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ABSTRACT

These five research reviews should be useful to educators concerned with developing and improving vocational education programs. Reviews include: (1) Four longitudinal studies of labor market experience conducted by The Ohio State University Center for Human Resource Research, concerning young men 14-24, young women 14-24, men 45-59, and women 30-44, (2) "Hiring Standards and Job Performance," a study from New York University with implications for working to change unrealistic hiring standards, (3) "Employment Manpower Planning and Forecasting," which, on the basis of experience in Minnesota, develops some basic guidelines for manpower planning by individual firms, (4) "An Optimum Training System in Apprenticeable Occupations," from Purdue University which provides a comprehensive guide and model for comparison with existing programs, and (5) "The Training System in The Pipe Trades,' a comprehensive occupational report by Purdue University researchers with application to many areas of vocational-technical education. "Frankly Speaking," an editorial, is devoted to the need for human resources development. A bibliography and ordering information for cited materials are included. (JS)

Manpower Research Visibility

Bridging the gap between researcher and practitioner by providing: interpretation and synthesis of manpower research and experimentation and development projects relevant to vocational-technical and practical arts education.

Inside MRV

Manpower Research Visibility is prepared by the American Vocational Association under a one-year contract (#82-11-71-37) with the Division of Research and Development Utilization of the Office of Research and Development within the Manpower Administration of the U.S. Department of Labor. MRV attempts to present manpower research and developmental projects conducted or sponsored by the U.S. Department of Labor and their implications in a form that will encourage Vocational-Technical, Practical Arts, and Adult Education and Manpower Trainers to put the findings to use in instruction, guidance, evaluation, curriculum, and operations.

Donald L. Rathbun, director of Manpower Research Information for AVA serves as editor of MRV. He is aided in the preparation of these columns by Miss Anne Burwell, research assistant. They will attempt to involve the readership through opinion polls, letters to the editor, reports from the field, and other forms of dialogue with practitioners. Your participation is requested. The editorial comments contained in MRV are those of the editor and do no necessarily represent the views or policies of the American Vocational Association nor the Department of Labor (Manpower Administration, or any of the departments, offices, or divisions).

frankly speaking

Human Resources Development: Meeting Needs of Various Groups

Developing human resources is a complex process which is vital to the socioeconomic welfare of our society. It is also a business—a big business if measured by profit and loss, investment and return, inventory and overhead. Educators, though, most often think of the process as a service primarily for the benefit of the individual. Admirable and altruistic as this approach may be, it alters both the method and the content of the development process to such a degree that the end product (i.e., the trained individual) may not meet employers' requirements.

Utilizing research, studying other programs, and trying the "better idea" could greatly broaden and improve the objectivity of the educator and consequently the "system." But educators who can view the development of human resources from different vantage points are increasingly difficult to find, further insulating the educational process from the workaday world.

Occupation education, though, more than any other subsystem of the educational system, is extremely fortunate to have within its ranks many who come from other points of reference and orientations. It is to these knowledgeable individuals that we look for leadership and guidance in the conduct of meaningful training.

If it is true that we have these leaders, then why aren't more people being reached? Why aren't programs more closely coordinated with individual needs and realistic employment requirements? Is it merely a matter of communication, communication between instructor and supervisor or administrator, communication between advisory committees, employers, and training institutions, or communication with the student and trainee? No! It is much broader than this, although the lines of communication implied above are basic to meaningful training and the preparation for life and the rewarding world of work.

Part of the difficulty lies in the fact that each group or individual tends to function in isolation. The teacher-trainer, the researcher, the employer, the instructor, the administrator, the counselor, the board member, and so on. Not so, you say! OK, then remove yourself from the forest, from the paper, from the meetings, and take another look. Cross over to the other side of the fence and look, listen, ask; do you still say, not so?

The difficulty may also be the "Peter Principle" personified, or the pressures of bureaucracy, or the lack of awareness, or the limited amount of time that cuts into the effectiveness of the human resources development activities!

Where do we start to change the picture? Well, like it or not, the picture is changing although not all are aware of it. To keep abreast of this change articulation must be improved all along the way, but first each individual must become aware of the permutation about him and become cognizant of his relationship to this change.

Alvin Toffler comments in his book, *Future Shock,* that the rate of change today is accelerated beyond that of any time in history and all indications point to a continuance of this acceleration. Because of this the individual can no longer stand dormant in his time and place, for to stand still today is to go backward as all about him is rapidly moving on.

Is Anybody Listening?

Addressing itself to this concern, the Fifth Report from the National Advisory Council on Vocational Education suggests—no, clearly states—that the problem is one of not listening to the voices of people. They ask if anyone is listening, listening to:

—The 40 million elementary school children who need career orientation.

—The 750,000 high school and college students who drop out each year, virtually all without marketable skills.

—The unemployed, or soon to be unemployed, workers not expecting callback because of shifts in technology or shifts in labor market demand.

—The highly motivated working poor stuck in low-skill, low-paying jobs, who need to hold two jobs to earn enough to cover their family needs.

—The older workers involuntarily retired who want to continue to work, but need a marketable skill.

—The mothers of school-age children who need and want to re-enter the labor market.

—The over 300,000 mental hospital patients discharged every year who need a marketable skill to sustain themselves.

—The over two million veterans returning to civilian life.

—The inmates in our prisons who need pre- and post-release skill training to cut down on the high rate of recidivism.

—The disadvantaged and handicapped.

—The reports from the State Advisory Councils on Vocational Education.

—The taxpayer as he votes down bond issue after bond issue on his local educational level.

Need for Responsive System

Perhaps this impaired hearing on the part of individuals and, thus, on the part of institutions is at the root of the problem. Many of the current demands for accountability are outgrowths of change brought about by an erupting cry from society for an educational system that is responsive to its needs.

To be responsive to all people our educational system has no alternative but to embrace the concept of effective vocational programs on all levels. This embracement however, may or may not represent what has been done or is currently being done.

The sheer momentum of change may be so overwhelming as to obliterate, bypass, or override all pro-

cesses, methodology, or organizations that are not responsive. As the public dollar is stretched to its limit, inefficient programs must go.

The concept of career education is now in the forefront. Vocational-technical education, the training of human resources, is an intrinsic and inalienable part of this concept. It represents a change, but a change more of improved articulation from kindergarten through college, a working relationship between the institutions and the private sector of business and industry, improved communication on the local level between institutions, and within all institutions as to the role individual teachers, counselors, and administrators perform in helping to prepare the student or trainee to take a productive place in society.

As we look at the mountains of evidence accumulating from a variety of educational and manpower research, career education makes sense. It surrounds and gives essence to the overall framework of our educational system by bringing together all present components in a concerted effort, but with the flexibility that allows for a track tailored to the individual's needs.

Future Changes

Will the minor changes (mainly philosophical) be supported? Will the "golden calves" be reshaped? Will the vocational-technical practitioner demand his rightful place in the total scheme and prove by his performance that he has the expertise to get the job done? Time will tell.

In the meantime it is essential that the vocational-technical practitioner seize every opportunity to upgrade, improve, and enhance vocational-technical and manpower programs with the latest methods and innovations but always with the broad view in mind. The view is of individual needs, employment requirements, sound business and management principles, and the necessary avenues of two-way communication that will articulate the entire process.

Communication is fundamental to this business of human resources development, but these other conditions of the total situation warrant equal consideration if full socio-economic development of human resources is to become a reality.

manpower reports

Four Studies of Labor Market Experience

THE CENTER for Human Resource Research of Ohio State University, under direction of Herbert S. Parnes, in 1965 contracted with the Manpower Administration of the U.S. Department of Labor to conduct a five-year longitudinal study of the labor market experience of four groups of the civilian population: men 45-59 years of age, women 30-44, young men 14-24, and young women 14-24. Each group is being surveyed at annual intervals for a total of six surveys.

First survey activities began in 1966 with the two male groups. The Bureau of the Census is responsible for developing the samples, conducting all interviews, processing the data, and preparing tabulations as requested by the Center.

These four groups were selected for study because each presents a number of challenges to the individual, to policy makers, and to the institutions or agencies that serve them over the years. For the young, the challenges center on the process of occupational selection, preparation, and assimilation into the labor market. The special problems of older men are manifest in a tendency toward unemployment and longer than average duration of layoffs, declining annual income after the mid-forties, and outdated skills. For the older group of women, problems are reflected in the difficulty of labor force entry or re-entry.

Although the problems of each group are distinctive, the conceptual structure of the studies reflects common objectives. Each study examines the experience and behavior of individuals in the labor market as an interaction between their environment and a variety of social, economic, demographic, and attitudinal characteristics of the individual. Each study involves a sample of about 5,000 individuals and attempts to pinpoint those factors that appear to influence the noted variations in labor force experience: e.g., labor force participation, unemployment periods, and certain types of labor mobility.

(Editor's note: For vocational-technical educators, the studies offer insights into the uses of, and the needs for, training and retraining, and some of the problems that need to be solved if training efforts are to be fully effective. In addition, the studies can improve our understanding of how the labor market functions and which labor market and institutional policies tend to compound the special problems of each group. Reports on the early surveys follow.)

Career Thresholds

The initial survey of the Longitudinal Study of the Educational and Labor Market Experience of Male Youth 14-24 Years of Age, entitled "Career Thresholds," was reported in the December 1969 *Research Visibility* section of this journal. The narrative that follows covers the second and third surveys of this group, taking us to the approximate midpoint of the five-year study. Approximately one-sixth of the 5,000 or so young men interviewed in the original survey were not re-interviewed in 1968, mainly because of entry into the armed forces.

(Editor's note: These reports are replete with tables clearly documenting the numerous elements of the studies. Space limitation dictates the exclusion of many factors that may be as pertinent or even of more interest to the individual practitioner. Because of the depth and comprehensiveness of these reports, you are encouraged to obtain the source documents for your own perusal and utilization.)

The findings demonstrate that the "transition from school to work" is much more complex than the phrase implies. Frequently the transition is in reality a series of changes—a finding of considerable significance for the vocational-technical educator and his approach to the teaching of job entry skills. About three in ten of those enrolled in school both years of the study revised their educational goals. Fewer changes were noted with those aspiring to professional-technical jobs by age 30.

More than one in ten not enrolled in school at the time the 1966 survey was taken were found to have enrolled at some time during the next two years. The probability of returning to school was three times as high for whites as for blacks.

This group is greatly affected by the "aging effect" of a few years. At 14 a youth is little more than a child, just starting secondary education, and below legal age for most employment. He has very little understanding of the world of work, has no economic responsibility, and is on the verge of emerging from the fantasy stage of occupational aspiration.

Four years later he may have completed high school, or may be in the service, or may have entered the labor market full time, or may be pursuing additional education or training for a specific career. Typically, by 24 he has completed his schooling or training, may have assumed an economic commitment (usually family), and oftentimes has made a firm occupational selection. We are now looking at this group at three points in a time frame.

The "aging effect" is more than just 2 years added to a youth's chronological age. It encompasses many facets of maturation that affect labor market aspirations and experiences. Those still in school have acquired more education and training. Those who have left school have acquired more exposure and/or experience.

There is perhaps no other time in life when so short a period of time will have such a profound impact on one's understanding and seriousness of purpose. Even the youngest of the group are now at an age where they can legally drive a vehicle and have much broader employment options under child labor laws. Labor force participation is naturally up. We mentioned earlier in this report how occupational goals tended to change during this period; many who earlier were undecided had now made rather definite occupational commitments. At this point those surveyed seemed to be moving in a more realistic direction consistent with their "total educational" experience.

The passing of time also benefited those in the study who were out of school and employed all three years. Their average hourly wage rates increased over 25 percent between 1966 and 1968. Job changers enjoyed larger wage increases than those who stayed on the same job, regardless of whether the change was by choice or involuntary. And the rate of job changing was much higher than in the labor force as a whole. Job satisfaction generally increased, and about 25 percent enjoyed job advancement, with those making interfirm shifts faring better.

The passage of time appears to place the less educated youth in a more viable position for employment; however, the difficulty he faces in securing employment is of such magnitude that this aspect of the "aging effect" is overshadowed. Continued encouragement and assistance to gain additional education, special training, placement, counseling, etc., are needed to mitigate his problems of becoming more employable, and thus to ease the frustrating and sometimes traumatic experience of the transition from school to work.

Years for Decision

The first survey of young women 14 to 25 years of age forms the basis for this report.

At 14, a girl is just starting her secondary education, is below the legal age of marriage and most full-time employment in many states, and is generally without economic responsibilities. She is emerging from childhood into adolescence with all its inherent problems of identity and life style choices. She has little understanding of the contingencies of married life or the world of work.

Four years later, if still unmarried, she has probably completed school and is faced with a series of decisions: work, continued education, vocational training, or marriage. By age 24 she usually is out of school permanently, has one or more children, and has withdrawn from the labor force. These are the years where options and pressures are the greatest, and they are truly "years for decision."

Approximately one-half of the subjects were enrolled in school at the time of survey in 1968. Nearly one in five high school girls were participating in

either a commercial or vocational program. Black girls (25 percent) were less likely to be enrolled in a college preparatory program than their white counterparts (40 percent). Nearly all reported favorable reaction to their school experience, but expressed a dislike for social sciences, physical sciences, and mathematics. Young women are less likely than young men to attend college, but also are less likely to drop out before the completion of high school.

A young woman's entrance into the labor market is dependent in part on a varied set of characteristics that influence her prospective employer's willingness to hire her. Some factors may have a relationship to her ability or training, while others are purely hiring preferences of the employer. Some of these factors are: education, training, skills, work experience, health, physical fitness or appearance, anticipated job stability (sometimes a function of marital status and number and ages of children), and age.

Young women out of school have many factors of family background that relate to educational attainment. Some of these are: a high probability of completing high school if her parents have and educational attainment directly related to the family socioeconomic status. Other factors, such as the occupation of head of household when she was 14 and access to reading materials when young, also influence her educational decisions.

The attitudes of black and white girls regarding their future roles differed greatly. Blacks express more favorable views toward the idea of mothers working and felt higher wages were more important than "liking the job." Black girls were not as likely to remain in school as white girls and were frequently over-age in grade.

Since this is an initial survey, it provides base data but also holds many implications for training programs and specialized support services, e.g., child care, health clinics, counseling. As this study progresses through the years, many of the questions regarding a young woman's preferences and prospects in the labor market, as raised from early hypotheses, should be answered.

Since the 1940s the proportion constituted by women of total employment in professional and technical occupations has been declining. Young women have also experienced high rates of unemployment during this period. One-fifth of all employed female college graduates are found in clerical, sales, service, and operative jobs, with current trends indicating little hope for improvement. This underutilization of an important source of human resources warrants serious consideration, which this study should provide.

Little is now known about gross movement into and out of the formal educational system, the labor force, and among different occupations and jobs. The causes and consequences of such changes, the effects of socioeconomic background, attitudes, scholastic ability, parental influences, health, marriage, availability of child care, and type of occupational preparation are but a few of the areas that this study will assess.

A better understanding of the impact of changing life styles, changing attitudes towards women's contribution to the labor market, occupational mobility, and a genuine commitment toward "equal pay for equal work" may be obtained from reading the study. (Editor's note: The significance of this particular study then is in its potential for future impact on private and public policies that will bring about an effective and more equitable development and use of the human resources of the nation. If your responsibility is the training of young women for gainful employment you will want to follow the unfolding of this longitudinal study.)

The Pre-Retirement Years

This report covers the first two surveys of the study of older men (45 to 59 years of age). The attrition rate from the sample due to factors other than death (1.2 percent) was 4.6 percent (2.5 percent refusal and 2.1 percent disappearance).

General health stayed more or less the same for all color and age groups. However, a slight worsening of health of blacks may be the beginning of a trend with implications for additional study and health services.

A larger percentage of white men than blacks at some time had taken vocational training outside of the regular school program. Surprisingly, overall 10 percent of the men had participated in vocational training during the preceding 12 months, however blacks were only 60 percent as likely to have participated in training programs as whites. Men in their late 40's were more likely to take some kind of training than men in their 50's.

Seven percent of white families were found to be in poverty as compared to 24 percent for the blacks. Poverty was much more frequent among those with large families. Both color groups showed gains in income, and substantial numbers of families had moved above the threshold of poverty since the initial survey.

A slight decrease in labor force participation was noted overall with the black rate of participation decreasing more than the white rate. Health factors were the most powerful forces affecting changes in labor force participation and unemployment, especially for the blacks.

During the year, one-tenth of the men had shifted to a different employer. Voluntary and involuntary separations were about equal for both color groups. Craftsmen showed above average rates of job changes, as did farm laborers; however, in the craftsman category the higher rate was with the whites and was attributable exclusively to involuntary separation. The authors suggest that this might reflect tenuous employment relationships in the construction industry where 24 percent of all white craftsmen are employed.

Job change rates for white service workers were close to the all-occupation averages, however voluntary to involuntary change rates ran ten to one. Black workers showed a lower than average job change rate.

The well established fact that voluntary quit rates decline in proportion to length of service with a particular employer is also confirmed. After the "try-out" period is passed, the worker begins to realize increased benefits and his psychological and social ties with the job increase with time. After 20 years or more, however, it was found that one in every 25 blue-collar employees had been severed involuntarily, substantially equal for all color groups.

(Editor's note: From this and other data [unreported] of the study of older men, we conclude that here is another period of life where decisions have to be made, but now the situation is more or less forced. Being cognizant of these impending problems the vocational-technical practitioner can contribute immeasurably through upgrading and retraining the middle-aged worker.)

Dual Careers

The last report in this series is on the labor market experience of women who were 30 to 44 years of age in 1967. A brief review of this study appeared in the December 1970 issue of this journal, so only highlights will be touched as they relate to other studies in this series and to their significance for the vocational-technical practitioner.

Over the past three decades there has been a tremendous increase in the employment of adult women, including those married with children at home. The spin off of this situation in terms of family income, health, child rearing, psychological well-being, fulfillment, and independence deserves certain consideration.

Five of every six women in this age group are married and living with husbands. Two-thirds of the remainder are either divorced, widowed, or separated. Out of the entire nonmarried group, 56 percent have children at home under 18 years of age. Employment for them is not a matter of choice but a necessity if a reasonable income level is to be maintained.

Choice of occupations and variations in income are very complex for this group of women. Some, never married and with better education, start higher and advance farther, while their married counterparts usually begin their careers with less education, lower on the ladder, and generally experience downward mobility due to deterioration of skills primarily through non-use.

Most were found to enjoy their work and indicated they would work even if they didn't need to. "Liking the job" seemed most important to white respondents.

Several areas of concern were mentioned. Early marriage usually means withdrawal from school which limits employability. Nearly 20 percent reported health or physical conditions that did not interfere or limit their ability to work, but participation rates are significantly lower than for those who reported excellent health. One in eight reported impaired health of husband, and this had an effect on the wives' labor force participation (whites' increased, blacks' decreased). One in eight mentioned health problems of other members of the family, but this did not affect the wives' labor force participation.

The study reinforces other documents that illustrate conclusively the positive relationship between educational attainment and labor force participation by occupational level. Most of the college graduates were in professional or technical occupations while those with less than a high school education were located in blue-collar and service jobs. One-third of the whites and over half of the blacks had less than a high school education.

Broad differences were noted in all aspects of labor market experience between white and black women. Other differences of attitude, education, marital status, etc., throughout the group point to many areas of social and economic life where the educational system must be more responsive.

This study, compared with the three other studies of this series, will provide a national sample base of information that will allow a dimension of analysis heretofore lacking in research circles.

See Sources of Information at the end of this section for ordering instructions.

Hiring Standards and Job Performance

THE EFFECTIVE vocational-technical practitioner who works closely with employers to help place his graduates has often encountered a variety of job entry requirements which he knows are neither realistic nor necessary for competent performance in his trade or occupation. These unrelated requirements bar capable workers from employment.

They can work a hardship on the employer as well, although he may not realize it, because his "system" screens out productive employees. Witness the labor market paradox of the 1960s when many employers reported manpower shortages in less skilled or entry level occupations while many new workers—often members of minority groups—could find no jobs.

The following item concerns a study of the role which employer hiring standards play in this labor market imbalance. It has obvious implications for the vocational-technical practitioner, who can work with business and industry to change unrealistic hiring standards.

This summary is drawn from *Hiring Standards and Job Performance*, Manpower Research Monograph #18, by Daniel E. Diamond and Hrach Bedrosian, both of New York University. The monograph is based on the authors' study of *Industry Hiring Requirements and the Employment of Disadvantaged,* conducted under contract with the Manpower Administration of the Department of Labor. The monograph is available upon request to the Manpower Administration; the full study may be purchased from the National Technical Information Service (NTIS), Accession No. PB191278. See end of section for ordering instructions.

Ten major entry and near-entry level occupations experiencing labor shortages were studied: five white-collar jobs (bank teller, cashier checker, hotel clerk, parts salesperson, and shipping and receiving clerk); four blue-collar jobs (arc welder, press feeder, production-machine operator, and wireworker); and one service occupation (orderly). These occupations were studied in 14 different industry groups in two metropolitan areas. The findings were used to develop hiring standard guidelines for each industry to help employers recruit more capable employees for jobs where manpower is scarce.

The analysis revealed that many employers had raised hiring standards for less skilled jobs, but few had examined the new standards in relation to workers' performance in those jobs. Instead, they cited such reasons for the change as: advancing technology makes jobs more complex; the educational level of workers has risen; the high school diploma has become a symbol of a more motivated and versatile job applicant than the high school dropout, etc.

A number of standardized procedures have been developed by employers to help evaluate job applicants: the application form, physical examination, tests, personal interview, and reference checks. The applicant data obtained are then weighed against the hiring standards.

Most of the firms did not have job descriptions for low skill level jobs and hiring standards were often determined informally by the preferences of one or two individuals. Furthermore, the standards were even more subjective because they were seldom written. The hiring process then involved the individual judgments of a few personnel "specialists" and may not have always related the applicants' credentials to the job task.

The researchers evaluated the appropriateness of hiring standards by observing the variations from company to company and by relating the specified employee characteristics to measures of job performance. They found little or no relationship between hiring standards and job performance, as might have been expected because of the extensive requirements for the same job. Marked differences occurred in company standards with respect to age, sex, education, previous work experience, and appearance, and in company policy on hiring those with criminal records or those who couldn't complete the application form properly.

In virtually all of the occupations studied, a majority of employers expressed a preference for the 22 to 45 age group. However, a sizeable minority of industries and, in one case (wireworker) a majority, gave no age group preference. In six out of ten occupations, a majority of employers preferred male workers; in the other four, sex preferences varied between and within the two metropolitan areas studied.

With the exception of a few occupations, the industries were quite specific in their educational qualifications and preferences. However, within and between the metropolitan areas studied, employers' opinions varied considerably on the education level required.

For example, about 40 percent of the hotels in one of the metropolitan areas specified no minimum educational level for hotel clerks, 25 percent required a high school diploma, 20 percent specified some high school, and the remainder accepted an eighth grade education or were uncertain what the level should be. In contrast, in the other metropolitan area, 50 percent required a high school diploma and 30 percent some high school; the rest wanted at least an eighth grade education or were uncertain. Similar variability was expressed in employers' preferences, and some employers who said education wasn't important specified some educational requirement for hiring.

Previous work experience was almost universally desired. In occupations where training periods for experienced and inexperienced workers differed by only a few weeks, however, there was some disagreement as to whether experience in the occupation was necessary or even preferable.

Appearance was almost consistently a key factor in hiring white-collar workers, but the researchers found that opinions on the importance of appearance for blue-collar workers varied widely. It was also found that in all occupations the question of what constituted appropriate appearance was debatable.

There was also a great difference in hiring policies for workers with criminal records. For example, in the orderly occupation, less than one-tenth of the hospitals in one metropolitan area, versus one-third of those in the other, would not hire workers with arrest records.

In most occupations a majority of employers would not hire applicants who could not complete the application form, even where the ability to read and write English was not considered critical to job success. The study cites the example of the press feeder occupation in one of the areas studied; only 50 percent of the employers thought reading and writing English was

important for job success, but 75 percent of them refused to hire workers who couldn't complete the application form.

The results of this research clearly indicated that the qualifications of employees which employers preferred or required showed little relationship to job performance. The only exception was previous work experience.

In only three of the 20 categories (10 occupations in each of the two cities) was there any consistent relationship between age and job performance. Even in these three categories where a significant relationship was noted, the links between age and job performance varied. Similarly, comparisons of job performance with the sex and education of employees showed no consistent or significant relationship. These findings imply that employers should reevaluate hiring preferences based on age, sex, and education if their aim is to recruit workers whose job performance will be superior. Work experience in like or unlike jobs when related to job performance showed consistent correlation.

The study affirms that employers who overstate hiring standards in terms of job performance requirements incur two unnecessary costs: first, "screening in" overqualified workers increases the employer's turnover because such workers soon become discontented with routine and repetitious operations and usually can find another job with ease; second, "screening out" qualified workers increases recruitment and related costs because it restricts the flow which is vital to an efficient and stable organization.

The finding that age, sex, education, and in some cases experience do not predict job success suggests that employers reassess their hiring minimums for entry and near-entry level jobs. The researchers suggest the use of appropriate work samples for the objective evaluations of certain worker traits (aptitude, interest, temperament). They also advocate the development of written hiring standards for major occupations, with periodic reevaluation to validate a company's employment practices.

(Editor's note: We at MRV believe the vocational-technical practitioner and his advisory committee can make a vital contribution in this reassessment—and it might be in order to suggest that vocational-technical people take a good look at hiring standards in their own communities for occupations in which they are providing training and compare the standards with student characteristics, entrance requirements, and evaluation criteria.)

See Sources of Information at the end of this section for ordering instructions.

Employer Manpower Planning, Forecasting

Making or using forecasts of manpower requirements to determine future training needs for a given area is not a popular activity among vocational-technical training institutions. School districts do make rather unsophisticated studies to qualify for state and federal capital outlay funds, and representatives of training institutions participate in the Comprehensive Area Manpower Planning System (CAMPS), which usually records what is being done, rather than what is needed.

The lack of good manpower forecasts is a weak link in the strong vocational-technical chain. Some states are attempting to assess the economic outlook for important labor markets, but often must rely on forecasts by state and federal manpower agencies which are difficult to adapt to local labor markets.

Following is a study of manpower planning and forecasting by employers. It is presented to emphasize the complexity of forecasting and its importance in organizing training that meets community needs.

AMERICAN MANAGEMENT only recently became concerned with formal manpower planning, and information about such planning is diffused and not widely known. Rarely is essential information about the anticipated manpower needs of local employers available. The need for "how-to-do-it" guides for individual employers led the Manpower Administration to sponsor the study reported here. *Employer Manpower Planning and Forecasting* is based on a larger study, *Manpower Planning and Forecasting in the Firm: An Exploratory Probe,* prepared by H. G. Heneman, Jr. and George Seltzer of the University of Minnesota.

This study surveyed approaches used by firms in Minnesota in the hope that their experience would be useful to those with like problems. The findings of the study are supplemented by a summary of some basic approaches to private manpower planning and by references to helpful bibliographical materials. The researchers generalized from the findings and presented case examples, analyzed planning problems, and developed some basic guidelines for manpower planning by individual firms.

First examined is the character of manpower planning and forecasting: the circumstances that call for

planning, the links between public and private planning, and an overview of micro (carried out by the employing organization for its own purpose) and macro (usually initiated by the federal government on an economywide basis) manpower planning.

Until the 1960s the principal occasion for manpower planning was severe manpower shortage, such as the shortage during World War II. During the 1960s manpower planning was given new impetus by recognition of the role of manpower development in reducing unemployment and by fears that automation and an expanding labor force would cause more unemployment.

Today several other factors are driving employers towards manpower forecasting: first, there is a new emphasis on problem solving by managers and on "management by objectives"; second, the federal government has influenced manpower planning activities by seeking more accurate job vacancy information for training and retraining and by requiring firms with government contracts to justify alleged manpower requirements; third, cooperation between government and business on employment, housing, and urban renewal has supported the spread of planning concepts; fourth, emphasis on manpower development naturally leads to manpower planning; fifth, despite national planning, effective manpower decisions are made by individuals and employing organizations.

A link between public and private planning is provided by the interchange of data, whereby firms may use national or regional labor force data to draw up plans, and government agencies may collect data from firms to provide aggregate manpower measures. Moreover, both public and private planning reflect a basic concern to insure that human resources are located, developed, committed, utilized, and conserved. Many of the concepts, problems, and methodologies of public planning may be useful to private manpower planners.

To provide insights into problems of manpower forecasting and planning, the researchers conducted a survey of the extent and type of planning and forecasting by firms, with emphasis on techniques of forecasting and factors considered. It was found that 72 percent of the respondents to the survey forecast at least some part of their manpower requirements. Such forecasts were more common among large nonmanufacturing firms, but only one-third forecast requirements for all employees and about the same proportion forecast manpower supply. Fifty-nine percent reported that their forecasting efforts had been initiated within the past five years, and only 29 percent of them prepared forecasts more than once a year.

Even among employers who said they engaged in manpower planning, most manpower plans were nonsystematic, disjointed, and not geared to achieving the organization's broad objectives. For example, a firm may formally plan sales expansion, product development, capital needs, and new buildings, but may frequently fail to integrate manpower needs in its projections.

Typically, manpower planning embodied the "grocery list" forecasting concept; for example, noting the need to shop soon for more welders. This type of planning is too specific in objective and ignores other facets of a well balanced program such as compensation, training, and labor relations. In some cases, planning was limited to insuring a supply of managerial talent. In others, it was used to meet manpower problems unique to a particular organization.

This tailor-made approach is desirable, if it yields a complete manpower decision system that includes all firms with like demands and adds up to area or regional plans. However, most systems are unbalanced because firms are unwilling to give out manpower information to their competitors or to agencies or institutions where such information might be misinterpreted or fall into the hands of competitors.

To illustrate that manpower needs of an organization are affected by changes in products and marketing, by techniques of production and administration, and by labor turnover, a diagram of the Minnesota model for micro forecasting is shown. In this model, relationships between product demand and manpower requirements are influenced by the following variables: changed efficiency, expansion of facilities and services, financial resources, external labor supplies, and internal labor supplies.

Over half of the firms surveyed considered sales as a factor in forecasting. Three other factors—work load, facilities expansion, and quality of internal labor supplies—were also considered by one-third of the firms. Although few firms considered technological changes per se, some of them took this factor into account in considering facilities expansion and the addition of new products.

Errors in forecasting were usually adjusted by either hiring more workers, slowing hiring, or laying off workers. In the majority of firms studied, manpower forecasting seemed to be almost completely isolated from other types of planning. The firms lacked adequate information about company plans, sales and production forecasts, internal and external labor supplies, and anticipated technical, administrative, and organizational changes. Employment records, essential to manpower forecasting, were often found lacking in sufficient information (attrition rate, number nearing retirement, etc.).

The primary purpose of micro manpower planning is to enable a firm to reach its goals and objectives more quickly, more efficiently, and/or with less expense. Two additional and closely related objectives may be expressed in terms of: (1) employers' reaching their employment objectives and, (2) the firms' attainment of social goals and objectives through the hiring and training of disadvantaged workers, as an example.

Before a program is initiated, it is essential to determine the needs for, and the uses of, formal manpower planning within the organization. The cost should be estimated and weighed against the anticipated benefits. These benefits may be an improved posture to anticipate and effectively deal with change, as well as the efficient utilization of manpower resources. (Manpower resources include not only individuals and special skills, but also output, effort, and motivation.)

The problems encountered in initiating manpower planning stem from the complexities of relationships within the modern employment system of our economy. These related factors involve the interaction of all parties in the employment relationship plus the community at large. To bring order out of such a complicated network all but dictates a systems approach. Micro manpower planning then is a logical and systematic process whereby a firm raises the probability of reaching its goals and objectives. The planning involves many alternatives to the decision making process, and centers generally, but not solely, on manpower requirements.

Case examples from the study illustrate various practical aspects of manpower planning, as well as some major problems. Analysis of the cases suggests several guidelines: (1) Lay out the objectives of the forecasts. (2) Assign priorities to objectives. (3) Determine the data needed. (4) Determine which data can be of cross-sectional nature, and which need to have a longitudinal base. (5) Make plans to evaluate the data. (6) Regard manpower forecasting as a part of a total manpower planning package.

The study notes that sales or production forecasts are commonly used to predict manpower requirements. Typically the historical relationships between sales, production, and employment are established. However, these relationships are usually not stable. One way to control the lack of stability is to take into consideration the factors affecting the relationship, such as inflation, administrative and technological changes, and type of product.

The researchers recommend that the best way to relate predictors to manpower requirements is to identify the purpose of each job and relate it to production or sales. In general, the procedure is to identify the time required per unit of work for each job, forecast the number of work units for each job, and multiply the two to forecast man-hours required. Also recommended is a projection of a range of labor needs because of the many factors that affect manpower requirements and difficulties in estimating the future state of these factors.

Total manpower forecasting for an entire organization is seldom sufficient since skill composition changes although total employment may remain constant. To plan for recruiting, training, transfers, and other related manpower considerations, it is necessary to project requirements for specific occupational groups. These group forecasts should include positions for top management and key personnel as well as skilled and semi-skilled workers.

Micro manpower planning has not yet attained the popularity or the acceptance that continued strains on manpower resources eventually compel. There is a substantial lag in application of available methodology. Hopefully, the inevitable programs will be preventive rather than remedial.

(Editor's note: This report was selected for review in MRV because of its relevance and implication for vocational-technical education involvement in manpower forecasting and planning. Institutions must eventually arrive at that point of sophistication and expertise where the type, level, and duration of training is enmeshed with actual manpower requirements.

Institutions should not rely on their own resources to undertake such an exercise, nor should they ever attempt to forecast training requirements in isolation. The appearance of this report speaks of an endorsement of the manpower planning approach for most communities. It also denotes the involvement of vocational-technical practitioners as a vital contribution both in the planning process and in the preparation of an optimum quantity and quality of manpower in a continuous time frame).

See Sources of Information at the end of this section for ordering instructions.

Optimum System of Training Apprentices

THIS IS ONE in a series of reports based on a research approach initiated in 1965 by the U.S. Department of Labor, Manpower Administration—Office of Research and Development to gain insights into how craft training is effected and how it can be improved.

The research for the study was conducted by a Purdue University team. *An Optimum Training System in Apprenticeable Occupations* tells how a basis of comparison can be established to detect strengths and shortcomings in established apprenticeship programs. It also offers a guide for construction of programs for apprenticeable occupations which do not have an established training system. Parts of the study would be helpful to educators in improving facets of vocational-technical training programs.

The researchers took a comprehensive approach in

securing background information by studying such subjects as program administration, policy making, selection and recruitment, as well as the training process itself. They explored philosophy, program objectives, continuation training for journeymen, adjustment to technological change, the training plant, instructor qualifications, and apprenticeship agreements.

Surveys and interviews provided the major source of data. Information was received from apprentices, journeymen, instructors, employers, union officials, teacher-educators, counselors, training coordinators, high school students, accrediting agencies, and joint apprenticeship committees. An analysis of trade journals and on-site examinations of exemplary training programs supplemented the data collecting process.

A rating form was developed and used to ascertain the amount of consensus among the surveyed as to those factors that make up the "ideal journeyman." This part of the process also helped to define the end product of an optimum training system for apprenticeable skilled trades.

Apprentices were queried to obtain information useful in framing proposals on recruitment, retention, and program improvement. Likewise, journeymen provided information on their background, current trade training, preference for future training, and their opinion of their apprenticeship experience.

Questionnaires were also sent to companies that manufacture parts, equipment, tools, and materials used by skilled workmen to determine the methods used to disseminate information on technological changes and related operational changes, as well as perceived or anticipated changes. The manufacturers were also asked to assess the relative degree of acceptance or resistance to these changes.

The preliminary structure for an optimum training program was then built through a review of 30 regional apprenticeship agencies and professional organizations, 19 national apprenticeship and training standards on file with the Department of Labor's Bureau of Apprenticeship and Training, and lists of "essential elements" compiled by advisory committees to the research group. After refinement and modification reflecting research in other areas, the optimum framework was formed. This framework was backed up by the field studies of outstanding programs.

Insights into attitudes and plans of youth regarding careers in the skilled trades were obtained to assist recruitment by sending questionnaires to male youths in Indiana. The results, plus information on the counseling programs of numerous high schools should be helpful in designing more effective vocational guidance and recruitment programs emphasizing career opportunities in apprenticeable occupations.

The model training program developed is comprehensive in that it includes program areas such as finance and administration, as well as curriculum and teaching methods. It recognizes that direction and organization are vital in any successful training program and that the objectives of the program must be commonly understood and accepted.

Most of those surveyed for the study indicated that the objective of apprenticeship programs should be the development of well-rounded journeymen rather than specialists. They felt that mainly a journeyman should have overall skill, followed by the ability to produce high quality work, initiative in moving easily from one task to the next, and ingenuity to see a difficult job through. The general objectives should be developed by all groups and should be available in explicit written statements.

Setting the objectives of the program presupposes the existence of a policy-making body. Whatever the form of this body, it must be clearly responsible for directing the program, allocating responsibility, and formulating broad and specific statements of program goals. In any successful training program, effective administration is essential.

The study also recognizes the need for recruitment efforts to establish a source of interested applicants for apprenticeship programs. Public relations efforts are necessary to point up the opportunities that exist in the trade. A national program for this is recommended, as well as taking advantage of trade contests and career days in high schools. In addition, high school counselors should be kept supplied with information on trade programs.

One difficulty in recruitment has been complaints of inadequate pay and benefits during the training period. If trade training is to compete with other career opportunities open to youth, the apprenticeship pay must be kept in line with other types of work.

Selection standards used in recruitment must be reviewed constantly to broaden the base for picking candidates and to make sure the admission standards and procedures are practical and relevant.

An optimum training program should also establish procedures to recruit and assign journeymen for on-the-job and related classroom instruction. For the instructors to be effective, they should have a desire to teach and should be fully qualified to do so. Research in this study revealed that 77 percent of journeymen teachers surveyed had no training as instructors.

This study found most training programs use occupational analysis to determine course content and sequence of presentation. To be effective, this method must be based on what workers are currently doing in the trade with provision made for anticipated technological changes. Since many activities are common to most trades, joint approaches on instructional materials and techniques are possible (example: blueprint reading). Such standardization of materials first requires a common training language and this study suggests that a standard glossary of words and phrases be developed for universal use throughout the trades.

According to the researchers, an optimum program for on-the-job training should provide for adequate

job rotation; experience with modern equipment, materials, processes and a variety of tasks; adequate training time; progressively greater challenges to apprentices at each level of work; and effective ways to evaluate and record achievements of skills learned on the job.

This study found most classroom instruction was regarded as good by apprentices, although they complained that what was taught in the classroom was often taught well before or after the matching skill was performed on the job. The optimum program should devise scheduling which correlates timing between theory and practice. It should also include teaching of nontechnical subjects such as leadership development, public relations, and work planning. New methods, materials, and equipment are essential, and teaching aids such as films and programmed instruction should be utilized. The use of trade literature in connection with classroom instruction is also recommended. Close contact between teacher and pupil must be maintained throughout the program.

A worker's apprenticeship program often ends when he is adequately trained. How does he keep up with new methods? An optimum training program includes continuing journeyman training to give the worker the opportunity to stay currently informed. Trade journals and other literature allow the worker to do this, but they do not replace the need for formalized post-apprentice programs.

The researchers for this study recommend that teams of journeymen, employers, technical representatives, etc., be appointed to determine content and structure of continuation training programs. Such programs must provide for good record keeping to facilitate granting of credit (especially where licensing might be appropriate). Programs featuring easy availability, low cost (if any) to the worker, increased pay, and upgrading to higher positions are the most successful.

The report mentions that workers involved in apprenticeship programs accepted apprenticeship as a desirable avenue to lasting career opportunities. The apprentice agreements should be written so that the period of indenture, conditions of employment, requirements for related instruction, work processes schedule, and responsibilities of all parties are clear.

To keep workers familiar with new equipment and processes, apprentices are rotated to locations where they are in use. Field trips to familiarize personnel with alternative methods are also valuable. From the programs surveyed, the investigators found no mechanisms for responding automatically to new equipment, processes, and other changes affecting job requirements.

To minimize skill obsolescence, the researchers recommend that trades develop a coordinated approach for identifying new developments and predicting changes requiring modifications of training programs. Various trades should also cooperate to evaluate and review constantly for better ways of doing a job. Trade journals and manufacturer's service bulletins have an important role in communicating changes and should be more widely utilized.

The report on the study for an optimum apprenticeship training program is followed by an appendix which gives a checklist to aid in evaluating current training systems or setting up new ones. (Editor's note: Most of the items are applicable to vocational-technical programs as well.)

See Sources of Information at the end of this section for ordering instructions.

occupation reports

Training System in the Pipe Trades

THE PIPE TRADES — plumbing, steamfitting-pipefitting, and sprinklerfitting—employ about 220,000 men in the United States. These trades have had a national apprenticeship system in operation for more than 80 years. *The Training System in the Pipe Trades* is based on research accomplished by a team at Purdue University, under contract with the Office of Research and Development—Manpower Administration of the U.S. Department of Labor.

The study, completed in 1969, is based on surveys of apprentices and journeymen affiliated with the United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the U.S. and Canada (UA), AFL-CIO. This study is one of a

series, which includes among others, *An Optimum Training System in Apprenticeable Occupations* reported in this issue of MRV.

The pipe trades have experienced most of the problems of other construction trades. This study of the training received by apprentices and journeymen in the pipe trades has direct application to other trades. The suggested training program changes or comments contained in this report are based on the recommendations from within the trade but also include inputs from many other sources closely connected with plumbing, steamfitting-pipefitting, and sprinklerfitting. (Editor's note: The comprehensiveness of this occupational report makes it specially applicable to many areas of vocational-technical education.)

Four hundred eighty apprentices at every stage of training were studied. The most common age of the men was twenty-two, ranging from 18 to 55. When they began their apprenticeship, 38 percent were married. Seventy-five percent of the apprentices had graduated from high school. Forty percent planned to continue training beyond that required by their apprenticeship; most wanted to coordinate their trade training with college study.

Their most common wage rate was $2.00 per hour ($5.25/hour highest reported). Sprinklerfitters generally start at two-thirds of the journeymen rate and plumbers and pipefitters start at less than half.

The survey revealed that two thirds of the journeymen in the pipe trades attributed most of their job knowledge to registered apprenticeship programs. They reported receiving their training in the following ways: 10 percent finished in nonregistered apprenticeship programs; 33 percent had special, on-the-job training (Editor's note: assumed to be a registered apprenticeship program); 25 percent attended a trade school, got instruction from a union training center, or just "picked up" the trade. Other sources of training mentioned were military training, high school courses, company training centers, etc.

The journeymen surveyed valued registered apprenticeship, OJT, and non-registered apprenticeship as the best methods of learning. (Editor's note: The terms on-the-job training and OJT were used interchangeably in the research document source. In one sense they imply "learning from experience while gainfully employed" [which may or may not be part of an apprenticeship program], and the other connotation is definitely that of being part of a registered apprenticeship program. At no time does either term specifically imply or exclude other types of on-the-job training programs or experiences.)

On-the-job training in the pipe trades, as in other trades, is intended to familiarize apprentices with actual work processes, to instill pride in workmanship, and to foster initiative. The greatest concern of apprentices with on-the-job training centered on production versus instruction. Twenty-five percent of those queried were concerned that instructors and journeymen do not have enough time to help and another 25 percent were concerned over unvaried work assignments. Others felt assignments weren't challenging and some said journeymen and instructors were not willing to help.

The benefits of OJT, as seen by the apprentices, were the opportunity to earn while learning, the chance to work with instructors, the well-rounded experience gained by rotation of work stations, and the challenge of work assignments.

The study emphasizes that each apprentice in the pipe trades must be given work experience in all phases of the construction industry. Because of the compartmentalized nature of the industry, it is unlikely that one employer could furnish all of the necessary experience to develop a well-rounded journeyman. Therefore, a multi-employer rotation training effort is recommended for the pipe trades.

On-the-job training is supplemented by classroom and shop training where the apprentice learns the theory underlying the job skills he is acquiring. The number of hours of classroom instruction varies from program to program. For example, classroom hours for pipefitters ranged from 1,000 to 1,080 hours in some programs to 720 in others. In the plumbing trade, the common lengths were 720, 800, or 1,000 hours.

Not enough sprinklerfitters are usually in one location to take regular classes so their related instruction is set up by correspondence course in which they must complete 174 lessons, requiring three to five study hours each. The sprinklerfitter apprentices were more dissatisfied with their program of related instruction than the other two groups. They missed the chance for a student-teacher dialogue and also had complaints about the curriculum of the courses.

In some cases, advanced classroom standing was given apprentices on the basis of length of prior experience in the trade. Usually one year of credit was given for experience.

In most cases the union—either alone or in cooperation with management and/or the public schools—or the schools alone provided the related classroom instruction. Classes for plumbers and pipefitters ran three to six evening hours per week during the regular school year. The sprinklerfitters' correspondence work was conducted year round outside regular working hours. Most apprentices received no reimbursement for the class time, though the books, tuition, and material for correspondence courses were generally paid for.

There was a variety of teaching techniques used in the plumber and pipefitter related instruction: lectures, supervised study, and programmed instruction. Aids to instruction, such as textbooks, worksheets, radio, recording, films, and slides, were found to be very helpful. Apprentices benefited most from the use of actual trade materials and equipment.

Course content is a major concern for those planning related instruction. Where should the emphasis be? How much reliance should be placed on the experience of present and former apprentices? How much on present and projected analyses of the trade?

The study revealed that the presently required courses generally were the ones the apprentices listed as most useful. For pipefitters, the subjects were listed in order of science, math, technology courses in heating and cooling, blueprint reading and drawing, welding, and other manipulative skills.

Plumbers valued their subjects in different order: print reading and drawing, plumbing codes, math, manipulative skills including welding and lead work, and science and theory. Pipefitters thought that instruction in electricity and electronics (dealing with automatic control devices) would be a useful addition. Plumbers wanted courses in layout-detailing included.

Manufacturers cited significant changes ahead for the pipe industry in fluidics, plastics, and other synthetics; more compact products; and quick-connect pipe ends and bonded joints. Skills training to meet these changes will need to be incorporated in apprenticeship programs.

Administering the training program is a big task with many problems. First to be accomplished is the formulation of a clear statement of general and specific objectives. With the objectives in mind, administration has a better chance of solving problems as they arise.

The pipe industry has developed a number of approaches towards solving problems in related instruction—such as the correspondence instruction developed for the relatively small sprinklerfitter trade. Some programs are experimenting in reducing duplication in training. One such program has combined the first two years of training for plumbing and pipefitting apprentices. The International Training Fund has contributed funds to supplement trade instruction available through public schools. Mobile classrooms have also been used to train workers.

The researchers identified the mechanisms affecting the ability of the labor force to keep up with industry's changing needs. For the journeymen, continuation training is necessary so that his skills don't become obsolete. For the manufacturer, it is essential that there be tradesmen with current skills who can handle technological innovations.

The study investigated the methods journeymen use to "keep current" and found that trade journals were used by 75 percent of the tradesmen. Talks with fellow tradesmen was the second most frequently used method cited by journeymen; manufacturers' service bulletins third; fourth, talks with foremen and supervisors; fifth, special union reports; sixth, talks with union representatives; seventh, talks with manufacturers' representatives; eighth, talks with trade instructors; ninth, attendance at training schools; and *last*, attendance at public vocational schools.

Researchers suggest that greater emphasis be put on the role of trade journals in this respect and also that more emphasis should be placed on vocational schooling since most of the tradesmen attending classes felt this was the best way of learning.

At present, only 20 percent of the journeymen are required by the union, the employer, or the Joint Apprenticeship Committee (JAC) to participate in additional training as a condition of employment. However, this is a higher percent than that found in other trades. More than 42 percent of the journeymen reported that no record was being kept of their continuation training; another 29 percent did not know of any record-keeping. Many of the journeymen received some payment for their training time or received financial help with tuition or materials.

The researchers found that 60 percent of the journeymen surveyed wanted more training, and others said they would take more training if it were required to keep their jobs. Pipefitters were more likely than plumbers to want additional training. A correlation was also noted between age and training desire; if a journeyman were under 45, he was a likelier prospect for extra training; this was also true if he were married and had dependents.

Completion of high school and completion of apprenticeship were other variables having a positive correlation with desire for continuation training. Most journeymen were not willing to spend over $1.00 for each hour of instruction, and many refused to pay that much.

The researchers asked manuacturers what they thought were the biggest obstacles to the introduction of new materials, fixtures, and equipment. The manufacturers felt that the unions and pipe tradesmen were not the greatest obstacles, and instead, bottlenecks came from architects and engineers responsible for specification of equipment.

Manufacturers usually thought that course content of present apprenticeship programs would have to change to meet trade needs in the future. Sixty percent of the manufacturing firms surveyed were involved in training by providing materials (i.e., catalogs, manuals, and lesson guides) or instructors to apprenticeship programs.

National guidelines have been established for apprenticeship training programs registered with the Bureau of Apprenticeship and Training (BAT): a starting age for apprentices of not less than 16 years; full and fair opportunity to apply for apprenticeship; selection on the basis of qualification alone; schedule of work processes in which a trainee is instructed; a minimum of 144 hours a year in organized instruction in subjects related to the trade; a progressively increasing schedule of wages; supervision of OJT facilities; periodic evaluation of apprentices' progress; keeping of records; employee-employer cooperation; recognition for successful completion of apprenticeship; and nondiscrimination in all phases of apprenticeship.

Standards for programs on record with BAT generally cover 18 to 20 major subjects; the pipe trades are no exception. The subjects include composition and duties of the local JAC, ratio of apprentices to journeymen permitted on jobs, standards and procedures, the apprenticeship agreement, probationary periods/terms of apprenticeship, wage rates, working hours, work experience, supervision on the job, related instruction, certificates of completion, and relevant definitions.

The plumber apprenticeship program standards include the suggestion that a JAC or some other committee act on all training matters. Both pipefitters and plumbers advocate transfer of apprentices from employer to employer when it is needed to provide overall experience to the trainee. The researchers found the standards tended to be unclear in assigning authority and responsibility for training of apprentices on the job.

The pipe trades generally go beyond other trades in outlining for their membership the various forms of assistance available from contractors, the United Association Training Department for Apprentices and Journeymen, BAT, State Apprenticeship agencies, the U.S. Office of Education, and the U.S. Department of Labor.

The study report concludes by stressing that the achievement of an optimum training system requires much time and effort for all concerned, but when key principles are applied in a systematic and uniform way, potentials and talents of the American craftsman can be unlocked.

(Editor's note: We in vocational, technical, and adult education believe likewise, but from time to time have found fault with apprenticeship programs because of their lack of system and uniformity. Likewise advocates of apprenticeship training and OJT propound that their way is current and more meaningful to the development of the journeymen. We suggest that there are truths in both viewpoints and that each can learn considerably from the other.

In 1937 the National Apprenticeship Act [the Fitzgerald Act] was passed. The Bureau of Apprenticeship and Training, Manpower Administration, U.S. Department of Labor, administers the act. The Bureau is charged with an advisory capacity to encourage joint cooperation by management and labor to establish and maintain apprenticeship programs. In connection with its advisory capacity, BAT is empowered to register programs which are not covered by state certification and which meet the standards set down by the Federal Committee on Apprenticeship. BAT maintains records of standards set down by programs registering with it. National standards are on file at BAT for national apprentices' programs for both plumbers and pipefitters, as well as standards affecting apprentices of Local 669, the sprinklerfitters.)

See Sources of Information at the end of this section for ordering instructions.

Labor Force Trends

In the past year the civilian labor force has increased by 1.2 million. Adult men accounted for three-fifths of this rise, with the largest number being 20-24 years of age, many of them veterans. Teenagers made up about one-third of the labor force gain, but adult women accounted for little growth. Total employment was up by 390,000 over the year, primarily numbered by men 20-24 years old, but this was offset by declines among adult women. Teenagers experienced little job growth over the year.

sources of information

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ERIC—Education Resources Information Center, EDRS, c/o Leasco Information Products, P.O. Drawer O, Bethesda, Maryland 20014. Copies priced according to the number of pages. MF price in the listing is for microfiche; HC price is for paper copies. Send remittance with order directly to ERIC-EDRS and specify the accession number (ED plus a 6-digit number) given in the listing. For a complete listing of services, special subject searches, and other products, order "How To Use ERIC," Catalog No. HE 5.212: 12037-C, Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (price 35 cents).

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ORD/MA—Office of Research and Development, Manpower Administration, 1111 20th St., N.W., Washington, D.C. 20210. Single copies free upon request.

NATIONAL REFERRAL CENTER—Science and Technology Div., Library of Congress, Washington, D.C. 20540. Catalog of information agencies and directories of information sources on broad subject areas. Write with subject specified for free referral to agencies having information on the subject.

NTIS—National Technical Information Service, Operations Division, 5285 Port Royal Road, Springfield, Virginia. 22151. Copies of reports with this designation may be purchased for $3.00 for reports with 300 or less pages, $6.00 for those with 301-600 pages, $9.00 for those with 601-900 pages, or 95 cents for a microfiche copy. Send remittance with order directly to the NTIS and specify the accession number (AD or PB plus a 6-digit number) given in the listing.

RESEARCH COORDINATING UNITS—50 states. Write State Dept. of Education, RCU, for ongoing reports and projects in each state.

SCIENCE INFORMATION EXCHANGE—1730 M St., N.W., Washington, D.C. 20036. Abstracts of research projects planned or in progress per year are available for a fee of $50 for the first 100 abstracts and $10 for every 100 abstracts thereafter.

NATIONAL ADVISORY COUNCIL—425 - 13th St., N.W., Suite 852, Washington, D.C., Reports of projects of State Advisory Councils.

Community College Acts To Avert Skill Shortage

The Haywood Technical Institute at Clyde, North Carolina, reacting to a survey that showed a high percentage of sawmills in the region were discontinuing operations primarily because of unavailable trained employees, set up an MDTA program to train sawyers, saw filers, lumber graders and kiln operators in 1969.

Two classes have been completed, graduating 57 men of whom 41 are still gainfully employed directly in the trade. The beginning salaries of these formerly unemployed men 18 to 45 years of age ranged from $125 to $200 per week. Most of the men were contacted by sawmill recruiters on campus prior to graduation.

Because of generous donations of equipment and materials from the private sector, only $40,000 of state money was needed to develop a sawmill training complex valued at over $600,000.

A full description of this program is contained in the June 1971 issue of *Manpower* Magazine, published by the Manpower Administration, U.S. Department of Labor. It clearly illustrates the vital role a training institution can play in bolstering the economy of its area by rightfully assuming a responsibility all too frequently shirked by post-secondary institutions.