, kindergarten and elementary	511	2.0	37.4
Truckdrivers	425	1.7	26.5
Nursing aides and orderlies	423	1.7	34.8
Sales representatives, technical	386	1.5	29.3
Accountants and auditors	344	1.3	40.2
Automotive mechanics	324	1.3	38.3
Supervisors of blue-collar workers	319	1.2	26.6
Kitchen helpers	305	1.2	35.9
Guards and doorkeepers	300	1.2	47.3
Food preparation and service workers, fast food restaurants	297	1.2	36.7
Managers, store	292	1.1	30.1
Carpenters	247	1.0	28.6
Electrical and electronic technicians	222	.9	60.7
Licensed practical nurses	220	.9	37.1
Computer systems analysts	217	.8	85.3
Electrical engineers	209	.8	65.3
Computer programmers	205	.8	76.9
Maintenance repairers, general utility	193	.8	27.8
Helpers, trades	190	.7	31.2
Receptionists	189	.7	48.8
Electricians	173	.7	31.8
Physicians	163	.7	34.0
Clerical supervisors	162	.6	34.6
Computer operators	160	.6	75.8
Sales representatives, nontechnical	160	.6	27.4
Lawyers	159	.6	34.3
Stock clerks, stockroom and warehouse	156	.6	18.8
Typists	155	.6	15.7
Delivery and route workers	153	.6	19.2
Bookkeepers, hand	152	.6	15.9
Cooks, restaurants	149	.6	42.3
Bank tellers	142	.6	30.0
Cooks, short order, specialty and fast food	141	.6	32.2

Note: Includes only detailed occupations with 1982 employment of 25,000 or more. Data for 1995 are based on moderate-trend projections.

1995 is shown in table 3. Although the list is dominated by occupations that are tied to continued growth of expanding industries and which have been among the strongest in the economy for the past decade, many reflect recovery from the recession. It is also important to note that these fast growing occupations generally are not found on the list of occupations that will add the most jobs over the period. Almost half of the 20 occupations in the list are either in the computer or health fields, which are among the fields with the strongest growth.

Some occupations are expected to decline over the period. (See table 4.) In general, occupations on the list are concentrated in industries that are contracting, or severely affected by technological change. For example, railroad conductors are concentrated in a declining industry, while data entry operators are affected by technological change.

Health-related occupations. Health care will continue to be an expanding field of work during 1982-95. Reflecting growth

in expenditures for health services, occupations in this field have been among the fastest growing for many years. Even during 1979-82, when total employment was virtually unchanged, employment in health occupations grew significantly. Continued population growth and expansion of health care insurance coverage are primary reasons underlying the expected continued growth. In addition, the aged, requiring the most health care, are expected to increase their share of the U.S. population. While the population is expected to go up by only 14 percent between 1980 and 1995, those over 65 years of age will increase by 26 percent.

The number of registered nurses is expected to grow by 49 percent between 1982 and 1995, an additional 642,000 jobs. Physicians are projected to increase by 34 percent, faster than the average for all occupations, and add 163,000 jobs. Nursing aides and orderlies should add 423,000 new jobs and licensed practical nurses, 220,000 jobs, both representing faster than average growth. Overall, these four occupations are projected to account for almost 6 percent of the total employment growth over the period.

Among the smaller and faster growing occupations, physical therapy technicians are projected to increase by 68 percent, occupational therapists by 60 percent, physical therapists by 54 percent, and medical assistants by 47 percent.

Computer-related occupations. Computers are expected to continue to have more widespread use throughout the economy through the mid-1990's. As a result, occupations that are directly related to computer development and use will be among the leaders in employment growth rates over the period. The number of systems analysts and computer programmers should expand at a very rapid rate through 1995. As more uses are found for computers in business and everyday life, software development will experience tremendous growth.

Most industry forecasts indicate that there will be more than 10 times as many computers in use during the next decade than exist today. This will translate into an increased demand for additional computer service technicians to maintain the equipment.

Recently, the focus has been on the micro- and mini-computers. Mainframe (large) computers have mostly been overlooked. In 1982, mainframe sales stood at \$10 billion representing the largest segment of the computer machine market. Fifth-generation machines are expected to be introduced in the early 1990's, and sales are projected to grow significantly by 1995. Therefore, this means strong growth in the number of computer and peripheral equipment operators needed by 1995.

Education-related occupations. The growth of employment in many occupations in the education field is closely tied to the size of the school-age population. Although births declined steadily during 1961-75, the number of children born each year has grown steadily since 1976 and is expected to

Table 3. Twenty fastest growing occupations, 1982-95

Occupation	Percent growth in employment
Computer service technicians	96.8
Legal assistants	94.3
Computer systems analysts	85.3
Computer programmers	76.9
Computer operators	75.8
Office machine repairers	71.7
Physical therapy assistants	67.8
Electrical engineers	65.3
Civil engineering technicians	63.9
Peripheral EDP equipment operators	63.5
Insurance clerks, medical	62.2
Electrical and electronic technicians	60.7
Occupational therapists	59.8
Surveyor helpers	58.6
Credit clerks, banking and insurance	54.1
Physical therapists	53.6
Employment interviewers	52.5
Mechanical engineers	52.1
Mechanical engineering technicians	51.6
Compression and injection mold machine operators, plastics	50.3

Note: Includes only detailed occupations with 1982 employment of 25,000 or more. Data for 1995 are based on moderate-trend projections.

continue until 1987. Because of this increase in births and the expected continued growth in the labor force participation of mothers of young children, employment of preschool teachers is expected to surge during 1982-95, increasing by more than 40 percent. Kindergarten and elementary schoolteachers as well as teachers' aides are anticipated to grow substantially as growth in the youth population works its way through the educational system.

The increase in the school-age population will not affect secondary schools until early in the 1990's. Therefore, secondary schoolteachers are expected to decline in numbers until 1990 and then turn around. Overall, between 1982 and 1995, this occupation should experience only minimal growth.

At the post-secondary level, vocational education teachers can be expected to grow at a strong pace. Growth of job training and retraining programs will be reflected in increased demand for this occupation. However, college and university teachers are projected to decline during 1982-95 because of a drop in the college-age population and because of higher tuition.

Scientific and technical occupations. Many scientific and technical occupations are expected to grow rapidly over the period, benefiting from the growth of high-technology industries. However, some will be negatively affected by the products of high technology and others will grow more sluggishly than average because they are concentrated in slowly growing industries.

Engineering occupations are expected to provide nearly 600,000 new jobs by 1995, as the occupation is expected to grow much faster than average. As manufacturing industries, primarily durable goods, rebound from the recession and place new technologies into their production systems, there will be heavy demands for electrical, industrial, and

mechanical engineers. More civil engineers will be needed to meet the demands of a rejuvenated construction industry. Petroleum engineers on the other hand should experience average growth as oil supplies stabilize and new drilling moderates.

Chemists will be affected by a diminished growth of the chemical industry and geologists and geophysicists by a slowdown in oil and gas extraction. Therefore, both occupations are expected to grow only as fast as average. A fairly strong demand for biological scientists is expected due to the growth of the drug industry. Electrical and electronic technicians, mechanical engineering technicians, and civil engineering technicians should experience strong growth similar to their engineer counterparts. Drafters is one important occupation in this group to fall victim to new technology. As computer-assisted design equipment gains more widespread use, the growth of this occupation will be virtually nil.

Office clerical workers. Most office clerical occupations are expected to grow more slowly during 1982-95 than in the 1970's because of office automation. Nevertheless, significant growth is expected in some of these occupations. Receptionists should be among the fastest growing clerical occupations, with a projected increase of 49 percent. Because of the varied responsibilities and the need for human interaction, it is difficult to replace this occupation with a machine. Secretaries will increasingly use advanced office equipment in the future, thereby becoming more productive. This in turn will dampen demand for the occupation. Nevertheless, secretaries are projected to grow at a rate that is about average because of the growth of industries in which they are concentrated.

Table 4. Twenty most rapidly declining occupations, 1982-95

Occupation	Percent decline in employment
Railroad conductors	-32.0
Shoemaking machine operatives	-30.2
Aircraft structure assemblers	-21.0
Central telephone office operators	-20.0
Taxi drivers	-18.9
Postal clerks	-17.9
Private household workers	-16.9
Farm laborers	-15.9
College and university faculty	-15.0
Roustabouts	-14.4
Postmasters and mail superintendents	-13.8
Rotary drill operator helpers	-11.6
Graduate assistants	-11.2
Data entry operators	-10.6
Railroad brake operators	-9.8
Fallers and buckers	-8.7
Stenographers	-7.4
Farm owners and tenants	-7.3
Typesetters and compositors	-7.3
Butchers and meatcutters	-6.3

Note: Includes only detailed occupations with 1982 employment of 25,000 or more. Data for 1995 are based on moderate-trend projections.

Most other office clerical occupations including typists will be growing more slowly than the average rate for all occupations. The expected increase in typing work will be in significant part taken care of by the increased use of word processing equipment. Stenographers is the one office occupation which has been declining and should continue to do so during the period.

Mechanics and repairers. The increasing complexity of equipment used by industry and by consumers is expected to provide continued steady growth for mechanics and repairers. Automotive mechanics are projected to grow faster than average—about 38 percent from 1982 to 1995—and because of the occupation's large size it will add nearly 324,000 jobs. Refrigeration and air-conditioning mechanics are expected to add 55,000 jobs. Office machine servicers and cash register servicers should rise by 72 percent as offices and stores are automated. This occupation will be among the fastest growing during the period.

Construction trades. Employment fluctuations caused by cyclical and seasonal factors characterize the construction industry. As a result, construction-related employment projections are difficult to develop accurately. Although employment among construction trades is projected to increase by more than 900,000 workers, much of this growth represents a recovery from the severe downturn of the early 1980's. If allowance is made for this recession, the growth of the construction trade occupations may be seen as approximating that of the rest of the economy.

Employment among the construction trades will also be affected by technological changes within the industry. Dry wall installers will benefit from the increased use of dry wall. Modular construction will slow the employment growth of carpenters. On the other hand, the increasing use of new types of electrical equipment will continue to aid the employment growth of electricians.

Food and beverage service occupations. The trend toward eating outside the home will result in continued employment growth among food and beverage preparation and service occupations. Sales in eating and drinking places nearly quadrupled between 1967 and 1981.⁴ This trend is expected to add 1.8 million jobs in eating and drinking places, an increase of 38 percent during 1982–95. Much of this growth, however, should be in fast food restaurants and therefore food preparation and service workers in these establishments would increase faster than other food service occupations. They are expected to increase by 37 percent and add 297,000 jobs. Other food service occupations will also grow faster than average including waiters and waitresses, up 562,000; cooks, 402,000; and bartenders, 121,000. These four occupations will account for more than 5 percent of the total growth in jobs over the period.

Transportation occupations. As economic activity increases, so does the demand for transporting goods. Technological change has not radically affected the trucking industry, therefore, a rising demand for its services brings about roughly proportional increases in the employment of truckdrivers. Truckdrivers are projected to show average growth but, because of its large size, add almost 424,000 jobs. Double trailers and larger trucks will dampen employment growth among long-haul truckdrivers as will competition for long-haul business from railroad transportation.

Ambulance drivers are expected to have average employment growth. Busdrivers and industrial truck operators should experience below average growth rates. Technological change may have a greater impact on industrial truck operators, who move materials from one location to another within factories and warehouses. Industrial truck operators are projected to increase by 70,000, which largely reflects recovery from the decline in manufacturing employment during 1980–82.

Production occupations. The recovery of manufacturing from the recent recession and its projected employment increase by 1995 will provide many additional jobs for production workers performing precision tasks. Although growth rates will only approximate the economy as a whole, supervisors of blue-collar workers will gain 319,000 jobs; machinists, 58,000; press and plate printers, 35,000; tool and die makers, 32,000; and millwrights, 30,000. The majority of machinists, tool and die makers, and millwrights work in durable goods manufacturing which declined during 1980–82 and which is expected to recover and grow.

Some of the lesser skilled production occupations (such as operatives) are threatened by the introduction of robots and other automated equipment. Robots can perform welding, machine loading and unloading, spray painting, and certain types of assembly work, but their introduction is currently hampered by factors such as the lack of visual capabilities and by their purchase, installation, and maintenance costs. If the robots' capabilities can be improved and their associated costs can be reduced through mass production, we may see an occupational impact.

Among the fabricating, assembly, and handworking occupations, the group of assembly occupations is anticipated to grow by 332,000, primarily in electrical and electronic components, machinery, and electrical equipment assembly. Welders and flamecutters are expected to increase by 105,000; however, they are expected to decline in the automotive industry as more spot welding robots are used. The number of filers, grinders, buffers, and chippers should grow by about 30,000 jobs.

Some machine operators and tenders will experience the impact of robots which can load materials into machinery. However, increases are expected in some operator jobs, including 52,000 combination machine tool operators and

39,000 power press operators. Sewers and stitchers should gain 78,000 jobs, although the growth rate is expected to be below average and employment is not even expected to reach the 1977 level by 1995. Production inspectors, testers, samplers, and weighers would be most affected by robotic vision systems, but the use of these systems seems to be in the distant future. Therefore, an increase of 119,000 inspecting jobs and 36,000 testing jobs is projected through 1995.

Sales occupations. Salesworker employment growth trends are generally tied to the growth of industries in which they are employed. Thus, security and bond sales agents and real estate agents should grow faster than average as do their related industries. Salesclerks should increase about average following the trend in retail trade where most are employed. However, because of the very large size of this occupation, it should be among the leaders in the *number* of jobs added during 1982-95.

Low and high alternative projections

The percentage distribution of occupational employment or staffing patterns within specific industries that was used to develop the low- and high-projection alternatives was identical to that used in the moderate-trend projections. Therefore, occupations that are concentrated in industries whose employment varies significantly are those which show the greatest variability among the three alternatives.

Total employment in the moderate-trend alternatives varied by only about 2 percent from both the low and high trends. Therefore, the distribution of employment by major occupational group varies little among the alternatives. (See table 5.)

In looking at specific occupations, significant differences may exist between the moderate and either the low and high alternatives. In virtually all cases, employment levels are small and the percent differences are relatively minor.

In a few instances, projected employment is greater in the low alternative than in the moderate, or lower in the high alternative than in the moderate. For example, employment for aircraft structure assemblers is projected to be 28,000 in the low alternative and 26,000 in the moderate and high alternatives. This is due to significantly higher projected employment for aircraft manufacturing in the low alternative which encompasses higher levels of defense expenditures.

Table 5. Percent distribution of employment by major occupational group, 1982 and projected 1995

Occupational group	1982	1995		
		Low trend	Moderate trend	High trend
Total, all occupations	100.0	100.0	100.0	100.0
Professional, technical, and related workers	16.3	17.3	17.1	17.2
Managers, officials, and proprietors	9.4	9.6	9.6	9.6
Salesworkers	6.9	6.8	6.9	6.9
Clerical workers	18.8	18.8	18.9	18.9
Craft and related workers	11.4	11.6	11.6	11.6
Operatives	12.8	12.1	12.1	12.2
Service workers	16.0	16.4	16.3	16.3
Laborers, except farm	5.8	5.5	5.5	5.6
Farmers and farmworkers	2.7	1.9	1.9	1.9

The following list identifies those occupations in which the difference between the alternative (high or low) projected employment is greater than 5 percent from the moderate trend:

- Postmasters and mail superintendents
- Railroad conductors
- Postal mail carriers
- Postal service clerks
- Bookbinders
- Locomotive engineers
- Railroad brake operators
- Extruder operators, rubber or plastics
- Compression and injection mold machine operators, plastics
- Press assistants and feeders
- Shoemaking machine operators

Data uses

The current and projected occupational employment estimates presented in this article are developed by industry and are a part of a national industry-occupational employment matrix. Data from the matrix will underlie information in the 1984-85 edition of the *Occupational Outlook Handbook* which will be issued in the Spring of 1984. In addition to being used in the development of career guidance information, national occupational employment data and projections are used at all levels of government, and by others, to formulate education plans, including vocational education, and training requirements. State employment security agencies utilize the national matrix as part of their own programs of developing occupational projections. Other government agencies and private organizations also use the matrix for analytical purposes. □

—FOOTNOTES—

¹See *Handbook of Methods*, Bulletin 2134 (Bureau of Labor Statistics, 1982), chapters 18–21.

²Table 1 includes only 370 detailed occupations with employment of 25,000 or more in 1982. Projections developed in greater detail with employment of 5,000 or more in 1982 will be published in the Spring of 1984 in *Occupational Projections and Training Data*, 1984 edition. Current and projected occupational employment estimates are developed by the Bureau in the National Industry-Occupational Employment Matrix program. The national matrix is developed by applying data on occupational staffing patterns of industries collected in the Occupational Employment

Statistics Survey program to estimates of annual average industry employment collected in the Current Employment Statistics program. These surveys count jobs rather than people; therefore, the employment estimates contained in this report are different from those derived from a count of individuals in the Current Population Survey.

³See Max L. Carey and Kevin Kasunic, "Evaluating the 1980 projections of occupational employment," *Monthly Labor Review*, July 1982, pp. 22–30.

⁴U.S. Bureau of the Census, *Current Business Report*, Series BR, Monthly Retail Trade.

A note on communications

The *Monthly Labor Review* welcomes communications that supplement, challenge, or expand on research published in its pages. To be considered for publication, communications should be factual and analytical, not polemical in tone. Communications should be addressed to the Editor-in-Chief, *Monthly Labor Review*, Bureau of Labor Statistics, U.S. Department of Labor, Washington, D.C. 20212.
