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ABSTRACT

This publication reviews available literature regarding apprenticeship in the United States and 17 other industrialized market-economy nations. It notes outstanding practices that may be replicated or transferred to strengthen U.S. apprenticeship. The publication begins by defining apprenticeships and outlining the unique features of U.S. apprenticeship, citing both its strengths and deficiencies. In the remainder of the work attention is given to improvements in seven deficiencies of U.S. apprenticeship: variable quality of training offered, inadequacies in the administration of apprenticeship, inadequate numbers trained, concerns about the cost effectiveness of apprenticeship, inadequate financing for certain apprenticeship programs, limited access to apprenticeships, and unclear role and relationship to other training. Promising practices are detailed that may help remedy the problems identified. Recommendations regarding the transferability of practices are suggested, including broader training, regular curriculum review and updating, development of trade examinations, establishment of a resource center, Federal leadership, adoption of a system of Industrial Training Boards, recruitment of women, promotion of alternant training, and collaboration between vocational education and apprenticeship. The paper calls for communication and dialogue with other industrialized countries on the subject of apprenticeship and industrial training. Nine pages of references conclude the report. (YLB)

Information Series No. 305

APPRENTICESHIP LESSONS FROM ABROAD

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TABLE OF CONTENTS

FOREWORD

Strengthening and expanding apprenticeship programs have been an emphasis of countries throughout the world for the past several decades Some of the reasons for this emphasis include unprecedented technological changes, unabating business and industry requirements for highly skilled workers, increasing competition in world trade, and the need to improve the transition of youth from school to work.

In the attempts to strengthen and expand apprenticeship programs, nearly every country has deliberated on alternative practices However, these deliberations and descriptions of resulting practices are either scattered in various publications, unpublished, or known only to those directly involved in operating the apprenticeship programs. This creates a situation where public and private sector policymakers, decision makers, practitioners, and others confront information voids, unconnected findings and opinions, and unexamined alternatives as they attempt to consider the transferability of various apprenticeship program practices.

To make progress on solving this situation, the Office of Vocational and Adult Education (OVAE), U S. Department of Education, through its contract with the National Center for Research in Vocational Education, designated a study to develop a review and synthesis of existing literature on domestic and international apprenticeship practices, perceived U.S. deficiencies, and potential transferable practices from other industrialized countries to improve U.S. apprenticeship programs This publication, resulting from the study, should aid policymakers, practitioners, and others in the further development of more effective and expanded U.S. apprenticeship programs

The apprenticeship and vocational education professions are indebted to Dr. Robert W. Glover of the University of Texas for his scholarship in the preparation of this paper. Dr. Glover has written and spoken extensively on apprenticeship, studied apprenticeship in the U.S. and other countries during on-site trips, and formerly served as Chairperson of the Federal Committee on Apprenticeship.

Special recognition is also extended to Bill Main, Manager of Skilled Trades Training for the Chrysler Corporation of America; Kenneth R. Edwards, Director of Skill Improvement and Training for the International Brotherhood of Electrical Workers; Virginia C. Gee, Special Assistant to the Chief of the Department of Industrial Relations, Division of Apprenticeship Standards, for the State of California; Gert Loose, University of Hamburg, Federal Republic of Germany; and Wayne E. Schroeder, Robert Bhaerman, Lois G. Harrington, Frank Pratzner, Morgan Lewis, and William E Hull of the National Center for Research in Vocational Education for their critical review of the manuscript prior to its final revision and publication Roy L. Butler, Senior Research Specialist, coordinated the publication's development, with assistance from Lucille C. Thrane and Mark Newton. Patti Brougher and Debbie Linehan served as word processor operators in preparing the final manuscript Editing was performed by Michael Wonacott of the National Center's Editorial Services

Robert E Taylor
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PREFACE

This publication reviews and synthesizes available literature on apprenticeship in the United States and other selected industrialized countries with market economies, highlighting noteworthy or promising practices that may be replicable or transferable across international boundaries and cultural settings. Although the specific aim of this work is to identify practices that may improve or strengthen apprenticeship in the United States, readers in other countries may find the ideas presented of use as well. The audience to which this work is addressed includes apprenticeship program operators as well as policymakers

A key premise of this publication is that any judgments about the transferability of foreign practices must be grounded on a thorough understanding of the American apprenticeship scene Thus, rather than deal solely with literature regarding practices outside the United States, this work synthesizes the literature on American apprenticeship together with materials on apprenticeship abroad. This effectively doubles the length of the publication but, I hope, makes it eminently more useful.

In assembling literature to be reviewed in this study, searches were conducted in several computerized databases, including Educational Resources Information Clearinghouse (ERIC), National Technical Information Service (NTIS) and International Labour Documentation (Labor Doc) In addition, every known bibliography on apprenticeship was consulted, as well as a compendium of theses and dissertations written on the subject of the apprenticeship in American colleges and universities (Butler and Glover 1985). Also, the library holdings of the National Center for Research in Vocational Education, The Ohio State University, Columbus, and the Center for the Study of Human Resources, the University of Texas, Austin, were combed, as well as the general library collections at both universities. Key words used to locate references included *apprentices*, *apprenticeship*, and *industrial training*.

This publication has some limitations that should be acknowledged at the outset. First, the coverage of non-English materials is limited. Across the 18 countries studied, a dozen languages are spoken in addition to English. Since the project constraints provided neither the time nor the financial resources for translation services, few non-English references were utilized. Second, up-to-date materials on foreign practices are not generally available in conventional bibliographic sources in the United States. The author found that personal contacts often offered the best source of information regarding current developments. Fortunately, while preparing this publication, the author had the opportunity to speak with a few knowledgeable foreign visitors at the National Center for Research in Vocational Education. These opportunities were most helpful, but further personal contact would be useful to glean up-to-date information. Third, a comparative study such as this should be ideally considered within broader political, social, and economic contexts of the various nations examined. However, to deal with such contextual issues properly across 18 countries was beyond the resources of the project. Further, the result of such an approach would probably be a document of such extraordinary length as to try the patience of most readers.

The author wishes to acknowledge the considerable assistance he received from numerous individuals in conducting this study Dr Roy Butler provided invaluable assistance in directing the project as well as in gathering materials to be included in the review Perhaps most helpful, as a colleague very knowledgeable about the American apprenticeship scene, he offered me a great source of intellectual stimulation and practical advice I also want to thank Dr Robert Taylor and Dr Lucille Thrane of the National Center's administrative staff for their enthusiastic support of this project. Ken Edwards, Dr Gert Loose, Minor Miller, Dr Frank Pratzner, and Dr Wayne Schroeder provided very helpful comments in reviewing preliminary outlines and drafts of this paper To all I convey my appreciation, while reminding the reader that I alone am responsible for any errors or omissions contained in the final product

Bob Glover
Austin, Texas

EXECUTIVE SUMMARY

This publication reviews available literature regarding apprenticeship in the United States and other industrialized market-economy nations, noting outstanding practices that may be replicated or transferred to strengthen American apprenticeship Special attention is given to improvements in seven subjects related to apprenticeship

- Quality of training
- Administration
- Expansion
- Cost-effectiveness
- Financing
- Access
- Role and relationship to other training

In each of these areas, the publication details deficiencies of U S apprenticeship and identifies promising practices that may help remedy the problems identified

Maintaining and improving the quality of training are the most important issues in American apprenticeship because they underpin all other issues Improving the quality of training involves several aspects, including—

- promoting greater uniformity and transferability of high-quality training,
- improving the quality and certification of instructor training,
- improving training methodologies,
- improving the quality and currency of curricular materials, and
- improving the certification of apprentice competencies achieved

Assuring transferable, high-quality training calls for reversing the American trend toward specialized, narrow training and following the German example of consolidating apprenticeable occupations and broadening apprenticeship. Where one firm cannot accommodate training in all aspects of the trade, interfirm workshops are established by groups of German firms Similarly, as part of its recent reforms, New Zealand has promoted group apprenticeship schemes. In the United States, industry-wide accomplishments in unionized construction, conducted under multiemployer sponsorship and financing from local and National training trust funds, merit greater attention and replication.

To improve the quality of instructor training and certification, we need to examine more closely the systems used in Germany and Austria, in which even on-the-job instructors must have a teaching (*meister*) qualification for firms to be able to sponsor apprentices Other countries do not neglect instructor training and we also can learn much from them As part of its training service to industry, the Irish Training Authority (AnCO) trains and certifies instructors for industry on a national basis In Japan, instructor training is a primary function of the Federal Institute of Vocational Education

Training methodologies do improve over time, and apprenticeship should not be totally bound to its traditional practices For example, competency-based training methods offer advantages over time-based training. Yet while some individuals may complete training faster under a competency-based system, competency-based training has been promoted in the United States as a means of shortening the scope of training—an entirely different matter This has earned it the opposition from several trade unions. Similar experiences in Germany with "training by stages" and in Britain with modular training both bear on this topic

In the area of curriculum development techniques, the DACUM (**D**eveloping **A** **C**urriculum) system, developed in Canada and the United States, has much to recommend it Several alternative versions of job analysis and task analysis are available as well. The key point is that apprenticeship curricula need to be developed systematically and updated regularly to ensure relevance to current work practices

As for systems to certify the competence of apprentices, many countries use a system of comprehensive exams France has its Certificate of Aptitude (CAP). Germanic countries require a final exam and may peg responsibility on the employer if an apprentice fails. For craft training, England uses the City and Guilds of London Institute and other entities as examination boards In New Zealand, the National Trades Certification Board sets examination standards, administers exams, and awards certificates to those who pass. The United States has nothing approaching the national system of standards and examinations found in other nations; but programs for examination and certification, operated by industry, exist in welding and automobile mechanics.

In the administration of apprenticeship, the United States is the only country in the world that relies on an incomplete Federal-State system. Thirty-two States do not even have a recognized apprenticeship agency, yet political trends call for reducing the Federal role further. The experiences of highly decentralized apprenticeship programs in Australia and Canada reveal problems in ensuring portability of skill certifications, in working effectively with multiplant employers, and in disseminating apprenticeship information. In contrast, the German government has centralized responsibility for the out-of-school portions of apprenticeship because it realizes that apprenticeship has important effects on the national economy. All industrialized nations make use of tripartite councils in the administration of apprenticeship. In the United States, the Federal Committee on Apprenticeship is structured as a tripartite group, but it requires greater independence to be able to function properly.

In order to expand industrial training, many Nations have adopted some form of levy-grant system, financed through a payroll training tax. One of the most innovative is found in France, where the tax is imposed as a penalty on firms that fail to invest in continuation training for their employees. The tax creates a real incentive to train while, at the same time, leaving the spending decisions in private hands. Reportedly, the tax is having its intended effect: payments to the French treasury have declined as expenditures on training have risen. In 1980, employers covered by the tax devoted 1.79 percent of their total wage bill to further training—even though the tax was set at only 1.1 percent. In a similar vein, the German government has used the threat of payroll tax

to stimulate employers to offer additional apprenticeships Other than the United States, all English-speaking countries have adopted some form of Industrial Training Board (ITB) system to promote and improve industry training practices Several of these ITBs have authorized the establishment of levy-grant funds

The levy-grant concept, used in France, Britain, Ireland, New Zealand, and other countries, offers hope for remedying the problems of inadequate financing for American apprenticeship The idea is not altogether foreign It is the basis for training trust funds established through collective bargaining in the construction industry and more recently in automobile manufacturing A variation of the concept has also been implemented to stimulate training using unemployment tax funds in California

The issue of the cost-effectiveness of apprenticeship has been investigated in Germany, Canada, the United Kingdom, and the United States Each of the studies conducted has attempted to measure benefits and costs of participating in apprenticeship from the point of view of an employer The studies are full of methodological problems, and fear of adverse conclusions has halted several studies in midcourse. A general finding among studies that have been completed is that costs vary significantly by employer. On average, over the period of the apprenticeship, the costs outweigh the benefits for most employers, but this does not take into account any benefits to the employer if the completing apprentice stays with the firm after his or her apprenticeship No studies were located that compared the cost-effectiveness of apprenticeship relative to other types of training

Although the United States has been a world leader in its concern for equity of access to apprenticeship, we can learn from the experience of other nations—especially regarding programs to involve females in apprenticeship Several nations, including Germany, New Zealand, and others, have established special efforts to recruit females into traditionally male apprenticeships We should investigate the results of these new programs, which to date have not been indicated in the literature

The unclear role of apprenticeship and its relationship to other training are part of a more fundamental deficiency in America the lack of coherent National policy and standards toward human resource development

The paper ends with a call for communication and dialogue with other industrialized countries on the subject of apprenticeship and industrial training A survey of the literature, such as this, has inherent limitations Only from direct contact with practitioners and experts in other countries can the kind of up-to-date information on programs and innovations that is needed for policymaking be secured

INTRODUCTION

Looking abroad for concepts and innovations to improve one's own apprenticeship programs is not a new idea Australia has taken a special interest in this approach, commissioning several tripartite missions to gather specific information on the training of skilled workers in other nations, both for the purpose of understanding the trades qualifications of prospective migrants from these countries and of locating useful ideas to apply to Australian training programs (Australian Tripartite Mission 1969, summarized in Casey 1970; Australian Department of Industrial Relations 1979) Prior to passage of the Industrial Training Act in 1964, the British closely examined various European systems of industrial training (Williams 1963). Parkes (1979) also reviewed European apprenticeship for England. A more recent study commissioned by the British similarly was motivated by a search for beneficial ideas among Britain's chief competitors on the world market (Hayes, Anderson, and Fonda 1984). The Province of Ontario, Canada, undertook an international conference aimed at uncovering ideas to reinvigorate its apprenticeship system (Ontario Ministry of Colleges and Universities 1977). The International Labor Organization sponsors a series of regional centers that track international developments in apprenticeship. Among the most active in the apprenticeship field are CENTERFOR in Montevideo, Uruguay, and The Asian and Pacific Skill Development Programme in Islamabad, Pakistan (Asian and Pacific Development Programme 1981).

In the United States, the Department of Labor has funded several investigations of training abroad, including a study of apprenticeship in eight European nations by the International Labor Organization (1966) and, more recently, a task force composed of Hugh Murphy, outgoing administrator of the Bureau of Apprenticeship and Training, and Beatrice Reubens, research associate at Columbia University (Reubens 1981). The U.S Congress occasionally has examined approaches to training taken abroad (U.S. Congress 1964 and U.S. Congress, Office of Technology Assessment, 1984) Also, individual American researchers have shown an interest in training practices abroad (Hansen 1967; Somers 1972, Roomkin 1973; Roomkin and Hansen 1975).

American apprenticeship sponsors themselves often have sought ideas and advice from foreign shores in improving their training programs. For example, John Deere Company, an agricultural implement manufacturer, invited a German and a Canadian to a conference it sponsored on apprenticeship (Hathaway 1982). The International Masonry Institute sent a team representing labor and management to Britain, France, and Germany to examine training in the trowel trades Officials from the operating engineers trade have visited England on similiar scouting missions. The International Brotherhood of Electrical Workers (IBEW) conducteo an extensive review of apprenticeship practices abroad in the early 1980s (Edwards 1983). International training practices are not unfamiliar to many in American industry. It should be remembered that multinational operations of many American firms often provide management first-hand experience with training systems abroad, and U.S. trade union officials have good contact with their counterparts in other countries through various international organizations.

This work reviews available literature on apprenticeship in the United States and 17 other selected industrialized nations with market economies in order to identify promising or noteworthy

practices that could be implemented to strengthen American apprenticeship It does *not* evaluate American apprenticeship but rather seeks promising practical ideas, projects, and innovations, both in the United States and abroad, that may improve American apprenticeship

The following criteria were generally used in selecting practices to be featured

- The practice addressed an existing deficiency in American apprenticeship
- The practice was portrayed by the literature as successful.
- Some element of the practice or innovation could already be found in place in America, thereby improving the chances for being successfully transferred

The publication begins by defining apprenticeship and outlining the unique features of American apprenticeship, citing both its strengths and deficiencies It identifies seven areas or themes of special interest, which form the organizational basis for the body of the work.

The 18 countries selected for review include industrialized Nations identified by the World Bank in its *World Development Report* (World Bank 1983). For convenience, these 18 countries can be classified into four groupings as is depicted in the following section, which also presents a brief profile of apprenticeship in each country, along with overview comments on selected issues at interest in this study

National Apprenticeship Profiles

English-Speaking

The English-speaking nations are perhaps closest to the United States culturally Thus it may be easiest to transfer ideas to America from these countries. Among the English-speaking countries, Australia and Canada operate training on a highly decentralized basis, whereas training in Ireland, New Zealand, and the United Kingdom is more centralized An innovation that almost all these nations have adopted is some form of Industrial Training Board to promote and support training on an industry-wide basis. The degree of success achieved with this innovation has varied considerably.

Australia. Apprenticeship is well established and highly decentralized among the states and territories, each of which has tripartite organizations that administer their programs. National functions are carried out by the Australian Department of Employment and Industrial Relations, with the assistance of a tripartite Australian Apprenticeship Advisory Committee. These functions include (1) arranging for the conduct of basic research on matters affecting apprenticeship, (2) providing an information service for the circulation of ideas, information, and overseas developments regarding all aspects of apprenticeship among the various apprenticeship and technical education authorities; (3) proposing trades that should be considered apprenticeable; (4) considering and making recommendations on all aspects of apprenticeship other than wages; and (5) disseminating information to promote public understanding and interest in apprenticeship.

Canada. Apprenticeship is decentralized among the provinces; yet the national government has found it necessary to undertake certain limited functions, for example, ensuring portability of apprenticeship credentials across the country. Canada is similar to the United States in that the two nations are the only ones in the world where apprenticeship is *not* primarily a training program for teenage youths.

Ireland. Apprenticeship is one of the forms of training fostered and financed through the Industrial Training Board system, which operates on a centralized basis through a national organization called AnCo. Training activities are financed by a tax levied on the firms in each industry. In this relatively small country, the Industrial Training Board approach apparently has operated quite successfully.

New Zealand. New Zealand has a well-established apprenticeship system, involving several national and local tripartite organizations. National and local apprenticeship committees sponsor apprenticeship. A National Trades Certification Board designs syllabi for related instruction, sets examination standards, administers exams, and awards certificates to those who pass. Related training is offered in regional technical institutes under the Department of Education. A network of 26 Industrial Training Boards, which report nationally to the Vocational Training Council, investigates training needs for changes in apprenticeships or the addition of apprenticeable occupations. Perhaps most interesting of all, in 1980, New Zealand began a major national reform of apprenticeship, modernizing and improving the training offered through the system.

United Kingdom. Britain adopted a system of Industrial Training Boards, but it abolished three-quarters of them because they were administratively flawed and they fell into distavor with the industries they were supposed to serve. Apprenticeship seems to be on the decline in the United Kingdom, allegedly because of its inflexibility and expense, and because of the demise of heavy industry, where apprenticeship traditionally has been best established. However, apprenticeship remains the traditional means of entry into skilled occupations (Fuller 1978).

United States. Privately sponsored and primarily funded from private sources, apprenticeship in the United States is concentrated in building trades (largely due to union interest in apprenticeship) and in major manufacturing (in firms that have low rates of employee turnover). A series of initiatives was undertaken during the 1970s to expand apprenticeship to other occupations and industries. No changes in Federal legislation covering apprenticeship have been made since 1937.

Germanic

It is in the Germanic nations that apprenticeship remains best established, with up to half or more of all school leavers entering an apprenticeship. Although there is some variation in the model in particular places and industries, the typical programs has youths aged 16-18 working on a job 4 days per week and in school for related training on the fifth day over a 3-year period. Because training occurs both on the job and in school, apprenticeship is commonly referred to as the *dual system* in Germanic countries. Well-developed institutions at the industry level work with firms in financing apprenticeship and supervising its operations to ensure quality. The private sector in all three countries—Austria, Germany, and Switzerland—has resisted governmental financing of apprenticeship, fearing that unwanted controls will accompany the funding. Nevertheless, the public sector does have important roles to play in the Germanic apprenticeship system, especially in the provision of related training. This means that proper coordination of practical training on the job and theoretical training in schools often involves significant public-private collaboration. Education at the federal or national level plays a greater role than in the United States. Apprenticeship is widely used in several professional occupations and retail trades where apprenticeship is not commonly found in the United States.

Austria. The Germanic dual system model may work best in Austria, where a higher proportion of school leavers enter apprenticeships than in any other country in the world. Strict controls are placed on who may sponsor apprentices and who may instruct apprentices.

Federal Republic of Germany. Whereas Germany considers *education* to be a responsibility of the Lander (states), the national government is legally responsible for training outside the school system because of its important implications for the national economy National efforts have been made to consolidate the number of apprenticeable occupations into fewer programs offering broader, more widely applicable training. Employer associations admonish members for improper training or for enticing skilled workers from other firms

Switzerland. In Switzerland, apprenticeship is decentralized to cantonal authorities that make use of tripartite public or semipublic bodies to organize and administer training

Scandinavia

Denmark. Denmark has the largest apprenticeship program in Scandinavia. It is nationally organized and long established Since the First Law for Apprentices in 1889, masters have been obliged to send their apprentices to technical or commercial colleges for related training.

Finland. Finland has successfully expanded the number of apprenticeships offered by providing public subsidies both to firms and to individual apprentices The amount of this regular subsidy declines for each year of apprenticeship. A special additional subsidy is offered to employers who apprentice unemployed youths under 25 years of age.

Sweden. Sweden has moved away from apprenticeship, but it has a very strong system of labor market training, administered by tripartite boards, which offer training programs including elements of work-study design Sweden maintains a small number of legally recognized, subsidized apprenticeships in a limited number of occupations.

Other

The following countries do not fall into any convenient categories In fact, each is almost in a category by itself.

Belgium. Apprenticeship constitutes a relatively small portion of the training system in Belgium and is concentrated primarily in manual crafts.

France. France has adopted a levy-grant scheme that is more flexible and decentralized than that found in Britain Its aim is simply to use the threat of a tax to encourage employers to train or to contribute funding for training by a school or other outside organization. Two separate payroll taxes are involved to promote training—a 0.5 percent tax for apprenticeship and a 1 1 percent tax for continuation training There appears to be less interest in influencing the nature of the training provided than there is in just making sure the training is offered. The system relies on the judgment of the firms to make appropriate decisions regarding what sort of training is provided

Italy. Italian experience illustrates that, although employer incentives may work effectively to expand apprenticeship, they may do so only at the expense of the quality of training offered Italy has a large number of apprenticeships because employers can avoid paying social security taxes (which amount to 30 percent of payroll) by hiring apprentices. Yet the training in many of these apprenticeships is unsatisfactory, and rates of noncompletion are reportedly extremely high (70 percent).

Japan. Japan does not use apprenticeship per se, but it does have a strong system of in-plant training that uses a work-study scheme (Asian and Pacific Skill Development Programme 1981b) Further, under Japan's system of lifetime employment, firms are more interested in investing in their workers, and older workers have less fear of displacement when they share their skills with younger workers. Thus the training atmosphere in the firm is enhanced

Netherlands. To counter youth unemployment, the national government has taken an interest in apprenticeship. Although legislative changes in the late 1970s imposed minimum wage requirements on employers sponsoring apprentices, qualified firms are eligible for a weekly subsidy toward the training of an unemployed youth under 23 years of age In practice, the subsidy covers only the expense of wages for the apprentice to atter d related instruction 2 days each week The subsidy was required to offset declines in apprenticeships offered during the mid-1970s. The Netherlands does not have a levy-grant system for promoting industry training, although the government has considered implementing one

Spain. There are few apprenticeships in Spain, these re concentrated within a limited range of occupations

Table 1 ranks nations in this study according to the extent of their apprenticeship activity in 1977 Note that while the United States had a low ratio of total apprentices to civilian labor force and thus ranked 14th in that dimension, it ranked 4th on the list in terms of size of program

Definition of Apprenticeship

Given the profile of nations to be studied, a logical starting point for this paper is to define the term *apprenticeship*, both in order to distinguish it from other forms of training and to ensure that the term is used consistently in discussing training across the 18 Nations involved. For an operational definition of apprenticeship, at the outset of this study, the author used a modification of a definition originally formulated by Reubens·

> Apprenticeship is an industry-based initial training system *characterized by* a contractual employment relationship in which the firm *or sponsor* promises to make available a broad and structured practical and theoretical training of an *established* length *and/or scope* in a recognized occupational skill category. Apprenticeship is a work-study training scheme in which part of the training occurs on the job and part occurs off the job in a classroom or workshop setting (Reubens 1981, p 19, italic designates author's modifications to original definition)

The modifications were made to Reubens's definition in order (1) to accommodate the practices of sponsorship by multiple entities, (2) to acknowledge the replacement of time-based training for competency-based training in certain programs, and (3) to emphasize that modern apprenticeship involves dual learning modes, with the on-the-job portion of training arranged by industry sponsors and related training often conducted by or with a school. In America, apprentices may be sponsored by an individual employer or a group of employers acting either unilaterially or jointly with a union.

In the Federal Republic of Germany, the work-study feature of apprenticeship is so paramount that apprenticeship is known as "the dual system," in which firms and schools jointly participate in training (Munch 1983). Although patterns of training vary by occupation and area across West Germany, including the use of various forms of block training in vocational school or in interfirm

training centers (Hayes and Wheatley 1979, p 68), a typical pattern is for apprentices to spend 4 days per week on a job and 1 day per week at a vocational school Under all patterns, German apprentices their related training during the regular workdays rather than in the evening on their own time German apprentices are paid training allowances—not wages—and these allowances are below what American apprentices are paid relative to journeyman wages

TABLE 1

RANKING OF INDUSTRIALIZED MARKET ECONOMY NATIONS BY INDICATORS OF APPRENTICESHIP ACTIVITY: 1977

Ranking & Country	Apprentices as a Percent of Total Civilian Employment	Ranking & Country	Total Apprentices
1 Austria	6 15	1 Germany	1,397,429
2 Germany	5 70	2 Italy	678,510
3 Switzerland	5 38	3 Great Britain[b]	462,940
4 Italy	3 42	4 UNITED STATES	262,586
5 New Zealand	2 69	5 France	194,273
6 Denmark[a]	2 29	6 Austria	183,659
7 Australia	2 05	7 Switzerland	151,483
8 Great Britain[b]	1 89	8 Australia	123,200
9 Ireland	1 62	9 Canada	96,835
10 Netherlands	1 35	10 Netherlands	61,417
11 Canada	99	11 Denmark[a]	55,362
12 France	93	12 New Zealand	32,706
13 Belgium	63	13 Belgium	23,600
14 UNITED STATES	29	14 Ireland	16,542
15 Finland	15	15 Finland	3,198
16 Sweden[c]	03	16 Sweden[c]	1,200

SOURCE Reubens and Harrisson (1980 p 12)

NOTE Data not available for Japan

[a]1976 data

[b]Number of apprentices for 1971 taken from 1971 Census, Economic Activity Part II Tables 1,10 London Her Majesty's Stationery Office 1975 Total Civilian Employment refers to 1977 As the trend in apprenticeship in Great Britain was downward during the 1970s, this estimate overstates actual 1977 apprentices

[c]Number designated to receive government subsidy under 1959 law on apprentices Unknown number of unsubsidized apprentices would raise Swedish total

Special Features of American Apprenticeship

Several features distinguish American apprenticeship from apprenticeship in other nations A recent summary of cross-country comparisons of apprenticeship was developed by Reubens (Reubens and Harrisson 1980, pp. 8-10, Reubens 1981, pp. 19-23). Reubens first distinguishes apprenticeship in English-speaking countries from that in non-English-speaking countries and then proceeds to elaborate on how the United States differs from other English-speaking nations As contrasted with practices in continental Europe, apprenticeship in English-speaking countries is characterized by Reubens as more strongly influenced by trade unions and more likely to be the primary responsibility of the ministry of labor or employment rather than the ministry of education. It is also characterized by higher wages for apprentices relative to fully skilled workers, more limited and controlled intake, a narrower range of actual or potential apprenticeable occupations, longer duration of apprenticeship, more diverse and less supervised training standards, higher rates of noncompletion, and an absence of external examinations for those who do complete apprenticeship

According to Reubens, the United States is distinguished from other English-speaking countries by its absence of national skill shortages, greater availability of training alternatives to apprenticeship, greater concentration of apprenticeship in the construction trades, larger incidence of unregistered apprenticeships, provision of related training outside of working hours commonly at the apprentice's own expense, and stronger emphasis in public policy on access to apprenticeship for minorities and women. In addition, the United States is the only English-speaking country without a system of national industry training boards

Perhaps the most important distinguishing feature is the age of apprentices in the United States. The United States and Canada are the only countries in the world in which apprenticeship is *not* training for teenage youth (Reubens and Harrisson 1980, p 10). Although no comprehensive information on the age of American apprentices is available, existing data indicate that the average age of a beginning building trades apprentice is 22 to 24 (Green 1976, pp. 209-10). In certain manufacturing industries in which apprenticeships are available only to existing employees on a competitive basis and are allocated at least partly by seniority, the average age of a starting apprentice is likely to be quite a bit higher (Glover 1982, p. 180). By contrast, in most other countries, an apprentice older than 20 is rare, and in fact, in some countries it is illegal to indenture anyone over 20.

Such a major difference in the age of apprentices has important implications in comparing apprenticeship practices internationally and making recommendations regarding transferability In most other industrialized nations, apprenticeship—as a work-study arrangement for *teenagers* who have left full-time school—functions as a device to smooth the transition from school to work. In America, apprenticeship has become largely a program for providing upgrade training to *adults* who are already employed.

The age difference also raises fundamental questions: Is apprenticeship in the United States really comparable to apprenticeship in other countries? Alternatively stated, might American apprenticeship better correspond simply to industrial training practices in other countries? Or might American apprenticeship best be compared with the initial training offered in foreign apprenticeships *together with* the training offered in programs of "further training" or "advanced training" sponsored by industry in other nations?

Also, the difference in the age of apprentices raises the issue of training content Exactly how does the content of what is taught in U.S. apprenticeship compare with what is taught in apprenticeship in other Nations? Unfortunately, such an international analysis of training content could

not be found in our search of the available literature to date Conducting a content analysis is complicated by numerous factors, not the least of which are differences in the way that occupations are defined in various nations Thus this task is beyond the scope and resources of the present study However, such a content analysis o'ght to be undertaken as a primary order of business if any further work on international comparisons or transferability of apprenticeship practices is envisioned

Common Criticisms of Apprenticeship

Apprenticeship has had no shortage of critics; much of their criticism is quite familiar across the industrialized world. For example, in England, Parkin (1978) and Lee (1979) noted, apprenticeship had become commonly perceived as tradition-bound. Hampson (1985, p 12) reported that British use of apprenticeship declined because apprenticeship "got very rigid" and became "very expensive" as a result, in part, of high rates of pay for unskilled apprentices Further, he pointed out that the heavy industries in which apprenticeship was best established have collapsed recently

Even in the Federal Republic of Germany, where apprenticeship is so well establisned that it has been copied by several other countries, apprenticeship has its share of critics (Reubens 1973) Such critics have charged that the dual system constrains children aged 10 or so and their parents by requiring them to decide future career paths in generally irreversible ways Because such a decision must be made so early, parents' social class tends to have an undue influence on the educational path that their children take. Thus, social mobility is impaired. Second, the system has failed to provide equal job opportunities for women, and, especially, for the sons and daughters of foreign workers. Third, the quality of training available through the dual system varies considerably by firm. Although many smaller firms provide good training, others do not, the latter seek apprentices primarily as cheap labor. Finally, because the system is not driven by labor market demands and because the employer and apprentice have no commitment to each other upon completion of the apprenticesnip, the graduating apprentice faces an uncertain employment future. (Glover 1981, p. 23).

Reubens (1979) decries what she perceives as "union control" of apprenticeship, a characteristic she finds especially prevalent in English-speaking countries. Many unions have taken a keen interest in American apprenticeship; without their support, apprenticeship in the United States would be much diminished Reuben's criticism fails to recognize that many union interests in apprenticeship are consistent with the public interest For example, unions advocate the use of broad and transferable training. Further, unions do play key roles on tripartite councils in many non-English-speaking nations.

Reubens also has lamented that apprenticeship in the United States is not more directed at youths (Reubens 1979). In part, her willingness to criticize apprenticeship for not doing more to alleviate youth unemployment problems stems from her view that skill shortages are not a National problem in the United States. Indeed, she alleges that the Un ted States has had "only brief and local experience with such shortages" (Reubens 1981, p. 22). Reubens shares this view with her mentor, Eli Ginzberg (1979, pp. 119-21).

Thus, from this perspective, relieving skill shortages cannot be an important National role for American apprenticeship—an opinion that clashes sharply with the viewpoint commonly expressed by those who tesified during the 1983 Congressional Oversight Hearings on the National Apprenticeship Training Act (U.S. Congress 1984). The Reubens-Ginzberg view on labor

shortages in the United States also contrasts significantly with several careful studies of supply-demand conditions in labor markets for such apprenticeable crafts as the machine trades (Rosenthal 1982, Louis Harris and Associates, Inc. 1982).

In a major survey of apprenticeship policy across several nations undertaken for the Organization for Economic Cooperation and Development (OECD), Reubens concluded with a statement quite critical of apprenticeship, advocating instead consideration of "other forms of training by employers and education-based systems which combine work and study" (Reubens 1975, p 82) Later, she observed that although apprenticeship and vocational education are in competition, both are becoming more congruent in that apprenticeship is providing "an enlarged role for related theoretical studies," vocational education "increasingly includes a practical component in a firm" (Reubens 1979, p 5)

However, as the theoretical component of jobs increases, according to Reubens, school-based training has inherent advantages over apprenticeship, and thus, the use of apprenticeship should decline (Reubens 1975, p. 82). Numerous other observers have reported or predicted a decline in the use of apprenticeship for various reasons. In his classic book, *American Apprenticeship and Industrial Education*, Douglas (1921) reported the demise of apprenticeship in America in the early 20th century Nine years later, William Haber described the "breakdown of the apprenticeship system" (Haber 1930). Strauss agreed, adding that technological progress deskills craft work and eliminates the need for many broadly skilled journeymen (Strauss 1965, pp 314-15) In this view, he repeated a point attributed to Paul Douglas:

> The division of labor was the real destroyer of apprenticeship Industry developed so many subdivisions that all-round training was expensive and useless. Modern industry does not require a large percentage of all-round skilled men. (Schuster 1959, p. 109)

Yet despite all the criticism and unfavorable appraisals by academics and public policy analysts, apprenticeship has stubbornly persisted and actually thrived in certain occupations, industries, localities, and countries. Further, to cope with new patterns of work (including worker participation schemes) and increased international competition, the need for all-round highly skilled workers is once again seen by many as vital to American industry (U S Congress, House 1984)

Strengths and Deficiencies of American Apprenticeship

American apprenticeship reflects the advantages and disadvantages inherent in the apprenticeship concept, such as the following.

- It offers learners the opportunity to earn while they learn, according to a progressive pay scale that automatically increases as their skills improve This is especially important to learners who cannot afford to leave the labor force to enter training in a school or institution.

- As a training scheme combining work and study, American apprenticeship offers the pedagogical advantages of blending theoretical and practical learning By its nature, apprenticeship involves learning *how to do* a task by performing on the job and *why a task is done that way* in related instruction.

- By offering learning in a paid on-the-job setting, apprenticeship can motivate certain learners who may not respond well to classroom learning offered alone

- Apprenticeship helps ensure that up-to-date equipment actually in use on the job is used in training The danger of ering training on out-of-date equipment is consequently lessened

- By design, apprenticeship trains for the industry rather than for the individual firm Apprenticeship can be conducted only in occupations recognized throughout an industry and according to National standards In practice, however, existing American National standards for apprenticeship are not compelling or sufficient to enforce industrywide training

Additional advantages derive from the peculiarities of American apprenticeship practices For example, U.S apprentices are employees who, if they successfully complete their training, will have the opportunity to remain with the apprenticeship sponsor. Indeed, they are expected to do so American apprenticeship sponsors shun workers who are likely to leave their work force before training costs can be recouped Thus, career placement is often a built-in feature of American apprenticeship Although most would consider this feature a strength, it is also the characteristic that makes American employers tend to choose to train only workers who "are mature and settled down" or "have proven themselves with the firm " Employers in America have tended to avoid apprenticing teenagers recently out of school, reportedly because such youths tend to be unstable workers with high rates of turnover, thereby adversely affecting productivity and program costs

American apprenticeship has weaknesses as well as strengths Briefly, some of the major deficiencies are as follows

- **Variable quality of training offered**—The quality of training offered in apprenticeship is highly variable across various trades and localities At one extreme, some U S. apprenticeship programs rank among the best occupational training programs in the world—offering broad, well-rounded training in all aspects of the craft But others are underfinanced, semistructured, or rigidly tradition-bound with obsolete curricula Some programs offer training that is narrow and firm-specific. Some suffer from inordinately high rates of noncompletion. Some programs, especially in small towns and rural areas, have inadequate or nonexistent related theoretical training because there are too few learners to make classes economically feasible

- **Inadequacies in the administration of apprenticeship**—Apprenticeship in America is voluntary partnership between labor and management, between private industry and public agencies, between departments of labor and departments of education or vocational education, and between the Federal government and the States It also currently exists without clear leadership

- **Inadequate numbers trained**—American apprenticeship tends to produce inadequate numbers of skilled workers. Although individuals who do complete apprenticeship training have a high assurance of maintaining employment related to their training, there are often too few trained to meet full labor market needs Also, as is characteristic of all employment-based training, apprenticeship tends to be sensitive to fluctuations in unemployment (Farber 1967, Dufty 1967). Finally, perhaps because apprenticeship is viewed as a more expensive source of skilled workers than pirating workers from competitors and because there is little in the way of public subsidies or financial incentives for employers to offer apprenticeship positions, relatively few employers train apprentices and the use of apprenticeship in America is confined to a narrow range of industries and occupations

- **Concerns about the cost-effectiveness of apprenticeship**—Apprenticeship training is perceived by many employers to be an expensive proposition that does not pay off. This may be one of the underlying causes of the alleged inadequacies of numbers trained in apprenticeship, as discussed previously.

- **Inadequate financing for certain apprenticeship programs**—During periods of prosperity, certain apprenticeship programs in the United States are well financed—especially some of the programs that are jointly administered by employers and unions. However, recessions adversely affect funding for most apprenticeship programs, and numerous programs are simply underfinanced all of the time. Funding from vocational education and other public sources varies considerably from State to State and fluctuates over time. Yet apprenticeship advocates in the private sector are reluctant to endorse expanded public financing of apprenticeship, fearing that increased public control of apprenticeship will accompany the funding.

- **Limited access to apprenticeship**—Effective equity in access to apprenticeship has been a problem in the United States. As profit-maximizers, employers tend to hire those whom they perceive to be the easiest to train or the quickest learners or those who will best "fit in." While most sponsors of apprenticeship in the United States see apprenticeship training as a regular cost of doing business, few include remedial training as a normal part of industry responsibilities. This viewpoint can lead to exclusion of the disadvantaged, handicapped, youthful or aged, or otherwise nontraditional apprentice.

- **Unclear role and relationship to other training**—Because the role of apprenticeship in the American "nonsystem" of training is ambiguous, its relationships to other training have been obscured and left to chance and local circumstances. For example, it is not clear what role, if any, apprenticeship should play in remedying teenage unemployment.

Of course, these issues are highly interrelated. For example, lack of proper financing is related to the variable quality of apprenticeship found across the United States. In turn, problems of inadequate financing of apprenticeship—leading to the underutilization of apprenticeship and inadequate numbers trained—may stem from perceptions about the cost-effectiveness of apprenticeship. Inadequacies in the number of apprenticeships offered compound the problems of access for the disadvantaged, women, and minorities. Yet ill-advised efforts to promote the number of available apprenticeships can result in a dilution of the quality of training, as the example of Italy well illustrates. Overarching all these issues is the confused state of apprenticeship policy in America. Lack of clarity regarding the appropriate role of apprenticeship in the American training "system" increases the problems of apprenticeship administration. The problems are further compounded by a lack of understanding of the nature of apprenticeship by many educators, employers, and the general public.

The remainder of this work focuses on these seven identified deficiency areas, seeking possible solutions through an examination of promising practices that might be transferred from other advanced, industrialized, market economy nations or from exemplary practices already in place in the United States.

There exists a rich diversity of outstanding American apprenticeship practices that are not well known to many, in part because we currently lack effective means to foster awareness, dissemination, and replication of successful innovations. Any effort to improve American apprenticeship should not neglect demonstrated successes in this country. Whereas successful foreign practices may not transfer well because of cultural, political, or philosophical differences, exemplary American practices have proven their ability to thrive on American soil.

VARIABLE QUALITY OF APPRENTICESHIP TRAINING

Maintaining and improving the quality of training is the single most important issue in American apprenticeship because it underpins all other issues. Achieving more apprenticeship training slots becomes meaningless if expansion of the system comes at the sacrifice of quality. Without high-quality training, equity of access is not a concern; why worry about women or minorities not entering apprenticeship if it fails to produce positive results for them? Nor would it matter how apprenticeship is administered or financed. Without high quality, cost-effectiveness becomes a matter of cost without effectiveness. Maintaining and improving the quality offered through apprenticeship training is also a key element in assuring that the welfare of apprentices is safeguarded—which generally has been the central reason why government has become involved with apprenticeship in the first place. In short, the quality of training in apprenticeship simply is a pivotal issue in apprenticeship training.

Defining Quality in Training

Unfortunately, it is much easier to cite the need for high-quality training in apprenticeship than it is to define quality, let alone measure it. In the United States, the Bureau of Apprenticeship and Training (BAT) in the U.S. Department of Labor has struggled for years with the issue of how to assess the quality of registered apprenticeship programs. Further, the quality of apprenticeship has been the subject of at least one Labor Department research project (U.S. Department of Labor 1970) Defining a minimum threshold of quality is the key to determining whether a program qualifies for registration. In practice, the 22 standards elaborated in the *Code of Federal Regulations* (29 CFR 29.5) regarding apprenticeship programs provide guidance to Federal and State field staff regarding the required minimums. However, these standards relate mainly to equal opportunity assurances, provisions to protect the welfare of apprentices, and administrative matters such as record keeping.

It is useful to move beyond the *minimum* standards to consider the question. What constitutes an *exemplary* training program?

Drew and others compiled a 63-point checklist of essentials of an optimum training system in apprenticeable occupations (U.S. Department of Labor 1970, p 19). The checklist was organized into seven categories: (1) training system (i.e., program administration), (2) recruitment and selection, (3) training process, (4) apprentice agreement, (5) facilities, (6) public relations, and (7) research. More than half of the items on the checklist related to the training process.

In addition to those elements enumerated by Drew or in U.S. apprenticeship regulations, other potential indicators of quality come to mind. One available quantitative indicator is the *apprentice completion rate* demonstrated by the program. Apprentices who enter exemplary programs tend to have relatively high rates of completion, thereby indicating high satisfaction with the training received as well as effective action by apprenticeship sponsors to maintain continuity of training during recessionary periods.

Measuring Quality in Training

One approach to measuring quality in training is simply to monitor programs, using a checklist such as the ones provided by Federal regulations or by Drew Presumably, the higher the proportion of checks received by a program, the higher quality training it provides This procedure presents at least two significant difficulties:

- It may be impossible for an outsider to determine whether or not a given program possesses a given characteristic. To borrow an example from the Drew listing, determining whether "In on-the-job training, adequate job rotation is provided through jobs that provide a challenge" may be a tough task. An undisclosive sponsor can foil all but the most persistent investigator. Thus, checklists of program characteristics may be best suited to self-evaluation.

- More fundamentally, the program inputs assessed by the checklists may not affect program outputs. In other words, the observed characteristics of the program may not make any difference To use the same example from Drew, having adequate job rotation through a series of challenging jobs does not ensure that teaching and learning are taking place.

Two Australian researchers were able to circumvent these problems in large part by asking completing apprentices a series of structured questions about the characteristics of the training they actually received. Among one group in Sydney, 72 percent agreed that they had been rotated systematically on the job through most aspects of their trades However, among those who had not received initial training in a school,

> a large percentage (45.0) had largely been left to their own resources to engage in "discovery learning in its worst context, that is, finding out for themselves by watching others and asking questions where they were sufficiently motivated. Another 45 percent had received instruction on the job, 20.9 percent of these from the foreman and 14 6 percent from a tradesman. Only 7.5 percent had learned by the old established method of apprenticeship, i.e., by working with or under one tradesman and learning specifically from him. (Richardson and Clayman 1974, p. 15)

Although it is useful and revealing to examine the character and extent of training that occurs in apprenticeship, this approach is limited to process evaluation that attempts to identify exemplary programs by examining the characteristics of the programs themselves An alternative approach is outcomes evaluation, that is, examining the performance of the individuals trained by the program compared with that of a control group.

Perhaps the ultimate indicator of quality is the *productivity gains* achieved by the individuals trained through apprenticeship. However, measuring productivity is a complex task, especially when products are jointly produced (as they are in many industries) Further, in some crafts, performance may be measured best in terms of what journeymen do *not* have to do rather than what they do. For example, factory maintenance mechanics who are able to have a leisurely work routine because they keep all the machinery running perfectly through preventive maintenance are certainly performing better than those who work extremely hard and long on crisis repairs that could have been avoided.

Even when an individual's productivity can be accurately assessed, it is extraordinarily difficult to prove conclusively that the productivity was *caused* by the person's apprenticeship training It

could be due to the person's innate ability, to educational advantages, to training the person undertook either before or after the apprenticeship, or to a wide array of other factors Note that these are general problems in proving a cause-and-effect relationship between productivity and any particular training

Where productivity cannot be accurately measured, performance on the job may be assessed by *supervisory ratings* Several studies have used this evaluation technique to try to ascertain the quality of apprenticeship training as compared with other training modes (Horowitz and Hernstadt 1969, Johnson 1981) Another means of assessing on-the-job performance is to compare the *job safety records* of individuals trained in apprenticeship with those of others

Exemplary apprenticeships are said to lead to well-paying jobs, characterized by steady employment and upward mobility for those who desire it. Exemplary apprenticeships provide initial training that is a gateway to a career rather than just a job Thus the quality of apprenticeship should be evident in various measures of *employability, earnings*, and *career advancement* In the American construction industry, where apprenticeship is best established, a strong association between the completion of apprenticeship and stability of employment, as well as advancement to supervisory positions, has been demonstrated in several studies (Marshall, Glover, and Franklin 1975, Collins 1973)

Exemplary apprenticeships convey a broad array of transferable skills, useful with a cross section of employers Exemplary apprenticeships turn out skilled workers who have portable skills (just as the traditional name for completers—*journeymen*—implies); completers of apprenticeship have the appropriate certification and skills to move to any geographic location in the National (or international) labor market and work at their trades Further, they have essential skills that prepare them to adapt to changes in technology or the marketplace, so common in modern economies Thus, *transferability of apprenticeship training and adaptability of apprentice completers* to change offer other possible indicators of the quality of apprenticeship training

As an alternative to measuring quality of training by performance on the job or in the labor market, one can assess the effectiveness of training through examining scores of *tested competence* In France, in 1962, among those sitting for CAP examinations, the pass rate was 70 percent among those trained in a full-time public vocational school as opposed to 45 percent of those trained in traditional apprenticeship (which included part-time vocational school and in-plant training) and 73 percent for those trained in apprenticeships with interplant training workshops (i.e , company schools) (International Labor Organization 1966, p 210) Given the prevalent use of trade examinations in other nations, it may be possible to obtain other such information comparing alternative training methods.

In the United States, there is some evidence that apprenticeship graduates do well compared to individuals trained in other ways. For instance, completers of apprenticeship have demonstrated much higher pass rates than others on a nationally well-regarded set of practical and written trade examinations used to license plumbers by the Texas Board of Plumbing Examiners (Marshall et al 1975, p. 146). But detailed research on the performance of apprentice completers, as compared with specific groups, such as graduates of postsecondary vocational programs or of training in the military, was not undertaken.

The preceding discussion explains how quality in apprenticeship training may ideally be defined and measured using outcomes variables. Unfortunately, very little literature on international apprenticeship practices measured the quality of apprenticeship programs by outcomes—especially as compared with the performance of control groups in alternative training schemes

Thus, in discussing quality of training, one is left with describing practices that are favorably regarded in the literature and that make intuitive sense. These include such matters as improving (1) the uniformity and transferability of apprenticeship training, (2) instructor training and certification, (3) training methodologies (4) curriculum development techniques, and (5) certification of apprentice competence.

Improving Uniformity and Transferability of Apprenticeship Training

Because American apprenticeships vary considerably in quality and because the risk of firm-specific training is significant, methods of promoting uniformity and transferability of training are important to American apprenticeship.

A key to attaining uniformity in training is achieving agreement on what to teach In some industries, this can mean negotiating uniformity in the content of occupational classifications. In Germany, primary emphasis is placed on consolidating and broadening training in apprenticeship Five of the 11 criteria for determination of an apprenticeable occupation deal in some way with the promotion of broad training. (In contrast, none of the four criteria used in the United States say anything directly about broad training.) One of the major functions of the advisory bodies to the West German Federal Institute of Vocational Education (BIBB) has been to negotiate consolidation of apprenticeable occupations. From 1971 to 1980, the number of apprenticeable occupations in Germany dropped from 606 to 451. During the same time period in the United States, the number of recognized apprenticeable occupations rose from 450 to 723, and the minimum number of hours required for apprenticeship was lowered from 4,000 to 2,000 (Glover 1981)

Interestingly, during the same period, a development was occurring in the American electric sign industry that ran counter to the general trend toward specialization. Like many American industries in the mid-1970s, the electric sign industry found itself plagued by a proliferation of narrow, specialized job descriptions. Although the work processes were basically similar nationwide, each firm divided the work into its own individual job descriptions. In fact, a study of the industry conducted during 1973-74 revealed over 80 job categories in use across the country, many of which were overlapping in nature (National Electric Sign Association/Tri-Trades Committee 1974) Often, job categories were the same or substantially similar but were called by different names

Thus, in July 1974, representatives of the National employer association, the National Electric Sign Association, and the three international unions involved—the International Brotherhood of Electrical Workers, the Sheet Metal Workers International Association, and the International Brotherhood of Painters and Allied Trades—met to devise a way of standardizing the job descriptions. As a result of the meetings, the 80 job classifications were consolidated into 18 classifications, which were subsequently adopted by the industry as a National standard.

The advantages of such National industry negotiations are significant for employers and workers alike. Adopting uniform job classifications and job assignments facilitates the development of National training programs that can produce competent journeymen in numbers sufficient to meet the needs of the industry. Standardizing occupations helps assure transferability of training and facilitates the flow of mechanics from one shop to another, or from one locality to another, as work loads shift. Workers have assurance that their training will be useful in other firms and other places, should they be laid off.

In order to improve the uniformity and transferability of training, a few trades in America have undertaken activities at the industry level, often using National training trust funds, as will be discussed later. These National activities have been a leading impetus in bringing improvements to apprenticeship. The experience in the sheet metal industry is especially instructive.

With workers who were highly mobile geographically, the industry found it difficult to cope with the wide diversity of the content and quality of local training practices around the country Industry leaders reasoned that a sheet metal worker trained in Jackson, Mississippi, who moved to San Francisco, California, ought to be able to work productively as a sheet metal worker in both places. Therefore, they organized to improve training and to promote nationwide uniformity of training. A key principle was to try to bring weaker programs up to the standards of the best

A National training trust fund was established in 1971, entitled the National Training Fund of the Sheet Metal and Air Conditioning Industry (NTF). It was jointly administered by the Sheet Metal Workers International Association (SMWIA) and the corresponding employers association the Sheet Metal and Air Conditioning Contractors National Association (SMACNA). A National curriculum was developed with input from workers and employers from all areas of the country To upgrade the equipment used in training, a loan/grant program was started. Through the loan/grant program, funds for purchasing equipment were made available to any local affiliate program with its own training facility. Local programs in need of a loan to buy equipment were provided one. Smaller local programs in rural areas without sufficient financial capacity to repay loans were offered grants for purchasing equipment. When National industry officials decided that they needed to upgrade the training offered in welding, they commissioned the development of new instructional materials, including a pathbreaking series of training videodiscs demonstrating welding techniques. They also bought five mobile semi-trailers and filled them with the latest welding equipment. These semi-trailers have been scheduled year-round for special training sessions, held where needed around the country.

Largely at the urging of NTF, many local committees have begun to address training needs beyond apprenticeship. They now offer opportunities for journeymen workers to update or upgrade their skills. There is increased recognition in the industry that training is indeed a lifelong necessity. NTF has developed curricula for the continuing training of journeymen in such specialty subjects as welding, architectural sheet metal, food and beverage dispensing equipment, energy management, and other advanced studies (National Training Fund 1983).

National industry-wide institutions such as NTF have also helped many local apprenticeship and training committees become more forward-thinking. NTF has financed forecasts and other studies of future skill needs of the industry. For example, it has been closely monitoring employment requirements in the solar energy field. Also, in response to growing concern for energy conservation, it has developed and put into place a training program for energy auditors—technicians who can examine or audit existing buildings and make recommendations for retrofitting them to improve energy efficiency.

Improving the Quality of Instructor Training and Certification

In America, certification of instructors is a hodgepodge of criteria and procedures, which vary significantly from State to State. There are a few bright spots, however In 1973, NTF contracted with the National Center for Research in Vocational Education at The Ohio State University to design and provide training for the industry's apprenticeship instructors. During the first dozen

years, more than 2,000 instructors and apprenticeship coordinators had been trained The training embodied teaching techniques and special technical courses in areas such as welding, solar energy and testing, adjusting, and balancing of environmental systems

In addition to the contracts with The Ohio State University (for instructors of related training in the sheet metal industry and also in the insulation industry), there exist programs at Purdue University (for instructors of related training in the pipe trades), a few exemplary regional efforts conducted by Texas A & M University Engineering Extension Service and The Pennsylania State University, and statewide training programs in California, Maine, Indiana, and Pennsylvania (Rice 1982, p. 14) Also, in the summer of 1985, the International Masonry Institute began offering training to instructors in the trowel trades. Beyond these efforts, there has been little systematic training of apprentice instructors in the United States. Training of on-the-job instructors and of apprenticeship coordinators has been almost totally neglected.

The Federal Republic of Germany offers a good illustration of what can be accomplished with instructor training. Germany tests and certifies as masters those individuals responsible for the instruction of apprentices on the job and in related training. The tests, which are uniform nationally, contain written, oral, and practical components, covering knowledge of the trade as well as the ability to teach (Norton and Butler 1981). Some critics have complained that the German system of certification is too formal and rigid, but it does help to assure the high-quality training of apprentices, as well as conferring a widely recognized status on the instructor.

Good examples of instructor training programs can be found in other countries, too. A special instructor training service of the Irish Training Authority (AnCO) trains and certifies instructors and training managers for industry (European Centre 1984b, p. 285). In Japan, instructor training is a primary function of the Federal Institute of Vocational Education, which trains instructors both for public vocational schools and private industry. The Institute offers "long-term" 4-year courses, "short-term" 6-month courses, and various update training courses, as well as correspondence courses for overseas instructors (Cantor 1985).

Improving Training Methodologies

With the advent of competency-based training and criterion-referenced testing, significant advances have been made in the methodology of training and testing and are worth noting by the apprenticeship community worldwide. However, some employers in America use the term *competency-based training* as a mask for reducing the scope of training delivered Unions have resisted this effort to move toward specialty training and away from the all-around broad skill-training apprenticeship that has traditionally characterized apprenticeship. The competency-based approach to training and the narrowing of the scope of training must be recognized as separate issues.

In America, several trades have moved away from simple time-based training toward competency-based training. For example, most carpentry apprenticeship programs now use a form of competency-based training entitled the Performance Evaluated Training System (PETS). PETS is a method of using a competency-based, modularized approach to training that does not compromise on breadth of training yet has the flexibility to adapt to the different sets of skills demanded of journeymen carpenters in various localities. The PETS curriculum contains a total of 70 skill blocks organized into 7 sections. To achieve journeyman status, an apprentice must complete all the core skill blocks in section 1 (including job safety, use of tools, industry orientation, and so forth) as well as any 80 percent of the skill blocks in each of the other 6 sections, for a total

of at least 52 skill blocks out of the 70 required for completion (Kelley 1981, p 23) After completion, an apprentice can return to learn any of the remaining skill blocks as part of journeyman upgrading courses

Similar approaches have been introduced in European apprenticeship programs under various names, including *modular training* and *training by stages* (Somers 1972; Hayes and Wheatley 1979), and everywhere, concerns about such innovations have been similar. For example, trade unionists in Britain were not convinced that competency testing could be a complete substitute for a defined period of apprenticeship. Further, they feared that "any change that resulted in the shortening of the period of apprenticeship might lead to a decline in craft standards and consequently a decline in the status of craftspeople" (Booth 1980, p. 14).

Improving the Quality of Curriculum Development and Update Techniques

Considerable advances have been made in the methodology of curriculum development One example is the DACUM (**D**eveloping **A** **C**urriculu**m**) process of occupational/job analysis DACUM was created initially during the late 1960s in a joint effort by the Experimental Projects Branch, Canada Department of Manpower and Immigration, and the General Learning Corporation, which provided technical direction to the Women's Job Corps Center at Clinton, Indiana. The system was subsequently improved by use in the Nova Scotia NewStart, Inc.; Holland College in Charlottetown, P.E.I. Canada; and the National Center for Research in Vocational Education. DACUM has been used extensively to provide a basis for vocational training in Canada and the United States, promoted by such organizations as the National Center for Research in Vocational Education and the Center for Occupational Research and Development. DACUM involves bringing together 8 to 12 expert workers in a given occupation (occasionally with 2 to 4 supervisors) for a 2- to 3-day workshop with a faciliator to define the tasks that successful workers in the occupation perform.

In New Zealand, the Vocational Training Council procedures call for a review of the apprenticeship curriculum in each trade at least once every 3 years. If deficiencies are identified, a subsidy from the National Training Development Assistance Fund may be available to improve or update curricula or design new training, upon application by the appropriate Industrial Training Board. These subsidies must be matched by private funding, which gives industry a financial interest in the outcome. In apprenticeship, a pilot project was undertaken to develop training for eight trades in the printing industry. An occupational analysis was performed using both the DACUM method and the traditional survey method. Both yielded the same results, but DACUM cost half the price Thus, the Vocational Training Council plans to use DACUM to update and improve apprenticeship in other industries in the future (telephone interview with Derek Wood, Director, New Zealand Vocational Training Council, June 21, 1985).

Making certain that apprenticeship curricula are up to date is a continuing issue. Some progressive apprenticeship trades in America with National curriculum materials have procedures to update materials every 3-4 years, beginning with a process similar to that used in DACUM.

Improving Certification of Competence

Although comprehensive final examinations for completing apprentices are rare in America, they are commonplace elsewhere. Trade examinations have two roles: first, they offer a means of controlling the effectiveness of training, and second, they provide a means for apprentices to obtain a nationally recognized qualification (International Labor Organization 1966). The first role

should not be underestimated. In many countries, if apprentices in a given firm begin to exhibit high rates of failure, the training provided by the firm is monitored If it is found deficient, authorization for hiring apprentices can be withdrawn. In Germany, if an apprentice fails to pass, the lagging employer sponsor can be penalized by the employer association (chamber) for inadequately instructing the youth.

A few American industries have adopted National programs of testing and certification The American Welding Society has a long-established program that tests and certifies craftworkers in va ious types of welding at different levels of skill. In 1972, the automotive service industry established the National Institute for Automotive Service Excellence (ASE) to offer a program of voluntary testing and certification of automotive technicians on a fee basis. Paper-and-pencil tests in 16 areas of proficiency are regularly given twice per year. Those who pass the tests are given certificates suitable for display in customer waiting areas. These certificates, which are valid for 5 years, may be revalidated by taking a shorter exam; this helps to ensure that the mechanic stays up-to-date with modern repair practices. Entirely initiated and sponsored by industry, ASE has made significant strides in involving vocational educators in its activities. Although a worthy effort, the ASE program is not widely known among the motoring public, and thus few garages and customers place much emphasis on the certificates. An even more telling criticism is that because the exams are confined to pencil and paper, they may not adequately measure performance on the job.

Tests during apprenticeship are also an important element of training In the United States, the Operating Engineers have made some improvements by developing criterion-referenced tests But testing, in general, remains an area needing further attention in apprenticeship

INADEQUACIES IN THE ADMINISTRATION OF APPRENTICESHIP

Apprenticeship activity in several States (including Wisconsin, Oregon, Kentucky, California, and Vermont) predated Federal interest and involvement. Moreover, prior to passage of the National Apprenticeship Act in 1937, 45 States had created State apprenticeship committees at the urging of the Federal Committee on Apprentice Training established under the National Industrial Recovery Act of 1933 (U.S. Congress 1937, p. 5).

An Incomplete Federal-State System

However, State interest in apprenticeship subsequently lagged; by 1985, only 28 States, Puerto Rico, the Virgin Islands, and the District of Columbia had State or territorial apprenticeship agencies (commonly referred to as SACS) that were recognized by the U.S. Department of Labor under "Labor Standards for the Registration of Apprenticeship Programs" (29 CFR Part 30). In addition, New Jersey has an apprenticeship agency, but as it is housed in the State Department of Education, which has no authority over labor standards on the job, the U.S. Department of Labor has withheld recognition of the agency. Thus, 22 States do not have a recognized State apprenticeship agency. Further, many SACs have insufficient funding to carry out their responsibilities. In States without an apprenticeship agency or with ones meagerly funded, the Federal BAT generally has filled in, providing staff and financing to carry out the functions of administering apprenticeship.

Strengthening existing SACs and establishing SACs in all States have been matters of long-standing concern and debate within the American apprenticeship community. In 1973, a paper entitled "New Initiatives in Apprenticeship" was authored by BAT staff in conjunction with a major National conference of practitioners designed to reinvigorate apprenticeship and convened by Secretary of Labor Peter Brennan. The paper recommended a study of Federal funding to strengthen SACs, establishment of SACs in all 50 States, and possible reimbursement for certain activities undertaken by SACs. Conference attendees concurred with these recommendations. In May 1975, BAT administrator Hugh Murphy issued Circular 75-23 reemphasizing the bureau's policy of promoting the establishment of SACs in all States and Territories. Likewise, the Federal Committee on Apprenticeship (FCA) conditionally recommended that State apprenticeship agencies be established in all 50 States, provided that—

- State and Federal apprenticeship procedures were standardized with enforcement by the Federal government;
- State laws were adopted to be consistent with Federal apprenticeship standards, and
- an acceptable plan for financing the State agencies was established. (Lyndon B Johnson School of Public Affairs 1980, p. 4.)

Yet, despite all the pronouncements, publications, and discussions, no new State apprenticeship agencies have been established since 1967, when Rhode Island set up its agency Indeed, if

anything, the trend is in the opposite direction Since 1983, Utah has dropped its agency, Florida has eliminated funding of its State apprenticeship council, Colorado and New Mexico have considered withdrawing funds for their State apprenticeship agencies, and the Washington State legislature levied a "user fee" on registered apprenticeship programs to pay for the apprenticeship agency. The user fee was abandoned in 1984 because it significantly reduced the number of registered apprentices. Minnesota passed similar legislation, but it was vetoed by the governor

The contradiction between rhetoric and performance can be traced to several causes Because apprenticeship is a voluntary system of training that is privately sponsored and primarily privately financed, State apprenticeship agencies are established at the initiation of industry leaders within the State (Lyndon B. Johnson School of Public Affairs 1980). Yet, in many States, industry leaders simply have not taken the lead in establishing apprenticeship agencies. In some States, the issue of establishing a State agency has been neither raised nor seriously considered by industry officials. Industry officials in other States have considered the matter and rejected it. The State of Michigan offers a good case in point. Michigan industry officials (led by the automotive manufacturers) have opposed creation of a State agency because they prefer to work with the Federal BAT. Of particular concern is that many apprenticeship sponsors with multistate operations find it easier to deal with a single registration agency rather than several on a state-by-state basis.

Second, although the official position of BAT favors creation of additional SACs, BAT field staff in certain areas have opposed the creation of State agencies, fearing that their jobs would be complicated by the establishment of what could be a competitive organization.

Third, part of the reason for a lagging interest in apprenticeship on the part of the States has been the lack of Federal incentives offered, in contrast with other Federal legislation. Other legislation has given States strong incentives to create agencies and establish programs for vocational education (under the Smith-Hughes Act of 1917), vocational rehabilitation (under the Civilian Rehabilitation Act of 1920), employment services (under the Wagner-Peyser Act of 1933), and unemployment insurance and workers' compensation (under the Social Security Act of 1935) Yet the National Apprenticeship (Fitzgerald) Act of 1937 merely authorized the Secretary of Labor to "cooperate with state agencies for the formulation and promotion of standards of apprenticeship" (50 Stat. 644; 29 U.S.C. 50). The one-page Fitzgerald Act gave States neither encouragement nor financial incentives to get involved with apprenticeship.

Fourth, in some States there is concern that if an apprenticeship agency were established, it would be lodged within the State department of education rather than within the State department of labor or with the State labor commissioner. This is viewed as an undesirable and illegal outcome because departments of education do not administer wage and hour laws and thus are seen to have no authority over the on-the-job portion of training (which in most American apprenticeships constitutes 90 percent or more of the time spent in training). On the other hand, if the State apprenticeship agency is not to be established under the State department of education or the State department of vocational education, these agencies often have opposed its establishment as duplicating their own responsibilities. This battle over turf creates a stalemate.

Finally, many State and industry officials perceive little advantage in establishing a State agency and supporting it from increasingly precious State funds and staff positions. In recent years, the proliferation of governmental agencies has become a matter of concern nationwide State officials are reluctant to establish another agency, especially one that they perceive will result in little benefit to the State. Also, many tend to associate apprenticeship with unions—rightly or wrongly—and because unions lack political strength in many States, the fortunes of State apprenticeship agencies suffer as well.

Remaining Issues

The key issues regarding federal-state relations in apprenticeship administration were outlined by the FCA in 1975 in the conditions applied to their recommendation that SACs be established in all 50 States. These issues involved apprenticeship administration under standardized procedures, consistency between State laws and Federal apprenticeship standards, and an acceptable plan for financing State apprenticeship agencies. Let us examine these three areas in greater detail.

Standardization and Consistency

In subsequent FCA deliberations, regulations governing the Federal and State administration of apprenticeship programs were formulated by the members of the Federal Committee on Apprenticeship. These regulations were implemented on February 18, 1977, basically in a form developed and approved by the FCA entitled "Labor Standards for the Regulation of Apprenticeship Programs." Published in 29 CFR Part 29, the regulations attempted to provide some standardization of apprenticeship procedures across all States and Territories. By design, the regulations established *minimum* standards for SACs and for sponsors of apprenticeship programs. Regulations of individual States could go beyond these minimum National standards.

However, in all the deliberation and debate over the publication of formal regulations, at least one question apparently was not answered adequately, namely: *Exactly what procedures, requirements, apprenticeship program standards, and policies should be standardized across all States and which matters should be left to State discretion?*

This question came into sharper focus in 1980 with the publication of a consolidated list of apprenticeable occupations by BAT. The specific issue at hand was the matter of deciding which occupations were to be apprenticeable. According to procedures in effect in 1980 under 29 CFR Part 29, any of the 32 State or Territorial apprenticeship registration agencies or BAT could individually interpret the four criteria for apprenticeability published in 29 CFR 29.4 and make a determination of which occupations were apprenticeable. Since the four criteria are quite broad and somewhat vague, they offered individual agencies considerable latitude in designating occupations to be apprenticeable.

As a result, an occupation declared apprenticeable in one State might be denied apprenticeability in another. Indeed, whereas BAT had traditionally considered approximately 450 occupations as apprenticeable, a consolidated tally of occupations recorded under State and National Apprenticeship Program System (SNAPS) record keeping in 1978 showed approximately 1,300 occupations to be apprenticeable. The list of 1,300 was examined closely by BAT staff, and occupations that did not appear to meet the four published criteria were discarded. Remaining were 723 occupations, which were published in the *Federal Register* on March 14, 1980, as a proposed list of apprenticeable occupations. Several occupations on the published list, such as pizza baker and tune-up mechanic, stirred considerable controversy within the FCA and the American apprenticeship community generally. Many thought these "trades" involved too narrow a range of skills to be considered apprenticeable. Also, tune-up mechanic was a part of the existing automobile mechanic apprenticeship.

The debate over the list revealed that underlying the apprenticeability issue was a significant federal-state issue—that under existing law and regulations, BAT lacked authority to enforce standards of any kind on State apprenticeship agencies. According to Department of Labor lawyers, the regulations in 29 CFR Part 29 do not confer to BAT or the Secretary of Labor any power

to enforce Federal apprenticeship standards on State agencies Indeed, the only leverage available to the Department of Labor is withdrawing or withholding recognition of State apprenticeship agencies. Is this sufficient Federal enforcement power to satisfy the Federal role in apprenticeship?

Acceptable Plan for Financing

Another major issue not yet adequately addressed is the matter of financing State apprenticeship agencies Over the years, various schemes have been proposed For example, the Lyndon B Johnson School of Public Affairs (1980) suggested a 50-50 federal-state matching arrangement, with the limit of allocations to each participating State based on the State's proportion of the National labor force employed in apprenticeable occupations. According to this scheme, Federal funds would be available only to States in which an acceptable written agreement was negotiated between the SAC and BAT. A similar, yet less detailed, arrangement for financing State agencies was offered in the proposed National Apprenticeship Act of 1979, but this measure failed to make it out of committee and thus never came to the attention of the full House or the Senate

Lessons from Abroad

No other advanced industrialized country in the world has an incomplete federal-state system for administering apprenticeship. America is unique in this regard.

At first glance, it seems easy to classify apprenticeship systems as either centralized—in such countries as Austria, Ireland, or New Zealand—or decentralized—in such countries as Switzerland, Australia, or Canada. But a loser look reveals that in every country, the picture is mixed. No matter how centralized apprenticeship is, certain administrative functions must be performed at the state or local level. Likewise, even when systems are highly decentralized, certain functions are carried out at the national level.

Decentralized apprenticeship systems face a common set of problems: assuring the portability of skill certifications, working effectively with multiplant employers, and disseminating apprenticeship information. For example, Canada, commonly regarded as highly decentralized, has established an Interprovincial Standards Programme Co-ordinating Committee and a process for negotiating "Red Seal" occupations for which apprenticeship completion certificates are accepted in all the provinces. It also finds it necessary to publish "The Ellis Comparative Chart of Apprentice Training Programmes," a booklet providing tables comparing training offered in different apprenticeships across the various provinces (Canadian Ministry of Employment and Immigration 1981) Australia, which is also highly decentralized, has found it necessary to establish an Australian Apprenticeship Advisory Committee, in part to "provide an information service for the circulation of ideas, information, and overseas developments covering all aspects of apprenticeship among the various apprenticeship and technical educational authorities" (Australian Department of Employment and Industrial Relations 1978).

Another feature of apprenticeship systems in other nations worth noting is the effective use made of tripartite councils in the administration of apprenticeship and training generally Such groups—involving representatives of employers, labor, and the public—are found in every country from Austria to Australia. These groups seem to function best when they are decision-making bodies with the strong support of professional staff.

In the United States, the Federal Committee on Apprenticeship was established as a tripartite group, but it lacks the independence and staff support to play an effective National role in American apprenticeship

The Need for a National Role in American Apprenticeship

All apprenticeship functions cannot be handled completely by States—even if apprenticeship agencies existed in all States The need for a Federal presence in American apprenticeship becomes clear when one examines three topics: (1) how apprenticeship is structured in the private sector, (2) how accreditation is handled in other American training systems, such as colleges and universities or proprietary trade schools, and (3) how important apprenticeship is to the National economy.

In industry, apprenticeship is primarily organized on a national-local basis More than 100 National organizations deal with apprenticeship, including National employer associations, unions, joint apprenticeship and training committees, National training trust funds, and National firms with facilities located in several States (Bureau of Apprenticeship and Training 1980). Many of these National organizations provide the leading impetus for progressive changes in apprenticeship State apprenticeship organizations exist typically only where there is a need to deal with a State agency or as a subdivision of a National body.

Other evidence supporting the need for a National role can be found in other American training and accreditation arrangements. Although many colleges and universities are operated by States, accreditation is performed on a regional or National basis (Young, Chambers, and Kells 1983). Likewise, private technical and trade schools have organized a nationwide scheme for accreditation through the National Association of Trade and Technical Schools (National Association of Trade and Technical Schools 1985). The National Home Study Council accredits correspondence courses. As indicated previously, the National Institute for Automotive Service Excellence and the American Welding Society operate National programs for testing and certifying the competencies of auto mechanics and welders. The Veterans Administration authorizes training for veterans, and the Department of Transportation approves training under the National Highway Act

Given the importance of training to the American economy in today's competitive world, greater National direction may be required in training. Noting the consequences of training for its National economy, the Federal Republic of Germany ascribed responsibility for vocational training to its federal government. Chris Hayes, in an assessment of the contribution of vocational training and eduation (VET) to economic performance in Japan, Germany, the U.S., and Britain, cited the lack of a national strategy for VET as an American weakness (Hayes 1985). Nell Eurich, in a recent survey of corporation training and education in America for the Carnegie Foundation for the Advancement of Teaching, concluded that

> the challenge is to create a pool of well-skilled and educated citizens from which society's requirements—including the economic—can be met for the future. Concerted action is called for from industry, labor, schools and universities, and the federal government. Such planning and projections cannot come effectively from separate states; their role comes in implementing and adjusting the programs within a great nation. No matter how appealing the new federalism may be, it abdicates leadership for America as a whole. (Eurich 1985, pp. 140-41)

INADEQUATE NUMBERS TRAINED

Both critics and advocates of American apprenticeship have long agreed that (1) apprenticeship in the U.S. does not turn out sufficient numbers of craftworkers and (2) apprenticeship is not used intensively over a wide array of occupations and industries. Critics view this situation as confirmation of their view that apprenticeship is an "anachronism in decline." On the other hand, advocates claim that underutilization of apprenticeship results in shortages of skilled workers—which, in turn, provoke inflationary pressures, diminish the quality of our products and services, impair our Nation's competitiveness internationally, and adversely affect National defense Commonly, these claims are made without supporting evidence. At best, on occasion, projected demand for craft occupations is simply compared with the anticipated number of future apprenticeship completions.

Apprenticeship is clearly used across a rather narrow occupational spectrum in the United States and trains only a portion of those individuals who enter these apprenticeable occupations. The implications of these facts are less clear. It is possible that both critics and advocates are wrong Evidence on the existence of skill shortages in the United States is mixed; better information is clearly needed on this point.

Perhaps the best informed discussion of the numerical adequacy of apprenticeship in the U S. construction industry can be found in Mills (1972, pp. 211-41). Mills correctly explains that judgments regarding adequacy depend on the objectives of apprenticeship. Further, he demonstrates that the functions of apprenticeship differ considerably by trade. Finally, he elaborates on the limitations and pitfalls of attempting to use available statistics to arrive at such a judgment, concluding that the task is nearly impossible to conduct on a National level with any precision, although it *may be* possible in certain areas with good sources of local data. Mills observes that if the purpose of apprenticeship is simply to produce a cadre of supervisors and key skilled workers for a given building trade, it may be entirely adequate numerically.

Basic questions that have not been adequately answered in the United States regarding the expansion of apprenticeship are simply, *Why*? and (if so) *Where*? (i.e., what industries, what occupations, and what areas?) and *How*? In arriving at answers to these questions for the United States, it is instructive to determine how other countries have responded to them

Why Expand Apprenticeship?

Skill shortages in apprenticeable occupations are a primary rationale for expanding apprenticeship. Historically, one stimulus to the growth of apprenticeship in this country was to replace immigration as a source of skilled labor. Today, to meet the needs of defense preparedness, apprenticeship may be needed to fill skill shortages in the defense contracting industry.

Other than to alleviate critical skill shortages, it can be argued that apprenticeship training should be expanded because it is a cost-efficient, effective mode of training workers in certain

occupations that yields more productive and better quality workers than alternative training methods. Apprenticeship turns out workers who are broadly skilled, more adaptable to change, more likely to undertake continuation training, and more likely to advance to supervisory status Moreover, it breeds more loyal workers who are more likely to stay with the trade and less prone to turnover. Although there is significant evidence to support these claims (Hills 1982; Franklin 1976, Marshall, Glover, and Franklin 1975; Maier and Loeb 1975, California Division of Apprenticeship Standards 1960, and Schuster 1959), conclusive proof sufficient to satisfy all objective observers is not yet available, largely because of methodological problems in the selection of appropriate comparison groups for study.

Thirdly, social goals for expanding apprenticeship may be appropriate as well. For example, in West Germany—where the system trains teenage youth—recent efforts to expand the apprenticeship system have been undertaken to accommodate the training needs of a baby boom cohort of school leavers. The campaign for new apprenticeship slots was aimed at ensuring that a suitable apprenticeship was available for every youth who wanted one. The goal established by the 1976 Act on the Promotion of Training Places was to have 12.5 percent more apprenticeships than applicants, based on the realization that at least some of the youths and apprenticeships would not be well matched geographically (Schmidt 1979).

Where Should Apprenticeship Be Expanded?

This question includes three subsidiary questions: What occupations? What industries? What areas? From 1973 through 1980, considerable effort was made by the Department of Labor to expand apprenticeship in the United States. Some gains were made; some attempts failed It is time to take stock of the *realistic* possibilities for expanding apprenticeship by taking a systematic look at labor market information, as well as institutional considerations, to identify future courses of action and program strategies.

A good starting place is to examine closely the definition of apprenticeship and how it compares and contrasts with other forms of occupational preparation, including its relative advantages and disadvantages. We need to compare the suitability of apprenticeship to the needs of various high-growth occupations and any occupations especially targeted in answer to the question, Why? For example, are occupations in the defense contract industry of key concern?

A second logical task is to examine past experience in this country with respect to initiatives to expand apprenticeship, paying close attention to institutional factors conducive or resistant to the spread of apprenticeship and analyzing the incentives and disincentives to industry in establishing registered programs.

Noting where apprenticeship is thriving in other countries may give us better perspective on the occupations and industries in which it might be of use in the United States One industry that makes significant use of apprenticeship in Europe is the hospitality industry.

How Should Apprenticeship Be Expanded?

Considerable discussion within American apprenticeship circles since 1973 has been devoted to the issue of how to expand apprenticeship Several general approaches have been suggested, including the following:

- Financial incentives, such as tax credits, schemes to match industry contributions for initiating training trust funds, legislation permitting payment of wages below prevailing rates only for apprentices (the concept behind both the Davis Bacon Act and a youth subminimum wage attached to a training guarantee), and so forth

- Nonfinancial incentives

- Making apprenticeship mandatory for government contractors or others

- Expanding apprenticeship in Federal government employment through a presidential executive order

- Promotion and development strategies by BAT and State apprenticeship staff

- Promotion and development contracts to industry associations, unions, schools, community groups, or professional associations to develop apprenticeship in certain industries

- Other advertising and publicity campaigns to promote apprenticeship among employers and the public

Conceivably, a mix of strategies differing by industry and/or occupation might be developed, taking into account varying institutional considerations.

Examination of apprenticeship experience in other industrialized countries provides new ideas that may be useful in promoting American apprenticeship. For example, to elicit "voluntary" behavior from German employers in providing additional training places for baby boom youth, the German government threatened to initiate a training tax on payroll Specifically, the 1976 Act on the Promotion of Training Places authorized the federal government to levy a new payroll tax of 0.25 percent if the goal of 12.5 percent over demand were not achieved. Under threat of a tax, employers made strenuous efforts, increasing the supply of training places by 30 percent, from 480,000 in 1976 to 624,000 in 1978. Although the number of apprenticeship training places still remained 4,000 short of the number of applicants (628,000) and although some of the new apprenticeships failed to offer training of adequate quality, the tax was not levied (Schmidt 1979). Subsequently the tax provision of the act was declared unconstitutional by the German courts

CONCERNS ABOUT COST-EFFECTIVENESS OF APPRENTICESHIP

The issue of the cost-effectiveness of apprenticeship has received repeated attention worldwide Indeed, it has been the subject of intensive study and investigation in several nations, including the Federal Republic of Germany, Canada, Switzerland, the United Kingdom, and the United States. However, despite the effort, few solid results are available to report

In Germany, a major study of employers' costs was cancelled in 1979 by the German Institute for Vocational Training (BIBB) due to unresolvable methodological problems. It was found that self-reporting by employers provided neither reliable nor uniform types of information (Reubens and Harrisson 1980, p. 47). This discovery also called into question the results of a well-publicized study by the Edding Commission in the early 1970s, which had also relied on self-reported information from employers. The Edding Commission report found wide variation in the net cost of apprenticeship paid by employers. Costs varied significantly by occupation and even more substantially by individual firm. Of the firms sampled, the 10.4 percent making a profit or breaking even were reported to be disproportionately found among members of the Chambers of Handiwork. About 30 percent of all firms reported net costs between DM 1,000 and DM 2,500, but 6 7 percent of firms had reported costs of over DM 10,000 (Reubens 1979, p. 56).

In Ontario, Canada, a commissioned study concluded that few generalizations could be made about employers' costs, the results were quite different for each firm (Currie, Coopers and Lybrand, Ltd. 1979).

In Switzerland, the Employers Association for the Machinery and Machine Tools Industry in Zurich conducted a study of costs among its members but reportedly suppressed the results, which showed high training costs, for fear that apprenticeship intake would be reduced (Reubens and Harrisson 1980, p. 47).

Cost-benefit studies of apprenticeship are notoriously difficult to carry out properly As Woodward (1975) notes, they are beset with methodological problems, among which are inadequate data on benefits and costs available from employers, difficulties in getting firms to cooperate in experiments, selection biases, and the "time-extensive" nature of most apprenticeship training

While acknowledging these difficulties, Woodward and Anderson (1975) conclude from a study of apprenticeship in Britain that, as a general rule, firms fail to make a profit on apprentices during the period of apprenticeship. However, these calculations do not take into account the stream of benefits to the employer after completion of apprenticeship if the apprentice stays with the firm. Moreover, net costs, as a percentage of gross costs incurred over the 4-year apprenticeship period, were small—usually not more than 3 percent.

A careful study of the feasibility of conducting cost-benefit studies of apprenticeship conducted for the U S. Department of Labor noted that such studies must be clear about the perspective from which they are addressed. The opinions are numerous; cost-benefit calculations can be made respectively from the perspective of apprentices, employer-providers, society, taxpayers,

unions, workers other than apprentices, or employers other than providers (Maller and Thornton 1980, p. 123) In their technical report, the authors presented the Department of Labor with three possible options to pursue for further studies

- A prototype cost-benefit estimate from the employer-provider perspective (at an estimated cost of $150,000)
- A comprehensive cost-benefit evaluation from the employer-provider perspective (at an estimated cost of $750,000 to $1,000,000)
- A comprehensive cost-benefit evaluation for the social, apprentice, employer-provider, and other primary perspectives (at an estimated cost of $15,000,000 or more)

The Department of Labor declined to pursue any of the recommended options for further study. In part, this decision resulted from fear on the part of BAT staff that the cost-benefit results might turn out unfavorably for employers, thereby making promotion of apprenticeship more difficult

The Maller-Thornton study correctly pointed out the importance of being clear about one's perspective in conducting cost-benefit calculations. They also focused on the most significant of all the possible perspectives: the employer-provider. If employers refuse to provide apprenticeship training places, apprenticeship ceases to exist.

Achieving favorable cost-benefit calculations from the employer's perspective may be the key to assuring that adequate numbers of apprentices are trained It is commonly recognized that "training is a cost of doing business." But how much of the cost borne by the firm can be recouped in benefits to the firm? In large part, this depends on how long the trained employee remains with the firm.

APPRENTICESHIP FINANCING ISSUES

It is not enough to have apprenticeship sponsors willing to offer training They must have the financial resources to be able to develop, deliver, and improve the training offered Certain training-related activities (such as development of curricular materials or instructor preparation) are best conducted on an industry-wide basis. Yet traditionally, sources of funds for training activities at the industry-wide level in America have been especially meager.

Occasionally an industry association has been able to sell instructional materials developed as a special project. Commonly, however, such sales barely generate sufficient revenues to recoup the costs of developing and producing the materials. Certain States, such as California, Wisconsin, and Maryland, have allocated special monies at the State level to fund the development of apprenticeship curricula. Public funds have been available from public vocational education in most States for conducting related instruction in the classroom. But such funding has been insufficient to administer the apprenticeship program and to monitor the quality of training offered at the job site—both traditionally functions of an apprenticeship coordinator. Since States and localities rarely provide funding for apprenticeship coordinators, financing this position is left to industry resources.

American Experience with the Training Trust Fund

Without external funding, an industry must impose a "tax" on itself if it wants to undertake training activity for the benefit of the industry as a whole. Where unions also have strong interests in training, this may be possible to accomplish through collective bargaining agreements. Jointly administered training trust funds can be established, with revenues generated through per-employee and per-hour contributions negotiated in the contract. For example, under the trust fund concept, a few cents for every hour worked under the collective bargaining contract can be placed into a special fund dedicated to training.

The training trust fund concept became popular during the mid-1950s in the United States in local collective bargaining contracts covering the mechanical and electrical trades within the construction industry. Once proven successful, the trust fund concept rapidly received enthusiastic endorsement from the plumbers' union, which promoted replication of the concept in all collective bargaining contracts entered into by its local affiliates in the plumbing and pipe fitting trades At present, the training trust innovation is used by local programs in every building trade and in a few occupations outside of construction in selected locations.

Subsequently, the plumbing and pipe fitting industry took the trust fund concept a step further and established a fund at the National level. This National training trust fund was financed by a supplemental levy on the hours worked under selected collective bargaining contracts that were negotiated directly by the international union. Monies from this National fund have been used to develop an improved National curriculum and to provide educational and technical training for apprentice coordinators and instructors of related training through a contract with Purdue University beginning in 1954 (Eddy and Corcoran 1969).

Several other unionized trades have followed the lead of the pipe trades in establishing a National training trust fund. By 1985, National trust funds had been established by joint (management and labor) sponsors in the sheet metal, insulation, masonry, lath and plastering, glazing, painting, and firefighting trades. Joint National training trust funds have recently been established in automobile manufacturing by General Motors and Ford Motor Company, along with the United Auto Workers (UAW).

Imitating the union sector, nonunion construction employers recently have begun their own apprenticeship programs, using the trust fund concept. Certain local affiliates of nonunion employer associations—such as the Associated Builders and Contractors, the Independent Electrical Contractors Association, the National Association of Plumbing-Heating-Cooling Contractors, and the National Association of Home Builders—have adopted the innovations pioneered by the union sector to start their own training programs, namely, multiemployer sponsorship of training and the training trust fund concept. The first such nonunion group program in the building trades was registered with BAT in 1971, and since then, the number of such programs has grown. In October 1983, six contractor associations announced plans to create a National Open Shop Training Trust Fund that proponents hope will funnel at least $50 million annually into "any legitimate training program in the construction industry." Most observers viewed this endeavor as an uphill effort filled with problems, not the least of which was defining a "legitimate training program eligible for funding" ("Training Trust Advances" 1983).

Even so, compared with apprenticeship programs in the union sector of construction, nonunion apprenticeship programs have been struggling. Nonunion employers, as a rule, have been more interested in minimizing the time and cost of training than in turning out broadly skilled craftworkers.

A key factor inhibiting the growth of training programs in the nonunion sector has been the inability of associations to raise training monies from their member employers. In 1982, construction industry investment in training by the nonunion sector was estimated to be only $13 million, compared with $230 million spent by jointly administered programs in the union sector. Further, of the $13 million invested, almost half was spent by the four or five largest nonunion contractors on in-house training programs ("Open Shop" 1982).

Essentially, raising monies amounts to employers imposing a tax on themselves, and many nonunion employers have resisted paying such a voluntary tax—no matter how worthwhile the cause. Thus, many nonunion construction contractors have continued to fill their skill shortages by "pirating" workers trained in the union sector. Unable to raise funds on a voluntary basis from their own members, nonunion associations have looked to vocational education resources and other public monies for assistance. They also have been able to find some construction owners willing to add a percent or two to construction costs, provided that these monies go into a dedicated training trust fund. In this way, nonunion construction employers can be assured that training costs will be shifted to the consumer.

Financing through Levy-Grant Schemes: The Experience Abroad

Every English-speaking country has established a system of Industrial Training Boards (ITBs), many of which have authorized the establishment of a levy (tax) on an industry's payroll in order to finance training. As the idea was introduced to the English-speaking world by Britain, it is useful to examine the U.K. experience.

The British Industrial Training Act of 1964 authorized the establishment of a series of Industrial Training Boards in various industry sectors Each ITB had the responsibility of working with firms in its industry to develop, promote, sponsor, and regulate training for the industry In order to fund training activities, each ITB was authorized to assess a levy on payroll in its industry. The tax rate was to be approved by an election within the industry. In practice, most ITBs ended up with tax rates between 0.5 percent and 1.5 percent, and the smallest employers were usually exempted from the tax. From the proceeds of this levy, the ITB covered the cost of its training activities and made grants to firms that were conducting approved training (hence the name "levy-grant scheme"). A few of these ITBs were able to gain the support of their industries. However, by the early 1980s, about three-quarters of the ITBs were abolished, reportedly because they failed to maintain the support of the firms with which they worked. These failed ITBs were characterized by administrative difficulties and heavy-handed regulatory activities Firms judged their benefits insufficient to outweigh their costs, and they were closed down. The 7 remaining ITBs cover an estimated 30 percent of the work force (European Centre 1984b, p. 61).

A contrasting case can be found in Ireland, where a system of industrial training was established under a centralized national agency, An Chomhairle Oiliuna (AnCO). Following the principle that industry itself should, as far as possible, carry the responsibility of training its workers, AnCO introduced a system of levies and grants into seven industrial sectors: textiles; clothing and footware; food, drink, and tobacco; engineering; chemicals; printing and paper; and construction Firms pay a contribution into an industry fund The amount differs according to type of business, typically it is either 1 percent or 1.25 percent of the annual payroll. Every firm can receive up to 90 percent of its contribution back as a grant, provided it follows training procedures prescribed by AnCO. The AnCO case and the surviving British ITBs demonstrate that ITBs and levy-grant schemes can work effectively to promote training.

France has implemented a levy-grant design with greater flexibility than is found in the English-speaking countries Two separate training taxes are involved:

- A 0.6 percent apprenticeship tax on payroll to be paid by all firms and allocated to training establishments of their choice. This tax is intended to finance initial vocational training.

- A tax amounting to 1.1 percent of payroll imposed on firms employing 10 or more wage earners. It covers continuing education and other training In regard to the second tax, the French strategy is to impose a payroll tax as a penalty *only on firms that fail to train* or contribute to training. A firm can avoid most of the tax by spending the money on "chargeable" training expenditures, including transport and lodging of trainees; expenses for internal training; contracts with external organizations for training; payments to training insurance funds; payments to training organizations that provide state-agreed courses for job seekers; and payments to organizations for studies, research, and information that contribute to the development of further training (within a limit of 10 percent of the contribution). Since 1978, employers have been obliged to pay 0.2 percent to the state to help finance community efforts to train job seekers. This reduces the minimum training budget (or possible tax obligation) of a firm to 0.9 percent of its total wage bill. In practice, expenditures on training have far exceeded minimum requirements. In 1980, companies with 10 or more employees devoted an average of 1.78 percent of their total wage bill to further training (European Centre 1984b, pp 240-41).

Actually, we do not have to look beyond American shores for an example of the levy-grant scheme used to promote training. In 1982, the California legislature created a variation of the levy-grant concept by diverting 0.1 percent of the unemployment insurance tax into a training fund, which is then allocated to various training organizations by a governor-appointed statewide body entitled the Employment Training Panel. Some of the funding has been awarded to industry groups in so-called "master contracts." Composed of private sector representatives, the panel also has oversight and monitoring responsibilities. A specific objective of the training is to stabilize employment for workers who are prone to being laid off, thus achieving savings through reductions in unemployment insurance claims.

LIMITED ACCESS TO APPRENTICESHIP

Equal opportunity in apprenticeship entry has been a special concern of public policy in the United States since the early 1960s, when blacks in major metropolitan areas demonstrated at various construction projects, successfully shutting many down. The original issue focused on getting more black males into apprenticeships in the building trades. Unlike most unions, in which blacks were well represented, certain skilled building trades unions had few black members.

Public concern regarding the issue prompted promulgation of special regulations for equal opportunity in apprenticeship beginning in 1961 (29 CFR 30), the first Congressional hearing on apprenticeship since the 1930s, numerous court cases (Marshall et al. 1978, pp. 26-60), a series of imposed and voluntary metropolitan plans for affirmative action (Brudno 1972), as well as a variety of research and action projects sponsored primarily with funding from the U.S. Department of Labor.

Early research documented the problem of the paucity of blacks in apprenticeship programs (Marshall and Briggs 1967). Limited exposure to information regarding apprenticeship and outright discrimination hindered the admission of blacks into apprenticeship. According to the best information available in 1960, blacks represented only an estimated 2.2 percent of all apprentices in the United States (Marshall and Briggs 1967, p. 28). Research also publicized promising techniques for solving the problems of underrepresentation through specialized community-based outreach programs for apprenticeship (Marshall and Briggs 1968).

Initial concern about the lack of black males in apprenticeship was subsequently extended to include all minorities. Then in the 1970s, concern grew for providing access to apprenticeship for women (Briggs 1973; R. J. Associates 1977) and, to a lesser extent, for handicapped individuals

These concerns generated a rich variety of experimentation, including regulatory efforts and new programs designed to provide access to apprenticeship for minority males, women, handicapped persons, and other disadvantaged groups. Fortunately, many of the successful program models for preparing these groups for entry into apprenticeship have been documented in research projects and publications. For example, effective programs funded under the Comprehensive Employment and Training Act (CETA) of 1973 have been described in several monographs (Lyndon B. Johnson School of Public Affairs 1979; Public/Private Ventures 1980, U.S. Department of Labor, Employment and Training Administration 1978; U.S. Department of Labor, Women's Bureau 1978a and 1978b; Kane and Miller 1981; Briggs 1981; Ullman and Deaux 1981, and Darby 1981).

Lessons from Practices in Other Countries

Despite the fact that the United States has been a world leader in its concern for equity of access to apprenticeship, we can learn much from the experiences of other nations. Australia and New Zealand have experimented with various subsidy programs to integrate aboriginal populations into apprenticeship. As the children of foreign workers have come of apprenticeable age in

Western Europe, the issue of minority participation has arisen—especially in Germany Considerable research has been conducted to ascertain the adjustment of young migrants, including their participation in apprenticeship, and a series of model pilot projects was begun in 1981 (European Centre 1983, p. 52).

Perhaps the most useful information from foreign practices regards the efforts to increase and improve female participation in apprenticeship European apprenticeship programs have included much higher female participation rates than have American apprenticeship programs However, this is largely due to the fact that several jobs traditionally held by women are considered apprenticeable in Europe.

Recent efforts have been made to integrate traditionally male apprenticeable occupations For example, a series of pilot projects was initiated in September 1978 to introduce females to traditionally male occupations in West Germany (Reubens and Harrisson 1980, p. 41) Designs for these projects were implemented only after careful research by the Federal Institute for Vocational Training (BIBB), which also had responsibility for monitoring and evaluating the results. In several ways, this effort has been a model in tying research to demorstration projects for the purpose of knowledge development.

Sex segregation by occupation is difficult to eliminate, as illustrated by the experience of New Zealand. From 1974 to 1978, New Zealand increased the share of first-year private sector apprentices from 4.8 percent to 8.4 percent, but closer examination showed that more than 80 percent of the increase was due to females entering hairdressing apprenticeships (Reubens and Harrisson 1980, p. 40). By 1977-78, females were found in only 18 of 72 apprenticeable trades in the private sector. New Zealand recently has begun a new subsidy program to increase female participation in traditionally male apprenticeships, entitled Female Apprenticeship Incentive for Recruitment (FAIR).

UNCLEAR ROLE AND RELATIONSHIP TO OTHER TRAINING

America has no coherent National policy and standards toward human resource development This makes it difficult to determine the relationship of programs to one another or to fit them under any particular policy umbrella.

This section deals with the issue of how apprenticeship relates to other training programs in the "nonsystem" of American occupational preparation These include journeyman upgrade training, vocational education at the secondary and postsecondary levels, vocational rehabilitation, training funded under the Job Training Partnership Act (JTPA) of 1982, training in the military, correctional training programs offered in prisons and detention facilities, and college and university training In the broader scheme of things, this subject also covers career guidance activities, job placement efforts, and other issues. Space and resource constraints prevent us from covering all of these linkages in this publication. Rather, we will limit our discussion to one key program issue—the relationship of vocational education and apprenticeship—and one key policy issue—youth employment and apprenticeship.

Apprenticeship and Vocational Education

In all nations studied, apprenticeship involves both public vocational education and the ministry or department of labor or employment. In each nation, a lead agency is generally designated, either from vocational education or from labor. Perhaps the most unusual case is in the province of Ontario, Canada, where the lead agency for the administration of apprenticeship is the Ministries of Colleges and Universities. The 1982 Apprenticeship Act in New Zealand brought an interesting change Formerly, apprenticeship was funded through the Ministry of Education and reported to the Ministry of Labor through the Ministry of Education. Under the new law, apprenticeship is funded through a new Ministry of Employment and reports to the Ministry of Education through the Ministry of Employment, which is supported by the Ministry of Labor.

In the United States, vocational education and labor have long been joined in a marriage for apprenticeship. But the marriage has been characterized by long separations, and apprenticeship has been treated as an orphan both by the Department of Labor and the Department of Education The antipathy between vocational education and apprenticeship has both historical dimensions (Frank H. Cassall and Associates, Inc. 1976, pp. 52-58) and attitudinal dimensions (Thomas 1983a, 1983b).

The Wisconsin legislature adopted the first apprenticeship statute in America in 1911 The same year it passed a State vocational education law. Born in the same year, so to speak, vocational education and apprenticeship (administered in the Department of Industry, Labor and Human Relations) have enjoyed a close relationship in Wisconsin. Apprenticeship field staff and vocational education officials even share offices. Wisconsin is unusual, however; in many States there remains no relationship between vocational education and apprenticeship at all.

At the Federal level, the origins of the relationship between apprenticeship and vocational education trace back to passage of the Smith-Hughes Act of 1917, which permitted Federal funds to be used to pay instructors of related training in apprenticeship (Patterson and Hedges 1946, p 204) Today, a significant (but unknown) portion of instructors of related instruction are paid at least in part from public vocational education funds. A representative of the Office of Education (now Department of Education) has been a member of the Federal Committee on Apprenticeship since its inception in 1934. On March 1, 1937, during discussion of the National Apprenticeship Act, the need for coordination of activities was recognized officially in a memorandum signed by the Secretary of Labor and the Assistant Commissioner for Vocational Education The memo questioned whether there should be two agencies dealing with apprenticeship; it answered affirmatively, dividing up responsibilities for apprenticeship between the two agencies. The Department of Labor would be responsible for protecting the welfare of apprentices on the job whereas Vocational Education would be responsible for related instruction. In 1950, further meetings between Labor and Vocational Education officials resulted in another document, which attempted to identify the roles and responsibilities of agencies involved with apprenticeship

With the Carl D. Perkins Vocational Education Act of 1984, Congress passed amendments aimed at effecting improved cooperation between vocational education and apprenticeship Certain activities related to apprenticeship were specified as allowable uses of funds; but States were not required to spend vocational training funds on apprenticeship. The act also generally encouraged consideration of apprenticeship in various advisory bodies, planning, reporting, and other selected activities under the act. Finally, it required the Secretaries of Labor and Education to develop and implement a plan for greater coordination between apprenticeship and vocational education within a year of the date of enactment. However, no funds were earmarked for implementation of the plan, and no sanctions were specified for failing to coordinate.

The relationship between vocational education and apprenticeship varies considerably by State and local area and by trade. Almost all apprenticeship officials will agree on at least two appropriate roles for vocational education—providing a source of well-prepared applicants for apprenticeship and serving as a resource in providing the related instruction portion of apprenticeship (Glover 1980). Providing well-prepared applicants calls for better preparation in basic academic skills by high schools and community colleges. It also calls for improved guidance and counseling. Serving as a resource for related instruction requires the development of a better working relationship between vocational education and apprenticeship organizations at the National, State, and local levels.

Although these roles remain unfulfilled in many places and trades, several examples of effective collaboration between apprenticeship and vocational education have been documented in various publications (Norton and Belcher 1984; Warmbrod et al. 1981). Two illustrations—school-to-apprenticeship linkage projects and dual enrollment for college credit—are described in the following section and demonstrate that innovations in collaboration can and do occur.

Successful Examples from American Practice

Since the average age of a beginning apprentice in the United States is estimated to be 24, recent graduates from high school or community college often have to wait several years before they become viable candidates for apprenticeship entry. In some trades this wait can be eliminated, however, through the establishment of school-to-apprenticeship projects (Glover 1983)

The concept of school-to-apprenticeship linkage is a simple one It involves the employment of high school seniors (or community college students) on a part-time basis as registered apprentices, with transition to full-time apprenticeships upon graduation. As full-time apprentices, they must complete their related instruction requirements, generally in special classes arranged through the local community college or area vocational school in the evenings after work

From 1977 through 1981, the U.S. Department of Labor funded a series of seven demonstration projects involving school-to-apprenticeship linkage. These projects were evaluated very favorably by participating employers, as well as by a team of evaluation specialists who analyzed the impact of the projects (Williams et al 1981). Four of the sites continued the projects even after the Federal funding ran out, and the idea has been initiated in other localities as well. Several "how to do it" manuals, guides, and other resource documents have been developed (Kossak 1980, Martin, Williams, and Davin 1981; Billings 1983; Johnson and Johnson 1983). Published articles have drawn attention to the concept in various projects (DeLaurentis 1980; Glover 1983; Whitworth 1982 and 1983, Norton and Belcher 1984). Although it is unlikely that the German dual system of in-school apprenticeships for teenage youth could be transported wholesale to the United States, school-to-apprenticeship linkage projects have demonstrated promise for extending the apprenticeship concept to American high school students.

An unmistakable trend in American apprenticeship is the increased availability of college credit for serving apprenticeships (Abbott 1977; Tuholski 1982; Mantsios 1983, Norton and Belcher 1984). The idea of providing college credit for apprentices was fostered during the 1970s by funded projects from the U.S. Department of Labor. One project was contracted with the American Council on Education to assess training in eight apprenticeable trades and establish guidelines for granting college credit (Kain 1978). A second was made to the George Meany Labor Studies Center to develop a 2-year college curriculum in labor studies for apprentices. A third project was contracted with the Operating Engineers Union to work with local community colleges to demonstrate the dual enrollment concept (Hammond and Collins 1975). Since the 1970s, the practice has become more widespread as related instruction has come to be conducted more commonly through institutions of postsecondary education.

Proponents of the practice of linking college credit and apprenticeship argue that it enhances the training and the opportunity for upward mobility of apprentices, upgrades the status and public image of the trades, and confers upon apprentices deserved recognition. Further, they argue that such a practice is favored by many apprentices and that it will help apprenticeship to attract more and better applicants to the trades.

Opponents argue that linking college credit with apprenticeship unnecessarily involves educators in apprenticeship training and opens apprenticeship to the possibility of inappropriate interventions and influence in the training process from academics. They fear that such involvement may tend to reduce the practical character of the training. Others argue that once apprentices have college degrees, they will shun manual work, failing to remain with the employer long enough to allow apprenticeship sponsors to recoup their investments in training. Further, they contend that most apprentices do not care about receiving college credit Some individuals enter apprenticeship with a 4-year college degree in hand already.

It would seem that any apprentice doing college-level work deserves the opportunity to obtain college credit for it, if he or she wishes The trends indicate that an increasing number of apprenticeship officials agree.

Apprenticeship and Youth Unemployment

Youth unemployment has been an issue of widespread concern in advanced industrialized market economies worldwide. Certain nations seem to be able to cope with it better than others Unemployment rates for youths have been notably lower in the Germanic nations of Austria, the Federal Republic of Germany, and Switzerland, where as many as half of all teenage school leavers enter directly into an apprenticeship. Such success raises interest in apprenticeship as a policy measure to counter high rates of youth unemployment (Glover 1981; Sorrentino 1981) Indeed, numerous groups and individuals have advocated public subsidization of apprenticeship in the United States exactly for this purpose (Reubens 1977; Carnegie Council on Policy Studies in Higher Education 1980; Taggart 1981).

Yet any suggestion that apprenticeship be made primarily responsible for solving the unemployment problems of American youth elicits a strong adverse reaction from both employers and union officials involved with apprenticeship Apprenticeship spokespersons correctly point out that U.S. apprenticeship relates only to craft jobs and a few other technical occupations that account for little more than 10 percent of the jobs in this country. "Given this fact, how can apprenticeship be expected to remedy the problems of all disadvantaged youths?" they ask. Further, they note that many American apprenticeship programs currently average four or more applicants for every apprenticeship available.

Once the initial fears and defensiveness have been calmed, most apprenticeship spokespersons will acknowledge that the apprenticeship *concept* has much to offer *as a part of* the solution to youth unemployment. They concede that apprenticeship could play a role as long as the essential features of apprenticeship operations in this country are not tampered with.

Since American apprenticeship is well established, offering numerous advantages and strengths in its present form, why attempt to pound it into another shape, more like German-style apprenticeship, to serve teenage school leavers? Such an effort will only stir predictable resistance from the American apprenticeship community.

An alternative and more promising approach is first to acknowledge the value of the apprenticeship concept, note its applicability to youths, and work with knowledgeable apprenticeship officials to devise youth training schemes that incorporate the advantages of the apprenticeship concept. However, to achieve even this will require significant leadership and political will at the National level as well as considerable public-private collaboration to develop and support an expansion of high-quality training programs for youth. Given the low priority accorded to apprenticeship by administrations from both political parties in the past, these would indeed be extraordinary developments.

Apprenticeship can smooth the transition from school to work The use of elements of the apprenticeship concept to devise alternative training for youths is beginning to be widely practiced in Europe. The movement is identified by the name *alternance training*, a term used to label the generic concept of alternating periods of structured training on the job and off the job. Apprenticeship, cooperative education, internships, and what the British refer to as "sandwich courses" are all variations of alternance training.

A clear sign of the mounting enthusiasm for training that combines both work and study modes can be seen in the increasing popularity of alternance training (European Centre 1981, *CEDEFOP Vocational Training Bulletin* 1983). A 1983 opinion poll of 500 employers and 800 workers in France found that employers and workers agreed—88 percent and 82 percent

respectively—that young people should receive alternance training, i e , practical training in the firm and theoretical instruction in a school or group training workshop (*CEDEFOP News* 1983, p 4)

Whereas alternance training is viewed as a useful mode for the entire spectrum of lifelong learning, it is seen to offer special advantages in the training of youths In a report for the British Manpower Services Commission, Hayes et al. (1983) closely examined various forms of alternance training. They distinguished "education driven" models from "work driven" models, pointing out the advantages and limitations inherent in each model. Their findings and recommendations helped lay the groundwork for a new Youth Training Scheme, introduced in 1985, for those who leave secondary school at the minimum age of 16. The scheme, which is available to all youths and covers all sectors of the economy, is based on systematic learning at work, together with training and education off the job. There will be a recognized "vocational qualification" for all completers (Hayes 1985, p. 7).

As a final comment, it should be noted that, at best, a strong apprenticeship system may be only one means among several to cope effectively with high rates of youth unemployment As the experiences of Sweden and Japan illustrate, low rates of unemployment can be maintained without the advantage of an extensive apprenticeship system However, in the case of Sweden, this has been achieved at considerable public expense Further, Japan has certain cultural traditions that may not readily transfer to an American setting

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

This work has been based on the premise that making recommendations regarding the transferability of practices from abroad into American settings requires a good working knowledge of apprenticeship operations in the United States, along with a clear understanding of those practices in other nations that seem applicable. Thus considerable space and effort have been devoted to explaining American apprenticeship and the key problems it faces, along with examining practices abroad

At the outset of our discussion of recommendations, a caveat is in order, namely, *no apprenticeship system in any nation is perfect or problem-free*. However, as to implications and recommendations that appear to have promise for America, several items can tentatively be suggested at this stage, as indicated in the following sections.

Improving the Quality of Training

The United States should follow the example of Germany in attempting to maintain and enhance broad-scope training through apprenticeship—a feature often recognized as one of the system's key strengths. Germany is consolidating apprenticeship occupations in a move toward wider and broader training. With a few exceptions, the trend in the United States, on the other hand, is toward more specialized and narrow training. Narrow, firm-specific training can become a pitfall in apprenticeship training, but steps can be taken to avoid it by such measures as encouraging the development of nationwide curricula, as found in Germany and several other countries.

Procedures for reviewing and updating curriculum on a regular basis, such as found in certain trades in America or under the reform measures undertaken in New Zealand, should be implemented. Every apprenticeship training program should be encouraged to adopt an effective procedure to ensure that its training is up-to-date and relevant to current and foreseeable labor market needs. It is also helpful to make occasional assessments of the future impact of technology on a given occupation so that apprenticeship training can become proactive rather than reactive. Since rigidity is a common—and often justified—criticism of apprenticeship, combating obsolescence should be of special concern to apprenticeship administrators. Fortunately, there are several examples, both in America and abroad, of how reviewing and updating may be accomplished effectively.

With substantial industry input, trade examinations should be developed to certify the proficiency of completing apprentices, using experience in Germany, Austria, Switzerland, France, England, and New Zealand. Although the United States would do well to avoid the rigidities and elaborate bureaucratic procedures characteristic of certification in certain countries, American skill certification systems are much in need of improvement. If properly developed, trade examinations can provide a means of controlling the effectiveness of training and evaluating alternative training methods, as well as a means for apprentices to obtain a meaningful, internationally recognized qualification.

Training for apprentice instructors, coordinators, and committee members needs to be improved on a National scale. Apprenticeship instructors—both on the job and in related instruction—need to be both technically competent and educationally proficient Training for coordinators and apprenticeship committee members has been largely ignored To assist in the development of a remedy, many fine examples of instructor training and certification can be found in Ireland, Germany, Austria, and elsewhere, as well as in the plumbing, sheet metal, and masonry industries and the few exemplary regional and State programs in America.

A specialized resource center should be established to share and disseminate information on innovations and advances in apprenticeship training materials. A National effort especially directed to an apprenticeship clientele is needed, but it should not ignore existing American databases and resources or apprenticeship developments abroad. Even in nations with the most decentralized apprenticeship systems, such as Australia, information gathering and dissemination are important national functions

Many apprenticeship innovations have already been attempted in the United States, but at present there exists no suitable dissemination network to gather and broadcast such information to the apprenticeship community.

Improving the Administration of Apprenticeship

The leadership vacuum in apprenticeship at the Federal level needs to be filled. Practices abroad indicate that effective use can be made of tripartite organizations in the administration of apprenticeship In this regard, the tripartite Federal Committee on Apprenticeship could be returned to the strength and independence that characterized the early years of its life At a minimum, this will require providing the FCA with greater independence from the Bureau of Apprenticeship and Training and providing it with an independent professional staff.

Resolving Problems of Financing and Expansion of Apprenticeship

Consideration should be given to adopting a system of Industrial Training Boards (ITBs) built upon existing industrial training institutions in America. A system of ITBs would provide a framework for industrial training, including apprenticeship, that would fill an important gap in National policy toward human resource development. Each could have the option of installing a levy-grant system, perhaps modeled after the French scheme imposing the tax as a penalty on firms that do *not* train or the Irish scheme of reimbursing 90 percent of the tax collected to employers who conduct training according to certain industry-wide standards. In either case, the system would encourage more spending on training, the costs of training would be shared across the industry, and spending decisions would be in private hands.

Access to Apprenticeship

The effectiveness of programs in Germany, New Zealand, Canada, and other countries in involving females in apprenticeships traditionally occupied by males should be investigated. Information regarding these programs is not yet available in conventional literature sources but could be obtained by personal correspondence and telephone contact.

The Role and Relationship of Apprenticeship to Other Training

Significant insights regarding collaboration between apprenticeship and vocational education may be gleaned from a close examination of practices abroad. Although vocational education and apprenticeship appear to be competitors in various countries, both are converging toward a similar mode of training using alternating periods of work and study. In apprenticeship worldwide, considerable attention is being given to strengthening and expanding the related instruction portion of training. At the same time, school-based vocational education increasingly includes a work component in its approach. In Europe there has recently been an increasing recognition that "education and training systems are both complementary and interdependent" (International Labor Organization 1979, p. 3). The results are reflected in the movement toward *alternance training*, a generic training concept that incorporates both work and study components.

Consideration should be given to promoting alternance training in a variety of forms, including apprenticeship, school-to-apprenticeship linkage, cooperative education, internships, and others. As a youth training initiative, alternance training can incorporate many of the benefits of the apprenticeship concept without undermining the current apprenticeship system in America.

The spirit of collaboration between vocational education and apprenticeship envisioned in the Carl D. Perkins Vocational Education Act of 1984 needs to be translated into action. The upcoming report to Congress required by this act provides an ideal opportunity to develop a "white paper" on apprenticeship to generate industry comment, dialogue, and consensus on apprenticeship revitalization and reform, as has occurred in New Zealand (New Zealand Vocational Training Council 1980) and in other nations over the past decade.

The Need for International Dialogue and Further Research

From the review of the literature conducted for this publication, numerous gaps in the available research were noted that merit further attention. A fundamental issue is whether apprenticeship in the United States and that in other countries are comparable. A content analysis of apprenticeship programs in key selected trades may be revealing. Could it be that other countries are teaching the same materials to beginning apprentices who are, on average, 8 years younger than beginning American apprentices? Or does American apprenticeship cover more advanced materials more suitable to these older workers? It is likely that American apprenticeship is more comparable to some combination of initial training and further training found in other countries.

Advocates and critics of apprenticeship disagree over the existence of National skill shortages Advocates of apprenticeship (and vocational education) argue that the United States faces significant National skill shortages in certain apprenticeable occupations. They say that expansion of the system is needed to remedy these shortages Critics disagree. Further investigation of skills shortages may be useful in resolving this issue.

Several additional questions come to mind:

- How do apprenticeship programs determine which skills are best taught on the job and which in related instruction settings? What principles are used to guide the allocation of teaching objectives between these two modes?

- What are the trends in the use of apprenticeship? How many apprentices do countries have now, as compared with 10 years ago?

- Does apprenticeship in other nations focus more on "hand" skills as opposed to "machine" skills?

- In countries with a system of industrial training boards, what is the relationship between the boards and apprenticeship committees at the national and local levels?

- What innovations are occurring to improve apprenticeship training in sparsely populated rural areas?

- What measures are taken to assure transferability of training beyond the individual firm offering the apprenticeship?

- What is the policy toward making additions to apprenticeable occupations and, in doing so, what procedures and criteria are followed? What examples of occupations recently declared apprenticeable can be identified?

- What attempts (if any) are made to consolidate training between similar or overlapping apprenticeable trades?

Even within the United States, better information is needed on fundamental subjects, such as the extent of interaction between vocational education and apprenticeship. It is even unknown how much vocational education and apprenticeship overlap. In what occupations does this occur, and how many persons are trained in apprenticeable occupations through vocational education? How much of vocational education funds is devoted to apprenticeship and for what expenses?

Finally, this broad-brushed review of apprenticeship practices across 18 industrialized nations suggests a keener focus for any additional research on the topic. Our own apprenticeship system would be served best by concentrating research more narrowly on those nations that are our chief competitors in the world economy or on those nations that have particular advantageous features superior to our own practices. The Federal Republic of Germany and Japan suggest themselves as examples in the first category. Austria and Ireland deserve further investigation because of their relative success with industrial training practices. Although Austria may have even greater success than West Germany with the Germanic apprenticeship model, less is known about its practices. Similarly, Ireland may offer a good example of a well-functioning system of Industrial Training Boards. The key point is that additional research should be targeted to specific nations and practices that appear to be most fruitful for consideration by U.S. policymakers and program operators.

Further research and dialogue with the international community on the subject of apprenticeship and industrial training should be conducted. Given even the best of existing resources in the United States, any review of literature conducted on the subject of apprenticeship practices abroad has severe limitations. Much current information is simply not available through conventional bibliographical sources. The best source of information regarding up-to-date practices is contact with knowledgeable in-country experts. Some of this can be accomplished by telephone and correspondence, but much could be gained by bringing together a selected group of experts in a structured conference, focused on a specific and important set of issues, aimed at clear objectives, and built on the firm foundation of substantial preparation. The upcoming 50th anniversary of the National Apprenticeship Act of 1937 may offer a fitting occasion for such a convocation.

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