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ABSTRACT

Occupational sex segregation is one of the most obvious facts of economic life. The largest declines in the sex segregation index between 1970 and 1980 were in the managerial and professional specialty and in the service occupations. Changes were greater for white-collar than blue-collar occupations for both white and minority women. White women reduced their entry into a number of traditionally female white-collar occupations that minority women, leaving private household work, continued to enter. It has been easier to pass laws mandating equal opportunity and affirmative action than to eliminate institutional and informal obstacles, such as sexual harassment or coworker hostility, outmoded administrative rules and procedures by employers and unions, and gender-tracked promotional ladders. There has been some growth in the number of women training for and entering higher-status, skilled blue-collar crafts. There are more women apprentices than women currently employed in the occupations. In construction, federally-mandated goals and timetables established in 1978 have led to increases in women employees, although enforcement efforts have been lax since 1981. In 1978, over 150 programs were able to recruit and train women for apprenticeships; only 50 remain after training and enforcement cutbacks. Federal training programs are doing relatively little to recruit and place women into nontraditional jobs; however, funding under the Perkins Vocational Education Act has been crucial to sustaining the successful community-based preapprenticeship training programs. (The paper also includes sections on integration of white-collar work, the impact of technological change, and policy implications and recommendations. Four data tables, a list of organizations contacted, and 115 references are included.) (CML)

26. FACILITATING WOMEN'S OCCUPATIONAL INTEGRATION

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Introduction

Occupational sex segregation is one of the most obvious facts of economic life. All that we know about other cultures, other economic systems, other times, testifies to the universality of the phenomenon. There is little question that it has been and continues to play a central part in the generation of women's economic and social subordination. Occupational segregation also figures prominently in stratification by race. Yet relatively little is understood about the causes of occupational segregation, the institutions, regulations, and habits that maintain it, the forms it takes, the changes it undergoes, and its possible cures.

Sex segregation in the labor market entails the physical and social separation of women and men into different categories of workers. Occupational segregation by sex involves more than separation into different occupational categories. It can include separate workplaces, departments, career ladders, fields of specialization, and/or responsibility for different types of clients or customers. One prevalent example of such intraoccupational segregation occurs among

waiters and waitresses. Most restaurants still have single-sex crews working at any particular meal, with male waiters concentrated in the higher-priced establishments (Bergmann, 1986). Therefore, any evaluation of progress in occupational integration needs to be sensitive to all facets of segregation.

We lack a systematic body of research into the causes and mechanisms of occupational segregation. We also lack extensive documentation of the results of attempts to ameliorate it. Even its current extent is poorly measured. This limits our ability to present a firm blueprint for improvement. Nevertheless, we can point to some of the findings and experiences that give valuable indications of fruitful directions for both action and research. Since most quantitative measures of occupational segregation can only capture segregation between occupational categories, case studies of specific occupations are more useful in presenting trends in intraoccupational segregation. The analytical focus of this paper is several critical categories of nontraditional blue-collar and white-collar work such as construction trades, elite professions, and management.

The first section of this paper defines the extent of occupational segregation by sex and presents alternative perspectives on its causes. This includes a historical example of the process of occupational integration and resegregation. The second section reviews recent trends in occupational integration, especially the pace of integration as measured by the segregation index.

This is followed by a discussion of the factors which influence the extent of occupational integration. These factors are then used to

analyze specific trends where they have been documented in occupational integration of blue-collar trades, professional fields, and management. The effect of technological change on occupational integration is considered in a separate section, where two questions are addressed. The first is whether job loss in female-dominated occupations will hasten integration; the second is whether emerging occupations and industries have avoided replicating patterns of segregation. Finally, in light of the analyses presented in the literature surveyed, policy recommendations are presented in the final section.

The Extent and Explanations of Occupational Segregation

An idea of the extent of occupational segregation by sex in 1984 can be discerned by looking at the sex composition of finely detailed occupations, as compiled by Bergmann (1986), and reprinted in Table 1. The most conservative definition of a sex-segregated occupation is one that is either 75 percent male or female. By this definition, 211 out of 335 occupations were either male-dominated (154) or female-dominated (57) in 1984. Most men and women worked in segregated occupations. Half of full-time women workers were employed in only 55 of the most female-dominated occupations, while half of full-time male workers were concentrated in the 131 most male-dominated occupations (all of which have less than 18 percent women). Thus, Table 1 indicates not only that most occupations are highly segregated, but that women are concentrated into a smaller number of occupations than men are.

Occupational segregation stems from tradition, from the historical domestic division of labor, from attitudes, and from restrictions on

women's choices resulting from current discriminatory practices in the labor market. To the extent that segregation reflects restrictions on choice, it is a matter of public policy concern. (See Reskin and Hartmann, 1986). The majority of the case studies and descriptions of segregation in this paper concur that discrimination is a highly significant element.

A common explanation of past and current segregation especially favored by economists with faith in the impersonal fairness of competitive markets is that segregation results not from a conscious design of employers, but by the free choice of women themselves. According to this perspective, women choose training and adapt their work lives to the expectation and requirement that they provide child care and household services, with men exempted from such duties (Polachek, 1981; Becker, 1985). Those who espouse this view suggest that segregation is not a problem for women or for society; if it is a problem, its source is not discrimination in the workplace.

Even if in the past women's employment decisions have been an important factor, women will not be able to choose a secondary position in the labor market in the future. An increasing proportion of women do not have a male to support them and must rely on their own earnings for support (Bergmann, 1986). Further, as in race relations, sex segregation is not merely a neutral separateness; it entails inequality and subordination of women to men. It is not that men and women merely do different things, but that men's and women's occupations are arranged so that women are subordinate to men on the job, as in the doctor-nurse and executive-secretary dyads (Reskin, 1988). Moreover, sex segregation

leads to wage inequality: jobs which are female-dominated pay less than male-dominated jobs requiring similar amounts of human capital (Treiman and Hartmann, 1981).

There is a considerable literature that portrays occupational segregation as an expression of male dominance in society. In past times, a major motive for segregation may have been to limit women's social contact with men to control women's sexuality (Reskin, 1988). Hartmann's (1983) view is that the job market is structured to perpetuate male dominance. Men benefit through access to jobs with higher wages and women's economic dependence, both sustaining the domestic division of labor. Men also benefit from access to jobs with interesting work and jobs that give them scope for personal autonomy and development of talents (see also Reskin, 1988).

Historical Dynamics of Segregation and Resegregation

A case study by Cohn (1985) on the introduction of women into clerical jobs at the turn of the century provides considerable illumination regarding the process of segregation and the barriers women face when they enter jobs atypical for them. The impetus to recruit women as clerical workers came from top management concerned with reducing wage costs. Only where large groups of workers would be affected, representing an important business cost, was there an interest in introducing women. Thus, the expansion of office work and a subsequent growing demand for labor encouraged management to hire women. This meant that when women entered into a workplace, they were not

sprinkled at random over the entire shop, but introduced in large, segregated occupational groups.

Middle managers closer to actual operations, more interested in worker relations than costs, fought a vigorous battle to prevent women's entry. Male workers and their unions also fought to exclude women from their workplaces. Among the rationales used were: (1) the difficulty of preventing contact between men and women workers, (2) the "facilities problem," and (3) women's alleged inability to do the work. Where upper management perceived potentially substantial cost savings, these rationales were swept aside and the fight to exclude women was lost.

To assuage male workers and maintain their productivity and morale, management maximized men's promotional opportunities. This could be accomplished by the creation of a group of jobs which were understood to be dead-end jobs; these could be occupied by women. Women could be rotated through those jobs by requiring them to leave upon getting married. Hence, it would be unnecessary to give women a long series of periodic wage increases to keep them motivated since they were often required to quit upon marriage.

In this context it should be noted that the issue of turnover is still salient in occupational sex segregation. Women are no longer required to quit when they marry, but their alleged greater propensity to quit serves as a rationale to deny them on-the-job training or access to certain jobs. Research has, in fact, shown that men and women have similar propensities to quit if they are paid the same wages (Viscusi, 1980; Blau and Kahn, 1981). Assigning women dead-end jobs and lower salaries thus ensures turnover will be maintained. Therefore, such

modern personnel methods have obviated the necessity for firing women upon marriage. By using these tactics, employers deliberately encourage high turnover rates to cut costs. Cohn (1985) calls this "synthetic turnover."

A view of the function of contemporary occupational segregation is given by Bergmann (1986). Job segregation insures that women and men do not interact as equals, that women do not supervise men, that men have access to positions which help train them for advancement, and that women and men in positions requiring equivalent human capital are not able to compare their salaries. Thus, like the feminization of clerical work, contemporary efforts to integrate women into skilled trades, the professions, and management have faced segregation within nontraditional workplaces and promotion barriers.

Recent Trends in Occupational Sex Segregation

Women's labor force participation rate increased from 50.0 percent in 1978 to 56.6 percent in 1988. The influx of women into the labor force has meant an increase in the percentage of women in many occupations, traditional and nontraditional. However, to evaluate whether the pattern of occupational segregation has truly diminished, we need to consider whether the distribution of women across occupations is changing as well.

The single largest occupational category of women workers is administrative support/clerical workers (see Table 2). But the percentage of women in this occupational group has declined almost 3 percentage points in the past decade. The greatest improvement in the

distribution of working women in nontraditional work was in management. Women have also increased their distribution among the professions and sales occupations, and slightly among technical and craft occupations. The integration into craft occupations has been slow. This represents a severe detriment to women because craft occupations generally represent the best pay and opportunities for workers without a college degree.

With the of exception craft, clerical, and service workers, the direction of trends for men and women are the same. Both men and women have moved into sales work, professional and technical work and moved out of the categories of operators and farming. The integration of operators, fabricators, and laborers may have been halted by the absolute decline in the number of blue-collar jobs in the 1980s. It is difficult to tell where real gains were made, though, with such aggregate data.

The extent of occupational segregation is frequently measured by a "segregation index," or "index of dissimilarity." This index is used to quantify broad changes in the degree of segregation over time. Although the segregation index has limitations which will be discussed, it signals general trends. Exact values for the segregation index vary depending on the data set used, the aggregation of the occupational categories, and whether the index is standardized for changes in the occupational composition of the economy.

The formula used to compute the segregation index, S_t is:

$$S_t = 1/2 \ \Sigma_i \ |m_{it} - f_{it}|$$

where m_{it} and f_{it} are the percentages of the respective male and female labor force that are in occupation i during year t. This gives a number

between zero and 100 (Blau and Hendricks, 1979). The index is zero when the distribution of women across occupations is the same as men's distribution. The index is 100 when all occupations are either totally male or totally female.

A decline in the index can be caused by changes in the sex composition of specific occupational categories. However, the index can also decline because of changes in the occupational structure or mix in the economy. If a relatively integrated occupation grows in the number of people employed, while a relatively segregated occupation shrinks, the index will decline but no new occupations will have been integrated (Blau and Hendricks, 1979). It is possible to test for these differences.

Estimating the segregation index in the 1980s and comparing trends with earlier decades is especially difficult because Census and Current Population Survey occupational classifications changed in 1980 and 1983 respectively. A study by Beller (1984) calculated an economy-wide segregation index of 61.66 for 1981, and estimates that the segregation index declined 2 - 3 times as rapidly during the 1970s as during the 1960s. When results were standardized to measure only the changes in composition effects (holding the occupational mix constant), Beller found almost as strong a decline in the index. This indicates that the segregation index fell because occupations became more integrated, not because previously integrated occupations became more prevalent

Since the decennial Census provides the most accurate and complete data for estimating the segregation index, we will not have the best picture of trends in the current decade until the 1990 Census data is

available. However, some projections for the 1980s have been made with available data. It is doubted that the rate of change of the segregation index in the 1970s will be sustained during the 1980s, since projected growth of the female labor force has slowed (Beller and Han, 1984).

Looking at segregation within large occupational groups reported in Table 3, the largest declines in the segregation index between 1970 and 1980 were in the managerial and professional specialty (from 55.5 to 42.9) and in the service occupations (from 67.6 to 55.1). The smallest decline was in precision production, craft, and repair occupations.

The specific occupations responsible for the overall decline of the indexes of these large occupational groups include accountants, elementary school teachers, bank officers, sales clerks, telephone operators, and delivery and route workers. Changes were greater for white-collar than blue-collar occupations; this was true for both white and minority women, but other major differences by race exist. White women reduced their rate of entry into a number of traditionally female white-collar occupations which minority women, leaving private household work, continued to enter (Beller, 1984).

Beller and Han develop projections to 1990 which indicate that the segregation index will continue to decline more for younger age cohorts than those already following a particular career path. This raises the question of how quickly changes in educational and career choices of those first entering the labor market can integrate an occupation, given a pool of older workers still remaining in their current fields. Beller and Han examine this question by focusing on how integration of college

majors can be expected to impact occupational integration of the professions. As the most "optimistic" scenario, they assume that college majors will continue to integrate as fast as in the 1970s. Under this assumption of a linear rate of decline in the segregation index among college majors, Beller and Han (1984) project the segregation index for professional occupations would fall as low as 42.6 in 1990. At the present rate of change, complete integration of college graduates by major would occur in the year 2009; but the segregation index for professional occupations would still be 23.9. Thus, even with an optimistic assumption about young cohorts, occupational segregation by sex would persist into the next century.

Thus, even under the most optimistic conditions, they conclude that policies which influence occupational choice and entry would affect occupational integration at a very slow pace. Furthermore, Beller and Han note that it is unlikely this optimistic scenario, which assumes that social change will continue at the same rate, will occur. Beller and Han do not expect that the preferences of young cohorts will continue to change at an equally rapid pace. Therefore, policies which reduce female attrition in nontraditional occupations and which encourage affirmative action among older workers are also necessary to sustain dramatic declines in segregation (Beller and Han, 1984).

The segregation index is useful in gauging trends. However, it underestimates by far the degree of occupational segregation that American workers actually experience in their workplaces. The published index depends on data that do not reflect segregation within

occupations, and the extent to which employers hire all men or all women in a particular job.

Factors Affecting Occupational Segregation

Researchers and practitioners have identified a variety of factors which can facilitate or limit women's occupational integration. First, the number of women entering nontraditional occupations depends on the choices of workers, influenced by factors such as their early socialization, educational choices, and training. To address these issues, there has been a flourishing of public and private programs designed to counsel and train women for nontraditional occupations, especially pre-apprenticeship training.

On the other hand, a range of legislative, institutional, and informal opportunities or barriers determines employers' demand for workers by sex. It has been easier to pass laws mandating equal opportunity and affirmative action than to eliminate institutional and informal obstacles. These include sexual harassment or coworker hostility, outmoded administrative rules and procedures by employers and unions, biased assignment practices by personnel managers, gender-tracked promotional ladders, and policies which facilitate intraoccupational segregation in the workplace. Demand for workers in different occupations is also influenced by overall macroeconomic trends in the economy and microeconomic changes within firms and industries. Economic factors such as employment growth, sectoral shifts, technological change, and organizational size can affect the level and pace of occupational integration.

The following sections review how these factors have influenced trends in nontraditional blue-collar, professional, and managerial occupations. Each section highlights trends, then examines factors influencing entry and retention in specific nontraditional fields.

Integration of Blue-Collar Work

Trends

Blue-collar work consists of a range of occupations, some of which have always had a significant number of women workers. For example, 40 percent of machine operators are women. They operate winding, twisting, separating, filling, painting, slicing, and sewing machines. But wages paid to operatives are lower than those in the high-paying skilled trades (O'Farrell, 1988). Minority women are more highly represented than white women in these lower status operative positions.

We can see some growth in the number of women training for and entering higher-status skilled blue-collar crafts in Table 4, although their representation is still small. What may be viewed as promising is that the percentage female is greater for women apprentices versus women currently employed, with the exception of the two female-dominated categories: cosmetologist and physical therapist. The national data on apprenticeship training by trade presented in Table 4 is available only since 1987. With more longitudinal data in future years, we will be able to assess whether the relatively higher representation of women in apprenticeship than employment is due to attrition of experienced women workers or to healthy growth. If future women apprentices gain and

retain employment in the trade in which they have trained, this would mean that more and more women are successfully integrating the nontraditional crafts. Hence, whether apprenticeship training will affect the employment percentages in the next decade will depend upon women having successful apprenticeships, good job placements, and tenure in the nontraditional occupations over time.

Women's progress in the crafts has been creeping along or stagnant, depending upon the occupation surveyed. Between 1960 and 1980, the percentage of electricians who were women increased from 0.7 percent to 1.2 percent and the percentage of carpenters who were women increased from 0.4 percent to 1.5 percent (Lillydahl, 1986). But in 1988, women were still only 1.5 percent of carpenters and 1.4 percent of electricians. Finally, looking at the construction occupations in Table 4, we find that women are more likely to be training for the jobs with the lowest median weekly earnings for full-time workers: painters ($323) and carpenters ($365), instead of the premium construction jobs of bricklayers ($441) and plumbers ($465) (U.S. Department of Labor, 1987).

Factors Facilitating Entry

The following sections review factors influencing these trends in blue-collar occupations. First, the role of legal changes and federal regulations in increasing the demand for tradeswomen is discussed. However, the first "pioneer" women in these occupations frequently found themselves insufficiently trained for their new fields. This led to a policy emphasis on alternative programs preparing women for

nontraditional work. Alternative routes to entering the crafts were also developed to address institutional policies and patterns in apprenticeship and federal job training programs that hinder women's entry.

Legal Factors as Groundwork for Change

Affirmative action and equal employment opportunity policies have, in part, facilitated the entry of some women into blue-collar jobs (Kane and Miller, 1981), especially in the construction, mining, and steel industries. However, only minor progress has been made. In construction, federally mandated goals and timetables were established by the Office of Federal Contract Compliance Programs (OFCCP) for public contractors and subcontractors in 1978. Construction contractors admit the increases in women employees would not have occurred without government goals and timetables (Reskin and Hartmann, 1986, p. 128). A "good faith effort" goal of 6.9 percent women per craft in each contract has been in effect since 1981, however no contractor has ever lost a contract or been disqualified for not meeting this goal. As of 1987 only 15 out of 50 states had met or exceeded the 6.9 percent goal for federally-aided highway construction projects, led by Utah, Idaho, Wyoming, and Washington (Reskin and Hartmann, 1986; Martin, 1988; Stanwick Associates, 1988; Johnson, 1988). Women's organizations such as Women Employed and the Women's Legal Defense Fund have expressed concern about lax enforcement efforts by the OFCCP since 1981 (U.S. House of Representatives, Serial No. 99-62, 1986).

With pressure from the federal government, nine major steel companies and the United Steelworkers of America signed a consent decree to increase the hiring of women and minorities into entry-level and craft occupations in 1974. Deaux and Ullman (1983) interviewed women who had gained access to jobs in the steel industry because of the consent decree. According to Deaux and Ullman (1983), specific outreach and recruitment were successful. However, layoffs during the 1981-82 recession in the U.S. steel industry may have undermined progress. Female employment in the industry in 1983 was lower than prior to the adoption of the consent decree stipulations (Deaux and Ullman, 1983, p. 164).

The first wave of women entered nontraditional blue-collar jobs in the 1970s, thanks to legal initiatives. For example, Walshok (1982) found that pioneer women obtained their jobs through the help of a government agency, a women's agency, or a friend or family member in similar employment. The few women who were able to persevere came from families with strong female role models and early childhood experiences with nonsex-typed activities. Successful pioneer women tended to have supportive spouses and family members. However, many felt that they were poorly prepared in the necessary skills required for their jobs.

Kane and Miller (1981) also found that most women in skilled trades were not prepared educationally, physically, and experientially. The women who managed to stay in traditionally male blue-collar jobs were more satisfied than women in clerical jobs. While male coworker hostility was a serious problem, the high pay was worth it (O'Farrell and Harlan, 1980; Schroedel, 1985).

The Emphasis on Training

The experiences of pioneer women led to efforts to ensure that women receive adequate job training. Existing apprenticeship and other formal training programs assumed a level of skills, ability, and experience that many women did not have (O'Farrell, 1978). Numerous studies (see, for example, Briggs, 1981; O'Farrell and Harlan, 1984; Roos and Reskin, 1984; Powers, 1986) as well as interviews with organizations encouraging women's entry into nontraditional occupations emphasize the importance of pre-apprenticeship training programs. (For a list of organizations contacted, see Appendix I.) These programs evolved in the 1980s to overcome some of the obstacles encountered by pioneer women. They also serve an important intermediary role in publicizing opportunities for nontraditional work and placing program participants in jobs and apprenticeships. Funding cuts in the 1980s have hurt these programs. Wider Opportunities for Women reported in 1978 that over 150 programs were able to recruit and train women for apprenticeships; only 50 remain after training and enforcement cutbacks (O'Farrell, 1988, p. 269). Several organizations contacted confirmed that funding cuts in the 1980s made sustaining their programs more difficult.

The organizations involved in pre-apprenticeship training have developed similar curricula designed to prepare women comprehensively. Components generally include (1) counseling and skills assessment to match participants with appropriate occupational choices; (2) tutoring or referrals to remedial programs for those whose test results indicate weakness in math, literacy, and basic education requirements which are

prerequisites of apprenticeship programs; (3) assertiveness training and other programs to improve self-esteem, life-planning skills, and conflict resolution techniques; (4) job-seeking skills, including resumes, interviews, test-taking; (5) physical fitness to build upper-body strength and confidence (usually involving aerobics and weight-training); and (6) exposure to more than one nontraditional field. The last component includes tool familiarity and hands-on training -- either a general course in building maintenance or segments in several fields such as carpentry, welding, electronics, plumbing, etc. Some programs include talks by women in the trades and by local employers; others visit local work sites.

Some of these pre-apprenticeship programs have been developed with the cooperation of local unions. Jersey City State College's Project WORC (Women's Opportunities and Retraining for Careers) cited the cooperation of the carpenters' local as crucial to their success. Working with locals of the operating engineers, carpenters, and electricians played a vital role in creation of ANEW (Apprenticeship and Nontraditional Employment for Women) in Washington. The unions approached State government and the Labor Department to fund pre-apprenticeship training because there were not enough blue-collar women to draw upon to meet compliance regulations. In Chicago, the United Brotherhood of Carpenters and Joiners has created its own coeducational pre-apprenticeship program, in addition to accepting women who complete a program sponsored by the Midwest Women's Center. However, the union's curriculum focuses narrowly on learning about tools and basic math and carpentry skills (J. Isaacson, personal communication, 1989).

Barriers in Pre-Existing Trainin Programs

The pre-existing apprenticeship training programs have administrative rules or procedures which serve as barriers to women's entry. Age limits for starting apprenticeship programs (for example, 18-26 years old) hinder women who consider career changes from traditional jobs, who spend time out of the labor market, or who are intermittently employed while bearing and raising children. Preferences for veterans and sponsorship by a union member are common practices which have also inhibited women's entry (O'Farrell, 1978; Roos and Reskin, 1984; Reskin and Hartmann, 1986).

Reflecting these obstacles, in their interviews with tradeswomen Schroedel (1985) and Martin (1988) found that some experienced unions as a vehicle for bettering their lives, while others felt they were hostile, male-dominated organizations. Unions have the potential to play a more active role for women in nontraditional jobs by negotiating nondiscriminatory wages and working conditions, identifying discriminatory practices, helping to reduce coworker hostility, monitoring affirmative action agreements, and representing women with grievances (O'Farrell, 1988). In Boston, the International Brotherhood of Electrical Workers (IBEW) Local 103 sponsored a women's support group for members and trained stewards and business agents on handling sexual harassment grievances (U.S. Senate, 1988).

One of the largest barriers to entry for women is so-called narrow recruitment policies and procedures. There are several examples. Traditional recruiting sources are: high school shop classes, the military, and trade schools/vocational education classes (O'Farrell and

Harlan, 1984; Reskin and Hartmann, 1986; O'Farrell, 1988). Collective bargaining agreements often stipulate that apprentice openings be advertised only within the plant, where few women have worked (Roos and Reskin, 1984). However, O'Farrell and Harlan (1984) report that a few large corporations, recognizing the limitations of traditional recruitment, have developed aggressive external and internal recruitment.

Under traditional recruitment schemes, women will lack information about apprenticeship opportunities. The community-based women's organizations interviewed have tried to fill this void. Women are informed of opportunities in nontraditional fields through publicity campaigns and introductory workshops featuring tradeswomen panels. Some organizations begin such efforts in high schools and junior high schools, so that girls will start to be familiar with alternative career choices at a young age. These programs may include establishing individual mentoring relationships or visits to nontraditional work sites. Networks and support groups of tradeswomen also distribute newsletters publicizing current apprenticeship openings and application methods.

On the West coast, the U.S. Department of Labor's Women's Bureau has been promoting better ways to recruit women for nontraditional training openings. Advertisements in local "advertiser" papers handed out in supermarkets and shopping malls are effective, particularly if the ads mention potential pay and that these jobs are available to women (M. Mixer, Women's Bureau, personal communication, 1989).

Federal Job Training and Nontraditional Opportunities

Federal job training programs are also a potentially important resource for women who want to enter nontraditional occupations. Federal programs do service large numbers of women and minorities (Sandell and Rupp, 1988). However, federal training programs are doing relatively little to recruit and place women into nontraditional jobs.

Several major studies of job training placement under the Comprehensive Employment and Training Act (CETA) (Harlan and Hackett, 1984; Waite and Berryman, 1984; Strecker-Seeborg et al., 1984; Burbridge, 1987) found extensive tracking of women into traditional occupations, even for those who expressed a preference for sex-atypical or mixed jobs. In response to these tracking problems, the 1978 reauthorization of CETA specifically required that local administrators reduce sex stereotyping in placements. According to Reskin and Hartmann (1986), after 1978 some small CETA programs demonstrated the potential of federally sponsored training to integrate male craft and technical jobs.

Although CETA was replaced with the Job Training Partnership Act (JTPA) in 1983, which specifically required efforts to eliminate sex-stereotyping, studies evaluating JTPA's performance indicate that the same tracking problems have reoccurred. In a study of 25 Service Delivery Areas (SDAs) (Solow, 1986), only one SDA said nontraditional placements were a priority. Department of Labor statistics for JTPA program year 1987 indicate that classroom training, largely geared toward clerical work, included disproportionately high numbers of women and minorities. On-the-job training, leading to better-paying

traditionally male jobs, enrolled a relatively higher percentage of men and whites (U.S. Department of Labor, 1988). As in CETA, JTPA channels women into traditionally female occupations.

While one-third of the SDAs funded small programs to provide nontraditional training for women, most of these were sponsored by nonprofit women's organizations. However, some women's organizations reject JTPA funds for nontraditional training (Solow, 1986). Several organizations we contacted felt that they did not want to limit participation to women who are economically disadvantaged as defined in JTPA. Support services such as child care are difficult to fund adequately given JTPA's ceiling on administrative and support service expenditures (Solow, 1986; Sanders, 1988). People associated with JTPA generally agree that it has resulted in a job training system that is highly sex-segregated (Sanders, 1988, p. 37; U.S. Senate, 1988).

With the passage of the Carl D. Perkins Vocational Education Act in 1984, there was a new attempt to incorporate single parents and homemakers into federally-funded training to be administered by states who desire to participate. Part of the Act requires 8.5 percent of the training funds be set-aside for single parents and homemakers and 3.5 percent of the funds be set-aside for sex equity programs. The set-asides have encouraged an influx of adult women into vocational education, especially since the set-aside programs have counseling and support services (such as child care) that reentry women need. While few programs have encouraged women to enter nontraditional fields, funding under Perkins has been crucial to sustaining the successful community-based pre-apprenticeship training programs (National Coalition

for Women and Girls in Education, 1988; Wider Opportunities for Women, 1988). Thus, federally-funded job training can be a positive facilitator of women's occupational integration, but is short of meeting its legislated goals.

Factors Facilitating Retention

If women can overcome the difficulties getting into blue-collar jobs, they then are faced with how to stay employed. Attrition is a major problem (Briggs, 1981) because of sexual harassment, barriers to advancement opportunities, and intraoccupational segregation. The dropout rate within apprenticeship programs is comparable for women and men (Martin, 1988); the problems leading to attrition seem to intensify after formal training. Involuntary job loss is also a problem. Women have been disproportionately affected by changes in the macro economy since they have low seniority. One follow-up study of nontraditional graduates from San Francisco Community College Centers found that one-third of women who left the trades indicated sexual harassment was one reason; one-third indicated they were laid off or fired. However, this is based on a small sample (McCullough and Tuttle, 1988).

Virtually every researcher or organization involved with encouraging women to enter blue-collar work cite sexual harassment, hostility, and discrimination by coworkers and supervisors as a major impediment to integration in the long run (O'Farrell, 1978; O'Farrell and Harlan, 1980; Walshok, 1981; Gruber and Bjorn, 1982; Wilkinson, 1984; Roos and Reskin, 1984; Schroedel, 1985; Reskin and Hartmann, 1986; Martin, 1988; Personal communications in Appendix II, 1989).

Comprehensive pre-apprenticeship programs attempt to prepare women for the harassment encountered on the job, but most practitioners agree that the actual work situation is worse than that experienced in role playing during the training programs. Most programs emphasize teaching women how to identify sexual harassment, what their legal rights are, and techniques for assertively confronting harassment. ANEW in Washington argues for a realistic approach which, while not condoning overt harassment, also emphasizes that women need to acculturate themselves to their new work environment.

In many occupations there are special problems. For example, in police training, a high level of physical fitness is emphasized while important human relations skills (where women excel) tend to be ignored. When fitness standards go unenforced, coworkers begin to stereotype and claim a lack of confidence in them (Martin, 1988). One other study indicated that women truckers faced harassment, but were able to avoid it if they rode with husbands or boyfriends. Having a male sponsor enabled them to escape sexual harassment (Lembright and Reimer, 1982).

The second most common reason for attrition and discouragement cited by groups who work with blue-collar women is lack of promotional opportunities. In a study of a large organization which sponsored changes in traditionally sex-typed departments, Schreiber (1979) found that nontraditional women had low expectations about their futures in the company. Their male counterparts in typically female jobs were optimistic about promotion opportunities. Their attitudes appeared to be grounded in reality. Between 1974 and 1976, in fields nontraditional for men, men were promoted faster than women. In fields nontraditional

for women, more women than men were downgraded or dropped out of their new positions (Schreiber, 1979, pp. 94 - 96).

While discriminatory attitudes are important, structural or institutional barriers in the workplace can be a severe problem as well. Structural or institutional barriers are administrative rules and procedures of the work site. Roos and Reskin (1984) document the more formalized barriers which are institutionalized in the firm's personnel practices. Once employed in a firm, most of the mechanisms that affect access to additional training, job assignment, and mobility are determined by employer practices and union procedures. For example, formal rules in promotion, transfers, layoffs, and benefits can negatively affect women bidding for or already in blue-collar occupations.

Seniority Systems

In unionized workplaces, seniority systems can negatively affect women in three ways. First, seniority counts highly towards advancement, and women may not have as much as their male counterparts. Second, seniority is a provision in many collective bargaining agreements that can determine layoffs, if they become necessary. Third, when seniority refers to sub-units of the organization, incumbents lose seniority and possibly must accept lower pay if they attempt to advance by changing jobs or transferring departments (Roos and Reskin, 1984; Bielby and Baron, 1984; Reskin and Hartmann, 1986; O'Farrell, 1988). Given the history of segregation, these arrangements freeze past discrimination. If a woman operative (or clerical worker) considers

entering a craft position, her incentive is reduced by loss of seniority if she transfers.

During the most recent recession, women lost some of the nontraditional blue-collar jobs they had fought to gain in the 1970s (Steinberg and Cook, 1981; Deaux and Ullman, 1983; O'Farrell and Harlan, 1984). The Coal Employment Project, for instance, has reevaluated its organizational mission since first opening its doors and encouraging women's entry into coal mining in 1978. Today, the Coal Employment Project is reduced to advocating programs such as parental leave for the few women who remain and assisting laid off miners collect benefits and seek new jobs.

The reform of seniority is crucial if the rate of promotion of blue-collar women is to rise above its present low level (see O'Farrell and Harlan, 1984). Some integration programs inside companies that have been successful have focused on company-wide job posting and reforming seniority systems, in addition to aggressive recruitment (Shaeffer and Lynton, 1982; O'Farrell and Harlan, 1984).

Promotional Opportunities and Intraoccupational Segregation

The other major barrier to promotional opportunities is intraoccupational segregation. It is argued that employers hire women into blue-collar jobs in order to appear to comply with equal employment opportunity (EEO) and affirmative action requirements, but track them into different job categories with shorter career ladders. Thus, women are hired at the entry level, but concurrently placed in newly created female "job ghettos." These practices maintain sex-segregated

occupational hierarchies which have traditionally assigned women and minorities to jobs with shorter career ladders (Harlan and O'Farrell, 1982).

In the steel industry Deaux and Ullman (1983) found that women were not receiving the opportunities to acquire skills that would enable them to assume foreman positions, such as serving as a subforeman on an occasional basis. Further, inadequate on-the-job training sometimes holds women back in the crafts. Women apprentices may rotate jobs so quickly that they do not have time to master the skills to enable them to be eligible for promotion (Walshok, 1982). In a large company, Harlan and O'Farrell noted the increased female enrollments in the firm's apprentice program. But women of both races were disproportionately placed in the least skilled jobs at the bottom levels of the plant hierarchy. The women interviewed believed their upward mobility chances were slim (Harlan and O'Farrell, 1982, pp. 371 - 72).

In a larger study of 400 California establishments, employers were found to practice "statistical discrimination:" they reserved some jobs for men and others for women, based upon perceptions of group differences between the sexes (Bielby and Baron, 1987). Bielby and Baron also found that creating job categories with different promotional paths for women and men was much easier in large, bureaucratic workplaces with many job classifications, job titles, and employees. It was also easier to segregate women when they were a minority of the workforce (Bielby and Baron, 1984).

Full integration requires that women have access to careers with promotional opportunities, not just entry-level jobs. Successful

occupational integration will have to (1) develop strategies to keep newly integrated occupations from resegregating; and (2) facilitate women's advancement into supervisory and other higher-paying positions. In addition to removing structural barriers within workplaces, we need to ensure that the initial training women receive is an adequate base for moving up on the job.

There have been few attempts to systematically evaluate the long-term effectiveness of pre-apprenticeship training programs in facilitating women's upward mobility. The programs surveyed had little or no idea of the long-term career paths of their graduates. Virtually all programs are required by funders to do some short-term follow-up (usually up to 90 days after placement). Most programs allow participants to come back to the placement service as needed, and so maintain informal contact with a select population. A few programs maintain ongoing support groups, but participation is voluntary. Every organization surveyed indicated they would like to see a systematic study of the programs' effectiveness and participants' long-term career development, but they lacked the funding and/or staff capability.

Integration of White-Collar Work

Trends

White-collar occupations include most of the occupations which are female-dominated such as clerical workers, health care workers, and teachers. However, professional and managerial white-collar occupations include the highest paid and most prestigious careers in our society:

engineers, doctors, lawyers, and financial/bank managers. Women's representation in these high-status management and professional specialties categories has been increasing since the 1960s.

A remarkable example of women's progress has been the field of accounting. In 1960, only 16.4 percent of accountants were women; in 1988 women have reached virtual parity -- accounting is 45.6 percent female. Similarly, the percent of financial/bank managers who are women increased from 19.4 percent in 1970 to 42.4 percent in 1988. Women have also made impressive gains in professions such as the following:

-- lawyers: from 3.3 percent in 1960 to 19.3 percent in 1988.

-- physicians: from 6.8 percent in 1960 to 20.0 percent in 1988.

-- college teachers: from 21.3 percent in 1960 to 38.5 percent in 1988.

-- pharmacists: from 8.1 percent in 1960 to 31.9 percent in 1988.

-- architects: from 2.1 percent in 1960 to 14.6 percent in 1988.

However, women were only 2.0 percent of engineers in 1970 and 7.3 percent in 1988. Although the proportions of black and white women in the professions are comparable, Hispanic women are underrepresented in all professional occupations, even female-dominated ones (Malveaux and Wallace, 1987).

The category of executives, managers, and administrators includes everyone from office managers to Fortune 500 executives. The percentage female of this broad category rose from 15.6 percent in 1960 to 39.3 percent in 1988. The proportion of white women who are managers is higher than the proportion of Hispanic women, and the proportion of black females who are managers is lower still (Malveaux and Wallace,

1987). In most of the sub-categories of managerial occupations in 1988, women have achieved more than 25 percent representation.

Although technically most managerial occupations are no longer overwhelmingly male-dominated, there is certainly pervasive sex segregation by industry, department, employer, job, or clientele served (Roos and Reskin, 1984; Reskin and Phipps, 1988; Reskin and Roos, forthcoming). For example, in general, women bankers felt their careers were blocked because they are predominantly managers of small, branch banks with little direct advancement possibilities in the organizational hierarchy. In contrast, male bank managers predominate in larger banks and in commercial banking, where advancement opportunities are greater (Reskin and Roos, forthcoming). Finally, in most companies, top and even middle management remains a white male preserve (Hymowitz, 1989).

Factors Facilitating Entry

As in blue-collar jobs, women's entry into management and the professions has been facilitated in part by government policy. Due to targeting of the banking industry by the OFCCP, for example, the category of bank managers has become an integrated occupation (Reskin and Phipps, 1988; Reskin and Roos, forthcoming). Federal enforcement of anti-discrimination laws by the Equal Employment Opportunities Commission (EEOC) in the 1970s prodded the insurance industry to recruit and employ women in nontraditional jobs such as sales agents (Reskin and Roos, forthcoming). However, in the specific case of insurance adjusters and examiners, Phipps (1989) argues that there is only some

indirect evidence that OFCCP or EEOC influence might be responsible for women's entry.

The growth of the service sector has played a major role in facilitating occupational integration of white-collar occupations. A combination of regulatory pressure and an expanding market in banking and insurance, for example, helped facilitate women's entry into financial/bank management and insurance sales (Reskin and Roos, forthcoming). Thus, macroeconomic trends played a role.

Progress in professions requiring highly specialized quantitative skills has been relatively slow. Women constitute a smaller percentage of the science and engineering workforce than they do of total employment in the professions. Researchers cite the on-going problems of early sex-role socialization, guidance counseling, and educational choices as primary factors in perpetuating occupational segregation for several science and social science professions.

Traditional sex-role attitudes may inhibit some women from developing quantitative skills or choosing nontraditional occupations. Further, many women lack support for exploring nontraditional interests (see Waite and Berryman, 1985; Berryman and Waite, 1987). Given the importance of advice and counseling in developing academic and career interests, sex-segregation may be replicated by sex-biased employment assessment and placement exams such as the Strong-Campbell Vocational Index. Moore and Ollenberger (1986) suggest that career counselors using such tests may be channeling women into historically female-dominated occupations and workplaces. (See also Marini and Brinton, 1984.)

The failure to develop quantitative skills during early school years may seriously restrict women's ability to compete for slots in traditionally male college majors (Lyson, 1984). While the choice of college major is a crucial factor affecting occupational choice and, thus integration, it appears that the study of math and science in high school is equally important (Berryman, 1983). The choices of young women only narrow as years of education increase.

An example of this is engineering. Unlike other college majors, students apply directly into engineering programs from high school; they do not sample courses in their first two years of college and then decide to enter the field. Therefore, high school socialization plays an especially important role in determining who enters engineering. This may be one reason women's progress into engineering has been slower than other professions, even others requiring quantitative skills (Bergmann, 1986).

Facilitating Retention Within the Professions

Once women do enter the professions, they face intraoccupational segregation. Women physicians, lawyers, engineers, economists, pharmacists, professors, and scientists, for example, are segregated by industry, employer, or field of specialization (see Strober and Reagan, 1976; Epstein, 1981; Butter et al., 1985; Roos and Reskin, 1984; Bergmann, 1986; Reskin and Roos, 1987; Sokoloff, 1987; Figart, 1988; Reskin and Phipps, 1988; National Science Foundation, 1988).

The National Science Foundation points out that women scientists are overrepresented in government and academic jobs. Women scientists

and engineers are also less likely than men to be in management (National Science Foundation, 1988; Reskin and Phipps, 1988). Women pharmacists are concentrated in hospitals and discount chains, whereas men are in research and industry, where pay scales are higher. Although 40 percent of law students are women, women lawyers are concentrated in government jobs, in research rather than litigation, and in certain specialties such as matrimonial law, real estate, and trusts and estates. Women lawyers are also less likely to run their own practices (Epstein, 1981; Reskin and Phipps, 1988). Women doctors are underrepresented in surgery, but overrepresented in pediatrics, anesthesiology, and psychiatry (Reskin and Phipps, 1988).

Factors Facilitating Entry and Advancement in Management

Unlike the professions which require extensive formal training and accreditation, entry into management can occur in a variety of ways. Like blue-collar trades, advancement in management depends upon active recruitment and informal sponsorship and training. O'Farrell and Harlan (1984) argue that recruitment of women into entry-level management may require expanded effort; firms should search broader geographic areas and hire recruitment firms if necessary to achieve affirmative action. Women's colleges should not be overlooked (Shaeffer and Lynton, 1982). Organizations need to consider expanding administrative support job descriptions to include more responsibility as a bridge into management.

Gaining access to informational networks and mentors is essential to upward mobility in management (Kanter, 1977; Harlan and Weiss, 1982; Shaeffer and Lynton, 1982; Roos and Reskin, 1984). A case study of financial managers by Bird (1989) reveals that at higher levels of

management (such as vice president), women had limited access to information about openings in their own banks and in other banks.

The attitude of coworkers and supervisors (in top management) is also an important factor affecting the pace of integration at all levels of the hierarchy. Management tends to be a closed circle in which social homogeneity becomes a factor for entry. Therefore, black female managers are less likely than their white counterparts to have corporate sponsors (Fulbright, 1987). Women who are able to enter managerial positions from clerical or operative jobs may face additional barriers to promotion. Often they are seen as qualified for their current position, but not for further positions in management since they may not have the same education and experience as other managers (Kanter, 1977). Sexual harassment is also a barrier, as are sabotage and more subtle expressions of hostility (Kanter, 1977; Malveaux, 1982; Roos and Reskin, 1984). Strong human resource programs which fight bias and harassment and which clearly outline promotion possibilities and available training are an important remedy.

A program at Corning Glass Works was able to (1) lower the attrition rates of women and black managers to equal that of white males and (2) increase the movement of women and blacks into middle and top management. The chairman of Corning ordered that top executives' assistance to women and minorities in reaching their fullest potential would influence the managers' own promotions. In order to fill top management openings, Corning is broadening its traditional promotion policy by not only promoting from within, but becoming active in regional black and women's professional groups to locate talent.

Workshops have raised awareness of subtle forms of bias (Hymowitz, 1989). In another model effort, Motorola requires middle- and upper-level managers to meet equal opportunity and affirmative action goals for technical and managerial staff or else loose up to 10 percent of their earned bonuses (U.S. Senate, 1988).

The Impact of Technological Change

The research on women and technological change has not directly addressed occupational integration. Several studies address two important questions regarding occupational integration:

(1) Will traditionally female occupations be affected by job loss due to technological change, hence necessitating women's entry into nontraditional work?

(2) Are emerging high-technology occupations and industries reforming or replicating patterns of sex segregation?

Technological Change and Female-Dominated Employment

There have been a variety of attempts to predict the impact of new technologies on clerical and other traditionally female employment (General Accounting Office, 1982; Werneke, 1983; 9 to 5, 1985; Leontief and Duchin, 1986; National Commission for Employment Policy, 1986; Hartmann, Kraut, and Tilly, 1986; Hunt and Hunt, 1986; Cyert and Mowery, 1987). The pace of diffusion of technological change provides the major source of disagreement over the extent of job loss. Those who predict a rapid diffusion (Leontief and Duchin, 1986) also project rampant clerical job losses. However, most studies merely anticipate a slowing

of the expansion of demand for office workers (Hartmann, Kraut, and Tilly, 1986; Hunt and Hunt, 1986; Cyert and Mowery, 1987).

Within this general trend, of course, there will be differential impact on various specific clerical occupations. Several studies predict that the lower-paid, "backroom" clerical jobs, where minority women are concentrated, will be hardest hit (U.S. Department of Labor, 1985; Hartmann, Kraut, and Tilly, 1986; Cyert and Mowery, 1987). Another concern is that automation of lower-level professional and managerial positions can potentially eliminate the few jobs which served as bridges from skilled clerical work, further reducing opportunities for women's mobility and occupational integration (Albin and Appelbaum, 1988).

Women in other job categories besides clerical work will also be affected by automation. The increasing use of microelectronics and deployment of robotics is expected to lead to a reduction of employment in industrial assembly -- one of the few areas of industrial employment that has traditionally had high female concentration (Lappe, 1985). Displaced minority and white women suffer longer spells of unemployment and more difficult job transitions than white men (Hartmann, Kraut, and Tilly, 1986; Cyert and Mowery, 1987; Flynn, 1988). Women are less likely to get lateral transfers or promotions when their jobs are displaced because it is assumed that they are not primary breadwinners in need of work or retraining (Flynn, 1988).

If jobs available in some female-dominated occupations and industries decrease or experience slower growth by the year 2000, this could be mitigated by increasing women's opportunities elsewhere in the

labor market (Phipps, 1989). While some women can move into traditionally female industries such as health care, technological change only reinforces the importance of strategies to remove barriers that impede women's entry into those nontraditional occupations which will continue to grow.

High industry growth rates may facilitate occupational integration when technological change occurs. Bielby and Baron (1984) discovered a successful experience in a large bank, where employment concurrently increased by 50 percent within 7 years. Innovation appeared to be responsible for the desegregation of several administrative and data processing job classifications. Their study is supported by research on the entry of women into bank managerial positions. Among the factors encouraging this trend was the 86 percent increase in the number of bank managers from 1970 to 1980. Competition brought about by deregulation of the industry and the demand for new, automated banking services led to the proliferation of small branches and a stronger commitment to customer service. But while industry growth provided new employment opportunities, women bank managers were concentrated in the smaller, consumer-oriented banks (Bird, 1989).

The insurance industry offers another example. Phipps (1989) found that rapid growth of the insurance industry from 1960 to 1980, coupled with technological change, paved the way for women's entry into adjuster and examiner positions. However, while men remained in outside field positions, women remained in the office using the telephone or computer to process insurance claims.

Thus successful integration is facilitated when firms adopt new technology which is labor-using and implement it in a period of industrial growth. To avoid intraoccupational segregation, however, management initiatives must treat technological change as planned interventions in the firm, in conjunction with affirmative action and equal employment opportunity (see O'Farrell and Harlan, 1984).

Technological change brings about changes in work organization and job content. Working with new technologies can eliminate repetitive tasks while demanding new skills and providing new opportunities. It can also standardize procedures and embed decision-making in automated processes. Unfortunately, preliminary case studies suggest that women are hired into male-dominated occupations when technological change has lowered rather than increased skill requirements (Hacker, 1979; Strober and Arnold, 1987; Reskin and Roos, 1987; Reskin and Roos, forthcoming; Phipps, 1989). Examples of occupations where case studies indicate this trend are typesetters, bank tellers, insurance claims adjusters, telephone line installers, and several positions within the computer industry.

This raises a question: does women's entry into an occupation change the perception of the job as necessarily less skilled because a woman is doing it? While such sociological factors may play a role, the studies cited indicate that the desire to introduce women workers is primarily a cost-saving measure during periods of intensified industry competition; lowering actual skill requirements is part of this cost-cutting trend. Thus, these contemporary examples exemplify the historical dynamic suggested by Cohn (1985).

High-Technology Industries and Occupations

One measure of women's changing opportunities might be whether new and emerging occupational categories are less segregated than older job categories. However, computer-related occupations and high technology industries have not avoided traditional patterns of sex segregation; they tend to be more segregated by gender than other industries. Compared to women in other industries, women in high-tech industries are less likely to be in managerial and professional/technical jobs. (See also Kaplan, 1984.) The computer field evolved from the fields of mathematics and engineering, and took on the gender designation of the parent fields (Strober and Arnold, 1987; see also Flynn, 1988). For example, computer scientists, systems analysts, and computer programmers are disproportionately white men; most data entry operators are women, with minority women a high proportion.

Two case studies of electronic assembly workers in Silicon Valley reveal the formal and informal barriers to upward mobility in high-tech industries. For example, assemblers felt that minimal on-the-job training could prepare them to become technicians. But requirement of a college degree blocked access and reflected management stereotypes that assembly work was unskilled, even though it entailed some complex tasks and special training (Green, 1983; Katz and Kemnitzer, 1984).

To the extent that workers lack basic educational preparation and technical and scientific background, they are less likely to be able to respond to new employment opportunities. Those with scientific and technical training will be able to enter and move up in rapidly expanding jobs such as computer systems analysts, programmers,

operations and systems researchers, and data processing equipment repairers, occupations projected to be among the twenty fastest growing from 1986-2000. Therefore, if women are to take advantage of growing jobs in the next decade, policy must focus on adequate training and removing barriers to male-dominated occupations (Hartmann, Kraut, and Tilly, 1986; Silvestri and Lukasiewicz, 1987; Noyelle, 1987).

The rapid growth of computer-related occupations and the replication of sex segregation within high-tech industries raises important questions about the focus of most efforts at occupational integration. While efforts to integrate blue-collar fields continue to be vital, a broader attack on the problem of nontraditional work for women is needed. Community-based training needs extension to all nontraditional fields requiring different education levels (B. Makris, Wider Opportunities for Women, personal communication, 1989).

However, occupations that are declining should not be ignored because there are still job openings due to turnover. With women so severely underrepresented in skilled trades, there is considerable room for improvement in these still-important occupations (Bergmann, 1981).

One example of an uncommon approach is the program of the Women's Technical Institute in Boston, which complements another Boston group, Women in the Building Trades. The Institute offers full-time and part-time programs in electronics, drafting, surveying, technical writing, office machine repair, and other technical fields. Local businesses have cooperated by donating equipment, and placement with local employers is as high as 94 percent. Now in their 13th year, the Institute sent out questionnaires to all locatable graduates. Although

the response rate was low, 85 percent indicated that they were still in the field for which they trained (M. A. Noel, Women's Technical Institute, personal communication, 1989).

The American Electronics Association, the largest trade group for the electronics industry, has established an Electronics Education Foundation. One of the Foundation's programs consists of fellowship-loan support for electrical/computer engineering and computer science students interested in pursuing their doctorates and teaching. A goal of this program is enabling women to become faculty members and serve as role models for young women considering science and engineering. Fewer than 6 percent of electrical engineering doctorate recipients in 1985 were women; almost 15 percent of those in the faculty development program are women (U.S. Senate, 1988, pp. 124-126). Programs such as these show promise for the next decade.

Policy Implications and Recommendations

A key strategy for occupational integration has been federal and local encouragement of affirmative action and equal employment opportunity (EEO) policies by employers. When EEO and affirmative action have been a top policy priority within firms and by federal enforcement agencies, gains have been made. All other policies, programs, and individual efforts build on this foundation.

We found that in blue-collar and white-collar occupations as well as emerging high technology industries, job integration is strongly aided by macroeconomic growth and an expanding labor force. Women's chances of being hired and retained in nontraditional opportunities are

increased if there is potential employment for both women and men in nontraditional and high-tech industries. Recessions, on the other hand, have a negative effect on women, displacing newer entrants into nontraditional work.

As suggested throughout our analysis of existing research and programs, the following are specific elements of a comprehensive strategy for eliminating occupational segregation in both blue-collar and white-collar employment:

Policies to Facilitate Entry

1. On the demand side, we need a strong commitment by top management to individual workplace EEO policies, with goals and timetables. Creative methods of recruitment should replace traditional sources if goals are not being met. Within occupational categories and workplaces, women should be recruited into positions with the same career ladders as their male counterparts, avoiding intraoccupational segregation. Middle and lower level managers should be monitored and given incentives to hire and promote women.

2. Administrative rules and procedures, such as veteran's preferences and age limits, which hinder women's entry into nontraditional training programs, need to balanced with affirmative action.

3. In unionized workplaces and industries, unions can play an important role in encouraging women's entry and providing training for nontraditional fields. In industries where unions have not traditionally played an active role in training entrants, they may still

be able to negotiate joint labor-management efforts to upgrade women's skills and move them from female-dominated job categories to nontraditional ones.

4. On the supply side, educational programs designed to encourage nontraditional career options for girls and boys need to be introduced at a young age, as do efforts to increase quantitative and mechanical skills. Innovative curricula may need to be developed which integrate human relations skills with quantitative and mechanical ones, so that tracking by gender does not occur. Scientific, mechanical, and computer skills must be developed as well.

5. Career counseling testing instruments need to be evaluated for bias and be reformed, if necessary. Guidance, career, and vocational education counselors' attitudes and knowledge about women's careers contribute to sex-stereotyping of occupations. Counselors must encourage women to consider nontraditional careers, not channel them into female-dominated occupations and workplaces.

6. Where women lack the requisite skills for entering training programs, pretraining or specialized curricula need to be developed. Pre-apprenticeship training offers a successful model, which needs to be utilized for other, expanding occupations. Elements of effective programs frequently cited by community-based organizations include: (a) comprehensive curricula that address women's personal development and build self-confidence; (b) targeting available jobs and providing effective placement mechanisms; (c) support of local employers, labor unions, and communities; and (d) supportive, creative staff, including women with experience in nontraditional work.

7. Federal and state programs designed to assist disadvantaged women and displaced homemakers reenter the labor market must overcome sex-stereotyping. As required by law, programs should actively encourage consideration of nontraditional fields. Because of strict post-program wage and placement requirements, some community-based organizations reject JTPA money. Whereas an apprenticeship, for example, may not have the rewards of clerical work in the short run, it may reap greater rewards in the long run. Women are encouraged to participate in training under set-asides of the Perkins Act, which allows some money to be spent for support services. Policymakers need to change program requirements to meet the specific needs of nontraditional training.

Policies to Facilitate Retention

1. Widespread dissemination of EEO and affirmative action policies, as well as clearly stated requirements for promotions, foster a receptive organizational climate. Women need to know what promotion opportunities are available, how to apply for them, and what the criteria for advancement will be. These policies help ensure that once women enter nontraditional occupations, they are not segregated into positions lacking opportunities for mobility.

2. Managers must feel that one criterion in evaluating their performance is their effectiveness at encouraging women's career development and assisting the organization in meeting goals and timetables.

3. Job ladders need to be developed in traditionally female occupations such as clerical work, as stepping stones into the professions and management.

4. Sexual and other forms of harassment must not be tolerated. Policies against sexual harassment must be disseminated. Education efforts to increase awareness of the nature of harassment are important preventative measures. Education efforts should target both men and women to increase awareness of the nature of harassment, and address more subtle forms of bias and exclusion. Federal and state training programs should require and enforce this aspect of training.

5. The structure of seniority must be reformed where it hinders affirmative action. Women should not be overlooked for job retraining and lateral transfers when job displacement occurs.

Finally, while model programs to facilitate women's entry into nontraditional white-collar and blue-collar occupations have emerged, systematic evaluation of such programs is rare. We recommend that funding be made available to independent researchers and to the organizations themselves to evaluate the relative effectiveness of the component elements of training and pre-training programs. We also recommend that the Department of Labor collect longitudinal data on women who train for nontraditional occupations via apprenticeships and alternative routes, to systematically evaluate the factors which cause attrition and facilitate retention.

TABLE 1

RANKING OF 335 OCCUPATIONS BY PERCENT FEMALE

AND ACCUMULATED PERCENTAGE DISTRIBUTION

OF FULL-TIME WORKERS BY SEX, 1984[a]

Rank	Occupation	Employment (thousands)			Accumulated Percentage of Workers by Sex	
		Men	Women	% Women	Women	Men
1.	Dental hygienists	b	25	100.00	.08	.00
2.	Child-care workers	1	133	99.25	.53	.00
3.	PreK/kindergarten teachers	2	203	99.02	1.21	.01
4.	Secretaries	59	3,070	98.11	11.47	.14
5.	Receptionists	11	432	97.52	12.91	.17
6.	Dental assistants	3	82	96.47	13.19	.17
7.	Typists	26	637	96.08	15.32	.23
8.	Licensed practical nurses	13	283	95.61	16.26	.26
9.	Private household workers	8	163	95.32	16.81	.28
10.	Registered nurses	52	923	94.67	19.89	.40
11.	Health record technologists and technicians	2	34	94.44	20.01	.41
12.	Teacher aides	9	150	94.34	20.51	.43
13.	Dieticians	3	49	94.23	20.67	.43
14.	Welfare service aides	2	26	92.86	20.76	.44
15.	Sewing machine operators	54	687	92.71	23.05	.56
16.	Telephone operators	14	164	92.13	23.60	.60
17.	Personnel clerks, except payroll and timekeeping	5	57	91.94	23.79	.61
18.	Data-entry keyers	26	280	91.50	24.73	.67
19.	Bank tellers	36	349	90.65	25.89	.75
20.	Stenographers	4	36	90.00	26.02	.76
21.	Bookkeepers, accounting, and auditing clerks	131	1,167	89.91	29.92	1.06
22.	Dressmakers	4	34	89.47	30.03	1.07
23.	Nursing aides, orderlies	100	760	88.37	32.57	1.30
24.	Speech therapists	5	37	88.10	32.69	1.31
25.	Material recording, scheduling, distribution clerks, N.E.C.	3	22	88.00	32.77	1.32
26.	Eligibility/welfare clerks	8	51	86.44	32.94	1.34
27.	Special-education teachers	21	132	86.27	33.38	1.38
28.	Billing clerks	18	110	85.94	33.75	1.43
29.	Hairdressers/cosmetologists	32	194	85.84	34.40	1.50
30.	Librarians	22	133	85.81	34.84	1.55
31.	Library clerks	7	41	85.42	34.98	1.57
32.	Child-care workers	23	129	84.87	35.41	1.62
33.	Interviewers	20	110	84.62	35.78	1.67
34.	Billing/posting/calc. mach. ops.	4	22	84.62	35.85	1.67
35.	Elementary school teachers	186	981	84.06	39.13	2.10

36.	Health aides, ex. nursing	42	209	83.27	39.83	2.20
37.	Physical therapists	8	39	82.98	39.96	2.22
38.	Information clerks, N.E.C.	19	91	82.73	40.26	2.26
39.	Payroll/timekeeping clerks	27	129	82.69	40.69	2.32
40.	Folding machine operators	5	23	82.14	40.77	2.33
41.	Cashiers	160	715	81.71	43.16	2.70
42.	Waiters and waitresses	96	429	81.71	44.59	2.92
43.	File clerks	41	178	81.28	45.19	3.02
44.	Public-transport. attendants	6	25	80.65	45.27	3.03
45.	Health specialties teacher	7	27	79.41	45.36	3.05
46.	General office clerks	101	374	78.74	46.61	3.28
47.	Records clerks	25	92	78.63	46.92	3.34
48.	Shoe machine operators	12	42	77.78	47.06	3.36
49.	Administrative support occupations, N.E.C.	107	363	77.23	48.27	3.61
50.	Sales workers, apparel	37	125	77.16	48.69	3.70
51.	Statistical clerks	19	64	77.11	48.91	3.74
52.	Cost and rate clerks	15	50	76.92	49.07	3.77
53.	Clinical lab. technologists and technicians	53	173	76.55	49.65	3.90
54.	Winding/twisting mach. ops.	21	67	76.14	49.87	3.94
55.	Maids and housemen	88	279	76.02	50.81	4.15
56.	Office mach. ops., N.E.C.	8	25	75.76	50.89	4.16
57.	Order clerks	40	121	75.16	51.30	4.26
58.	Legal assistants	29	80	73.39	51.56	4.32
59.	Investigators/adjustors, except insurance	75	206	73.31	52.25	4.50
60.	Electrical and electronic equipment assemblers	93	247	72.65	53.08	4.71
61.	Food preparation workers	20	52	72.22	53.25	4.76
62.	Solderers and braziers	11	28	71.79	53.34	4.78
63.	Hotel clerks	17	42	71.19	53.48	4.82
64.	Food counter and rela. occs.	23	56	70.89	53.67	4.87
65.	Mgmt.-related occs., N.E.C.	58	136	70.10	54.13	5.01
66.	Recreation workers	14	32	69.57	54.23	5.04
67.	Sales workers, other commodities	176	388	68.79	55.53	5.44
68.	Bill and account collectors	24	52	68.42	55.70	5.50
69.	Hand packers and packagers	70	151	68.33	56.21	5.66
70.	Sales counter clerks	22	46	67.65	56.36	5.71
71.	Health technologists and technicians, N.E.C.	53	108	67.08	56.72	5.83
72.	Insurance adjusters, examiners and investigators	67	130	65.99	57.16	5.99
73.	Laundering and dry-cleaning machine operators	39	74	65.49	57.41	6.08
74.	Supervisors, general office	125	232	64.99	58.18	6.36
75.	Computer operators	231	419	64.46	59.58	6.89
76.	Knitting, looping, taping, weaving machines operators	14	25	64.10	59.67	6.93
77.	Supervisors, fin. records proc.	27	48	64.00	59.83	6.99
78.	Radiologic technicians	33	58	63.74	60.02	7.06
79.	Inhalation therapists	18	31	63.27	60.12	7.11

80.	Managers, med. and health	33	55	62.50	60.31	7.18
81.	Graders/sorters, ex. agric.	33	53	61.63	60.48	7.26
82.	Social workers	144	230	61.50	61.25	7.59
83.	Supervisors, food prep./serv.	63	99	61.11	61.58	7.73
84.	Religious workers, N.E.C.	16	25	60.98	61.67	7.77
85.	Typesetters and compositors	20	31	60.78	61.77	7.82
86.	Pressing machine operators	40	62	60.78	61.98	7.91
87.	Therapists, N.E.C.	13	20	60.61	62.04	7.94
88.	Transportation ticket and reservation agents	32	49	60.49	62.21	8.01
89.	Supervisors, pers. service	10	15	60.00	62.26	8.04
90.	Cementing/gluing mach. ops.	16	22	57.89	62.33	8.07
91.	Pers. service occ., N.E.C.	22	30	57.69	62.43	8.12
92.	Personnel, training, and labor-relations specialists	132	164	55.41	62.98	8.43
93.	Pkging/filling mach. ops.	166	203	55.01	63.66	8.81
94.	Optical goods workers	22	25	53.19	63.74	8.86
95.	Expediters	48	53	52.48	63.92	8.97
96.	Counselors, educ. and voc.	77	83	51.87	64.20	9.15
97.	Photo. process machine ops.	36	38	51.35	64.32	9.23
98.	Production inspectors, checkers, and examiners	332	345	50.96	65.48	9.99
99.	Mail clerks, ex. postal serv.	67	68	50.37	65.71	10.15
100.	Cooks, except short order	395	397	50.13	67.03	11.06
101.	Sales workers, shoes	22	22	50.00	67.11	11.11
102.	Food batchmakers	13	13	50.00	67.15	11.14
103.	Animal caretakers, exc. farm	20	20	50.00	67.22	11.18
104.	Production coordinators	90	89	49.72	67.51	11.39
105.	Teachers, N.E.C.	80	79	49.69	67.78	11.57
106.	Misc. textile machine ops.	35	34	49.28	67.89	11.65
107.	Street/door-to-door venders	33	32	49.23	68.00	11.73
108.	Real-estate sales	135	130	49.06	68.43	12.04
109.	Secondary school teachers	544	523	49.02	70.18	13.29
110.	Bookbinders	17	16	48.48	70.23	13.33
111.	Misc. printing machine ops.	16	15	48.39	70.28	13.37
112.	Psychologists	43	40	48.19	70.42	13.47
113.	Underwriters/other financial officers	279	258	48.04	71.28	14.11
114.	Bartenders	97	89	47.85	71.58	14.33
115.	Public-relations specialists	66	58	46.77	71.77	14.48
116.	Personnel/labor-relations managers	56	49	46.67	71.94	14.61
117.	Misc. food-prep. occs.	135	118	46.64	72.33	14.92
118.	Weighers, measurers, and checkers	30	26	46.43	72.42	14.99
119.	Biological technicians	25	21	45.65	72.49	15.05
120.	Managers, properties and real estate	102	85	45.45	72.77	15.28
121.	Editors and reporters	96	80	45.45	73.04	15.50
122.	Sales workers, furniture etc.	53	44	45.36	73.19	15.62
123.	Dispatchers	86	69	44.52	73.42	15.82
124.	Short-order cooks	20	16	44.44	73.47	15.87
125.	Economists	58	46	44.23	73.62	16.00

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126.	Sales, other business serv.	187	146	43.84	74.11	16.43
127.	Attendants, amusement, and recreation facilities	35	27	43.55	74.20	16.51
128.	Assemblers	555	422	43.19	75.61	17.79
129.	Medical scientists	16	12	42.86	75.65	17.83
130.	Advertising and rela. sales	59	44	42.72	75.80	17.96
131.	Postmasters and mail superintendents	15	11	42.31	75.84	18.00
132.	Buyers, wholesale and retail trade, ex. farm prod.	89	65	42.21	76.05	18.20
133.	Misc. hand working occs.	18	13	41.94	76.10	18.24
134.	Accountants and auditors	620	443	41.67	77.58	19.67
135.	Molding/casting machine ops.	53	36	40.45	77.70	19.79
136.	Technical writers	27	18	40.00	77.76	19.85
137.	Dental lab. and med. appliance technicians	21	14	40.00	77.81	19.90
138.	Painters, sculptors, craft artists, art printmakers	51	33	39.29	77.92	20.02
139.	Designers	160	102	38.93	78.26	20.39
140.	Officials/admin., public administration	248	158	38.92	78.78	20.96
141.	Statisticians	16	10	38.46	78.82	20.99
142.	Admin., educ./rela. fields	237	147	38.28	79.31	21.54
143.	Supervisors, cleaning and bldg. service	70	42	37.50	79.45	21.70
144.	Purchasing agents/buyers, N.E.C.	137	80	36.87	79.72	22.01
145.	Stock/inventory clerks	291	165	36.18	80.27	22.68
146.	Financial managers	218	123	36.07	80.68	23.18
147.	English teachers	16	9	36.00	80.71	23.22
148.	Waiters/waitresses assts.	68	38	35.85	80.84	23.38
149.	Tailors	18	10	35.71	80.87	23.42
150.	Art/drama/music teachers	19	10	34.48	80.90	23.46
151.	Computer programmers	306	161	34.48	81.44	24.17
152.	Physicians assistants	28	14	33.33	81.49	24.23
153.	Science teachers, N.E.C.	35	17	32.69	81.55	24.31
154.	Postal clerks, ex. mail carriers	164	79	32.51	81.81	24.69
155.	Technicians, N.E.C.	125	60	32.43	82.01	24.98
156.	Barbers	21	10	32.26	82.04	25.02
157.	Business/promotion agents	26	12	31.58	82.08	25.08
158.	Production testers	39	18	31.58	82.14	25.17
159.	Bakers	44	20	31.25	82.21	25.27
160.	Engin. technicians, N.E.C.	124	56	31.11	82.40	25.56
161.	Hand printing, coating, and decorating occupations	20	9	31.03	82.43	25.61
162.	Insurance sales	251	110	30.47	82.80	26.18
163.	Misc. machine ops., N.E.C.	630	274	30.31	83.71	27.63
164.	Management analysts	37	16	30.19	83.77	27.72
165.	Supervisors/proprietors	1,341	570	29.83	85.67	30.80
166.	Computer systems analysts and scientists	201	85	29.72	85.95	31.26
167.	Actors and directors	36	15	29.41	86.00	31.35

168.	Machine ops., not spec.	212	88	29.33	86.30	31.83
169.	Biological/life scientists	41	17	29.31	86.36	31.93
170.	Managers/admin., N.E.C.	2,865	1,180	29.17	90.30	38.52
171.	Operations/systems researchers and analysts	99	39	28.26	90.43	38.74
172.	Machine feeders/offbearers	56	22	28.21	90.50	38.87
173.	Slicing/cutting mach. ops.	118	46	28.05	90.66	39.14
174.	Securities, fin. serv. sales	126	49	28.00	90.82	39.43
175.	Punching/stamping mach. ops.	87	33	27.50	90.93	39.63
176.	Bus drivers	149	56	27.32	91.12	39.98
177.	College/univ. teachers	72	26	26.53	91.21	40.14
178.	Chemical technicians	51	18	26.09	91.27	40.26
179.	Crushing/grinding mach. ops.	40	14	25.93	91.31	40.35
180.	Pharmacists	79	27	25.47	91.40	40.53
181.	Purchasing managers	63	21	25.00	91.47	40.68
182.	Supervisors, computer ops.	27	9	25.00	91.50	40.74
183.	Printing machine ops.	299	96	24.30	91.82	41.43
184.	Traffic, shipping, and receiving clerks	304	92	23.23	92.13	42.13
185.	Lawyers	237	71	23.05	92.37	42.67
186.	Managers, marketing, advertising and pub. relations	259	77	22.92	92.63	43.27
187.	Chemists, ex. biochemists	73	21	22.34	92.70	43.44
188.	Supervisors, distribution, sched., adjusting clerks	115	32	21.77	92.80	43.70
189.	Inspectors/testers/graders	87	24	21.62	92.88	43.90
190.	Stock handlers and baggers	273	74	21.33	93.13	44.53
191.	Messengers	58	15	20.55	93.18	44.66
192.	Janitors and cleaners	1,002	258	20.48	94.04	46.97
193.	Sales workers, hardware and building supplies	109	28	20.44	94.14	47.22
194.	Photographers	51	13	20.31	94.1[illegible]	47.33
195.	Announcers	20	5	20.00	94.20	47.38
196.	Sales workers, radio, television, hi-fi, appliances	85	21	19.81	94.27	47.58
197.	Inspectors and compliance officers, ex. construction	124	30	19.48	94.37	47.86
198.	Misc. metal-, plastic-, stone-, glassworking mach. ops.	25	6	19.35	94.39	47.92
199.	Physicians	178	42	19.09	94.53	48.33
200.	Correct. instit. officers	132	31	19.02	94.63	48.63
201.	Admin., protect. services	35	8	18.60	94.66	48.71
202.	Drilling/boring mach. ops.	23	5	17.86	94.68	48.76
203.	Musicians and composers	28	6	17.65	94.70	48.83
204.	Laborers, ex. construction	766	163	17.55	95.24	50.59
205.	Upholsterers	33	7	17.50	95.26	50.67
206.	Vehicle washers/equip. cleaners	121	25	17.12	95.35	50.95
207.	Misc. material moving equipment ops.	127	26	16.99	95.43	51.24
208.	Butchers and meat cutters	179	36	16.74	95.55	51.65
209.	Math. science teachers	26	5	16.13	95.57	51.71
210.	Judges	21	4	16.00	95.58	51.76

211.	Painting/paint spraying machine ops.	142	27	15.98	95.67	52.08
212.	Architects	48	9	15.79	95.70	52.19
213.	Sales reps., commodities, ex. retail	1,020	191	15.77	96.34	54.54
214.	Metal plating mach. ops.	27	5	15.63	96.36	54.60
215.	Grinding, abrading, buffing, polishing machine ops.	114	21	15.56	96.43	54.86
216.	Supervisors, motor vehicle ops.	22	4	15.38	96.44	54.91
217.	Mail carriers, post. svc.	194	35	15.28	96.56	55.36
218.	Drafting occupations	245	41	14.34	96.70	55.92
219.	Athletes	30	5	14.29	96.71	55.99
220.	Lathe/turning mach. ops.	72	12	14.29	96.75	56.16
221.	Supervisors, prod. occs.	1,108	182	14.11	97.36	58.71
222.	Meter readers	39	6	13.33	97.38	58.80
223.	Guards/police, ex. public serv.	403	61	13.15	97.59	59.72
224.	Electrical/electron. techn.	219	33	13.10	97.70	60.23
225.	Surveying/mapping techn.	49	7	12.50	97.72	60.34
226.	Production helpers	57	8	12.31	97.75	60.47
227.	Air traffic controllers	23	3	11.54	97.76	60.52
228.	Chemical engineers	49	6	10.91	97.78	60.64
229.	Sheriffs, baliffs, other law enforcement officers	70	8	10.26	97.80	60.80
230.	Photoengravers/lithographers	35	4	10.26	97.82	60.88
231.	Data process. equip. repairers	90	10	10.00	97.85	61.09
232.	Misc. plant/system ops.	27	3	10.00	97.86	61.15
233.	Geologists/geodesists	37	4	9.76	97.87	61.23
234.	Farm workers	610	65	9.63	98.09	62.64
235.	Sales workers, parts	122	12	8.96	98.13	62.92
236.	Supervisors, guards	31	3	8.82	98.14	62.99
237.	Supervisors, mechanics and repairers	223	21	8.61	98.21	63.50
238.	Garage/service-station-related occs.	152	14	8.43	98.26	63.85
239.	Mining machine ops.	33	3	8.33	98.27	63.93
240.	Farm managers	44	4	8.33	98.28	64.03
241.	Telephone installers and repairers	218	19	8.02	98.35	64.53
242.	Mechanical controls and valve repairers	24	2	7.69	98.35	64.58
243.	Industrial engineers	181	15	7.65	98.40	65.00
244.	Sales workers, motor vehicles and boats	195	16	7.58	98.46	65.45
245.	Police/detect., public serv.	382	31	7.51	98.56	66.33
246.	Civil engineers	192	15	7.25	98.61	66.77
247.	Engineering teachers	26	2	7.14	98.62	66.83
248.	Electrical/electron. engin.	436	33	7.04	98.73	67.83
249.	Taxicab drivers/chauffeurs	82	6	6.82	98.75	68.02
250.	Physicists/astronomers	28	2	6.67	98.75	68.08
251.	Supervisors, farm workers	42	3	6.67	98.76	68.18
252.	Truck drivers, light	342	24	6.56	98.84	68.97
253.	Sawing machine operators	72	5	6.49	98.86	69.13

254.	Freight, stock, material, movers, hand, N.E.C.	389	26	6.27	98.95	70.03
255.	Industrial truck and tractor equip. ops.	376	22	5.53	99.02	70.89
256.	Mixing/blending mach. ops.	89	5	5.32	99.04	71.10
257.	Groundskeepers/gardeners except farm	326	18	5.23	99.10	71.85
258.	Telephone line installers and repairers	55	3	5.17	99.11	71.97
259.	Welders and cutters	510	27	5.03	99.20	73.15
260.	Drivers, sales workers	193	10	4.93	99.23	73.59
261.	Misc. electrical/electron. equip. repairers	60	3	4.76	99.24	73.73
262.	Separating, filtering, clarifying mach. ops.	61	3	4.69	99.25	73.87
263.	Mechanical engineers	237	11	4.44	99.29	74.41
264.	Supervisors, police/detec.	65	3	4.41	99.30	74.56
265.	Machinists	478	22	4.40	99.37	75.66
266.	Engineers, N.E.C.	180	8	4.26	99.40	76.08
267.	Clergy	227	10	4.22	99.43	76.60
268.	Sheet metal workers	117	5	4.10	99.45	76.87
269.	Elect. repairers, communic., industrial equip.	121	5	3.97	99.47	77.14
270.	Painters, construc./maint.	226	9	3.83	99.50	77.66
271.	Specified mechanics and repairers, N.E.C.	336	13	3.72	99.54	78.44
272.	Mach. maintenance occs.	26	1	3.70	99.54	78.50
273.	Construction inspectors	54	2	3.57	99.55	78.62
274.	Airplane pilots/navigators	54	2	3.57	99.56	78.75
275.	Glaziers	27	1	3.57	99.56	78.81
276.	Lathe/turn. mach. setup ops.	27	1	3.57	99.56	78.87
277.	Pest control	28	1	3.45	99.57	78.93
278.	Cabinetmakers/bench carpent.	28	1	3.45	99.57	79.00
279.	Forestry/conserv. scientists	29	1	3.33	99.57	79.06
280.	Not spec. mechan./repairers	121	4	3.20	99.59	79.34
281.	Petroleum engineers	31	1	3.13	99.59	79.41
282.	Extruding/forming mach. ops.	31	1	3.13	99.59	79.49
283.	Crane and tower operators	94	3	3.09	99.60	79.70
284.	Supervisors, firefighting	33	1	2.94	99.61	79.78
285.	Supervisors, rela. agric. occs.	66	2	2.94	99.61	79.93
286.	Industrial mach. repairers	506	15	2.88	99.66	81.09
287.	Household appliance and power tool repairers	35	1	2.78	99.67	81.17
288.	Furnace, kiln, and oven operators, ex. food	106	3	2.75	99.68	81.42
289.	Millwrights	86	2	2.27	99.68	81.62
290.	Small-engine repairers	44	1	2.22	99.69	81.72
291.	Construction laborers	565	12	2.08	99.73	83.02
292.	Stationary engineers	97	2	2.02	99.73	83.24
293.	Carpet installers	49	1	2.00	99.74	83.35
294.	Grader/dozer/scraper ops.	99	2	1.98	99.74	83.58
295.	Truck drivers, heavy	1,536	31	1.98	99.85	87.11
296.	Supervisors, extractv. occs.	50	1	1.96	99.85	87.23

297.	Timber cutting/logging occs.	50	1	1.96	99.85	87.34
298.	Office machine repairs	55	1	1.79	99.86	87.47
299.	Construc. trades, N.E.C.	112	2	1.75	99.86	87.73
300.	Auto. body/rela. repairers	128	2	1.54	99.87	88.02
301.	Locomotive operating occs.	64	1	1.54	99.87	88.17
302.	Tool- and diemakers	130	2	1.52	99.88	88.47
303.	Drywall installers	74	1	1.33	99.88	88.64
304.	Carpenters	826	11	1.31	99.92	90.54
305.	Aircraft engine mechanics	84	1	1.18	99.92	90.73
306.	Plumbers, pipefitters and steamfitters	363	4	1.09	99.94	91.56
307.	Electricians	559	6	1.06	99.96	92.85
308.	Automobile mechanics	636	6	.93	99.98	94.31
309.	Operating engineers	127	1	.78	99.98	94.60
310.	Helpers, construc. trades	141	1	.70	99.98	94.93
311.	Supervisors, N.E.C.	318	2	.62	99.99	95.66
312.	Bus, truck, stationary engine mechanics	320	2	.62	100.00	96.40
313.	Heating, air conditioning, and refrigeration mech.	181	1	.55	100.00	96.81
314.	Aerospace engineers	74	b	c	100.00	96.98
315.	Firefighting occs.	160	b	c	100.00	97.35
316.	Heavy-equip. mechanics	152	b	c	100.00	97.70
317.	Farm equip. mechanics	37	b	c	100.00	97.79
318.	Supervisors, electricians/ power trans. installers	36	b	c	100.00	97.87
319.	Brickmasons and stonemasons	98	b	c	100.00	98.09
320.	Electrical power installers and repairers	103	b	c	100.00	98.33
321.	Plasterers	26	b	c	100.00	98.39
322.	Concrete/terrazzo finishers	68	b	c	100.00	98.55
323.	Insulation workers	49	b	c	100.00	98.66
324.	Roofers	106	b	c	100.00	98.90
325.	Sheet-metal duct installers	29	b	c	100.00	98.97
326.	Structural metal workers	50	b	c	100.00	99.08
327.	Drillers, oil wells	53	b	c	100.00	99.21
328.	Mining occs., N.E.C.	37	b	c	100.00	99.29
329.	Boilermakers	33	b	c	100.00	99.37
330.	Water/sewage treatment ops.	38	b	c	100.00	99.45
331.	Power plant operators	51	b	c	100.00	99.57
332.	Railrd. conduct./yardmstrs.	36	b	c	100.00	99.65
333.	Railrd. brake, signal, and switch operators	48	b	c	100.00	99.77
334.	Excavating/loading mach. ops.	63	b	c	100.00	99.91
335.	Garbage collectors	39	b	c	100.00	100.00

[a] Based on employment in detailed occupations of more than 25,000 workers.
[b] Fewer than 500 workers.
[c] Less than .005.

Source: Barbara R. Bergmann. The Economic Emergence of Women. (New York: Basic Books, 1986), Appendix I, pp. 317 - 328.

TABLE 2

DISTRIBUTION OF WOMEN AND MEN BY MAJOR OCCUPATIONAL GROUP

	Women		Men	
Occupation	1978	1988	1978	1988
Total	100.0%	100.0%	100.0%	100.0%
Executive, administrative, and managerial	6.3	10.8	12.2	13.6
Professional specialty	12.7	14.4	10.4	11.9
Technical	2.7	3.3	2.5	2.9
Sales	11.5	13.0	10.1	11.1
Administrative support, including clerical	31.1	28.3	5.7	5.7
Precision production, craft and repair	1.9	2.3	20.2	19.7
Operatives, fabricators, and laborers	12.4	8.9	24.5	20.9
Service	19.9	17.9	8.8	9.6
Farming, forestry and fishing	1.5	1.1	5.5	4.5

Sources: U.S. Department of Labor, Bureau of Labor Statistics. Employment and Earnings, January 1989, Table 21; U.S. Department of Labor, Bureau of Labor Statistics. Employment and Earnings, January 1984, pages 13-16.

TABLE 3

INDEX OF SEGREGATION BY OCCUPATIONAL GROUP, 1970 AND 1980

MAJOR OCCUPATIONAL GROUP	1970	1980	Change 1970 - 80
Total Employed	67.7	59.2	-8.5
Managerial and professional specialty	55.5	42.9	-12.6
Technical, sales, and admin. support	63.9	57.8	-6.1
Service occupations	67.6	55.1	-12.5
Farming, forestry, and fishing	38.0	31.0	-7.0
Precision, production, craft, and repair	56.7	53.6	-3.1
Operators, fabricators, and laborers	57.6	52.9	-4.7

Source: U.S. Department of Commerce, Bureau of the Census. Women in the American Economy, by Cynthia M. Taeuber and Victor Valdisera, Current Population Reports, Series P-23, No. 146, 1986, Table 12.

TABLE 4

PERCENT FEMALE IN APPRENTICESHIPS AND EMPLOYMENT

FOR SELECTED OCCUPATIONS

	Employment in			
Occupation	1978	1980	1988	1988 Apprentices[a]
Automobile mechanic	.6	.6	.7	2.8
Bricklayer	--	.1	.5	1.6
Carpenter	1.0	1.5	1.5	4.4
Cosmetologist	89.1[b]	88.3[b]	89.5[b]	87.5
Electrician	.8	1.2	1.4	4.1
Machinist	3.1	3.4	4.8	4.9
Painter	5.2	6.0	5.8	8.3
Physical therapist	70.4[c]	73.7	73.5	67.4
Plumber/pipe fitter	.7	.6	.4	2.2[d]
Tool-and-die maker	1.1	2.8	2.4	2.5
Welder	6.0	5.3	4.9	5.6

Notes: [a]For apprentices, data includes 70 percent of national data.

[b]Includes hairdressers.

[c]Includes speech and inhalation therapists.

[d]Women were 3.3 percent of pipe fitter apprentices, 2.2 percent of plumber apprentices.

Sources: U.S. Department of Labor, Bureau of Labor Statistics. Employment and Earnings, January 1979, Table 23, January 1981, Table 23; January 1989, Table 22; U.S. Department of Labor, Bureau of Apprenticeship and Training, unpublished data.

APPENDIX I

ORGANIZATIONS CONTACTED

Community-Based Training and Advocacy Organizations

Access for Women
NYC Technical College
Brooklyn, NY

American Association of
University Women
Washington, DC

Apprenticeship and Nontraditional
Employment for Women (ANEW)
Renton, WA

Building Opportunities Project
Massachusetts Department of
Employment and Training
Boston, MA

Chicago Women in Trades
Chicago, IL

Coal Employment Project
Knoxville, TN

Hard-Hatted Women
Cleveland, OH

NASA Ames Research Center
Moffett Field, CA

Non-traditional Employment for
Women (NEW)
New York, NY

PREP, Inc.
San Francisco, CA

PREP Ohio
Cincinnati, OH

Project WORC
Jersey City State College
Jersey City, NJ

San Leandro Girls Club
San Leandro, CA

Southeast Women's Employment
Coalition
Lexington, KY

Tradeswomen Inc.
San Francisco, CA

Wider Opportunities for Women
(WOW)
Washington, DC

Woman Unlimited
Monmouth, ME

Women Employed Institute
Chicago, IL

Women in the Building Trades
Boston, MA

Women's Development Center
Waukesha City Technical Institute
Pewaukee, WI

Women's Technical Institute
Boston, MA

YWCA Memphis Women in
Trades Project
Memphis, TN

Government Agencies and Research Institutes

The Enhancement Group

Institute for Women's Policy Research

National Academy of Sciences, Committee on Women's Employment and Related Social Issues

National Center of Education and Employment

National Commission for Employment Policy

U.S. Department of Labor, Bureau of Apprenticeship and Training, Employment and Training Administration

U.S. Department of Labor, Women's Bureau

U.S. House of Representatives, Subcommittee on Employment Opportunities

U.S. Senate, Subcommittee on Labor

Wellesley College Center for Research on Women

Unions and Employee Associations

Communication Workers of America

International Union of Electrical, Radio and Machine Workers

Massachusetts Nurses Association

National Education Association

9 to 5: National Association of Working Women

United Brotherhood of Carpenters and Joiners

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