INDUSTRIAL COOPERATIVE VOTATIONAL TEACHER EDUCATION

With Special Reference to the Projection of a Program in the State of Illinois

A DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

by

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Approved by:

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Adviser
PREFACE

The problem of how to integrate the basic components of a teacher education program with the proficiency required of a trade and industrial education teacher has been of increasing concern to those interested in a comprehensive program of public education. The State of Illinois has become especially conscious of the problem due to the enactment of legislation requiring an undergraduate degree as one of the requirements of certification for all public school teachers.

The writer has been assigned the challenging task of organizing a method of preparing an adequate number of trade and industrial teachers who can meet all certification requirements. This study is an approach to this problem.

Full cooperation was received from many individuals throughout the United States and my indebtedness to them is greater than mere words can repay. The writer is happy to acknowledge here the help and example given by his advisory committee: Dr. William E. Warner, Chairman, Dr. Earl W. Anderson, and Dr. Dan H. Eikenberry. Dr. M. Ray Karnes, Chairman of the Department of Industrial Education at the University of Illinois early visualized the need for this study and has been most helpful throughout its development.

Mention of those who contributed to the completion of this study would be incomplete without paying tribute to the constant encouragement and assistance received from Harriet Harmer Lux, the writer's wife.

July 15, 1955

DONALD G. LUX
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Chapter I
INTRODUCTION

The problem of how to recruit and train adequate numbers of competent trade and industrial vocational education teachers is becoming ever more serious. The dilemma underlying the problem is the distinct dichotomy in the qualifications demanded of the trade teacher. He must be both a tradesman and a teacher, and to prepare for either one of these callings requires an extended period of time. Together, they can require nearly a decade.

The futility of trying to induce skilled tradesmen to enter conventional college teacher education programs has long been realized. In recognition of this, the common pattern of requirements for vocational teacher certification does not include an undergraduate degree, despite agreement that the tradesman-teacher must be professionally competent and possess a broad educational background. The ineffectiveness of attempts to provide trade-competent teachers by academic means has also been recognized. There is universal agreement that trade teachers must be experienced in their trade. Yet no commonly accepted functional means have been devised to provide teachers with all the desired competencies. Only with such a solution, consistent with socio-economic conditions, is the problem likely to be solved.

The Problem. In this study the writer sought a method of preparing trade and industrial vocational teachers which can provide the
State of Illinois with an adequate number of teachers competent both in their trade and in the teaching profession.

Indications that a cooperative plan, used so successfully for half a century in the closely related field of engineering education, may solve many existing trade and industrial teacher education problems, are to be found in the literature of the industrial education field. David Snedden, of Teachers College, Columbia University, presented (78, 420-21) a proposal for a cooperative means of preparing trade teachers as long ago as 1924:

Within a few years it should prove practicable to devise a total program for teacher training for at least a number of the trades and industrial vocations for which school vocational training in whole or in part should prove expedient and necessary.

Such a program should almost certainly include the following elements:

1. Enrolling in the training school at 18 years, the prospective teacher should be allocated to wage-earning participation in his trade on some part-time basis whereby he could give sufficiently prolonged periods, perhaps 8, 12, or 16 weeks, to wage earning work, after which he would return to the school for a period of perhaps half as long for intensive study of the related subjects of the vocation in question. During this time, too, he could be directed in a moderate amount of reading of a pedagogical nature designed to be preliminary to his later pedagogic study.

2. After four years of this practical training and productive work, the prospective teacher should then turn his attention exclusively to pedagogic preparation. He should take the usual studies basic to the training of teachers, emphasis always being placed upon the peculiar character of the teacher vocation into which he is expected to go.
3. During the last, or sixth, year he should divide his time between further pedagogic studies and supervising practice teaching in successful industrial schools.

The net outcome of this training process should be a teacher adequately prepared to enter not only all ordinary teaching, but also any necessary related technical instruction and instruction in related subjects.

Nothing approaching the comprehensiveness of the program suggested above, in 1924, has received anything but the most limited acceptance in vocational-industrial teacher education practice. However, concern for such a program has not been found wanting, as evidenced (36, 44) by the statement of William B. Hawley, then Assistant State Superintendent of Public Instruction in Michigan, in 1951 that:

For some vocational teachers in the business field, the industrial field, the agricultural field, the content must be obtained by experiences on the job—enhanced, enlarged and broadened always by the formal school contacts in that subject matter area.

... It would, therefore, seem relatively simple (but a long, long time in coming) for teacher educating institutions to recognize this and to provide planned experiences in the business, agricultural and industrial world for all who plan to teach in those areas.

Such planned experiences should, of course, be worthy of appropriate college credit toward the "teaching major." In such a planned program by teacher educating institutions, it would be possible to produce a supply of teachers in various occupational fields, and it would not be necessary, as it now is, to recruit such teachers, without professional teacher training, from the ranks of industry directly.

Much has been said about the desirability of work experience for teachers of all subjects so that they can have some acquaintance with the world of work. Is it any
more difficult for teacher educating institutions to plan and provide for this kind of experience than it is for the secondary school to do so for its youths, as is advocated by most writers in the field of education today? If both of these qualities are things to be done, the chasm of misunderstanding can be narrowed and the quality of teaching bettered.

In this study the writer seeks to fulfill the optimistic belief of Snedden that "within a few years it should prove practicable to devise a total program for teacher training for at least a number of the trades and industrial vocations for which school vocational training in whole or in part should prove expedient and necessary," and to help obliterate the pessimistic afterthought of Hawley, that such a program would be a "long, long time in coming."

The following questions are important in attacking the problem:

1. What are the educational needs of American youth with particular reference to trade and industrial education?

2. What do these educational needs of youth imply for trade and industrial teacher education programs?

3. What potentiality does cooperative education have in overcoming problems in trade and industrial teacher education?

4. What is the scope and status of cooperative trade and industrial teacher education?

5. What limiting factors qualify the development and operation of a cooperative trade and industrial teacher education program for the State of Illinois?
6. To what degree can these limitations be overcome?

7. What operating principles and procedures have been successful in cooperative programs?

8. Would a cooperative program receive widespread acceptance by leaders in trade and industrial education?

9. Would cooperatively trained trade teachers be acceptable to local school administrators in Illinois?

Need for the Study. The following factors indicate a need for the study:

1. The Illinois State Legislature enacted a teacher certification law, effective July, 1953, that requires all public school teachers to possess an undergraduate degree. Inadequacy of the teacher supply forced an extension of the enforcement to July 1, 1955. Because various schools throughout the state wish to inaugurate or expand trade and industrial programs, because normal attrition in the trade and industrial teacher supply is not being replaced, and because the past school year provided, from the designated teacher training institution, a single graduate to fill normal placement requests from Illinois schools for twelve to twenty trade and industrial education teachers, the law will unquestionably be further extended until enough teachers are provided. The will of the legislature and certification authorities is clear, however, and teacher education has a mandate to seek an alternate method of preparing trade and industrial teachers.
2. There is an almost total lack of information as to the scope and character of cooperative trade and industrial teacher education and to the operational procedures involved in organizing and operating them. This gap in the literature of the industrial education field should be filled.

3. The effectiveness of teacher education largely determines the quality of education in the schools, and any serious concern for the improvement of education must relate to the status of teacher preparation and the availability of competent teaching personnel. The welfare of the public school trade and industrial programs therefore depends on finding an alternate method of providing an adequate supply of qualified teachers.

4. The University of Illinois, conscious of its legal responsibility as the designated trade and industrial teacher education institution for the State, has employed the writer to devote himself full-time to the development of an alternate method of recruiting and preparing trade and industrial education teachers.

5. Startling increases in the percentage of school age youth enrolled in secondary schools and in the present and predicted enrollment totals warn that the present teacher shortage will soon multiply. Unless a more adequate supply of competent teachers is provided, an increasing number of pupils seeking industrial vocational courses will be denied them.


Limitations. This study has, as does any extensive undertaking, certain limitations, reflected in the approach to the problem and the results. These rather well-defined limitations are here acknowledged.

Vocational education will be considered only within the framework of the federally reimbursed program, and the major emphasis will be on the secondary school trade and industrial field.

The curriculum proposal made as part of this study was designed for the needs of the State of Illinois. Because of this, limiting factors considered in developing the program were dependent upon conditions and requirements within that State. The writer believes that this limitation may add significance to the study. Geographic, educational, legal, and economic conditions vary so greatly from state to state that a curriculum proposal based upon a composite of all requirements would have little meaning; whereas, an intensive study of all the factors affecting the development of a program within a single state should provide a pattern for investigating needs and inaugurating a program within others.

The limited publications in the area of the study, the lack of major studies concerning applications of cooperative education to trade and industrial teacher education, and the limited number of experimental programs placed a real limitation on the extent to which previous experience could be brought to bear on many aspects of the study.
The time factor is considered to be the most serious limitation of the study. The validity of the findings cannot be ascertained without an extended evaluation period. To determine properly if the teacher education proposals made in the study will provide a greater number of competent trade and industrial teachers than do traditional methods, follow-up studies will have to be made of the performance in the field of graduates. To evaluate even first year graduate performance requires projecting the study over a period of five to ten years after its initiation. Even such an extended period will provide little opportunity to evaluate leadership capabilities of graduates. A comprehensive evaluation of the proposed program will involve more than a decade, and practical limitations require that even a short-term evaluation of its effectiveness, in terms of the performance of its graduates, be left to a future study.

Definition of Terms. In a dissertation which involves closely allied, synonymous, and even overlapping terms such as: "practical arts," "industrial arts," "industrial education," "vocational education," "industrial vocational education," "trade and industrial education," "cooperative education," "distributive education," "diversified cooperative education," "work experience," and "industrial experience," much of the clarity and effectiveness of the written work is dependent upon concise usage. Therefore, four of the most basic terms, and their components, which lend themselves to different interpretations are defined insofar as they are used in the study.
Practical Arts Education. This term includes the general education aspects of industrial arts, business education, agricultural education, and home economics. The content embraces the orientational experiences which culminate for some in specialized vocational education. Because of this, advanced practical arts activities are sometimes difficult to distinguish from introductory vocational activities. For instance, there are undoubtedly industrial arts programs which could more properly be classified as vocational industrial education and vice versa.

Vocational Education. In its broadest sense vocational education includes preparation for all vocations, but throughout this study vocational education will be meant to include education of less than college grade in the subdivisions as given in the vocational education acts, i.e., trade and industrial education, agricultural education, distributive education, and home economics education. Vocational education is special education primarily intended to offer preparation for employment in a specific trade or occupation.

Work Experience. There is no commonly accepted clear-cut and comprehensive description of the various types of work experience, and in its broad sense it must be taken to include social, cultural, pre-vocational, or vocational work. However, in this report the following classifications are used: Work experience is restricted to include only those activities which are performed primarily for their social and cultural value. Cooperative industrial experience is taken
to include only trade or industrial experience which is closely supervised and coordinated with related phases of a total educational program and which is offered by cooperating agencies each of which have some part in planning and conducting the experience. **Industrial experience** is defined throughout the study as on-the-job experience in a trade or industry which is taken simply for purposes of making a living or to gain certain skills, but which is not closely supervised or coordinated and integrated with a total educational program. **Diversified cooperative training** and **cooperative distributive education** are defined by provisions of the federal vocational acts and the terms are used in this study as they are defined in the acts. Under these definitions, work is restricted to experiences which are pre-vocational or vocational in nature and to occupations, which require a certain minimum learning time. Diversified cooperative training programs offer training in trade and industrial occupations, while cooperative distributive education programs offer training in occupations involving the sales and distribution of goods. **Industrial Education** includes engineering education and all training for industrial employment, but in this study it is taken to encompass (1) industrial arts, which is designed to introduce every citizen to industrial technology and its effect on their lives, and (2) trade and industrial education, which is designed to provide pre-employment training in a specific trade or industrial occupation.
Methods of Obtaining Data. Information for much of the early part of the study was obtained through a documentary survey to provide the socio-economic setting as it relates to vocational education in general and to trade and industrial education in particular. The scope and characteristics of cooperative education in general were also determined by a canvass of available literature. In addition, certain outstanding cooperative programs were visited and studied by the writer to obtain detailed information on organizational and operational features.

Sparsity of information on the scope and characteristics of cooperative trade and industrial teacher education dictated a national survey to obtain these data. The location of programs was ascertained through contacting the chief trade and industrial education official in the state department of education in each of the forty-eight states. On the basis of this survey, each institution was further surveyed and visited to permit detailed study and observation.

Review of Related Studies. No major study has determined the extent to which cooperative teacher education programs have been employed in industrial vocational teacher education, although there are innumerable major studies in the vocational education field which have: investigated the need for vocational education, surveyed present programs and facilities, surveyed and evaluated present practices, surveyed and evaluated certification requirements, made curriculum studies and proposals, and analyzed other phases of industrial
vocational education and teacher education. A comprehensive trade and industrial teacher education curriculum employing cooperatively planned and supervised trade and industrial experience which is an integral part of a total teacher education program has never been derived in a major study.

Thus there are more related data on certain aspects of this study than on others. Some of the studies which are closely allied to this undertaking which have been reviewed are briefly mentioned here.

An Advisory Committee on Education was appointed by the President of the United States in 1936, initially for the purpose of making a study of progress under the program of federal aid for vocational education, including the relation of such training to general education and prevailing social and economic conditions, and to reporting the extent of a need for an expanded program of federal aid for vocational education. The Committee was subsequently charged, in 1937, with expanding its study to include the whole subject of federal relationships to state and local conduct of education and to prepare a report of its findings. The Report of the Committee, Vocational Education, contains a wealth of material on the role of vocational education in American education.

The United States Department of Health, Education, and Welfare Bulletin 1954, No. 11, Cooperative Education in the United States, reports on the nature and scope of the cooperative plan of education with special reference to engineering education. There is information
In this bulletin concerning administrative and operating requirements and patterns of organization and administration which are closely related to phases of this study.

Cecilia Ruth Earhart, in her dissertation, *Vocational Teacher Training and Certification*, analyzed the qualifications for the first certificate for every state and territory of the United States. The 1947 study, when compared with earlier ones of this nature, provides evidence of trends in vocational teacher certification, and, in itself, provides data on recent certification requirements in the various states.

Parker Malcolm Green's dissertation, *A Survey and Evaluation of the Industrial Vocational Teacher Training Aspects of State Plans for Vocational Education*, was completed in 1947 at The Ohio State University. He surveyed and evaluated the teacher training provisions of the various state plans for vocational education in an attempt to derive the essential elements which should be included in all state plans. The conclusions of this study have significance to anyone attempting to develop an industrial-vocational teacher education program.

Harold Allen Huntington evaluated current practices in the organization and operation of industrial-vocational teacher education programs in his 1940 dissertation, *Industrial-Vocational Teacher Education*, done at The Ohio State University. He developed evaluative criteria based upon a documentary survey and jury opinion, then
evaluated current practices and proposed administrative and organizational improvements. This is another study which provides rather recent data on the status of trade and industrial teacher education. In addition, it offers proposals for improvements which can be considered profitably in any attempt to develop a teacher education curriculum in the same field.

M. Ray Karnes provides an extensive background of information on organized labor's attitude towards vocational education in his 1948 dissertation, *Evolving Concepts of Industrial Education in the Thinking of Organized Labor*. This was completed at the University of Missouri. The findings are of importance to anyone attempting to develop relations with organized labor in the development of a cooperative industrial education program, as well as to a coordinator who must develop and maintain working relations with organized labor.

John Robert Ludington's dissertation, *Industry and Education*, provides a counterpart of the preceding study with reference to management. In this study, completed at The Ohio State University in 1940, an effort was made to determine the values which serve as guides to political, economic, industrial, and educational relationships, to review educational policies and practices of certain large organized industrial groups in the manufacturing industries, to analyze and interpret the nature and extent of the educational policies and practices of certain organized industrial interests in the United States, and to project and appraise the importance and place
of a consideration of social-economic problems of industry in programs of modern public education. This study contains extensive background information pertinent to an understanding of management policies and attitudes.

Virginia M. O'Neil studied the function of work experience in American education in her dissertation completed at The Ohio State University in 1944. The title of the study was, *The Function of Work Experiences in Education in a Democracy with Implications for the Education of Teachers*. It provides a philosophical justification for offering work experience as a phase of education in a democracy.

Leo Fred Smith provided the most widely quoted study in the field of cooperative education with his dissertation, *Cooperative Work Programs in Higher Institutions: Present Status, Trends, and Implications*, completed at the University of Chicago in 1946. The data in this study, when combined with the findings of the 1954 study of cooperative education previously mentioned, provide a basis for determining recent trends in cooperative education.

The National Manpower Council, in their 1954 publication, *A Policy for Skilled Manpower*, provide a detailed analysis of America's needs for highly skilled men and women whose formal education usually stops at the high school or junior college level. It offers a basis for determining the training task facing those responsible for providing American industry with adequately skilled manpower.
The Twentieth Century Fund's revised report, *America's Needs and Resources - A New Survey*, by Dewhurst and associates, provides statistical data which indicate the status of American technological development and needs. The data from this study, when combined with information provided in the preceding study, provide information for predicting future American industrial training needs.

Data from previous researches and that compiled in this study have been applied to the problem of designing a functional cooperative trade and industrial teacher education curriculum for the State and the University of Illinois. The following chapter contains information pertinent to establishing a frame of reference for the investigation. Chapter III follows with data on cooperative higher education programs in general, cooperative trade and industrial education programs in particular, and potentialities of cooperative education in vocational industrial teacher education.

Chapter IV is devoted to an analysis of factors which limit the development of a cooperative trade teacher program in Illinois, and Chapter V contains a review of organizational procedures successfully employed in operating cooperative programs.

A proposed curriculum, based upon the findings of the study, is presented and evaluated in Chapter VI. The final chapter contains the summary, conclusions, and professional recommendations.
Chapter II
HISTORICAL BACKGROUND OF THE PROBLEM

The American public since colonial times has expressed, by legal proclamation and action, a faith in the efficacy of education. The first state laws encouraging education in 1642 and 1647, were followed by subsequent enactments in the forty-eight states. The first federal encouragement preceded the organization of the federal government. The Second Continental Congress, in the Northwest Ordinance of 1787, declared that "Schools and the means of education should be forever encouraged." A growing list of federal laws promoting education has grown from that precedent.

Beyond the generalization that Americans have faith in and support education lies little common agreement on its form or content. Despite this, popular statements of the objectives of education have generally included some mention of vocational competency. One of the cardinal principles of secondary education as reported (90, 13) in 1918 by the Commission on the Reorganization of Secondary Education of the National Education Association is "vocation," described as follows:

Vocational education should equip the individual to secure a livelihood for himself and those dependent on him, to serve society well through his vocation, to maintain the right relationships toward his fellow workers and society, and, as far as possible, to find in that vocation his own best development . . .
The Educational Policies Commission, in *Education for All American Youth*, gives (64, 17) the following as one of the common needs of youth:

All American youth will be expected to engage in useful work and will need to work to sustain themselves and others; all therefore require occupational guidance and training, and orientation to current economic conditions.

This is evidence of the support for public education and for the provision of vocational competencies as a phase of that education.

A report is made in this chapter of the historical development of factors and movements which have influenced American faith in education with particular emphasis on vocational education. Attention is given to the ways in which teacher education has moved to meet the demands for trained teachers of trade and industrial teacher education in terms of social and economic needs.

**SOCIAL DEMANDS FOR VOCATIONAL EDUCATION**

Harry G. Good relates (31, 5) man's material and intellectual development in this statement:

The road is long and winding from the cave and the shack to the Parthenon and the skyscraper; but it is, nevertheless, the same road. Civilization and culture, including those intellectual phases which the Greeks called *paideia* and the Romans called *humanitas*, are the cumulative result of work done to satisfy first our basic needs and then those more subtle and refined needs and wants which have grown out of the elemental ones. Only by building civilization can man become human; and it is by work that he builds civilization.
Arthur B. Mays emphatically states (56, l) the relationship between cultural and social development and vocational efficiency as follows: "Among the basic institutions of civilized society one of the most significant is vocation. Upon the continuing success of this institution depends the existence of all others. ... Where progress of the vocations is retarded, all other social institutions are found to be unprogressive, and all human life remains on a low level."

Parker M. Green offers (32, 35-36) the following statement of the importance of vocations to social welfare:

Vocations vary greatly in the facility afforded for direct service to society and individuals differ even more in the purposes which motivate their vocational activities; however, one's vocation affords the chief means of playing a part in the constructive work of civilization. The general welfare of society is thus involved in the vocational life of every individual.

If one accepts the thesis thus advanced that man's cultural heritage and his productiveness are interrelated, it follows that "intellectual education" and "education for work" should have equal prestige in the schools and that the dignity of men who work with their hands, particularly in a democracy, should be understood and appreciated.

The Emergence of a Unitary Educational System. Past civilizations have always glorified the "learned professions" and generally candidates for them were prepared in some sort of school, while education for "lesser" vocations historically has been largely an
individual or family affair. Fabian Ware states (97, 3) that, "For centuries, one might almost say since the moment when Greek civilization reached its zenith, the schools of Europe had devoted themselves almost exclusively to the training of scholars."

The Boston Latin Grammar School, founded in 1635 and earliest predecessor of the high school, brought to the colonies a European form of education suitable for developing a gentleman social class and for continuing the traditional educational pattern. To these functions the trivium of Latin grammar, rhetoric, and logic perhaps seemed appropriate, but to the education of farmers, business men, traders, and craftsmen who were vocal in government and members of a society which recognized no genteel class, it was quite impractical. Thus Americans early began to search for a more suitable system capable of meeting realistically the educational needs of the developing nation.

The Industrial Revolution, which necessitated increased knowledge on the part of those workers whose duty it was to control the new forces applied to industry, emphasized the inadequacy of the traditional restriction of education to the favored few and gave further impetus to the search for suitable education for every citizen.

An early manifestation of this concern was the initiation of trade and technical schools which sprang up under private and later
public auspices. However, the early programs of this type were not incorporated into the offerings of the common schools. The following comment on the relative value of vocational education in the common schools is reported (55, 39) to be "the typical attitude of the opponents of all forms of practical or non-bookish activities in the schools" in the 1880's.

Now the schools we have to conduct are to train boys and girls in those directions that are common to everybody, and one of the things that the boys and girls ought to learn in these schools is how to get information from books. There is no information stored up in the plow, hoe handle, steam engine; but there is information stored up in books. If a boy is prepared to get information from books he can make indefinite progress. If you take out of his hand the books and put in there the hand-saw and the hammer, ask the teacher—who is most likely a young girl—to teach them, when she does not know anything about them, the whole matter simply becomes "a bore" to all parties concerned. The saw is brought into the recitation room and the teacher says "now saw." It is a thing that does not belong to the school at all. It belongs outside and ought to be attended to outside.

In most other nations the practical subjects have been retained in a separate school, and a dual system of education prevails. Youth are sorted at an early age into groups training either for the learned or sub-professional careers. There is little opportunity to change from group to group after this early decision has been made because the curricula are considerably different for the two patterns.

In America the tenets of democracy fostered the question as to whether those preparing for the "lesser" vocations were not
entitled to the same preparation for their life's work as those preparing for the professions. At first this question appeared to most educators as sacrilegious and as an effort to desecrate "the sacred halls of learning." But the economic and social needs prompting the question could not easily be put aside, and the educational leaders were forced (57, 156) to consider this matter and take some definite stand on it. A clear-cut, unanimous answer was impossible because of the lack of agreement on just what composes an education required by all. Such a definition is essential. Many educators have addressed themselves to a definition of what a "common" education implies. Alexander Stoddard advances (87, 6-9) this thought:

There is not one kind of education that prepares a person to make a living and another kind that prepares for living. That is, there is not an education that fits one for the life of a gentleman. The specifics involved may differ somewhat but the distinctions are rapidly disappearing between the practical every-day affairs of the commercial establishment, the industrial plant, the banking house, where men earn their livings, and art, music, drama, and other avenues through which men pursue happiness and the so-called inner satisfactions of life. . . . All Americans should be prepared adequately for productive service, that is, for employment at useful occupations, and all Americans should be prepared so as to enable them to live richly and effectively in accordance with our cultural heritage. Every American should know how to make a living at a useful occupation and also be able to pursue happiness with some assurance of a reasonable expectation of success.

Mays contributes (57, 160) this analysis of the problem:

Educational thought has made notable progress with reference to the relationship between general and vocational education since the first efforts to provide
school vocational education of less than professional level. It has moved by slow steps from an aristocratic, class-conscious concept to an enlightened, democratic way of thinking. The task now confronting American education is to make the school with its varied activities and the total life of the community with all its potential ability to contribute to the education of youth, more effective in bringing about a genuinely democratic program of education. The problem of the modern educator is to develop an educational system which expresses in its practices the democratic philosophy he so often expresses in words. This problem will be solved when educators see clearly that there can be no question of vocational versus general education. These two aspects of the education of every individual constitute the two sides of a coin. When either is lacking, the coin is worthless as a coin. The only problem involved is how to make both as effective as possible, and its solution requires the mutual understanding and cooperative efforts of both the general educator and the vocational director.

The Committee on Research and Publications of the American Vocational Association offers (5, 4) the following comment:

It is appropriate to ask, "What are the public schools doing to help prepare the vast majority of our youth, who will take jobs in business, industry, and service occupations, or become farmers and homemakers?" These young people, like those who enter college, are entitled to some specialized instruction at the secondary school level which will be of direct benefit to them in finding and holding jobs, whatever they may be. They should be impressed with the breadth of opportunities and rights extended to the American worker. This group deserves to receive preparation not only in "how to live" and "what to live for," but also in "how to make a living."

The report of the President's Commission on Higher Education states (72, Vol. I, 62-63):

The ends of democratic education in the United States will not be adequately served until we achieve a unification of our educational objectives and processes.
American education must be so organized and conducted that it will provide, at appropriate levels, proper combinations of general and special education for students of varying abilities and occupational objectives.

The struggle in Illinois over whether vocational education should be separated administratively from the general school system waxed hot during the years immediately prior to and during World War I. The debate was climaxed in 1919 by the passage of the State Acceptance Act which provided for a unitary pattern of control under which the State Superintendent of Public Instruction became the executive officer of the State Board for Vocational Education and the official to whom the State Director of Vocational Education is directly responsible.

The developments leading to the decision in favor of a unitary system is germane to this study. Edwin G. Cooley, former Superintendent of Schools in Chicago, proposed, as the result of a visit to study the dual system of education developed by Georg Kerschensteiner in Munich, Germany, a vocational bill patterned after the German system. This bill had the support of the Chicago Commercial Club and business interests, but on several successive submissions to the legislature was defeated due to the opposition of organized labor and the Chicago Teachers' Federation (62, 20-21).

The Regents' Inquiry into the character and cost of public education in the state of New York as a result of their 1939 study,
listed (68, 56) a number of advantages and disadvantages for separate and combined vocational schools and then stated:

The fundamental disadvantage arising from separating the vocational work, and the only one on which sufficient evidence was obtained to make an authoritative statement, is the mutual disesteem in which each school group holds the other.

A school system divided against itself is not likely to reach the educational level of one in which objectives, procedures, and outcomes of the whole system are discussed in an atmosphere of friendly cooperation. Separation solidifies differences. In attempting to outwit the other, each group makes the innocent pupil the recipient of its venom.

Hawkins, Prosser, and Wright report (35, 116) that, with the single exception of Wisconsin, the American people have delegated the responsibility for vocational education to the regular public schools of the states. The National Manpower Council reports (66, 23) that four-fifths of the 2,000 high schools offering trade and industrial courses under the federal-state program are general high schools rather than vocational schools.

Impact of the Changing Secondary School Population. Phenomenal changes in the secondary school population since the turn of the century have emphasized the need for a reevaluation of secondary school offerings. The first of these changes has been in terms of sheer numbers. The secondary school population has roughly doubled (93, Table 13) each decade from 1900 to 1940, with an over-all increase of greater than ten times in 40 years. There was a noticeable
decrease in secondary enrollments during the 1940-1950 period due to the low birth rate in the 1930's, but the over-all trend is again upward, with the 1960-70 decade predicted to double the enrollments of 1940-50, based upon a doubling of the number of births between 1933 and 1953. When considered in the light of the increased proportion of school-aged youth in attendance, this is perhaps a conservative estimate.

The expansion of the educational enterprise has focused public attention upon its effectiveness in meeting society's educational needs. This attention has encouraged the expansion of practical education in all its many forms.

Impressive though numerical growth in secondary enrollments may be, an even more pertinent aspect of this growth is the proportionate number of school-age youth in schools and the number who complete school. Only about 10 percent of the 14-17 year old youth attended high school in the year 1900. In 1940, 73 percent (72, Vol. I, 25) were in attendance. Yet of every 100 children (6, 3) now entering the fifth grade, fewer than half graduate from high school and only about two-fifths of those who graduate currently enter college.

The American secondary school has changed from an institution serving a minority of the population predominantly preparing for professional careers to a school enrolling nearly three-fourths of the school-age population, only a minority of whom are preparing
for college or able to profit from colleges as they are now con-
stituted. This change in student body has made mandatory the
reorientation of the high school curriculum if the ideal of equality
of educational opportunity is to be obtained.

It was the changing high school population and the resultant
changing educational needs that provoked the Life-Adjustment
Education Program and its concern for the "60 percent" of American
youth who, the Prosser Resolution states (35, 558), are not receiv­
ing the training they need and to which they are entitled as
American citizens.

Diversity of Opinion Among Vocational Educators. This statement
of opinion on the need for vocational education as an integral part
of American free public education cannot be taken as an indication
that educators in general agree to this need. Neither can it be
taken to imply that there is complete accord within the field of
vocational education. Some believe they have no obligation to the
60 percent previously mentioned.

Opposition to a comprehensive high school to meet the needs
of all youth has not been solely from one group. Indications of
support for vocational schools apart from the comprehensive high
school are voiced (74, 131 and 133) by the 1938 Advisory Committee
on Education as follows:

There appears to be an increasing tendency among
many of those engaged in the Federal program of voca­
tional education to consider themselves a separate edu­
cational group and to do everything possible to restrict
positions of administrative authority to those who have come up through the program.

... It seems particularly unfortunate that certain leaders in vocational education have given the impression of deliberately cultivating the attitude of separateness.

Hawkins, Prosser, and Wright summarize (35, 114) some of the theories advanced by vocational educators in support of separate vocational education:

1. Vocational education has accepted the theory of the new (habit) psychology while regular education still follows the theory of the old (faculty) psychology. Consequently, regular school authorities have had no experience to aid them in dealing effectively with vocational education. Just to the degree to which the methods and organizations of the regular schools have been used in vocational education, has the latter tended to become less efficient. The regular school authorities, however expert they may be in the field of general education, have no experience or knowledge which would enable them effectively to organize and administer vocational education.

2. The regular school authorities are already burdened with tremendous responsibilities. ... It would be impossible for a form of education so recently developed, so experimental, and so beset by new and difficult problems, to receive adequate attention from an educational authority already burdened with multitudinous duties and responsibilities.

3. Vocational education must be protected, for many years to come, against the extreme emphasis regular schoolmen lay upon training for "culture." As long as this attitude exists, vocational education cannot get efficient cooperation from such officials. Hence, it must be administered by authorities who are in sympathy with its aims and who attach proper importance to its social and economic value.
4. Where vocational education is administered by a separate body, receiving a direct appropriation for its work, adequate funds for its support are more likely to be secured than where the cost must be taken out of a general school appropriation.

An alternate basis for action is presented (37, 11 and 18) by William B. Hawley as follows:

(We should recognize) . . . the reality that each state and/or local community can develop a lasting but flexible vocational education effort only to the extent that the programs of vocational education within those state and local communities are planned and believed in by the concerned local people, and become a unified part of the total education effort of state and/or local community.

. . . Finance . . . is a tool to accomplish a defined goal through agreed-on activities. If vocational education development is to become an accepted goal of states and local communities, and considered a responsibility by them as an inseparable part of the total educational effort, original and forward-looking planning must not be tempered by external "pressure," financial or otherwise. Ideally, states and local communities will carry forward their plans, determine their directions and goals, organize potential programs, pave the way for increased excellence in existing programs; then look for the resources to help achieve these things.

. . . The "security" of the permanent appropriation clause of the Smith-Hughes Act should not create a blind spot which will black out a road to a course of action which promises to help bring some of our basic ideals and our educational practices into a closer relationship.

Educators—and vocational educators in particular—must have the courage to look to the future, take full measure and advantage of the present, and learn with vision and wisdom the lessons of the past.

These two preceding bases for planning and organizing a comprehensive vocational education program express the views held by
vocational educators at both extremes. Between these two extremes are found all degrees of differing opinions. However, in keeping with the precepts of American democracy and the weight of the arguments advanced, the latter views are more acceptable. In this regard, the National Manpower Council states (66, 21):

Preparation for citizenship, for the growth of the individual, are related and complementary purposes of secondary education. They are not in conflict with one another, or even in competition, although the debates that engage educational leaders sometimes suggest that they are.

Status and Trends - With Reference to Illinois. Illinois produces one-fifth of the nation's steel, ranks third in the nation in the value of manufactured goods, and has one-half of its more than four million labor force employed in some trade and industrial occupation. This in itself is strong argument for a broad trade and industrial education program in the state.

Trade and industrial education is provided (7, 9) for employed workers in more than 60 occupations. On the secondary level trade preparatory classes are given in twenty-five areas leading to training in order that students may enter as apprentices in specific trades.

The first day school trade and industrial program was begun in Illinois with sixteen enrollees. Part-time classes brought the first year's total to 1,221. This compares with enrollments in the same categories for 1953-54 of 6,051 and 28,048. Courses for these
latter students were offered (43, 12) in 103 school districts with
122 administrative units.

Due to the excellent cooperation of labor and employer groups,
there has been a marked increase in interest in part-time trade ex-
tension classes. One of the pioneers in the state in this work was
the Washburne Trade School of Chicago which began operating in
1919 with an enrollment of twenty-five apprentices in carpentry.
Today it is one of the outstanding apprentice training institutions
of its kind in the nation, enrolling (43, 9) nearly 4,000 apprentices
in a dozen trades.

Enrollments in trade and industrial education in Illinois for
the period 1917 to 1954 are depicted in Table I. The general trend
has been toward an increased enrollment, although two very noticeable
reversals are in evidence. The first of these, in the years follow-
ing the stock market crash in 1929, was not checked until 1932.
During the depths of the depression, with jobs difficult to find,
youth entered training programs. This was indeed fortunate in view
of the demand for skilled workers at the outbreak of World War II.

The second marked enrollment decrease was caused by several
factors. Youth entered the armed forces, and federally controlled
and operated training programs. Youth of school age were decreasing
in numbers because of the lower birth rates in the depression years.
The Smith-Hughes Act of 1917 initiated the trend toward an in-
creasing public school vocational education enrollment. The
continuing over-all increase indicates at least a degree of satisfaction with this program. The general enrollment trends in Illinois are similar to those throughout the country.

A significant trend was discovered within the Illinois day-trade program enrollments through a study of state department office files. This trend cannot be verified from state or federal published reports because no breakdown is made of the day-trade enrollments. However, by the means discussed, the proportion of enrollments in Type A and Type B programs were found to be changing markedly as shown in Table II. The data indicate a rapid shift from the more restrictive Type A program to the more flexible general industrial Type B program which provides for a broader vocational training.

Table II
ALL-DAY TRADE CLASS ENROLLMENTS IN ILLINOIS, 1945-1954

<table>
<thead>
<tr>
<th>Period</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type A</td>
</tr>
<tr>
<td>1945-46</td>
<td>5,452</td>
</tr>
<tr>
<td>1949-50</td>
<td>3,275</td>
</tr>
<tr>
<td>1953-54</td>
<td>2,128</td>
</tr>
</tbody>
</table>

All-day classes in Illinois received about 43 percent of the combined trade and industrial secondary school funds in 1953-54. Part-time extension and evening schools used another 34 percent, and
the remainder of the budget, about 23 percent, was spent on cooperative programs, general continuation classes, and supervision, travel and coordination (43, 69).

Within the various vocational fields in Illinois, trade and industry received 25.3 percent of the total disbursement. Home-making and agriculture each received about 30 percent, with the remaining 15 percent going to supervision, distributive education, and teacher training, in that order (43, 12).

Despite tremendous progress in trade and industrial education within the state, one needs only to make a comparative analysis of vocational agriculture and trade and industrial programs to clearly outline the job remaining to be done.

Agriculture in Illinois employs 260,000 people, while trade and industrial occupations employ over 2,000,000, yet vocational agriculture had 511 approved departments and an enrollment of 32,072 in 1954, while trade and industrial education had 103 approved programs and an enrollment of 28,048 for 1954. There is considerable room for expansion of trade and industrial education programs in the state of Illinois (40, 18).

The national situation is much the same. Earl J. McGrath, President, University of Kansas City, and former United States Commissioner of Education, gives (59, 17) this report on the national picture:
Viewing . . . developments of the past 3½ years some may ask whether objectives of the Smith-Hughes legislation and other acts of Congress related thereto have not already been fully achieved? In spite of . . . excellent achievement this question must be answered in the negative. Of the 24,000 public secondary schools in the United States last year, only 14,000 had any vocational education program whatever . . .

. . . It has been conservatively estimated that if the needs of the nation are to be met, twice the number of young people who are now receiving such training should actually be in a vocational program.

. . . These facts make it abundantly clear that when one asks the question, has vocational education reached full maturity? the answer must be "no." The cold bare fact is that less than 50 percent of the young people of the nation who need and can profit from vocational education of less than college grade have an opportunity to gain such an education . . .

The National Manpower Council makes (66, 176-77) the following recommendations to alleviate the above situation:

1. Now that work has been removed from the home and direct participation in work is often postponed until eighteen or later, the schools have an obligation not to turn young people loose in the world of work and adult economic responsibility without prior preparation.

2. Interest is vital to learning. The school can best enlist the enthusiasm of many students by centering their studies about an occupational goal. Moreover, once the student's interest in purely occupational training has been captured, it is then possible to extend his motivation into related courses such as mathematics and science and sometimes into general education course which had formerly seemed to have no connection with life.

3. The high schools must provide systematic skill training because apprenticeship and other organized on-the-job training programs are not sufficiently developed to take care of the nation's needs. In view of the large number of skilled workers who pick up their abilities
haphazardly and by chance, the contribution of the vocational schools to the nation's skilled labor force takes on added significance. For the high schools to neglect systematic preparation in the fundamentals of industrial work would not be fair to the worker, wise for the economy, nor safe for the national interest.

ECONOMIC DEMANDS FOR VOCATIONAL EDUCATION

Human values are of primary consideration in an educational system, but these cannot be considered apart from economic factors. In a primitive society there is little need for formal vocational education. Each youth observes the total operation of the community and participates in the family group, producing food, clothing, and shelter. Whatever skills are demanded of him in adult life are generally acquired as part of his normal rearing. Even one hundred years ago only 20 percent of the American labor force worked for an employer. With the intervening shift from an agrarian to an urbanized, highly interdependent industrial society, however, only 20 percent of the labor force are self-employed.

When compulsory education laws, rigid enforcement of attendance, rising standards of living, employment policies, and local, state, and federal labor agreements and legislation are added to the changing social scene, severe problems of vocational adjustment face modern youth.

Vocational adjustment is not the problem of only a few of the secondary school pupils when they leave school. By one means or another, virtually the whole of this group must become occupationally adjusted. At the present time,
the main source of help for these pupils is their own initiative. But the history of what happens to many of them is clear evidence that self-reliance is not sufficient when the training has been inadequate. To rely on children to find their own calling results in tragic cost.

This observation was made (68, 140) in the report of the Regents' Inquiry in New York State. Thus an investigation will be made of a minute part of the complex economic factors which affect the demand for vocational education in modern society.

**Man versus Machine.** A continuing debate is waged over the wisdom and outcome of man's increasing dependence upon the machine. Oswald Spengler in *Man and Technics* predicts only one outcome for an ever increasingly complex technological society, and that is destruction. An antithetical position is that technological advancement can enable man to achieve a finer civilization and culture. Some reinforcements for this latter belief are advanced as follows:

We cannot neglect technical education. The world's resources, human and physical, are not unlimited or too large. We have never produced enough properly to take care of the world's population—never. We must hope to do so and plan to do so if we want succeeding generations to live in peace and dignity. Both the human and the physical resources of the world will be taxed to do so. Technical and scientific education against that background takes on new urgency. W. S. Lloyd, Minister of Education, Saskatchewan Province, Canada (52, 293-94).

There is all too little truth in the picture of the happy, creative artisan of other centuries who loved the product he created and was one with his environment. To the extent that he existed at all, he was one of a very
small minority. His fellows were underpaid and overworked; they died young. We cannot believe that men were never uprooted or unemployed . . . that all workers were at peace with their fellows, up to the time James Watt discovered the uses of steam and Eli Whitney fitted together a set of interchangeable parts. Nor did men begin to be frustrated, insecure, unhappy, and tired of dull jobs only after Henry Ford had laid down the first assembly line forty years ago.

Some tend to forget that in the fine preindustrial cultures of the past a small privileged class lived on the destitution of the great submerged mass of humanity. If we would see history as it really was, we need only visit China today, or India, or Russia. These peoples, living in the main by spinning-wheel agrarian culture, share one passionate desire—to acquire adequate food, clothing, and shelter. They will get even that minimum only through industrialization, for only industrialization can produce enough to provide broad and varied distribution of goods and services to all classes. They will get it, too, only under that system of free wages and prices known as democratic capitalism . . . Gwilym A. Price, President of Westinghouse Electric (81, 18-19).

Freedom and dignity and a good life are not confined to a homestead on the land. They are possible in an industrial civilization, and moreover they are possible for all the people who contribute constructive effort to industrial enterprise . . .

Under the American form of government the capitalistic, profit-making system and its industries can be made to take cognizance of the human equation in labor relations and with respect to human welfare. We have had enough experience during the past hundred years with such matters, in my opinion, to believe that this is true . . . Therefore we struggle for equality of status, for economic security. And in the struggle we have improved the whole United States. A. J. Hays, President of the International Machinists Union (81, 20).

The consensus of opinion indicates that the real question is not one of "man versus machine" but one of how the rich potential of technology can be directed to solving man's economic needs and through
this, how to provide man with greater time to master his social environment.

**Changing Employment Patterns.** The National Manpower Council, in its recent study of skilled manpower needs, decried (66, 18) the lack of an adequate inventory of skilled and technical manpower and the subsequent lack of reliable forecasts of the nation's future requirements in this field. However, certain changes in employment are evident. Probably the most important shift in employment has been from agricultural employment to urban, industrial employment. The total population of the nation doubled during the 1900-1950 period, yet the farm population declined one-third. Within this change has been a further shift from small shops to large factories, with a resultant specialization of employment (60, 14).

The historical changes in employment patterns have been from universal self-employment to obtain the necessities of life, to the specialization of occupation resulting in the self-employed handi­craftsman who sold goods to purchase his needs, to the unskilled laborer of the early industrial period, to the semi-skilled factory worker, and finally a reversion to the skilled craftsman who this time is employed by someone else.

This latter trend is described (66, 57) by the National Manpower Council as follows:

> From today's vantage point, the automatic factory of the future promises to displace the semi-skilled operative, the machine-tender whose work is narrowly specialized and more or less routine, in much the same
way that earlier changes in technology adversely affected the handicraftsman, and to give added significance to the skilled and technical labor needed for production, maintenance, and repair of the new automatic machine. One forecast of the manpower results of automation sees the appearance of a new type of "artisans" who will be "skilled adjuster-builders."

As this trend toward an increasing need for skilled and technically trained workers increases, there will result a wider demand for industrial-vocational education to further complicate already inadequate provisions.

Skilled Manpower and the Economy. The relationship of the quantity and quality of skilled manpower available in an industrial economy to economic development and progress is apparent. Other factors such as geography, climate, availability of raw materials, and transportation facilities influence the economic situation. Placing the finest factories in the finest of environments without providing skilled labor to operate and maintain them would result in failure.

The National Manpower Council states (66, 58) that, "It is clear that the lack of skilled workers can impede economic expansion, and that technological advances depend as much upon the availability of skilled technical labor as upon the contributions of scientists and professionally trained workers." Despite this, the majority of skilled workers in American industry are trained by methods that are neither consciously directed nor planned.
Due to unrecorded factors, such as the importation of countless European craftsmen in the early years of this century, to fill skilled positions in American industry, the true demands for skilled labor throughout the period of industrial growth are unknown. However, what is known indicates that skilled workmen are not being replaced as fast as they are being lost, not to mention needed increases. The serious effects of such a continued situation on the national economy both nationally and internationally can be foreseen.

In *A Policy for Skilled Manpower*, five major long-range objectives are prescribed (66, 3-4) for strengthening the nation's resources of skilled workers and technicians:

1. To strengthen the contributions made by secondary education to the acquisition of skill.

2. To develop a more effective program for vocational guidance.

3. To provide more equal opportunities for all individuals and technical manpower.

4. To improve the facilities and methods used to train skilled and technical manpower.

5. To increase knowledge about our manpower resources.

In the 23rd Yearbook of the National Society for the Study of Education, the statement is made (67, 417) that, "A community must pay either for the cost of training labor or for the much greater cost of inefficiency of labor, and inefficiency of labor means
inevitably general industrial and commercial inefficiency." This statement does not refer to the resultant decrease in the standard of living which also must follow a de-emphasis of vocational training, but when this and all the factors are considered, America cannot afford the price of inadequate vocational education.

Relationship Between Social and Economic Needs. The individual in an agrarian economy can foresee the function he will likely fulfill in adult life. This anticipation controls his thought and action in the developmental years and culminates in satisfaction which results from knowing that he has a purpose which is consistent with society's needs. Under these economic conditions little concern need be devoted to inconsistencies or weaknesses in the social-economic relationship.

Industrialization has complicated this relationship, and the far-reaching implications are of extreme importance to the individual, the common welfare, and American education. The relationship of economic productivity and the social environment is pointed out (19, 3) by Samuel M. Brownell as follows:

The tremendous economic productivity of our nation has resulted in part from the great abundance of our natural resources. But full credit must also go to a people who have seen the importance of education in the world's work and who have insisted that educational opportunity shall be widespread and adapted to the important needs of our people and the society in which they live.
The demands of a growing population, a rapidly expanding technology, and changing characteristics of the workaday world bring new large responsibilities to us all. The level of basic knowledge needed by the every-day citizen to stay even with technical developments in his occupation and to comprehend his responsibilities as a citizen is steadily increasing.

However, the individual's difficulty in comprehending his role as a citizen under modern economic conditions and his lack of security and feeling of worth are pointed out (54, 131) by Elton Mayo:

Just as our political and economic studies have for two hundred years tended to take account only of the economic functions involved in living, so also in our actual living we have inadvertently allowed pursuit of economic development to lead us into a condition of extensive social disintegration.

... The most important problem for a complex and rapidly changing society is the contrivance of means that will assure the preservation of a social integrity of function side by side with the development of function. It is probable that the work a man does represents his most important function in the society; but unless there is some sort of integral social background to his life, he cannot even assign a value to his work.

Prosser and Quigley discuss (73, 410-11) the plight of the modern worker and its effect on society and the economy as follows:

In the shop, store, and office, on the farm and in the home, the workers of America are confused by the kaleidoscopic, technological, and economic swirl in which they are engulfed; disturbed by the shifting demands of their occupations; discouraged by the uncertain character of their employments; alarmed by the rising standards and requirements of their occupations; and baffled in their efforts to meet these rising standards because they need knowledge and understanding, as well as skill, which their daily job alone cannot provide.
These difficulties lead to unemployment, lowered morale, social unrest, reduced income, and lower standards of living among workers. They also lead to a growing inability of workers to meet the rising standards of efficiency in the performance of work which competitive business has set up in the case of industry and commerce; competitive agriculture in the case of homemaking. Entirely aside from the question of justice to the beleaguered workers of the country and of their personal welfare, the future of American industry, American business, American agriculture, and the American home is at stake.

The role of the school in preventing the aimless wandering of youth seeking employment, in guiding youth in determining a suitable life's work, and of aiding youth in becoming initially adjusted to economic activity is clear. With the family no longer able to provide vocational orientation and training for youth, the school, as society's designated educational agency, must assume these functions for the welfare of the individual and the group. Youth who no longer can see their function or contribution in a highly complex society must be aided in their efforts to give order and meaning to their lives.

TRADE AND INDUSTRIAL TEACHER EDUCATION

The relationship of progress and efficiency in the public schools to the effectiveness of teacher education has not been determined, but if education and training are of value, it can only follow that there is a positive correlation between them. It is accepted as a postulate in this study that education and training are of value and that the effectiveness of teacher education is
the most important determinant of progress in the public schools.

Traditional Methods of Recruiting and Training Teachers. The trade teachers of old provided their apprentices with opportunities for learning the skills of a particular craft by observing and helping in their craft. Ramifications of the movement from a handicraft to an industrial economy, paralleled by the development of a science of pedagogy, led to a demand for trade-trained craftsmen who had some professional training as teachers.

The early source of trade teachers in the modern sense was direct recruitment from the trade to be taught. That this remains the primary source today, is illustrated in Table III. Of 39 states responding, 32 indicated that their primary means of trade-teacher recruitment was directly from the trade. Five states listed colleges and universities as their primary source of trade teachers, and only two states indicated that industrial education teachers already in the field were their primary source.

Keller reports (50, 18) that there are three methods of recruiting and preparing vocational teachers: (1) general education, teacher-training courses and specific trade education are given by a designated teacher training institution, (2) experienced tradesmen are secured and given teacher-training prior to teaching service, or in-service training, and (3) persons skilled in various trades are employed directly from the trade without teacher training being required.
Table III

SOURCES OF ALL-DAY SHOP TEACHERS BY STATES SHOWING RANK OR PREFERENCE OF THREE ORIGINS*

<table>
<thead>
<tr>
<th>State</th>
<th>Industry</th>
<th>Colleges and Universities</th>
<th>Industrial Education Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>100%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Arizona</td>
<td>No response</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Arkansas</td>
<td>2</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>California</td>
<td>100%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Colorado</td>
<td>1</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Connecticut</td>
<td>1</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Delaware</td>
<td>100%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Florida</td>
<td>1</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Georgia</td>
<td>1</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Idaho</td>
<td>100%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Illinois</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Indiana</td>
<td>No response</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Iowa</td>
<td>No response</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Kansas</td>
<td>2</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Kentucky</td>
<td>100%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Louisiana</td>
<td>100%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Maine</td>
<td>1</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Maryland</td>
<td>100%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>1</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Michigan</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Minnesota</td>
<td>1</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Mississippi</td>
<td>No response</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Missouri</td>
<td>1</td>
<td>2</td>
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</tr>
<tr>
<td>State</td>
<td>Response</td>
<td>Number</td>
<td>Number</td>
</tr>
<tr>
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<td>----------</td>
<td>--------</td>
<td>--------</td>
</tr>
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<td>Montana</td>
<td>No response</td>
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</tr>
<tr>
<td>Nebraska</td>
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<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Nevada</td>
<td>2</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>100%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>New Jersey</td>
<td>1</td>
<td>2</td>
<td>-</td>
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<tr>
<td>New Mexico</td>
<td>No response</td>
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<td>New York</td>
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<td>North Carolina</td>
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<tr>
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<tr>
<td>Ohio</td>
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<tr>
<td>Oklahoma</td>
<td>1</td>
<td>2</td>
<td>-</td>
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<tr>
<td>Oregon</td>
<td>100%</td>
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<tr>
<td>Pennsylvania</td>
<td>1</td>
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<td>-</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>100%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>South Carolina</td>
<td>1</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>South Dakota</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Tennessee</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
<tr>
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<td>1</td>
<td>3</td>
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</tr>
<tr>
<td>Utah</td>
<td>1</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Vermont</td>
<td>1</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Virginia</td>
<td>70%</td>
<td>30%</td>
<td>-</td>
</tr>
<tr>
<td>Washington</td>
<td>1</td>
<td>2</td>
<td>-</td>
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<tr>
<td>West Virginia</td>
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<td>Wisconsin</td>
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</tr>
<tr>
<td>Wyoming</td>
<td>2</td>
<td>1</td>
<td>-</td>
</tr>
</tbody>
</table>

*Rutherford E. Lockette. Table I from a report made in Ed. 499, University of Illinois, Spring Semester, 1954.*
Advancing Certification Requirements. Licensing standards for all teachers have been advancing. As recently as 1937 only five states required any public school teachers to have four years college preparation. In 1955, 30 states required at least college graduation for all teachers. Other states are working on legislation to advance existing requirements. Table IV indicates the steady advance in certification requirements for the period 1921 to 1955.

Table V indicates the increase in educational requirements for all-day trade and industrial teachers in the period 1946 to 1954. It will also be noted from Table V that no state of the 41 responding required a four-year college training for trade and industrial teachers. This means that either the states reported in Table IV as requiring four-year degrees for all teachers are discounting special legislative dispensations for vocational certificates, or they are giving lip-service to the qualification. In 1951 the Illinois Legislature passed a law requiring uniform certification, but in face of the inadequate supply of qualified trade teachers, was forced to extend the enforcement of the law. This extension expires on July 1, 1955, but the only recourse under the present situation is to again extend the enforcement.

The Competent Trade and Industrial Teacher. There is universal acceptance that a trade teacher must know his trade before he can teach it, but there is no universality of opinion on how this
Table IV
ACADEMIC REQUIREMENTS FOR TEACHER CERTIFICATION

<table>
<thead>
<tr>
<th>Minimum Scholarship Prerequisites</th>
<th>Number of States</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>1921* 1926* 1937* 1955#</td>
</tr>
<tr>
<td>High School graduation and 4 years of higher grade</td>
<td>0 0 5 30</td>
</tr>
<tr>
<td>High School graduation and 3 years of higher grade</td>
<td>0 0 8 2</td>
</tr>
<tr>
<td>High School graduation and 2 years of higher grade</td>
<td>0 4 11 12</td>
</tr>
<tr>
<td>High School graduation and 1 year of higher grade</td>
<td>0 9 8 4</td>
</tr>
<tr>
<td>High School graduation and less than one year of higher grade</td>
<td>4 14 2 0</td>
</tr>
<tr>
<td>Four years secondary school (may or may not include professional courses)</td>
<td>14 6 6 0</td>
</tr>
<tr>
<td>No scholarship requirement</td>
<td>30 15 8 0</td>
</tr>
</tbody>
</table>


Table V
MINIMUM EDUCATIONAL QUALIFICATIONS OF ALL-DAY SHOP TEACHERS

<table>
<thead>
<tr>
<th></th>
<th>Qualifications in 1946*</th>
<th>Qualifications in 1954*</th>
<th>Increase (+) or Decrease (-)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Elementary</td>
<td>Secondary</td>
<td>Teachers</td>
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<td>Alabama</td>
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<td>X</td>
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</tr>
<tr>
<td>Arkansas</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>California</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colorado</td>
<td></td>
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<td>Connecticut</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Delaware</td>
<td>X</td>
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<td></td>
</tr>
<tr>
<td>Florida</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Georgia</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Idaho</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illinois</td>
<td>X</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Indiana</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iowa</td>
<td>X</td>
<td></td>
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</tr>
<tr>
<td>Kansas</td>
<td>X</td>
<td></td>
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<td>Kentucky</td>
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<tr>
<td>Louisiana</td>
<td>X</td>
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<td>Maine</td>
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<tr>
<td>Maryland</td>
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<td>X</td>
<td>X</td>
<td></td>
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<td>Michigan</td>
<td>X</td>
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<tr>
<td>Minnesota</td>
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<tr>
<td>Mississippi</td>
<td>X</td>
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<tr>
<td>Missouri</td>
<td>X</td>
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<td></td>
</tr>
<tr>
<td>Montana</td>
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Table V (Continued)

<table>
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<tr>
<th>State</th>
<th>Requirement</th>
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<th>¾</th>
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</thead>
<tbody>
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<td>Nebraska</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Nevada</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Hampshire</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Jersey</td>
<td>X</td>
<td>X</td>
<td>2 - X</td>
<td>4</td>
</tr>
<tr>
<td>New Mexico</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New York</td>
<td>X</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North Carolina</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North Dakota</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Ohio</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Oklahoma</td>
<td>X</td>
<td></td>
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<tr>
<td>Oregon</td>
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<tr>
<td>Pennsylvania</td>
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<tr>
<td>Rhode Island</td>
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<tr>
<td>South Carolina</td>
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<tr>
<td>South Dakota</td>
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<tr>
<td>Tennessee</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Texas</td>
<td>X</td>
<td>2</td>
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</tr>
<tr>
<td>Utah</td>
<td></td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Vermont</td>
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<tr>
<td>Virginia</td>
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<td></td>
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<tr>
<td>Washington</td>
<td></td>
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</tr>
<tr>
<td>West Virginia</td>
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</tr>
<tr>
<td>Wisconsin</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Wyoming</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>


# Rutherford E. Lockette. Table II from a report made in Ed. 449, University of Illinois, Spring Semester, 1954.
competency shall be measured. The divergent points of view on
the nature of trade competency are represented in articles by
Leighbody and Vezzani. Vezzani presented (95, 9) the following
thesis:

... the policy of using apprenticeship plus
journey-man experience as the primary basis for the
selection or approval of trade teachers appears to
be faulty.

Since there is some doubt on the question, the
state vocational staff in Michigan decided to inter­
pret the apprenticeship standards for trade teachers
liberally. As an experiment, it was decided to base
the approval of trade teachers on their competence in
their trade, regardless of how this competence was
developed. Moreover, the competence of a candidate
was to be determined by adequate tests, administered
by qualified examiners.

This plan was opposed (51, 7) by Leighbody as follows:

It is a great error to assume that any type of
test yet devised, performance or otherwise, can meas­
ure the occupational competence of a prospective
teacher. At best such a test can sample (and in a
limited way) only the ability of a candidate to oper­
ate certain machines, handle certain tools, or answer
certain technical questions connected with an occu­
pation. Knowing about an occupation is far from be­
ing competent to teach it. The most important aspects
of occupational competence are not revealed by such
tests, and can be understood only through rich and
fairly lengthy experiences as a mature worker in the
occupation.

The latter position would have been strengthened by an ex­
position of how the "richness" of occupational experience is
determined. As regards length, it was stated (51, 7) that,
"There are few occupations of a skilled or technical nature which
would not require a minimum of five years for reaching the
occupational maturity which is the hallmark of the successful vocational teacher."

There is no greater agreement concerning the other competencies of the trade and industrial teacher than there is concerning technical competency. There is general agreement that trade and industrial teachers should be qualified teachers and participating citizens in their community, but there is great diversity of opinion on what these imply and how the competency shall be determined.

The reason for confusion concerning accepted requirements for trade and industrial teachers is obvious. It is the hopelessness of providing adequate numbers of competent tradesmen who are willing to complete the conventional teacher-training program that leads to a multitude of proposals requiring somewhat less than the combination of these two. (See Table V.) Yet in consideration of the thesis that vocational education is an integral phase of public education, comparable preparation and qualifications should be required for all teachers.

Problems in Traditional Programs. In addition to the hopelessness of providing adequate numbers of trade teachers with broad educational backgrounds and journeyman experience in their trades, there are many problems faced by college programs in training the teachers who do follow this course. Certain of these problems will be listed briefly.
1. Even though tradesmen can be drawn into conventional college programs, they are four years removed from their trade at graduation, and this, in terms of the rapidity of modern technological development, nullifies much of their previous trade training.

2. Certain values to be gained through simultaneously taking the general, professional, and technical aspects of a program are lost when these are taken separately. Relationships and applications are more readily made in an integrated program. Over-all planning is also greatly facilitated in a combined program.

3. When trade training is obtained only during summers, certain seasonal experiences are not received. There are also definite as well as subtle differences between part and full-time employment.

4. Tradesmen specialize in modern industry, yet trade teachers need broad training. For example, few individuals in the printing industry are skilled as compositors, pressmen, bookbinders, engravers, linotype operators, and photolithographers, but the trade teacher needs competencies in all these areas. It thus becomes the obligation of the teacher training institution to round out the craftsman.

5. Adequate campus facilities for training teachers in all the trades involve financial outlays. Most states have only a handful of vocational teachers in a number of the trades, yet facilities for adequately training them should be available.
6. Obsolescence of equipment for modern training facilities occurs at such a rapid rate that some equipment is already outdated by the time it is installed.

7. Schools have little or no voice in the type of trade experiences prospective teachers obtain.

8. It is difficult or impossible to maintain a competent staff to teach on-campus technical phases for the number of teacher candidates in the various fields.

9. Salaries of beginning teachers make it economically difficult to expect a tradesman making over $5,000 annually to forego this income for four years.

10. Tradesmen with a few hours of "teacher training" who rise to positions of local, state, and national leadership find themselves handicapped by the lack of educational background.

ADEQUACY OF TRADE AND INDUSTRIAL TEACHER EDUCATION

In view of increasing teacher shortages, rapidly advancing high school enrollments, lack of common guiding principles and policies in trade and industrial teacher education, and problems facing present programs, an evaluation of the adequacy of present practices is timely.

The Socio-Economic Demands. There is common agreement that inadequate vocational education results in human and economic waste in a highly industrial and interdependent society. Evidence of an
engulfing tide of secondary school enrollments about to flood the schools is abundantly clear, and the aggravation of the present teacher shortage by rising enrollments and expanding vocational education programs is also evident. Despite this there is an ominous lack of activity in teacher education to determine potential needs and to revise teacher training methods to enable them to more nearly meet these needs without losing present gains made in certification standards.

The needs of society and the economy demand that teacher training institutions provide the schools with competent trades teachers who can not only teach their trade but who also comprehend the needs of youth and the manner in which they learn and develop. It is equally important that they understand the role of the school in the social order so they can participate in and contribute to school-community planning. It is clear that traditional methods of recruiting and training teachers will not fulfill the demands for teachers with all these competencies, and an alternate method of trade and industrial teacher preparation must be found if the needs are to be satisfied.

Inconsistencies. The following appear as inconsistencies between existing trade and industrial teacher education recruitment and training practices and educational developments and socioeconomic conditions:
1. On the one hand there is an evolving philosophy that vocational education is an integral phase of public education, and on the other hand there is a universal pattern of differential certification requirements for vocational teachers.

2. In the face of mounting demands for ever more skilled workers, mounting enrollments, and expanding vocational programs, teacher education institutions are making little or no effort to broaden the base for recruitment to provide a more adequate supply of teachers.

3. Conventional teacher education programs recruit students from high school graduates who have not yet established families and become entrenched in an adult community. Trade and industrial teacher educators have not availed themselves to any appreciable extent of this supply of trainees.

4. There has been a rapid advance in certification requirements for teachers as a whole, while the certification requirements for vocational teachers have remained relatively unchanged.

5. There has been widespread effort on the part of educators as a whole in such reports as General Education in a Free Society, The Improvement of Teacher Education, and Higher Education for American Democracy to define a common basis for education in a free society. No comparable efforts have been made by professional vocational educators.
6. There is general recognition that a vocational teacher must be technically competent but that this in itself is inadequate. Yet there has been no comprehensive planning to provide for teaching and citizenship competencies.

The writer seeks through this study an alternate plan of recruiting and training trade and industrial teachers, especially for the State of Illinois, to provide an adequate supply of competent teachers, to overcome certain of the problems facing conventional programs, and to remove some of the inconsistencies which now prevail.
Chapter III
COOPERATIVE HIGHER EDUCATION

Work-study programs in higher education have taken and continue to take varied forms depending upon the objectives of the parent institution. No investigation will be made of the various forms of cooperative education in connection with this study, for this would be a duplication of the dissertation by Leo F. Smith in 1943, Cooperative Work Programs in Higher Education, and the study reported by the United States Office of Education of 1954 on cooperative education. The findings of these studies and other data will be employed in establishing the status and trends in this field. Virginia M. O'Neil's dissertation, The Function of Work Experiences in Education in a Democracy, provides a background and a philosophical basis. Her study will be relied upon for that phase of this chapter.

The major emphasis given to the work aspect of a cooperative program is generally economic, social, vocational, or a combination of these. Whatever the major emphasis may be, the other elements will also influence the program. The major concern of this study is vocational education, but pioneering programs with each of the above, will be studied in recognition of the part each plays in a total program.
DEVELOPMENTS IN HIGHER EDUCATION

With the advance of the industrial revolution it became apparent that a new type of training was needed to prepare men for rising industrial needs and demands. The Rensselaer Polytechnic Institute was founded in 1823 and from that time technical institutes and engineering colleges grew and expanded both in number and enrollments. There was considerable criticism of these institutions by the beginning of the twentieth century because of the lack of application of theory with industrial practices, and the cooperative idea was born as a result.

Basic Assumptions of Cooperative Programs. Smith reports (77, 31) that two basic philosophies appear to govern the organization and administration of the "co-op" programs. These are: first, work in and of itself is of value in broadening the student's outlook on the needs and demands of the world, and second, the job provides practical applications of the theories studied in school and hence aids students to grow in their ability to understand the relationships of theory and practice.

Antioch College champions the first thesis, and the University of Cincinnati and subsequent cooperative engineering programs support the second. The following quotation expresses (9, 8-9) the basic ideals which govern the Antioch work program:

Primarily, Antioch regards this experience (work) as wedded a liberal education to life. It is intended to place the student at grips with the realities of
life, to help each select a profession or vocation, to develop a sense of social and financial responsibility, to accelerate the development of initiative, poise, and self-confidence, and to beget in the student a compelling code of ethics.

Schools supporting the idea that work gives meaning to theory, take care that jobs are related to the student's major field of study, a concern which is not important in the former concept. They also believe that effectiveness is dependent upon the thoroughness with which the placement and campus phases of the program are coordinated. Within these limitations, however, they believe the program to be sound. On the values of cooperative education, Parks states (70, 15): "From the standpoint of the school and the student, the most important feature of cooperative education is the realization of theory through its practical applications. In a very literal sense, the studies in the curriculum become 'applied subjects'."

Smith reports (77, 32) that, "Similar statements may be found in the publications of other cooperative engineering colleges. The administrators of these institutions are firm in their belief that students grow in their ability to understand and appreciate the relationship of practice and theory and hence develop a technical competence which cannot be approached in a full-time program."

Types of Cooperative Programs. There are two types of cooperative education, the distinction lying in their administrative organization: first, the cooperative plan in which students devote
full-time to academic studies for a period and then work full-time during alternate periods on jobs off-campus; second, the institutional work plan whereby students attend regular classes throughout the school year and work part-time daily in campus work which is organized and administered by the school. The University of Cincinnati uses the first plan, while Berea College, in Kentucky is the most widely known school employing the second. These schools form the extreme ends of a continuum on which may be found work-study programs embodying in varying degrees some of the principles of both types of organization.

Some colleges with long-established cooperative plans are Northeastern University, Boston, Massachusetts; University of Detroit, Detroit, Michigan; Antioch College, Yellow Springs, Ohio; and Drexel Institute of Technology, Philadelphia, Pennsylvania. Antioch College stands out among these as having the program with the heaviest non-technical emphasis.

Some colleges with well-known institutional work plans are Blackburn College, Carlinville, Illinois; Park College, Parkville, Missouri; Tuskegee Institute, Tuskegee, Alabama; and Union College, Lincoln, Nebraska. Institutions of this latter type are not included in the study reported in the United States Office of Education Bulletin, Cooperative Education in the United States, and are not considered extensively in this study for these reasons: school organized and administered employment may not be representative of
modern business and industrial practices, certain values to be
gained by working outside the campus community are not obtained,
and the variety and depth of experiences available off-campus cannot
be obtained on campus.

**Origin of the Cooperative Plan.** Clyde W. Park states (71, 415):

The cooperative plan was not put into practice any­where until 1906, when Dean Schneider introduced it at
the University of Cincinnati, but the idea seemed ob­vious and almost inevitable, once it was brought to peo­ple's attention. It was admittedly a new departure in
education, and yet it seemed to be something that should
have been done long before.

Dean Herman Schneider of the University of Cincinnati is right­fully considered the father of the cooperative idea. Actually ap­prenticeship training, part-time programs, extension schools, the
Manual Labor Movement, and various similar forms of combined work
and study had been employed long before the inception of the Cinc­cinnati program. However, a cooperative program as part of a formal
higher education program and involving alternating periods of full­time employment and campus study with coordination of the two ac­tivities had not been tried before.

Professor Schneider joined the staff of the University of
Cincinnati as an Assistant Professor of Civil Engineering in 1903.
This was three years after the College of Engineering was organized
as a department of the University. In a study made at Lehigh Univer­sity prior to his joining the University staff, he had found that
most graduates, who, after completing their college courses, had
shown marked engineering ability had either worked while attending college, during vacations, or stayed out of college a semester or a year in order to earn money to continue their education. This led him to the idea that engineering students might start employment on a part-time basis while still in college and that the work might be a recognized part of the education program.

He visualized a new kind of institution which would offer a combined theoretical and practical training designed to give the student a foundation in the basic principles of science, the ability to use these principles in practice, an understanding of engineering in general as well as of one special department, a working knowledge of business forms and processes, and a knowledge of men as well as of matter (71, 4).

Professor Schneider immediately after assuming his new position began trying to interest industrial executives in Cincinnati and officials of the University in his proposed plan of engineering training.

Many industrialists had recognized the lack of practical knowledge in engineering graduates and Schneider succeeded in convincing an impressive number of manufacturers that industry should work with the college in providing a more practical method for training engineers. He argued that college training would mean more to the students if they could study the applications of theory to industrial practice. On this same basis he gained the support of a friendly but sceptical faculty.
In three years, by January, 1906, the University's Board began drafting plans for the new program, and the first students enrolled in the cooperative plan in September, 1906. Under the original organization, paired students alternated weekly between campus studies and employment for nine months for each of six years. Two students shared one full-time job, and campus assignments and course work were duplicated every other week so that all students did approximately the same course work. Professor Schneider supervised the total program, assuring continuity and smooth alternation between the phases of the work. He also held evening or Sunday conferences with individual students, as well as with paired students who were to change places for the coming week.

The cooperative plan proved so successful that the regular four-year curricula in engineering were abandoned in 1920 and the entire School of Engineering has operated exclusively on the plan since that time. In 1906 twenty-seven cooperative plan students formed the first class and there were 107 regular engineering students. All the original co-ops worked in Cincinnati industries. By 1920 there were 950 co-ops and no regular or other students, and there were 150 participating firms in several states. Last year the University had over 3,000 co-ops employed in 500 firms throughout northeastern United States.

Status and Trends. From its beginnings at the University of Cincinnati cooperative education has invaded, as of the 1953-54
school year, 35 colleges and 8 technical institutes. These offer 33 different curriculums leading to baccalaureate and 13 different non-degree courses. These institutions enrolled 22,528 students, who were employed by 4,340 industrial firms and governmental agencies (91, vii). Table VI shows the status of cooperative programs leading to degrees in 1953-54 as reported by the United States Office of Education.

Smith stated (6, 55). "There appear to have been three phases in the growth of the cooperative plan in this country: (1) prior to World War I (1906-1917), (2) postwar decade (1919-1929), and (3) depression and post-depression years (1930-41)." To this would now have to be added a fourth period, from 1945 to 1955. Using the data from Figure VI, there were five programs at the close of the first period, 15 at the close of the second period, 19 at the close of the third period, and 35 at the close of the fourth period. There were approximately 6,350 students enrolled in cooperative programs in 1925-26, 12,000 in 1940-41, and over 19,000 in 1954-55.

There was a decline in the rate of growth of cooperative education during the depression years but an over-all growth both in terms of number of programs and students enrolled. There was a greater growth in the past decade than in any similar preceding period. Last year almost 10 percent of all engineering students in the United States were enrolled (91, 54) in cooperative engineering curriculums leading to baccalaureate degrees.
Table VI
COOPERATIVE PROGRAMS LEADING TO DEGREES, 1953-54*

<table>
<thead>
<tr>
<th>Institution</th>
<th>Year program started</th>
<th>Year offered</th>
<th>Curriculums</th>
<th>Cooperative students</th>
<th>Degrees granted</th>
<th>Number of cooperating firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Non-Engi-</td>
<td>Non-Engi-</td>
<td>Non-Engi-</td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
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<td>neer-</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>9</td>
<td>2</td>
<td>300</td>
<td>50</td>
<td>30</td>
</tr>
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<td>Los Angeles State College</td>
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<td>4</td>
<td>5</td>
<td>50</td>
<td>300</td>
<td>0</td>
</tr>
<tr>
<td>University of Cal., Berkeley</td>
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<td>5</td>
<td>0</td>
<td>36</td>
<td>0</td>
<td>2</td>
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<tr>
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</tr>
<tr>
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<td>1944</td>
<td>4</td>
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<td>8</td>
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<td>3</td>
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<td>1912</td>
<td>7</td>
<td>0</td>
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<td>101</td>
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<tr>
<td>Evansville College</td>
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<td>3</td>
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<td>124</td>
<td>2</td>
<td>10</td>
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<tr>
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<td>1925</td>
<td>4</td>
<td>3</td>
<td>124</td>
<td>6</td>
<td>101</td>
</tr>
<tr>
<td>Mass. Institute of Technology</td>
<td>1919</td>
<td>2</td>
<td>0</td>
<td>93</td>
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<td>46</td>
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<td>Northeastern University</td>
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<td>5</td>
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<td>1451</td>
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<td>6</td>
<td>0</td>
<td>1469</td>
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<td>General Motors Institute</td>
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<td>1</td>
<td>1673</td>
<td>175</td>
<td>154</td>
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<td>1950</td>
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<td>97</td>
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<th>6</th>
<th>7</th>
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<th>9</th>
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<td>1945</td>
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<td>20</td>
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<td>3</td>
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<td>340</td>
<td>0</td>
<td>39</td>
<td>0</td>
<td>33</td>
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<tr>
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<td>79</td>
<td>859</td>
<td>22</td>
<td>159</td>
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<td>University of Cincinnati</td>
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<td>6</td>
<td>6</td>
<td>1371</td>
<td>1746</td>
<td>217</td>
<td>256</td>
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<td>143</td>
<td>129</td>
<td>312</td>
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<tr>
<td>Drexel Institute of Technology</td>
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<td>1610</td>
<td>728</td>
<td>200</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<td></td>
</tr>
<tr>
<td>St. Joseph's College</td>
<td>1951</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>105</td>
<td>0</td>
<td>0</td>
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<td></td>
</tr>
<tr>
<td>University of Pittsburgh</td>
<td>1910</td>
<td>5</td>
<td>9</td>
<td>0</td>
<td>154</td>
<td>0</td>
<td>0</td>
<td>13</td>
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<tr>
<td>University of Tennessee</td>
<td>1926</td>
<td>5</td>
<td>1</td>
<td>131</td>
<td>27</td>
<td>16</td>
<td>3</td>
<td>42</td>
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<td>University of Houston</td>
<td>1946</td>
<td>10</td>
<td>0</td>
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<td>1925</td>
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<td>0</td>
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<td>71</td>
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<td>Virginia Polytech. Inst.</td>
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<td>0</td>
<td>318</td>
<td>0</td>
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<td>0</td>
<td>51</td>
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</tr>
<tr>
<td>Marquette University</td>
<td>1919</td>
<td>1</td>
<td>1</td>
<td>110</td>
<td>25</td>
<td>44</td>
<td>18</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>148</td>
<td>51</td>
<td>13161</td>
<td>5945</td>
<td>1913</td>
<td>1047</td>
<td>3536</td>
<td></td>
</tr>
</tbody>
</table>

1Program suspended during World War II.
2Program will start in fall of 1954, not included in totals.
3Program newly organized.
4Units of General Motors Co.
5Program suspended 1930 to 1952
6Does not include programs reported in Table V.
Smith developed (71, 136-139) these generalizations from his study of cooperative education:

1. There are certain definite and tangible values which accrue to cooperative students. Of these, the financial return is undoubtedly the most important. The fact that it enables certain students to attend college who would not otherwise be able to go is in itself partial justification of the cooperative plan.

2. It is somewhat more difficult to evaluate the attainment of the intangible values which proponents of the cooperative system advance, but the weight of the testimony seems to warrant the following conclusions. Students do obtain an insight into some of the problems of labor and have the opportunity to see the working man in action. Likewise, the students are well agreed that the work experience provides an understanding of the discipline required to get along with people. Approximately 70 percent of the students in two different studies indicated that the work experience increased their interest in the academic course. Whether students achieve a more comprehensive understanding of principles due to the cooperative job is still open to question although this claim is made by many advocates of the system. No experiments have been conducted in which all elements are controlled with the exception of the work experiences; this is an area which might prove worthy of investigation.

3. Certain disadvantages to students are recognized by advocates of the plan and by the students themselves. The course in the degree-granting colleges and universities is increased in length. There is considerable confusion and lost motion due to the constant shifting from school to work and back again. This is accentuated when the blocks are short and when the students are at work in cities away from their homes or the school. Some students complain about the lack of social life while on the work block. Opponents of cooperative education state that too much information is forgotten while the students are away from school, while the advocates state that this period of mental relaxation more than offsets any forgetting which takes place. The evidence on this point is lacking and the conclusion must be held in abeyance.
4. The institutions which employ the cooperative plan have discovered that there are distinct advantages to it. Of these, the fact that more students can be accommodated with the same size of staff and plant is a value which cannot be contradicted. To some schools this is of major importance. Institutions are more closely integrated with the life of the community because of the cooperative plan. Through this it is probable that there is a better understanding of mutual problems and in the long run a greater service is rendered. The processes and developments which students note on the work block are brought back into the classroom with the resulting pressure for keeping the curriculum abreast of industrial needs.

5. There are several difficulties which institutions encounter when a cooperative plan is organized. Of these the administrative problems involved in locating training positions, selecting students for interviews, formulating alternating schedules, and handling misunderstandings which inevitably arise with labor unions and industries, are ones which administrators of all-resident programs do not encounter. Likewise, if full-time and cooperative students are enrolled in the same courses the problem of the duplication of teaching arises. A major difficulty also arises during severe industrial depressions when the number of training positions is not sufficient to take care of the students desiring employment. Not only does the number of positions decrease but there is the possibility that the quality of those openings which do exist will fall off. Techniques have been devised to alleviate the problems occasioned by economic depressions, but some of the cooperative programs find it exceedingly difficult to survive during these periods.

6. There is considerable evidence that industries which employ cooperative students over a long period of time find this a fruitful source of supervisory and executive personnel. . .

7. . . A fear expressed during the early years of the cooperative plan was that the foremen and other workers would resent the presence of cooperative workers. Although there is no evidence that the foremen have ever been enthusiastic over training two men to do the work which might
be done by one full-time employee, neither is there any considerable body of testimony indicating that foremen or other employees resent cooperative students.

In summary, it appears reasonable to conclude that the cooperative plan has considerable merit. Evidence that it has been mutually profitable to students, institutions, and employers, is indicated by the several programs which have been in continuous operation for twenty years or more. This does not signify that there will not be difficulties and discouragements experienced by all participants, but it does seem that the advantages which have been outlined overbalance the disadvantages.

Smith concluded that certain definite advantages were enjoyed by cooperative students and that cooperative education received their favorable endorsement. However, he also found that some of the claimed advantages of the plan are still open to question due to inadequate supporting evidence. His over-all evaluation was that there is definite merit in the cooperative plan.

THE DEVELOPMENT OF PIONEERING PROGRAMS

Antioch College, Berea College, and the University of Cincinnati were selected as pioneering programs of the type and emphasis which they represented. The writer studied and visited these programs to obtain information concerning their administrative organization, their coordination of work and study periods, and any unique features involved. Antioch and Cincinnati, although both having cooperative plans, were visited because the former has a strong general education emphasis while the latter's primary interest is in technical training. Berea was visited to obtain any helpful information
resulting from certain teaching and operational problems shared by both major types of cooperative education.

The above programs were studied by reviewing literature pertinent to the schools, discussing the programs with coordinators and administrative officials, observing students at work, interviewing students and observing the types of records used in obtaining and recording information on student activities and progress. A work sheet was designed to serve as a guide while visiting each college.* Mental notes were made on replies to questions outlined on the work sheet. Later the same day these notes were written down.

It was hypothesized that an intensive study of several pioneering programs would give added meaning to available data from other studies and a more personal attachment to the ideals of cooperative education and the problems of administering such a program. One desired outcome of the study was suggestions valuable in planning and initiating a cooperative program.

The Cincinnati Plan. The University of Cincinnati continues to operate on a two-section basis with one pair of students sharing a full-time job and taking campus courses which are repeated, thus enabling each to cover the same material. The periods of alternation now are generally eight weeks in length, and the academic program runs for five, eleven-month years. This change was inaugurated before World War I.

*See Appendix A for a Sample Form.
Campus classes close one month each fall. The student jobs are filled all year, and students change positions in the middle of the academic vacation period. This provides each student with a two-week vacation, and lengthens the work periods preceding and following the vacation break to ten weeks. Table VII shows the schedule of work periods for the University of Cincinnati class of 1959.

It will be noted from Table VII that one-half of the freshman class does not receive work experience during its first school year. The other half has one eight-week period of employment at the close of the year. The senior class spends the bulk of its final school year on campus. Each student completes at least eleven work periods during his attendance.

Because certain information is confidential, this paper will discuss the individual programs in general and give detailed descriptions only of the unique features of the individual programs.

The Antioch Plan. An engineer in 1920, Arthur U. Morgan pioneered the essential outline of the Antioch plan as it is known today. He was dissatisfied with the unreality of the average liberal arts program and with the narrowness of the usual technical training and sought (8, 16) to "promote the development, in proportion, of every element of personality." He sought this development through a cooperative plan.
Table VII

WORK PERIOD SCHEDULE FOR THE UNIVERSITY OF CINCINNATI CLASS OF 1959

<table>
<thead>
<tr>
<th>Year</th>
<th>Work Period</th>
<th>SECTION II Date of Work Periods</th>
<th>Number of Weeks</th>
<th>SECTION I Date of Work Periods</th>
<th>Number of Weeks</th>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>Pre-Junior</td>
<td>5th</td>
<td>10</td>
<td>5 Nov. 1956 - 29 Dec. 1956</td>
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<tr>
<td></td>
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<td>6th</td>
<td>8</td>
<td>25 Feb. 1957 - 20 Apr. 1957</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>Junior</td>
<td>8th</td>
<td>10</td>
<td>4 Nov. 1957 - 28 Dec. 1957</td>
<td>8</td>
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<td>9th</td>
<td>8</td>
<td>24 Feb. 1958 - 19 Apr. 1958</td>
<td>8</td>
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<td></td>
<td>10th</td>
<td>8</td>
<td>16 June 1958 - 23 Aug. 1958</td>
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</tr>
<tr>
<td></td>
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<td>11th</td>
<td>10</td>
<td>3 Nov. 1958 - 27 Dec. 1958</td>
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</tbody>
</table>
Antioch today is described (8, 8-9) briefly as follows:

Antioch is a coeducational, liberal arts college. It offers the A.B. and B.S. degrees. The program ordinarily takes five years, with the first year frequently spent in full-time study on campus and the other four in interwoven work and study.

Since students get much of their education from each other, Antioch aims at diversity of personality and background in the college community. Antioch teachers and students come from many different states, countries, races, religions, and social and economic groups.

... The academic curriculum at Antioch introduces each student to our common human past, our modern social organization, and our newest knowledge in basic science. ...

The cooperative plan sends Antioch students out, every other three months, to take active, adult part in the work of the world. In communities across America, on regular, paid jobs, students learn what many people do and how they live. They learn much about themselves and society, and where they can best contribute to it.

The Antioch cooperative plan is described (8, 10) as follows:

For the past three decades the cooperative, or study-plus-work, plan has been basic to the Antioch degree. Advisers plan work experiences with the student as part of his personal development, his general education, and his vocational training.

Through jobs the student discovers his vocational interests and learns the basic principles and skills that he will need for success in his field of work.

Job experiences also include the educational possibilities in his total working and living environment. Through various jobs he can learn how to work effectively, how to get along with people, and how men and organizations function in the every day world. He can gain flexibility and the ability to orient himself rapidly. By living on his own, he develops financial responsibility, independence, poise, self-confidence, and resourcefulness.
During his period of work, the student sees his textbooks in action. He can observe many things about American society which will round out his college study in economics or history or American civilization. Sociology becomes more than a theory, science more than a formula. Often he is involved in challenging new developments—in science, business, industry, the arts, social and educational ventures, national and international relations.

The cooperative plan does not enable the student to work his way through college. He can usually support himself on his job and often save some money, but his real aim is educational.

Students at Antioch are not necessarily paired on a job, although they may be. They are not required to repeat on a job and, in fact, are required to have varied experience in their placements. Because two students are not assigned full-time to a particular job throughout the program, there is an added task of seeking new placements in many of the available positions each work period. There is the advantage under this arrangement, however, of being able to use short-time positions which are created by seasonal openings in various fields. The Antioch work-study schedule is presented in Table VIII.

The academic year is divided into four periods, with two eight-week fall periods and winter and spring periods each twelve weeks in length. This division permits repetition of the offerings in the fall and spring for employed students who return to the campus. Jobs are filled all year, but because of the nine-month academic year each student gets six weeks' vacation either in June and July or in
Table VIII

ANTIOCH COLLEGE CALENDAR BEGINNING SEPTEMBER, 1955

Entering Freshmen, September, 1954

<table>
<thead>
<tr>
<th>Period</th>
<th>Student A</th>
<th>Period</th>
<th>Student B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sep. 6 - Dec. 23</td>
<td>Study</td>
<td>Sep. 6 - Dec. 23</td>
<td>Study</td>
</tr>
<tr>
<td>Dec. 24 - Jan. 2</td>
<td>Vacation</td>
<td>Dec. 24 - Jan. 9</td>
<td>Vacation</td>
</tr>
<tr>
<td>Jan. 3 - Apr. 1</td>
<td>Work</td>
<td>Jan. 10 - Mar. 30</td>
<td>Study</td>
</tr>
<tr>
<td>Apr. 7 - June 22</td>
<td>Study</td>
<td>Apr. 4 - July 30</td>
<td>Work</td>
</tr>
<tr>
<td>June 23 - July 31</td>
<td>Vacation</td>
<td>July 31 - Sep. 4</td>
<td>Vacation</td>
</tr>
<tr>
<td>Aug. 1 - Oct. 29</td>
<td>Work</td>
<td>Sep. 5 - Oct. 28</td>
<td>Study</td>
</tr>
<tr>
<td>Oct. 31 - Dec. 22</td>
<td>Study</td>
<td>Oct. 31 - Dec. 31</td>
<td>Work</td>
</tr>
<tr>
<td>Jan. 2 - Apr. 3</td>
<td>Work</td>
<td>Jan. 9 - Mar. 29</td>
<td>Study</td>
</tr>
<tr>
<td>Apr. 8 - June 23</td>
<td>Study</td>
<td>Apr. 5 - July 31</td>
<td>Work</td>
</tr>
</tbody>
</table>

Program continues until a minimum of 90 weeks of work are completed.
July and August. Students do not co-op until after their first semester in residence.

Antioch gives one credit for each week of satisfactory cooperative employment under the supervision of the college, and ninety hours of cooperative credit are required for graduation. Thirty of the required ninety hours may be transferred on the basis of one credit for each two weeks of full-time employment prior to admission or during withdrawal from the college.

The primary objective of the Antioch work program is the gaining of liberal education benefits derived from experience gained through supervised employment. However, the vocational orientation and preparation aspect of the work is valued also. The basis for assignment of jobs and aspects of placement are described (8, 11) as follows:

As a Freshman, he (the Antioch student) will get acquainted with the members of the Personnel Department in orientation conferences. If he is studying a full year (taking two sets of courses in alternate periods) he will get some first-hand experience on a campus job. If he is on the work-study plan, he will go on a job after his first study period.

Each student has a personnel adviser who is in charge of his job placement and career advising. Together they decide upon the student's job, after they have talked over his interests, future plans, and the present job possibilities.

For his first few periods, job placements are made with an eye to broadening experiences, the possibilities for personal development, and exploring different jobs. A young student may gain poise and command of people's attention as a lecturer-guide in a New York radio network
headquarters. A girl from a Northern city may organize recreation for children in a county home in Georgia. A future doctor may see what hospital life is like from the drug-dispensing room of a Chicago clinic.

The student tests and reshapes his vocational aims and course of study as he goes along. In upper-class years, after he has more or less found himself, his jobs will ordinarily be in his field of interest, and he will carry increasing responsibilities. The Personnel Department is in constant touch with employers and employment trends, and advises students on the future as well as the present.

Antioch relies heavily on private firms for student placement, but the school itself founded several industries in the 1920's and has continued to develop various business enterprises. Some of these are the Vernay Laboratories, Incorporated, which manufacture molded synthetic rubber products for international distribution; Morris Bean and Company, which was launched as the Antioch Foundry, a subsidiary of General Motors Corporation; the Antioch Press; the Antioch Shoe Project; and others.

From Table VIII it can be seen that freshman students have relatively the same Christmas holiday the first year. After that time students have the same holidays as other employees when they are employed, and have the regular school holidays when they are on campus. Short periods are provided between the end of academic periods and the beginning of work periods and vice versa to enable students to travel to their jobs or to the campus and to locate housing. This is especially essential since students worked with employers in over thirty states the past school year. One student
who was interviewed had participated in a hydrographic survey which took him by ship to the Aleutians and Japan. This student used his regular work period plus his summer vacation to enable him to make the seventeen-week cruise.

The Berea Plan. It has been previously noted that Berea College operates on the institutional work plan whereby students participate daily in school organized and administered work and regular academic classes. This type of organization would not be practical for training trade and industrial education teachers, but there are some similar features in the two plans and certain benefits may be gained from a study of the Berea program.

Berea College had its first articles of incorporation adopted in 1859, but because of interruptions resulting from the Civil War, they were not recorded until April 5, 1866, and it was not until 1873 that the first A.B. degrees were granted.

William J. Hutchins became president in 1920 and gradually caused a change in emphasis in the work program. Until about 1925 Berea College attempted to combine the idea of labor and industrial training in such a way as to prepare students to pursue similar work after leaving school. After this date the idea received less emphasis, as developments indicated that the institution could not achieve this objective along with its academic emphasis on a "liberal" education. Increasing emphasis was placed thereafter upon the educational values of the work experiences to individual students and
also upon the values resulting from life in a community in which each member did some kind of work which contributed to the general welfare (28, 11).

In addition to its four-year college, Berea has always included a Foundation School which offers ungraded work for students fifteen years of age or older who have not completed the elementary grades of high school. The Foundation School offers both a college preparatory and terminal or vocational course. The annual enrollment in the foundation school is between 300 and 400 students.

Berea College proudly claims that no student shall be denied an education because of lack of money. Any able, qualified student living under the economic disadvantages of the Southern Appalachian Mountains may attend the College or Foundation School provided he is willing and able to work. At least 90 percent of the enrollment comes from this area.

No tuition is charged, but students must work to pay for board, room, some class fees, and personal expense money. All students have the same job opportunities, although jobs are awarded on a seniority basis. Any student may be eligible for any job on the campus provided he has the necessary qualifications. All students must work a minimum of ten hours per week. Students may work more hours by decreasing their academic load proportionately.

There are sixty-two departments in which students may be employed. A student may work in only one of these departments or he
may work four years in a different one each semester. The work pro-
gram is administered by the Dean of Labor, who has equal rank with
the administrative officers and is also a member of the teaching
faculty. In his office the various work activities are coordinated
and student records kept. Each of the sixty-two departments has a
superintendent who works under the Dean of Labor, and who serves in
the capacity of a teacher as well as an administrator of the work
program in his department.

Because students at Berea carry a full academic load in ad-
dition to their part-time work, the traditional four-year under-
graduate program prevails. Because all the work is in the campus
community, problems of travel, field coordination, public relations
with cooperating agencies, and repetition of academic offerings for
returning off-campus students, are non-existent. However, strikingly
evident are the problems of deriving educational values from work
which may be menial and monotonous, of overcoming the inefficiency
of inexperienced workers, of securing personnel both technically
and professionally competent to coordinate the work and study, of
getting students to devote equal attention to the quality of their
work and study, and of organizing suitable records for recording
student progress.

General Impressions. The general impressions gained from a
study of and visit to selected cooperative programs are as follows:
1. All the programs evidence a belief that both general and vocational education values can be derived from work experience.

2. Because of the intangible nature of the social benefits gained from the work experience, students receive most value from the economic and vocational aspects of their employment.

3. Inclusion of off-campus employment of any significant amount involves an extension of the curriculum to five years.

4. Students are satisfied that their program has benefits for them which they could not obtain from a traditional program. They seem sure of themselves and of their educational and life objectives.

5. An off-campus work-study program results in a certain amount of confusion and lost effort because of travel time and repeated periods of reorientation at the beginning of campus and field periods of residence.

6. Administrative officials are agreed that a cooperative program is generally harder, more involved, and more expensive to operate than a traditional program. They are also firmly convinced of the superior value of a cooperative plan for their particular needs.

7. Coordination of work and study is difficult and involves considerable staff time and on-the-job contact by school staff as well as the understanding cooperation and support of the campus staff.
8. Labor and management are willing to participate in a co-operative program although it may involve sacrifices for them.

9. Full-time employment in an environment removed from college life offers opportunities for understanding the worker's life and problems that cannot be obtained from part-time work performed while in residence on campus.

10. Some individual or department should be assigned the responsibility for the supervision and coordination of the work experience.

11. An efficient record system and organization for communicating with employers is essential to the successful operation of a cooperative program.

12. Participating employers will be more impressed with their responsibilities in the program if they participate in evaluating the student's progress.

13. There is no typical cooperative program, and each program takes on the ideals and operational characteristics of its institution and is regulated somewhat by its geographical situation.

14. The staff seem close to their students and the schools are close to their communities. Students bring reports of new developments to the campus and formal course work is tied to contemporary living. Cooperative schools recognize the needs and demands of participating agencies and cannot remain in an ivory tower.
Unique Features. The unique features of the programs studied outnumber any general characteristics.

Each of the institutions had a distinctive organization for the administration, supervision, and coordination of the work phase of the program. Berea, with its Labor Office and Dean of Labor, has a distinctive organization for overseeing the work program. The Dean of Labor has scholastic and administrative rank with the members of the academic faculty and is directly responsible to the President. In the Labor Office comprehensive four-year records of every student are kept on a single card. These are kept in upright files for easy access, while cards of graduates or withdrawals are kept in loose-leaf binders. The record card contains the student's photograph, brief personal data, and a complete work record. Jobs performed, hours worked, pay rate, wages earned, loans made and their present balance, and the quality of the work are all readily available. Through his relationships with students and labor superintendents, the Dean of Labor endeavors to promote personnel policies and procedures which will result in the greatest possible values being derived.

The Antioch Personnel Department is made up of a number of full-time counselors and coordinators, with full academic status, who handle both the campus advisement and field coordination. Each co-op is visited at least once each work period, meaning that placement
of a student with Filene's in Boston or with A. O. Smith's in Milwaukee, involves a minimum of four trips yearly by the coordinator, who advises students in either the vocational field concerned or in a designated area of the country.

An unusual feature of this personnel department is the Personnel Department Advisory Board. This is a representative group of upper-class students which brings to its weekly meetings information and comments from the campus and from work assignments. The group acts as a "sounding board" for ideas and suggestions, as interpreters of personnel department policy, and as leaders in personnel department conferences with individuals or student groups.

The personnel department holds weekly conferences with student groups to help them profit from previous placements and to prepare them for their next placement. Aspects of the previous placement, such as performance, reports, and crediting are discussed at the first conference. A new qualification sheet is prepared at the next conference for the employer noting new skills acquired and added academic background. The third conference is devoted to a discussion of the possible next placement. This is followed by conferences with placement groups, by field trips, and by additional conferences to prepare students for placement.

When the student leaves for placement he is given housing information, maintained in a file compiled from experience of students
who previously worked in the area and containing general descriptions of the situation as reported by these students. He is also given a "report syllabus," a card of introduction from the personnel department, and a "job reporting card." The report syllabus contains field assignments, pertinent information concerning assignments, and deadline dates for submitting each assignment. The card of introduction is brief, neat, and simple, and contains the date on which the student is to report. The job report card gives the student's placement address and confirms his arrival at the job and placement. It is printed on a two-cent postcard which is addressed to the personnel department. A cash fine is imposed upon students who fail to return this report within a minimum period.

The University of Cincinnati's Department of Coordination and Placement in the College of Engineering is similar in many respects to the Personnel Department at Antioch and it performs much the same function. Coordinators at Cincinnati are also full-time counselors and field coordinators with full academic standing. There are differences in the two departments, however, resulting from the different emphasis given the work phase of the program. Because the University of Cincinnati's College of Engineering is particularly interested in training engineers, many of the types of work offered at Antioch, and thus the types of counseling and records kept, would be unsatisfactory there.
Coordinators at Cincinnati attempt to work out a definite training schedule, and, through the years, schedules have been worked out with many of the firms. Others are in the process of working them out. An accurate record is kept by the coordinators of the kind and amount of work done by each student, as well as of the employers' ratings of the work. The coordinators do not attempt to evaluate the technical skills learned by co-ops on-the-job. It is recognized that no two firms offer identical training, but that the training is nevertheless somewhat comparable. They do evaluate the personal qualities exhibited by the student during employment periods.

Antioch's efforts to relate academic and field work are especially impressive. Technical cooperative plans with a vocational emphasis claim to espouse the liberal education values of work experience and to coordinate field and academic work, but they have not emphasized these aspects as at Antioch. Even in areas such as foreign language where it would seem difficult to integrate employment with academic work, Antioch will make an effort to secure housing for students with families who speak the language of the student's choice. Required field reports have been designed to encourage students to report practical applications of classroom learning during work periods. Campus teachers encourage students to bring related experiences from their co-op periods into the classroom.

Other techniques employed by Antioch are the formulation of a "student qualification sheet," the placement of students on seasonal
jobs, and the use of alumni to do some long-distance coordination.
The student qualification sheet is sent to a prospective employer
and contains brief personal data about the student plus his educa-
tional background, skills obtained from previous experience, and a
detailed list of pre-Antioch employment and cooperative employment
with each employer rating.

About one-fourth of the placements by the personnel department
are in seasonal jobs arranged on an eight or twelve week basis.
Examples of this type of work are department store selling during
seasonal rush periods, summer camp work, and short-term forestry or
field research projects. This type of employment opens many place-
ment opportunities which would not be available on a semester or
yearly basis, but it also involves considerable additional work for
the placement officers.

Visits in the field by personnel department representatives at
least each work period demand extensive travel, and in an isolated
situation the travel can be prohibitive. The personnel department
overcomes this obstacle whenever possible by contacting alumni in
the placement area who are willing to serve as coordinators. Another
provision which provides help for students in the field is the send-
ing of upperclassmen with inexperienced students whenever two or
more placements are made in the same city. This procedure enables
the beginning student to make more efficient use of his time and
shortens his orientation period in the new situation.
Unique features of the Cincinnati program are the extent to which they have arranged for industrial scholarships for their students, the degree of success they have had in working with organized labor, and their eleven month academic year. Industry has been encouraged to select promising engineering candidates and to send them to the cooperative plan at Cincinnati. The successfulness of this effort is indicated by the fact that the majority of their entering freshmen in mechanical engineering last fall were sponsored by industrial firms. In effect, these students were assured employment before they ever began their program.

Unions cooperate generally with the cooperative plan. In certain situations where agreements prohibit firms from cooperating, they have been successful in getting clauses accepted which permit a specified maximum number of trainees to be employed.

Details of the academic program organization have been previously presented in a discussion of the Cincinnati Plan.

CHARACTERISTICS AND SCOPE OF COOPERATIVE TRADE AND INDUSTRIAL TEACHER EDUCATION

Published information on the extent of cooperative trade and industrial teacher education programs in the United States is nonexistent. The most recent publication of the United States Office of Education on cooperative education, bulletin 1954, number 11, Cooperative Education in the United States, purports to include degree granting cooperative teacher education programs. However,
The three programs of this nature listed were outside the trade and industrial field and none of the programs reported were enumerated. The programs reported were in operation for some time prior to the study.

The only other study reported was by C. E. Highlen of Purdue University at the American Vocational Association Convention at Chicago in 1953. The results from this unpublished report were not used for this study because nineteen of the forty-eight states did not respond to his questionnaire. Because of the lack of accurate comprehensive data on the scope and characteristics of existing trade and industrial teacher education programs, a survey was undertaken by the present writer to provide this information. Much of the remainder of this chapter is based on the results of this survey.

Two questionnaires were used to obtain survey data. Copies of these are included in Appendix A. The first form was designed to locate programs and to secure opinions of leaders in the various states on the cooperative plan. To insure a high return on this form it was kept extremely simple, requiring the respondent to check either yes or no after the question, "In your state, has any attempt been made to develop a cooperative trade and industrial Teacher Education program involving alternate placement in industry and attendance in college with some degree of coordination of the two activities?" and a space was provided for remarks. If programs existed in the state, its location and director's name were also
requested. Stamped, self-addressed envelopes were enclosed, and the total time to place the form in the mail, including time to read the brief cover letter, was less than five minutes. A sample of the original cover letter is also included in Appendix B.

The first form was sent to the state director, chief, or supervisor of trade and industrial education or some equivalent title in the state department of education. These individuals were considered most likely to know of approved teacher training programs in their respective states. The first mailing produced replies from 42 of the 48 states. The second mailing, 30 days later, gained three more replies, and the final mailing, 60 days after the first mailing, collected the remaining three for a total of 48.

In designing the first form, the principal objective was the simple response indicating whether or not a cooperative program was being planned or operated in a particular state. This reply was so important that the remark concerning the cooperative plan was left open for any comment by the respondent. It was hoped that the person would feel strongly enough about the program to comment even though the remarks were optional. This feeling was justified inasmuch as 37 of the 48 respondents did make some statement concerning their programs.

A second, more involved questionnaire was developed and sent to directors of programs located through the first questionnaire.
Each of those contacted replied to the first mailing for a complete return.

In considering the scope of established cooperative programs in the trade and industrial teacher education field, it is essential to observe the criteria used to define this particular program. The limitations of this study exclude programs which simply gave credit for uncoordinated and unsupervised part-time employment, those which gave credit for experience prior to admission, and those which did not offer the field experience on an alternating period basis. Only those programs which offered "alternate placement in industry and attendance in college with some degree of coordination of the two activities," appear in this study.

The results of the first survey indicated that there were ten programs being planned or in operation in eight states. Further checking indicated that seven of these programs were outside the criteria considered above, were in the planning stage, or were operating in a related field. Thus the survey indicated that there are only three established programs operating in the United States, and that these programs are in the State of Michigan. Table IX provides a complete tabulation of the responses to the first survey. Table X contains a further breakdown of the affirmative answers received in first survey replies.
Table IX

REPORTS FROM STATES AS TO THE EXISTENCE OR NON-EXISTENCE OF COOPERATIVE TRADE AND INDUSTRIAL TEACHER EDUCATION PROGRAMS IN 1955*

<table>
<thead>
<tr>
<th>State</th>
<th>Contact</th>
<th>Reply</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALABAMA</td>
<td>J. F. Ingram</td>
<td>No</td>
<td>Never actually put into operation. Still believe the plan provides the key to the recruitment problem</td>
</tr>
<tr>
<td></td>
<td>State Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trade and Ind. Ed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARIZONA</td>
<td>Louis A. McElroy</td>
<td>No</td>
<td>We will be interested in the results of your survey. Many of our teachers do go back to their work at the trades during the summer months, but it has not been on an organized basis.</td>
</tr>
<tr>
<td></td>
<td>State Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trade and Ind. Ed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARKANSAS</td>
<td>J. C. Ruppert</td>
<td>Yes</td>
<td>We are attempting to take some of our outstanding graduates and interest them in industrial education. They are placed on the job for additional experience and for the financial help. Time is divided daily. No credit is allowed.</td>
</tr>
<tr>
<td></td>
<td>State Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trade and Ind. Ed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CALIFORNIA</td>
<td>Sammel L. Fick</td>
<td>No</td>
<td>All T. &amp; I. teachers in California have completed three years of journeyman experience prior to securing a teaching</td>
</tr>
<tr>
<td></td>
<td>Chief, Bureau of</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Industrial Ed.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*For a list of institutions see Table X.
#A sample of the questionnaire used to secure data for this table is included in Appendix A.
<table>
<thead>
<tr>
<th>State</th>
<th>Name</th>
<th>Title</th>
<th>Response</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>COLORADO</td>
<td>Herbert L. Benson</td>
<td>Teacher Trainer</td>
<td>No</td>
<td>I think there is considerable merit in your plan. The facilities with which to do the job would be our major problem. We would not likely consider a cooperative training program as you describe equivalent to actual trade experience. Our teachers must be able to teach trade extension courses to men with many years' trade experience, and we would hesitate to use a person trained as you indicate to teach trade extension classes. We feel the pre-employment trainee is entitled to an instructor qualified to teach tradesmen.</td>
</tr>
<tr>
<td>CONNECTICUT</td>
<td>L. W. Eddy</td>
<td>Consultant, T &amp; I Teacher Training</td>
<td>No</td>
<td>We have always drawn our instructors from men with 7 years minimum trade experience and therefore have not had a need for the program you suggest.</td>
</tr>
<tr>
<td>DELAWARE</td>
<td>A. B. Anderson</td>
<td>Assistant State Director of Voc. Ed.</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>FLORIDA</td>
<td>H. F. Hinton</td>
<td>State Supervisor</td>
<td>Yes</td>
<td>We have not actually had any cooperative program with industry in the teacher training field. One is being planned.</td>
</tr>
</tbody>
</table>
Table IX (Continued)

<table>
<thead>
<tr>
<th>State</th>
<th>Name</th>
<th>Supervisor Title</th>
<th>Response</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEORGIA</td>
<td>W. M. Hicks</td>
<td>State Supervisor Trade and Ind. Ed.</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>IDAHO</td>
<td>S. R. Glenn</td>
<td>State Supervisor Trade and Ind. Ed.</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>ILLINOIS</td>
<td>E. M. Claude</td>
<td>Chief, T &amp; I Education</td>
<td>Yes</td>
<td>It has not been possible to induce highly qualified and thus highly paid trade and industrial workers to become teachers and require them to complete work for a degree. The most promising source would be a cooperative training program where trade experience and academic training could be secured in a planned, coordinated program on the college level.</td>
</tr>
<tr>
<td>INDIANA</td>
<td>H. G. McComb</td>
<td>State Director Trade and Ind. Ed.</td>
<td>Yes</td>
<td>We have discussed it at Purdue University but our only recognition of it thus far is work-experience programs of students needing some employment experience.</td>
</tr>
<tr>
<td>IOWA</td>
<td>H. W. Carmichael</td>
<td>State Supervisor Trade and Ind. Ed.</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>KANSAS</td>
<td>O. H. Beaty</td>
<td>State Supervisor Trade and Ind. Ed.</td>
<td>No</td>
<td>Plan has been discussed at Kansas State T.C., Pittsburg, but no program organized.</td>
</tr>
<tr>
<td>KENTUCKY</td>
<td>Harold G. Wilson</td>
<td>State Director Trade and Ind. Ed.</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>LOUISIANA</td>
<td>T. E. Hampton</td>
<td>State Supervisor Trade and Ind. Ed.</td>
<td>No</td>
<td>None</td>
</tr>
</tbody>
</table>
Some thought has been given to such a plan and I for one am heartily in accord with the idea. I am convinced that our teachers would show a marked improvement during the initial or "breaking in" stage of employment were their educational backgrounds compounded of "on the job experience" and technical and professional "know why." Subsequent service would I believe, also indicate the value of this plan.

Dr. Hornbake will be very happy to give you full and complete particulars concerning the program to date.

To my knowledge, I know of no organized attempt to try such a program in this state.

Mississippi State is in the beginning stages of a college wide cooperative program which includes Ind. Ed. Just what we will be able to do with it remains to be seen.
<table>
<thead>
<tr>
<th>State</th>
<th>Name</th>
<th>Position</th>
<th>Response</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missouri</td>
<td>Merton Wheeler</td>
<td>State Director, Industrial Ed.</td>
<td>No</td>
<td>I think there is merit in the plan, also many problems.</td>
</tr>
<tr>
<td>Montana</td>
<td>W. L. Roeseler</td>
<td>State Supervisor, Trade and Ind. Ed.</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>Nebraska</td>
<td>Howard Gorham</td>
<td>State Supervisor, Trade and Ind. Ed.</td>
<td>No</td>
<td>What will labor think about a program which will qualify a two year mechanic to teach on day trade and extension levels?</td>
</tr>
<tr>
<td>Nevada</td>
<td>F. I. Wallace</td>
<td>State Supervisor, Trade and Ind. Ed.</td>
<td>No</td>
<td>There are no teacher training institutions in Nevada which offer courses in Trade and Ind. Ed. T &amp; I teachers are recruited from industry, or from teacher training institutions in other states. No attempt has been made to coordinate the summer time employment of teachers with their regular teaching assignment.</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>Howard E. Swain</td>
<td>State Director, Trade and Ind. Ed.</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>New Jersey</td>
<td>Arthur Wrigley</td>
<td>State Supervisor, Trade and Ind. Ed.</td>
<td>No</td>
<td>We prefer that our shop instructors have a minimum of 8 years of broad trade experience including apprenticeship.</td>
</tr>
<tr>
<td>New Mexico</td>
<td>Henry A. Gonzales</td>
<td>State Supervisor, Trade and Ind. Ed.</td>
<td>No</td>
<td>None</td>
</tr>
</tbody>
</table>
Table IX (Continued)

<table>
<thead>
<tr>
<th>State</th>
<th>Name</th>
<th>Profession</th>
<th>Institution</th>
<th>Program Status</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEW YORK</td>
<td>C. Thomas Olivo</td>
<td>Prof., Ind. Ed.</td>
<td>State Ed. Dept.</td>
<td>No</td>
<td>We are not offering a cooperative program, but rather, are selecting competent tradesmen who have potential ability as trade teachers.</td>
</tr>
<tr>
<td>NORTH CAROLINA</td>
<td>Murray Thornberg</td>
<td>State Supervisor</td>
<td>Trade and Ind. Ed.</td>
<td>No</td>
<td>Prospective trade teachers who take work at the teacher training institutions in our state are required to have three to six years of trade experience prior to the time they are considered for employment.</td>
</tr>
<tr>
<td>NORTH DAKOTA</td>
<td>G. W. Haverty</td>
<td>State Supervisor</td>
<td>Trade and Ind. Ed.</td>
<td>No</td>
<td>There is no institution in North Dakota where a teacher training program is operated for training of teachers for service in the T &amp; I field. Ours has been strictly an in-service teacher training process.</td>
</tr>
<tr>
<td>OHIO</td>
<td>Byrl Shoemaker</td>
<td>State Supervisor</td>
<td>Trade and Ind. Ed.</td>
<td>No</td>
<td>This type of program has not been attempted in Ohio. Our observation of such programs in universities in other states has led us to believe that most of the persons enrolled in such a program enter industry rather than teaching. Thus it seems that such a program can not be justified from the standpoint of preparing teachers. Also, in some states union organizations have objected to this method of preparing teachers for trade programs.</td>
</tr>
</tbody>
</table>
Table IX (Continued)

<table>
<thead>
<tr>
<th>State</th>
<th>name</th>
<th>position</th>
<th>response</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>OKLAHOMA</td>
<td>Glen Smith</td>
<td>State Teacher Tr.</td>
<td>No</td>
<td>I think the plan is excellent and may be the only way we will be able to maintain a program to furnish qualified teachers for trade and industrial education. We are having great difficulty getting the kind of teachers we need. Of course we could still lose them to industry as we are now.</td>
</tr>
<tr>
<td>OREGON</td>
<td>G. O. Cannon</td>
<td>Asst. Prof.</td>
<td>No</td>
<td>To date we have found no need for such a program. We are just getting a program of teacher training started now and we hope to be able to expand it. We are now getting some of our prospective instructors into our regular professional classes and hope to be able to place those who prove satisfactory in the near future.</td>
</tr>
<tr>
<td>PENNSYLVANIA</td>
<td>G. M. Schaffer</td>
<td>Chief, T &amp; I Ed.</td>
<td>No</td>
<td>A true cooperative program for the preparation of trade teachers has not been tried in Pennsylvania . . .</td>
</tr>
<tr>
<td>RHODE ISLAND</td>
<td>Edw. J. Medeiros</td>
<td>State Supervisor</td>
<td>No</td>
<td>None operating nor being planned.</td>
</tr>
<tr>
<td>SOUTH CAROLINA</td>
<td>G. E. McGrew</td>
<td>State Supervisor</td>
<td>No</td>
<td>None</td>
</tr>
</tbody>
</table>
Table IX (Continued)

<table>
<thead>
<tr>
<th>State</th>
<th>Supervisor</th>
<th>Training Program</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOUTH DAKOTA</td>
<td>C. O. Gottschalk</td>
<td>No</td>
<td>Your idea is a good one to my way of thinking.</td>
</tr>
<tr>
<td></td>
<td>State Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trade and Ind. Ed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TENNESSEE</td>
<td>Warren A. Seeley</td>
<td>Yes</td>
<td>I would appreciate a copy of your findings.</td>
</tr>
<tr>
<td></td>
<td>State Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trade and Ind. Ed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEXAS</td>
<td>W. R. Cate</td>
<td>No</td>
<td>Insofar as I can learn, there has never been operated in this state any type of cooperative program for the training of T &amp; I teachers. The possibilities of such a program have been discussed periodically for a number of years and for that reason we will be interested in the success of such a plan if you are able to work it out.</td>
</tr>
<tr>
<td></td>
<td>State Director</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trade and Ind. Ed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UTAH</td>
<td>Reed R. Allen</td>
<td>No</td>
<td>I have heard of such a program in operation at Vancouver, B.C., but I have not seen its operation. The reports I have heard are very much in favor of this type program. I would appreciate hearing of your findings and results should you operate such a course. I feel it has merit and is a basis for an excellent teacher training program.</td>
</tr>
<tr>
<td></td>
<td>Trade and Ind. Ed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Teacher Trainer</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>State Dept. of Ed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VERMONT</td>
<td>Harold F. Graeme</td>
<td>No</td>
<td>Nearly 100% of our trade teachers are employed directly from industry and no trade training is given in any institution.</td>
</tr>
<tr>
<td></td>
<td>State Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trade and Ind. Ed.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table IX (Continued)

<table>
<thead>
<tr>
<th>State</th>
<th>Name</th>
<th>Title</th>
<th>Respond</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIRGINIA</td>
<td>B. H. Van Oot</td>
<td>State Supervisor</td>
<td>No</td>
<td>I can see the wisdom of a cooperative program where a prospective teacher has very limited shop background.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trade and Ind. Ed.</td>
<td></td>
<td>I think the idea is a good one. Practically all our teachers are recruited from industry.</td>
</tr>
<tr>
<td>WASHINGTON</td>
<td>Herman N. Miller</td>
<td>State Supervisor</td>
<td>No</td>
<td>At the present time our institutions of higher learning do not offer degree courses in trade and industrial education.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trade and Ind. Ed.</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td>WEST VIRGINIA</td>
<td>F. W. Eberle</td>
<td>State Supervisor</td>
<td>No</td>
<td>This would be an excellent idea if the teacher in training had previously had an adequate background of actual trade experience in the field indicated. The amount of such experience as could be secured in the cooperative program contemplated would not in itself be enough.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trade and Ind. Ed.</td>
<td></td>
<td>It is my opinion that a cooperative trade and industrial teacher education program would be very valuable. I would like to see such a plan put into operation to check its value.</td>
</tr>
<tr>
<td>WISCONSIN</td>
<td>H. C. Thayer</td>
<td>Chief, T &amp; I Ed.</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>WYOMING</td>
<td>Sam Hitchcock</td>
<td>Director, Voc. Ed.</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>Name of Director or Coordinator</td>
<td>Institution</td>
<td>Status</td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------------------</td>
<td>------------------------------</td>
<td>--------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Fayetteville, Arkansas</td>
<td>Marion E. Maddox</td>
<td>University of Arkansas</td>
<td>Planning stage</td>
<td></td>
</tr>
<tr>
<td>Tallahassee, Florida</td>
<td>E. K. Hankin</td>
<td>Florida State University</td>
<td>Planning stage</td>
<td></td>
</tr>
<tr>
<td>Urbana, Illinois</td>
<td>Donald G. Lux</td>
<td>University of Illinois</td>
<td>Planning stage</td>
<td></td>
</tr>
<tr>
<td>Lafayette, Indiana</td>
<td>C. E. Highlen</td>
<td>Purdue University</td>
<td>Planning stage</td>
<td></td>
</tr>
<tr>
<td>College Park, Maryland</td>
<td>R. Lee Hornbake</td>
<td>University of Maryland</td>
<td>Not in teacher education but is employed in &quot;Education for Industry&quot; curriculum</td>
<td></td>
</tr>
<tr>
<td>Michigan: Ann Arbor</td>
<td>Hugh Pierce</td>
<td>University of Michigan</td>
<td>In operation since 1951</td>
<td></td>
</tr>
<tr>
<td>Detroit</td>
<td>Douglas Sherman</td>
<td>Wayne University</td>
<td>In operation since 1946</td>
<td></td>
</tr>
<tr>
<td>Kalamazoo</td>
<td>Joseph Giachino</td>
<td>Western Michigan</td>
<td>In operation since 1947</td>
<td></td>
</tr>
<tr>
<td>State College, Mississippi</td>
<td>T. K. Martin</td>
<td>Mississippi State College</td>
<td>Planning stage, college wide program</td>
<td></td>
</tr>
<tr>
<td>Nashville, Tennessee</td>
<td>R. E. Stewart</td>
<td>Tennessee State A. &amp; I. University</td>
<td>Planning stage</td>
<td></td>
</tr>
</tbody>
</table>
The Wayne University Program. The first cooperative trade and industrial teacher education program was undertaken at Wayne University, Detroit, Michigan, in 1946, according to information received on the questionnaire returned from that institution. Its early emphasis was on the training of automotive mechanics teachers, which still remains its major enrollment area. This is perhaps due to its location in the automotive center of the world and the close association of its staff with the National Association of Industrial Teacher Educators committee formed (12, 2) by the American Vocational Association in December, 1946, which was to "study and recommend methods of improving automotive mechanics instruction in the public schools."

One activity of this committee was the development of an automotive mechanics teacher training curriculum by M. D. Darrow, Andrew D. Althouse, Gerald Baysinger, and G. Harold Silvius. The latter two are staff members at Wayne University. The curriculum was developed for use at Wayne University and students were accepted (12, 3) for this curriculum in the summer of 1948.

Wayne University, situated in the heart of Detroit's heavy industrial area, has ample opportunity to place students locally and is thus spared the problems of student and coordinator travel which arise when the local area does not offer adequate placement opportunities for trainees. The cooperative program has been in operation long enough so the University has been able to evaluate many aspects
of the program and its graduates. A general summary of information concerning the operation of the Wayne program, gained by a visit and a discussion with the staff members, appears in Table XI.

Particularly significant to persons planning a program is the reported difficulty which resulted from relying too heavily on a single employer for student placement. The problem of having all the students released because of adjustments in policy or production by a single employer has also arisen, and one operating requirement in the Cooperative Manifesto of the Society for Engineering Education is (30, 128) the "Spread of employment at all times over as many employers as possible, consistent with efficient supervision by college officials."

Table XI

THE WAYNE UNIVERSITY PROGRAM

<table>
<thead>
<tr>
<th>Features</th>
<th>General Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recruitment</td>
<td>Geographically simplified because of heavy population concentration within a 50 mile radius of Detroit. The program is directed chiefly at this area and includes mailing to schools in this area an informational booklet, a newsletter, and one and two page leaflets about characteristics of Wayne and their program. Staff are available for lectures to secondary school groups, and alumni are contacted to locate prospective students.</td>
</tr>
</tbody>
</table>
Coordination of Field and Campus Work

Monthly written reports, outside written assignments, and a term report are required of trainees on the job. A group seminar was attempted for employed students but was dropped because of lack of common interest in topics discussed. Regular individual conferences in the coordinators office were substituted for the group meetings.

Training Schedule

The development of a training schedule is dependent upon the training station. Generally advancement is dependent upon the trainee's ability to secure advancement on the basis of his improvement.

Evaluation of Work Experience

A written semesterly rating is forwarded by the employer and the instructor-coordinator rates the trainee's monthly reports and other outside assignments.

Proficiency Exams

The full required cooperative experience can be satisfied by proficiency examination.

Cooperating Employer's Attitude Toward Program

Generally favorable.

Labor's Attitude Toward Program

Not a factor, since labor is not included in an advisory committee and difficulties have not arisen.

Other

In auto mechanics work is on an alternating year basis. In other trades on an alternating semester basis.

All employment is obtained locally. The program was originally tied to one employer, and a temporary recession with this employer caused the withdrawal of the cooperative program from the college offerings until other arrangements could be worked out.

A comparison of the essential features of the Wayne program with the other two programs now in operation is provided in Table XIV.
The Western Michigan College of Education Program. The program at Western Michigan is the largest cooperative trade and industrial teacher education program and is also the only four-year curriculum in the United States. The arrangement which enables completing the various requirements in four years, including gaining three calendar years of trade and industrial experience, is the taking of a partial academic load the year around while also working a full-time afternoon or night shift on a job for three years.

Western Michigan is typical of those colleges which are not located in a metropolitan center but which do have enough industry to support the needs of a cooperative program. Kalamazoo offers enough varied industrial employment so none of the students needs to travel outside the environs of the city for employment. The cooperative program at this institution is one aspect of a total technical program offering degrees in four areas besides teaching, as well as a two-year terminal technical training in seven other areas.

A general summary of information concerning the operation of the Western Michigan College of Education program, gained through visiting the college and a discussion with the program coordinator, appears in Table XII. A comparison of some specific features of the Western program with those of the other two programs now in operation is provided in Table XIV.
<table>
<thead>
<tr>
<th>Features</th>
<th>General Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recruitment</td>
<td>Restricted to circulation by mail of a small catalog describing the technical and industrial teaching curriculums.</td>
</tr>
<tr>
<td>Coordination of Field and Campus Work</td>
<td>Considered a big problem. Progress is checked by a monthly discussion of a monthly written student report.</td>
</tr>
<tr>
<td>Training Schedule</td>
<td>No formal schedule is used, but it is worked out on an individual basis to the best degree obtainable.</td>
</tr>
<tr>
<td>Evaluation of Work Experience</td>
<td>The student submits a monthly written report. A mid-semester and semester examination, oral, written, and performance, is given by a shop teacher on-campus in the student's special field.</td>
</tr>
<tr>
<td>Proficiency Exams</td>
<td>The entire industrial experience credit can be earned by proficiency examination. The student's proficiency is judged by a committee of the staff.</td>
</tr>
<tr>
<td>Employer Attitudes</td>
<td>Cooperating employers are generally hostile to a training schedule, but they are favorable to the program as a long-range cooperative undertaking.</td>
</tr>
<tr>
<td>Labor Attitudes</td>
<td>Organized labor was encountered in a single case, and in that case the student was accepted as a trainee without difficulty. Advisory committees are not used.</td>
</tr>
<tr>
<td>Other</td>
<td>Students spend one-half day on campus and afternoons on a job. Summers are spent on the job, but no credit is allowed for summer employment. This is somewhat compensated for by the student's being able to earn six semester hours credit during the academic year for off-campus employment.</td>
</tr>
</tbody>
</table>
Unique features of the Western Michigan College cooperative program are the four-year length of the curriculum and the comprehensive mid-semester and semester examinations. The former has been examined, but the latter is worthy of further consideration. Few would deny that a comprehensive examination by oral, written, and performance techniques would help immeasurably in determining the progress of a student in the occupational phase of his training, but a program such as that at Western is ideally suited to carry out this type of evaluation. Among the staff in the technical programs are found tradesmen-teachers competent to test a trainee who is advanced in his training. The small staff found in many industrial education programs would not be able to administer a testing program such as this in all the various occupational areas in which trainees are likely to be enrolled.

An alternate possibility, for programs with less on-campus staff and facilities than those at Western Michigan College, would be the development of tests by a craft committee to be administered by a member of the teacher training staff or a member of the training or supervisory staff at the place of employment, although the former possibility would be advantageous in terms of maintaining more control, and therefore more standardized procedures, by the school staff.

The University of Michigan Program. The most recent addition of a cooperative trade and industrial teacher education program was
at the University of Michigan. This began in 1951 and has had no graduates as yet, since it is a five year program. Although Ann Arbor does have some varied industry, the occupational experience is offered on an alternating semester basis, which indicates that even though the local situation may be similar to that at Western Michigan, the two programs differ considerably. This corresponds to the development in engineering education. The Society for the Promotion of Engineering Education stated (30, 569), "There is no standard cooperative plan of education. A cooperative program takes on the ideals, purposes, and standards of the school and companies cooperating."

A general summary of information concerning the operation of the University of Michigan program, gained through a visit to Ann Arbor and a discussion with members of the staff, appears in Table XIII. A comparison of some specific features of the University of Michigan program with those of the other two programs now in operation is provided in Table XIV.

Unique features of the University of Michigan program are the cooperative arrangement with the junior and community colleges, the "career leaflet" idea, and the individual counseling program for designing each student's total program. The latter two features are covered in sufficient detail in Table V to make them self-explanatory. The former idea will be explained further.
### Table XIII

**THE UNIVERSITY OF MICHIGAN PROGRAM**

<table>
<thead>
<tr>
<th>Feature</th>
<th>General Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recruitment</strong></td>
<td>A University loose-leaf binder containing &quot;career leaflets&quot; is placed in every high school library in the state. A career leaflet on cooperative trade and industrial teacher education has been produced for use in these folders. An arrangement has also been made with a number of the junior and community colleges so that students can obtain part of their cooperative training in their home town and they can transfer full credit to the University of Michigan.</td>
</tr>
<tr>
<td><strong>Coordination of Field and Campus Work</strong></td>
<td>Considered big problem because of lack of time. Students are encouraged to make monthly visits for conferences with the coordinator. Convincing them to &quot;can't coordinate from behind a desk.&quot; Regularly scheduled meetings are held for the total trainee group to discuss matters related to the program.</td>
</tr>
<tr>
<td><strong>Training Schedule</strong></td>
<td>Evolving one where possible. Mostly on a basis of trainees being able to advance and assume other jobs on their own merit.</td>
</tr>
<tr>
<td><strong>Evaluation of Work Experience</strong></td>
<td>Trainees are expected to enroll in related courses or evening courses where they work and report on their progress at their conferences with the coordinator.</td>
</tr>
<tr>
<td><strong>Proficiency Exams</strong></td>
<td>No provision exists although the idea is favored.</td>
</tr>
<tr>
<td><strong>Employer Attitudes</strong></td>
<td>Generally favorable. In most instances a training schedule cannot be pushed.</td>
</tr>
<tr>
<td><strong>Labor Attitudes</strong></td>
<td>Not involved generally, although the AFL and CIO are represented on a 6 man advisory committee.</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>No prescribed curriculum obtains. Each program is individually designed through an individual counseling program.</td>
</tr>
</tbody>
</table>
Under the joint participation plan initiated by the University of Michigan, the junior and community colleges in the state are able to participate for two years in the five-year cooperative curriculum without any loss of time or credit to the student. The obligations of the colleges and the university are set down as follows:

Participation of the College:

1. The College recruits prospective vocational-industrial teachers and coordinators.

2. The College uses its guidance facilities and customary counseling procedures in the selection of students for the curriculum.

3. The College enrolls students in non-professional subjects of the curriculum or equivalent courses acceptable for transfer to the University program.

4. The College places prospective vocational-industrial teachers in industrial employment in the trades which they aspire to teach or in industrial employment which will satisfy the requirements of the State Plan for Vocational Education in the case of coordinators.

5. The College arranges for related instruction in the technical information of the occupation which the student is engaged in learning.

6. The College furnishes coordination services to employed students.

7. The College grants credit for the student's industrial experience and related study on the basis of four semester hours for a semester's work and study, and three semester hours for such work and study during the summer.

8. The College records and certifies all work processes and related study engaged in by the student on a transcript which is furnished to the University so the latter may recommend the student for the trade competency examination, if necessary, or the vocational certificate, if possible, upon graduation.
Participation of the University:

1. The University accepts students qualified for transfer from the college directly into the School of Education.

2. The University provides the professional education of the student and whatever other courses not transferred from the College are necessary for graduation.

3. The University arranges for the additional industrial experiences of the student necessary for recommendation for vocational certification.

4. The University arranges for a trade competency examination, where required, for students who do not possess stipulated amounts of industrial experience required by the State Plan upon graduation.

5. The University maintains liaison with the College to the extent possible with respect to the wishes of the latter and serves in a consultative capacity on matters of the College's participation in the program as requested.

Comparison of Program Characteristics. Some of the essential characteristics of existing cooperative programs will be considered here to establish the degree to which present programs have developed along a common pattern, as well as to determine what the characteristics of the programs are. Of course each of the programs offers alternating periods of campus study and supervised off-campus work, but these were the only qualifications for a trade and industrial teacher education program to be considered in this study.

Table XIV provides a comparison of the essential characteristics of existing programs. It will be noted from available data that the
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Michigan</td>
</tr>
<tr>
<td>1. Years in Operation</td>
<td>4</td>
</tr>
<tr>
<td>2. Number of Graduates</td>
<td>0</td>
</tr>
<tr>
<td>3. Percent of Graduates in Teaching</td>
<td>0</td>
</tr>
<tr>
<td>4. Length of Curriculum</td>
<td>5 yrs.</td>
</tr>
<tr>
<td>5. Degree Granted</td>
<td>B.S.</td>
</tr>
<tr>
<td>6. Current Enrollment</td>
<td>10 plus unknown no. in cooperating J.C.'s</td>
</tr>
<tr>
<td>7. Curriculum Content:</td>
<td></td>
</tr>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Professional</td>
<td>20</td>
</tr>
<tr>
<td>Technical</td>
<td></td>
</tr>
<tr>
<td>On-campus</td>
<td>20</td>
</tr>
<tr>
<td>Cooperative</td>
<td>25</td>
</tr>
<tr>
<td>Electives</td>
<td>14</td>
</tr>
<tr>
<td>Total Semester Hours</td>
<td>124</td>
</tr>
<tr>
<td>8. Percent of Enrollment in</td>
<td></td>
</tr>
<tr>
<td>Cooperative Program</td>
<td>100%</td>
</tr>
<tr>
<td>9. Organizational Pattern</td>
<td>semester</td>
</tr>
<tr>
<td>10. Alternating Period</td>
<td>semesters</td>
</tr>
<tr>
<td>11. Co-op Firms</td>
<td>no data</td>
</tr>
<tr>
<td>12. Occupational Prerequisite</td>
<td>none</td>
</tr>
<tr>
<td>13. Occupational Areas in</td>
<td>Any for which</td>
</tr>
<tr>
<td>Which Training is Offered</td>
<td>adequate training can be offered and in which a teacher can be placed</td>
</tr>
</tbody>
</table>

*With the single exception that automotive mechanics majors alternate on a yearly basis.*
programs, even though existing within a single state, have little or no common pattern, except that they are all organized on the semester basis, all award the B.S. degree, and all require no occupational experience for entry. None of these particular characteristics are peculiar to a cooperative program. A comparison of the existing programs indicates that cooperative programs do take on the characteristics of the institutions which offer them and that there is no typical cooperative program any more than there is a typical conventional program.

Analysis of Characteristics in Terms of the Situation at the University of Illinois. Only two items stand out as offering a challenge in developing a cooperative program for the University of Illinois. One of these, the geographic differences between the three existing programs and the University of Illinois, suggests that the University develop some other pattern of offering off-campus experience. The industry in the Champaign-Urbana area cannot support programs similar to any of those described. The second item challenges the University to undertake a cooperative program. From Table VI it will be noted that the three institutions in the State of Michigan have a total trade and industrial teacher education enrollment of at least 77 students. In Illinois, where the University of Illinois is the only institution so designated, no students can be obtained from among competent craftsmen who would have to be encouraged to undertake a four year program with little
or no assurance that they could again achieve their present economic status in the next ten to fifteen years.

No evidence can be obtained to indicate that a cooperative program, similar to those operating in Michigan, would be successful in Illinois. Neither is there any evidence which indicates that these two heavily industrialized states do not have enough in common to warrant serious consideration of the inauguration of such a program in the State of Illinois.

Although certain information gained from existing programs indicates that the University of Illinois should proceed with the development of a cooperative program, the geographic difference previously mentioned poses a definite problem. It is immediately recognized that distant placement of trainees immediately obligates additional staff time for coordination over and above that required when all placement is local, and this must be considered in planning the University of Illinois program.

The long, successful operation of programs such as those at Antioch and the University of Cincinnati, which place students throughout many states, indicates that with additional time and effort, placement outside the Illinois campus area will not block the successful operation of a cooperative program.

The problem of placement should be somewhat lessened by the location of heavy industrial concentrations within a 175 mile radius at Chicago, East St. Louis, and Indianapolis, plus the closer and
smaller industrial concentrations at Joliet, Kankakee, Decatur, Danville, and Peoria which lie within a radius of 125 miles.

POTENTIALITIES OF COOPERATIVE EDUCATION IN TRADE AND INDUSTRIAL TEACHER EDUCATION

It is inadequate simply to declare that work is "good for a student." A presentation of the basis for the derivation of educational values from work experience is therefore undertaken.

On the basis of accepted psychological and pedagogical theory, it can be postulated that education has two aspects: (1) it takes place through experiencing in the environment and (2) it is a continuous process. It then follows that reinforcements for learning can be derived from selected experiences which relate to studies in the school and which allow students to experience applications of their studies in their community context. It is explicit in this rationale that all work is not inherently educational and that efforts must be made within the school to correlate school work to field experience if maximum mutual benefits are to be obtained.

It is with this qualification of the educational value of work that the potentialities of cooperative education to provide the components of a trade and industrial teacher education program will be investigated. For ease of exposition, aspects of a teacher education program will be considered under three headings, although it is believed that no clear distinction can be made between many inclusions in the three classifications.
One further consideration of the potential of the cooperative plan must be the degree to which the plan conforms to accepted educational theory and practice. A plan which is contrary to trend and in opposition to contemporary thinking would likely have little chance for success.

Consistency of Work as Education with Educational Philosophy. The beginnings of the movement to combine work and education are lost in antiquity with the origin of apprenticeship, but the movement has continued through the ages. Pestalozzi was perhaps the first actually to put into practice a school-controlled work-study program. This is described (10, 12) by Barnard as follows:

The institution for the poor at Neuhof was opened in 1775. Poor children flocked in from all directions, many of them gathered by Pestalozzi himself from their misery, and out of the streets. He had soon fifty children, whom he kept busy in summer with field labor, and in winter with spinning and other handicrafts, instructing them all the time, and developing and clearing up their mental arithmetic.

Pestalozzi's enthusiasm for combined offerings of work and study carried to some of his disciples who developed highly successful schools of their own. Outstanding among these was Fellenberg's institution at Hofwyl in Switzerland in 1806. The influence of these educators was felt (28, 19) throughout Europe and spread to America where the idea of combining manual labor with academic studies became a significant movement in the first half of the nineteenth century.
The first American implementation of the work-study idea at the college level began (57, 157) with the Manual Labor Movement in the period 1820-1840. "This was essentially a scheme to provide a means of supporting needy classical students in college and to aid in the support of the colleges. The plan was to require students to attend classes one-half the day and work in the fields or shops owned by the college the other half. ... (The idea) failed to achieve its economic purposes, and is significant principally because many of its advocates argued eloquently for the educative value of the work experience, and a few saw in it a means of vocational education."

The Manual Labor Movement was followed by the movement to establish agricultural and mechanical colleges, which was in turn followed by the Manual-Training Movement which had its beginning in this country in the late 1870's. However, widespread concern was not evidenced until the early years of the twentieth century. The popular support given the Smith-Hughes Act in 1917 gave impetus to broader consideration of the role of work in education.

In a pamphlet published in 1940, the American Council on Education stressed (4, 19) the importance of work in general education:

There is no factor of general education which is more important to consider than work. This statement should not be thought of as applying merely to a few marginal cases, but should be accepted as a principle of the widest possible application. Those who are to enter the professions need to labor at some period in their lives in order to gain an understanding and appreciation of what labor is. Those who are going to earn their living by labor have a right to be trained under competent supervision so that they may enter on their careers under the most favorable conditions possible.
The same body, in a consideration of *Youth and the Future* added (5, 25-26) the following on the importance of work in education:

For all youth it would be a great improvement over the present condition of affairs if the principle were widely accepted that formal education should not be continued beyond the twelfth or thirteenth grade without several months of experience in some realistic form of gainful employment . . . The greatest misfits among youth today include many of those who have good minds, but who have pursued the absorptive processes of reading, listening, and studying so long and so uninterruptedly that their personalities have taken on the major characteristics of a sponge.

In the hypothetical Farmville School described in *Education for all American Youth*, work is an integral part of the school offerings. Features of this phase of the program are described (64, 167-169) as follows:

1. Each student is expected to render some service to the school and the community each year, without pay, as his or her contribution to the common welfare . . .

2. There are . . . jobs in the school which require more time, continuous work throughout the year, and some skill developed through experience . . .

3. Students are not paid for work performed primarily for its learning value, even though it may be productive . . .

4. Students are paid for work on productive projects, however, when they have developed reasonable skill and when such work is in addition to their normal educational programs . . .

5. There are also a few continuous jobs on productive projects which require considerable skill and, frequently, managerial ability as well. For all these, students are paid wages as a part of the costs of production . . .
6. As far as possible, students are helped to get work which is related to their educational and occupational plans. This is usually practicable for jobs within the school and other public agencies.

7. Every work experience, however remotely related to occupational plans, is considered a part of the youth's education. The teacher in the student's major field of interest is responsible for enlisting the cooperation of the employer and for helping the youth to gain the maximum learning from the experience. Counselors are included, of course, in the planning of all such experiences.

8. As far as eligibility is concerned, no distinction is made between jobs maintained by federal student-aid funds, by state and local student-aid funds, by the regular school budget, and by private employers.

9. As a general practice the amount of public funds used for student aid is determined by the availability of private jobs.

10. Federal and state funds for student aid are used chiefly to pay for work associated with new ventures in education and in other public services.

11. Increasingly the school is using its local student-aid funds to help students earn money through enterprises which they manage themselves.

12. Counselors may make outright grants for student aid in exceptional cases in which such action seems clearly in the interests of boys and girls.

In 1948 the American Association of School Administrators subscribed to effective work experience as part of the learning process. They charged the schools with the responsibility of providing work experience that would give the pupil "useful insights, attitudes, habits, or skills as a working member of society as follows:
To assume that a child can learn to be a worker without having the experience of work is as indefensible as to hold that a baseball player can be developed without actually playing the game, that a surgeon can acquire his skill from textbooks and needs no working acquaintance with the scalpel, or that a teacher can learn to teach without teaching. People learn to work by working, whether they work under conditions which promote the development of good attitudes and good habits of work or under conditions that are disintegrating. The school is obligated therefore to see that its pupils gain their work experience under optimum conditions.

Leo F. Smith said (77, 27), "From all sides comes an increasing demand for a reorganization of the curriculum in order that provisions will be made for realistic experiences which will enhance each individual's opportunity for achieving occupational skills and economic status."

Hamden L. Forkner stated (29, 436) that, "Experiencing work is essential to the complete education of every young person. Whether the individual is to become a professional person, a housewife, a businessman, an industrialist, or simply an employee, his general education is not complete unless he has experienced the responsibilities involved in a job."

Harold Florian Clark, stating the view of an economist on Work in Education, said (21, 10):

All students should have to work because of the educational effect of the work. For long centuries one group had the "education," while another did the work of the world. That produced a most unfortunate division between work and education. Education without work is weak and undemocratic. Work without education is slavery.
There is indeed evidence on every side that the cooperative plan is consistent with a trend in educational theory and practice to include more work experience in the educational program.

Facility for Providing General Education. Virginia O'Neil found (69, 125) that certain subject matter areas in the school program would have to be emphasized to enable cooperative students to clarify their understandings of some of man's problems and to improve the insights they might gain which would lead to improved personal and community living in a democratic society. These needed emphases are:

1. A history of man's struggle for freedom all through the ages which would lead into a study of American Democracy. This would be of great value to students in seeing that democracy is an achievement. The decline of feudalism, motivations for settling America, the growth of the pre-industrial agrarian economy, the rise of industrial society, the growth of labor unions, and the development of capitalism should be among the areas studied. All of these topics should be studied in their relation to the changing concept of liberty.

2. An intensive study of American society today with an analysis of the meaning of such terms as rugged-individualism, free enterprise, laissez-faire, mixed economy, and collectivism.

3. A comparative study of the social philosophies, ideologies, and programs with which democracy is being challenged in the world today.

4. A careful consideration of the place of work in our society. This would include studying the effect of changes in our culture on work opportunity, the psychological values of work to the individual, the possibilities of growth through work experiences, its potentialities for giving a student insight into democratic ideals and processes, the ways in which work can be made part of our educational program, and the problems which are involved in efforts to integrate work experience with school work.
To the extent that these needed emphases are found in the curriculum, educational objectives related to intelligent citizenship may be reinforced through work experience. This specific gain would be concomitant to the principle objective of developing trade competency in a trade teacher, but none would deny the desirability of aiding the prospective teacher to obtain a sense of personal significance and greater social purposiveness.

Facility for Providing Professional Education. The dilemma facing trade and industrial teacher education posed by demands for technical and technical-related competencies is similar to the engineering education need for providing these. Trade-trained teachers pay little attention to teaching techniques used in their training, and they have little occasion to ponder the principles involved in the learning process. Trade teachers who receive their professional training preceding or following college are unacquainted with the reactions that applied theory will evoke from students and cannot visualize the classroom application of much of what they do. When trade training and study are taken simultaneously, questions can be asked, explanations and applications made throughout the learning process.

Cooperative employment, carried on concurrently with studies which are planned and coordinated, offers opportunity for resolving the dilemma of how to relate trade training and college study. This plan will also provide the experiences to be gained from full-time
campus residence and full-time employment which cannot be obtained on a part-time or extension basis.

Facility for Providing Technical Education. The amount of trade training which could be obtained in a curriculum of reasonable duration will definitely be limited in terms of conventional trade experience requirements. Typical five-year programs offered by engineering schools provide between two and three years of employment. If this period is taken up with unorganized unsupervised work, the training would unquestionably be inadequate. However, if the time is carefully planned in terms of the individual's professional goals, his previous experience, and his abilities, sufficient progress should be made to qualify him as a beginning trade and industrial education teacher.

Indications are that an adequate number of industrial firms would be willing to cooperate in offering a planned training program so the desired type of experience could be obtained.

The truly significant contribution of the cooperative plan to technical competency is not in the length of experience, but rather in the quality and type of experience gained. For example, O'Neil (69, 14) states:

The problem is to make work experience a gateway to "the more abundant life." It served this end in primitive societies. Work meant maintaining membership in the group, and achieving a plan for living the "more abundant life" as it was then interpreted. The primitive child participated with members of different age groups, in the social and productive activities of his community. He got his patterns of living and understanding from the whole world about him rather than a segment of it.
The change in this pattern should be obvious. Today's employee cannot receive the completeness of experience available to his forebears. The modern craftsman, in obtaining specialized competencies, inherently loses contacts with other members of society. A cooperative program which combines technical training with a broad education will help overcome these shortcomings by giving the individual an insight into the place of his particular occupation in society and into how he can contribute to democratic living. It is concluded that a teacher thus trained will be a more desirable teacher than otherwise.

Recruitment. Perhaps the most obvious shortcoming of the traditional method of providing trade teachers is its inability to provide adequate numbers of competent teachers. The cooperative plan, by recruiting secondary school graduates who generally have few financial or family responsibilities, gives promise of more nearly meeting the trade teacher demand.

The prospect of earning a substantial part of the expense of college education provides an inducement for students to enter a cooperative program. This should encourage the enrollment of capable students who wish to go on to college but cannot afford to do so.
A functional cooperative curriculum within a given state, for a specific institution, and in a single field must be developed within the limitations of the policies, regulations, and practices which are approved by, or have the acceptance of the respective parties concerned. One of the more extensive controls on such a curriculum, the needs of the clientele to be served, has been considered in Chapter II. This chapter now presents factors posed by federal and state regulations, university policy, and the attitudes and policies of cooperating agencies which affect the development and acceptance of a cooperative trade and industrial education curriculum.

FEDERAL REGULATIONS

The University of Illinois, Urbana, Illinois, has been designated \((41, 15)\) by the State Board for Vocational Education, as the institution which shall have responsibility for conducting the teacher preparation program in trade and industrial education for the State of Illinois. Therefore, any consideration of an industrial-vocational teacher education curriculum for the University of Illinois must acknowledge the various provisions of the Illinois State Plan for Vocational Education and the federal acts upon which it is based. Pertinent provisions of the federal vocational acts are presented first because of their basic nature.
The Development of the Federal Vocational Acts. Although there are now only two federal vocational education laws concerning education of less than college grade in the "continental" United States, there are seven acts (9, vii-viii) which are of importance in the development of the present federal legal provisions for public vocational education. These acts are:

1. The Smith-Hughes Act approved February 23, 1917 (Public, No. 347, 64th Cong.). This is the basic act since it contains many provisions which have been made to apply to later acts. The act provides annual appropriations for distribution to the States for the promotion of vocational education in agriculture, trades and industry, and home economics, and for the training of teachers for those fields. This act is still in effect.

2. An act extending the provisions of the Smith-Hughes Act to Hawaii approved March 10, 1924 (Public, No. 35, 68th Cong.). The act authorized an annual appropriation to be used for the same purposes and under the same conditions as the funds appropriated by the Smith-Hughes Act for use in the States. This act is still in effect.

3. The George-Read Act approved February 5, 1929 (Public, No. 702, 70th Cong.). This act authorized appropriations of additional funds for use by the States and Territories for vocational education in agriculture and home economics. In general, the conditions of the Smith-Hughes Act applied to work done under this act.

4. An act extending the provisions of the Smith-Hughes Act and any supplementary acts to Puerto Rico approved March 3, 1931 (Public, No. 791, 71st Cong.). The act authorized an annual appropriation to be used for the same purposes and under the same conditions as the funds provided by the Smith-Hughes Act for use in the States. This act is still in effect.

5. The George-Elizay Act approved May 21, 1934 (Public, No. 245, 73rd Cong.). This act replaced the George-Read Act and authorized for a period of 3 years,
appropriations to the States and Territories for vocational education in agriculture, home economics, and trades and industry, to be expended under the general provisions of the Smith-Hughes Act.

6. The George-Deen Act approved June 8, 1936 (Public, No. 673, 74th Cong.). This act replaced the George-Ellzey Act in 1937 and authorized annual appropriations for use by the States and Territories, including Puerto Rico and the District of Columbia. Additional financial provisions were made for the services covered by the Smith-Hughes Act and, also, for education in distributive occupations. Some exceptions were made to the conditions of the Smith-Hughes Act. The principal change provided for the matching of Federal funds on a graduated scale, starting at 50 percent and reaching 100 percent in 1947.

7. The Vocational Education Act of 1946, commonly known as the George-Barden Act, approved August 1, 1946 (Public Law 586, 79th Cong.). In form, this act amended the George-Deen Act; in reality, it rewrote that act, adding many new provisions and thus superseded the George-Deen Act. Like the George-Deen Act, the George-Barden Act is permanent legislation authorizing annual appropriations. The amounts of the annual appropriations authorized were increased and expenditures for a number of new phases of work were authorized. This act is currently in effect.

In commenting (89, viii) about these acts, the authors of the federal bulletin, Administration of Vocational Education, state:

All of these acts were passed for the same general purpose—to promote and develop vocational education of less than college grade. In the main, the basic principles and standards included in the first act have been carried over into the supplementary acts. Modifications have been made as experience has shown the need. In general, however, the pattern set by the Smith-Hughes Act has proven quite satisfactory in providing for the further promotion and development of vocational education. The principles enunciated in the Smith-Hughes Act are basic.
Provisions of Public Law 347 (Smith-Hughes Act) and Public Law 586 (George-Barden Act) which pertain especially to teacher education are to be considered here.

The "Smith-Hughes Act." Public Law No. 347, approved February 23, 1917, is commonly known and referred to (89, 98) as the "Smith-Hughes Act." It is "an Act to provide for the promotion of vocational education; to provide for cooperation with the States in the promotion of such education in agriculture and the trades and industries; to provide for cooperation with the States in the preparation of teachers of vocational subjects; and to appropriate money and regulate its expenditure."

Section 4 of this act makes an appropriation specifically for the "purpose of cooperating with the States in preparing . . . teachers of trade and industrial . . . subjects." It is further provided in Section 5, that "no State shall receive any appropriation for the salaries of teachers of trade, home economics, and industrial subjects until it shall have taken advantage of at least the minimum amount appropriated for the training of teachers of trade, home economics, and industrial subjects, as provided for in this Act."

Section 9 sets the condition, "That the appropriation for the salaries of . . . teachers of trade, home economics, and industrial subjects shall be devoted exclusively to the payment of salaries of such teachers . . . having the minimum qualifications set up for
the State by the State board, with the approval of the Federal
Board for Vocational Education."

Section 12 places several restrictions on teacher preparation
as follows:

That in order for any State to receive the benefits
of the appropriations in this Act for the training of
teachers . . . of trade or industrial subjects, the
State board of such State shall provide in its plan for
such training that the same shall be carried out under
the supervision of the State board; that such training
shall be given in schools or classes under public
supervision or control; that such training shall be
given only to persons who have had adequate vocational
experience or contact as a part of their training; and
that the State board, with the approval of the Federal
board, shall establish minimum requirements for such ex­
perience or contact for teachers . . . of trade and in­
dustrial subjects.

Section 12 further provides that a certain minimum of the ap­
propriations of the act must be used for teacher preparation in
each of the several vocational fields.

... that not more than sixty percentum nor less
than twenty percentum of the money appropriated under
this Act for the training of teachers of vocational sub­
jects to any State for any year shall be expended for any
one of the following purposes: For the preparation of
teachers, supervisors, or directors of agricultural sub­
jects, or the preparation of teachers of trade and industrial
subjects, or the preparation of teachers of home economics
subjects.

The George-Barden Act. Public Law No. 586, approved August 1,
1946, which is titled "Vocational Education Act of 1946," is com­
monly known (89, 106) as the "George-Barden Act." It is "an Act to
provide for the further development of vocational education in the
several States and Territories." Unlike the Smith-Hughes Act, this act did not make a separate authorization of funds for teacher preparation. The only reference to teacher training in this act is in subsection (b) of section 4, and it reads (89, 107) as follows:

The funds appropriated under authority of paragraphs (1) to (4), inclusive, of subsection (a) of this section may be used for assisting the several States and Territories, for the purposes therein specified, in the maintenance of adequate programs of administration, supervision, and teacher-training . . . Provided, that all expenditures for the purposes as set forth in this section shall be made in accordance with the State plan for vocational education.

Provisions for Trade and Industrial Teacher Education. The following provisions of the federal vocational laws have an important bearing upon the development of a trade and industrial teacher education curriculum:

1. No state can receive any federal appropriations for teacher salaries unless it has taken advantage of at least the minimum amount appropriated for teacher training. This is an acknowledgement in the acts that an adequate supply of competent teachers is an essential feature in the development of a program of vocational education.

2. The state board concerned has direct authority and the Federal Board for Vocational Education has ultimate authority in defining the "minimum qualifications" of teachers, and only those teachers meeting such standards may receive salary reimbursement under the vocational acts. This emphasizes the obligation of the teacher training agency to comply with provisions of the vocational acts if teachers' salaries are to be reimbursed.
3. The responsibility for teacher training rests entirely with the state board, although the federal board has the power to approve or disapprove the plan submitted by the state board. This regulation provides for state autonomy within the provisions of the federal act and enables a state to undertake a program such as will be proposed by this study.

4. The state board may designate an institution or institutions to carry out the vocational teacher education function, provided the institution or institutions concerned are under public control. It is under this provision that the University of Illinois has been designated as the industrial-vocational teacher training institution for the State of Illinois.

5. Teacher training shall be given only to those persons who have had "adequate vocational experience or contact as a part of their training." In the interpretation of this provision, the simultaneous gaining of vocational experience or contact and formal teacher preparation has received approval.

6. No one of the three types of teacher education (agricultural, trade and industrial, or home economics) may use more than 60 percent nor less than 20 percent of the teacher training fund appropriated to that state which provides for a somewhat equitable distribution of funds.
 STATE REGULATIONS

Under section 21-1 of the Illinois School Code, it is provided (42, 82) that:

No one shall teach or supervise in the public schools nor receive for teaching or supervising any part of any public school fund, who does not hold a certificate of qualification granted by the Superintendent of Public Instruction or by the State Teacher Certification Board and a county superintendent of schools as hereinafter provided, or by the board of education of a city having a population exceeding 500,000 inhabitants.

In addition, as previously noted, vocational teachers in the public schools who receive salary reimbursement from federal funds must fulfill the "minimum qualifications" in the state plan for vocational education. Therefore, it is essential that a proposed teacher education curriculum which intends to prepare vocational teachers for the public schools of Illinois, meet the various certification standards.

The State Plan for Vocational Education. The legal basis for participation in the benefits of the federal vocational acts is (41, 1) in the State Acceptance Act, known as "An Act in relation to Vocational Education," approved March 16, 1919, and contained in Chapter 122, Sections 694-698, inclusive of the Revised Statutes of Illinois. This act also created the State Board for Vocational Education.

In I-D-1, of the Illinois State Plan for Vocational Education, it is provided (41, 14) that:
It shall be the responsibility of the State Board for Vocational Education to maintain and supervise vocational education teacher-training programs for the purpose of preparing qualified teachers, supervisors, directors of vocational education, and vocational counselors, and upgrading employed teachers, supervisors, and directors in the field of vocational guidance and counseling.

Green, after analyzing the Federal law in regard to teacher training, stated (32, 55-56) that there are three ways in which the states may prepare vocational teachers:

1. By a State institution, usually a State university, college of education, engineering school, teachers' college, or normal school, to which the State has delegated more or less responsibility, the State board usually retaining the right to supervise and inspect, and the power to withdraw the teacher training function; such an arrangement is part of the State plan submitted to and approved by the Federal Board and thereby subject to revision.

2. It may be organized and carried in directly by the State board or its agents, being delegated as a part responsibility to the directors and supervisors. This is often called "itinerant teacher training" and is more or less casual and disorganized, or it may be placed a total responsibility in the hands of a teacher training specialist.

3. Or by a combination of these two plans, usually through the extension divisions of the State university by means of the extension courses and correspondence courses. These courses are generally given in the evening or on Saturdays and in any convenient center. Courses in summer school often are available to those who have time off from their teaching or occupational pursuits to attend.

The State of Illinois operates within the first of these patterns with the University of Illinois at Urbana being designated (41, 15) the only institution in the State to conduct trade and industrial teacher training.
The State plan provides (41, 17-18) in II-A-4-e for the use of the Smith-Hughes and George-Barden funds in teacher training as follows:

Reimbursement for vocational teacher training will be limited to salaries and travel, except for rental of space, clerical services, supplies, communication and printing which are necessary to an adequate program of research and State supervision and teacher training in vocational education.

Actual certification of teachers is not a function of the State Board for Vocational Education; however, it does have the authority to train teachers and approve teachers for reimbursement. Therefore, there is an interrelationship between this board and the State Teacher Certification Board which does grant, in conjunction with county superintendents, all limited certificates. Luther J. Black, Secretary of the State Teacher Certification Board, in a letter to the writer, stated that, "... we always require the approval of the Director of the Vocational Education Department for provisional certificates." The statutory and administrative State Certification requirements follow.

The School Code. Article 21 of the Illinois School Code contains the statutes which, in conjunction with the provisions of the State Certification Board, regulate the certification of teachers within the State. Section 21-1 of article 21 provides (42, 82) that:

No one shall be certificated to teach or supervise in the public schools of the State of Illinois who is not of good character, good health, a citizen of the United States and at least nineteen years of age.
In regard to the types of certificates, section 21-2 provides (42, 82) that:

All certificates issued under this Article shall be State certificates valid, except as limited in Section 21-1, in every school district coming under the provisions of this Act and shall be of two grades: (a) those limited in time, issued by the State Teacher Certification Board and a county superintendent and designated as . . . limited vocational certificate . . . and provisional vocational certificate: (b) those unlimited in time, issued by the Superintendent of Public Instruction and designated as . . . life special certificate.

Sections 21-6 (42, 82) and 21-10 (42, 82-83) delimit the limited vocational certificate and the provisional certificate, respectively, as follows:

Section 21-6. Limited vocational certificate.
A limited vocational certificate shall be valid for four years for teaching the vocational subjects named therein in grades seven to twelve, inclusive, of the common schools. It shall be issued to persons who have graduated from a recognized institution of higher learning with a bachelor's degree, with not fewer than 120 semester hours including 16 semester hours in professional education, 5 of which shall be in student teaching in the subject or subjects named in the certificate, under competent and close supervision. The vocational subject or subjects which the holder is qualified to teach shall be named in the certificate and the minimum amount of preparation in the subject or subjects named shall be determined by the Superintendent of Public Instruction in consultation with the State Teacher Certification Board.

Section 21-10. Provisional certificates. . . .
Prior to July 1, 1955, the State Teacher Certification Board may also issue a provisional vocational certificate. The requirements for a provisional vocational certificate shall be determined by the Superintendent of Public Instruction in consultation with the State Teacher Certification Board.
The State Teacher Certification Board. The requirements for a teaching certificate in Illinois are in part statutory and in part prescribed by the State Teacher Certification Board. The Board was created to carry out the legal provisions for teacher certification, and is empowered to make and prescribe rules necessary for the administration of the certification laws so long as it does not exceed the legal qualifications. Issuance of limited certificates is delegated to the Certification Board and County Superintendent of Schools, while life certificates are issued by the State Superintendent of Public Instruction.

The requirements of the State Teacher Certification Board for the provisional vocational certificate and the limited state vocational certificate follow:

Provisional Vocational Certificate. (Vocational subjects are those subjects approved under the provisions of the State Plan for Vocational Education)

The Provisional Vocational Certificate is valid for teaching the subject or subjects named in the Certificate in grades seven to twelve inclusive of the common schools. This certificate may be issued to applicants who have presented certified evidence of having earned the following credentials:

For Trade and Industrial Education

1. Trade Training and Experience. Candidates must qualify under one of the following options:

   a. Graduation from an approved four-year industrial or technical high school course and the completion of five years of appropriate trade training and experience subsequent to high school graduation.
b. Graduation from a four-year high school program including two units of shop work and one unit in mechanical drawing, and the completion of six years of appropriate trade training and experience subsequent to high school graduation.

c. Graduation from an approved four-year high school and the completion of seven years of appropriate trade training and experience subsequent to high school graduation.

d. For candidates over forty years of age, satisfactory completion of the eighth grade and at least one full year of work in an approved high school or its equivalent. In addition, the candidate must present evidence of having completed a satisfactory combination of nine years of appropriate trade training and experience.

Note: The following equivalents may be accepted:

One-half year credit on trade experience for each year of study in a technical or engineering school above the high school level if the major or minor is in the field for which trade experience is to be credited. Limited to two years' trade experience credit.

One-half year credit on trade experience for each full year of successful teaching in the subject on an Industrial Arts basis for which trade experience is to be credited. Limited to one year trade experience credit.

Under no condition will less than three years of trade experience be considered sufficient for meeting the requirements of the Certificate.

Employment experience and proven occupational competence must be certified to by the State Director of Vocational Education.

2. Education (Professional).

Four semester hours in each of the following subject areas:

a. Trade Analysis and Preparation of Trade and Industrial Instructional Material.
b. Methods of Teaching Trade and Industrial Subjects.

Note: The Provisional Vocational Certificate may be granted to a person otherwise qualified who does not have the required eight semester hours of pre-employment professional training but who arranges immediately to acquire such training.

3. Renewal of Certificate.

The Provisional Vocational Certificate is renewable at the end of four years upon successful teaching and professional growth satisfactory to the county superintendent of schools and certified evidence that the holder has completed a total of fifteen semester hours of work since the issuance of the Certificate, and at the end of the succeeding four-year periods upon certified evidence that the holder has completed fifteen hours of work in a recognized higher institution of learning, until such time as the applicant has completed all the requirements for a Bachelor's degree in a recognized institution of learning with a minimum of 120 semester hours, including sixteen semester hours in education.

Persons securing a Provisional Vocational Certificate should make immediate arrangements to secure the additional credentials necessary for the Limited State Vocational Certificate.

Approved by the State Teachers Certification Board
January 26, 1952
Luther J. Black, Secretary

Limited State Vocational Certificate. (By a Vocational Subject is meant such subjects as are approved under the provisions of the State Plan for Vocational Education.)

Limited State Vocational Certificate, valid for four years for teaching the vocational subject or subjects named in the Certificate in grades seven to twelve inclusive of the common schools, renewable in periods of four years upon successful teaching and professional growth satisfactory to the county superintendent of schools, and certified evidence that the holder has completed a total of fifteen semester hours of work since the issuance of the Certificate and at the end of the succeeding four-year
periods upon certified evidence that the holder has completed fifteen hours of work in a recognized higher institution of learning until such time as the applicant has completed all of the requirements for a bachelor's degree in a recognized higher institution of learning with a minimum of 120 semester hours, including sixteen semester hours in education. This Certificate may be issued to applicants who have presented certified evidence of having earned the following credentials:

For Trade and Industrial Education

1. Trade Training and Experience. Candidates must qualify under one of the following options:

   a. Graduation from an approved four-year industrial or technical high school course and the completion of five years of appropriate trade training and experience subsequent to high school graduation.

   b. Graduation from a four-year high school program including two units of shop work and one unit in mechanical drawing, and the completion of six years of appropriate trade training and experience subsequent to high school graduation.

   c. Graduation from an approved four-year high school and the completion of seven years of appropriate trade training and experience subsequent to high school graduation.

   d. For candidates over forty years of age, satisfactory completion of the eighth grade and at least one full year of work in an approved high school or its equivalent. In addition, the candidate must present evidence of having completed a satisfactory combination of nine years of appropriate trade training and experience.

Employment experience and proven occupational competence must be certified to by the State Director of Vocational Education.
2. **Education (Professional)**  

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Trade Analysis and Course Organization</td>
<td>4</td>
</tr>
<tr>
<td>b. Methods of Teaching Industrial Subjects, including practice teaching</td>
<td>8</td>
</tr>
</tbody>
</table>

Before the **Limited State Vocational Certificate** can be renewed, the holder must acquire fifteen semester hours of college credit which must include the following courses:

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Principles of Industrial Education</td>
<td>2</td>
</tr>
<tr>
<td>b. Shop Organization and Management</td>
<td>4</td>
</tr>
<tr>
<td>c. Vocational Guidance</td>
<td>2</td>
</tr>
<tr>
<td>d. American History and Government</td>
<td>10</td>
</tr>
</tbody>
</table>

3. **Educational requirements for re-issuance of the Certificate** shall follow the same pattern as for the **Limited State High School Certificate**.

**Note:** An **Emergency Vocational Certificate** may be granted to a person otherwise qualified who does not have the required eight semester hours of pre-employment professional training but who immediately arranges to acquire such training.

Approved by the State Teachers Examining Board  
May 7, 1945  
Luther J. Black, Secretary

In further delineating the state certification requirements, the Certification Board has outlined the following content requirements for a **limited state high school certificate**:

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. English, including Oral and Written Expression</td>
<td>8</td>
</tr>
<tr>
<td>b. Natural Science</td>
<td>6</td>
</tr>
<tr>
<td>c. English, including Oral and Written Expression</td>
<td>8</td>
</tr>
<tr>
<td>d. Natural Science</td>
<td>6</td>
</tr>
<tr>
<td>Course</td>
<td>Semester Hours</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>c. Social Science (Including a course in American history and/or government)</td>
<td>6</td>
</tr>
<tr>
<td>d. Humanities</td>
<td>6</td>
</tr>
<tr>
<td>e. Health and Physical Education</td>
<td>3</td>
</tr>
<tr>
<td>f. Additional work in any above fields</td>
<td>6</td>
</tr>
</tbody>
</table>

| Education (Professional)                                             | 16             |
| a. Adolescent Growth and Development or Educational Psychology       | 2 or 3         |
| b. Principles, or Philosophy of Education (including the study of professional ethics) | 2 or 3         |
| c. Student Teaching (High School level)                              | 5              |
| d. Materials and Methods in the Secondary School, or Methods of Teaching a Particular Secondary School subject | 2 or 3         |
| e. American Public Education                                         | 2 or 3         |
| f. Electives in professional education                               | 3              |

| Electives                                                           | 21             |

| One Major (area of specialization)                                  | 32             |
| One Minor (area of specialization)                                 | 16             |

| Total                                                               | 120            |

**Management Attitudes and Policies**

A significant factor in the satisfactory operation of a cooperative teacher education program with industry is the favorable acceptance of it by industry. In discussing (80, 19) cooperative plans, Elmer F. Sproule, Training Manager, Hughes Aircraft Company, stated:
Obviously, such plans necessitate close cooperation and communication between the educational institutions and the cooperating industrial firms. To be successful, the co-op plan must have the full sympathy, understanding, and cooperation of the business of industry in which it is operated.

In this same regard, Superintendent John D. Meade, in addressing (61, 9) the 27th Annual Meeting of the Virginia Manufacturers Association, stated:

Those in public school education today are conscientiously trying to do a good job and it is your conscientious desire to make it possible for them to do a good job. In order for you to make this possible there must be a better interpretation by school people to you of the needs that exist, and you in turn must develop a positive and definite approach for deciding for yourselves whether these are justifiable needs in your opinion, and if they are, you should adopt a specific program for helping meet these needs.

That there is a degree of interdependence between industry and education, and therefore a basis for cooperative action by them, is stated (75, 2) by Noel Sargent, Secretary of the National Association of Manufacturers, as follows:

The Association (National Association of Manufacturers) believes . . . that businessmen have a pretty precise meeting ground for joint consideration of educational problems with educators themselves. One of the principal raw materials of industry is its human element, the workers who accept employment for the first time. This raw material of industry is, however, the finished product of the schools. Is this finished product usable—both as it is, and with reference to its possibilities for further development?

This, I repeat, furnishes a basic common point for consideration of educational problems by industrialists and educators.

The need for obtaining the sympathetic understanding of industry is recognized, and since there is a common interest, it should be
possible to promote cooperative effort. However, a lack of acquaintance on the part of the educator with the policies within industry can cause needless friction and misunderstanding and thus render a cooperative program ineffective. Therefore, the remainder of this chapter briefly presents data indicative of the attitudes and policies which control the actions of management and labor.

**Changing Concept of Entrepreneurship.** Ludington cites (53, 130-131) the necessity for a change in management's outlook on the role of industry in modern society as follows:

Industry cannot exist long without a wholesome concern for the people it serves. As our culture has become more complex and interdependent, industry has become more directly associated with the public upon which its very existence depends. Enlightened industrial management has come to be defined in terms of responsibilities to owners, workers, customers, and the public. Practice according to this definition has increasingly approached the democratic concept of industrial public relations through an active concern for the conditions and well-being of others.

In this same vein, Brown states (18, 637) that:

... decisions on industrial and economic policies which once were made solely from the standpoint of private interest and profit considerations, must now be evaluated in terms of consequence—not merely to one individual company, but to an entire industry of which the particular company must take into account a new factor of increasing significance—that of public relationships.

There is no ready way of determining the degree to which management has changed its emphasis from private interests to social responsibility, or whether such changes were based upon a growing humanitarianism or upon the requirements for survival in a modern
economy. However, it is important to note that at least 4,340 separate industrial plants (91, 7-8) were cooperating with higher education institutions in 1954, and this is sufficient testimonial that a willingness on the part of management to work with the schools does exist, and that a portion of management does recognize the obligation industry has today as one of the most significant institutions in modern society.

Studies of Employers' Opinions. C. E. Highlen, at the December, 1950, American Vocational Association Convention in Miami, in a report entitled "How to Secure the Cooperation of Industry" presented the results of a brief study of industry's willingness to cooperate in offering training for trade and industrial education teachers. He contacted 233 industries regarding training in more than 25 major occupational areas. Slightly over 50 percent of the firms, or a total of 123, returned the questionnaire and of these, over 35 percent indicated that they definitely would cooperate, and 54 percent indicated that they could not cooperate.

The fact that a majority of the answering concerns could not, for a multitude of reasons, support the program at that particular time is not the significant aspect of the findings. More important to this study is the fact that even within the small number contacted more training stations could be obtained than could ever be used by the largest trade and industrial teacher education program. The number of firms willing to offer training and the occupational area in which the training could be offered are presented in Table XV.
### Table XV
SUMMARY OF EMPLOYER ATTITUDES*

1. **Summary of Tabulations**
   - Total number of firms contacted by letter: 233
   - Replies received:
     - Definitely would cooperate: 43
     - Could not cooperate: 67

2. **Areas in which Training could be Provided**

<table>
<thead>
<tr>
<th>Area</th>
<th>Number of Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drafting</td>
<td>38</td>
</tr>
<tr>
<td>Machine shop</td>
<td>34</td>
</tr>
<tr>
<td>Electrical</td>
<td>21</td>
</tr>
<tr>
<td>Industrial training</td>
<td>21</td>
</tr>
<tr>
<td>Sheet metal</td>
<td>13</td>
</tr>
<tr>
<td>Foundry</td>
<td>11</td>
</tr>
<tr>
<td>Industrial supervision</td>
<td>11</td>
</tr>
<tr>
<td>Personnel</td>
<td>11</td>
</tr>
<tr>
<td>Patternmaking</td>
<td>9</td>
</tr>
<tr>
<td>Printing</td>
<td>6</td>
</tr>
<tr>
<td>Auto mechanics</td>
<td>4</td>
</tr>
<tr>
<td>Carpentry and cabinetmaking</td>
<td>4</td>
</tr>
</tbody>
</table>

*A total of 17 additional areas such as welding, fabrication assembly, general plant maintenance, diesel engine mechanics, pipe fitting, and radio and television were written in.

3. **Analysis of Replies Saying That They Could Not, or Would Not, Cooperate**

<table>
<thead>
<tr>
<th>Reason</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unable to cooperate (no explanation)</td>
<td>9</td>
</tr>
<tr>
<td>Very much interested but unable at present time</td>
<td>9</td>
</tr>
<tr>
<td>Now have a co-op program but unable to expand</td>
<td>8</td>
</tr>
<tr>
<td>Approval withheld until more details are available</td>
<td>7</td>
</tr>
<tr>
<td>Lack facilities for training T &amp; I teachers</td>
<td>5</td>
</tr>
<tr>
<td>Very much in accord with idea but too far away</td>
<td>4</td>
</tr>
<tr>
<td>Prohibited by Union Contract</td>
<td>4</td>
</tr>
<tr>
<td>Does not lend itself to their type of industry</td>
<td>2</td>
</tr>
<tr>
<td>Unsatisfactory experience with co-op program</td>
<td>2</td>
</tr>
</tbody>
</table>

*Adapted from a study (38) by C. E. Highlen.*
It should be noted that each possible training station represents training facilities for two students when the station is manned on a half-time alternating basis.

Table XV also presents an analysis of the replies that stated a firm could not or would not cooperate. A study of each grouping resulting from this analysis indicates that few of the immediate negative answers precluded eventual cooperation. Many replies were based merely upon temporary conditions. Obviously if a firm has inadequate or unsuitable facilities for proper training, it could not be considered further as a potential training station. However, firms with suitable facilities which are barred from cooperating by present union contracts, which have had previous unsatisfactory experiences, or who lack information as to its possibilities may still be potential future contacts. Through working with union representatives, permissive clauses may be introduced in new contracts. Further visits and communication may persuade hesitating, uncertain firms to cooperate fully. The fact that industries have previously participated in a co-op program is evidence that they are or were favorably disposed to the principles involved. In such cases the reasons for the breakdown of relationships may be corrected and the firms may again participate with assurance.

A committee of the American Society for Engineering Education conducted a survey in 1946 of a large number of industries which employ engineers. In this survey they asked, "What do you think of
the cooperatively trained engineers?" The distribution of these responses is reported in Table XVI. The majority of opinions were favorable (91, 52-53) to the co-op system.

Table XVI

DISTRIBUTION OF RESPONSES OF INDUSTRIAL ORGANIZATIONS TO QUESTION "WHAT DO YOU THINK OF THE COOPERATIVELY TRAINED ENGINEERS?"

<table>
<thead>
<tr>
<th>Opinion Expressed</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>We consider co-op trained students to be very satisfactory</td>
<td>28</td>
</tr>
<tr>
<td>We regard the co-op system favorably</td>
<td>28</td>
</tr>
<tr>
<td>We have had no experience with co-op graduates but approve the general idea of the system</td>
<td>25</td>
</tr>
<tr>
<td>We have observed no significant difference between co-op and regular graduates</td>
<td>10</td>
</tr>
<tr>
<td>We think co-op graduates are inferior to regular graduates</td>
<td>5</td>
</tr>
<tr>
<td>We are opposed to the interruptions in study</td>
<td>3</td>
</tr>
<tr>
<td>The co-op theory is good but its application is impractical</td>
<td>1</td>
</tr>
</tbody>
</table>

*From a survey report by a committee of the American Society for Engineering Education (91, 52).

The NAM and Education. Noel Sargent, Secretary of the National Association of Manufacturers, in an address at the NAM's Educational Conference in New York City, traced the position of the NAM with reference to educational matters over the past fifty years. Portions
of this address, which seem especially pertinent to this study, are quoted (75, 2-11) below.

As I see it, the NAM starts with a basic philosophic belief that education is a lifelong process. It consists not only of formal education in schools, but is also the result of experiences and training in homes, churches, clubs, and at work; of contacts with fellow-students, and playmates, while at work and at play. All of these enter into the totality of education as it relates to the individual.

Education, moreover, from the standpoint of an organized group, such as NAM, includes the formulation and coordination of its own basic beliefs and their dissemination and promotion.

Since 1905, the Constitution of the NAM has included, among the Association's objectives, "Dissemination of information among the public with respect to the principles of individual liberty and ownership of property."

... In 1897, our second President, Mr. Theodore Search, was actively connected with the School of Industrial Arts in Philadelphia. He and other industrialists declared that technical schools in both England and Germany were far superior to those in the United States, and at their request the Association urged the establishment of commercial and industrial art schools in United States cities.

... By resolution that year (1900) the Association advocated free public commercial and technical schools or the establishment of such departments in regular high schools and colleges.

A further step was taken in 1913 when the Association urged Federal grants for extension work in agriculture, continuation schools for youngsters employed in industry, and for home economics training. In 1916, the Association renewed its support for Federal aid to vocational education, and the following year the Smith-Hughes Bill was enacted into law.

In 1938, the Association was an active participant in two conferences held by the Advanced School of Education of Teachers College at Columbia University, dealing with the
relationship between public education and United States industry and business.

... In 1941, the Association stressed the importance of adequate financial support for schools and the need for cooperative exchange of viewpoint between industry and educators. In conjunction with a committee of the National Education Association, under the chairmanship of Dr. Alonzo Myers of New York University, the Association engaged in 1942, 1943, and 1944 in forty-five regional meetings and 250 community discussion groups, in which industry and educators participated.

In 1947 the Association began active sponsorship of Business-Industry-Education Days, in which local educators visit local plants. This idea was originated by Professor Carl Hohn at Michigan State College, and the NAM has cooperated in the holding of several such days in different communities throughout the country. Both educators and industrialists find it very beneficial to have these contacts, and I anticipate that they will be substantially extended.

Through such contacts, the Association intends, so far as is possible, to do something to meet a situation described as follows in a resolution adopted at the Association's 1913 convention: "Our system of common school education is exceedingly defective in important particulars... because businessmen have not been upon state and local boards, or when on, have served only perfunctorily and not with the interest which they give to their personal affairs." And in 1947 the Association said that "all members of industry should take a deeper interest in the problems and performance of the schools."

Thus there is considerable evidence that industry collectively supports cooperation with the public schools. This cannot be taken to mean that every industrial plant approached will "roll out the carpet," for certain plants, because of the nature of their work, or local conditions, or previous experience will not be able to cooperate. However, there exists a generally favorable attitude
which should enhance the possibility of industry's acceptance of its role in a cooperative teacher education program.

One of the stated objectives of the NAM, the "Dissemination of information among the public with respect to the principles of individual liberty and ownership of property," contains an implied caution when evaluating reports of the association. The NAM, as well as the Industrial Conference Board, the Chamber of Commerce, and innumerable other organized management interest groups, seeks support for industrial policies. In an attempt to provide an understanding and appreciation of the manufacturer's viewpoint, what is "right" and "good" often becomes coterminous with what the group believes. This, of course, is a privilege of the group, but in promoting industry-education relations management groups and individuals in management must understand that the schools cannot compromise their obligation to place values under the careful scrutiny of intelligent and critical appraisal. And, bias by any individual or organization should be acknowledged.

However, in clarifying the position of the schools, an educator cannot promote understanding by taking a "holier than thou" attitude with management because the schools have also been remiss in certain of their obligations. In this regard, Ludington states (53, iv):

Each group (industry and education) is interested in helping people to understand and more intelligently appreciate the importance of industry in daily life according to its own point of view. Vital cooperative
relationships, however, have not been worked out by industry and the schools. On the whole much waste and confusion have resulted, with organized industry and public education becoming two highly conservative social institutions with each struggling to maintain its own concept of the status quo.

If the schools, industry, and society are to overcome present poor communications with each other, increased emphasis will have to be given to positive, cooperative, constructive action aimed at achieving common goals. This thought should serve as a guide for a cooperative school-industry program coordinator in his relationships with industrial representatives.

Legal Considerations in Employing Students. Almost every student in the cooperative program, at least after a year's residence work, will be over eighteen and therefore exempt from child labor laws and the hazardous employment provisions (84, 91) of the Fair Labor Standards Act for minors.

Again in almost every case, cooperative students will be employed where there are more than eight employees on the payroll and for this reason will be included in coverages extended by the Federal Unemployment Tax Act and Social Security Legislation without an employer having to adjust his previous payroll or record system.

The fact that students in the proposed program will be regular employees and will need no special dispensations or preferential treatment other than that required by their training, is an important asset. Management's only concession will need to be in
rotating trainees through various training situations and in de-
voting the added supervisory time to assure this rotation.

TRADE AND LABOR ORGANIZATION POLICIES

Factors which make a consideration of labor's policies manda-
tory as a phase of this study are: (1) the need to examine the
basis for replies from contacted firms, as indicated in Table XV,
that they would be unable to cooperate due to union agreements,
(2) recognition of their interest and support over the years for
public school industrial education, and (3) the fact that an ac-
quaintance with such a significant factor in American industry may
be considered to have educational value for industrial teachers.

Pioneering cooperative programs in teacher education have not
developed extensive relationships with labor because the preponder-
ance of their placements have been in unorganized shops. However,
in many situations labor would be a determining factor in the suc-
cessful operation of a program. For this reason, labor's policies
in regard to education are considered here.

Several industrially organized unions left the AFL nineteen
years ago and formed the CIO. Early in 1955 the two labor groups
agreed to come together in a new federation. As yet no name has
been chosen for the new organization. The 15 million combined
membership of the unions comprises less than 25 percent of the
American labor force, but their influence is strongest in areas
where cooperative programs are most likely to operate.
Because the new labor federation has not been organized it has no historically developed policies. The policies of leaders and groups established before the merger will therefore be presented in the belief that the policies of the new group will reflect previously adopted principles.

The AFL and Education. The American Federation of Labor, founded in 1881, is the oldest and strongest (1955 membership of 10 million) labor organization. It has been interested in the form and direction of industrial education from its beginnings.

There is some evidence that labor, prior to 1890, might have favored both manual training and trade training, provided, of course, that certain conditions be met. In the first place, manual training must be taught as a phase of general education. . . . Trade instruction must be broad, basic, and fundamental with the emphasis placed on the theory and principles underlying the work of the trade. Above all, the training must be designed to prepare for entrance in the trade as an apprentice, not as a journeyman or master mechanic. Labor never at any time acknowledged that there is any type of preparatory instruction that constitutes an adequate substitute for apprenticeship (48, 355).

Shortly after 1890 labor and other leaders could see that existing manual and trade training could not satisfy industry's need for skilled workers, and until the end of the first decade of this century a more satisfactory means of training was sought through private technical schools, trade groups, correspondence schools and other means. Labor joined the movement for vocational education

*The present tense is used because the previously noted merger is still in its embryonic period.
in the public schools hoping to influence its development so that it would not work against the best interests of labor.

Labor was one of the strongest supporters of the Smith-Hughes Act in 1917 and in varying degrees has supported public vocational industrial education ever since. Recent indications of the AF of L's support of vocational education are exhibited in the following selected statements: The AF of L will "wage a fight against any efforts to cut these (vocational education) appropriations. You may be assured that the American Federation of Labor will do everything possible to expand vocational education and will resist all efforts to hamper this very much needed program for training skilled workers." (Taken from a letter by George Meany, President of the AFL, under date of December 24, 1953, to Lester Washburn, International President, United Auto Workers of America - AFL, made public in the March, 1954, AVA Journal.)

We hope for and will work toward improved cooperation at all levels, to the end that industrial education will continue as a vital part of our public education system, not controlled by any corporation or private group. We realize, at the same time, that knowledge about management and labor groups on the part of industrial educators is essential to the proper functioning of the industrial education programs. Cooperation then, is the keynote. (From an unpublished address to the Illinois Vocational Association Convention on March 4, 1955, by John D. Connors, Director of Education, AFL. Taken from a copy of the address received from the speaker.)

**Historical Development of Labor Policies Toward Education.** John D. Connors, as a part of the address noted immediately above, briefly
traced the early development of organized labor policies with regard to industrial-vocational education, as quoted below:

Early unions thought so much of the need for vocational education that they set up their own vocational schools, in early days, organizing evening classes for their members and apprentices. Leaders of the early unions in America urged that our schools be opened to provide trade and industrial education with day classes for public and evening classes for employed workers. Beginning in 1903, the Conventions of the A.F.L. have set up regular convention committees to handle and report on education. At the 1908 Convention in Denver, the Federation appointed a special committee of eighteen delegates to consider the subject of industrial education and vocational education. A final report was adopted at the 1911 Convention. Although constantly subjected to review in the years since, the 1911 report was of such clarity and scope that much of it is valid still. This report is the basis of the A.F.L.'s present position, and indeed, is similar to the industrial education program which, in fact, developed. A few of its policy points, from many deserving attention, might be mentioned, noting particularly that these were adopted as policy 44 years ago. Some of these provide that:

1. Industrial Education should not displace any of the existing general education, but should be added to it.

2. It should not begin before 14 years of age.

3. Industrial education should be controlled and directed by the public, not by private institutions or corporations.

4. The teachers of industrial subjects should have practical experience and should be recruited from the trades themselves.

5. Supplemental technical education for those already employed in the trades should be provided through continuation schools.

Vocational Education Policies of Organized Labor. M. Ray Karnes summarized (48, 361-76) the evolved attitudes and policies of labor on issues and problems in vocational education as follows:
Control of entrance to the trade. . . . This issue . . . became the most important factor underlying labor's criticisms of private trade schools, and later, public preparatory trade training in the public schools. Labor has always carefully scrutinized all training programs to determine their probable effects on the number of workers entering the trade.

While still a problem of grave importance to labor, control of entrance to the trade has, since 1900, gradually made way for other considerations bearing on the economic welfare of wage earners and on the maintenance of a strong union.

Specialized Versus Comprehensive Training. . . . Labor is interested in all round training and experience that will make of each employee a valuable worker who can demand and get the maximum wage. With the exception of the fact that labor, about 1900, began to place more emphasis on competency in all branches of the trade than formerly, no appreciable change has occurred in labor's policy relative to this issue. In both preparatory and on-the-job instruction the demand is for comprehensive training.

Dual Versus a Unified System of Education. Labor . . . was insistent that vocational education be made a part of the regularly constituted public school system to the point that in 1916 it threatened to withdraw its support of the Smith-Hughes Bill unless it be amended to insure unified administrative control on the state and local levels. Labor . . . has since 1938 maintained that, in order to ensure unity in education, controls for general as well as for vocational education must remain in the Office of Education.

Labor and Employer Representation on Advisory Committees. . . . One striking feature of labor's educational pronouncements is the incessant claim to the effect that it is only through the close cooperation of educators, labor, and employers that a practical program of industrial education can be developed.

Relationship of General and Vocational Education. Invariably labor raises two major questions when a new proposal for vocational-industrial education is called to its attention. First, what economic and social effects will this new measure have on organized labor? Second, how will it
affect general education? . . . Never has it been willing to permit any form of vocational education to interfere with the highest possible general, cultural development of high school youth.

Selection and Training of Teachers. Labor has from the beginning of its interest in industrial education recognized the importance of placing highly competent union members in industrial schools as teachers. While assuming that craftsmanship is a first consideration in the selection of teachers for these positions, it has at the same time insisted that these men take advantage of the training in methods of teaching made available through various teacher training institutions. From experience with its own training programs, labor knows that skill in a trade does not guarantee the ability to do an acceptable job of teaching that trade.

. . . Particularly objectionable to organized labor has been the practice of installing college trained teachers, without adequate trade experience, in the vocational schools as teachers of trade and industrial subjects. Labor has, however, insisted that trade teachers have, in addition to occupational proficiency, a substantial general education and that they assume the responsibilities of the teaching profession.

Although the record of organized labor is quite clear, it cannot be assumed that these over-all policies apply to a particular local union. These enjoy considerable autonomy in their operation and the acceptance or rejection of a cooperative training program at the local level may depend very little on top-level policy. This factor plus organized labor's strong and continuing feeling toward industrial education makes it doubly important that representatives of the unions be included in program planning.

Union officials, when informed concerning the objectives of the program, are generally favorable to school, labor, and industrial cooperative programs. This is attested to by the extent to which
cooperative trainees have been placed in strongly organized plants by secondary and higher education programs. Unions and union officials are willing to help schools with their problems, but they are often unwilling to make concessions in labor-management agreements for a school's trainees when they are uninformed concerning the program and have not been a party to program planning.

There is little question that a cooperative program can be operated without the cooperation of labor by using unorganized firms as training stations. The real question is whether such a procedure is in the best interests of the program or its students.

Personal experience in working with representatives of organized labor has resulted in the formulation of the following general guiding principles in developing these relationships:

1. Ask for Help. Union representatives hold responsible positions, are busy people, and are not obligated to spend their time listening to the demands of persons not directly in their sphere of operation. They are generally willing, however, to offer their services when they are approached by individuals or groups who request their help.

2. Invite Them to Plan. When they are invited to participate in the planning and made to feel that "we" worked out a training schedule or some other problem, the relationship is on the right track.
3. **Don't Push.** Because of the nature of their work, union representatives, when hurried for an immediate, specific answer, are forced to give a "no" reply. If gradually introduced to the question on repeated visits, with enough time allowed to enable the contact to clear with others, an affirmative answer is much more likely.

4. **Leave Apprenticeship Matters to the Joint Apprenticeship Council.** Do not ask for special privileges for trainees. If they perform up to union standards there is every reason to believe that they will receive appropriate standing for all previous experience when a question of trainee status arises.

**UNIVERSITY POLICY**

The University of Illinois, like every other public educational institution, is operated within a framework of state laws which control its operation. In addition to the extensive legal enactments which affect the operation of the University, there is an even greater amount of published material and accepted practice which further helps to establish University policy in practically all matters. Since any curriculum offered by the University must comply with its regulations and policy, attention will now be turned to various aspects of a program which are specifically affected by established policy.

**Admissions.** The following requirements for admission have been selected from those presented (44, 14-22, passim) in the 1954-55
undergraduate bulletin of the University of Illinois, as being especially pertinent to students in industrial education.

High School Graduation. To be admitted by certificate, an applicant must be a graduate of an accredited secondary school. If the school is in Illinois, it must be fully recognized by the Superintendent of Public Instruction; if located elsewhere, its rating must be equivalent to full recognition.

Admission by Examination. Entrance examinations are given by the University several times each year. They are given in Chicago four times each year, in March, June, August, and December. These examinations cover substantially all the subjects required or accepted for admission.

Required Subjects. Industrial Education; English, 3 units; Algebra, 1 unit; Plane Geometry, 1 unit.

Fifteen Units Required. Fifteen units of acceptable secondary school work are required, including the following:

1. Two majors and one minor, selected from English, Foreign Language, Mathematics, Science, Social Studies. One of the majors must be English.

2. A total of at least nine units from the fields of English, foreign language, mathematics, science, and social studies, including preparation amounting to a major or minor sequence in at least three different fields.

3. All subjects prescribed for the curriculum which the applicant desires to enter. (See Required Subjects above.)

4. The six remaining units necessary for admission may be selected from any of the high school subjects which are accepted by an accredited school toward its diploma and which meet the standards for accrediting. Fractional credits of the value of less than one-half unit will not be accepted. Not less than one unit of work will be accepted in a foreign language, elementary algebra, plane geometry, physics, chemistry, or biology.
Although the above admission requirements establish as prerequisites for admission to an industrial education curriculum both algebra and plane geometry, it is established practice to allow students, who otherwise meet the requirements, to be admitted (\textsuperscript{44}, footnote, 17) on condition that the deficiency be removed during the first year of residence.

**Proficiency Examinations.** Since it is assumed that certain of the students electing a career in vocational teaching will have had considerable trade or industrial experience, it is highly desirable that some provision be made for them to receive evaluation of this experience insofar as it applies to the requirements of the curriculum. Credit by proficiency examination is provided (\textsuperscript{44}, 2\textsuperscript{4}-25) for by University regulation as follows:

**Proficiency Examinations.** Each semester the University gives proficiency examinations, similar to the regular semester examinations, in courses normally open to freshmen and sophomores. Proficiency examinations in more advanced undergraduate subjects, are given on recommendation of the head of the department and approval of the dean of the college. No fee is charged for these examinations. A student who passes a proficiency examination is given credit toward graduation, provided that this does not duplicate credit counted for his admission to the University and that the course is acceptable in his curriculum. The grade in the proficiency examination is "pass" or "not pass," but no student is given a grade of "pass" unless he has made at least "C" in the examination. No official record is made of failures in these examinations.

Proficiency examinations are given under the following restrictions: (1) They may be taken only by persons who are in residence, or who are candidates for degrees at the close of the college year in which the examination is to be given and who need no more than ten semester hours
to complete the requirements for their degrees.

(2) They may not be taken by students who have received credit for more than one semester of work in the subject in advance of the course in which the examination is requested. (3) They may not be taken to raise grades or to remove failures in courses.

**Graduation.** Each candidate for the baccalaureate in the College of Education at the University of Illinois, must meet (44, 25-26 and 96 passim) the general University requirements with reference to registration (i.e. registered during the session in which the degree is awarded), residence (i.e. either the first three years or the last year must be spent in residence), fees (i.e. all fees must have been paid in full), hygiene (i.e. required of all students entering the University with less than thirty semester hours of credit unless they have had the equivalent), military training (i.e. all male students entering with less than sixty semester hours, unless otherwise exempt from the military requirement, must register for military and take the basic course), physical education (i.e. students entering with less than sixty semester hours credit are required to secure four semesters of credit in physical education including the amount transferred), and rhetoric (i.e. satisfactory proficiency in the use of written English, as evidenced by at least a "B" in Rhetoric 102 or its equivalent. Those receiving less than a "B" must pass a qualifying examination before graduating).

Graduates of the College of Education at the University of Illinois, who are preparing for a teaching field must complete
the requirements of their curriculum with a minimum of approved courses totaling 120 semester hours, not counting the first two years or required work in military and physical education. Twenty hours in education are also required, including the following courses: Foundations of American Education, 2 hours; Educational Psychology, 3 hours; Technic of Teaching in the Secondary School, 3 hours; a course in the subject of specialization, 2 hours; Principles of Secondary Education, 2 hours; and Educational Practice, 5 hours. A 3.5 average ("A" = 5.0) is prerequisite to Educational Practice.

Organization for the Approval of Curriculums. The University of Illinois Senate, on February 14, 1949, authorized a unique body, the Council on Teacher Education, which was directed to "formulate policies and programs in the fields of teacher selection, retention, guidance, training, and placement in the schools which offer curricula for the training of teachers for the elementary and secondary schools and the community colleges." The Council on Teacher Education is composed of the Deans and Directors of the Colleges and Schools offering the curriculums in the various types of teacher education just mentioned. The Senate further provided that "all curricula shall be approved by the Council on Teacher Education, by the respective colleges, and the Senate of the University." The customary procedure is for a specialized area of teacher education to propose a curriculum which is then submitted to the College of Education Policy Committee, which acts upon the proposal and sends
it back for revision or submission to the electorate of the college.
The Council on Teacher Education then acts upon the proposal, and if it receives favorable acceptance, it is forwarded to the Senate. The Senate then votes upon the curriculum proposal, and, if it is passed, the proposal is sent to the Board of Trustees. After this final approval, the curriculum becomes a functioning part of the University's offerings. Because the procedure is complicated and difficult to explain, it is graphically presented in Table XVII.

Although the organization for curriculum approval on a large university campus can be described and portrayed to some degree, it can never be taken as a fixed or definite channel. The best results can perhaps be obtained by working both with and ahead of the proposal (and even behind it) as it moves toward adoption. Those who have been kept informed on the progress being made with the proposal, are likely to be better informed on the matter and better able to decide its value to the university and the state. If tentative proposals are sent ahead of the formal proposal, criticism can be received and acted upon which might otherwise delay acceptance of the curriculum.

The procedure for the consideration of major changes in required undergraduate professional courses* is similar to that given in

*Major changes are those involving the required sequence, the basic nature of a required course, hours of credit for a required course, or total hours required.

Required professional courses are College of Education courses required in any undergraduate degree program.
Table XVII

PROCEDURE FOR SECURING APPROVAL OF
A TEACHER EDUCATION CURRICULUM PROPOSAL
AT THE UNIVERSITY OF ILLINOIS

- Initiation by Staff Member of Group
  - Consultation with Service Division
  - Coordination and Action by Chairman and Dean
  - College of Education Policy Committee
  - Area Committees
    - Committee on Required Courses
  - College of Education Electorate
  - Council on Teacher Education
    - University Senate
      - Committee on Educational Policy
      - BOARD OF TRUSTEES
Figure XVII except that the final review of course changes is given by the Council on Teacher Education. It is through this latter procedure that permission to make revisions and modifications are sought to improve a functioning curriculum.

Administrative Support. The wisdom of carrying along the central administration in planning for the organization and administration of a new program is obvious, and this is especially so with a program which departs from the traditional pattern of campus offerings.

A cooperative program inherently requires the broad participation and support of many persons within the college organization, as well as within the community and state. This makes the support of the highest officers of the administration necessary to sustaining the plan.

Henry H. Armsby, Chief for Engineering Education, United States Office of Education, states (91, 18) that, "It is essential to the success of a cooperative program that the administrative and teaching staffs of the institution endorse and support the plan and those responsible for its administration."

It necessarily follows that all aspects of a cooperative program which are contrary to established university policy must be modified if administrative support is to be obtained. An alternative is to revise university policy to conform with program needs.
Between these two courses, staff and administration must be able to alleviate difficulties which would block full support by the institution at large.

The refusal to formulate or inaugurate the cooperative program at the University of Illinois until a staff member could be provided to work full-time on the program is indicative of the careful consideration being given the program in Illinois. It is considered by all to be a long-term development worthy of the total efforts of a staff member.

One other factor, more intangible in nature, is the relationship between community and state. Many satisfactory conditions exist for the acceptance of a cooperative trade and industrial teacher education program in Illinois. Among these are:

1. An extension and field service program reaches all parts of the state and enables the University staff to establish and maintain contacts in the local schools. Local teachers are kept informed on developments at the University and vice versa.

2. For at least four years the industrial education department has been discussing the possibilities of cooperative trade and industrial teacher education with local supervisors and classroom teachers, informing them of its merits and enabling the department to revise its thinking wherever it may have been faulty.

3. Thirty-two high school diversified occupations programs are in operation throughout the State with the result that educators,
the public, industrialists, and labor leaders have already been introduced to one type of cooperative trade and industrial education.

4. Joint staff meetings have been held between members of the Department of Industrial Education and the industrial education staff of the State Department of Education, thereby providing solutions to problems relative to the development and operation of a cooperative program which are mutually satisfactory.

The presence of at least those elements of University policy presented here are considered essential to the operation of a cooperative program. If a portion of the candidates for the program are to be selected from tradesmen who may or may not have graduated from high school, some provision should be made to permit their entering the program through examination. Similarly, if gaining trade competency through trade or industrial employment is to be recognized as possessing educational value, then portions of these competencies already possessed at time of entry should be acknowledgeable by proficiency examination and credit toward graduation. Some accepted channel for making recommendations for curriculum changes allows for a definite check on the progress and status of a proposal and also encourages staff and departments to entertain proposals.
Because the opinions of professionals of any new development in their field are important, one phase of this study included a survey reaching representatives of all the state departments of education, showing the reactions of these specialists in trade and industrial education to the cooperative teacher education plan. A tabulation of these reactions is provided in Table IX. Certain of these will be examined individually, and the total responses will be analyzed in Table XVIII.

Opinion of the Chief, Trade and Industrial Education. Trade and industrial teacher education is a cooperative undertaking in Illinois with the State Department of Education, the Board for Vocational Education, and the University participating. Therefore the acceptance or rejection of a teacher training program by the state officials is critical to the success of the plan.

In this frame of reference the statement by E. M. Claude, Chief, Trade and Industrial Education, Illinois State Department of Education, in responding to the questionnaire has real significance. He said:

It is not possible to induce highly qualified and thus highly paid trade and industrial workers to become teachers and require them to complete work for a degree. It therefore becomes necessary to rely on the college trained people who have had a minimum of trade experience, which was secured, in the main, on a piece-meal basis. The ideal and most promising source would be a college or university cooperative training program where trade experience and academic training could be secured in a planned, coordinated program on the college level.
This statement is taken as a strong endorsement of the effort to organize a cooperative trade and industrial teacher education program for the State of Illinois.

Analysis of Opinions of State Leaders in Trade and Industrial Education. An analysis of responses received from State Department of Education officials on a survey form is presented in Table XVIII. These responses were optional and quite varied in nature. For purposes of making an analysis of the thirty-five opinions, they were divided into five categories: (1) strongly favorable, (2) favorable with reservations, (3) no definite opinion expressed, (4) unfavorable with reservations, and (5) strongly unfavorable. Any classification of types leaves certain borderline cases, but typical examples under each classification are provided.

Statements such as that just quoted from E. M. Claude, and the following are favorable toward the cooperative plan:

Maurice C. Varney, State Director, Vocational Education, Maine: Some thought has been given to such a plan and I for one am heartily in accord with the idea. I am convinced that our teachers would show a marked improvement during the initial or "breaking in" stage of employment were their educational backgrounds compounded of "on the job experience" and technical and professional "know why." Subsequent service would, I believe, also indicate the value of this plan.

Glen Smith, State Teacher Trainer, Trade and Industrial Education, Oklahoma: I think the plan is excellent and may be the only way we will be able to maintain a program to furnish qualified teachers for trade and industrial education. We are having great difficulty getting the kind of teachers we need. Of course we could still lose them to industry as we are now.
Sam Hitchcock, Director, Vocational Education, Wyoming: It is my opinion that a cooperative trade and industrial teacher education program would be very valuable. I would like to see such a program put into operation to check its value.

Statements such as the following are favorable with reservations:

Samuel L. Fick, Chief, Bureau of Industrial Education, State Department of Education, California: ... I think there is considerable merit in your plan. The facilities with which to do the job would be our major problem.

Merton Wheeler, State Director, Industrial Education, Missouri: I think there is merit in the plan, also many problems.

H. C. Thayer, Chief, Trade and Industrial Education, Wisconsin: This would be an excellent idea if the teacher in training had previously had an adequate background of actual trade experience in the field indicated. The amount of such experience as could be secured in the cooperative program contemplated would not in itself be enough.

Statements such as the following express no opinion:

H. F. Hinton, State Supervisor, Trade and Industrial Education, Florida: We have not actually had any cooperative program with industry in the teacher training field.

O. H. Beaty, State Supervisor, Trade and Industrial Education, Kansas: Plan has been discussed at Kansas State Teachers College, Pittsburg, but no program organized.

Walter W. Klausler, State Supervisor, Trade and Industrial Education, Minnesota: To my knowledge, I know of no organized attempt to try such a program in this state.

Statements such as the following are unfavorable with reservations: (Only two of all those received were thus classified.)
Howard Gorham, State Supervisor, Trade and Industrial Education, Nebraska: What will labor think about a program which will qualify a two year mechanic to teach on day trade and extension levels?

Arthur Wrigley, State Supervisor, Trade and Industrial Education, New Jersey: We prefer that our shop instructors have a minimum of 8 years of broad trade experience including apprenticeship.

Statements such as the following are strongly unfavorable:

(Only two of all those received were thus classified.)

Herbert L. Benson, Teacher Trainer, Colorado A. & M.: We would not likely consider a cooperative training program as you describe equivalent to actual trade experience. Our teachers must be able to teach trade extension courses to men with many years' trade experience, and we would hesitate to use a person trained as you indicate to teach trade extension classes. We feel the pre-employment trainee is entitled to an instructor qualified to teach tradesmen.

Byrl Shoemaker, State Supervisor, Trade and Industrial Education, Ohio: This type of program has not been attempted in Ohio. Our observation of such programs in universities in other states has led us to believe that most of the persons enrolled in such a program enter industry rather than teaching. Thus it seems that such a program can not be justified from the standpoint of preparing teachers. Also in some states union organizations have objected to this method of preparing teachers for trade programs.

Table XVIII

OPINIONS OF STATE LEADERS IN TRADE AND INDUSTRIAL EDUCATION*

<table>
<thead>
<tr>
<th>Strongly Favorable</th>
<th>Favorable With Reservations</th>
<th>No Opinion Expressed</th>
<th>Unfavorable With Reservations</th>
<th>Strongly Unfavorable</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>8</td>
<td>27</td>
<td>2</td>
<td>2</td>
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</table>

*Based upon the responses reported in Table IX.
The data in Table XVIII indicate that seventeen state leaders in trade and industrial education were favorable to the plan. Only four respondents were unfavorable, while twenty-seven did not express a definite opinion for or against cooperative training.

Opinions of Local Administrators. The opinions of school administrators would be pertinent to the development of a cooperative program. A list was therefore secured of the names of all schools in the State of Illinois which offer federally reimbursable programs. It was considered that a response from a school with a vocational staff of twenty or more was more significant than one given by an administrator employing a single teacher. In recognition of this the schools were classified by the extent of their reimbursement.

Schools in the City of Chicago are a separate entity from those in the remainder of the State because of many legislative provisions in favor of their situation. These schools were treated therefore as one group. The remaining schools were grouped according to those receiving above or below $10,000 in reimbursement. The former group contains 13 schools, and the latter 75 schools. Each of the eight Chicago schools and 13 schools in the upper group were contacted. A sampling of the 75 was obtained by taking every fifth name from an alphabetized listing.

A total of 34 questionnaires were sent out: eight in group I, 13 in group II, and 15 in group III. The form requested the highest
administrative official in a school to indicate the type training they believed would best prepare a trade and industrial teacher for their system by ranking three possibilities: (1) apprenticeship plus journeyman experience totaling six years and 30 semester credits of teacher training courses, (2) five years of integrated trade experience and college work leading to a B. S. degree with half time on campus and half time in employment, and (3) any type of program they might prefer. A third possibility was written in on only one return and this prescribed a teacher with a B. S. degree and four summers experience in industry as a second choice.

The 50 percent answering in the first group all favored the first choice above. This is perhaps due to the large vocational programs in these schools in which most teachers teach their specialty full time. Extensive trade-extension and advanced classes are also offered in these schools.

Seven replies were received from each of the remaining groups representing about a 50 percent return in each case. Those from schools receiving over $10,000 reimbursement were unanimous in favoring the integrated program graduate. Administrators of the smaller programs with a single exception, also favored the integrated program graduates. This interest in teachers with a degree is perhaps due to the frequent need in smaller schools for vocational teachers qualified to teach other subjects, principally industrial arts.
The returns from this brief survey indicate that cooperatively trained vocational industrial teachers would be favorably received by the majority of school administrators throughout the State.
Chapter V
OPERATING PRINCIPLES AND PROCEDURES

Details as well as the general features of the organization of cooperative programs vary considerably. An attempt will be made despite this to describe the operating principles and procedures generally employed in cooperative programs both to ascertain alternative opportunities and to identify conclusions made by persons experienced with the administration of a cooperative program.

While the total field of cooperative higher education will be investigated, particular emphasis will be given to trade and industrial teacher education and the manner in which experiences in other co-op fields relate to the development of a program in this special field.

ADMINISTRATIVE PATTERNS

Little has ever been written on the administration of cooperative programs, and most available descriptions concern themselves with organizational patterns. An exception is the report (30) of the Committee on Aims and Ideals of Cooperative Engineering Education, by C. J. Freund, Chairman, which provides a statement of accepted administrative principles and practices in cooperative programs. The report of this committee has been adopted as the official statement of policy for the Cooperative Engineering Division of the American Society for Engineering Education.
Administrative and Operating Principles. The following are presented (30, 127-29) as administrative and operating requirements for a cooperative program by the Committee:

1. Educational and training values must be paramount considerations in the placement of students.

2. Employers and their officials must clearly understand the educational purposes of the plan, and must derive direct and quite obvious advantages from their cooperation in it.

3. There must be no exploitation of the student by the employer.

4. The higher administrative officers of the school or college must be enthusiastic supporters of the plan.

5. Employment of students must be as closely supervised as their academic work and status. This involves: (a) Frequent and preferably personal check with each student's employer and, if necessary, with the student's immediate supervisor. (b) Regular conference with the student concerning progress, employment conditions, and character of his duties. (c) Thorough employment reports and records, including name of employer, type of work, caliber of performance, hours completed, wages earned, difficulties encountered and solved, and additional significant data.

6. A plan must be made for each student's work in compliance with the broad aims of the cooperative method, his field of study and special vocational aims, and his capacities, interests and personality, insofar as these can be ascertained.

7. The college must maintain organized counselling service for cooperative students concerning their employment relations.

8. Cooperative students should be carefully selected in the first place with reference to employment qualifications.

9. Adjustment must be made for cycles of industrial booms and depressions. These include the following: (a) Effective service of the employer by the cooperative institutions. In turn, the employer can be expected to make serious efforts to maintain student employment in dull periods instead of promptly laying students off. (b) Restriction of the number of students in normal and boom periods. There can be no justification for
enrollment in peaks of production of so many cooperative students that great numbers of them will be dismissed with the first slight recession in production volume. (c) Placement of as many students as possible in long established and stable types of industry in which fluctuation is less severe, such as food processing, fuel production, power, transportation and communication utilities. (d) Reduction in the employment hours of all students rather than laying off a few completely while the remainder continue fully employed. (e) Spread of employment at all times over as many employers as possible, consistent with efficient supervision by college officials. (f) Inducing employers during dull periods to undertake special, long-term development projects in which students can be advantageously engaged. (g) Allowing limited cooperative work credit for diligent and intelligent efforts on the part of the unemployed student to find work on his own initiative. (h) Aggressive search for employment openings by investigating want ads, announcements of new incorporations, publications of contracts let and orders placed, and even by advertising for positions; likewise by close contact with officials of manufacturer's associations, trade associations, engineering societies, chambers of commerce and similar agencies.

Practices found in cooperative trade and industrial teacher education conform in general with these principles, but there is at least one marked difference. Item 2 of the quotation indicates that employers must "derive direct and quite obvious advantages from their cooperation" in such a program. This may be possible in training engineers who may remain with an employer after the completion of the program. Such advantages are not possible, however, when the trainee is expected to leave the employer after he is trained, such as in the case of teacher education for the public schools.

Employers are expected to appreciate the educational values sought by the program of cooperative teacher education, but they will derive only long-range and intangible benefits by participating.
Beginning workers are inefficient and training is costly, so little reward can be expected in return for providing candidates with an opportunity to become proficient in a trade. The only potential value to cooperating employers in such a program is the satisfaction derived from having contributed to a social obligation by cooperating with public education. Industry is vociferous in demanding more competent workers from the public schools, and in a cooperative teacher education program, can play its part in providing skilled teachers with an understanding of modern industrial processes and problems so that students may have greater comprehension of modern industry and its problems. Participating industrialists in a cooperative teacher education program will be expected to hold the view that industry, and thus society in general, will be improved if the general usefulness of trade and industrial program graduates can be improved through a superior teacher education program.

Techniques for Organizing Programs. Smith's study revealed (77, 83-84) that five techniques were utilized to organize cooperative programs: (1) a general meeting, (2) appointment of advisory committees, (3) use of faculty members and department heads, (4) employment of a coordinator for this purpose, and (5) requests made by industry, with the first four being utilized much more than the fifth. He added that the techniques are by no means independent of each other but are interrelated and often used to supplement each other.
The oldest cooperative trade and industrial teacher education program (i.e. Wayne University, Detroit) employed a combination of the first two methods. Through a general meeting subsequent committees were appointed. The special automotive trade advisory committee still serves in that capacity. The original cooperative program was begun by the lone efforts of Herman Schneider. The Western Michigan program, using the fourth method, was organized by the head of the trade and industrial education program. The method of employing a coordinator to organize the program was used at University of Michigan. The fifth means is considered to be an incentive for undertaking to organize a program rather than as a means of undertaking it.

Smith reached (77, 93-94) the following conclusions, after evaluating the various techniques of organizing cooperative programs:

1. It is desirable, in initiating a cooperative program, to hold one or more general meetings to which industrialists, labor leaders, and representatives from other institutions with cooperative programs are invited. At this time outlines of the basic objectives and purposes of cooperative education should be depicted in detail along with the more specific goals visualized for the local community. Even before these meetings it is advisable to make preliminary contacts with key people to assure that their individuals are in favor of such plans . . .

2. The appointment of advisory committees as an aid in organizing programs is of extreme importance. Such groups can be of considerable assistance in avoiding misunderstandings which might arise and in bringing the school into closer relationship with the community. To be most effective, these committees should not be too large and should include representatives from business, labor, and the school. The advisory committees should be concerned with specific types of businesses, such as distributive occupations, hotel management, construction industries, and so on.
3. The use of coordinators and interested faculty members is also a valuable organizational technique. These individuals may assume the tasks of visits to prospective employers, making plans for training circuits, selling the program to students and parents, and estimating the training value of cooperative positions which are offered. If teachers are utilized for these tasks, it is essential that they be allowed sufficient time to fulfill adequately these duties, and it is imperative that they have a sincere interest in, and enthusiasm for, the program.

4. When requests are made by industries for cooperative students, the problems of the school are greatly simplified. Such requests, however, should be carefully analyzed to assure that the industries are sincerely interested in providing training experiences and not seeking a cheap source of labor.

Cooperative trade and industrial teacher education programs have not generally reflected Smith's opinion as to the value and importance of advisory committees. Actually it cannot be stated that a given procedure will be effective in a specific locality, and the organizational procedures employed should be dependent upon the factors peculiar to a particular situation.

Techniques for Administering Programs. There are two methods of administering cooperative programs. The first involves the departmental chairman or a member of his staff as the person responsible for the program. This is the traditional pattern. The second employs a coordinator or a department of coordination to take charge of the work phase of the program and be responsible for promoting the integration of the work and study phases. Smith found that 60 percent of cooperative programs use the latter organization. Part of the reason for the popularity of this pattern is explained by its use in the Cincinnati Plan.
At the beginning, Dean Schneider handled the total operation of the program. He developed industrial contacts, recruited students, coordinated work and study phases, visited students on the job, counseled them, and maintained their records. After four years, the original 28 students in the cooperative program had grown to 138, which caused an administrative change as follows:

In order that the progress of a student might be more closely followed by those directly concerned with his school training, the business of making the transfers and planning a student's practical work was turned over to the heads of the civil, mechanical, electrical, and other engineering departments. To facilitate this work and to insure for the students the greatest degree of personal attention, each of the professors and instructors were assigned a special list of shops and a regular schedule for visiting them.

At the same time that the engineering professors were given full responsibility for the adjustment of shop and school work, they were relieved of the business details in the relations between students and employers. The commercial part of the work was placed entirely in the hands of a special field secretary in the dean's office. His duties included opening negotiations with new firms, investigating complaints from students or employers, and adjusting wages and working conditions. It was also provided that through the field secretary should be made all promotions, transfers, substitutions of alternates, and other changes affecting the employment of cooperative students.

This system, which appears to be an intermediate step between the two principal patterns found, again proved inadequate, and in 1919 a department of coordination was established with an assistant dean of the College of Engineering in charge. This is the administrative organization which remains at Cincinnati today.
Under this arrangement, each division of the College is represented in the department of coordination by a coordinator with the rank of assistant professor or above, who is a regular member of the teaching staff. Each coordinator reports to the Dean of Coordination and not to the Dean of the College. The coordinators act in an advisory capacity with the individual deans of the several colleges.

Although no trade and industrial teacher education program has an enrollment to justify a department of coordination, two of the programs have an individual on the staff who devotes a part of his time to coordination. The third program has the department head functioning as coordinator. In the former two cases the coordinator reports to the departmental chairmen.

Smith presents (77, 94-95) the following conclusions concerning the relative merits of the two systems:

In most of the institutions in which department heads or faculty members are utilized to administer the cooperative program, the numbers of cooperative students enrolled are relatively small and hence this plan has several advantages.

1. The department heads and faculty members are generally well acquainted with the students whom they are placing and hence know something of each individual's academic background, attitude toward work, and ability to get along with others. Because of this they are able to recommend students for positions which will be commensurate with their ability and interest.

2. The department heads and faculty members, because of their more intimate knowledge of the students, are in an ideal position to assist them with their personal and vocational problems.

There are also certain disadvantages in this technique.
1. When department heads become burdened with administrative details, they tend to make industrial contacts by telephone, a practice which, if carried on over a long period of time, results in a loss of good will. This was the principal factor which resulted in the establishment of the department of coordination at Cincinnati.

2. Faculty members are apt to view teaching as their primary responsibility and devote only the minimum time required to the duties of administering and coordinating the work programs.

3. If industries employ cooperative students from several departments, confusion arises as to the proper department head or faculty member to contact.

Two advantages of administration by a coordinator or central department of coordination are significant:

1. Although coordinators have various administrative duties at school, they are employed principally to make industrial contacts, select students for jobs, assist in coordination, and act as liaison officers between their institution and cooperating industries. The school officials who employ these coordinators generally select them because they have the type of training, technical background and personal characteristics deemed desirable for this type of work. Similarly, coordinators view the administration of the cooperative program as their primary duty and hence are likely to devote their full interest and energy to this end.

2. The use of a central office of coordination makes it possible for all contacts with industry to clear through a central office. This is a distinct advantage when a single company employs students from several departments of the school.

The major objection which has been raised to the use of a central office of coordination is that the coordinators do not have the close personal contact with students that department heads or faculty members do. This is a serious objection if it is valid. In large institutions one might also question how well the department heads really know the personal characteristics and problems of the students working under them...
Inasmuch as all stated objectives of cooperative plans include references to the improvement of learning by experience through practical applications of theory, some effort should be made to coordinate the work and study phases, and some individual or some group should be charged with the responsibility of seeing that the maximum educational benefits are derived from the total program. The Committee on Aims and Ideals of Cooperative Engineering Education states (30, 129) that, "cooperative employment relations of the school or college and of the students should be placed in the exclusive charge of a single official who is usually called the 'coordinator'." Because of the importance of the task of the coordinator to the successful operation of the program, elements of the function and qualities of a coordinator will be further investigated.

THE COORDINATOR

The United States Office of Education 1954 report on cooperative education states (91, 28) that, "By far the most important elements in the organization and administration of the cooperative educational plan are the functions performed by the persons called coordinators."

Each of the cooperative trade and industrial teacher education programs reported has an individual charged with the duties of a coordinator. These are principally concerned with the work phase of the program, but certain responsibilities are also assigned to
promote integration of the total program. Specific techniques employed in accomplishing the latter objective are briefly touched upon in Chapter III; however, a more detailed report of the role of the coordinator and coordinating techniques will be presented here.

Role of the Coordinator. The Society for the Promotion of Engineering Education reports (30, 579) that the work of the coordinator includes the following:

1. Establishing relations with firms and arranging for positions,

2. Keeping these positions filled,

3. Shifting students about so that their training shall be progressive,

4. Keeping records of the students' progress,

5. Maintaining sufficiently close contacts with students and firms so that troubles can be adjusted or foreseen and prevented,

6. Acting as advisers to the students and assisting them to get the most out of their industrial experience.

The coordinator for a cooperative trade and industrial teacher education program serves as a course of study builder for each trade, as a labor mediator, as a teacher in integrating work and study phases of the program and making related information assignments for students on the job, as a counselor in securing optimum placements, as a job supervisor, as a public relations representative of the school, and as a general overseer of the program employing the combined services of the school, the state, and the community.
The University of Cincinnati Catalog describes (20, 81-82) the role of the coordinator under the Cincinnati Plan as follows:

Department of Coordination and Placement is responsible for the successful operation of the cooperative courses in the industries. All questions regarding wages, transfers, and changes of jobs are handled by this department. There is a coordinator for each course . . . These coordinators confer with the employers in planning the course in practical work so that the students get a logically and carefully arranged training.

In order that the studies in the University may be definitely coordinated with the practical work, the coordinators make a direct correlation of the work of the shop with the instruction given at the University. They make a careful study of each cooperating firm and work out programs of training showing the various kinds of work which a student can most profitably follow. In addition, a graphical record is made for every student, which shows the various kinds of work that the student has done during his course. In this way every student's record is under constant scrutiny of the coordinator of his department.

In addition to planning schedules of the student's practical work, the coordinators meet students in the classroom. These classes, which differ according to departments, include discussions of such topics as (a) general manufacturing organization, planning, and production control; (b) chemical and metallurgical control of materials and processes, (c) power transmission, electronics, and lighting; (d) surveying, design, construction, and estimating.

Coordinating Techniques. Methods used to coordinate the work and study phase of cooperative trade and industrial teacher education programs are reported in Chapter III. In addition, it is pertinent to the study to consider those techniques which have been developed in the older cooperative plans. These are reported (91, 29-32) in the study, Cooperative Education in the United States:
The following devices . . . are used in cooperative schools today and have been found to be practicable and effective in helping the student to get the greatest educational value from his industrial experience.

**Orientation Class.** A course designed to provide general orientation to industrial employment has proved helpful in preventing embarrassing errors by students. Such a course is usually conducted for one or more terms or semesters of the freshman year, prior to the start of industrial employment. It generally includes instruction in first aid, safety, industrial hygiene, and other industrial problems and practices, an understanding of which will help the students to perform more smoothly on the job and to gain values which otherwise they might miss.

**Coordination Class.** After students have started their co-op employment, an occasional meeting of a "coordination class" gives opportunity for the interchange of practical experience, and for preparation and stimulation for the next period of employment. Oral or written work reports by members of the class aid in the identification of values received from work experience and present problems for discussion and attempted solution by the group. Oral reports by students have proved particularly interesting and effective, especially if written outlines are submitted to the instructor in advance so that he may be ready with questions and related material.

**Work Syllabus.** A "work syllabus" is an outline of the types of experience the student is expected to gain on a particular job, generally formulated as a series of questions. The student is expected to obtain the answers through direct observation, suggested text material, company catalogs and advertisements, and other sources. The answers to these questions might well be checked by the professor whose field and background are related most closely to the work of the student.

**Work Reports.** The basic principle of cooperative education is that a combination of academic study and practical experience will produce a better graduate than either one can do alone. It is easy to assume that the student will gain the full educational benefits of his jobs. The benefit he derives, however, will depend to a large degree on the extent of his motivation for exploring
the values in his working environment, for evaluating for
himself his job experience, and for providing the necessary
synthesis of classroom theory and industrial practice.

The student's "work report" is probably the most
logical basis for this motivation. Coordinators generally
agree that some formal work report, either oral or written,
should be required from every student for every cooperative
work period, in such form that its preparation will consume
an appreciable amount of the student's time and necessitate
some careful work. The specifications for the report
usually make it necessary for the student to begin organizing
his report early in his work period, to analyze his job,
to cultivate the habit of close observation, to extend
personal contacts, and generally to increase his useful-
ness and the value of his experience.

Job supervisors who understand the true purpose of the
"work report" often cooperate with the student and fre-
quently ask to see the finished report, which generally
indicates interest in the student's development much more
than it indicates any fear that confidential or embarrassing
information may be disclosed.

It is frequently recommended that the reports from
any one student should be varied in type, but that all of
them should conform to acceptable standards of composition.
Some schools require submission of written reports to the
department of English for grading from the standpoint of
organization and composition. Some utilize oral reports
as exercises in public speaking, in which the student is
coached on methods of delivery as well as being graded on
the organization and technical correctness of his report.

Such reports as have been briefly described above
constitute a dynamic part of the process of education and
provide information and stimulation to the student himself,
his fellow students, his teachers, employers, and coordina-
tors, especially if teachers are encouraged to use the re-
ports in classes, personnel conferences, and in relations
with employers and with other students.

Employer Evaluation of Student. Another device which
has been found practicable and effective in helping the
coop student realize the fullest educational benefit from
his industrial experiences is the evaluation of the student
by his employer, which is required in one form or another
by most cooperative colleges. Such evaluations, carefully
made out by conscientious work supervisors, can be of tremendous value to students and counselors. Some institutions have regular report forms which they request the employer to use. Others simply ask for informal statements from the student's immediate supervisor. Still others combine the two methods.

The form of the employer's report is much less important than the methods used to interpret to the student his performance and progress. The greatest value of the report lies in the encouragement of work supervisors to deal directly with students in giving them judgments of their work and suggestions for improvement. Such appraisal of the student's cooperative work is so valuable to the student and to the college that the coordinator can well afford to devote considerable time and energy to personal discussions of students and their work with work supervisors.

Placement of Students in Co-op Employment. Coordinators generally agree that it is desirable for a student, particularly in the early part of his course, to secure a variety of jobs to aid him in determining his fitness and liking for some particular kind of work, or as one coordinator has phrased it, "to find out some of the things he doesn't want to do." Many of the more capable and far-seeing students, however, realize that their education will not cease with graduation and are anxious to secure employment with companies which have well-organized and efficient training programs. From this viewpoint they are anxious to get started as early in their careers as possible with a good company, and to stay with it.

It is important that for each co-op student a properly graded sequence of jobs be arranged which will parallel his theoretical instruction and constitute a steady progression from subordinate tasks into positions of technical or administrative responsibility . . .

One criticism that has been leveled against the cooperative system is that the student loses the experience of finding his own job, since the coordinator places him with a firm. While it is true that in most cases the coordinator does place the co-op student, the employer is usually chosen on the basis of the expressed desires of the student himself, either for a particular employer or for work in a particular industrial or governmental area. In other words, the placement is generally a cooperative effort
of the student and the coordinator to find the work for which the student will be best suited, and in which he will be happiest. Furthermore, the usual practice in co-op colleges is to require the student to report to the employer for an interview in which he must "sell himself" just as any other applicant for work must. The employer is at liberty to reject the student and to ask for another candidate. However, because of the screening done by the coordinator, and the advice and counsel he gives the co-op student, the co-op represents a better-than-average risk for his employer.

Qualifications of the Coordinator. The coordinator, if he is to be a member of the teaching staff of an institution, should meet the qualifications prescribed for other members of the faculty in the department concerned. In addition, the Committee on Aims and Ideals of Cooperative Engineering Education prescribes (31, 129-30) the following qualifications for a successful coordinator:

1. Engineering education or wide engineering or industrial experience.

2. Sympathetic attitude toward students and young people.

3. Information and experience concerning personnel procedures and techniques.

4. Vocational information in the fields of engineering and industry.

5. Willingness promptly to solve problems as they arise, without regard to personal convenience, office hours, work routine, . . .

6. Ability to solve problems completely without compromise of principle, indecision, evasion or timidity.

7. Fairness, tact and skill in dealing with students, employers, and faculty.

8. Buoyant, optimistic and confident attitude in the face of difficulty and disappointment.
9. More than usual resourcefulness in appraising a complex situation and in revising plans and procedures accordingly.

10. Ability to adhere to standards and principles under widely changing and complex situations.

11. Large capacity for friendship.

Optimum Load. The teaching load of a coordinator should be comparable to the faculty practice in the department concerned. However, this statement is easier to make than to employ. Much of a coordinator's time is taken up with duties other than classroom instruction and it is difficult to evaluate in terms of load.

One attempt to arrive at a basis for determining the work load of a coordinator was based (17, 593-595) upon the number of co-ops placed by a coordinator. Bintzer's study of coordinators in seventeen colleges reveals that the number of students placed by one coordinator in one placement period varied from a low of 8 in one institution to a high of 250 in another, the mean being 59, and the mode being 50. Among institutions placing more than 100 students each period, the mean was 83 students per coordinator while the mode was again 50. Nearly all the respondents in this study believed that the maximum load should be 100 students so that more individual attention could be devoted to students and to training stations.

Of the seventeen colleges studied, ten required some classroom teaching by their coordinators and seven required none. Fourteen of the seventeen required services of coordinators for making addresses
to high schools, service organizations, trade associations, and the like. Four coordinators had full charge of admissions and seven had graduate placement in their charge. Ten schools made at least one visit to each co-op each quarter, six made visits every other term, and one made visits only when employment troubles arose on the job.

The investigator concluded (17, 595) as a result of the above study that the typical full-time coordinator should expect to have the use of a full-time secretary, should expect to do some teaching, should do some public relations work, should assist in at least one other key administrative function, should visit each co-op each term, and should maintain good relationships with 100 to 150 employers throughout the year.

The governing criterion for determining the load of the coordinator should be whether adequate time has been allowed to maintain the effectiveness of all aspects of the program. Indications of failure to meet the minimum time allotment for all aspects of the coordinator's task will be noticeable dissatisfaction among cooperating employers over details which have not been provided for by the coordinator, complaints from trainees that communications with the campus are inadequate, statements from students that the work and study phases of the program do not complement each other, and a multitude of similar difficulties which, if not remedied, may lead to failure of the program.
One other detail stands out from the questionnaire study of operating cooperative trade and industrial teacher education programs. Of the three programs, two devoted a minimum of one staff member half time to coordination. The third allowed but 10 percent of one staff member's time for coordination. The sampling is too limited to have significance, but the former programs have succeeded in getting into operation much faster than the latter. It seems to follow that a program involving so much preliminary field work should require the major part of one staff member's time, if it is expected to expedite inauguration of a program.

ADVISORY COMMITTEE STRUCTURE AND FUNCTIONS

It was determined in the questionnaire survey of cooperative trade and industrial programs that only one of the three employed an advisory committee, and that none of the programs formulated craft advisory committees with the exception of the single field of auto mechanics at one institution. The three pioneering programs also did not have advisory committees. Despite this, the use of advisory committees is an established practice in the field of vocational education. The federal acts provide (89, 16) for using appropriated funds for reimbursing the travel expenses of members of representative state advisory committees when attending meetings called by a state board for vocational education.

The study, Cooperative Education in the United States, also reports (91, 18):
Some institutions have found it useful to organize a cooperative work committee consisting of representatives of the administration, the degree-granting departments, and the coordination department to serve in an advisory capacity to the coordinators in establishing policies, in evaluating cooperative jobs for their educational value, in selecting students for their respective jobs, and in evaluating student experiences.

The undertaking involves the efforts of persons outside the institution. It follows therefore, that those who are to contribute to the program should be consulted. For these reasons, advisory committee function and structure will be presented in some detail.

Types of Advisory Committees. Two types of advisory committees can be employed in the planning and operation of a cooperative program. A general advisory committee, with representatives from groups participating in the program can contribute to formulating general policy and procedures. "Craft" or specialized trade advisory committees can be employed to provide advice on the more detailed aspects of a training schedule for specific trades. This involves obtaining the counsel of skilled craftsmen in the various trades and is too detailed in outline to be handled by a general advisory committee, although craft committees could function as sub-committees of the general committee.

Whatever the type of advisory committee, the emphasis of the committee's being is in the first word of the title. These are advisory committees, and when they become policy-making bodies they have ceased to perform their function.
Purposes and Functions of Advisory Committees. These should be outlined by the appointing authority concerned. One of the controlling factors in determining the role of the committee should be flexibility. As desirable as it may be to have broad representation from every conceivable agency that may contribute to the operation of a cooperative program, it is important to remember the following:

1. If a committee is unwieldy, business will be delayed.
2. It is difficult to arrange a common meeting time for large numbers of persons of the stature desired for membership.
3. If membership is not somewhat balanced in a group representing widely varied interests, conclusions are likely to be of little value. This makes attendance increasingly important.

The function of an advisory committee is to provide advice, and unless this is based upon the consensus of a balanced representation, it is likely to be of questionable value. The purpose of a general advisory committee is to provide proposals and advice on:

1. Organization, operation, and improvement of the program,
2. Location and approval of training stations,
3. Job placement procedures and actual placement,
4. Securing the cooperation of management and labor,
5. Nominating personnel for craft advisory committees,
6. Preventing friction or misunderstanding, and
7. Setting standards.
Advice obtained from such a group can save a considerable amount of time-consuming backtracking from unwise action that is unacceptable to one or more of those expected to cooperate with the program. The public relations value is also important. Persons involved in the planning of a venture are likely to be stronger supporters than those who have no vital interest in its success.

The purpose of a craft advisory committee is to provide proposals and advice on:

1. Training schedules,
2. Related instructional materials,
3. Fair and equitable wages,
4. Standards in all phases of the program,
5. Evaluating trainee progress, and
6. Cooperation of management and labor.

In a small program with a single coordinator the need for advisory help from experienced craftsmen in a particular specialty seems evident.

Proposed General Advisory Committee Charter. A general advisory committee charter based upon previous considerations will now be presented. This charter will be designed for the specific purpose of creating an advisory group for the advisement of the Industrial Education Department of the University of Illinois in the planning and operation of the program proposed in Chapter VI.
Membership on this committee should be by representatives of statewide organizations. Each member should be nominated by the head of a group, and appointment should be contingent upon approval by the person directing the group to be advised. Ability of the group to contribute to the effectiveness of the program, extent of representation within a group, balance of representation between groups, and restriction to a number of representatives to permit efficient operation are criteria for selection of membership.

The following are typical of these groups from which membership would be logical in Illinois:

1. Secondary School Principals Association
2. Secondary School Superintendents Association
3. Teachers Colleges
4. Industrial Education Association
5. Department of Public Instruction
6. School Board Association
7. Illinois Educational Association
8. Parent Teachers Association
9. Legislature
10. Department of Certification
11. American Federation of Labor
12. Council of Industrial Organizations
13. Department of Labor
14. Federal Bureau of Apprenticeship (no state bureau)
15. Federation of Teachers
16. Association of Manufacturers
17. Chamber of Commerce
18. Association of Training Directors
19. Society of Professional Engineers

Certainly there are others that could be added to such a list. Even with this number it is inconceivable that a common meeting date for representatives of each group could be arranged. The number is therefore reduced to a committee of nine with one ex-officio member.
The specific reason for selecting nine as opposed to six or eleven members is difficult to justify. However, three representatives are selected from management and labor, for they are the two principal agencies cooperating in the operation of the program. Three others are selected from public education, since these represent the schools in which the graduates of the program will be expected to teach. Members from groups playing less important roles in the program are excluded to maintain small enough membership to provide for efficient operation. The program coordinator is made ex-officio to provide secretarial services for the committee and to enable him to participate in committee meetings. He is excluded from full membership to prevent his being advisory to himself. The proposed charter follows:

CHARTER OF THE GENERAL ADVISORY COMMITTEE FOR COOPERATIVE TRADE AND INDUSTRIAL EDUCATION

An Advisory Committee to the Industrial Education Department College of Education, University of Illinois

I. PURPOSES AND FUNCTIONS. The Committee will promote the development and continued improvement of the cooperative curriculum by providing proposals and advice on:

A. The organization, operation, and improvement of the cooperative industrial education curriculums

B. The location and approval of training stations

C. Job placement procedures and job placement

D. Securing the cooperation of management and labor

E. Suitable personnel for occupational advisory committees
F. The prevention of friction

G. Setting and maintaining standards

II. MEMBERSHIP

A. The Committee will have nine regular and one ex-officio member:

1. Three labor representatives
   a. A representative of the American Federation of Labor
   b. A representative of the Council of Industrial Organizations
   c. A representative of the Federal Bureau of Apprenticeship

2. Three management representatives
   a. A representative of the National Association of Manufacturers
   b. A representative of the State Chamber of Commerce
   c. A representative of the Illinois Association of Training Directors

3. Three educational representatives
   a. A representative of the Secondary School Principals Association
   b. A representative of the Industrial Education Association
   c. A representative of the State Department of Public Instruction

4. The program coordinator of the Division of Industrial Education (ex-officio, but without vote)

B. Term of Members

1. Regular members will be appointed for three-year terms, beginning June 1, 1955, with initial appointments varying to make possible a rotating membership with one-third of the members retiring each year.

2. Ex-officio membership is continuous for the program coordinator for the Division of Industrial Education.

III. STUDY GROUPS

The Committee is encouraged to set up study groups including members of the committee and specialists to assist them.
IV. RELATIONSHIPS

The Committee is advisory to the Department of Industrial Education of the University of Illinois.

V. ASSISTANCE FOR THE COMMITTEE

The Department of Industrial Education will endeavor to provide the travel expenses of the members and of the program coordinator.

VI. COMMITTEE ORGANIZATION

The first meeting is to be arranged by the program coordinator, who will serve as temporary chairman. The Committee will establish by-laws pertaining to the selection of officers, sub-committees and study groups, and procedures for conducting its meetings.

VII. MEETINGS

The time and place of meetings will be determined jointly by the Advisory Committee and Coordinator.

A number of the features of this proposed charter could be worked in a variety of ways. However the membership is selected, it is important to the proper functioning of the committee that they be balanced in numbers between groups as indicated.

In selecting members, one procedure is to contact the director or president of each of the groups from which representation is sought. Each can be requested to suggest two or three possible personnel to represent his group. This provides the University with an opportunity to select persons of known ability, with the sanction of the group concerned. A revolving term of membership is important for several reasons. Personnel move about quickly enough in modern
times to make long-term appointments impractical. A changing membership will also provide fresh ideas.

Some provision should be made in the formal charter to indicate the relationship of the committee to the University. Provision can be made for a rather rigid organization of the group, but better results should be obtained by permitting them to devise their own rules.

The matter of paying travel expenses to meetings will depend upon school policy and the availability of funds. It will also depend on the individuals on the committee. Some will have expense accounts that cover such duties. Others may be without such support and will welcome the provision for financial aid.

Perhaps the most significant factor in the long-term success of a general advisory committee is whether or not its members receive evidence that their proposals and advice are being considered and acted upon in the planning and operation of the cooperative program. For this reason regular reports of action taken on matters considered by the committee should be forwarded to committee members.

Proposed Craft Committee Charter. This will be more informal than the General Advisory Committee in both structure and function. Such committees may be constituted for each employing establishment, for trainees in a single trade, or for variations of these. The important factor is to have an organizational structure which will result in obtaining the maximum cooperation of management and labor
in the training program with the result that students may obtain the greatest educational benefit from their employment.

A craft committee should be a small group, with perhaps only one representative of management and one from labor. Members should be acquainted with the function of the committee, but there is little need for specifying formal terms of membership, regularly scheduled meetings, and provisions for other functions than building training schedules and supervising their fulfillment. Representative members should be nominated by the coordinator, and meetings should be held as necessary, even in the plan during or after the day's work. After the original training schedule has been set up, only occasional short-term meetings will be required to review the schedules and their implementation. A proposed craft committee charter follows:

**COMPOSITION AND FUNCTIONS OF A CRAFT ADVISORY COMMITTEE FOR COOPERATIVE TRADE AND INDUSTRIAL TEACHER TRAINING**

An Advisory Committee to the Industrial Education Division, College of Education, University of Illinois

I. PURPOSES AND FUNCTIONS

The Committee is to promote the development and continued improvement of the cooperative program by providing advice on:

A. Training schedules

B. Related instructional materials

C. Equitable wage scales for trainees
D. Standards on all essential phases of the program
E. Evaluating trainee progress

II. MEMBERSHIP

The Committee will have at least three members:

A. A representative of management,
B. A representative of the employees, and
C. The program coordinator serving as executive secretary.

III. RELATIONSHIPS

The Committee is advisory to the Department of Industrial Education of the University of Illinois.

IV. ORGANIZATION AND MEETINGS

The membership will be nominated by the program coordinator and will serve until written notice is received from a member that he wishes to withdraw or until the coordinator disbands the committee. Meetings will be called and scheduled by the program coordinator as the welfare of the training program dictates.

Craft advisory committees constituted by the above charter can offer counsel in developing a program that will provide trainees with experiences judged by specialists in the field to be broad enough in scope and for an appropriate period of time, to insure comprehensive training. A sample training schedule derived by an advisory committee serving the cooperative auto mechanics area at Wayne University is included in Appendix B.

Consideration of the operating principles and procedures presented in this chapter is essential to the success of a cooperative program such as that proposed in Chapter VI.
Chapter VI

A PROPOSED TEACHER EDUCATION CURRICULUM

The curriculum herein proposed will be based upon those factors previously considered which mandate the present form of a cooperative trade and industrial teacher education program for the State and the University of Illinois. Nothing in the proposed program will be permanent, but the individual and collective parts of the program will indicate one possible means whereby existing offerings at the University of Illinois, with the single exception of cooperative trade and industrial experience, can meet the requirements of the agencies concerned.

The State Teacher Certification Board requirements, which are specified in general titles and principally by the number of required semester hours, will be analyzed. The specific requirements of the State Board for Vocational Education, the University of Illinois, and the College of Education will also be identified and presented in a curriculum outline.

In addition, the content of the curriculum will be evaluated in terms of the underlying purpose of the proposed curriculum which is to provide the public schools of the State of Illinois with trade and industrial teachers who:

1. Possess the necessary trade competence,
2. Are competent to cope with educational problems,
3. Possess the background of experience and education upon
which to assume positions of leadership in an essential and expanding phase of education, and

4. Can meet certification requirements.

GENERAL EDUCATION

As previously noted in Chapter IV, the limited high school certificate requires a minimum of 35 semester hours of general education. This requirement is flexible enough to allow for considerable freedom. The university offers two patterns through which the educational requirement may be met.

In the first pattern the student may take those traditional courses such as rhetoric and composition, college algebra, history, philosophy, and sociology. The second pattern is provided by the Division of General Studies courses which are readily transferable to other college curricula or may lead to a two-year certificate.

The Division of General Studies was designed to introduce the student to points of view and methods of exploration characteristic of the resources in a single field. The courses are planned (44, 167) to supplement and support one another and to run through two semesters. The Division of General Studies ("DGS") courses are used to satisfy the general education requirement in the proposed curriculum in the belief that this pattern of courses most nearly meets the prospective teacher's general education needs. The student would be receiving a limited introduction of a general nature to many fields, and to the extent that the Division relates the fields involved while providing
an overview of a particular field, they build according to student needs without reference to prerequisites for further work in a specialized area.

A comparison is made in Table XIX between the semester hours of general education in certification requirements, and in the content proposed for the cooperative program. It will be noted that the minimum requirement is met or exceeded in every case. It will be noted also that there is an apparent excessive emphasis over certification requirements, in the programs of the natural and social science fields. This is due to the requirement for a minor of 16 semester credits. The proposed program is devised to extend the student's general education and to permit him a minor in either the natural or social sciences. If a minor in natural science is desired, it could be obtained simply by taking an additional three-credit course as an elective in mathematics or natural science. The minor requirement also could be met according to individual interests.

Table XIX
GENERAL EDUCATION REQUIREMENTS FOR CERTIFICATION AND FOR THE PROPOSED PROGRAM

<table>
<thead>
<tr>
<th>General Education</th>
<th>Secondary Certificate</th>
<th>Proposed Program*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. English and Speech</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>2. Natural Science</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>3. Social Science</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>4. Humanities</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>5. Health and Phy. Educ.</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>6. Additional in any of above</td>
<td>6</td>
<td>(met in Item 2 or 3 above)</td>
</tr>
<tr>
<td>TOTAL (semester hours)</td>
<td>35</td>
<td>45</td>
</tr>
</tbody>
</table>

*Course titles for the work within the listed number of semester hours are provided in the curriculum outline in Table XXII.
The State Board for Vocational Education requires a two-credit course in American History and Government. There are no other general requirements of the State Board of Vocational Education or the University although the form and scope of the curriculum are analyzed by the various university agencies which consider it for approval.

Evaluation of General Education Offerings. The assumption has been made to this point that an adequate background can be provided from existing general education offerings to meet the needs of teachers to be trained in this program. Courses consistent with the general objective "to provide teachers with the background of experience and education upon which they can assume positions of leadership in an essential and expanding phase of education" have been selected. The amounts and kinds of courses have been determined on the basis of requirements and on what courses are available. However, it seems essential to the further improvement of the program that an inquiry be made into what general education needs exist for teachers so that means may be set up to assure their eventual realization.

Troyer and Pace report (85, 95):

General education both precedes and follows the development of professional interest. It extends throughout the span of formal education from kindergarten to graduate school. At the college level, it may be conceived as a broad foundation upon which professional competence is built. Or it may be conceived as the broadening of professional development and perspective so that special skills and insights are seen in relation to general ones.

The latter concept of general education will be employed in an
These authors state further (85, 97) that evaluating a program of general education is not different from any other evaluative task, and that it involves the following steps:

1. Determining objectives
2. Clarifying these in terms of student behavior
3. Identifying appropriate sources of evidence
4. Applying suitable measuring devices
5. Interpreting the results in the light of the goals

The general objective of providing teachers with a background which will enable them to function and advance in life needs to be further delineated for purposes of evaluation. An analysis is, therefore, made of the types of experiences that teachers need to satisfy this objective. A list so derived is provided (1, 14-15) by the American Council on Education as follows:

1. To improve and maintain his health and take his share of responsibility for protecting the health of others.

2. To communicate through his own language in writing and speaking at the level of expression adequate to the needs of educated people.

3. To attain a sound emotional and social adjustment through the enjoyment of a wide range of social relationships and the experience of working agreeably with others.

4. To think through the problems and to gain the basic orientation that will better enable him to make a satisfactory family adjustment.
5. To do his part as an active and intelligent citizen in dealing with the interrelated social, economic, and political problems of American life.

6. To act in the light of an understanding of the natural phenomena in his environment in its implications for society, to use scientific methods in the solution of his problems, and to employ useful non-verbal methods of thought and communication.

7. To find self-expression in literature and to share man's experience and his motivating ideas through literature.

8. To find a means of self-expression in music and in the various visual arts and crafts, and to understand and appreciate art and music as reflections both of individual experience and of social patterns and movements.

9. To practice clear and integrated thinking about the meanings and values of life.

10. To choose a vocation that will make optimum use of his talents and enable him to make an appropriate contribution to the needs of society.

Each of these objectives will be examined to discover the extent to which the proposed curriculum meets them. Good health and an awareness of conditions essential to personal and student good health would be gained by a knowledge of normal growth and development, by a clean and healthful appearance, and by enthusiasm for activities and exercises which promote good health. Within the curriculum courses which attempt as their major emphasis to provide these are courses entitled, Personal and Community Hygiene and Physical Education. The former is described (44, 358) as a course "especially designed for teachers, occupational therapists, social workers, . . ." The latter covers a great variety of courses which
provide activities that contribute to the development and maintenance of physical fitness. Skills, knowledge, attitudes, and conditions are taught in courses ranging from circus stunts and foil fencing through bowling and the American square dance. When evaluated in terms of the goals sought, there appears to be ample evidence of content suitable to meeting the first objective considered. From the statement on the nature of the hygiene offerings, it appears that inadequate provision is made also for the fourth objective, "basic orientation for family adjustment." Broad opportunities exist for developing competencies in recreational activities both as participant and spectator.

The ability to express oneself clearly and properly is an important asset to the teacher and should be evidenced by a relaxed and satisfying speaking manner and the ability to write good letters and reports. Proficiency in verbal communication is provided in the proposed curriculum by a one year course in Verbal Communication in the Division of General Studies.

Courses in the Division are designed to give an overview of various of the humanities and sciences. The Division was given complete freedom in the pattern of its offerings, and staff members were selected by the Director from the total University staff. Staff members are "specialized generalists" in their particular fields. The course in Communications is described (44, 303) as "a study of theory and practice in writing, reading, speaking, and listening."
The third and ninth objectives are thought to pervade the entire program and its co-curricular activities, and will not be specifically evaluated except to state that the availability of opportunity to fulfill these objectives is unlimited on a large university campus. Much of the responsibility to assure each student's adjustment in terms of these objectives is dependent upon the advisers. In the proposed program, the long relationship of students with the coordinator should promote added attention to the individual's social development.

The fifth objective could be fulfilled by the History of Civilization course which is described (44, 304) as a survey of "the social, economic, political, cultural, and intellectual life of the Western world from the earliest times to the present day." However, specific certification requirements of unit courses in American Government and History of the United States prevent inclusion of the above course in the proposed curriculum. For this reason it would be consistent with the objectives sought, to substitute the general course for the specific requirements.

On the same basis of judgment made concerning the fourth objective, the sixth, seventh and eighth objectives are considered to be met by the course Physical Science, which is described (44, 304) as a study of fundamental principles in astronomy, chemistry, geology, and physics on life in a scientific age, and the course Literature and Fine Arts which is described (44, 304) as an
"introduction to the general principles of art by an analysis of selected works of literature, music, painting, sculpture, and architecture."

The final objective is not provided for in a special course but will be met through a program of comprehensive counseling and guidance.

The extent to which cooperative industrial experience contributes to this phase of the program is considered in Chapter III. In view of this and the preceding discussion, the over-all evaluation of the provisions for general education in the proposed curriculum results in a highly satisfactory rating.

PROFESSIONAL EDUCATION

Table XX provides a comparison of the semester hours of professional education required by the Certification Board and those included in the proposed program. The previously considered general education courses were not rigidly defined except for minimum hours in specified areas. The professional courses are, however, specified both by the State Board for Vocational Education and the College of Education. As noted in Chapter IV, the State Board requires the following professional courses: (The corresponding course equivalent of the requirement is placed in parenthesis after each item.)

1. Trade Analysis and Course Organization, 4 hours (I.E. 286)

2. Methods of Teaching Industrial Subjects, including practice teaching, 4 hours, (Ed. 242)
3. Principles of Industrial Education, 2 hours (I.E. 381)
5. Vocational Guidance, 2 hours, (Ed. 325)

The College of Education requires:
1. Foundations of American Education, 2 hours, (Ed. 201)
2. Educational Psychology, 3 hours, (Ed. 211)
3. Technic of Teaching in the Secondary School, 3 hours (I.E. 388)
4. A teachers' course in his specialization, 2 hours, (I.E. 286)
5. Principles of Secondary Education, 2 hours, (I.E. 381)
6. Educational Practice (student teaching), 5 hours, (Ed. 242)

These requirements are met in the proposed curriculum, Table XXII.

Table XX

PROFESSIONAL REQUIREMENTS FOR CERTIFICATION AND FOR THE PROPOSED PROGRAM

<table>
<thead>
<tr>
<th>Professional</th>
<th>Secondary Certificate Credit Requirement</th>
<th>Proposed Program* Credit Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Educational Psychology</td>
<td>2 or 3</td>
<td>3</td>
</tr>
<tr>
<td>2. Philosophy of Education</td>
<td>2 or 3</td>
<td>2</td>
</tr>
<tr>
<td>3. Student Teaching</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>4. Methods</td>
<td>2 or 3</td>
<td>3</td>
</tr>
<tr>
<td>5. American Public Education</td>
<td>2 or 3</td>
<td>3</td>
</tr>
<tr>
<td>6. Electives in Education</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>7. Principles of Guidance</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td><strong>TOTAL (semester hours)</strong></td>
<td><strong>16 to 20</strong></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>

*Course titles for the work within the listed number of semester hours are provided in the curriculum outline in Table XXII.
The evaluation of the proposed curriculum content begun earlier in the chapter will be continued here with special reference to the general objective of providing teachers "competent to cope with the educational problems which confront all teachers."

**Evaluation of Professional Offerings.** No suitable listings of objectives of professional education could be found even in the evaluations of professional teacher education reported (85, 135-178) by the American Council on Education in *Evaluation of Teacher Education*. However, each school undertaking an evaluation did derive some objectives, and an attempt was made to ascertain the degree to which these objectives are being fulfilled.

This study revealed that professional education should lead the student to:

1. An early orientation to the teaching profession in such a way that the student will gain an understanding of the profession as a whole.
2. Understand the role of the school in the social order to give meaning and direction to professional undertakings and to participate in school-community planning.
3. Examine the bases upon which American education is postulated.
4. Understand the guidance process so that he may aid students in making vocational choices.
5. A familiarity with theories of learning and their relationship to teaching methodology.
6. A familiarity with the backgrounds and objectives of his particular specialization.

7. A familiarity with methods and techniques of teaching based upon psychological and social as well as technical objectives.

8. Understand the purposes of educational evaluation.

9. Attain the ability to analyze content in his specialization and to present it in a manner which provides for effective learning.

10. Observe actual situations which make application of theoretical learnings and to apply and practice these in actual situations.

The first objective gives meaning to the program. A teacher in training with an effective introduction to the profession will be less confused than otherwise with the place and purpose of the program offerings. In the proposed program this introduction is provided by the course, Nature of the Teaching Profession, which is described (44, 312) as "An introduction to educational problems: the nature of teaching, its opportunities and responsibilities." This course meets the first objective.

An understanding of the role of the school in the social order is provided in the course, Foundations of American Education. This is described (44, 312) as "A study of contemporary American public education in the setting of American culture. Issues with respect to the school program, its purposes, its content, its methods, and its organization are related to social, economic and political purposes and organizations, both domestic and foreign. An attempt is made
through the study of these relationships to clarify the functions of the American school and teaching profession." This course appears to satisfy the second objective.

The third objective is met by the course, Principles of Vocational Education which is described (44, 317) as a "Study of basic concepts and practices of modern vocational education." It is prescribed by regulation but is too limited to provide fully for an understanding of the philosophic bases of American education as a whole. It is thought to be consistent with the third objective to provide for acceptance of a broader philosophy offering to replace the proposed course. The existing course does provide for the sixth objective.

A course in fundamental guidance concepts and practices is provided to fulfill the fourth objective, while an introductory course in educational psychology meets the fifth objective.

The seventh objective is met by the course, Special Techniques of Teaching Vocational-Industrial Subjects which is described (44, 317) as "A study of the application of principles of industrial education in vocational-industrial education. Methods of developing industrial skills, appropriate vocational attitudes, and related technical knowledge." On the basis of the course description there is evidence that various teaching methods and their relationship to theories of learning are considered, and the development of "appropriate vocational attitudes" connotes attention to the social responsibilities of trade teaching.
No offering provides specifically for objective eight, however, it is treated as a part of the above described course in its relationship to the total teaching situation. This is considered to meet this objective fully.

The course Trade Analysis and Course Organization provides for the ninth objective.

The tenth objective concerns a single field experience of six weeks duration in the final year. The student teaching quarter is divided into three parts with preliminary preparation in the psychology of learning and teaching methodology occupying the first period. This is followed by six weeks of student teaching, which is followed in turn by a third period of reviewing experiences and providing solutions to problems faced. The structure of this particular offering is considered superior but the neglect of intermediate field experiences between the first and last years is not consistent with the need for making continual application of theory in practice. Part of this can be compensated for in the proposed curriculum by effective coordination of work periods, although certain additional periods of observation and limited participation in the public schools would be consistent with the needs implied by the tenth objective.

TECHNICAL EDUCATION

Table XXI provides a comparison of the requirements for a major in the proposed cooperative curriculum and certification board requirements. Here again, the requirements are general in nature with
no other provision than that the major include 32 semester credits. It is within this phase of the curriculum that the most radical substitution is made. Instead of shopwork requirements being interpreted as an on-campus offering, it is planned as actual job experience in a trade or industrial occupation.

There are no specific restrictions against the above interpretation of shop training in the certification regulations or the policies of the University of Illinois. In fact, there is considerable precedence for the granting of credit for off-campus work. Student teaching has long been recognized as an accepted phase of the teacher education program, as has internship in the medical program. In both these cases, it has been recognized that students can most profitably receive this aspect of their training beyond the confines of the campus because the university cannot offer equivalent experiences. Granting university credit for trade and industrial experience for the trade and industrial education teacher in training, parallels these situations.

There are no college or university regulations as to the nature of the major, this being left to the departments concerned. The major in industrial education has been set at 43 semester credits. The most specific aspect of the major requirement is presented by the statement in the State Certification Board leaflet that, "Under no condition will less than three years of trade experience be considered sufficient for meeting the requirements of the Certificate."
(See Chapter IV.) It is exactly this that presents the most serious block to the effective operation of the proposed cooperative program.

If students in the program work full time for four summers or 12 months and extend their program a fifth year of 12 months, only two years of experience are obtained. This can be extended another 4 1/2 months by allowing a semester's credit (2 hours per summer and 3 per semester) for the total experience, but the total of 28 1/2 months would still fall short of the minimum requirement of 36 months experience. There are at least five ways to resolve this problem. One is to further lengthen the curriculum, another is to establish prerequisites for entry, a third is to seek a revision in the certification requirements, a fourth is to shorten on-campus time requirements by taking transferable credit from area colleges while employed, and a fifth is to offer further credit for more off-campus work. Inasmuch as the student is already committed to a five-year program for a bachelor's degree, a not uncommon requirement in architecture and engineering, but a maximum length for most undergraduate programs, the first possibility is considered unpractical. Few, if any, students could be drawn into a program which commits them to more than five years for an undergraduate degree.

The second choice, to establish a prerequisite of one year's experience for entry, would have some disadvantages but could resolve the problem. Some reasons for not accepting this solution except as a last resort are:
1. Many students want to go directly from high school to college, knowing that once they start work it is difficult to leave an income and start studies.

2. Few high school graduates would be ready to make an intelligent choice of a specialized trade or occupational area.

3. Few high school graduates would be able to arrange with employers to receive the type of employment that would be a benefit to a training program.

4. Random employment would add little to the student's status for entry in the program.

5. Going to work for a year may result in being drafted to serve the military in a lesser capacity than would be possible after completing the program.

The third possibility, to petition the certification agencies for a reconsideration of the requirement, is considered to be the most satisfactory solution. The decision which needs to be made in this case is whether slightly over two years of planned, supervised, and coordinated experience is equivalent to three years of some less orderly type of training or experience. One factor in obtaining acceptance of the shorter training period may be the development of comprehensive trade competency examinations,—performance, oral, and written,—to be given to cooperative program graduates. These examinations could be developed and administered by committees composed of representatives of the trade, the state certification
agency, and the training institution. The pro and con of accepting this method of determining trade competency are presented in Chapter II. Whatever promise examinations hold as a basis for determining trade qualifications, it is now almost universal practice to base trade competency on a specified number of years in a trade.

A petition to accept the shorter training period without an examination has been made in Illinois and an addendum to the State Plan is being formulated for approval of the State Board for Vocational Education. A final decision on the acceptance of the revision will not be reached before the completion of this study so cannot be reported. The proposed program, however, is planned in the hope that the answer will be affirmative for the shorter and well-organized plan. If this hope is unjustified, the second alternative, that of prescribing a year's industrial experience for entry, will be resorted to.

The possibility of providing more trade and industrial experience by having employed students take transferable credit while employed holds some promise. Several factors affect the extent to which this may be practical.

Although the 40 hour work week is now common, the average is somewhat over that, and season employment still runs to as much as 60 hours per week. In addition, cooperative students are expected in all reported programs to do outside assignments related to their employment to aid their understanding of and advancement in
their trade. In trade and industrial programs they are encouraged to participate in community activities and otherwise take advantage of citizenship training opportunities if maximum values are to be derived from the program. Employment periods are considered to involve the student's total efforts just as do campus periods. For these reasons, the fourth possibility for extending available time for industrial experience is of limited value and then at the sacrifice of other educational opportunities.

Further lengthening the work period and granting a larger block of credit for it would be inconsistent with the relative value of this phase of the training in the total program. Increasing this credit, without lengthening the program beyond five years, would obligate the removal of other content from the curriculum. The only acceptable exchange would be within the major through removal of certain on-campus technical offerings which give the student a comprehensive over-view of major trade and industrial fields. This would be particularly undesirable in the State of Illinois where a large proportion of trade and industrial education teachers outside of Chicago must teach industrial arts courses as part of their teaching schedule. They need the varied experience in several major fields to enable them to qualify for teaching industrial arts, and it also may be argued that such varied training is invaluable for the full-time industrial-vocational teacher to enable him to comprehend and cooperate in a total vocational education program.
Table XXI
SPECIAL EDUCATION REQUIREMENTS FOR CERTIFICATION
AND FOR THE PROPOSED PROGRAM

<table>
<thead>
<tr>
<th>Special Education</th>
<th>Secondary Certificate</th>
<th>Proposed Program*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Shopwork</td>
<td>No breakdown</td>
<td>20</td>
</tr>
<tr>
<td>2. Drawing and Design</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>3. Industrial Practice</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL (semester hours)</strong></td>
<td></td>
<td><strong>47</strong></td>
</tr>
</tbody>
</table>

*Course titles for the work within the listed number of semester hours are provided in the curriculum outline in Table XXII.

The State Certification Board's requirements for the limited high school certificate are completed with 21 semester credits allowed for electives to make a total requirement of 120 semester credits including health and physical education. The proposed program allows eleven credits of electives, although this could be extended by reducing the required general education in excess of certification minimums, and totals 128 semester credits exclusive of health and physical education and military science. It is University practice to exclude these latter courses from the totals considered for graduation.

**Evaluation of Special Offerings.** The general aim in the area of specialization is to provide competent teachers in the trades or occupations they intend to teach. An evaluation of the degree to which this objective is fulfilled in the proposed curriculum, beyond
that made in the preceding section, would require an analysis of the offerings in each trade and industrial area. The nature of such a task makes it an impractical undertaking because of its scope and because training schedules for trainees will have to be worked out as a major problem in the future. Despite the difficulty of evaluating the specific offerings in the area of specialization, certain generalizations can be made as follows:

1. If training schedules such as those shown in Appendix B can be worked out for each training area by a cooperating committee of employers and employees, and if the schedule is adhered to in principle, a comprehensively trained tradesman should result.

2. If close supervision is provided to integrate skills with related technical information, a tradesman with a broad understanding of the "knowing" as well as the "doing" aspects of his trade should result.

3. If field work is coordinated with related campus learning, a tradesman with an understanding of the practical applications of theory should result.

4. If carefully selected campus technical offerings are included to round out a student's field of specialization, he should make an ideally qualified teacher for advanced technical high school programs and other advanced general education technical offerings.
THE CURRICULUM OUTLINE

Although the general content of the proposed curriculum and its raison d'etre have been presented, the organization of the content has not been considered, other than as to length, and the period covered by the program requires some further consideration. The various requirements demand a curriculum of at least five years duration, and the reason for not exceeding this length has been given. The possibility of shortening the total time is offered by the plan used at the Western Michigan College of Education at Kalamazoo. In this plan the students work in local industry and carry a partial academic load around the calendar for four years. The industrial situation around the Champaign-Urbana area will not support this type of plan, and alternating periods of full-time campus work and full-time job experience must be resorted to. This necessitates a five year program for the University of Illinois, but does not indicate that another arrangement would not be preferred under different circumstances.

The great majority of cooperative programs operating on the alternating period basis restrict the first off-campus assignment to at least the second semester of residence. This is justifiable in terms of getting an opportunity to know the individual student better and, in the trade and industrial field, is further justified by the need for giving the students some orientation to available fields of work as well as basic skills in their desired field to make them more
employable. For the above reasons, the first cooperative period is placed at the end of the first year's residence. From this period on, the experience is offered each summer and alternate semesters with student teaching providing the off-campus work in the final year. To enable students to graduate at the June commencement, the final summer is not required although this may be adjusted to needs. The alternate periods of placement, although involving more field work by the staff, offer greater opportunity for the integration of various elements of the total program and are, therefore, preferred.

The organization of cooperative work periods on an alternating basis enables students to be paired and to occupy a training station full time, except for summer periods, during which all students are employed and additional training stations beyond the year-round demand are required. This problem is non-existent under the quarter system, where the periods can be equally divided into four per year. The scheduling of the total enrollment for summer jobs is another provision in the proposed program which results from the specific situation at the University of Illinois, which operates on a semester basis, but which ideally should be changed.

By alternating the semester of the year that a particular student is on-campus in succeeding years, each student is on-campus at Christmas time one year and off-campus at Christmas time of the following year. The same would apply to seasonal holidays in the spring. Thus,
a student on the job in the spring semester will continue on the job until the following spring, providing a continuous year of experience. This is advantageous considering that in certain fields of employment the work changes with the seasons and a full year will provide the trainee with an understanding of these changes and what they involve.

Although specific course titles are provided in the curriculum outline in Table IV, the identical program might well never be used in actual practice. A beginning student, with previous woodworking experience equivalent to Industrial Education 181, Introductory Woodwork, would not take this course in the first semester of the freshman year, but would rather take some other introductory course to broaden his technical background.

A student who would prefer the conventional rhetoric and composition courses for the general language arts course offered by the Division of General Studies, could substitute Rhetoric 101 and 102, Rhetoric and Composition, for D.G.S. 111 and 112.

A final consideration in the proposed curriculum in Table XXII is the type of electives which would reinforce the student's specialization. For these, a survey was made of the offerings of the various departments of the University, and selections were made from the wealth of available courses which are to be found on a great university campus. Only the department, course number, title, and semester hours of credit for each course are given at the end of the
curriculum outline, but from these can be seen the great array of related fields which bear on the proposed curriculum.

Table XXII
A PROPOSED COOPERATIVE TRADE AND INDUSTRIAL TEACHER EDUCATION CURRICULUM
For the Degree of Bachelor of Science in Industrial Education

<table>
<thead>
<tr>
<th>First Year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Semester I</strong></td>
</tr>
<tr>
<td>D.G.S. 111 Verbal Communications</td>
</tr>
<tr>
<td>G.E. 101 Elements of Drawing</td>
</tr>
<tr>
<td>I.E. 181 Introductory Woodwork</td>
</tr>
<tr>
<td>Hygiene 104 Personal and Community Hygiene</td>
</tr>
<tr>
<td>Electives</td>
</tr>
<tr>
<td>Military Science</td>
</tr>
<tr>
<td>Physical Education</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Semester II</strong></td>
</tr>
<tr>
<td>D.G.S. 112 Verbal Communications</td>
</tr>
<tr>
<td>Math. 112 Combined Freshman Math</td>
</tr>
<tr>
<td>I.E. 183 General Metal Work</td>
</tr>
<tr>
<td>Ed. 101 Nature of Teaching</td>
</tr>
<tr>
<td>Profession</td>
</tr>
<tr>
<td>Military Science</td>
</tr>
<tr>
<td>Physical Education</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**First Summer**

Industrial Practices (3 months supervised industrial experience) . . 2

**Second Year**

<table>
<thead>
<tr>
<th>Semester I*</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.G.S. 141 Physical Science</td>
</tr>
<tr>
<td>Psych. 100 Introd. to Psych.</td>
</tr>
<tr>
<td>I.E. 182 Advanced Woodwork or</td>
</tr>
<tr>
<td>I.E. 284 Advanced Metal Work</td>
</tr>
<tr>
<td>Ed. 201 Foundations of Am. Ed.</td>
</tr>
<tr>
<td>Ed. 325 Introduction to Guidance and Counseling</td>
</tr>
<tr>
<td>Military Science</td>
</tr>
<tr>
<td>Physical Education</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Semester II</strong></td>
</tr>
<tr>
<td>Industrial Practices (full semester of supervised trade and industrial experience) . . 3</td>
</tr>
</tbody>
</table>

*Half the class begins the fall term on-campus and the other half remains in their summer jobs. At the beginning of the second semester the two halves of the class exchange positions.*
Table XXII (Continued)

<table>
<thead>
<tr>
<th>Second Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Practices . . . . . . 2 semester hours</td>
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<table>
<thead>
<tr>
<th>Third Year</th>
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</thead>
<tbody>
<tr>
<td>Semester I</td>
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<tr>
<td>Industrial Practices . . . . . . 3</td>
</tr>
<tr>
<td>Semester II</td>
</tr>
<tr>
<td>D.G.S. 142 Physical Science . . . 4</td>
</tr>
<tr>
<td>History 152 History of U.S. . . . 3</td>
</tr>
<tr>
<td>Pol. Sc. 150 American Govt. . . . 3</td>
</tr>
<tr>
<td>Art 137 Design Analysis . . . . 2</td>
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<tr>
<td>I.E. 285 Gen. Electricity . . . . 3</td>
</tr>
<tr>
<td>Journalism 204 Topography . . . . 2</td>
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<tr>
<td>Military Science . . . . . . . . 1</td>
</tr>
<tr>
<td>Physical Education . . . . . . . 1</td>
</tr>
<tr>
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</tr>
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<td>19</td>
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<table>
<thead>
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<th>Third Summer</th>
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<tr>
<td>Industrial Practices . . . . . . 2 semester hours</td>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester I</td>
</tr>
<tr>
<td>D.G.S. 161 Literature and Fine Arts . . . . . . . . . 4</td>
</tr>
<tr>
<td>Econ. 108 Elements of Econ. . . . 3</td>
</tr>
<tr>
<td>I.E. 286 Trade Analysis and Course Organization . . . . 4</td>
</tr>
<tr>
<td>I.E. 180 Automotive Maint. . . . 3</td>
</tr>
<tr>
<td>I.E. 280 General Drawing for Teachers . . . . . . . . 3</td>
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<tr>
<td>17</td>
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<table>
<thead>
<tr>
<th>Fourth Summer</th>
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<tbody>
<tr>
<td>Industrial Practices . . . . . . 2 semester hours</td>
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Table XXII (Continued)

<table>
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<th>Fifth Year</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester I</td>
<td></td>
<td>Semester II</td>
</tr>
<tr>
<td>D.G.S. 162 Literature and Fine Arts</td>
<td>I.E. 388 Methods and Techniques of Teaching Industrial Subjects</td>
<td>4</td>
</tr>
<tr>
<td>Econ. 240 Labor Problems</td>
<td>Ed. 211 Education Psychology</td>
<td>3</td>
</tr>
<tr>
<td>I.E. 381 Principles of Vocational Education</td>
<td>Ed. 242 Educational Practices in Secondary Education</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>Electives</td>
<td>6</td>
</tr>
<tr>
<td>Electives</td>
<td>Total Semester Hours (not counting required hygiene, physical education, and military science)</td>
<td>16</td>
</tr>
<tr>
<td>16</td>
<td>128</td>
<td></td>
</tr>
</tbody>
</table>

SUGGESTED ELECTIVES

| Management 101 Industrial Organization and Management | 3 |
| Accounting 201 Fundamentals of Accounting | 3 |
| Mechanical Engineering 232 Motion and Time Study | 3 |
| Management 221 Work Simplification and Time Study | 3 |
| Mechanical Engineering 235 Industrial Safety | 3 |
| Psychology 145 Industrial Psychology | 3 |
| Industrial Education 387 Training Programs in Industry | 3 |
| Engineering 239 Industrial Development and Supervision | 3 |
| Management 205 Production Planning and Control | 3 |
| Management 312 Problems of Administration and Organization | 3 |
| Mechanical Engineering 233 Industrial Quality Control | 3 |
| Mechanical Engineering 283 Industrial Plant Design | 3 |
| Mechanical Engineering 285 Problems in Industrial Safety | 3 |
| Law 347 Labor Law | 3 |
| Engineering 230 Labor Relations | 3 |
| Economics 248 Personnel Administration | 3 |
This curriculum complies with all the Illinois requirements for certification with a single exception. The requirement of a minimum of three year's trade experience cannot be provided for practically in the curriculum and, for the reasons expressed, the revision of state standards in terms of the unique nature of the training in "Industrial Practices" offers the most desirable answer to this exception. With continued improvement the curriculum provides a practical solution to many of the problems facing trade and industrial teacher education.
This dissertation is concerned with preparing an adequate number of competent trade and industrial teachers for the State of Illinois. It seeks to answer the following questions: (1) What are the educational needs of American youth with reference to trade and industrial education? (2) What do these imply? (3) What potentialities does cooperative education possess for overcoming traditional problems? (4) What is the status and scope of cooperative trade and industrial teacher education? (5) What limiting factors qualify the development and operation of such a program? (6) To what degree can these be overcome? (7) What operating principles and procedures have been successful in these programs? (8) What acceptance would cooperatively trained teachers have in the schools and industries of Illinois?

The socio-economic situation and the potentialities of the cooperative plan as a replacement for traditional methods are investigated, and the findings suggest that such a program can overcome many existing problems.

**FINDINGS OF THE STUDY**

Apprenticeship and other organized on-the-job training programs are not supplying the nation's need for skilled workers, and the schools, with 75 percent of secondary school aged youth in attendance, continue primarily to provide college preparatory offerings.
The labor force of Illinois contains 2,000,000 in trade and industrial occupations, as compared to 260,000 in agriculture, yet pre-employment courses preparing youth for careers in industry have fewer enrolled than the latter.

The more restricted Type A trade and industrial course enrollment in the State of Illinois has decreased by more than half in a decade, while the more flexible Type B programs have increased fourfold. The national trend is toward a single system of education and the comprehensive high school requires broadly prepared teachers. Steadily rising certification standards in a majority of the states specify a bachelor's degree, yet every state makes an exception of trade and industrial teachers.

The cooperative plan, employed successfully for fifty years in the closely allied field of engineering education, has been adapted to trade and industrial teacher education in only three programs in the United States, all in a single state. These programs enrolled over seventy-five full-time prospective vocational industrial teachers in 1954-55. The State of Illinois, comparable industrially, had no students in this category. Cooperative programs—recruiting high school graduates and offering them an opportunity to earn part of their college expenses—are able to attract comparatively large numbers of students. Programs attempting to recruit competent and therefore highly paid tradesmen have failed to attract students.
Traditional training methods do not take advantage of the values obtainable from established teacher education programs. A cooperative program, involving the combined efforts of industry, which provides an optimum of skill training, and the university, which provides academic and professional preparation, can be developed within the framework of state and federal requirements and satisfy management and labor policies.

A year's study was devoted to travel and consultation with officials in cooperative programs in five states to ascertain program characteristics and operating principles and procedures that implement the planning and organization of successful programs.

CONCLUSIONS AND PROFESSIONAL RECOMMENDATIONS

The necessity of equalizing educational opportunities for the changing secondary school population, the move toward the comprehensive high school, the dependence of the economy and the nation's security on an adequate supply of skilled manpower, an evolving concept that trade teachers must be teachers as well as tradesmen, the move toward uniform certification requirements, the growing shortage of competent trade and industrial teachers, and the potentialities of cooperative education have stimulated the following recommendations:

1. The University of Illinois, legally designated trade and industrial teacher education agency for the State, should institute the proposed program. The inadequacy of present methods and the urgent need for personnel require that the potentialities of a cooperative program, to provide larger numbers of competent teachers,
be acknowledged. The University should also organize a General
Advisory Committee, on the basis of the Charter proposed in Chapter V.

2. The secondary schools should provide further pre-employment
trade and industrial training. Other agencies are not supplying
needed skilled manpower, and equality of educational opportunity for
American youth dictates a reorientation of the secondary school
program.

3. Professional leadership should develop programs which com­
bine the basic elements of a teacher education program: general,
professional, and technical. The integration of industrial voca­
tional education with common school offerings requires comparable
preparation.

4. State departments of education should reevaluate their
certification requirements for trade and industrial teachers in the
light of evolving educational concepts to assure the preparation of
well qualified trade and industrial teachers.

5. A comprehensive evaluation should be made periodically to
determine the effectiveness of the cooperative program and to help
insure its continual improvement.

6. The cooperative plan should be employed on a national scale
where investigations reveal it may solve problems facing other states.

7. Companion studies should be undertaken to discover the im­
plications of the cooperative plan for programs preparing industrial
training department personnel.


29. Forkner, Hamden L. "Work Experience, A Must in Education," Teachers College Record, April, 1942.


53. Ludington, John Robert. Industry and Education. Ph. D. Dissertation, Columbus, Ohio, The Ohio State University, 1940.


75. Sargent, Noel. NAM's Fifty-Four Year Interest in Education. An address at the NAM's Educational Conference, New York City, October 13, 1949. Reprint issued by the Education Department, National Association of Manufacturers, 14 W. 49th Street, New York 20, N. Y.


95. Vezzani, A. A. "Must T. and I. Teachers be Tradesmen?" *School Shop,* November, 1953.

96. Vezzani, A. A. "Should College Credit be Granted for Trade Experience?" *Industrial Arts and Vocational Education,* April, 1955.

APPENDIX A

INFORMATION FORM NO. 1

In your state, has any attempt been made to develop or operate a cooperative trade and industrial teacher education program involving alternate placement in industry and attendance in college with some degree of coordination of the two activities? Yes_______ No_______

If such programs have been planned or are operating in your state, please indicate below the name of the institutions and the directors or coordinators of the programs.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Program Being Planned</th>
<th>Program in Operation</th>
<th>Director or Coordinator</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

Comments concerning a program of the type discussed:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

(signature)
APPENDIX A
INFORMATION FORM NO. 2

Institution__________________________

Director or Coordinator of Cooperative Program__________________________

1. A cooperative program of trade and industrial teacher education is now:
   (a) being planned ( )
   (b) in operation ( )

NOTE: If (a) above is checked, omit items 2 through 9, but complete all the remaining items which have been considered in your planning.

2. Date first students were enrolled in the cooperative program:_____

3. Number of students now enrolled in the cooperative program:_____

4. Number of students of each class rank in the cooperative program:
   (a) freshmen_____ (c) juniors_____ (e) graduate_____
   (b) sophomores_____ (d) seniors_____ (f) other_____

5. Percent of full-time trade and industrial education majors enrolled in the cooperative program:____%?

6. Total number of graduates of the cooperative program to date:_____

7. Percent of cooperative program graduates: in:
   (a) military service____% (c) industry____%
   (b) teaching____% (d) other____%

8. If any follow-up has been made of cooperative program graduates, do the findings indicate that the students are:
   (a) making better adjustment than teachers prepared other ways ( )
   (b) making as good adjustment as teachers prepared other ways ( )
   (c) making lesser adjustment than teachers prepared other ways ( )

9. Number of cooperating firms:_____

10. Areas in which training is offered through the cooperative program:
   (a) aviation mechanics ( ) (g) machine shop ( )
   (b) auto mechanics ( ) (h) trowel trades ( )
   (c) building trades ( ) (i) plumbing ( )
   (d) cabinet making ( ) (j) sheet metal ( )
   (e) drafting ( ) (k) welding ( )
   (f) electricity ( ) (l) other (specify) ( )

__________________________________________
11. Required semester hours of:
   (a) general education ( )
   (b) professional ed. ( )
   (c) cooperative experience ( )
   (d) on-campus technical work ( )
   (e) total required semester hours ( )

12. Length of curriculum:
   (a) campus work ( ) semesters
   (b) cooperative experience ( ) months
   (c) time from entry to graduation ( ) years

13. Degrees granted in the cooperative program:__________________________

14. Outline the organization of the cooperative experience and the campus work (whether alternating half-days, alternating summers and regular sessions, alternating semesters, etc.):__________________________

15. Travel limitations on cooperative experience:
   (a) restricted to community ( )
   (b) restricted to state ( )
   (c) other (specify) ( )

16. Number of coordinators for the cooperative program: ( )

17. Percentage of time coordinators devote to coordination duties______%

18. Frequency of visits by institutional supervisor or coordinator to the student on the job:
   (a) weekly ( )
   (b) bi-monthly ( )
   (c) when requested by student or cooperating agencies ( )
   (d) other (explain) ________________________________

19. During periods of employment are regularly scheduled seminars, conferences, or meetings, other than those mentioned under item 16 above, held for student groups? (a) yes ( ) (b) no ( )

20. If (a) above is checked, give the title and organization of the meetings:____________________________________

21. Are cooperating agencies paid for their education services, and if so, who makes the payment? (a) yes ( ) (b) no ( )
    Omit (c) and (d) if answer above is "no."
    (c) student ( ) (d) institution ( )
22. If the program has a general advisory committee, give the number and representation of members and frequency of meetings:


23. If the program has craft advisory committees, give the number and representation of members and frequency of meetings:


24. Has a handbook been prepared which explains or defines the operation of the program?   (a) yes (  )   (b) no (  )

25. What previous trade and industrial experience, if any, is required for entrance to the program?

26. What percentage of employed students receive apprentice status on the job?  

27. What percentage of graduates attain journeyman status in a trade by the date of graduation?  

Thank you for your help. If you would like a summary of the information obtained from the various institutions contacted, just check here. (  )
APPENDIX A

Work Sheet for Studying Cooperative Program

1. Name of institution:
2. Person contacted.
3. Appointment place and date:
4. Basis for selection of students:
5. Major emphasis of cooperative program:
   educational -
   vocational -
   economic -
   other -
6. Characteristics of program:
   study-work schedule -
   coordination techniques -
   administrative organization -
   other -
7. Characteristics of work phase:
   amount required -
   types -
   kind and amount of planning -
   basis for awarding credit -
8. Cooperating agencies:
   school controlled or private -
   geographical restrictions -
   representation on school advisory groups -
   how contacted -
9. Records and publications:
   student reports -
   information collected on employment -
   handbooks -
   public relations releases -
   other -
10. Problems encountered in operating the program:
11. Comments of students:
12. Comments of staff:
13. Secure information relative to studies of program.
### A Training Schedule for Auto Mechanics Teachers

**Cooperative Work-Study in Industry**

**First Contact**

#### A. Lubrication, Engine Cooling System .................................. 4 weeks

<table>
<thead>
<tr>
<th>Manipulative Units</th>
<th>Informational Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Lubricate cars and trucks.</td>
<td>1. Location of lubricating points.</td>
</tr>
<tr>
<td>2. Service battery and tires.</td>
<td>2. Types of lubricants.</td>
</tr>
<tr>
<td>3. Inspect visually.</td>
<td>3. Lubrication equipment.</td>
</tr>
<tr>
<td>4. Pack and adjust front wheel bearings.</td>
<td>4. Caution in driving car on and off hoists.</td>
</tr>
<tr>
<td>5. Clean and fill oil bath and air cleaner.</td>
<td></td>
</tr>
<tr>
<td>6. Replace oil filters.</td>
<td></td>
</tr>
<tr>
<td>7. Clean and repair oil lines.</td>
<td></td>
</tr>
</tbody>
</table>

**Engine Cooling System**

<table>
<thead>
<tr>
<th>Manipulative Units</th>
<th>Informational Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Remove, test and repair radiator.</td>
<td>1. Operation of cooling system.</td>
</tr>
<tr>
<td>3. Remove, test and replace thermostat.</td>
<td>3. Testing thermostats.</td>
</tr>
<tr>
<td>4. Remove, overhaul and replace water pump.</td>
<td></td>
</tr>
<tr>
<td>5. Clean cooling system (reverse flushing).</td>
<td></td>
</tr>
<tr>
<td>6. Condition cooling system for anti-freeze.</td>
<td></td>
</tr>
<tr>
<td>7. Repair and balance fan.</td>
<td></td>
</tr>
</tbody>
</table>

#### B. Installation of Accessories .......................................... 4 weeks

<table>
<thead>
<tr>
<th>Manipulative Units</th>
<th>Informational Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

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253
C. Frame Straightening, Welding and Brazing .......................... 4 weeks

**Manipulative Units**
1. Heat metal.
2. Rivet metal.
3. Weld metal.
5. Cold straighten metal.
7. Install glass and body hardware.
8. Repair and align gusset plates, fish plates and doublers.
9. Replace side rails and cross members.
10. Check and correct alignment of bent frames.

**Informational Units**
1. Uses and operation of welding equipment.
2. Frame straightening equipment and procedures.

B. Brakes ................................................... 8 weeks

**Reline and Adjust**

**Manipulative Units**
1. Inspect brakes.
2. Adjust brakes (minor).
3. Remove and replace brake assembly (major).
4. Adjusting brakes (major).
5. Testing brakes.

**Informational Units**
1. Construction and operation of brakes.
2. Brake shoe materials.
3. Brake systems.

**Hydraulic System**

**Manipulative Units**
1. Bleed hydraulic system.
2. Overhaul master cylinder and wheel cylinders.
3. Replace hydraulic lines and hoses.
4. Flush and refill hydraulic system.

**Informational Units**
1. Master cylinder (hydraulics).
2. Hydraulic brake fluids.

**Power Brakes**

**Manipulative Units**
1. Check system for leaks.
2. Lubricate power cylinder and linkage.
3. Adjust linkage and power cylinder valve.

**Informational Units**
1. Construction and operation power brakes.
2. Linkages.
E. Front End

Springs

**Manipulative Units**
1. Remove and replace springs and shackles.
2. Replace spring leaves.
3. Rebush shackles.

**Informational Units**
1. Function of springs and support arms.
2. Spring capacities.

Tires

**Manipulative Units**
1. Dismount and mount tires on rims.
2. Repair tires and tubes.
3. Criss cross tires.

**Informational Units**
2. Patching procedures (hot patch).

Shock Absorbers

**Manipulative Units**
1. Remove and disassemble shock absorbers.
2. Inspect and assemble shock absorbers.
3. Clean and replace worn parts of shock absorbers and adjust.

**Informational Units**
1. Operation of shock absorbers.
3. Shock absorber fluids.

Front Suspension

**Manipulative Units**
1. Remove and replace pivot pins and bushings, springs, control arms, knuckle supports, king pins and bushings.
2. Check and correct camber, king pin inclination, caster and toe-in

**Informational Units**
1. Construction and operation independent front wheel suspension.
2. Principles of front end and wheel alignment.
3. Steering geometry.

Wheel Balancing

**Manipulative Units**
1. Check and correct wheel balance.

**Informational Units**
2. Front end checking equipment.
## Front Wheel Bearings

**Manipulative Units**
1. Remove hub from spindle.
2. Remove bearings.
3. Clean and inspect bearings.
4. Pack bearings with lubricant.
5. Replace and adjust bearings.

**Informational Units**
1. Wheel and bearing pulling devices.
2. Bearing lubrication.

## Steering Gear

**Manipulative Units**
1. Remove steering gear from vehicle.
2. Disassemble, clean and inspect.
3. Replace worn parts, reassemble and adjust.
4. Replace steering gear in vehicle.
5. Adjust linkage (drag link and tie rods).
6. Service or repair steering wheel and columns.

**Informational Units**
1. Operation and principles of steering gear.
2. Steering geometry.

## Transmission and Clutch

**Manipulative Units**
1. Remove transmission from vehicle.
2. Disassemble, clean, inspect gears, bearing shafts and bushings.
3. Replace worn parts and reassemble.
4. Replace transmission in vehicle.
5. Service overdrive, underdrive, auxiliary transmission, winch, power take off and 4 and 5 speed transmissions.

**Informational Units**
1. Operation of transmission in all speeds.
2. Gear trains.
3. Transmission lubrication.
4. Types of transmissions.
5. Automatic transmissions.

## Transmission Overhaul

**Manipulative Units**
1. Remove transmission from vehicle.
2. Disassemble, clean, inspect gears, bearing shafts and bushings.
3. Replace worn parts and reassemble.
4. Replace transmission in vehicle.
5. Service overdrive, underdrive, auxiliary transmission, winch, power take off and 4 and 5 speed transmissions.

**Informational Units**
1. Operation of transmission in all speeds.
2. Gear trains.
3. Transmission lubrication.
4. Types of transmissions.
5. Automatic transmissions.

## Automatic Transmission

**Manipulative Units**
1. Remove transmission from vehicle.
2. Disassemble, clean, inspect and assemble.
3. Install transmission in vehicle and adjust.

**Informational Units**
1. Theory, construction and principles of operation.
2. Diagnosis of trouble.
3. Service procedure.
Gear Shifting Mechanism

**Manipulative Units**
1. Disassemble, clean and inspect mechanism.
2. Replace worn parts.
3. Reassemble and adjust.

**Informational Units**
1. Operation of gear shifting mechanism.

Clutch Overhaul

**Manipulative Units**
1. Remove clutch from vehicle.
2. Disassemble, clean and inspect clutch.
3. Replace parts and assemble clutch.
4. Install in vehicle and adjust.

**Informational Units**
1. Wet and dry disc clutches.
2. Energy absorption.

Body Adjustments ................................................. 4 weeks

**Manipulative Units**
1. Remove and replace fenders, hoods, bumpers, panels and radiator grills.
2. Align doors.
3. Remove and replace door hardware.
4. Remove squeaks and rattles.
5. Paint (touch up.)
6. Adjust hoods.
7. Replace glass and rubber mouldings.

**Informational Units**
1. Body nomenclature.
2. Silencing devices.
3. Safety glass.
4. Body hardware.

Rear End .......................................................... 4 weeks

**Manipulative Units**
1. Remove rear axle from vehicle.
2. Disassemble, clean, inspect, replace worn parts and reassemble.
3. Replace rear axle in vehicle.
4. Remove, overhaul and replace universal joints and drive shafts.
5. Pack rear wheel bearings.

**Informational Units**
1. Construction and operation rear axle.
2. Torque tube.
3. HOTCHKISS DRIVE
4. Universal transmitting devices.
Rear Springs and Shackles

Manipulative Units
1. Remove and replace springs and shackles.
2. Replace spring leaves.
3. Rebush shackles.

Informational Units
1. Methods of mounting springs to axles.
2. Spring Loading.

Shock Absorbers

Manipulative Units
1. Disassemble and assemble shock absorbers.
2. Clean, inspect and replace worn parts of shock absorbers.
3. Fill shock absorbers.

Informational Units
1. Operation of shock absorbers.
2. Construction and operation of independent front wheel suspension.

Cooperative Work-Study in Industry

Second Contact

A. Parts, Stock and Customer Contacts ........................................ 4 weeks

Manipulative Units
1. Order parts.
2. Inventory parts.
3. Meet and handle customers.

Informational Units
1. Methods of handling customers.
2. Knowledge of accessories and availability.
3. Instruction in timekeeping, follow up and filing.

B. Engine Repair and Overhaul ......................................................... 24 weeks

Valve Fitting

Manipulative Units
1. Disassemble valves from engine.
2. Clean carbon and inspect parts.
3. Recondition valves and valve tappets.
4. Reassemble and adjust valve tappet clearance.

Informational Units
1. Valve refacing equipment.
2. Heat resistant steels.
3. Types of valves.
4. Tappet Devices.
**Pistons and Rings**

**Manipulative Units**

1. Remove piston and ring assemblies from engine.
2. Clean carbon from cylinders, pistons and combustion chambers.
3. Fit rings to cylinders and piston rings grooves.
4. Fit pistons to cylinders.
5. Reassemble piston and ring assemblies.

**Informational Units**

1. Compression leakage.
2. Types of piston rings.
3. Types of pistons.
4. Oil Rings.
5. Expanders.
6. Checking cylinders with cylinder gauge.

---

**Connecting Rods**

**Manipulative Units**

1. Remove and inspect connecting rods.
2. Inspect inserts and replace if necessary.
3. Check piston pin clearances.
4. Check rod alignment.
5. Replace connecting rods.

**Reboring and Honing Cylinders (Optional)**

**Manipulative Units**

1. Disassemble engine and remove carbon.
2. Check cylinder bores with gauge or micrometer.
3. Rebore cylinders for oversize pistons.
4. Hone cylinders and fit pistons.
5. Fit and install new rings.
6. Align connecting rods.
7. Reassemble and tune engine.

**Informational Units**

1. Correct method of timing

---

**Timing Chains and Gears**

**Manipulative Units**

1. Remove and install chains and sprockets.
2. Time engine.

**Informational Units**

1. Correct method of timing
### Main and Connecting Rod Bearings

**Manipulative Units** | **Informational Units**  
---|---  
1. Fit main bearings. |  
2. Fit connecting rod bearings. |  
3. Clean oiling system. |  
4. Remove initial bearings. |  

#### Engine Overhaul - Complete

**Manipulative Units** | **Informational Units**  
---|---  
1. Remove engine from vehicle. |  
2. Disassemble engine completely. |  
2. Elec. checking equipment. |  
3. Clean all parts for inspection. |  
4. Inspect manifolds for cracks and warps. |  
5. Rebore cylinders and fit pistons, rings and pins. |  
6. Clean lubrication system thoroughly. |  
7. Inspect crankshaft journals and crank pins. |  
9. Install main bearings. |  
10. Inspect camshaft journals. |  
11. Inspect camshaft bearings and align. |  
12. Align connecting rods. |  
13. Overhaul oil pump. |  
15. Overhaul ignition distributor. |  
16. Reassemble engine and make all necessary adjustments. |  
17. Clean carburetor and fuel pump. |  
18. Tune engine completely. |  
A. Overhaul carburetor. |  
B. Overhaul starter. |  
C. Overhaul generator. |  
D. Condition cooling system. |  
E. Service exhaust system. |  
F. Overhaul waterpump. |  
G. Overhaul fuel pump. |  
H. Check battery and cables.
C. Fuel System ........................................4 weeks

Carburetor

Manipulative Units
1. Remove, clean and replace manifold.
2. Disassemble, clean and inspect carburetor.
3. Replace worn or damaged parts.
4. Reassemble carburetor.
5. Adjust carburetor on engine.
6. Adjust automatic choke.

Informational Units
1. Construction and operation of carburetor and auto choke.
2. Characteristics of fuels.
3. Operation of manifold heat control valve.

Fuel Pump

Manipulative Units
1. Clean fuel pump filters and screens.
2. Disassemble fuel pump.
3. Clean and inspect parts.
4. Reassemble fuel pump and check its operation.

Informational Units
1. Construction and operation of fuel pump.
2. Construction and operation of combination fuel and vacuum pump.

Fuel Tanks and Lines

Manipulative Units
1. Remove, clean, repair and replace fuel tanks.
2. Remove, clean, repair and replace lines.
3. Remove, check and replace fuel tank and dash gas gauge unit.

Informational Units

D. Electrical System .................................. 10 weeks

Generator Overhaul

Manipulative Units
1. Turn armature commutator and undercut mica.
2. Disassemble, clean and test generator.
3. Replace bushings.
4. Reassemble and fit new brushes.
5. Test and adjust output.

Informational Units
1. Construction and operation of generator.
## Generator Regulator

**Manipulative Units**

1. Make quick checks to determine operation condition of units in regulator assembly.
2. Clean regulator points.
3. Test and adjust voltage regulator.
4. Test and adjust current regulator.
5. Test and adjust cut out relay.

**Informational Units**

1. Construction and operation of generator regulator.

## Starting Motor Overhaul

**Manipulative Units**

1. Disassemble, clean and test starting motor.
2. Turn armature commutator.
3. Reassemble and fit new brushes.
4. Test motor operation.
5. Test and adjust solenoid and relay.

**Informational Units**

1. Construction and operation of starting motor.

## Ignition Distributor Overhaul

**Manipulative Units**

1. Clean, disassemble and inspect all parts.
2. Replace worn or damaged parts.
3. Reassemble distributor and adjust points.
4. Block test automatic advance.
5. Test ignition coil and condenser.
6. Install and time ignition.

**Informational Units**

1. Operation of ignition system.
2. Construction of distributor.

## Battery

**Manipulative Units**

1. Clean battery terminals and protect from corrosion.
2. Test battery using hydrometer cell tester and high rate discharge test for capacity.
3. Recharge battery.

**Informational Units**

1. Construction and operation of battery.
2. Precautions to be taken during recharging.
### Electric Wiring and Lighting System

<table>
<thead>
<tr>
<th>Manipulative Units</th>
<th>Informational Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Locate and repair openings, shorts or grounds in electrical wiring.</td>
<td>1. Explanation of circuits to all operating units in the electrical system.</td>
</tr>
<tr>
<td>2. Replace lamp bulbs and sealed beam units.</td>
<td></td>
</tr>
<tr>
<td>3. Aim headlights.</td>
<td></td>
</tr>
<tr>
<td>4. Check and replace instruments.</td>
<td></td>
</tr>
<tr>
<td>5. Replace circuit breakers.</td>
<td></td>
</tr>
<tr>
<td>6. Repair horn.</td>
<td></td>
</tr>
</tbody>
</table>

**E. Trouble Shooting and Tuning up**

8 weeks

### Diagnosing Trouble and Road Testing

<table>
<thead>
<tr>
<th>Manipulative Units</th>
<th>Informational Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Locate trouble in operating units.</td>
<td>1. Methods used in locating trouble (analyzers).</td>
</tr>
<tr>
<td>2. Road test vehicle for performance, handling and safety.</td>
<td>2. Procedure for road testing.</td>
</tr>
<tr>
<td>3. Inspect finished repair work.</td>
<td></td>
</tr>
</tbody>
</table>

### Engine Tune-up

<table>
<thead>
<tr>
<th>Manipulative Units</th>
<th>Informational Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Perform all operations necessary to secure good compression, perfect ignition and properly adjusted carburetion.</td>
<td>1. Review technical information on all adjustments.</td>
</tr>
</tbody>
</table>

### New Car Conditioning and Inspections

<table>
<thead>
<tr>
<th>Manipulative Units</th>
<th>Informational Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Perform new car service.</td>
<td></td>
</tr>
<tr>
<td>2. Perform 1000 mile inspection.</td>
<td></td>
</tr>
</tbody>
</table>

### Preventive Maintenance

<table>
<thead>
<tr>
<th>Manipulative Units</th>
<th>Informational Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Lubricate, adjust and repair major units of vehicle.</td>
<td></td>
</tr>
</tbody>
</table>
I, DONALD G. LUX, third son of Joseph H. and Mary Bernhardt Lux, was born in Austin, Minnesota, February 21, 1924. I received my secondary school education in the public schools of Claremont, Minnesota. In 1942 I enlisted in the United States Navy and served in the amphibious forces until 1945, being discharged a chief petty officer. On November 1, 1945, I married Harriet H. Harmer, and to this union have been born three children; Michael, Gregory, and Kathleen.

My undergraduate training was obtained at The Stout Institute, Menomonie, Wisconsin from which I received the degree Bachelor of Science, with distinction, in 1949. From the same institution, I received the degree Master of Science in 1952. During the second semester of the 1948-49 year and for two subsequent summers, I acted in the capacity of assistant to Professor John Jarvis, Dean, Division of Industrial Education at the Stout Institute.

I taught in the Louisville Junior High School, DuPont Manual Training High School, Male High School, and Theodore Ahrens Vocational High School, all in the Louisville, Kentucky, public schools. In September, 1952, I received an appointment as Instructor, Department of Education, The Ohio State University, and served in that capacity until December, 1954, at which time I received an appointment as Assistant Professor of Industrial Education, University of Illinois.