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YEARBOOK 5 1956

PROBLEMS AND ISSUES in Industrial Arts Teacher Education

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AMERICAN COUNCIL ON INDUSTRIAL ARTS TEACHER EDUCATION

Problems and Issues in Industrial Arts Teacher Education

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AMERICAN COUNCIL ON INDUSTRIAL ARTS TEACHER EDUCATION

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OFFICERS OF THE COUNCIL

FOREWORD

Yearbook V has resulted from the cooperative efforts of a large group of industrial arts teacher educators. This is in keeping with the democratic spirit of the times. The American Council on Industrial Arts Teacher Education is most appreciative of the sincere effort put forth by these men to bring about another yearbook of high professional quality in so short a time.

First, commendation goes to Dr. C. Robert Hutchcroft as editor and writer, and to his committee of contributors including Elroy W. Bollinger, John A. Fuzak, M. Ray Karnes, Kermit A. Seefeld, Calvin M. Street, Robert L. Thompson, Walter Waetjen, and John A. Whitesel for their work in preparing the manuscript.

Second, the Council is most grateful to the McKnight and McKnight Publishing Company for again giving unstintingly of its services in producing the yearbook and in distributing it to the membership.

Finally, the yearbook would not have been possible except for the advance planning work done by the Yearbook Planning Committee.

John A. Whitesel, *President*
American Council on Industrial
Arts Teacher Education

Milwaukee, Wisconsin
April 24, 1956

AMERICAN COUNCIL ON INDUSTRIAL ARTS TEACHER EDUCATION

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PREFACE

A discussion of current issues and problems should be of interest to all those concerned with the present and future status of teacher preparation in industrial arts. This volume is an attempt to present some points of view and to stimulate both thinking and action.

The editor wishes to express his appreciation to the Planning Committee, the contributing writers of the various chapters, Mr. W. D. Stephens of the McKnight and McKnight Publishing Company, staff members of institutions who answered questionnaires, and all others who so kindly contributed to this Yearbook. The editor also wishes to thank the many copyright holders who granted permission to use quotations from their publications.

It should be pointed out that the views expressed in this volume are not necessarily those of the Council or of the institutions with which the writers are connected. While points of view belong to the writer identified at the beginning of each chapter, the editor must be charged with such errors, omissions, or other faults the reader may find in these pages.

This book does not provide a complete or comprehensive treatment of the issues or problems facing teacher educators. It is hoped, however, the Yearbook V will stimulate further study of those issues mentioned as well as other issues which are involved in industrial arts teacher education. This could contribute to a more effective program of preparation for industrial arts teachers. Better preparation of teachers should result in greater contributions of industrial arts to the youth and adults of our nation. This is our ultimate goal.

C. Robert Hutchcroft

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CHAPTER I

The Improvement of Teacher Education

C. ROBERT HUTCHCROFT
University of Michigan

ESSENTIAL FACTORS

The world today is sorely faced with a need for more effective education; education that will cause nations as well as individuals to change their behavior. We need greater understanding of ourselves, of others, of the world about us, and of the enormous potential that humans have to improve this world in which we live. We need also to give top priority to human values when considering possible solutions to the problems with which we are confronted.

Even a casual observance of recent publications will reveal that education today is faced with many problems. To converse with any considerable number of teachers and teacher educators will confirm this observation. We in industrial arts teacher education are no different than those in other areas with respect to our concern for our problems, and our desire to find solutions for them. Progress in our profession must come through the solution of problems that we face. To identify these problems and issues is the *first factor* essential in the improvement of teacher education. A considerable portion of this chapter is devoted to reporting the results of a questionnaire survey conducted for this purpose. The *second essential factor* is to define and explore these problems and issues. Chapters two through nine attempt to do this for certain of these problems. More than this however is needed. It is very important that large numbers of our professional educators actively concern themselves with this identification of issues, and debate as to the most promising approaches toward solutions. Widespread participation in the consideration of these issues and problems is the *third essential factor* in improving teacher education. A proposal for all to participate is presented in the following section.

A CHALLENGE

You are invited to participate in a phase of professional activity that may prove to be quite interesting and profitable to you. Would you like to consider, with others in your professional field, some of the important problems and issues before us today? Here is the plan.

First, in Chapter one, you will find a large number of problems and issues that have been named by teacher educators from thirty-two states.

Second, in Chapters two through nine, you will find points of view expressed on certain significant issues by eight different writers.

Third, on page 19 you will find directions for determining if you have reached your *Professional Curiosity Retirement Date.*

Fourth, on page 19 a "Call to Action" is presented for those whose Professional Curiosity Retirement Date is still in the future. This invitation to participate is intended for all those who classify themselves as "active" (rather than "passive") industrial arts teacher educators. Permission is also granted to those not in industrial arts teacher education, but who may be interested, to join with us in this exciting venture.

INQUIRY TO INSTITUTIONS PREPARING INDUSTRIAL ARTS TEACHERS

An attempt to identify problems and issues in industrial arts teacher education might proceed from any of several points of attack. It would indeed be interesting and very likely profitable to make inquiry of teachers at one or more points in their careers. An inquiry could be made at (a) the time of graduation from college, (b) after teaching one year, (c) after teaching five years, and (d) after teaching ten or more years. An inquiry could be made of college students whose opinions on certain aspects of their preparatory program might reveal problems or issues that lie in the realm of the professional preparation of teachers. An inquiry might be directed to administrators, whose responsibilities include the selection, supervision, evaluation, and retention or replacement of industrial arts teachers. Certainly the opinions of such administrators would prove of value in any attempt to identify issues and problems important to successful teaching and thus important to the improvement of teacher education.

Three additional types of inquiries would be of particular interest to the writer. First, an inquiry directed to the parents and other taxpayers in the community which might reveal desires for changes that could best be brought about through the professional preparation of the industrial arts teacher. The second would be an inquiry directed to the pupils whose activities are under the supervision of the industrial arts teacher. The opinions expressed by the pupils might suggest some important considerations for improvement of industrial arts teacher education. The third would be an inquiry directed to other teachers in the school who work with the industrial arts teacher. These are his colleagues and these are the persons with whom he shares the responsibility of organizing and conducting the school program so as to result in maximum values to the learners and to the community.

Since limitations in the production of this Yearbook, particularly with reference to time and finance, appear to make these inquiries impractical at this time, it was felt that an inquiry to those institutions offering a teacher preparation program in industrial arts should be made. Your editor sincerely hopes that the other inquiries mentioned above will not be abandoned, but only postponed.

The Questionnaire

It was decided that an attempt should be made to assemble problems and issues from teacher educators who work particularly with teacher preparation programs in industrial arts. Accordingly a questionnaire was prepared for this purpose, a copy of which is shown on the following page. An inspection of this form finds it largely self-explanatory but it might be mentioned that the brevity of the form was deliberate with the purpose in mind of securing the maximum number of replies. No claim is made that this is a scientifically prepared research instrument and no "pilot run" was made. Rather it was intended to be an invitation to a nationwide list of teacher educators to reveal what seemed to them to be important problems and issues in industrial arts teacher education. It was intended to accommodate the busy individual who might list informally two or three items that might readily come to mind in terms of his current activities in teacher education work. Informal and unrehearsed remarks were anticipated and desired and in many cases this apparently did result.

AMERICAN COUNCIL ON INDUSTRIAL ARTS TEACHER EDUCATION

November 30, 1954

To: Chairman, Industrial Arts Teacher Education Department

From: Editor, Fifth Yearbook Committee (C. Robert Hutchcroft)

Will you help us identify some of the most important problems and issues in Industrial Arts Teacher Education? We need your assistance in planning the Fifth Yearbook of the American Council on Industrial Arts Teacher Education.

Will you help by writing below, under some of the categories listed, important issues or problems as you see them? Even if you have time to list only one or two items it will be appreciated. Just jot them down informally and *return this sheet to:*

C. Robert Hutchcroft, Room 4200C, School of Education,
University of Michigan, Ann Arbor, Michigan.

Problems and Issues in Industrial Arts Teacher Education.

I. In the areas of individual development and learning, and the demands of our contemporary culture.

II. In the areas of purposes or goals, methods, and evaluation.

III. In the areas of general education, technical education, and professional education.

IV. Other areas:

(Use other side for additional space if needed. Won't you mail this sheet back today? Thank you.)

To Whom Sent

It was decided that the *First Yearbook*[1] of the American Council might be used to furnish a mailing list to institutions. It was further thought desirable to send one inquiry to each institution since scope was particularly desired rather than numbers. The *First Yearbook* lists 202 institutions offering programs in industrial arts work. By adding the University of Michigan (which was omitted in the *First Yearbook*) a total of 203 institutions was placed on the mailing list. By making reference to the *Second Yearbook*[2] of the Council it was possible to address most all questionnaires to the chairman or department head by name. While it might have been interesting to mail one to each person in the *Second Yearbook*, which contains 1080 names, it was felt that inquiries directed to the institutions might sample the expression of our teacher educators throughout the country without causing a high frequency of some items due to many teachers in a department reporting the same problem or issue which may be critical in that particular region.

The Returns

Of the 203 inquiries sent out, 71 returns were received and used in connection with this chapter. One reply was received indicating that the department at that institution[3] had been discontinued. Of the remaining institutions, replies received showed a wide geographical distribution. There were thirty-two states represented in the replies and no state had over six replies in those compiled for this report. The states from which one or more replies were received are listed alphabetically below. The number of replies received from each state is shown in parenthesis after the name of the state.

Arizona (2)	Iowa (1)
Arkansas (2)	Kansas (2)
California (3)	Kentucky (2)
Colorado (2)	Louisiana (1)
Florida (1)	Michigan (2)
Georgia (1)	Minnesota (4)
Illinois (4)	Missouri (3)
Indiana (2)	Montana (3)

[1] *Inventory-Analysis of Industrial Arts Teacher Education Facilities, Personnel and Programs*, Yearbook 1, 1952. American Council on Industrial Arts Teacher Education.

[2] *Who's Who In Industrial Arts Teacher Education*, Yearbook 2, 1953. American Council on Industrial Arts Teacher Education.

[3] The University of Vermont reported that their department of Industrial Education had been closed.

Nebraska (3)	Tennessee (2)
New Mexico (2)	Texas (4)
New York (3)	Vermont (1)
North Carolina (1)	Virginia (3)
North Dakota (2)	Washington (1)
Ohio (3)	West Virginia (1)
Oklahoma (6)	Wisconsin (1)
Pennsylvania (2)	Wyoming (1)

It is apparent that the replies received represent a considerable spread among those to whom the questionnaire was sent. The number of items listed on each return varied from one to eighteen. The median was four. Sixty-eight percent of the replies contained from three to six (inclusive) items. It would appear therefore that one or two persons or one or two states did not contribute the lion's share of the items but that the contributions were rather widespread.

The items on the returns were duplicated without editing and sent to each of the persons writing a chapter for this volume. This was done for information only and no suggestion was made or implied as to how these were to be used. The authors of the various chapters were free to determine the way in which they wished to treat their assigned chapters.

For the purpose of reporting the returns in this chapter it was felt some classification and tabulation was desirable. However it was found quite impossible to fit the replies into neat categories for tabulation purposes. Many of the respondents stated a problem or issue in such a manner as to permit its classification under two or more of the headings given. This is not an indictment of the instrument, or of the persons answering, but evidence that the categories used are closely interrelated and that in considering our problems we find of necessity that some identification of issues involve a number of factors and that they cross lines of classification titles. It may be some measure of satisfaction to find these replies cutting across topic lines, since this could infer that those replying may have given more attention to the actual problems and issues in their educational experience than to a pre-occupation with the theoretical and somewhat arbitrary topical divisions presented in the questionnaire. The divisions of topics used may be of value for analyzing and discussing issues but no claim is made that they reflect clear cut segments of educational practice.

An attempt was made to combine ideas, expressions, and statements that were similar or closely related and thus achieve some usable form of grouping of the data. In some instances statements were different but one seemed to be contained within the other so that the difference was one of scope rather than of kind. It is also admitted at this point that some injustice may have resulted by combining statements received, but a sincere attempt was made to avoid significant compromise in grouping statements. A few statements were relegated to the miscellaneous class since they did not seem to lend themselves to joining other groups without possible violence to the meaning of the statement. Some subjective judgment therefore entered into the establishment of frequencies reported in the next section.

ISSUES AND PROBLEMS NAMED

The current thinking of teacher educators who returned the questionnaire was reflected by questions, statements, and informal remarks, which in some cases, would need be revised and reworded to appear in a formal list of issues and problems. It was felt however that certain objections might arise in trying to make such revisions unless each was returned to the originator for approval of the revised form. This procedure was impractical and it was felt that the intent and meaning of the returns would be better reported if no such revisions were attempted. Consequently the reader will not find a formal listing of issues with frequencies indicated, but will receive a report that while admittedly less well organized, is none-the-less very revealing of the opinions and beliefs of those replying to the questionnaire. It is believed the reader will have no difficulty identifying the issue involved in the comment or statement reported.

Learning and Contemporary Culture

Many references were made to "modern" or "present" needs and the "contemporary" scene in our culture. The most frequent listing in this part of the questionnaire was a statement or question pointing up the demands of our present society and identifying it as complex, highly technological, and dynamic in character. This general viewpoint was in some instances illustrated by more specific references to highly technical aspects of our present society, the interrelationships and interdependencies that exist in our society today, and the rapidity with which it is undergoing change.

The next most frequent type of statement made was one that referred to child (or individual) growth and development, and how learning takes place. Many of these statements were framed in such language as to infer that definite opinions were held by the respondents on this subject. One must hasten to say however that there were large variations in the points of view expressed. It would appear from the returns that we might say a major issue is the underlying principles of growth and development and the learning process and that no extensive unanimity of opinion is apparent even among those who have expressed strong feelings about this matter.

In addition there were many statements which were specifically concerned with objectives, general education, and methods. These will be included as such topics appear below. The variation in answers included such items as the "appropriateness of industrial arts for low I. Q. pupils," the "recruitment of teachers," and the "implications of the do-it-yourself program for industrial arts." After reading the items included under this topic on the questionnaires, one is tempted to readily agree that we do indeed live in a "complex" society and that industrial arts teacher educators need be alert to the host of factors that are associated with the nature of individuals and the nature of the society in which these individuals live and work.

Goals, Methods, and Evaluation

If we combine statements on goals, objectives, and values claimed for industrial arts work we find seventy percent of the replies mentioning this as an important problem or issue. Some express the need for more specific determination of objectives or outcomes while others felt we had "over specified" these. Many felt the statements we have used in the past were too theoretical and that we need more tangible statements of reference to the goals of our work. A few referred to the desirability for refining objectives in terms of "behavior outcomes." Not a few felt our objectives and goals should show greater uniqueness and less overlapping with other school areas. There were a few who stated the goals should be expressed in terms of "human beings," while others, with what appeared to be equal zeal, stated that we need to define goals in terms of "industry and industrial methods" and "skills." These may not be mutually exclusive if they were developed by their writers but they appear to represent quite different approaches to this important topic.

At least two persons expressed the opinion that this entire issue may be largely a problem in semantics. Some clarification of positions seems highly desirable as the next step in working with the problem or issue of goals and objectives.

"Methods" were mentioned by fifty-eight percent of those replying. More effective methods of teaching, or gaining widespread use of a method the respondent felt was particularly effective, characterized about half of these replies. A number expressed a problem or issue in method without revealing their opinion of its present state of effectiveness. For example the issue of "the effectiveness of pupil-teacher planning" as a method in learning might easily permit approach from the negative as well as the positive side. Stated in a positive manner as desirable methods were "visual aids," "democratic process in teaching," and "greater organization of materials." The desirability of using "television" and working with the "Junior Achievement program" appeared as issues that had apparently not been finally resolved in the respondent's mind. Issues involving a "greater proportion of manipulative work" and methods of "intellectualizing industrial arts" might be somewhat less than compatable if these were developed in certain ways. At least two persons are concerned, lest industrial arts become "book courses" and two more feel we "must further the understanding of other school subjects" and "put more emphasis on spelling, punctuation and written work." These point up some issues of method and it would appear we have some basic issues of principle and theory to be determined prior to the final selection of the methods best able to carry out the objectives of the industrial arts program.

"Curriculum" is recognized by many to be closely tied up with method and thus we have forty-five percent of the respondents including some reference to the curriculum and the areas that should be included or the issue of what shall constitute the curriculum. This involves both the curriculum for teacher preparation and the curriculum to be offered in the public schools. Some respondents were rather specific and over one fourth of those replying to this section mentioned the "General Shop" as a desirable part of the curriculum. The issue of how the industrial arts curriculum should tie in with the training of elementary teachers and whether industrial arts majors should include in their preparation some study of the program in the elementary grades was mentioned by five persons. A "curriculum for minors" and the "place of safety in

the curriculum" were each mentioned twice. The issue of whether the Driver Education program should be or should not be a part of the industrial arts curriculum was also presented.

"Evaluation" was included in the questionnaire under this section. Thirty percent of those returning questionnaires made some statement on evaluation. In these statements the use of evaluation included not only an evaluation of our work and the student's work but an evaluation of our objectives, of our programs, and the way (or method) we have been doing certain things. It seemed evident that the concepts expressed on evaluation went considerably farther than the traditional "grading" and in some instances seemed to raise as an issue the degree to which some of the things we are now doing are fulfilling the purposes we claim for them. If this is a reflection of our growing desire to question the requirements, techniques, and procedures we now use in the light of results actually obtained, we may well see a revival of real discussion on this important but difficult aspect of our professional duties.

General, Technical, and Professional Education

The highest number of replies in this section for any one item was on "general education" where almost half of those returning questionnaires made some type of statement with regard to this item. While these references also vary as do those previously reported, it may be of interest to attempt some grouping of these items. A number of persons would like to have "general education" defined more specifically. Many want the place of "general education" in the college training of teachers spelled out. Others want the role of "general education" well defined as it applies to the public schools so that persons now preparing to teach may see this relationship in connection with the levels on which most are likely to teach. Between the lines of the replies it seemed that the main issues may be "just what is this concept called general education" and "how should it affect our programs of teacher preparation." Not implicit in the written replies but included in conversations at the 1955 national meeting of the Council was a concern that teacher educators make a clear distinction between the role of general education on the college level and the role of general education on the elementary and secondary school levels, so that the implications for industrial arts may be made in terms of application to a specific program on a particular level.

Over one-fourth of those replying listed "technical education" as one of the important issues today. Some were concerned as to the amount and kind of technical education the prospective industrial arts teacher is to receive. Others expressed concern over the technical aspects of the curriculum which our industrial arts teachers are to offer their pupils in the public schools, or in post high school technical courses. There was also some concern that teacher educators be alert to changes taking place today in the technical fields of our society with the hope of these changes being reflected in the current curriculum offerings. "Professional education" was specifically listed as an issue by one-third of those replying. The problems and issues identified with professional education covered a wide range. The student teaching program, with one person suggesting a year of full time internship, was of concern to many. This concern included both the content and duration of the student teaching experience. Another issue mentioned several times was the promotion of membership and participation in professional organizations for industrial arts teachers. The professional content of the graduate offerings in industrial arts was mentioned in issues listed by four persons. Other issues under this topic included "in-service training of teachers of industrial arts" and the problem of "identifying and strengthening leadership" in this field.

Forty-four percent of those replying considered general education, technical education, and professional education, as "parts of the curriculum for preparing teachers" and thus posed issues involving the relative proportion of each of these three types of education in the program for preparing Industrial Arts teachers. Also mentioned in this connection was the type of work that should be included under each of these three categories of courses on the college level. One-fifth of these respondents included as a possible issue for consideration, the fifth year as a regular part of preparing teachers in the attempt to find a solution to the lack of time in the four-year program for inclusion of all the courses thought necessary. Three persons posed the issue of allowing credit for trade experience as a part of the work in teacher preparatory programs.

Another classification of problems which many put in this group was "relationship of industrial arts with other areas." Thirty percent of those replying mentioned this with reference to some area or areas outside industrial arts. Most frequently mentioned was the "relationship between industrial arts and vocational education." The "relationship of industrial arts to

industry" ran a close second. The "relationship of industrial arts to fine arts, design, and creativity" was third in frequency of mention under this heading. Also mentioned were the "relationship with the public," "relationship to Liberal Arts Colleges," and "relationship to all other subjects in the curriculum." This apparent concern with the relationship of industrial arts to other areas of the curriculum, to industry, and to the public, may indicate a shift in thinking since inquiries by this writer a few years ago found concern for problems and issues confined almost entirely to considerations *within* our field. Two persons listed the issue of "how to secure more cooperation and less 'bickering' between industrial arts and other areas." From conversations at the 1955 national convention of the Council it would appear that this issue is very much alive in some places. However it is a real satisfaction to state that others reported an improved situation in a number of places with regard to this factor. It may be that all teachers as well as other persons will eventually discover that greater progress can be made by cooperative endeavors with our colleagues than by dissipating part of our efforts on "in fighting." There is even some hope that states and nations may learn this lesson. It is a basic principle of democratic society and our schools need to practice as well as preach this principle of cooperation and respect for the opinions of others.

Other Areas Named

The fourth category on the questionnaire was labeled "Other Areas." This was intended to gather in those items which were thought to be important but which seemed to the respondent not to fall under the previous headings. One item which was listed here (and also in each of the other categories) was that of recruiting, selective retention, and holding of teachers of industrial arts. Over thirty-five percent of those replying to this questionnaire mentioned specifically this item as an issue or problem we face today. The scope of this item, if taken collectively from the replies, would include the identification of potential candidates for teacher preparation programs, interesting them in taking the program, selective retention during the college program, placement, and holding the newly placed teacher in teaching (rather than losing him to industry). The issues include who shall do this job, how shall it be done, and the securing of "cooperative support" in this endeavor throughout the complete cycle. Many persons have recently expressed

to this writer their concern that unless this problem gets more attention, major harm will result to our profession. This seems particularly true of industrial arts teachers since there seems to be rather widespread and successful competition by agencies and employers other than schools for the services of industrial arts majors at the time of their graduation from college or shortly thereafter.

The next highest frequency of replies in this group was those included under "supervision, state programs and certification." Those mentioning supervision referred usually to state supervision but some mentioned local supervision and one mentioned county supervision. State programs are frequently tied in with state supervision when discussing this issue. While it may be a misinterpretation of the data, it seems there is a sharp cleavage between those wishing more "uniformity on a state wide basis" and those who wish more "individual development of programs with local autonomy." This issue is of course basic in determining the desirability and extent of supervision on the state level. References to certification seem to infer a desire to raise in some instances, and put a floor under the minimum requirements for one who wishes certification to teach in this field. It is common knowledge that states vary widely in the requirements for the teaching licenses in "special subjects" where industrial arts is usually classified. In some states teacher educators have worked cooperatively to achieve higher standards of certification even though state regulations have not actually been changed.[4]

"Shop planning," "physical facilities" and "equipment selection" were identified as important issues before us today. This appears to be a problem facing industrial arts people in all parts of the United States and with projected building needs and school population increases, it seems reasonable to predict these factors will become increasingly important in the professional activities of industrial arts teachers. The writer has seen little evidence of unanimity of opinion by teacher educators on specific advice to schools on these items. This may weaken our standing with school administrators, architects and others charged with preparing plans for new and expanded school facilities. It was clearly evident at the 1955 national convention

[4] An example is the state of Michigan where the State Industrial Arts Curriculum Committee sponsored a two day conference of representatives of all the industrial arts teacher training programs in the state (November 22-23, 1954) resulting in a new statement of recommended minimum requirements to which all the representatives present agreed.

of the Council[5] that those present were interested in and felt a genuine need for some sound recommendations with regard to shop planning, physical facilities and equipment selection for industrial arts laboratories and shops.

Another item which appeared with considerable regularity on the replies was the problem of "definition of terms." Several persons referred to this directly or indirectly and any clarification that might be brought about in this category would apparently be gratefully received. It seems evident that improvement in our ability to communicate with precise meaning will certainly aid in our efforts to resolve some of these important issues and problems which we face.

"The extent of public school consultation and follow-up of graduates" was another issue listed under this group. This issue appeared to be largely one of determining the extent to which these duties should be considered a regular part of the teacher educator's job. One person suggested that perhaps twenty percent of his time might be so allocated. Conversations with a number of teacher educators from various parts of the country revealed a healthy suspicion that their administration might not approve such use of their time since it would be hard to convert into "teaching load credits." Representatives of a few institutions have made statements which seem to acknowledge field consultation and follow-up of graduates as a valuable and recognized part of their duties. No commitment was made as to how it was to be credited in computing the teacher load. Too often it has been an "extra" and thus this important job could not be carried out as adequately as desired.

In the eyes of at least four respondents there is a definite issue involved in accrediting industrial arts programs in colleges and universities. By whom they would be accredited and upon what basis are two questions included in this issue. One respondent sees this issue not as whether we should or should not accredit industrial arts programs, but as whether we wish to take the initiative to set up such a procedure or "stand by" and have this function performed by "persons outside our field who know little about an adequate program in our area." Another teacher educator stated upon being questioned about this issue that he "had no fears" of accrediting agencies and felt we had "many other more important issues to face." The writer pressed for an example of a "more important issue" and received the reply that "a more important issue is the selective recruitment

[5] Particular reference is made to the morning session, April 27, 1955 at Atlantic City.

of industrial arts teachers and the improvement of salaries and working conditions so as to retain him in teaching after he has completed his college program." This issue has been included in an earlier part of this chapter.

"Guides for administration and teaching of industrial arts" were mentioned as the subject of important issues in this group. The relative strengths and weaknesses of such guides as aids to industrial arts make a spirited debate at most meetings of teacher educators. This issue is far from resolved and might well take a turn in the direction of identifying the strengths and weaknesses of guides with which we are familiar, followed by designing a guide which includes as many of the strengths as possible and suggests ways to use it so as to avoid as many of the weaknesses as possible. The issue then becomes a question of whether the benefits warrant the effort necessary to produce such a guide. This may prove to be an issue that will need to be determined by careful experimentation rather than by debate.

Other scattered topics which did not seem to fit into the above groups were mentioned by one or two persons. These include "the need for more time to teach," "establishing pilot or exemplary programs," "the issue of where to place the industrial arts program in the University organization (College of Education, College of Engineering, or other Division)," and the problem of "fostering creative possibilities."

It should not be inferred that topics omitted are accorded a position of relative unimportance. Selection was intended to reflect frequency of mention by teacher educators rather than an evaluation of the merit of each. No doubt there are many other problems and issues of real importance which are recognized by teacher educators but not recorded here. At least we have identified here both a sufficient number and variety to suggest possible uses of our time and talent toward the end of greater understanding and accomplishment through improved industrial arts programs in teacher preparation.

PLAN OF THIS YEARBOOK

The plan for this Yearbook was somewhat different from those Yearbooks of the Council which preceded it. Since the time available to prepare the copy was unusually short, it was felt that a plan involving a number of writers, each being responsible for one chapter, might be appropriate. While informal discussion on such a Yearbook had taken place among some members of the Council (your editor remembers Walter Wil-

liams describing the possibility of such a volume as early as 1951) the first formal planning for Yearbook Five took place at a conference held in Washington D. C. on September 25 and 26, 1954.[6]

Planning Committee

Members of this Washington conference were R. Lee Hornbake, Walter R. Williams, Gordon O. Wilber, and John A. Whitesel. Also John R. Ludington was invited and participated as a member of this group. In reality this was a subcommittee of the Council's regular Yearbook Planning Committee. The latter consisted of Gerald Baysinger, Fred Schmidt, Jr., Otto Hankhammer, DeWitt Hunt, and George Henry in addition to those mentioned above on the subcommittee.

While this Washington conference drafted principles governing Yearbook planning, discussed a Yearbook session as part of the next convention, suggested administrative structure for Yearbook production, and prepared an extensive list of possible topics for future Yearbooks, the item on which most of the time was spent, was the planning of the Fifth Yearbook. It was recognized that the time was very short to meet the deadline for publication and thus the committee made some detailed plans to expedite work on the volume. The committee selected the title "Problems and Issues in Industrial Arts Teacher Education." A proposed outline was then drafted for the entire book. It included the purpose of the Yearbook, the chapter titles, and a suggested outline to furnish some guidance to the development of the chapters. It was further decided that the volume would be a symposium and writers were selected for each chapter and an editor named for the volume. These plans were then forwarded by John Whitesel to the various persons who had been selected to write for this Yearbook.

The Authors

The authors invited to participate in writing this volume were selected at the Washington Conference previously referred to. Walter Waetjen, Associate Professor, University of Maryland, was selected to write Chapter II, "The Human Element: Individual Development and Learning." Chapter III, "The Demands of Contemporary Culture" was written by Kermit A. Seefeld, Chairman, Industrial Arts Department, University of California, Santa Barbara College. "The Derivation of Goals

[6] "The ACIATE Washington Yearbook Conference" *The Industrial Arts Teacher* Vol. 14, No. 2 (December 1954) page 11.

and Purposes of Instruction" is the title of Chapter IV and was written by John A. Whitesel, Professor of Industrial Arts, Miami University, Oxford, Ohio. It was felt that "Curriculum and Method" should be combined and this was the title given to Chapter V which was written by Robert L. Thompson, Chairman, Department of Vocational Education, New York University. Chapter VI entitled "Concepts of Evaluation" was written by M. Ray Karnes, Chairman, Department of Industrial Education, University of Illinois. "Concepts of General Education" was the title assigned to Chapter VII and this chapter was prepared by Calvin M. Street, Associate Professor of Industrial Arts, Memphis State College, Memphis, Tennessee. Elroy W. Bollinger, State Education Department, New York State, wrote Chapter VIII, "Concepts of Technical Education." "Concepts of Professional Education" was the title given to Chapter IX. It was written by John A. Fuzak, Associate Professor of Education, Michigan State University, East Lansing. The editor selected by the planning committee was C. Robert Hutchcroft, Associate Professor of Industrial Arts Education, University of Michigan, Ann Arbor. The editor also prepared Chapter I, entitled "Improvement of Teacher Education." These persons who had been active in the work of the Council accepted the invitation to contribute to this Yearbook.

Organization of Content

The editor held a conference with representatives of the McKnight and McKnight Publishing Company concerning the manufacture of the book. Following this conference the editor prepared directions for form, style, procedure, suggestions for coordination, and a timetable for submitting copy. Each writer was at all times free to develop his chapter as he saw fit, and there was no attempt from any source to indicate the point of view each should take. It was felt that the risk of some disunity between chapters, and the possibility of some overlapping, were greatly preferred to controls that might interfere with each writer expressing his own ideas as he wished. The readers of this volume may therefore find at points some disagreement between writers and occasional overlapping of issues. It should also be mentioned that with the exception of one chapter which was duplicated in draft form and distributed to each author, the chapters were written independently and writers were unable to read other chapters before preparing their own.

Freedom to Dissent

Freedom to dissent is a principle that permeates this entire yearbook. In the beginning our area of education was developed by people who were dissenters. They challenged the school program as then carried on and raised issues that led to the experimental trial (and later an acceptance) of industrial arts work in the school program. Freedom to disagree is implicit in the professional discussion of these issues. Each author participating in this volume has been accorded that freedom, and each reader is also accorded the same privilege. It is the editor's hope that dissent may result in further discussion of these important matters, leading to greater clarity of the problems and issues and very likely to new or refined, and better understandings and procedures in our professional area. This in turn will permit a greater contribution of industrial arts to the education of learners of all types and ages, and is indeed the common goal toward which we are all striving.

Manufacture of this Volume

The American Council on Industrial Arts Teacher Education is the author and publisher (through a committee) of this volume and holds the copyright to it. The printing, binding, and distribution of this volume are carried out by McKnight and McKnight Publishing Company based upon an agreement made with the Council. The following information about the manufacture of this book may be of interest.

Set in Linotype Century Schoolbook Expanded, with Vogue headings, Yearbook 5 was lithographed by McKnight & McKnight Publishing Company on satin plate Wescar Offset, manufactured by the Oxford Paper Company at its West Carrolton, Ohio mill. It is bound in Holliston Sturdite Span-o-tone by the Pantagraph Printing and Stationery Company of Bloomington, Illinois.

The distribution is made from the office of McKnight and McKnight Publishing Company. A copy is mailed without charge to each member of the Council whose dues have been paid for the current year as of March 1, 1956. To all others this volume is for sale directly from the McKnight and McKnight Publishing Company, Bloomington, Illinois.

QUALIFYING TEST

NOTE: It is intended that chapters two through nine be read before taking this test.

Having read this volume you are now ready to determine if you have reached your PCRD[7] by answering the following questions:

	YES	NO
1. Do you feel the urge to express *your* point of view on some issues in industrial arts teacher education?	.....	.....
2. Has anything been stated in chapters one through nine with which you disagree?	.....	.....
3. Would you like to debate some of these issues with your colleagues?	.....	.....
4. Are there other issues in this field that are more significant in your opinion than those named in this volume?	.....	.....

Scoring

If you checked three or four "yes" answers you probably have been engaging in a number of the items listed under CALL TO ACTION on the next page, and your PCRD is well in the future.

If you have checked one or two "yes" answers you are still eligible, and you are cordially invited to consider the items listed under CALL TO ACTION, page 20.

If you have checked not even one "yes" answer it may indeed be "later than you think." This may be symptomatic of a temporary plateau in your professional curiosity, or your PCRD may have actually arrived.

[7] Professional Curiosity Retirement Date (no apparent relationship to chronological age)

CALL TO ACTION

If your "Professional Curiosity Retirement Date"[8] is still in the future you are urged to participate in discussing the important problems and issues in industrial arts teacher education. In deciding *how* you can participate you may wish to consider:

1. Including a discussion on some of these items at your local, area, state, or regional Industrial Arts Teachers Association meetings.
2. Writing your point of view on one or more of these items and submitting it to one of the professional magazines, or other publishers.
3. Including some of these items in your teacher education classes, with particular attention to participation by your students.
4. Requesting programs on some of these matters at our annual national Council meetings.
5. Making this volume available to others outside our Council membership, by loaning your copy, recommending it for addition to your school library, and including it on appropriate bibliographies.
6. Standing ready to lead, or participate, in a discussion on various phases of this volume with others who express interest in doing so.
7. Sponsoring or carrying out some experiment or research project that will have a bearing on one or more of these issues.

You will of course be able to suggest additional ways in which you can participate. The important point is to choose one that appeals to you and *start today*. Regardless of present position or geographical location each of us can get into this "act." Your editor is convinced that to do so may well be the most effective technique to contribute toward improving industrial arts to the end that this vital curriculum area in education may serve more effectively all those who seek to learn.

[8] See test on page 19.

CHAPTER II

The Human Element: Individual Learning and Development

WALTER B. WAETJEN
University of Maryland

APPROACH TO LEARNING

Should educators be concerned with the total development of their pupils? If so, they would have to take into account the physical, social, mental and emotional growth of learners. Perhaps teachers should confine their concerns to teaching subject matter. Whichever of these points of view one subscribes to, he believes himself to be correct. He operates in good faith as regards his intentions about producing useful, enlightened, and productive citizens of the future. There must be some way to resolve, even if only partially, the situation that has been described.

Perhaps a clue to the solution lies in the following key words which were taken from different references pertaining to objectives of education. These words are: thinking, undertaking, developing, making, working and modifying. Each of these words is stated in the active form; they imply motion, action, or on-goingness. At this point we must ask ourselves the question, "What is it that causes motion, activity, and on-goingness?" No matter how the question is viewed, the answer can be condensed into a single word — *energy.* Since the advent of the atomic age this has become a household word, for we encounter it repeatedly in newspaper articles, radio commentaries, television programs and magazine literature. As a society we have become extremely sensitive to the importance of energy as it relates to instruments of death and sources of power for transportation. Unfortunately, we as educators have been relatively neglectful of the concept of energy organization as it relates to human behavior. A glance at the human being as an energy system could help us in determining what our approach to industrial arts education shall be.

MAN AS AN ENERGY SYSTEM

In the course of a single day a person is likely to do such things as, arise in the morning, perform his daily ablutions, dress himself, eat his meals and engage in the occupation of his choosing. He may also spend some of his time doing the things which have great interest for him such as, bowling, furniture-making, photography, golf or participation in some fraternal or civic organization. For youngsters this may mean learning to play baseball or football, joining the scouts or working in one's workshop. While the person is engaged in any one of these activities there are other things he is doing. Simultaneously, there are many things going on inside one's body which are of tremendous importance to the well-being and actual life of the individual. Food is being broken down into fine particles preparatory to absorption, enzymes are splitting complex chemical materials into less complex materials, blood is coursing through the vascular system in a never-ending stream, materials are being added and materials are being taken away from certain cells, tissues, and organs of the body. These physiological processes are basic to all other processes.

All of the activities which have been mentioned above seem to give one a picture of energy being used in a highly diverse fashion much like tiny rivulets of water running off the top of an automobile, each going its own way with no purpose or organization. However, there is much more unity to a human being. Closer scrutiny of the processes and activities mentioned above reveal this. Some of those could be grouped under a heading called maintenance of organism. In other words, about fifty percent of the food energy taken in during the course of a day is used for keeping ourselves alive. Some is used for keeping the heart beating, some for keeping the wave-like action of the small intestine in motion, and some for keeping the multitude of cells in good repair. On the other hand, people do much more with energy than just keep themselves alive. Our own experience tells us that much energy is used for growing, especially during certain times in life. Yet, in addition to energy being utilized for maintenance of the body and for growing, there is something else that can be gleaned from the hypothetical description of a person's activities in the course of a day. For instance, such things as golfing, bowling, playing ball and scouting are mentioned. Obviously, these things have nothing to do with keeping the organism alive or with its physical growth.

These are the things people *want to do.* It is in this connection that we see youngsters (actually, all human beings) mobilizing and expending their energy in ways which will help them move toward the goals they have defined and the interests they have developed. Since this energy is used for adapting one's self to his goals, his interests and his environment it could be said that this energy is used for *adaptive behavior.*

Thus we begin to see that man is an energy system — an open-energy system to be more exact. This merely means that a human being is constantly taking in or capturing food energy, is continuously subjecting it to breakdown or controlling it and is always using the energy to attain his own ends. In this connection Freeman makes a statement which is particularly germane at this point:

> The term energy system means an arrangement of work capacities, potential or aroused, which forms a unified whole. The atom, the planets, and the man are all natural orders of matter whose actions constitute energy systems. As a living organism, man is that particular kind of energy system whose behavior is not only an expender of aroused energy but also an attacher of new energy potential. This "open" type of system maintains a more or less constant level of energy transformation and hence does not run down or burn itself out by activity, as does a piece of coal.[1]

By stating that an energy system forms a unified whole and that it maintains a rather constant energy level, Freeman brings to industrial arts educators an important concept. The implication is that we must be concerned with the broad concept of individual development. Since man is an energy system behaving as an indivisible unity, there is recourse in education to view people in terms of the totality of their development. Having taken this view, it would seem in order to examine further the various uses to which energy is put.

Maintenance Of The Organism

Another dimension can be added to the concept of man as an energy system by considering each part of the body in its relation to the capture, control and expenditure of energy. Sense organs such as eyes, ears, nose, tactile receptors and taste apparatus serve to locate energy sources for the human being. Once this is accomplished, the legs and arms propel us to the energy source and help in getting the energy into the body.

[1] G. L. Freeman, *The Energetics of Human Behavior,* Ithaca, New York: Cornell University Press, 1948. p. 34.

At this point we see that the various parts of the digestive system, whether they be mechanical parts such as teeth, tongue, and muscles of the esophagus or chemical parts such as enzymes and acids, break the food energy down from large and complex forms of energy to small and simple energy forms.

At this point the circulatory system begins to play its role in the drama of energy. The blood stream is a unique transportation system distributing the energy materials to all parts of the body so that no cell shall want nor be rendered useless because of insufficient energy supply. On the other hand, the blood stream removes many of the waste products of metabolism and directs them to sources where they can be expelled from the body. Each of these is a highly important function intimately related to the total organization and utilization of energy in the organism. The functions of the respiratory system are somewhat analogous to those of the circulatory system for here, again, we discover that vitally needed materials for energy use are transported, and waste materials which disturb energy flow and use are discarded. It is needless to describe each system of the body and enumerate the functions it serves in the controlling of energy. The foregoing examples are sufficient to illustrate the concept.

But what parts of the body are important in expending one's energy in the direction which will prove to be satisfying to the person? Whether one desires to use his energy in reading, constructing an article of furniture, learning a concept about economics or operating a silk screen frame, it is reasonably apparent that almost any part of the body could be involved in the activity. In fact, all parts of the body *are* engaged in the activity!

Some special mention must be made of the nervous system since it has such a key role in all behavior. It is the nervous system which keeps all parts, functions and processes operating concurrently and harmoniously. It helps the organism to integrate so that it can mobilize itself to capture, control and expend energy with ever-increasing complexity and efficiency. The nervous system is of paramount importance in providing organization for the individual person. According to Gerard: "The behavior of an entire organism, more than any other of its activities, depends upon its organization . . . This is the mechanism for utilizing its energy toward useful ends by adaptive behavior."[2] The implication for industrial arts is not a remote

[2] R. W. Gerard, *Unresting Cells*. New York: Harper and Brothers, 1949. p. 416.

one by any manner of means. The notion of organization, as it is advanced by Gerard, clearly suggests that people can be understood only in terms of the total pattern of energy organization. For an educator to try to teach youngsters without due regard for all aspects of energy use is as fallacious as trying to start an automobile by neglecting all operating factors other than the weight of the oil in the crankcase. Organisms behave as units, as totalities, as organized wholes and not as machines capable of many diverse and unrelated behaviors.

If one is inclined to doubt that some kind of organization is typical of the human organism, there are other data to make this idea more explicit. All teachers are aware of the fact that the human body is made up of organic material. These materials are capable of breaking down very quickly. If they were not capable of breaking down very quickly the human being would not be capable of the explosive action and dynamic behavior which characterizes him. But the more observing person would be quick to point out that people are remarkably stable in some respects. Consider the fact that our body temperature varies but very little whether it be summer or winter, that our red blood count has a narrow range of variation and that a person can go on living even though he has been so unfortunate as to miss a meal or two. There begins to come into focus a picture of the human being as an organism composed of very unstable materials, yet capable of equilibrium or stability. In addition, the organism cannot only adjust or keep balanced what goes on inside his body, but he can keep himself balanced in spite of imbalance existing in the external world. This ability to keep one's self in a relative state of equilibrium is due to a sequence of physiological events which have been termed *homeostatic mechanisms.*

The term homeostasis refers to physiological mechanisms which enable the human being to keep his bodily processes, or internal environment, in a state of relative balance so that he can adapt himself with ease to the demands, the learnings and the obstacles which confront him in living. However, some scientists are expanding this concept so that it may encompass social processes[3] and psychological processes.[4] The position taken here is that the homeostatic mechanisms are the processes which keep us in a constant state of relative balance so that

[3] Walter B. Cannon, *The Wisdom of the Body.* New York: W. W. Norton and Co., 1939. Chapter XVIII.

[4] Freeman, *op. cit.*

energy can be used effectively for keeping ourselves alive, for growing and for reaching our goals through working, learning, and experiencing. This seems to emphasize further the fact that to fully understand how people function, it is necessary to take into account the total picture of individual development.

Physical Growth

Many years ago children were thought to be miniature adults and therefore subject to the same kinds of expectations in classrooms as were their elders. Needless to say, this view of children has been rejected in light of the research findings which have to do with the way children grow, with the way in which they develop neuro-muscular coordination and with the way in which they learn.

It has been mentioned that approximately half of the food consumed by children is used for keeping the organism in good repair. This has been called the process of maintaining the organism. Yet there is always some energy "left over" from maintenance process. A part of this residue is used for growing or elaborating the size of the body.

Since a more complete picture of the total growth of children is to be discussed in a later section of this chapter, only those growth aspects which are immediately relevant to the organization of energy will be advanced at this point. In order to do this, growth will be divided into three periods: infancy, childhood, and adolescence.

Ordinarily, infancy is thought of as that period in a person's life which starts at birth and terminates with the close of the second year. These limits are arbitrary ones which are subject to the usual limitations of generalizations describing human growth and behavior. During the first two years of post-natal life infants grow at a very rapid rate of speed. A rule of thumb used by many physical anthropologists is that the adult height is twice that of the infant on his second birthday. Not only is there an increase in size but also there is a change in body configuration as well. The ratio of head length to body length changes considerably during infancy. In general, infancy is a period of much growth and much learning. Even though growth is taking place at a rapid rate, the velocity of growth is decreasing during infancy. For example, the percentage of growth during the first year is greater than for the second year. Energy-wise we could say that a great portion of the energy which is

left over from maintaining the body is used for growth during the first two years of life.

As children move into childhood, the picture changes considerably in terms of growth and adaptive behavior. Beginning with age two and extending through age ten or eleven, children become exceeding more complex in all types of behaviors. Their growth during these years is rather steady and proceeds at an even rate. It might be said that "all is quiet on the growth front." This, however, is not to suggest that growth does not take place, for indeed it does. It merely means that year for year, there is not much change in the amount that one grows. In comparison with growth during infancy the velocity of growth in childhood is much slower.

At this point it is useful to think of the human being as an energy pool.[5] From this pool, energy is used to maintain the bodily processes, to grow and to learn, think, and act more effectively. Since any particular quantity of energy for a certain use comes out of a common pool, it follows that all uses are inseparably related. Therefore, if a person is growing rapidly other energy uses are affected. Adolescence is a time in life when this thought seems to be germane.

Adolescence likewise, has no clear-cut age at which one is said to have completed the period of adolescence. Interestingly enough, this should not be a distracting thought for educators. It simply indicates that all human beings are endowed with a time schedule of development which is genetically determined. Some children's bodies mature to pubescence in twelve years while other children's bodies require eighteen years to achieve the same degree of differentiation. Contrary to popular opinion, there seems to be no organic superiority connected with slow, rapid or average rate of growing. So it becomes evident that it is normal for some youngsters to begin adolescence at age twelve while others will not achieve it for four more years.

Regardless of the timing of the onset of pubescence, it is demonstrated to us in our dealings with junior high school youngsters that this is a period of rapid growth. When the rapid spurt in adolescence is compared to the slow growth in the childhood years, some insight as to energy use is obtained. To provide the fuel necessary for the increased rate of growth great quantities of energy are taken from the energy pool. When we

[5] Glenn C. Dildine, "Energy — Basis for Living and Learning," *Journal of the National Education Association*, April, 1950, p. 253.

consider that the maintenance processes are taking their toll of energy, there emerges a picture of adolescent children who may not have much energy available for learning, thinking and behaving.

Energy Used For Adaptive Behavior

When the demands of maintaining the body are taken care of and the growth aspects are under control, persons are then able to use energy for adaptive behavior. It would be fallacious to conclude that these processes occur in time sequence. Actually, any person is utilizing energy for all three of these processes simultaneously. However, it is necessary that a person budget his energy supply so that these things may be accomplished. As a result we see that during periods of great increase in growth an individual's energy supply for learning to silk screen, operating an engine lathe or working on a committee may be of slight amount. In other words, some energy will be budgeted to learning activities, to thinking and to acting more effectively even though he may not expend as much energy on these activities as was once done during a stage of slower growth.

A person's overt behavior (that which we actually see in industrial arts laboratories) is the final phase of energy use. It is exceedingly important to the person for it helps him to attain the ends which he has come to define as being good for him. With this energy human beings explore the world in which they live, they learn about institutions, customs, codes of behavior, and they learn about themselves as people.

Implications For Industrial Arts

If there is a difference of opinion among industrial arts educators regarding concern for individual development of pupils, the concept of the organization of energy provides some basis for opinion formation. Generalizations which may be helpful in this process are as follows:

1. The human being is an open energy pool. The energy we have is directed toward certain jobs: maintenance of good working order of the many bodily processes; growth and differentation of all the parts of the body; and learning to understand ourselves and the culture of which we are a member.
2. The various uses of energy are inextricably interwoven. When something affects a child's health it also affects his physical growth and his ways of learning, thinking and behaving. The disposition of the energy in our energy

pool depends upon the efficiency of our physiological processes and our highly unique psychological organization.

3. Individuals possess varying degrees of energy output. The efficiency of bodily processes may cause some persons to have more energy to expend than others. On the other hand, youngsters with a low rate of energy output may be handicapped by a chronic illness or lack of motivation. In addition to these, our own experience demonstrates to us that energy output varies with one's position in the growth cycle. Most people have much energy to expend early in life, it then tapers off but tends to become high again during adolescence.[6] After adolescence the rate of energy expenditure seems to decrease steadily.
4. The rate and timing of physical growth in each individual is genetically determined. Chronological age is a rather inaccurate indication of the degree to which a person has elaborated his body structure and processes. Some children are considerably more differentiated in body structure and process than other children of the same chronological age. The converse of this is true also. It is important for a teacher to know the degree of a person's physical maturity, whatever his grade level. Physical maturity has profound influence on one's interests, his relationships with other people, the way in which he sees himself as a person, and the tasks of living which he faces in growing up.[7]
5. The professional responsibility of industrial arts educators is to help students learn effective ways of channeling their available energy. To do this one must be familiar with the technological culture in which he lives; and he must be able to function or pattern his energy in ways which are acceptable to society. It is equally important that the learned patterns for expending one's energy be satisfying to the person.
6. An individual is an indivisible unity. All aspects of one's growth, development, adjustment, and learning are interactive and have some impact on behavior at any given moment.

[6] Glenn C. Dildine, "Motivated to Learn," *Journal of the National Education Association*, May, 1950, p. 357.

[7] Daniel A. Prescott, "Meeting the Needs of Children." Chapter 11 in, *Improving Public Education Through School Board Action*. Pittsburgh, Pa.: University of Pittsburgh Press, 1951.

THE AUTHORITY OF GROWTH

Those who work with human beings are all familiar with the many learning tasks that people face in the time span from birth to death. These tasks of learning are wide in their degree of intensity, their scope and their timing. Fortunately, there is a sequence of these tasks of development that is common for all who grow up in the same society. This sequence, or series of tasks, gives some insight into the behavior of all human beings at any given developmental level. The last statement could be very misleading if one were to take it in a highly literal sense, so it becomes necessary to qualify it to some extent. Kluckhohn and Murray provide a thought which may serve as a point of departure in clarifying this issue. They state that: "Every man is in certain respects: a. like all other men, b. like some other men, c. like no other man."[8] Points "a" and "b" of the foregoing quotation help in defining a developmental task.

Undoubtedly, some people are like all other people in certain respects. The same pattern (even if different rates of speed) of growth is experienced, adjustments to conditions of mutual dependence with other people and groups must be made and people must internalize the traditionally defined expectancies of their culture. Yet we know that people differ in some respects. For instance, educators have different preoccupations than do tool makers; supervisors have common traits different from those of non-supervisors; children have qualities which are similar, but which are dissimilar to those adults have. These ideas could be condensed into a definition which states that a developmental task is a learning which all people in the same society, or sub-society, thereof, must accomplish in the process of living.

As we observe students in classrooms it becomes apparent that they do not work on one of these developmental tasks at a time; they work on many of them concurrently. Since this is a characteristic of developmental tasks, it seems logical that they should be interrelated in some way. The late Caroline Tryon had the following to say in this regard:

> Another characteristic of developmental tasks is that they are interrelated in a complex fashion. Successful accomplishment of any task at the appropriate time not only facilitates mastery of other tasks which are being worked upon simultaneously, but such success creates readiness for

[8] Clyde Kluckhohn and Henry Murray, *Personality in Nature, Society, and Culture.* New York: Alfred A. Knopf Co., 1949. p. 35.

succeeding tasks. Failure in dealing with a developmental task predisposes the individual to further failure.[9]

These tasks, then, are not only important to the individual's effective conduct at the moment, they have impact on the tasks which one faces in the future. Nothing succeeds like success, it would seem. But success is a relatively defined thing. Success is only such when the individual attains that state in terms of his own definition or motivational pattern. Therefore, the struggle to accomplish any developmental task is uniquely and individually a person's own struggle. The reader may think that the last statement contradicts one which was stated previously about a developmental task being a learning which is common to all people living in the same society. Yet, these two thoughts can be combined without doing violence to either. While all persons in a particular society face common learning tasks, the way in which they work on these tasks is very different. For instance, adolescents working on the developmental task of behaving in keeping with the expectations of an industrial democracy may do so by testing the rules of the school, by asking questions of a part-time employer, by asking a guide in an industrial concern whether employees are allowed to smoke, or by all three of the foregoing methods. Each of the adolescents is working on the same task, but he is doing so in his own way.

The Origins of Developmental Tasks

To know that people have common tasks as they grow and develop is of importance to educators, but in order to give guidance to learners it is equally as important to know the sources from which the tasks spring. Knowing these sources one can be more alert in recognizing the onset of the tasks and planning experiences whereby accomplishment of the tasks will be facilitated.

There are forces which not only determine developmental tasks but also set the timing of the tasks. "There are two major areas of force which interact to set these tasks. The first are the expectancies and pressure of society, the 'culture patterns.' The second are the changes that take place in the physical organism through the process of maturation."[10] In addition it should be stated that a third force is involved, that of the personality of the individual.

[9] Caroline Tryon in, *Fostering Mental Health in Our Schools*, 1950 Yearbook of The Association for Supervision and Curriculum Development, National Education Association, Washington, D. C. p. 79.

[10] *Ibid.*, p. 78.

It is common knowledge that the maturation and growth of the organism result in behaviors of an increasingly complex nature. As the person moves from one level of development to the next he does not merely add to what he was in the past, but he actually becomes a new person by virtue of the fact that he has reorganized himself at a higher level. New potentialities are integrated into the total physical pattern. Here is where we see growth making it possible for a person to better coordinate his muscular activity, to make the adolescent want to relate himself to members of the opposite sex or make it possible for him to coordinate eye muscles so that reading can be learned. However, it is here that the expectancies of the society begin to play their crucial role in developmental tasks. The culture pattern of the society determines the various uses to which one can apply his newfound coordination. It determines the acceptable ways in which one may relate himself to the opposite sex, and it determines the language which one should learn to read. The culture pattern defines the limits within which behavior may occur. The specific behavior a person sees as being satisfying to him, within the cultural limits, is a function of his personality organization.

Developmental Tasks of Late Childhood And Adolescence

Regardless of age, sub-societal affiliation or developmental level, all people have learning tasks which they must work on and complete with some degree of success. This discourse has however, as its major focus the development of individuals during the school years. With this orientation in mind, the following statement of developmental tasks is presented. The list is not finite, but merely a partial indication of important tasks.

Tasks of Late Childhood

1. Refining skill in the use of large muscles and developing skill in small muscle coordination.
2. Active identification with one's own sex and age mates and the acceptance of peer standards as being more important than adult standards. In this instance peer standards are those standards of behavior that the group of children in a classroom develops of their own volition.
3. Learning to apply general principles to the concrete.
4. Learning more realistic ways of controlling the physical and social worlds.
5. Achieving good relationships with adults on an impersonal basis such as justice and use of humor.

6. Learning to manipulate the written symbols of the culture. Some of these symbols are time, money, numbers, words, marks on maps and symbols which appear on various kinds of drawings.
7. Learning to apply concepts of right and wrong. This may well be a step in developing morality or conscience.
8. Developing a concept of reality such as time, space, processes of the physical world and materials of the physical world.
9. Developing the ability to do reflective thinking through using symbols for that which the child has never experienced.
10. Developing a scientific approach in relating one's self to the cosmos.

Tasks of Early Adolescence

1. Adjustment to bodily change and the acceptance of bodily change.
2. Adjustment to and acceptance of new motor ability patterns.
3. Development of ways of behaving in keeping with group demands and societal expectations.
4. Establishing one's independence from control of parents and other adults. Independence should not be thought of as total isolation but more as wanting to be recognized as an individual.
5. Acceptance of a newly defined sex role and close identification with one's sex group.
6. Establishment of satisfactory relationships with the opposite sex.
7. Acceptance of the reality of one's appearance.

Tasks of Late Adolescence

1. Relating one's self to the universe through developing a social philosophy and religious convictions.
2. Development of a standard of moral values which guide one's behavior in the absence of authority figures.
3. Continued development of aesthetic appreciation. This may be done through experimenting with color, texture, form, composition of subjects and rhythm.
4. Achieving assurance of economic independence.

5. Learning to behave in keeping with the pressures and expectancies of an industrial, democratic society.
6. Recognition of the worth and rights of others.
7. Accepting one's future role in manhood or womanhood, including the implicit and explicit demands and expectancies.
8. Exploration of possible life vocations.

The developmental tasks which have been listed do not represent the totality of tasks experienced in childhood and adolescence. Only those which seemed most important and particularly relevant were selected.

If tasks of development are, in part, a function of personality does this mean that educators can do very little about them? Since these learnings occur as actual situations in the lives of people it would seem that there is opportunity for guidance to take place. In a later section of this chapter there will be discussed ways in which industrial arts teachers can apply knowledge of human growth and development in classroom situations. The everyday moment to moment activities in teaching are the best means of helping learners to accomplish their developmental tasks. Implicit in the foregoing statement is that teachers will be alert to the potentialities of youngsters as they unfold. Once having become sensitive to the potentialities, it then becomes possible to provide opportunities for practice and exploration, so that developmental tasks may be worked on with continuity and ease.

When a teacher is sensitive to and has knowledge of the evolving potentialities of his students there is every reason to believe that what he teaches them and expects of them will not be irrelevant to the developmental tasks they are facing. Traditionally, higher education in industrial arts has tended to place slight emphasis on the understanding of human behavior as a prerequisite to effective teaching and learning. Thus, there must be considered ways in which teachers may develop insight into the growth, development and behavior of pupils.

LEARNING

Thus far the reader will have encountered the term *learning* in a number of places and connections. The developmental tasks of youngsters were thought of as tasks of learning, and the growth of teacher sensitivity to these tasks was thought of as a learning experience also. These activities were made possible because the human organism channels some of its energy into

adaptive, or learning behavior. In a very real sense we could say that the central concern of public school education is to facilitate learning so that pupils can internalize the culture of their society. When this is done in ways which are acceptable to society and to the individual, we take the position that a person is living an effective life — he has learned. This places on one the burden of choosing his weapons, or more specifically, defining what is meant by learning.

From the time that man began to speculate about man's behavior, learning has been a major issue. Whether a person is a dictator, a parent, army officer, teacher or hunter, learning influences his life significantly. How are human beings able to take information which exists in the environment and make it meaningful or real to them? Equally as important, what is it that sets in motion the processes which enable people to make aspects of their world meaningful? Modern-day psychologists have pondered and theorized at length on these two questions and their deliberations have added to a continuing stream of knowledge regarding learning. We are able to distinguish certain "schools of thought" such as conditioning, connectionism, field theory and functionalism. Since learning is one of the self-developmental processes it is necessary to consider some aspects of personality in order to understand learning.

The Perceptual Field

Probably every person has had the experience of trying to tell someone of the beautiful sunset he saw or of the feeling of awe experienced when watching a press stamp the top of an automobile. Similarly, he may have felt his efforts to communicate his experience were futile, inasmuch as the listener merely smiled and nodded his head. The person relating the incident was drawing on his private world of experience while the second person was trying to understand or interpret what was being related to him from a different private world. "This private world may be called the phenomenal field, the experiential field, or described in other terms. It includes all that has been experienced by the organism, whether or no these experiences are consciously perceived . . . An important truth in regard to this private world of the individual is that it can only be known, in any genuine or complete sense to the individual himself." [11] Thus it appears all human beings are not only unique in terms of body build, health, social groups to

[11] Carl R. Rogers, *Client-Centered Therapy*, New York: Houghton-Mifflin Co., 1951. p. 483.

which they belong, but experience in their perceptual field as well.

If educators were to be fully satisfied with the idea that the perceptual fields of individuals are different they would deny to themselves much insight into human behavior. However, if they were to accept the idea that people behave and react to the field as they experience it and perceive it, insight would be enhanced. What is "real" for a person is his perceptual field. More important, human beings behave according to their realities. In this connection Lewin believes that, "Every fact that exists psychobiologically must have a position in this field and only facts that have such a position have dynamic effects (are causes of behavior). The environment is for all of its properties (directions, distances, etc.) to be defined not physically but *psychobiologically,* that is, according to its quasi-physical, quasi-social and quasi-mental structure."[12] This might explain why a pupil on having his first experience with hand-modeling of clay rejects it with the statement that he dislikes "mud." Another pupil in the same laboratory willingly participates in the activity. In the former instance the pupil had no previous experience, direct or vicarious, with ceramic materials or processes and so rejected it on the basis of his reality that it was mud. The other youngster had visited a pottery making plant and his perception of the clay was in terms of his experience. Each pupil possesed a unique perceptual field and each behaved accordingly.

Change In The Perceptual Field

If the perceptual field were statically organized learning could not possibly occur. As a case in point, the pupil who perceived the clay as mud would never be able to perceive it differently. Certainly our own experience suggests that the field *can* be changed and that our behavior undergoes corresponding change. Logic would lead one to deduce that since learning involves change in behavior, change in the field is prerequisite to learning. Conversely, if there is no change in the field, no learning has occurred. The teacher of the boy who rejected the clay modeling might choose to bring about change in the boy's perceptual field by embarking on a study of the ceramics industries. Through reading, visits to industries and the like, his perceptions might change sufficiently so that he would see the clay as a raw material for producing pottery rather than as mud.

[12] Kurt Lewin, *A Dynamic Theory of Personality.* New York: McGraw-Hill Book Company, Inc. 1935. p. 79. By permission.

Traditionally, many people think of learning as a mere acquisition of new data, ideas, concepts or skills. This implies that there is little or no organization within the perceptual field and that when one has a new experience it adds a new perception and so behavior changes. If this vein of thought is pursued to its logical end the human being becomes the victim of his experience. He changes (or learns) with the vagary of experience. Such a thought is distressing for, if it were true, dictators would surely exploit the process to its ultimate. Recent research findings and theories are comforting for they suggest that learning is *differentiation* of the field.

"Learning may, therefore, like perception, be considered a process of increasing differentiation of the field."[13] The author as a machinist supervisor had the experience of teaching an apprentice to scribe a layout line on a casting. The apprentice was unable even after repeated explanations to see that the layout line was a point of reference from which all other measurements were calculated. However, when it was explained that the layout line was comparable to the center line which he had used in his drafting room experience he was immediately able to grasp the idea and proceed with the layout. Presumably, his perceptual field had differentiated to the extent that he was able to distinguish some relationship between elements in the field. That he was able to complete the layout on the casting is further evidence that people tend to behave in terms of their perceptions of reality.

Lawfulness of Learning

To this point it has been implied that learning is not a random, haphazard process which occurs without direction. Differentiation does not occur merely because a person accumulates experience. On the other hand, it is well to go back to the discussion of energy at the beginning of this chapter. It was cited that human beings are constantly involved in keeping balanced or equilibrated. This was referred to as homeostasis. Strangely enough, the concept seems to have application to learning.

If a person had no desires, no goals, or no needs there would probably be no behavior! He would be in such a state of balance that there would be no goal-seeking behavior, and consequently, no chance for learning to occur. From this we can infer that

[13] Donald Snygg and Arthur Combs. *Individual Behavior* New York: Harper and Brothers Co., 1949. p. 38.

there will be negligible differentiation of the perceptual field if there is no need for differentiation. The apprentice engaged in the layout of the casting was able to differentiate (or learn) because the need was present, his job required him to be proficient in layout techniques. Successful teaching may well revolve around the degree to which the instructor was able to set up experiences which created need for the learners in a laboratory to differentiate their fields. Unless this is done the degree of differentiation will be extremely slight and, in addition, will not have permanancy. We are all familiar with the student who "learns" only enough to get him through the course and two months afterward does not even recall the title of the course. His only need was to "get by," therefore differentiation was slight and temporary. Had the need been closely allied with the self-structure of the person, such as developmental tasks, it is probable that greater and more permanent learning would have occurred.

Conceivably, it is possible that a pupil may have ample need for differentiating and be able to do nothing about it. A pupil studying ways of delineating lines in the graphic arts industries may have need to learn how to delineate a line through contact printing but not be able to differentiate because the opportunity is not available. Analogously, a person may have need to learn to swim but unless a body of water is accessible he does not have the opportunity to learn the skill. Effective learning is contingent upon the need and opportunity for differentiating the perceptual field. Since industrial arts is concerned with acquainting pupils with the materials, industrial processes and the social and economic aspects of a technological society, richness and variety of opportunities for learning must be available.

Since trial and error is a term that occurs frequently in a discussion of learning, it should be discussed in its relation to differentiation. Ordinarily we think of trial and error as the efforts of a person to reach some goal or to solve some problem. If the trial is unsuccessful the learner takes a new tack and tries once more. Somehow this seems to have a mechanistic connotation in that the learner figuratively bumps into an obstacle, backs up, turns ten degrees and sets off in a new direction. The new science of cybernetics gives us the concept of feedback which may help in seeing so-called trial and error learning in relation to differentiation of the field. Wiener says that . . . . "feedback is a method of controlling a system by reinserting into it the results of its past performance. If these

results are merely used as numerical data for the criticism of the system and its regulation, we have the simple feedback of the control engineers. If, however, the information which proceeds backward from the performance is able to change the general method and pattern of the performance, we have a process which may well be called learning."[14] Using this information we can hypothecate that when an individual is engaged in learning he feeds back the results of his successes and these data bring about differentiation in the field and change in behavior. If, however, the learner is unsuccessful in his attempts to differentiate, and the information fed back doesn't bring about need-satisfaction through differentiation, the person will then engage in some other behavior. Through feeding back the results of one's actual performance, and not expected performance, human beings are able to continually correct their ineffective attempts to differentiate the field.

With increased differentiation in the perceptual field there is a change in behavior which may be called learning. Stated differently it could be said that precision in behavior is a result of increased differentiation of the field. Precise behavior is that which helps individuals to attain their goals with minimal difficulty or to internalize the expectations of society with ease.

This section on learning has endeavored to present the idea that learning is a function of personality organization. Since it is so intimately associated, we are left with a two-fold implication: (1) the organization of one's personality (including his perceptual field) influences the learning process, and (2) through learning, change in personality is implemented. Here is further evidence that industrial arts educators consider the totality of factors influencing the growth and learning of pupils. Also, we are left with no other conclusion than that of evaluating a person's learning by means of the change that has taken place in his behavior.

Transfer of Learning in Industrial Arts Education

When attending educational conferences it is not at all uncommon to hear one's fellow teachers point with glowing pride to the way in which their instruction has influenced the lives of former pupils. Many times there is implicit in the discussion the fact that much transfer of learning has occurred from the industrial arts laboratory to conditions of later life.

[14] Norbert Wiener, *The Human Use of Human Beings.* New York: Doubleday and Co., 1954. p. 61. By permission of Houghton-Mifflin Co., Boston.

"One of the principal aims of education for centuries has been to transfer that which has been learned in one situation to another situation."[15] Obviously there must be some transfer as a result of learning or else a technological culture could not continue, nor would there be any point in establishing public schools for the educative process.

Literally hundreds of experiments have been conducted on transfer of learning in many kinds of situations. The findings demonstrate that two theories of transfer seem to be possible: the theory of generalization and the theory of identical elements.[16] According to the theory of generalization, those ideas or concepts learned in one situation and used in another situation are said to have been transferred. A pupil who has learned the principle of electro-magnetism in the school shop and applies it to situations at home and in the community would illustrate the theory of generalizations in transfer of learning. On the other hand, the theory of identical elements refers to transfers from one situation to another of elements which are common to the situations. An example of this is the pupil who has learned to prepare the surface of wood by using, successively, coarse and fine abrasives. To the extent that he does the same thing, relatively, in preparing metal surfaces, he has transferred identical elements in the two situations. The illustrations which have been given point out that both kinds of transfer of learning may occur in industrial arts.

Identification of theories of transfer of learning is not sufficient, however, for good instruction must be concerned with *enhancing* transfer of learning. Rather than to slight the importance of a theory, the preceding statement was intended to mean that nothing is so practical as a good theory. With this in mind it is possible to make three suggestions for facilitating the transfer of learning in an industrial arts laboratory.

First of these suggestions is that curriculum experiences be *vital from the learner's point of view.* Here the instructor will take his cues from the pupils. Their behavior will indicate to him whether the experience is vital to them or not. Vitality may be enhanced by the richness and variety of offerings which were cited in an earlier section of this chapter. We may infer from

[15] Louis Thorpe and Allen Schmuller, *Contemporary Theories of Learning.* New York: Ronald Press, 1954. p. 68.

[16] Herbert Sorenson, *Psychology in Education* New York: McGraw-Hill Book Co., 1954. p. 496.

this that many industries will be represented. When this is provided there is increased opportunity and freedom for each learner to differentiate or learn solutions to the problems under consideration. Contrary to popular opinion this approach would seem to make the task of the teacher less difficult rather than more difficult. At the same time the perceptual field of the pupil becomes enriched and differentiated with consequent precision in behavior. With such opportunity the pupil's picture of himself will develop into that of being confident and being able to accept new situations. The willingness to accept new situations and experience permits greater transfer of learning.

Closely related to the first suggestion is the second, that *learning involves life situations.* Youngsters are constantly asking questions about new materials, the way in which materials are formed and the way in which industry affects their lives. In this regard we can feel rightfully proud as industrial arts educators, for the profession has long recognized that direct experience is an essential in learning. We believe in learning by doing. Complacency may breed lack of insight, however. It is entirely conceivable that we assess what is happening in industrial arts and ask ourselves the question, are the curriculum experiences related to the developmental tasks of pupils? The course of action is apparent if the answer to the question is in the negative. Similarly, we might determine whether it is sufficient for industrial arts pupils to have experiences which center solely around learning ways of shaping and forming materials. In their day-to-day living children have many occasions to experience their technological culture in ways which do not have relation to tool processes. To a greater or lesser extent they encounter some aspects of distribution of goods, location of industries, management-employee relations and pricing of goods. Encountering these things in living suggests learning of them in life situations in industrial arts.

Last of the suggestions regarding transfer of learning in industrial arts is that *experiences be understandable and meaningful to the pupil.* It has already been cited that transfer is facilitated when pupils have freedom to explore and opportunity to differentiate. The teacher may help transfer by pointing out relationships between situations. In addition, the teacher may *encourage pupils* to seek commonalities and relationships. When this is in conscious focus such relationships as weight of product, mode of transportation of product and ultimate cost may be transferred. In like manner, relations between hardness of ma-

terials and the angles of cutting tools may be discerned. Cronbach feels that teachers can encourage transfer by:

a. Identifying the desirable response in the form of a general principle,
b. Making that principle very clear to the pupil (drawing on his past experience or providing lucid illustrative material),
c. Drawing the pupil's attention to places where the principle applies, and
d. Giving him opportunities to recognize its applicability in increasingly varied and complex situations.[17]

Transfer may also be encouraged by keeping before a group the connection between the immediate activity and the objective toward which a group intends to move. In other words, a teacher can help to keep a group oriented toward *ends*, by seeing *means* in their proper perspective. No matter what the suggestion, it seems that children cannot learn and transfer their learning if the problems they are attempting to solve are *not their own.*

LEARNING TO UNDERSTAND THE BEHAVIOR OF PUPILS

Teacher educators have recognized the value of pre-service and in-service teachers having knowledge of the dynamics of human behavior. As a consequence, higher education curricula include such courses as general and educational psychology, human physiology, sociology and cultural anthropology. For the most part the students in these courses have learned the scientific generalizations that apply to large groups of people. Yet, they found difficulty in determining why Johnny threw wood in the industrial arts shop, or why Joan was unable to set type in a composing stick or why Jack was more interested in talking to classmates than in working at the forge. The teachers of these children did not dispute the fact that their collegiate courses had provided them good information. However, they did find it difficult to relate that information to behavior that occurs from moment to moment in their classroom. How, then, can teachers develop sensitivity to the needs and motivations of pupils?

Knowledge of Research Findings

Education is intimately concerned with the growth and development of pupils, comunicating the culture pattern of the society in which it functions, the way in which children learn,

[17] Lee J. Cronbach, *Educational Psychology.* New York: Harcourt, Brace and Company, 1954. p. 272.

and the methods which enhance effective learning. Eminent scholars have spent much time and effort to describe the forces which affect behavior and the educative process. It is essential, therefore, that teachers be familiar with the basic concepts and generalizations which stem from the fields of medicine, genetics, physical anthropology, sociology, cultural anthropology, group dynamics, psychology and psychiatry.

The material from these various disciplines provide landmarks or guideposts to the understanding of behavior. In our own experience we are aware that the findings from different sciences do not apply directly to all human beings. Indeed, it is entirely possible that these findings actually describe a "model," or theoretical individual. They do not rule out the possibility that, in the case of a particular individual, the dynamics may have more or less intensity and more or less applicability. However, knowledge of these findings is nonetheless valuable for teachers to have.

Such knowledge of behavorial dynamics may come about through courses dealing with discrete aspects of behavior. It may be gained also by directed reading and discussion or lectures by persons who are well informed in the desired field of knowledge. Another, perhaps more meaningful, way would be that of participating in a group which attempts to synthesize the findings from all the fields of behavorial science. This approach will be discussed in a subsequent part of this chapter dealing with developing skill in interpreting children's behavior.

Knowledge of Individual Children

In addition to having information from many areas of scientific research, it is necessary to have many explicit facts about individual children, in order to understand the causes of behavior. This is not unlike learning to plane a board. Through reading we can derive knowledge of many of the practices and procedures which help to master the skill; however, it is not until we have plane in hand and board in vise that additional facts in the learning are known to us. So it is with understanding pupils' behavior.

The teacher is able to gather specific facts about pupils from sources convenient to him. By means of consulting the cumulative record the teacher can obtain facts about (1) the performance of the pupil on achievement and aptitude tests (2) handicaps which may be of great concern to the child (3) the the pupil's record of relationships with teachers, classmates and

parents (4) the expectations the family has of him (5) the social class and ethnic group to which the pupil belongs, and (6) the satisfactions and dissatisfactions experienced by the child. Interpretation of these data is withheld, pending the inclusion of information from other sources.

Realizing that children receive much of their education at home, many teachers make use of the valuable information obtained in conference with parents or in a visit to the child's home. When the teacher perceives of this as his part in the cooperative enterprise of educating a child, rather than as the bearer of ill tidings, rich resources are his. The parents, sensing the teacher's acceptance of them feel free to "explore . . . feelings toward the child and toward the school."[18] In this way the interpersonal relationships which enhance or retard a child's feeling of security are learned, as well as the values of the family. There may be additional value in conferring with parents in the home situation. Here the teacher has the opportunity to see something of the community in which the child lives and gain some insight into the geographical area in which the child has most of his daily experience. Obviously a child who lives in a well-to-do community has different perceptions of himself and the world than does a child who lives in the slums. Whatever the nature of these perceptions they determine what one's behavior shall be.

Perhaps the most meaningful and abundant source to which the teacher can turn to get information about a pupil is that of observation. The facts derived from observing behavior are then used to construct an anecdotal record. "A good record is one which includes specific details, a wide selection of behavorial incidents, actual conversations, samples of written or other creative expressions, descriptions of behavior in formal and informal situation, behavior with friends and relatives, and behavior in and out of the classroom. A good anecdotal record is specific, factual, descriptive of what was actually seen to occur, devoid as much as possible of subjective terms. The recorder should indicate time of day, persons involved, central focus of the incident, beginning, middle, and end."[19]

Having built up a body of facts about a child from consulting the cumulative record, visiting the child's home and confer-

[18] Ira J. Gordon, "Guidance in the Small Community: The Role of the Teacher," *Understanding The Child*, January, 1954, p. 14.

[19] Helen Bieker, "Using Anecdotal Records to Know the Child," in *Fostering Mental Health in Our Schools*, 1950, p. 185.

ring with the parents, describing the child's community and writing anecdotal material gained through observation, the teacher is well provided with facts about a child. How then can he relate scientific concepts describing human behavior and the information which has been collected about a particular individual?

Developing Skill in Interpreting Behavior

In discussing learning it was cited that learning is the process of differentiating one's perceptual field. This process is not confined to children's learning; it applies as well to the learning of adults. Since learning is such a uniquely personal thing, it seems that Rogers is correct in saying, "*We cannot teach another person directly; we can only facilitate his learning.*"[20] This suggests a situation in which pre-service or in-service teachers are active participants rather than passive receptors.

Such a situation might be a small group of teachers who meet regularly with acceptance and informality being the keynotes of the learning climate. To this group each member has the responsibility of contributing from his reading scientific information about human behavior. This serves the purpose of building a broad basis in scientific thinking for the group. In addition, each group member has a second responsibility of sharing with the group the material which he has collected relevant to a pupil's behavior. Having assumed these responsibilities the group members are then ready to interpret behavior by relating hypotheses about an individual to an appropriate and inclusive framework of validated generalizations about human behavior and development. To accomplish this a preliminary interpretation is made of the data about a pupil by suggesting a series of hypotheses to explain an incident in the behavior of the pupil. For instance, one group member may ask the help of the group in interpreting why the pupil he selected for study volunteered to clean the ink from a printing press after other pupils had voiced dislike of the job. The group then proceeds to suggest hypotheses as to why the person might have behaved this way. The hypotheses that are advanced are done so in light of known principles of human development and behavior derived from the literature.

So that personal inclinations of the teacher are minimized in interpreting the behavior, the hypotheses are then subjected to critical test. From the large body of information which has

[20] Rogers, *op. cit.*, p. 389. (Italics in the original).

been collected about the pupil are drawn those facts which support and/or refute the various hypotheses. Frequently it is discovered that several hypotheses appear to be good ones, but there is insufficient evidence in the behavorial record to substantiate, reject or modify them. When this occurs additional data are gathered so that the hypotheses may be tested adequately. Those hypotheses which appear valid, after testing, give insight into the personal needs and motivational pattern of the pupil being studied.

Skill in interpreting behavior is further enhanced by identifying those behaviors that tend to recur in the life of a person. These patterns of behavior reflect the individual's successes, unsolved developmental tasks, and perceptions of himself and the world. Sharing food with other children, helping girls to complete assignments in the school shop and repeated questions about qualifications for a particular job are typical examples of recurrent patterns of behavior in an adolescent's life. These would indicate that the pupil is working on the developmental tasks of gaining acceptance in the peer group, of relating himself to girls in a socially acceptable manner and of exploring the possibility of a future life's vocation.

Developing sensitivity to the needs and motivation of youngsters seems then, to call for three types of experiences (1) that of building a synthesis of knowledge about human behavior from research findings (2) collecting much information about an individual from many sources of information, and (3) the oportunity to participate in a group wherein scientific knowledge may be integrated with facts about an individual.

USING KNOWLEDGE OF GROWTH AND DEVELOPMENT IN THE INDUSTRIAL ARTS LABORATORY

When teachers have had the opportunity to learn of the growth, adjustment and learning of children through a direct study of their behavior, more has been acquired than facts. Certain attitudes are formed which serve as major points in one's orientation toward all human beings. Studying all the relationships and conditions which prevail in the life of a pupil, leads a teacher to believe that all behavior is caused, that behavior doesn't "just happen." This attitude makes it possible for a teacher to set up conditions in the classroom that will influence the pupil's positive self-development. The teacher soon begins to see that while all behavior is caused, these causes are multiple and cannot be separated one from the others. From the data

gathered about a youngster, a teacher begins to see that a human being is an indivisible unity, that his physical condition, home conditions, school success or failure, his relationships with his friends and his feelings about himself cannot be dealt with in isolation. All of the dynamics in a person's life have impact on behavior at a given moment. Finally, there is the attitude developed that all human beings are unique, are different, in some respects, from any other individual.

With the development of these attitudes teachers do not become discouraged and feel overwhelmed by the task of trying to understand children. Consequently, teachers do not view themselves as failures, nor the pupils as obstreperous, when their instructional efforts are not equally effective with all children.

The knowledge and attitudes that teachers have about the behavior of children can be translated into action in terms of curriculum content, shop organization and classroom methods. There can be no prescriptions set forth as to the use of these data; each teacher will, inevitably, work out the implications from the synthesis he has made of the findings from many research areas. Therefore, there will be described the ways in which three teachers at different levels of education, used child growth and development information in their instructional program.

An Intermediate Grades Industrial Arts Program

Recognizing that children who are in 4th, 5th and 6th grade, are seeking to expand their sphere of experience, one industrial arts teacher organized his shop on a multi-unit basis. There were opportunities for boys and girls to work with woods, metals, ceramics, leather, textiles, electricity and graphic arts media. Mr. X did not endeavor to provide intensive experience in a given area such as graphic arts; his approach was to make available a broad scope of experience. When setting up the woods area, for instance, this teacher included basic hand operations as the core of the unit since it provided good means for youngsters to release the great supply of energy they possess. In addition hand operations such as sawing, planing and drilling gave the children opportunity to learn to coordinate large muscles and small muscles. On these same bases he omitted such activities as chip-carving and wood turning.

Whenever it was possible Mr. X gave his pupils the opportunity to see the relationships between cost of materials, cost of

labor and price of product. In like manner the children explored the relations between technological discoveries and social progress. Essentially the program was experience with materials and tool processes, but since children at this developmental level are learning to understand casual relations, Mr. X led them to discover casual relations between industrial processes and society.

Drawing on his knowledge of peer relationships this teacher was careful to make provisions for the children to work on individual projects and on projects which represented a group effort. In this connection he was sensitive to the fact that children in late childhood are desirous of doing individual work, but that they are relating themselves also to their peers or contemporaries. By the same token he was not dismayed when the fifth and sixth grade youngsters declined to work on a committee with members of the opposite sex, for he recognized this as a time of close identification with same-sex peers. Mr. X was not laissez-faire in the matter of peer relations; he helped individual children develop skills and talents for peer recognition through teaching special tool skills, and in helping a child who was to make a report to the class. In essence, Mr. X *accepted* each child.

Through self-evaluation this instructor helped each pupil to gain understanding and acceptance of his own worth and potential. This he could justify since the children of this age try to free themselves from their strong identification with adults. Mr. X was trying to establish controls within the child. Self-evaluation as it was carried on was determining how one contributed to the group, the manner in which he contributed and how it aided the group to progress as well as the individual child.

A Junior High School Industrial Arts Program

Mr. Y, through his study of child growth and development, elected to have his industrial arts shop similar to Mr. X's insofar as multi-unit organization was concerned. However, he was diligent in seeing to it that each unit of the total program provided for more experience than those areas in the intermediate grades shop. The rationale for this action was that early adolescents seek ever-increasing experience with the world at large. In planning the graphic arts area there was provided opportunity to delineate lines in a wide variety of ways. This gave breadth and depth of experience with the materials, tools and processes of an industrial society.

In this instance, much more effort was made by the teacher to relate industrial skills and processes to the contribution these made to living and the economic impact manifested. Mr. Y reasoned that this was feasible at the junior high level because early adolescents try to relate concrete experience such as casting a book-end to such abstractions (to them) as the nature of labor regulations which help or hinder the capacity to produce goods. He aided youngsters to accomplish the developmental task of relating concrete experience to abstract generalizations through industrial arts experiences.

Mr. Y felt that his instructional program should enable pupils to become emotionally independent of him as an adult, and yet give the pupils opportunity to work on the peer group belonging that is so vitally important to adolescents. Accordingly, he gave them much latitude in devising a shop personnel organization for managing the shop. Mr. Y did not abdicate his role as teacher; he set limits when it was called for but, for the most part, he served as guide rather than as director of learning. He was careful to assume this same type of role in getting students to evaluate themselves. Independence through experiencing self-direction was what the pupils wanted and Mr. Y tried to provide for this.

Adolescents, being interested in belonging to the peer group and in establishing boy-girl relationships, suggested to Mr. Y certain experiences for his pupils. Through working on a group project, each student could contribute his particular skill to the project. In addition he could establish for himself a certain role in the peer group. This same group experience gave pupils the chance to work on boy-girl relationships in an educative and socially acceptable manner. He felt that this furthered learning and reduced discipline problems. The planning and execution of an assembly line job furthered the same ends. The children were able to work on peer relationships while learning of an industrial technique.[21]

Since most junior high school pupils are in a stage of rapid growth the teacher perceived that the amount of energy available for learning might be little. He made available activities that called for varying rates of energy expenditure so that students would select the activity most compatable to their energy supply. This same growth dynamic made it explicit to Mr. Y that adolescents must cope with the new motor ability patterns.

[21] Walter B. Waetjen, "Peer Society — Industrial Arts Education — Their Relation," *The Industrial Arts Teacher*, April, 1953 p. 27.

Growth causes one to learn to adjust to new centers of gravity in the body. During this learning period skill performance may be rather erratic; therefore, Mr. Y made sure his expectations were not too high nor too rigid.

A Senior High School Industrial Arts Program

Late adolescents face the developmental task of exploring the possibilities for a future life's vocation. Mr. Z, in planning an industrial arts program, thought this developmental task suggested unit shop organization. Provisions were made for shops in wood, ceramics, electricity, graphic arts, textiles and metal. Each of the shops was well-equipped and contained as wide a range of experiences as was feasible. In describing the industrial arts area of the school program to the P.T.A., Mr. Z pointed out that there was no trade-training objective in mind. The purpose in the unit shop plan was two-fold: (1) to give pupils broad and intensive experience with the tools, materials processes and social implications deriving from the technology of their culture (2) to give pupils the opportunity to clarify their future roles as citizens of an industrial democracy through industrial arts experience.

In helping the boys and girls to develop an adult set of social values, the teacher gave them every opportunity to view themselves as adults and to develop insight into the broad social values of the society. To facilitate these ends an industrial problems approach was used. In group discussion the pupils were encouraged to identify industrial problems, look for causative factors and suggest possible solutions. These problems were varied in nature; some centered strongly around an industrial process while some were focused on industrial management or supply and demand. Most times, however, any one problem led eventually to most aspects of industry. In this way the pupils worked with tools, did research work, participated in group discussions and prepared illustrative material related to the problem under consideration. Mr. Z was mediator in these activities, always giving help where needed and making resources available to the group.

Being sensitive to the fact that boys tend to mature slower than girls, Mr. Z was aware that the fine motor skills of the boys may be less well developed than the girls. Therefore, he was prepared to fit his expectations to the individual development of each pupil.

SUMMARY

We are thus able to see that pupils are dynamic beings whose energy is channeled into learning ways of working on developmental tasks. The learning takes place through differentiation of perceptual fields which are, in some respects, known only to the individual. Gaining insight into human behavior is facilitated by engaging in a direct study of the pupils. In this way we begin to see some elements in their perceptual fields and we begin to recognize their ends and concerns in life. These needs and concerns of pupils are the foundation on which industrial arts curriculum content and teaching method may well be based.

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CHAPTER III

The Demands of a Contemporary Culture

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INTRODUCTION

If a Greek educator were writing about the demands of his contemporary culture in the year 10 B. C., what would he note? Egyptian and Babylonian culture before him had gone into decadence and although he could not know, the Greek nation and the Roman Empire were to follow the same pattern.

Is our major concern downfall, a forthright effort to avoid that which has happened to advance civilizations in the past or are we concerned about a continuing program of upgrading, assuming that this nation cannot go over the top? Maybe we are content to maintain the status quo. An answer to this question will give direction to social forces which will be interpreted by the chapters to follow specifically in the area of Industrial Arts Teacher Education.

A second question asked: What is the objective of our contemporary culture? Stuart Chase has said that Americans are not a happy people. Do we care? Is happiness an objective? A research report states that this great country of ours represents 6% of the world's land, 7% of the world's population, and at the same time possesses 67% of the world's goods.[1] Is wealth our goal? Apparently money and happiness can exist separately. Opportunity to respect one's fellow man, opportunity to worship as one pleases plus peace of mind, freedom from want and fear, and the comforts of life made possible by a good standard of living are the objectives of our culture.

People have obligations to the culture of which they are a part. Usually three are mentioned: First, they must appreciate and understand their culture. The home and the school ac-

[1] J. E. Hobson, "Research in a Defense Economy," Mimeographed report, Stanford Research Institute, Stanford 1952.

cept major responsibility. Second, society accepts an obligation of transmitting habits, ideals and attitudes which have been historically determined for a future generation which will accept them as a social heritage. Culture is transmitted by language and also by the nonverbal methods of material things such as tools, weapons, clothing and art forms. The third demand is improving on the past. Most people have a desire to improve. Understanding and appreciation of our culture plus the problems of improving and passing it on to the succeeding generations is our great problem.

DEFINITIONS

When discussing a problem it is very necessary to have common understandings. Consequently, important terminology is defined.

Culture

What do we mean by the word culture? It is derived from the word, "cultura" and from the meaning to till or cultivate. Mr. J. C. Shairp elaborates by, "What the Greeks expressed by their *paideia,* the Romans by their *humanitas,* we less happily try to express by the more artificial word *culture.*"[2]

Speaking more specifically, culture is the act of developing by education or discipline. It is the training or refining of the intellectual and moral nature of man. Too many people in our society accept the limited definition: "Conversance with and taste in fine arts, humanities, and broad aspects of science; — distinguished from vocational, technical, or professional skill or knowledge."[3] More appropriately we believe culture to be the enlightenment and refinement of taste acquired by aesthetic and intellectual training. What technical accomplishment has ever become a reality without intellectual effort and are aesthetics divorced from the machine? Industrialism is gauged by functionalism first, cost second, and aesthetics third. Intellectual and aesthetic training applies to all aspects of society and must include industrialism. Culture is the intellectual content of civilization and the refinement of manners, taste and thought. We think of an elderly cultured individual uneducated in formal schooling, as perhaps a tool and die maker by vocation and a gardener by avocation, who has refinement of manners, taste and thought.

[2] By permission. From Webster's *New International Dictionary,* Second Edition, copyright, 1934, 1939, 1945, 1950, 1953, 1954 by G. & C. Merriam Co., p. 643.

[3] *Ibid.* p. 643.

Culture to our way of thinking is anything done, acceptable to our society, which enlightens and refines the taste of citizens in our society and which is acquired by formal or informal education in the realm of intellectual, technical and aesthetic training. Is aesthetic appreciation restricted to the fine arts or does it apply to the growing of a flower or the production of a machine?

Ogburn states, "Culture may be thought of as the accumulated products of human society, and includes the use of material objects as well as social institutions and social ways of doing things."[4] The term material culture is used to describe the technical aspect of a society and is used by Wissler in defining culture: "The term culture as used by anthropologists generally includes such groups of traits as social organization, ceremonial activities, art and material culture,"[5]

Why should the technical accomplishments of man be considered separately? All historians admit that the accomplishment of the past, cultural or otherwise, are written in terms of handicrafts or material objects such as Egyptian pyramids, Greek architecture, Roman aqueducts, and American Indian basketry. Sociologists speak of "Material Cultures" and it is right that they should.

Industrialism

Ours is primarily an industrial society consequently our culture in large part should be material. Industrialism is a word used to describe our culture. It is a social organization in which large industries predominate. Meadows defines industrialism as the culture of an industrial society and comments.[6]

"Industrialism then, is the primary characteristic of contemporary civilization." Every society has a culture and each is characterized by emphasis and accomplishments. Our material culture characterized by industrialism and the machine is the center of it.

Mass Production

The industrial revolution changed our culture. Horsepower is now furnished by machine rather than man or beast and we are all aware of its effect. "Today, we are told that 95% of all

[4] William Fielding Ogburn, *Social Change*. New York: The Viking Press, 1950, p. 58.

[5] Clark Wissler, "Aboriginal Maize Culture as a Typical Culture Complex," *The American Journal of Sociology*, Vol. XXI, No. 5, March, 1916, p. 661.

[6] Paul Meadows, *The Culture of Industrial Man*, Lincoln: University of Nebraska Press, 1950, p. 8.

the work which is done in our manufacturing industries is performed by mechanical energy, while less than 5% is the product of human effort," comments Mr. Fairless.[7] An equally revolutionizing innovation in our culture is mass production and mass consumption.

Mass production is not alone the idea of producing many items exactly alike. It is not only specialization and departmentalization of labor and jobs but is an idea or principle which makes possible the coordinated potential of power, economy, system, continuity and speed. Method is sometimes confused with speed or the number produced. Mass production can be done with hand power completely divorced from the machine. It is indigenous to our American material culture and is a recent innovation which the Ford Motor Company originated and perfected. Mass production operates on the principle of simplicity which orders or directs raw material through a shop. It allocates work on a highly specialized basis to men and machines. All parts in mass production must fit. There is no time allowed for fitting. Measurement both absolute and comparative is necessary. It will not function too well if dependent upon man alone. Machines are capable of holding measurement tolerances to greater accuracy than man. The massing of man and machines is not enough. Neither is profit motive enough to make it succeed. Mass production demands a need for mass consumption.

It is questionable which comes first, production or consumption. The more important generalization is that one cannot succeed without the other. Mass production attempts to affect economy of time, material and labor. If success is achieved world's goods can be made available to the consumer at lower cost. Consumers can then buy more and people who could not afford an item at high cost might be able to if the price is reduced. The whole picture becomes cyclical — more buying, more demand and more mass production. One might say, more mass production, lower prices and consequently a greater market. As was pointed out earlier modern man is victimized by the machine or the machine is master of the man in mass production. When considering the aspect of consumption a new light appears. Man with the machine is master of his environment. Monotony of work was mentioned earlier. The breaking of jobs into operations has made the job lighter, but it has increased repetition. To be sure, but was Medieval toil void of

[7] Benjamin F. Fairless, "The Great Mistake of Karl Marx," United States Steel Co. Speech to Annual Meeting of the Chamber of Commerce in Pittsburgh, Oct. 22, 1952.

monotony? If mass production is effective it must pay (1) the worker, (2) the buyer and (3) the manufacturer. Higher wages, greater profit and a better product for less money are the objects of mass production. If the system functions we have no worry about unemployment. The honest efforts of everyone in society are needed for the good of all.

Machines and Tools

Our material culture is made up of machines and tools and the commodities made by man with the aid of machines and tools. Man has designed, made and used tools to increase his effectiveness. "He has been on earth for many centuries but in the brief span of 1% of his total existence he has multiplied his speed of transport fifty fold, his speed of communications, 30 million times, his power by one hundred fold, his illumination by one thousand fold and increased his life span by two to three fold."[8]

Tools are used by man to increase his potential but have limitations commensurate with his strength and cunning. Machines are a form of tool used to augment his ability and in addition to the tools are propelled by a source of power which he controls.

Instruments, which may be either tool or machine, are used to determine definitive measurement and accomplish intricate operations. With the aid of instruments, minute quantities can be weighed, measurements of a millionth of an inch made, and pictures can be taken at less than a millionth of a second.[9]

OUR CULTURE

What is Wrong?

Is an industrial culture good or bad? According to Meadows: "There is a crisis in our age, deeper and more revolutionary than the wars we fight. It is a fact of failure, not merely of government, nor of capitalism, nor of leadership, but of an entire culture-industrialism."[10] We have evidence that past civilizations which excelled fell while others, which never demonstrated any great flare in quantity or quality in the realm of industrialism have continued for thousands of years. We need

[8] J. C. Hobson, "Industrial Research, A Service to Western Industry," Talk given before Harvard & Stanford Business Alumni Group. Mimeographed by Stanford Research Institute, May 24, 1950, p. 1.

[9] A. M. Zarem, F. R. Marshall, "A Multiple Kerr-Cell Camera," *The Review of Scientific Instruments*, Vol. 21, No. 6. June 1950, p. 514.

[10] Meadows, *op. cit.*, p. 2.

little worry about our culture failing in that most of us will not be here as witnesses. Humanitarianism may prompt people to a concern for the future. Sociologists have said, if not by forthright statement then by inference, that our industrialism or material culture is bad for several reasons; the decadence listed above being one. Secondly, they point out that we are not a happy people. Machines have robbed us of the quality of humaneness. Stuart Chase discusses the question of whether the machine is enslaving the factory worker.[11]

We do not live an experience of accomplishment. Work at a machine is pointless except for the paycheck. Its monotony makes a robot out of a human being. Without a sense of purpose a worker is a millstone about the neck of society. Injury is heaped upon insult with the advent of the radio and television. Citizens robbed of the chance to think at work are robbed more completely of thought, hearing and sight by the television.

Men made to act like the machines are said to be poor citizens, slightly or completely insane who commit grave crimes both to society and their children who are all delinquent. The machine has introduced in the past such social problems as child labor, women in industry, labor-capital controversy, crime, insanity, divorce, juvenile delinquency and many others.

Other indictments are that he is completely dependent on his job, and as a citizen. He has no self-respect largely because of his dependence and his denial of the privilege to create. His life is routinized beyond his control. He becomes an animal dominated by the machine and the machine society. Smoke, dust, poisonous gases, heat and artificial light are unhealthy. Each new machine strikes in his heart fear of unemployment. Large industry concentrated in large cities causes the worker to live in cramped and subnormal living quarters. Renting his home and using industries' tools makes him propertyless. He is a poor citizen who is unhappy because he lacks freedom.

In addition to personal encroachments on his dignity he is robbed of the music and art which was enjoyed by previous civilizations. He knows great waste of material resources and wars and rumors of wars are always upon him. Although he may not realize it, population is growing because of the demand for labor and the necessity for mass consumption.

Many other evils of a material culture might be mentioned.

[11] Stuart Chase, *Men and Machines*, New York: The Macmillan Company, 1929, see Chapter I, "Slaves and Philosophers," pp. 1-21.

What is Right?

Rather than ask what is wrong with a material culture let us ask what are the objectives and values. We are a wealthy nation surely because of resources but more surely because of industrialism. Wealth itself is not of great value but is of value for what it represents namely, respect of fellow man and the comforts of life.

First let us speak of the comforts of life. Who, sociologist or other, would like to go backwards one day in our industrialism. Last year's automobile, the radio rather than the television, or the washboard rather than the automatic clothes washer — which do you prefer? The dictionary uses in describing comfort the following synonyms: assistance, relief, strengthening, support, enjoyment, freedom from want, anxiety, and pain. The automatic dishwasher assists, gives relief, supports, offers enjoyment, and provides freedom. Think of any or all our material culture and make your own application.

Are people less free than man of a non-material culture? Freedom is a relative thing — to do as one pleases from want and from fear. Man today has the freedom to choose a life of isolation in the hinterlands of our nation — few do. He is not imprisoned by or a slave to the factory like the slave of the ancient galley. Probably man's greatest freedoms today are freedom from want, freedom from fear, and freedom to choose.

Are men robbed of their sense of importance? Stuart Chase believes that genuine robots can hardly exceed five per cent of our population.[12] A machine robot is a worker who does one minor operation in the manufacture of an article. What is the answer to the problem? It can be assumed that because of increased automation that fewer people, percentagewise, will be doing ignoble work, nevertheless, we will always ask many people in an industrial culture to do work which has little prestige value and which does not offer a sense of accomplishment. Industry is now attempting to solve the problem in part by making the worker aware of his contribution to the whole and also by giving him responsibility of one type or another in relation to the machine at which he works. Cleaning and oiling are cases in point.

It may be necessary to admit that some of the industrial workers are subjected to monotonous jobs. It is possible that shorter hours of work, greater pay and the possibility of leisure activity will enable these people to be happy. The factory

[12] *Ibid.* p. 265.

worker enjoys working in his yard, workshop, or basement and enjoys his new automobile in greater measure than the president of the plant in which he works. Millions of families in America engage in various types of home constructional hobbies and many have one or more power tools in their home workshop. [13] The family and the home have changed considerably since the time of the industrial revolution. Looms and cobblers' benches defiled the home at one time. Today it is enjoyed by a family united not only in the purpose of toil but of leisure and relaxation as well. It has been reported that some twenty million families participate in home decorating and repairing and that some 200,000 have built their own homes.[14] Admitting that a small percentage of the people are robbed of the opportunity to see what they create and to do repetitious work they have the opportunity to live the good life away from the factory. *Fortune* magazine estimates that each of us spend 2200 hours in leisure pursuits which is more hours than many people work for hire. Leisure time activities made possible a six billion dollar business in 1954.[15] Who is worrying about unemployment? Each new gadget used at home or machine used in the plant provides more employment. History offers proof positive that more machines provide more employment.

Are we an unartistic people? The symphony orchestra is a contemporary idea. It could be called a factory of articulated musical instruments. In fact it originated with the industrial revolution. Aesthetic accomplishments like our culture are subject to change but for the good. Buildings today are better looking and much more functional than they were in the past. Photography, an artistic medium, has provided individual aesthetic expression in color and motion not known by the classic artists.

People in our culture are not slaves to the machine. They have, with the machine, mastered their environment. They can be happy individuals. An entirely new movement within our culture is taking place possibly by accident but possibly more because man and industries desire to provide a better life.

Industry is becoming more decentralized. Rather than bigger manufacturing plants in metropolitan areas which are already overcrowded, many industries are building units in scattered places. Electricity as a source of power which can

[13] "Modern Living" *Time* Vol. LXIV, No. 5, (August 2, 1954) pp. 62-68.

[14] *Consumers' Research Bulletin* Vol. 34, No. 5, (November 1954) see editorial, page 2.

[15] "Modern Living," *op. cit.*, p. 62.

be sent with little cost over great distances has made possible decentralization. One hears talk of atomic power which can be transported with even less difficulty. Some future thinking experts conceive of an idea of transmitting energy through the air. A completely accurate system of technical communication in the form of schematic and symbolic drawings enables branches of industry to coordinate various phases of work. Measurement possibilities such as we now enjoy are equally vital to the decentralization of industry. Truck, rail and air transportation have helped as much as our efficient means of communication. The greatest good of all accrues to the worker who moves from the large congested city to a small urban or rural community where land is cheap. He builds a home and enjoys life such as never before. During the last year 10 million Americans have moved into outlying areas.

Has this change taken place by accident or has the welfare for man prompted the movement? It is hoped the latter is true which will permit one to look forward to similar changes in our culture which will take place for the good of all concerned. Some say that preparation for war has contributed to this change.

What is the Problem?

Assuming that a material culture has many advantages, what is the problem? We have evidence that man has probably changed little, biologically, in the last 25,000 years. His social and cultural elements however have changed greatly.[16] Not only have changes been evidenced since the beginning of history but it has been accelerated by a record of patents. The fact that change is accelerated is understandable but also alarming. The discovery of the wheel was necessary before the jet airplane. Assuming that we think graphically of change beginning in a horizontal line and that change or advancement is plotted in an accelerated curve up to a vertical line we see the problems. One, where are we now and two, what will happen when we approach a vertical line?

It is interesting to note that a phenomenon of acceleration has caused many inventions and discoveries to be made independent of the other at places far removed from the other but at approximately the same time.[17] Cases in point are: Printing by Gutenberg (1443), and Coster (1420-23); Sewing Machine

[16] Ogburn, *op. cit.* pp. 118-142.

[17] Ogburn, *op. cit.* pp. 90-102.

by Thimmonier (1830), Howe (1846) and Hunt (1840); Typewriter by Beach (1847-56), Sholes (1875) and Wheatstone (1855-60); and the Flying Machine by Wright (1895-1901), and Langley (1893-7). We may look forward to an ever increasing rate of discovery and patent which will provide for a material culture which is continually gaining momentum.

Social change need not and does not change at a rate commensurate with cultural change consequently a social lag posits problems. One example will bring the point in focus. Watts' discovery of the steam engine brought about changes: mass population, migration to cities, child labor, poor housing for factory workers. Social change in the form of legislation against child labor followed fifty or more years later. From the beginning of the industrial revolution the social lag has caused problems, most of which have been righted.

Another problem pertains to man and his educational objectives. Most youth of 100 years ago heard parents say, "I want my boy to get an education." "He will not have to work as hard as I." This line of thinking is what enabled elementary teachers to say to a young boy, "Johnny you must work hard on your multiplication tables." If the young student should have asked why and continued to push the question, our teachers would have made the following statements.

"So that you can learn algebra."

"So that you can go to college."

"So that you will not be made to do manual labor."

Our forefathers in hewing a great civilization out of a wilderness, needed great physical strength as well as the ability to think. The less fortunate could get along nicely with only physical prowess. One cannot help but think that the entire picture has changed. The less fortunate now can get along nicely without the ability to think and with very little physical effort. Can you name a dozen job titles which necessitate great strength other than collegiate and professional athletics. Our industrialism has addressed itself first to the backbreaking jobs of the past. Lifting and carrying are almost entirely done by machine lifts and conveyors of one type or another. Labor for the most part now directs or shifts materials where one day in the past they picked it from the floor and carried it great distances.

Per contra let us characterize the life and responsibility of the boy who learned multiplication tables, algebra, calculus

and earned a college education. He conceivably could now be a president of an industrial plant and sit at a desk not for eight hours, but probably for ten or more hours per day. His desk is decorated with an intercommunication system and two telephones. Has this fellow gone to college so that he would not have to work as hard as his father? His physical effort will be less to be sure, but his mental and emotional efforts have never been matched.

Our material culture is requiring less and less from the man on one end of the continuum of responsibility and more and more from the highly trained on the other.

PROPOSALS

What proposals are offered as a solution to existing evils of industrialism? Shall we return to the horse and buggy days? No one seems to fancy the idea as a good one. Everyone seems to be intrigued by the latest technological accomplishments and speak with pride about them even though they are completely divorced from the invention or discovery. Maybe we should look to oriental culture with the hope of maintaining the status quo, or should we go forward ignoring the comments and accusations of those among us.

We are destined to go forward. We cannot turn back. Momentum is carrying us to a greater and better day. We will progress but an obligation looms on the horizon commensurate in size with progress. Speaking specifically our problems are: (1) Need for a knowledge and understanding of the social lag, (2) Appreciation and understanding of all work in industrialism, (3) Education for technical understanding and know how, (4) Education for leisure time, (5) Recognition of the fundamental value of man, and (6) The preparation for moral and spiritual growth which will cement all into a unified whole for the good of man.

Education must accept a large responsibility in acquiring these goals and industrial arts as an integral part of general education will become increasingly important at all levels.

Need for Knowledge and Understanding of Social Lag

Automobiles are being manufactured by the millions each year. Their ever increasing number pose many real problems. Judging from the thousands of people killed by them, one might conclude that they are a menace to society and rule that they be banned. Is the machine at fault? Basically each new model is

better than the past. They will go faster and stop quicker. The trouble lies not with the machine but with the man who uses the machine. Brigadier General Sarnoff states: "We must always remember that nothing we produce is either good or bad unless our use makes it so."[18]

Man fails on two counts. One, he personally uses poor judgment driving the car, and two, he has not as a social being kept pace with the machine. What are his obligations? Again social progress has lagged behind the material culture. Our laws governing the driving of an automobile lag behind the advancement of the motor car. Do you not believe that appropriate laws properly enforced would in part decrease automobile accidents?

Society has lagged on a second count. We are now beginning to build free ways and super highways, but newspapers are replete with the statement that they are used beyond capacity immediately after they are finished. Should not society provide laws and highways appropriate for the auto which we enjoy so much?

The motor car is cited as only one of hundreds of incidences of social lag. Both the home and the school must accept responsibility in teaching knowledge of the problem of social lag and knowledge of how to live in a changing society. How and at what age level this information is to be taught is a problem accepted by other chapters in this book. It is safe to say that it falls within the responsibility of all parents and educators who accept the teaching of good citizenship as a prime objective.

Appreciation and Understanding of All Work in Industrialism

Our appreciation, touched by emotion and inspired by the sublime is very real for beautiful paintings. We are equally thrilled by the strains of good music. You will agree that some of us enjoy equal feelings of emotion, admiration, and pleasure as we observe an automatic machine in action. Great and beautiful buildings such as the United Nations Building inspire people in even greater measure. Have you ever wondered what kind of a world this would be if all society were taught to enjoy and appreciate all creations of man? Again it is the responsibility of schools, parents and social organizations in society to make life more worthwhile in the future by appreciating and teaching for appreciation.

[18] David Sarnoff, "Research and Industry, Partners in Progress," Speech to Board of Directors of Stanford Research Institute, November 14, 1951.

If this concept can be achieved, the robot in industry will no longer be a human machine but will, because of his attitude and understanding, be an empire builder regardless of his menial task.

Education for Technical Understanding and Know-how

We are destined to continue to improve and expand our material culture. What then is the obligation of society? New inventions and discoveries are achieved by capable men who are provided educational experiences which prepare them for their contribution. Society must insist that our school curricula offer experiences which will prepare explorers, researchers, scientists, and inventors for tomorrow.

Education for Leisure Time

Workers on an average today have more leisure than working hours. If social trends continue they will enjoy an increasing number each succeeding generation. Education has concentrated on preparing young people to earn money but has been lax in teaching them how to spend it. Education has been equally negligent in preparing young people how to spend their leisure time. The Do-It-Yourself movement flourished because business and industry have accepted the responsibility of teaching people how to spend their leisure time profitably and enjoyably. Should high schools offer a course in leisure time activity? Will industrial arts classes suffice?

Recognition of the Fundamental Value of Man

Can society be taught to accept and appreciate the efforts of all men regardless of the magnitude and quality of effort? If so each man is king in his own right. Knowledge of and a desire for the betterment of mankind cannot be taught void of values. One person respects the other particularly if the second is less noble in our cultural system only if a base of moral values exist. Whether these be adopted on a pragmatic basis or on a power greater than man is not questioned. Although the second has greater potential, both may be acceptable and very necessary.

Preparation for Moral and Spiritual Growth

Those who contribute to our material culture are first to recognize man's place in the greater order of things. If man accepts the concept of order he must be cognizant of his contribution to society which assign to him fundamental value. If he accepts himself as having fundamental value he will in turn

respect his fellow man for the same. Our culture has provided for the basic needs of food and shelter and the comforts of life. It seems apparent that an effort must be made to provide for another need — spiritual and moral. Industrial arts is usually thought of as accepting the responsibility to present our industrial culture, but it has responsibility of another nature expressed by Bode: "and so Industrial Arts is still a humble handmaiden to 'spiritual values'." [19]

INDUSTRIAL ARTS EDUCATION

The effectiveness of an industrial arts program rests on a philosophy, on a body of knowledge, and on the method by which it is taught. Responsibilities are outlined in the six proposals mentioned above. And even more important problemwise is the selection, recruitment, guidance, and preparation of effective industrial arts teachers. They must comprehend the problem and be adequately prepared. They must be natively intelligent, and they must possess a humanitarian philosophy. Bode, in his challenge to the Epsilon Pi Tau Honorary Fraternity stated: "The task confronting our teachers of industrial arts is to make their subject matter a gateway to a philosophy of life in an industrial democracy."[20]

SUMMARY

As educated people we can't help but look at other past civilizations and ask why they no longer excel in arts, industry and education as they once did. We are cognizant of our type of culture which is an industrial material culture much like those civilizations which were once looked to for leadership. We know that a material culture does not remain static. Each discovery and invention makes possible many more. Rapid growth of machines and industry has created many evils such as dependence, specialization, the robot worker, crime, insanity and many others. Are these evils as bad as depicted? History has proved that each new discovery causes a social problem. The discovery of the linotype caused unemployment. Each new machine displaced six men. Biologically man has changed very little since the beginning of history. Social changes take place only after necessity presents itself. Cultural change in the form of new discoveries and inventions accelerate uninhibited by either man's social or biological change. One phase of change

[19] Boyd H. Bode, "Industrial Arts and the American Tradition," Epsilon Pi Tau Brochure, Columbus, Ohio, 1942, p. 3.

[20] Bode, *op. cit.*, p. 9.

outdistancing the other causes problems which can be solved more quickly and expertly than has been the case in the past. A forthright understanding of social lag and the appreciation of the material culture on the part of all people made possible through education can achieve the goal.

It will be necessary for this society to provide: (1) understanding of social lag, (2) appreciation for an industrial culture and the efforts of every worker, (3) education in technical know-how so that all may contribute, (4) education for leisure time, (5) appreciation for the fundamental values of all men and (6) preparation for spiritual and moral growth.

Industrial arts educators must accept their fair share of the responsibility. Consequently, they must be capable people who possess a humanitarian philosophy.

Progress in our material culture is inevitable. Our problem is not the machine but the man. Edwin Markham expresses our objective:

> We are blind, until we see
> That in the human plan
> Nothing is worth the making if
> It does not make the man.
>
> Why build these cities glorious
> If many unbuilded goes?
> In vain we build the work, unless
> The builder also grows.[21]

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[21] From *Poems of Edwin Markham,* Harper & Brothers, 1950. By permission.

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CHAPTER IV

The Derivation of Goals and Purposes of Instruction

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UNDERLYING RELATIONSHIPS

The derivation of goals for the everyday teaching of industrial arts in the school program implies a study going all the way back to the origin of conditions which have brought about the gradual development of such purposes. Before doing this, one must understand several relationships. He should know the relation of industrial arts itself to the over-all educational program. Industrial arts is one of the several areas of such a program and its aim is solely one of contribution to the whole of education. One should also understand the relationship between education and human needs. He should know that education exists for the prime purpose of helping individuals better to meet their needs of life. Thus, educational purposes are derived from human needs.

The aim of this chapter is, *first,* to explore the sources of goals in education by examining life needs and their origins; *second,* to discuss the translation of life needs into educational goals; *third,* to analyze industrial arts contributions to education in terms of goals for teaching; and *fourth,* to examine the preparation and background needed for teachers to be able to derive goals of instruction. It should be said that the nature of sources such as the human element and the influences of culture have been adequately dealt with in Chapters II and III respectively and will not be repeated here. However, the emphasis here will be given to showing how needs grow out of such influences.

THE STUDY OF LIFE NEEDS AS THE SOURCE OF GOALS IN EDUCATION

The study of life needs involves an exploration of their origins; it includes an analysis of their nature and an examination of the areas where they occur.

The Origin of Life Needs

The everyday living of human beings in their environment is the origin of all life needs. Some needs originate from within the individual himself and exist regardless of his environment. They are concerned with the welfare of human development. They may be primarily of a physical nature, or primarily of a mental or educational nature. They may be primarily emotional or social. However, we know that the human being is an integrated whole and cannot be separated into independent parts or aspects. Any need springing from the individual is a final result of the drives and interplay of the whole being.

Some needs closely associated with physical development include the need for food and the general understanding of many problems involved to insure healthful living. Others have to do with the need for exercise and activity, with the need for fresh air, and the need for rest and relaxation. Some have to do with safe practices and procedures in our everyday modern living to prevent accidents and physical injury.

Needs more closely associated with the mental or intellectual aspect of development involve such problems as the need for suitable learning experiences and opportunities for creative expression. They involve the need for experiences permitting the problem solving or scientific approach to learning, and the development of reasoning. They call for conditions, situations, and experiences that are stimulating and challenging and that bring about increased attention span on the part of the learner. Also, they call for experiences built around goals of the learner.

All of these needs are also more or less related to the emotional aspect of human development. It has been found that the satisfying of emotional needs increases one's rate of learning. Various lists of emotional needs have been given by different educational writers. However, they are most all in fair agreement in such needs as the urge to be successful, the craving for recognition, the desire for sympathy and affection, the desire for security, and the urge for adventure. The individual has strong need for experiences that will help satisfy such desires and urges.

Moreover, in accordance with our previous statement, it is practically impossible to separate needs primarily of an emotional origin from those grounded in the social aspects of human development. However, social development implies emphasis on social relations which immediately creates needs that involve more than the individual himself. For this reason they will be considered at a later point in the chapter.

The above discussion has dealt primarily with the needs that have their source in the individual. Let us now see how some needs originate from his cultural influences. Many of the things individuals need to do are brought about by the customs, traditions, beliefs and values of the society in which they live. Our western civilization has evolved through many centuries of experience and reflection. Gradually society learned to rate certain ways of life higher than others. Those that were considered good were passed on to the coming generations. Thus, gradually a set of values has been built up to hand on down to our times. The culture of the western world for centuries was separate from that of Russia and the eastern world. Naturally, different sets of values have developed.

Moreover, the people's values change with the times and the conditions under which they happen to live. The values of our present society are both an outgrowth of the evolving western culture and also environmental conditions in *America* itself. Two American characteristics of greatest influence today are our democratic tradition and our industrial-technological way of life.

Our democratic heritage has its roots back in centuries of development in England and Western Europe. However, it remained for conditions and influences in America to give us our present set of democratic values. Our present system of public schools and its objectives have grown from our American democratic concepts. Universal education is a need in our democratic way of life. We are concerned not only with passing on the culture of our times but also with the meeting of life needs in a democratic culture as well as a gradual improvement of society itself. Performing the demands of a democracy and the gradual bringing about of its improvement require on the part of individuals an education. They also require that schools actually be conducted in the democratic way of life.

There are the many needs involved in carrying out self-government and other responsibilities in a democracy. The freedom and respect for the worth of individuals and the rights of

others bring about needs. The right and responsibility of individuals to develop and use their abilities in their own interest as well as for the good of society also involve many needs.

Our second great influence of our present day society is our industrial and technological way of life today. We have moved from an agrarian society in early America to a highly populated industrial nation. Furthermore, we have moved in only recent years into a very highly technical society. This has brought about a great need for much greater technical understanding, appreciation, and competence. This not only involves one as a producer but also as a consumer in his use of the many new technological products. Not only is there a need for greater technical competence but a need has been brought about for much greater specialization and for preparation for new occupations. The whole way of life and mode of living have been changed.

Another source of needs is in all the natural phenomena of the world about us. While this source is not often referred to by educators, it is nevertheless important. The greatest cause of needs of this nature is the sun and solar system itself whose influences affect most all forms of life. Other such sources of needs are associated with topographic conditions of the earth. The varied plant and animal life bring human needs. Also the many physical and chemical forces and relationships are sources for needs in everyday life.

Probably the great majority of needs of individuals arise from the complicated interaction of human beings with the many forces of the environment mentioned or implied above. All life is one of constant interaction between individuals and their environment. Thus, there are all of the many drives, urges, and needs of the human being interacting with all of the many different values and requirements of the culture of our democratic and industrial society. Since individuals differ considerably, such interactions are not exactly the same for any two persons. Nor are they identical for the same individual on different occasions. The set of values of a society vary with different groups of people. They also differ for the same group of people at different times. In other words, there are two sets of variables continually interacting and bringing about needs that also are in a constant state of variation.

In man's interaction with his environment the interplay and conflicts of his many human urges and needs with those of his culture and other environmental forces cause many needs that are so intricately patterned that they are difficult to single

out. Such needs are also often interrelated. It is sometimes difficult to satisfy one need without arousing one or more other needs which are just as urgent as was the former one.

The youngster whose needs to explore and investigate often run abruptly into the dangers of machines and technology in life today suddenly finds himself in need of safe behavior around them. This in turn brings about a need for the understanding of machines and tools and their uses in a technical way of life.

Also the satisfying of a large need often involves the meeting of many smaller needs of a more specific nature. The need for the preparation for a vocation involves the need for understanding about a number of occupations and the need for the final selection of a particular vocation. The satisfying of these needs brings about the need for developing all the many small and specific understandings, abilities, and skills involved in preparation for a particular occupation. One could go on and on breaking down an individual's needs into many infinitely smaller ones. Thus, one sees the sources of human needs are from within the individual himself, from the demands of his society or culture, and from the exceedingly complex interaction of a human being with all his environmental forces in our ever-changing democratic and technological society of today.

The Nature of Life Needs

Human needs are classified in a number of ways by educational thinkers today. Some needs are of a universal nature and common to all. Many examples of these needs arise from within the individual. The needs for food, sleep, exercise and so on are common to all. It matters not whether people are from the communistic or from the democratic way of life, whether they are young or old, or whether they are boys or girls. Nor does it matter whether their society is a simple agrarian one or a highly technical and industrial one. Many needs arising from the culture or society are also common to all people. For example, there is a universal need for some form of government where groups of people live together. This is true even though the government of some people is much more simple than that of others.

Some needs, on the other hand, are individual or special in nature. Although a person has many needs in common with all other human beings, and he has many in common with others of his particular group, he still has other needs due to his own particular differences or combinations of strengths and weaknesses.

These grow out of his own physical, intellectual, emotional, and social traits which are the result of his own innate self and its interaction with all his environmental pressures in his lifetime of experiences. Such special needs call for special experiences in industrial arts for the individual.

Some needs are classified by educators as persistent or recurring. Such needs are constantly recurring and often persist all through life. The needs for self-esteem and for being recognized and respected by others persist throughout one's lifetime. The need for understanding healthful living persists all through school and not at just one particular grade level. The need for understanding our industrial way of life is a persistent one. It is needed by the pre-school child; it is needed throughout all years of formal school, and it is also needed all through life. Such a fact makes industrial arts valuable all through school instead of just beginning with the seventh grade.

These persistent needs are continually involved with present and future life. Others are of a more temporary and usually of a strictly immediate nature. They may be brought about by physical, emotional or social situations of concern to the individual at this immediate time but which may no longer be a need several months from now. They also may be brought about by various social or cultural pressures of a temporary nature which are forced upon the individual. The modern industrial arts program makes extensive use of such immediate and temporary needs and desires as well as persistent ones on the part of pupils as a starting point in learning experiences.

Most needs are of a variable and complex nature, and often a combination of many other different needs. Frequently they are of such an intricate pattern that they cannot be singled out easily for individual emphasis. Moreover, even if they could, any effort toward meeting such needs may involve a number of other needs. For example, dealing with some social need, may involve emotional as well as physical needs.

Educators usually think of needs from the standpoint of whether they are persistent and common to all, whether they are peculiar to a particular group, or whether they are special or individual in nature. Then, also, another kind of need of importance is the immediate felt need, desire or concern of individuals in everyday living.

The Areas of Life Needs

A great deal of study has been given by leading educators to the identification and analysis of areas of life needs. There are

a number of excellent statements listing such areas. Although variations exist in different classifications most life needs can be included in the following areas: (1) Emotional and physical well-being; (2) Mental capabilities; (3) Aesthetic satisfaction; (4) Avocational living; (5) Social relationships; (6) Consumer understandings; and (7) Producer concerns. Such statements of needs are often grouped as personal, social, and economic. The personal areas usually involve the needs of emotional and physical well being, those associated with mental capabilities, those in aesthetic satisfaction, and the needs for improved avocational living; the social areas are concerned with individual, group, and intergroup relations; and the economic areas usually have to do with needs involving consumer understandings, and increased producer efficiency.

Broadly speaking, *emotional and physical well being* involves all matters of health. It involves the various emotional needs mentioned earlier as well as many more. Included among these are such needs as those for affection and sympathetic understanding, for recognition, for prestige, security, success, adventure and a variety of others. It involves the need for the development of a workable philosophy of life — one that makes for wholesome emotional growth. Also there are the physical needs of life. The life needs associated with food, shelter, clothing, rest, sleep, recreation, exercise, cleanliness, and the protection from injury are all included in this area. The child is in need of a developmental program of education. Probably in no other area of life needs is this more pronounced. This implies an educational curriculum geared to the natural stages of development in the child such that the program advances with the unfolding of the child's development.

The mental capabilities are a group of tools, powers, or skills referred to by various names. Stratemeyer calls them intellectual powers.[1] Often included in this area are all the needs associated with communication, with the dealings in quantitative relationships, with the use of scientific techniques in solving life problems, and with creative expression in one form or another. Every child in our modern culture has need to communicate both orally and in written form. Being able to express one's self and interpret what others are communicating involves reading, writing or drawing, speaking, and listening. Drawing and

[1] Florence Stratemeyer, Hamden L. Forkner, and Margaret G. McKim, *Developing a Curriculum for Modern Living* (New York: Bureau of Publications. Teachers College, Columbia University, 1947) p. 108.

reading a plan for a problem in industrial arts is an example of the graphic method of communication. The needs all around us in everyday living for understanding number concepts and quantitative relationships are much in evidence. Measuring in various units and computing quantities and costs of materials are only a few of many examples in industrial arts. Life is one continuous chain of encountering and solving of problems. The more one is able to use the scientific approach and technique in dealing with such situations, the more successful he will be in meeting the problems of life. There is probably no area of the school program that is based more on the use of this approach to solving problems than is the teaching of industrial arts. Creative expression on the part of individuals is of paramount importance from the standpoint of progress in a culture. One should probably point to the contrast between the old, traditional industrial arts methods which use patterns, and job sheets with completed steps for the pupil to follow, and the modern methods where each individual is encouraged to create his own design and develop construction procedures as he sees the situation.

Aesthetic satisfaction involves all the needs associated with the appreciation of the expression of others and the beauty of nature around us as well as those needs having to do with our own aesthetic expression. One learns to appreciate good music, good painting, and various other media in art. He learns to appreciate master craftsmanship in many materials and trades. He also learns to appreciate attractive choice and use of clothing, of decoration and arrangement of furnishings in a home, and of artistic landscaping. Not only does one have a need of such appreciations to satisfy but he also has a craving to express himself aesthetically. He feels the need of making his own dress attractive to others, to make his home beautiful both on the outside as well as as its interior decoration and arrangement. He feels a need to make any of his graphic expressions aesthetically attractive and also a need for expressing himself in an aesthetic manner when it comes to craftsmanship.

Avocational living is becoming an even more important part of modern life. With the changes that are taking place in the present day social-economic structure more and more leisure time is at our disposal. The working hours per week are gradually on the decrease due in a large measure to our adoption of modern machine methods. Also the gradual lowering of the age of retirement along with the increased span of life and improved retirement financial programs has made for greatly

increased need for more need of satisfying avocational or leisure time living. Among other causes of needs in meeting changing situations in avocational living is our greatly increased economic interdependency and specialization from the standpoint of consumer goods. Instead of meeting our own needs in the home we find it much simpler to purchase what we wish commercially manufactured from the store. This also gives us increased hours of free time for avocational activities.

The area of *social and civic relationships* includes a variety of needs in facing many different situations. The individual has many relationships with other individuals. This involves other members of his family, the storekeeper, the doctor, his teacher and his various classmates. He also has many relations with groups of persons. This includes his classes, his school clubs, the ball teams, the church groups, scouts and other groups of which he may be a part. He needs to make judgments concerning what groups to join and also concerning just what his responsibilities are as a member of the group. He is also involved in many intergroup relations. This includes such situations as games between two different school teams, relations between classes, between clubs, between different churches, different races, different political parties, different communities and many others. When his group becomes a political unit such as a city, county, state or nation he is especially concerned with civic matters of governing. For that matter, a certain amount of governing is involved in any club or group.

One large area of life needs is often referred to as *consumer understandings.* It includes needs for understanding in the matter of the selection of consumer goods and services, in matters pertaining to the wise use and maintenance of consumer products, and the conservation of consumer goods. This involves needs associated with the understanding of values in materials, processes, and workmanship. Also included in consumer needs are all those having to do with understandings essential for solving basic economic problems of everyday living. For instance, the need for knowing what and when to buy in the way of goods and services as well as the intelligent amount is involved. Needs for understandings associated with money matters pertaining to insurance, banking, and saving are also included.

The area of *producer concerns* includes all those needs having to do with and centering about the earning of one's livelihood. Involved here are needs having to do with the choosing of a vocation, the preparation for a vocation and successful parti-

cipation and progress in a vocation. There are needs pertaining to the understanding of various occupations and their advantages and disadvantages as well as the understanding of one's self and his traits and abilities and the likelihood of possible success in different occupations. The individual has many needs pertaining to preparing himself for a particular vocation or occupation after a choice is made. These include needs connected with his schooling, his apprenticeship or other preparation on the job. There are needs in connection with securing employment as well as successful adjustment and advancement on the job after one has accepted a position.

This first section of the chapter has dealt with a study of life needs as a basis for the determining of educational goals. It was found that these needs come primarily from a complex and constant interaction of individualistic human beings with the ever changeable nature and conditions of our society or culture and the values we as groups come to accept. It was also discovered that these needs are highly complex, overlapping, interdependent, and even sometimes conflicting. It is impossible in actual everyday life to divide them into neat compartments. However, for purposes of study an attempt was made to list them under a statement of areas where such needs seem chiefly to fall. The areas used above were emotional and physical well being, mental capacities, aesthetic satisfaction, avocational living, social relationships, consumer understandings, and producer concerns.

THE TRANSLATION OF LIFE NEEDS INTO EDUCATIONAL GOALS

This section will deal with the translation of the general needs of everyday living into educational goals for the over all school program. This process will involve the setting up of a plan or procedure to be followed; the analysis and classification of pupil needs; and finally the development of goals from the needs for educational purposes.

A Democratic Procedure

If one were to characterize modern educational thinking there is no question that the importance of democracy in education would be given a pre-eminent emphasis. However, all too often we do not understand its full significance. Not infrequently we profess to believe in the importance of democratic methods in education and yet at the same time continue to follow our traditional autocratic procedures. True understand-

ing of democratic methods will come about best through the actual living and experiencing of the democratic way of life in the school program.

Any organization or procedure for studying and translating life needs into educational goals should be done in a democratic manner. Ahrens says:

> All concerned — administrators, supervisors, teachers, parents and students — should participate from the very beginning of the project. Too often status leaders err in making certain decisions before others are invited to participate. . . . . .
>
> Any plans for curriculum improvement should be based on a census of problems obtained through co-operative planning of teachers, parents, students and administrators. . . . . .
>
> Where it is found necessary to use small committees to do special kinds of work in problem solving the committees should not make decisions for the total group. . . . . .
>
> . . . . . The varying needs, concerns and problems of young people from city to city, school to school, and class to class should be recognized. . . . . .
>
> A plan of action should provide flexibility in the program so that teachers in the classroom will have many opportunities to employ democratic methods such as those involved in co-operative planning with pupils and to deal with problems that cannot be anticipated.[2]

The procedure of studying and translating life needs into educational goals should be done cooperatively by all concerned. A democratic atmosphere and procedure should prevail throughout.

Another characteristic of such a study procedure, in addition to a prevailing democratic atmosphere, is the concern of all for the total program of education for children. Each area of the school program will have as its primary concern a well rounded educational program based on the total life needs of the pupils. The industrial arts teacher will certainly be a part of this total study group of administrators, supervisors, teachers, parents and pupils. He will enter into it wholeheartedly and in a highly cooperative spirit.

The Identification and Classification of Needs

The cooperative study discussed above will give careful consideration to all needs of school children in everyday life. These needs will be considered as three types. First, the great

[2] National Society for the Study of Education, *Adapting the Secondary School Program to the Needs of Youth* (Chicago: University of Chicago Press, 1953), p. 105.

bulk of them will be the general needs of all youngsters in our society today. Second, consideration will be given to group needs in the school. These will include the school group as a whole and then various smaller groups within the school. Finally, careful study will be given to discover the special needs of the individual pupils. This will be done cooperatively and individually by the entire staff.

The Development of Goals from Needs

After the identification of the various types of educational needs of the pupils the next step is the translation of the needs into educational goals. The over all goal of the school is not one of supplying all the various needs of children but rather as Tyler says to help prepare students educationally to better meet these various needs themselves.[3] The responsibility of the school is to aid youngsters in developing behavior patterns that will better help to meet their own basic needs.

These behavior patterns must be thought of as including such aspects as understandings pertaining to various situations and issues. However, this alone is not enough. One may have understandings and yet not behave in a desirable manner. He must have attitudes conducive to following such behavior. Finally, he may have both understandings and appropriate attitudes but lack the ability to behave in the desired manner. The school's duty is to help him make progress in developing all three — understandings, attitudes, and abilities.

The next step for the cooperative study is to state the many needs identified in the language of desirable behavior patterns to be used as teaching goals in the over all program of the school. Such statements of desired behavior will be in terms of understandings, attitudes, and abilities as mentioned above and will be especially for the children of that particular school.

THE ANALYSIS OF INDUSTRIAL ARTS CONTRIBUTIONS TO EDUCATION AS GOALS FOR INSTRUCTION

After a fairly extensive list of desirable behavior changes for the over all program of education for a particular school have been developed cooperatively by all concerned, the next step is to analyze the special or unique contributions that the industrial arts area can make toward meeting such goals. Such contributions will be threefold. They will be thought of in terms of common goals for all, in terms of goals for the par-

[3] *Ibid.*, page 215.

ticular school, and also in terms of individual needs of those enrolled in industrial arts classes. A list of such contributions in the form of desirable behavior changes should be cooperatively developed and stated in a form suitable for use in the evaluation of instruction in industrial arts.

Industrial Arts Contributions Toward Meeting Common Educational Goals

Various study groups of industrial arts teachers in conferences and workshops should spend considerable time analyzing special or unique contributions that industrial arts can make toward the common educational goals for the whole program of education. In Ohio for example, the State Association of Industrial Arts Teacher Educators devoted two annual conferences to the study of the contributions of industrial arts. The industrial arts staffs of the universities of Ohio spent considerable time in such analysis. The whole faculty, the parents, and the students of any school system should have a part in identifying the possible contributions of the industrial arts area. Such contributions should be thought of in terms of desired behavior changes and would involve understandings, attitudes, and abilities. They might well be listed under some such classification as the seven headings given earlier in the chapter as areas of life needs.

Industrial Arts Contributions Toward Meeting Smaller Group Needs

Following the development of a statement of industrial arts contributions toward common goals in education, careful study should be given to the analysis of possible industrial arts contributions toward preparation for meeting the needs of various groups found in a school program. Such a study should be carried on cooperatively by the industrial arts teachers and all the other instructional staff, as well as the parents and children concerned with that particular school program. The industrial arts contributions possible for various group needs thus identified and stated as desired behavior changes would be assimilated into the general list previously discussed.

Industrial Arts Contributions Toward Meeting Individual Needs

The next phase is careful study both individual and cooperative on the part of industrial arts teachers and others concerned toward the continual identification of individual needs and the analysis of industrial arts contributions toward educational preparation to meet such needs. Such desired behavior

change contributions possible in industrial arts for individual needs would be variable from time to time. Some might be of short duration while others may be a part of a long term program. A good teacher is continually watching students for individual needs. He also discovers such needs through other teachers, parents, and pupils. He weaves these contributions for individuals along with those for various groups as well as the contributions for common over all needs into a pattern of desired behavior changes for his own instruction in industrial arts.

Industrial Arts Contributions as Goals for Instruction

The following list of contributions of industrial arts to education was developed cooperatively by the teaching staff of the Miami University Department of Industrial Arts Teacher Education. They were thought of as goals for instructional purposes.

1. Improved Emotional and Physical Well-being.
   a. Greater self assurance.
   b. More workable philosophy of life regarding the successful completion of undertakings.
   c. Increased understandings regarding physical needs with respect to healthful working conditions.
   d. Greater understanding regarding the safe use of industrial tools, machines and products.
2. Growth in Ability to Use Intellectual Powers.
   a. Improved ability in graphic interpretation and expression.
   b. Increased appreciation and concern for accurate quantitative relations.
   c. Growth in ability to deal with quantitative relations.
   d. Growth in problem solving abilities.
   e. Greater ability in creative expression.
3. More Enjoyable and Profitable Use of Leisure Time.
   a. A wider range of avocational interests and pursuits.
   b. Increased awareness to the possibilities and desirability of leisure time activities in the home.
   c. Increased interest and participation in community and other group avocational projects.
4. Improved Aesthetic Appreciation and Expression.
   a. Greater ability in recognizing and enjoying harmonizing colors, materials, and designs in one's surroundings.

b. Increased understandings and appreciations of design and aesthetic craftsmanship in consumer products.

c. Greater ability in creative aesthetic expression in the various media and materials in industry.

5. Improved Social Living.
   a. More respect for the accomplishments and rights of others.
   b. Increased ability to work and live with other individuals.
   c. Greater understanding and closer relationships with respect to community and cooperative group activities.
6. Improved Consumer Efficiency.
   a. Greater understandings involving design, materials, processes, workmanship and production costs leading to a more intelligent selection and securing of consumer goods.
   c. Better practices in the maintenance and conservation of consumer goods.
7. Improved Producer or Occupational Efficiency.
   a. Greater appreciation of one's responsibilities in our society of earning a living.
   b. Better industrial understanding leading to more intelligent occupational choices.
   c. Improved self-analysis from the standpoint of interests and capabilities with respect to choosing an occupation.
   d. Increased skills and abilities relative to general industrial processes.
   e. Greater understanding regarding the problems of securing and succeeding in a job.
   f. Better understandings and appreciations of economic problems of industry and everyday living.

Industrial Arts Contributions Developed for Teaching - Learning Purposes

The following industrial arts contribution or goal has been developed to show the relationship of goals, instruction, and evaluation. It is thought of as typical of how industrial arts teachers may develop and use goals for instructional purposes.

The Contribution or Goal: Improved Producer or Occupational Efficiency.

1. Some Typical Student Behavior Changes Involved in the Goal.
   a. The student looks forward to taking his place as a worker in everyday life.
   b. He develops a fair understanding of the requirements and opportunities of a wide variety of typical occupations.
   c. He grows in his understanding of his individual interests, and capabilities and their importance in choosing a vocation.
   d. He increases his general understanding of many modern industries and their materials, tools, processes, and problems.
   e. He improves his skills and abilities in performing a variety of modern technical and industrial processes.
   f. He becomes familiar with the common terminology of present day technological and industrial occupations.
   g. He becomes able to make intelligent decisions regarding the choice of an occupation based on his own interests, and abilities in respect to the requirements and opportunities of the occupation itself in modern times.
   h. He develops the ability to analyze and plan for the preparation he will need to enter his chosen occupation.
   i. He learns how to work cooperatively with his associates.
2. Experiences Effective in Developing Desired Behavior Changes.
   a. He studies about employment and wages and how people work. He discusses and makes reports on such topics in class.
   b. He gets various odd jobs and earns money in his spare time especially during vacations and gets an appreciation of the place of work in everyday life and learns to work with others.
   c. He reads and participates in class discussions and makes reports on a variety of typical modern day

industrial occupations and their requirements and opportunities.

d. He sees moving pictures on various occupations and industries and notes the industrial processes and the working conditions.
e. He tries out a variety of industrial activities in the shop and learns his own interests and abilities.
f. He performs many industrial and technological processes in his school shop in a workmanlike manner for the purpose of gaining greater industrial understandings and increased skills and abilities.
g. He will visit a number of industrial plants to observe the manufacturing processes and working conditions.
h. He will examine and study a variety of different consumer products to learn processes, materials, and workmanship.
i. He will experiment with different industrial materials and processes.
j. He will listen to talks and observe demonstrations in various aspects of industry and its processes.
k. He studies industrial terminology and uses it freely in his conversation about industry.
l. He talks with his teacher and counselor about his occupational choices based on his interests and abilities in relation to the requirements and opportunities of the occupation.

Industrial Arts Contributions or Goals as Guides in Evaluation

The next step is one of evaluation. The purpose of all the procedures discussed above would not be fulfilled without using their outcome for continual evaluation in the instructional program. The responsibility of the industrial arts teacher in cooperation with others concerned is thus to develop an instrument or various instruments suited to their needs in determining the educational progress of the students in the classes. This is done in the light of the teaching-learning goals discussed above and how well they have been achieved. Such goals may be stated in the form of desired behavior improvements. A variety of instruments and evaluative techniques may be used to determine the relative achievement of the goals. An example showing the relationship between the goal, the teaching-learning experience, and evaluation may be found in Chapter I of

A Guide to Improving Instruction in Industrial Arts published by the American Vocational Association. Wilber has developed an outline of this nature in his book, *Industrial Arts in General Education.*[4] Also, J. Osborne Johnson and the Denver teachers have outlined such an instrument for us entitled *Industrial Arts Education: An Instructional Guide of the Denver Public Schools.* The topic of evaluation is very ably discussed later in Chapter VI and will not be dealt with in detail here.

THE PREPARATION OF THE INDUSTRIAL ARTS TEACHER FOR DERIVING GOALS

The program of experiences in industrial arts teacher education should be such that the graduate embarking upon a career of teaching has adequate preparation and background for deriving goals of instruction. His preparation might be divided into three categories for discussion purposes. He should have a broad general education, the necessary technical preparation, and adequate professional understandings. However, concepts in all of these areas have been adequately dealt with in later chapters and need only be referred to here.

General Education

Every beginning industrial arts teacher should have a well rounded education for mature everyday living. From this standpoint his education would not differ materially from that desirable for persons in any other walk of life. The teacher should, according to Macomber:

> possess those characteristics essential for full and effective living as a member of the community, state, and nation. He must be well informed on socio-economic, political, and scientific problems of the times and be capable of guiding the youth of the community in their search for understanding of the major problems of living. He should be a person of sound mental and physical health, and one who understands and is successful in his personal and social relationships.[5]

The industrial arts teacher's general education should include a special emphasis on a pretty broad and thorough understanding of our modern culture and social forces. He should be cognizant of the values of our present day society and aware of the significance of all these with respect to the needs of individuals and to the determination of teaching goals.

[4] Gordon O. Wilber, *Industrial Arts in General Education* (Scranton, Pennsylvania: International Textbook Co., 1954) p. 60.

[5] By permission from F. G. Macomber, *Teaching in the Modern Secondary School* (New York: McGraw-Hill Book Company, Inc. 1952) p. 2.

Technical Education

The beginning industrial arts teacher should have a fair understanding of the nature and significance of the technical, industrial, mechanical, and craft aspect of our present technological society. He should have a fair picture of the industrial and technological trends of our times and their implications for the educational program. He should see the need for greater technological understanding on the part of individuals and the importance of the broadening of leisure time interests.

The industrial arts teacher should have developed a fair amount of appreciation of skill through the development of technical competencies himself in working with tools, machines, materials, and problems of our modern technology. The teacher education program should be planned to include opportunity for a wide variety of technical experiences in the laboratory as well as out in actual life. This latter might include technical experiences both as a consumer and as a producer in industry. Thus by the time he starts out as a teacher, he is able to see the implications of all the many technical ramifications in the developing of instructional goals in the teaching of industrial arts.

Professional Education

From the professional angle, the beginning teacher should have a good understanding of the nature and needs of the human being and of his development; he should be familiar with a sound philosophy of education as well as modern practices in teaching; he should understand the significance of life needs as a basis for deriving teaching goals; and he should understand the role of industrial arts as a contributing area of the entire educational program.

The teacher education program is responsible for supplying experiences that will help bring about the above professional competencies on the part of its students. Macomber states that:

> it implies the development of an understanding of basic psychology principles and their implications for the teaching and learning process, the development of a guiding philosophy of education and the attitudes and abilities which make it possible for the teacher to implement these principles and philosophy both inside and outside the classroom.[6]

The professional experiences in industrial arts teacher education include those in the professional courses themselves, those in regular school activities, and those outside the more formal school program itself.

[6] *Ibid.*, p. 3.

SUMMARY

In the present chapter certain aspects of the derivation of goals and purposes for instruction have been reviewed. First, a study was made of life needs as a source of goals in education. It was assumed that educational purposes and goals are derived from human needs. Furthermore, the origin of life needs is found in everyday living itself. Some needs originate from within the individual, some from the present day society and our accepted scale of values in our culture, some from natural phenomena of the world, and still others from complex interaction of individuals with environmental forces.

The nature of life needs are found to be varied. Some needs are universal or common to all people; some are of a persistent nature and are thus continually recurring throughout life; others are of a temporary nature and thus only last a short while; some are individual or special and pertain only to a particular person, and most needs are a variable and complex combination of several of the above types.

It was observed that life needs are often considered as falling within certain areas of everyday living. Some such areas often noted are emotional and physical well being, mental capabilities or intellectual powers, aesthetic satisfaction, avocational living, social relationships, consumer understandings and producer concerns. These areas are often classed as personal, social, or economic.

Second, the translation of life needs into educational goals was considered. It was noted that the procedure for any such undertaking should be of a democratic nature participated in by the staff, the administration, the parents and the students concerned. The needs of the students were identified and classified as common or universal, as pertaining to school groups, or as existing for only certain individuals. Such a listing of needs was translated into statements of desired behavior changes to be used as goals for the over all educational program.

Third, industrial arts contributions to education were analyzed as goals for industrial arts instruction. The identification of possible industrial arts contributions was done cooperatively by industrial arts teachers and others concerned at regional work conferences, by school groups, and by individual teachers. The contributions of industrial arts were thought of in terms of common goals for that particular school, and also in terms of individual needs of those enrolled in industrial arts

classes. Such a statement of industrial arts contributions should be developed into a list of desired behavior changes to be used as an evaluation instrument for instructional purposes.

Finally, the preparation and foundation of industrial arts teachers for deriving goals of instruction were contemplated. The teacher should be well prepared from the standpoint of general, technical, and professional education. He should have a well rounded education for everyday living with special emphasis on a broad understanding of our modern culture and its implications for life needs. He should possess a fair amount of technical competence and an appreciation of the significance of the present technology in our present society. He should also possess an understanding of the nature and needs of the learner and his development; he should have an appreciation of a workable philosophy of education and modern methods of teaching; he should clearly understand the role of industrial arts as a contributing area of the entire educational program.

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CHAPTER V

Concepts of Curriculum and Method

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DEFINITIONS

Concept, according to Webster, is an idea, especially a generalized idea of a class of objects; a thought; a general notion. Method is a way of doing anything; mode; procedure; process; especially, a regular, orderly, definite procedure or way of teaching, or investigating. Curriculum is a running, course, race, career, a specific course of study or, collectively, all the courses of study in a school, university, etc. This chapter then is concerned with *generalized* ideas of *teaching* the industrial arts *curriculum* area, especially *teacher education* which is preparation for regular school teaching.

EVOLUTION OF CURRICULUM AND METHOD

Present concepts of method are deeply rooted in the history of industrial education. Of course we could begin with the Babylonian Code of Hammurabi[1] and continue through the ages with the contributions of the early monks; the guilds; the industrial schools for poor delinquent children; the Manual Labor Movement in our theological seminaries; the mechanic institutes for industrial workers; and the development of the agricultural lyceums; let us, however, begin our evolution of method in the latter part of the nineteenth century.

Early Origins

Approximately 85 years ago Victor Della Vos, for the first time in history, analyzed the mechanic arts of the era and organized definite procedures or ways of teaching shopwork. This was done at the Imperial Technical School at Moscow.

[1] About 2300 years before Christ. "If an artisan take a son for adoption and teach him his handicraft, one may not bring claim against him."

To help us recall this era in America, it is interesting to note that Abraham Lincoln and Andrew Johnson were successive presidents of the United States. The first transatlantic cable had been laid, and the Union Pacific Railroad completed. Nebraska was the thirty-seventh state to be admitted to the Union, and James Oliver turned out the first chilled-steel plow. The zipper invented in 1879 was so cleverly and strongly opposed by the button manufacturers that it didn't get on the market for 30 years. The Morrill Land-Grant Act was passed providing thirty-thousand acres of public land per representative and senator from the several states for the establishment of colleges of agriculture and the mechanic arts. The *energy output* in this country in 1860 was largely animal. According to Dewhurst,[2] it was approximately 79 per cent animal, 14 percent human, and only 7 per cent technical energy represented by a meager 1.6 billions of horsepower hours.

The system of teaching the mechanic arts devised by Della Vos was exhibited at the Centennial Exposition in Philadelphia in 1876, almost 30 years before the Wright Brothers' first flight, and there were two direct results of the exhibit. Dr. John D. Runkle, President of the Massachusetts Institute of Technology in Boston, opened the School of Mechanic Arts in connection with the institute, and Professor C. M. Woodward adapted the principles of the system at the St. Louis Manual Training School at Washington University. These two schools gave the impetus to the manual-training movement which spread in the high schools throughout the United States.

It is important to note that the newly created system of teaching the mechanic arts was a regular, orderly, definite procedure or way of teaching. It consisted of a *graded series of exercises.* The student made a *thing* and stress was laid entirely upon *hand tool skills.* The exercises were learned by making a series of models which were arranged according to the increasing difficulty of construction. The models had no particular *use.* The general notion was to teach practical engineers to use their hands and was geared to students of college grade.

It is also surprising to notice the similarity of the teaching methods used at the Imperial Technical School[3] in 1868 with

[2] Dewhurst, J. Frederic, and Associates. *America's Needs and Resources,* New York: The Twentieth Century Fund, 1947, "Energy Output from Mineral, Fuels, and Water Power, Compared with Work Animals, and Humans 1850-1960," p. 812 (see Appendix 32.)

[3] Bennett, Charles A., *History of Manual and Industrial Education, 1870 to 1917,* Peoria, Illinois: Chas. A. Bennett Co., Inc., 1937, pp. 22-41. This and the following references to the same book used by permission of the Chas. A. Bennett Co.

many of our present day methods of teaching shopwork. The instructor would assemble the students around a workbench and describe the tools and materials. He would then demonstrate the use of the first tools to be used on the first job. Benches and sets of tools were then assigned. Workbooks were required and notes were taken on the procedures for each exercise. Following the demonstrations, the instructor went from bench to bench giving individual help where needed. Each operation performed by the student had to be accepted by the instructor before he was permitted to proceed. As the student progressed, an effort was made to have him develop independence in the solution of a problem. Careful planning for future jobs was encouraged and, upon occasion, complex models might be assigned to *small groups* of students for completion. Related information was organized by the student which would supplement the facts presented by the teacher. The teacher was required by the director to keep complete records on the progress of each student, and all work was performed in the areas of woodworking, blacksmithing, and locksmithing.

During this same era, while the early leaders in our field were wrestling with the problems of teaching manual training, another movement of shopwork instruction was taking place in Finland and Sweden, i.e., Sloyd of Scandinavia.[4] The sloyd (slojd in Swedish) means home instruction in art, handskills, patriotism, and the resulting disciplines. With the advent of the factory system home sloyd disintegrated, and educational leaders of the two countries tried to perpetuate it in the schools. Uno Cygnaeus of Finland and Otto Salomon of Sweden were largely responsible for the organization and promotion of educational sloyd. The outstanding characteristics of educational sloyd were the *making of useful objects,* useful in the home and not just abstract exercises as used by Victor Della Vos; *an analysis of processes* taught by a series of models ranging from the simple to the complex; and the conviction that this kind of work was a phase of every youngster's well-rounded education. Many educators from all over the world, especially from the United States, visited these two countries, observed the work in the schools, and learned the best training methods employed in the teaching of educational handwork. Thus an entirely different approach to the teaching of shopwork was gradually "mixed into" the existing methodologies of teaching manual training

[4] *Ibid.,* pp. 53-106.

in American Schools. The Russian system, devised by a government engineer, was a mass-production system of special education. The sloyd system, devised by educators, was an individual-production system. It was recognized that children had individual capacities and all teaching was individual in character.

Probably the most important period in the historical background of our work was the last decade of the nineteenth century. Benjamin Harrison and Grover Cleveland were successive presidents of the United States. Basketball was invented and the Anti-Saloon League was launched. The frontier had disappeared and Idaho, Wyoming, and Utah, were the 43rd, 44th, and 45th states, respectively, to be admitted to the Union. Long-distance telephone service was opened from New York to Chicago, and the Sherman Anti-Trust Act was passed with the hope of protecting the consumer and the small business man. New York had its first moving-picture show and William James published "Principles of Psychology." The fear that the nation would go off the gold standard, coupled with inordinate speculation in land and in railroad building, brought on the panic of 1893. The great Pullman Strike (1894) followed, and for the first time an injunction was used in an important way in a labor case. The battleship *Maine* was sent to Havana on a friendly visit and was destroyed by an explosion. "Remember the Maine" became a war cry, and the American people, wearied with grinding domestic conflicts, embarked with enthusiasm upon a crusade to free the oppressed people of Cuba. The *energy output*[5] in this country was approximately 52 percent animal, 10 percent human, and 38 percent technical energy represented by 31.3 billions of horsepower hours derived from minerals, fuels, and water power. It will be noticed, by comparing these figures with those previously given for 1860, that the percentages of animal energy and human energy had been greatly reduced, that technical energy had increased by 31.5 percent, represented by an increase of almost thirty billions of horsepower hours. Our country was rapidly becoming industrialized with the concomitant human problems associated with an industrial society.

It was during this era that a very important educational experiment was taking place in Boston that was to have its impact upon the teaching of shopwork in the public schools of this nation. Mr. Gustaf Larsson of Sweden, who was considered

[5] Dewhurst, *op. cit.*, p. 812.

the ambassador of Swedish Sloyd to America by Otto Salomon, was teaching shopwork or sloyd work in a private school as well as giving instruction to public school teachers (interested in shopwork instruction) in his part time. Mr. Frank M. Leavitt, a graduate of the School of Mechanic Arts at the Massachusetts Institute of Technology, and thus well trained in the basic principles and methodologies of the rigid system Dr. Runkle had observed at the Centennial Exposition in Philadelphia, was teaching shopwork in another Boston school. A third teacher, Mr. Benjamin F. Eddy, an expert woodworker trained in industry, and an excellent instructor, was teaching shopwork in still another Boston school. Eddy had combined some of the best methods from both the aforementioned systems. This is best illustrated by his series of wood-turning exercises. The student was first required to perform a series of exercise pieces. He was then required to make a series of useful projects involving the same cuts and forms he had mastered when making the exercise pieces.

Mr. Edwin P. Seaver, Superintendent of the Boston schools, sent exhibits from these three schools to the Columbian Exposition in Chicago in 1893. Also exhibited at this exposition were samples of shopwork from many of the schools that had been influenced by the earlier exposition in Philadelphia seventeen years previously. The exposition attracted much attention, and the various exhibits were studied in detail by all schoolmen and especially by teachers of shopwork. It appeared to most visitors that the various exhibits were so nearly alike that they all seemed to belong to one system, with small useful objects resulting. According to Bennett:[6]

> The effect was almost immediate. It was recognized that by accepting some of the so-called principles of the Swedish sloyd while continuing to apply some fundamental practices of the Russian system and harmonizing these with the best American practice in the use of woodworking tools . . . an American system of manual training that was pedagogically sound and practical . . . . had been produced.

In 1899 John Dewey wrote "School and Society" placing industrial occupations, in the broadest sense, at the very center of the elementary school curriculum and in 1904, Professor Charles R. Richards of Teachers College, Columbia University, wrote an editorial in the "Manual Training Magazine" suggest-

[6] Bennett, *op cit.*, p. 434.

ing that the term *industrial arts* be used to describe the existing kinds of shopwork taught in the public schools. Professor Richards contended that:

> . . . We are rapidly leaving behind the purely disciplinary thought of manual training . . . and we are beginning to see that the scope of this work is nothing short of the elements of the industries fundamental to modern civilizations.[7]

It was not long after this that Bonser and Mossman, also professors at Teachers College, coined their widely quoted definition of industrial arts.[8]

Colleges, Associations, and a New School Unit

One cannot disassociate the influences of the early colleges, associations, and public school changes, from present day teaching methods. The early public school shop-teachers were generally men, chosen from the community, who were clever with their hands and who had, perhaps, some formal training. As shop work instruction become more acceptable to educators the colleges were called upon to furnish trained personnel for this new school subject.

As early as 1880, Oswego State Normal School in New York fitted up a crude shop in the basement, and shopwork was taught by the janitor, who was a good mechanic. An industrial laboratory for woodworking was installed at the State Normal School at Bridgewater, Massachusetts, and the work was closely correlated with science. In 1883, instruction in the use of woodworking tools was begun at the State Normal School at Whitewater, Wisconsin, and the work was considered a valuable adjunct to the science department. In 1884, manual training instruction was begun at the State Normal School in New Britain, Connecticut; in 1890, at the State Normal School, San Jose, California; in 1891, at the State Normal and Model School, Trenton, New Jersey; and about 1890, the State Normal School at Millersville, Pennsylvania, had begun to teach woodwork in a recitation room which had been turned into a shop. Privately endowed institutions became famous for their contributions toward the development of teacher training in the manual arts.

[7] *Ibid.*, p. 453.

[8] As a subject for educative purposes, industrial arts is a study of the changes made by man in the forms of materials to increase their values, and of the problems of life related to these changes.

Chief among these were Stout Institute in Wisconsin and Bradley Polytechnic Institute in Peoria, Illinois. Leadership provided by such large universities as Columbia and the University of Chicago proved to one and all that the foundation of the "upstart" in educational circles was not built upon sand.

Professional associations of shop teachers began to spring up throughout the country. Chief among these were the Manual Teachers' Association in 1894, American Manual Training Association in 1896, Eastern Manual Training Association in 1900, and the Eastern Art and Manual Teachers' Association in 1910. Conferences were held throughout the land and progress was inexorable.

During the first decade in the twentieth century progress in the teaching of shopwork reached a *fork in the road.* One direction was created by a new movement which was established in 1906, the Vocational Education Movement. Practically everyone who is interested in shopwork education is familiar with the purposes of Vocational Education and the great impetus it received with the passage of the Smith-Hughes Act, which was signed by President Wilson on February 23, 1917. The other direction was followed by the proponents of industrial arts education, who gained momentum for their work within a new educational movement which reorganized elementary and secondary education in 1910. A new school unit, the junior high school, came into being at this time in Columbus, Ohio, and Los Angeles, California. The cornerstones of the junior high school are, *exploration, guidance, individual differences, and socialization.* In order to meet the demands of the new school, the general shop was created by the advocates of industrial arts education. Dr. Struck[9] has summed up the purposes of the general industrial arts shop:

> It is only through multiple activities carried on in such a shop that pupils can get anything approximating a satisfactory course of instruction that will provide the guidance, exploratory, and try-out experiences needed in industrial-arts education.

He also pointed out that the fundamental educational philosophy underlying this form of education is that industrial arts, on the junior high school level particularly, should be *varied and broad in scope* — representative of industrial arts as they exist in the world of work in industry and manufacturing.

[9] F. Theodore Struck, *Creative Teaching — Industrial Arts and Vocational Education,* New York: John Wiley & Sons., Inc., 1938, p. 460. By permission.

MID-TWENTIETH CENTURY INDUSTRIAL ARTS

The energy output from minerals, fuels and water power has reached the astronomical figure of 386 billions of horse power hours, representing a technical energy of 94 per cent. This is 383 billions more than the 3 billions in existence at the time of the Centennial Exposition in Philadelphia in 1876. Animal energy and human energy have been reduced respectively to only 3 per cent.[10] Drucker[11] says, "Today . . . areas not undergoing rapid industrialization are few and isolated; the representative, the decisive industrial unit anywhere is the large, *mass-production plant,* managed by professionals without a stake in ownership, employing thousands of people, and altogether organized on entirely different technological, social, and economic principles . . . than the family-owned or family-managed factories of yesteryear. The modern worker . . . *no longer produces,* even in the plant; he works. But the product is not being turned out by any one worker or any one group of workers. *It is being turned out by the plant.* It is a *collective* product. The individual worker usually is not capable of defining his own contribution to the productive organization and to the product. Often he cannot even point to a part or a process and say; this is my work. In an industrial society . . . it is only a very small minority of artists and professional men who can produce at all by themselves. All the others are dependent upon access to an organization to be productive. *It is the organization rather than the individual which is productive in an industrial system.*" Regardless of the attempts which have been made to protect the small business man, we know that approximately 2 per cent of American plants do approximately 50 per cent of the nation's business. Every dollar of taxation taken from industry is passed along in inflated prices to the consumers and ultimate taxpayers. We know that a labor strike in any of the major industries such as coal, steel, electrical, transportation, textile, and the like affect practically every individual in the United States.

It has been said that we have passed from the air age into the atomic age. Formal ground has been broken at Shippinport, Pennsylvania by President Eisenhower for what will be our first commercial atomic power plant. An atomically driven submarine, the Nautilus, has been launched.

[10] Dewhurst, *op. cit.*, p. 812.

[11] Drucker, Peter F., *The New Society — The Anatomy of the Industrial Order,* New York: Harper Brothers Publishers, 1950, p. 6.

The Bell Telephone Laboratories has a battery that converts sunlight into electricity — enough electricity for the amplification of speech on telephone lines. A sun-powered battery has been developed in Dayton, Ohio, by the Wright Air Development Center which can supply current enough to light lamps and operate electric appliances in an average home twenty-four hours a day.

A year ago an unmanned balloon floated up from Texas carrying a package of film. At an altitude of 25 miles a particle from outer space tore through the package of film. When the film was developed straight tracks were in evidence. The particle collided with a proton and converted it into light — the light (photons) turned into electrons (energy). To produce the tracks it was found that *ten million billion* volts were necessary. Compared with this the energy released when an atom in an H-bomb explodes is feeble.

Technological progress is inexorable.

Industrial Arts in the Public Schools

It is very difficult to separate method from curriculum. Both go hand in hand. There seems to be a vicious circle of misunderstanding concerning public school teaching methodology, demands by supervisors (city and state,) and college teacher education. Each makes demands upon the other.

The following may cause some consternation. *Since the first decade of the 20th century, industrial arts education has not kept pace with our rapidly changing industrial society, nor has it measured up to the concepts and methodologies of 1955 general education.*

For years, industrial arts teachers *copied* the job or trade analysis approach used by vocational educators in making courses of study. In fact this is still very prevalent throughout the country in various state and city bulletins or syllabuses. Many trade and vocational teachers have been employed as industrial arts teachers with resulting emphasis on a high degree of skill (hand and machine) as well as upon job training. Much groping has been done by the leaders in our field and general confusion seems to appear throughout the country as to the methods of attaining or interpreting the aims and objectives of industrial-arts education. Very few state departments of education have a division of industrial-arts education — this division generally being buried somewhere in the over all organization of the departments of industrial-vocational education.

There seems to be no available data on the number of city or state courses of study or the number of city and state supervisors of industrial arts education.[12] It appears that most supervisors of industrial arts education have come up from the ranks of early manual training or have been borrowed from the field of vocational education. Most of these gentlemen have a tendency to carry on the job analysis and skills program which was a direct result of the Columbian Exposition in Chicago held sixty-two years ago. This same indictment can be made of many college professors teaching unit shops. Basic projects are a must and squaring a board, joints, exercises, and many obsolete manual training "fundamental" operations and processes which date back to the days of the horse and buggy, *must be taught daily.* The operation progression chart is very much in evidence on the walls of many shops.

We have beaten our chests and shouted to the educational world about the importance of industrial arts. On *paper* we have the finest of modern educational objectives. We lay claim to the accomplishment of training all boys and girls to meet the demands of our industrial society. Let's look at a few facts.

In a survey of education in the United States,[13] it was found that the curriculum area of industrial arts enrolls only *25 per cent* of all pupils in all types of secondary schools. Among the industrial arts subjects, the largest enrollments are found in general shops, woodworking, and mechanical drawing respectively. *These three subjects account for three-fourths of the enrollment in the industrial arts field.* Next in order of frequency of mention is metal work, which enrolls only 2.8 per cent of all pupils, and printing, which enrolls 1.2 per cent. All other industrial arts subjects listed report an enrollment of less than *1 per cent* of the total secondary school enrollment. Variations in percentages of pupils enrolled in industrial arts courses in the 48 states and the District of Columbia range from a low of 3.6 per cent to a high of 42.1 per cent. It can certainly be assumed that if only one-fourth of the youngsters in this nation are subjected to industrial arts courses - and three-fourths of this fraction are subjected to only three different types of shopwork - it is high time for us to "get out of the rut" and to discard our

[12]. Gerbracht, Carlton John, *Industrial Arts Teacher Supply and Demand in the United States.* Reprinted from *Abstracts of Doctoral Dissertations,* No. 62, Columbus, Ohio: The Ohio State University, 1952.

[13] "Offerings and Enrollments in High School Subjects" Chapter 5 of *Biennial Survey of Education in the United States, 1948-50.* Office of Education, Washington, D. C.

"habit thinking." It is imperative that every industrial arts teacher conscientiously examine the contributions of his program to modern day aims and objectives.

In an article in *School Shop Magazine*,[14] it was pointed out that more than three-fourths of the youngsters in our public schools favored opportunities for practical work experiences. More than half of them would take industrial arts to develop a hobby or to gain *general* experience with tools and materials while more than one-fourth of them believed such training would help them to get a job. If given preference for shopwork, over 40 percent indicated a desire for *general* shop work . . . over 40 per cent of the students who planned to go to college or into business would take a general industrial arts course *if it was offered* in the school and more than two-thirds of them would like training in home-mechanics. Our industrial arts programs should meet the needs of these youngsters and we can't do it with "straight-laced" courses in two or three unit general shops, woodworking, and mechanical drawing.

In a recent public school survey of one of our large cities it was found that the program of industrial arts was conducted in 107 shops distributed among 92 schools. Seventy-two teachers instructed classes in schools housing grades K-8 and twelve teachers conducted courses in nine academic schools.

Organized shop courses are required for all boys in grades 6, 7, and 8. Senior high school courses are elective. In the elementary grades (1 to 6) two different kinds of industrial arts work are conducted. One of these is an outgrowth of the elementary school classroom program and provides for construction work . . . the other form places emphasis on tool processes in woodwork . . . *entire classes make the same article at the same time.*

In grades 7 and 8 classes meet two double periods weekly. In 24 of the schools visited, the course included woodwork; in nine of these schools metalwork was taught; electricity was taught in four schools; ceramics in two; printing and textile work each in one school. In the seventh grade shops visited, and in 19 out of 29 eighth grade shops visited, *all* pupils in the *same* class follow the *same* plans in making their projects. Shop demonstrations and technical lessons were given by group instruction. Only six of 29 teachers visited used pupil project planning forms.

[14] Anderson, Stuart. "How Does Industrial Arts Rate?" *School Shop*, Vol. XI, No. 7 (March 1952,) pp. 5-6.

In the senior high schools considerable emphasis was placed upon project construction and technical information. Less than 10 per cent of the pupils in senior high schools are enrolled in industrial arts courses. Work is largely limited to woodwork. Four of the schools have metal, printing, and electrical equipment and two are planning for printing and ceramics.

In the senior high schools there was confusion on the part of the school principals concerning the objectives of the industrial arts courses in their schools. Nine principals interviewed listed 26 different objectives. There was general agreement (66 per cent of the principals) that one purpose of industrial arts education is to give pupils experience with tools and materials. Only 30 per cent of those interviewed attached guidance or exploratory value to the industrial arts courses. Thirty per cent of the principals considered industrial arts to be vocational in character.

Industrial Arts Teacher Education

Probably the best picture of mid-twentieth century industrial arts teacher education was presented in our 1952 yearbook.[15] A few items from the synthesis of data (pages 1 to 10) follow:

> The term "Industrial Arts" is preferred in 141 of 200 schools offering industrial arts programs . . . the number of personnel in industrial arts teacher education showed an overall 69 per cent gain during the decade 1941 to 1951 . . . instructional programs in industrial arts teacher education have shown a distinct prediliction for the familiar materials areas of woods and metals, as well as drafting. Programs in crafts appear to be on the increase. Transportation is a strong newcomer. Graphic arts is emphasized, but in far less degree than the "big three," of which woods and drawing are still predominant . . . the typical program offers a total of 105 semester hours of work and includes 19 hours of woods, 14 hours each of drawing and metals, 11 hours each of graphic arts and professional courses, 8 hours of electricity, and 5 hours each of crafts and general shop. Other courses in which transportation experiences predominate, total 18 semester hours. This program leads to a bachelor of science degree, usually designated as a bachelor of science in education. If a master's degree is offered, it is probably a master of arts in education or a master of education degree . . . 14 institutions offer doctoral work . . . the department has five faculty members, with a head who ranks as professor, one associate professor, one assistant professor, and two instructors. These men deal with

[15] *1952 Yearbook Inventory-Analysis of Industrial Arts Teacher Education Facilities, Personel and Programs*, American Council on Industrial Arts Teacher Education; Edited by Walter R. Williams and Harvey Kessler Meyer; The McKnight and McKnight Publishing Company, Bloomington, Illinois.

about one hundred industrial arts majors, some full-time, and some part-time students, reasonably equally divided. It is not likely that there is a graduate program, for only one in three institutions has such a program. If one exists, it is handled by the regular staff, and has ten graduate students pursuing work. The staff members' professional preparation is most likely to include the attainment of a master's degree. Less than one-half the departments have a staff member possessing a doctor's degree. Instructors may have a master's degree —many do not . . . approximately 10 per cent hold no degrees, most of these being in specialized instructor brackets for skills work . . . a combined laboratory space of 23,000 square feet, and an equipment valuation of $148,000 provide a mean equipment expenditure of $6.44 per square foot of space . . . the typical laboratory possesses an area of 14,000 square feet and houses equipment valued at $112,000 . . . *metals and wood occupy 50 per cent of the total space devoted to industrial arts.*

At the *turn* of the *century* shopwork instruction was under attack by various educators.[16] It was claimed that there was no information "stored up" in tools, but there was information "stored up" in books; that whatever strength of energy was expended on shopwork was withdrawn from mental training; that it was "wooden in its teachings;" that "the thought side is feeble;" that it was "iron in its rigidity;" that courses were not liberal "because they hardly touch science, which is rapidly becoming the basis of every industry;" they deplored the rigid course of models (basic projects) and claimed that "uniformity is absolute tyranny" and "to put down a course of study and say that every teacher shall follow it is tyranny"; it was claimed that shop teachers had not been broadly educated and therefore did not have a professional outlook beyond the technical phases of the subject they were teaching. It would appear that a direct parallel can be drawn between shopwork instruction at the turn of the century, and industrial arts instruction (in the public schools as well as in teacher-education) in mid-twentieth century. It would seem that very little over all progress has been made. Certainly "professional advancement in the field of industrial arts demands a new sense of mission, the envisioning of new goals, and a renewed devotion to the ideal of industrial arts opportunities for all American youth."[17]

Woodwork is not industrial arts education. Nor is metalwork or drafting. They are only phases of the curriculum area of in-

[16] Bennett. *op. cit., pp.* 439-455.

[17] *1952 Yearbook, op. cit.,* p. 10.

dustrial arts education. This curriculum area[18] is a phase of general education that deals with industry — its organization, materials, occupations, processes, and products — and with the problems resulting from the industrial and technological nature of society. Industrial arts teacher-education is largely responsible for the static condition of industrial arts education in the public schools. It is quite obvious that we have graduated teachers of woodwork or metalwork or drawing. We have *graduated very few teachers of industrial arts education.*

Our graduates should be well trained in all industrial arts shop areas, i.e., textiles, ceramics, woodwork, electricity, leatherwork, plastics, metalwork, drawing, graphic arts, transportation, general science, physics, chemistry, and art. Each area should receive *equal* consideration. This means that the time spent in the area, the amount of money invested for equipment and supplies, shop space, and such methods of shop teaching as demonstrations, lectures, reading assignments, industrial visits, project selection, number of visual aids used (films, slides, etc.) should be *equalized.*

Our graduates should be equipped to teach youngsters how to plan and/or create a project in all the above areas, how to construct the project, and how to integrate the science and mathematics involved. Our neophyte teachers should realize that the project is only a vehicle used to meet the goals of general education which may be summed up as implying three basic purposes:[19] (1) to transmit a way of life, (2) to improve and reconstruct that way of life, and (3) to meet the needs of individuals. Our teachers must learn that if the interest of the child is personally centered in the project or in his activities, the work becomes richly meaningful to him. What the child learns is not superficial, but enters into his personality and influences his point of view and approach to things in general. He will plan, read, write, figure, cooperate, and appreciate. The youngster will learn industrial arts when such traits as creativeness, independence, responsibilty, initiative, and the power to think, do, and enjoy, are brought into play. If, however, colleges continue to turn out industrial art teachers (?) who are capable in the "skills" program of two or three unit shop areas, and whose teaching does not enter into the personality of the learner, or affect the learner's thinking, or shape the learner's mental de-

[18] Wilber, Gordon O., *Industrial Arts in General Education*, Scranton, Pennsylvania: International Textbook Company, 1954, p. 2.

[19] Wilber, *op. cit.*, p. 3.

velopment, or influence the action of the learner, *spurious* results will accrue.

There are a number of reasons why we have a static curriculum and why there is a lack of growth in progressive methodologies. Too many programs of industrial arts education in colleges are a collection of unit shops. Professors become associated with certain types of shops. They will teach only metalwork or drawing or methods of teaching, etc. The students may take woodwork in their freshman year and never touch a woodworking tool again until they take a city examination or go to work in a public school. Of course there are those college programs that require two years of certain shop areas, thus specializing their students to teach "degrees of skills" in only several phases of industrial-arts education. The students have been indoctrinated in the unit shop plan, how to make a course of study (job analysis) in a *phase of* industrial arts education, how to demonstrate certain isolated skills, how to teach youngsters to make a project which has been superimposed by the teacher to provide a vehicle for his (the teacher's) job analysis. Thus the gate hook and chisel becomes a requirement in forging, the funnel and sugar scoop in sheet-metal, the pump lamp and bread board in woodwork, fifteen unrelated plates in drawing, the split-pattern anvil in foundry, etc. Our young tyros teach as they have been taught. They cannot teach too much about the "changes man makes in the forms of materials to increase their values for human usage, and the human problems of life resulting from these changes." Course content becomes narrow, is geared to the few isolated skills of the teacher and to his attitude that a few hand skills well taught and well learned by the pupil meet the aims and objectives established for our field. Our graduates soon learn that it is much easier to require *basic* projects than to teach diversified activities, cross-fertilized by the interests of the pupils. The young teacher's conscience is clear — after all that's the way he was taught in college.

Various attempts have been made by colleges to break with tradition and to improve curriculum and teaching methods. They have, however, run *head on* into state certification requirements, city examinations conceived by "men in the field," and criticisms from supervisors and administrators of every rank. Many state departments have not altered their requirements in the last thirty years or more. Many graduates of our colleges take competitive performance examinations given by city examination boards to obtain teaching positions. Thus an individual's skill

in making a through-multiple dovetail joint, or a sheet-metal French watering can, or his ability to set-up a work-and-turn form, becomes the criteria for industrial-arts teacher selection. They are also examined on the "old and tried" textbook-assignment-recitation scheme of teaching which is so familiar to experienced teachers and possibly upon some other famous type of lesson presentation.[20] These forms of lesson presentations being rigid stereotypes are the methods suffering from standardization and superficiality.

If the beginning teacher survives the examination and is placed in a teaching situation he becomes subservient to some state, city, or local supervisor. In too many cases the teacher must organize his course and use those teaching methods recommended by some person in "power." There is a great lack of freedom for new ideas, for experimentation, classroom research in methodology, and investigations into new curriculum areas which would lead to acquisitions of new pupil concepts.

Thus colleges must train for examinations and certain teaching requirements in certain areas in order to *place* their students. The demands of state certification bureaus affect colleges, teachers, and local public school administrations. Supervisors perpetuate (preserve from oblivion) *established* curriculums.

Much valuable research has been accomplished in graduate work. In practically all cases the results are *too far advanced* for the field. It cannot be used in the public schools because it is useless in terms of existing teaching situations. The textbook companies will not publish most of the research projects because "they will not sell." In 1951 one of the publishers in our field sold over 20,000 copies of metalworking textbooks, over 17,000 copies of woodworking and a like number concerning drafting. *Textbooks concerned with any other area of industrial arts never reached the five thousand sales figure.* "Viva Manual Training."

Public School Developments and Trends in Industrial Arts Education Affecting College Teaching

There are three fairly modern developments in industrial-arts education which are slowly, but much too slowly, gaining

[20] The inductive development lesson originated by the German educator and the psychologist Herbart. Lifted from its context by American students who visited Germany and who promoted it as a cure-all. The familiar and time-honored steps are: (1) Preparation, (2) Statement of Aim, (3) Presentation, (4) Comparison and abstraction, (5) Generalization, (6) Application. *Or*, the deductive-development lesson with its (1) Presentation of data, (2) Assimilation, (3) Inference, and finally (4) Verification.

momentum. One is the development of the Comprehensive General Shop[21] in the East. In this shop, graphic arts, electricity, textiles, woodworking, metalwork, ceramics, leatherwork, and plastics are taught in one shop simultaneously to all boys and girls of secondary school age. In this shop a functional pupil-personnel organization as well as a study or research center are necessities. Planning by the pupils and academic correlations cannot be avoided.

Another development is the Laboratory of Arts and Industries. This shop laboratory, found principally in the South and Middle West, excludes no shop activity from its program and is based upon a new curriculum which embodies such areas as power, construction, manufacture, transportation, communication, and personnel.[22]

The third development worthy of note is the progress being made in elementary industrial-arts education. Industrial arts teachers are being used as consultants by elementary grade school teachers where the activity program is used. In some elementary schools, small industrial-arts laboratories have been established. Strong elementary school programs of industrial arts will undoubtedly force the raising of standards of industrial arts in the junior and senior high schools.

An important trend in our work is a gradual uprising among many industrial arts men who resent the traditional offerings and the ancient methods of presenting industrial-arts education to today's youth. They are beginning to evaluate their work in the light of modern-day education, to experiment with and exchange new ideas through the media of state and national conferences and by the printed word, to conduct studies — many of which have been done in partial fulfillment of the requirements for advanced degrees,[23] and to organize and teach new courses in shopwork in an attempt to modernize and broaden the offerings of our curriculum area. Besides the three top-

[21] *Industrial Arts Syllabus in Comprehensive General Shop:* University of the State of New York, Albany, N. Y., 1949. See also the appendix to this chapter.

[22] *Florida Presents a Guide to the New Technology in Industrial Arts.* Bulletin No. 12, 2nd Edition. State Department of Education, Florida, 1948. See also the appendix to this chapter.

[23] *Studies in Industrial Education,* A.V.A. Bulletin No. 4, 1949, 160 pages. American Vocational Association, Inc., 1010 Vermont Avenue, N. W., Washington, D. C. (A bibliography consisting of a listing of 2,002 studies in the field of industrial-education completed during the period January 1930 to September 1948. Comments or annotations are included on 1,396 of the studies.)

ranking types of shopwork already mentioned, the secondary school enrollment in subjects offered in fifteen or more states are, in order of their rank: metalwork (4th,) printing (5th,) electrical work (6th,) handcrafts (7th,) automobile mechanics (8th,) and home mechanics (9th).[24] Secondary school enrollments in *uncommon* subjects offered in *fewer* than *fifteen* states are, in order of their rank: plastics (14 states), industrial arts aviation (9 states), textiles (6 states), and transportation laboratory (2 states).[25] It is encouraging to note[26] that among the broad subject fields offered in the public schools, home economics and industrial arts had the greatest percentage increases in enrollment from 1934 to 1949.

SUGGESTED TEACHER EDUCATION TO MEET THE CHALLENGE

Any college group responsible for industrial arts teacher education should resist being poured into any one mold or being "kept" propagandists for the doctrines of any pressure group. Certainly our departments of industrial arts education must, without compromise or hesitation, sift and winnow in their pursuit for truth. Our curriculums should not, however, become a "tossed salad" or a melange of courses piled one on top of the other without internal unity and external integration. Admittedly, we must prepare our graduates to teach in certain communities, communities which make certain demands upon their teachers, but to the best of our ability we must help the following situation:

> Select a young and pleasing personality: drain off all mannerisms of voice, dress or deportment; pour over it a mixture of equal parts of the wisdom of Solomon, the courage of young David, the strength of Samson and the patience of Job; season with the salt of experience, the pepper of animation, the oil of sympathy and a dash of humor. Stew for about four years in a hot classroom, testing occasionally with the fork of criticism thrust in by a principal or superintendent. When done to a turn, garnish with a small salary and serve hot to the community.

Experiments in industrial-arts teacher-education should be reported to the American Council on Industrial Arts Teacher Education. The Council, in turn, should assume the responsibility of notifying all member colleges of any experiment. Individual colleges should be professionally responsible for contacting persons in charge of the experiments taking place throughout the

[24] "Offerings and Enrollment in High School Subjects," *op. cit.*, pp. 62-65.

[25] *Ibid.*, pp. 92-93.

[26] *Ibid.*, p. 28.

country at the present time. Several experiments, however, beginning in September, 1955, should be watched by the Council. Comparative data will not be available until after 1960. These experimental programs are four years in length and the graduates must serve in the public schools for at least one year before evaluations can be made.

A new curriculum has been devised for the School of Education, New York University. With the help of faculty advisers, students plan their programs from the *three* major areas of the new curriculum: general core, educational theory and application, and specialization. It is hoped that through its unified approach the new curriculum will help the student integrate his experiences and to develop the understandings, appreciations, and skills needed.

Briefly, the general core area (approximately 60 points) will provide the student with opportunities to grasp facts, principles, and concepts that are basic to and cut across many fields of knowledge. Learning experiences in this area are designed to yield common understanding of nature, of man, and of society in relation to which the student may conceive and play his personal and professional roles. More specifically, the educational outcomes of the learning experiences in this area deemed vital to the citizen as an educator and to the educator as a citizen include:

1. Understanding the world of nature and man's increasing capacity for adaptation to and mastery of it.
2. Understanding man's cultural heritage and growth in capacity to evaluate it as a basis for intelligent action.
3. Understanding self and others and growth in capacity for continuing self development and for relating to others.
4. Understanding the contemporary social scene and the development of values and skills necessary to effective participation in the solution of its problems.
5. Understanding the role of communication in human living and developing skill in communication.
6. Understanding the role of aesthetic forms in human living and developing the capacity for satisfaction in such forms and self expression through them.

The development of these educational outcomes in the general core area, as well as those related to the other two major areas of the new curriculum, are fostered and enriched through the active participation of the student in the life of the surround-

ing community, through continuous association in the community to improve education for democratic values, and through directed experiences in learning to use effective modes of thinking and applying them in defining and seeking solutions to his problems. Lectures, discussions, wide use of audio-visual materials, laboratory and studio facilities will be used in seeking satisfactory solutions to the basic problems under consideration.

In the area of educational theory and application (approximately 20 points including student teaching) students will be given an opportunity to test in actual practice what they have learned about children, youth, and adults in many environments. From their experiences in the areas of general core and specialization (industrial arts) they will learn about the nature and needs of society, about the growth and development of human beings, about environments and relationships that best promote learning and development, about how to work with other people as individuals and as members of groups. In applying and practicing educational theories the students will be people learning how to work with other people; people learning how to use their skills through practice in developmental patterns. They will learn and practice their skills just as members of other professions learn and practice theirs. The following competencies will appear in every course in one form or another, so that the young teacher candidate will begin his study of the use of the group process in his first year and continue the study every year thereafter;

1. Recognizing needs (to be sensitized to all those needs that are relevant to the learning situation).
2. Relating needs to the teaching process (to use the knowledge of needs in making education meaningful, in building incentive, in developing the proper climate for learning, etc.).
3. Developing problem-solving skills.
4. Using the group processes (for committee, faculty, PTA and other community meetings as well as classroom use).
5. Counseling (for conferences with students, parents, staff members).
6. Analyzing values (to recognize the values of students, the differences among them and the effects on incentive; to recognize self-values and their effect on classroom behavior).

7. Evaluating goal achievement; including the teacher's role (using, in the process of evaluation, all of the above skills).

It is hoped that through field and laboratory experiences in which the teaching candidates use films and other visual media; materials produced by and about children, youth, and adults; recordings; and observations; the above skills and competencies will be developed and extended. By using group processes, analyzing thinking, extending concepts, identifying and resolving needs, testing theories of learning and development, the teaching candidates' own abilities to communicate, to think, to reflect, and to act intelligently will be sharpened and refined.

In the area of specialization (approximately 50 points) the teaching candidate must develop mastery in his chosen field. It is important that the candidate have opportunities to investigate his specialized area thoroughly in order to develop an understanding of its place in the total educational program. The courses and experiences provided the candidate in his area of specialization have been worked out carefully in order to meet generally accepted certification requirements. However, the student's program opportunities go far beyond certification requirements and offer extensive and intensive preparation for special field demands.

In the specialized field of industrial-arts education, *eight* basic shop courses will be required for all students. *Each* shop course carries five points of credit and meets four times each week (3 clock hours each period) for fifteen weeks.[27] The comprehensive general shop is offered to first term Freshmen. The aim of the course is one of orientation to industrial arts and to teaching. Mechanical drawing is offered to second term Freshmen. This course is functional to *all* shop areas. Textiles is offered in the first term of the Sophomore year and ceramics and metalwork in the second term. Woodwork and graphic arts are offered in the first term of the Junior year and electricity in the second term. The Senior year is reserved for elective shops. Each senior student may choose 2 points of advanced shopwork in any *four* of the basic shops (a total of 2 different shop areas or 4 points each semester) according to his needs and interests (the total electives for the year not to exceed 8 points.) The balance of his program will of course, be in the areas of educational theory and applications (including student teaching) and in core.

[27] 36 clock hours per point totals 180 clock hours for each shop.

Courses in Essentials of Art and Industrial Arts Design will be centered in the second term of the Sophomore year and an attempt will be made to correlate learning throughout the eight shop areas. Specialized methods courses will be centered in the second term of the Junior year and will be directly correlated to the area of educational theory and applications. A special feature of the specialized methods courses is a *pre-student teaching* center located in a private school (K to 8th grade, boys and girls) near the campus where all teaching techniques and theories can be applied and evaluated. (See appendix to this chapter, page 123.)

Another experimental program in industrial-arts teacher-education will be conducted in New Jersey. Dr. Carl E. Frankson is in charge of the program. A new building is being built to house the industrial arts department at the State Teachers College, Montclair, New Jersey, and the new program should begin at this institution in September, 1957.

Neophyte teachers will be prepared in a large industrial arts laboratory which will contain all recognized shop areas, i.e., woodworking, metalwork, textiles, ceramics, graphic arts, electricity, planning center, transportation, and crafts (leather, plastics, etc.). Freshmen will take Industrial Arts I, and will receive preliminary instruction in *all shop areas*. Sophomores will take Industrial Arts II, and will receive instruction in the *same shop areas*, the instruction being based upon the learnings of the Freshman year. Juniors will take Industrial Arts III, and again, the instruction will be based upon the accumulative learnings of the Freshman and Sophomore years. The Senior year will be concerned with student teaching and advanced shop work according to individual candidate needs.

The purpose of these two teaching experiments, if they can be called experiments, is to indoctrinate and/or to "steep" the teaching candidate with industrial arts. It will be noticed that both plans place emphasis on equal training in all shop areas. One plan is composed of a series of unit shops, the other is a well balanced laboratory. Textiles will be as important as woodworking. Centering a ball of clay will be as important as soldering. Heating, bending and twisting plastics will be as important as heating, bending and twisting metal. The construction of a shop apron will be as important as making an orthographic projection.

All teaching candidates must face the tasks involved in explaining ideas and developments, planning, individual instruc-

tion, group instruction, initiating, administering, showing and demonstrating, clarifying ideas, thoughts, feelings, aspirations and interests for all students. They must learn to contribute to the emotional security of children in many group situations, to relate industrial arts to the work of the community, the school, and society, and to integrate these for the best educational effort possible. They must also evaluate, record, report, recognize individual differences and individual rates of learning, diagnose learning difficulties, and carry on such remedial efforts as will help the particular student to become a more effective learner. The teaching candidate must realize that he is a part of the whole school and must relate himself to schoolwide policies and personnel, to the profession of teaching, and to the community in the broadest sense. He must realize that it is *his* responsibility to *improve* the conditions of industrial arts in his first job and he should have the "know-how." He should not be afraid to experiment with new ideas and should have the courage of his convictions. *Colleges can take leadership if they will support their graduates.*

Another experiment worthy of the attention of the American Council on Industrial Arts Teacher Education is the one being conducted by Professor George R. Keane, Division of Industrial Arts, The City College of New York. For several years Professor Keane has been experimenting with a mass production project in industrial-arts education. Professor Keane presented a paper outlining this experiment at the 1954 annual convention of the New York State Vocational and Practical Arts Association. A report of this method entitled "Understanding Industry As Part of General Education" will be found in the appendix to this chapter.

CONCLUSION

If we plan to train teachers in industrial-arts education to interpret our industrial society to the youngsters of our nation through the medium of general education, we certainly face a Herculean task. How can we hope to do this, (a) with the narrow program of shopwork which is in existence today, (b) with only 25 per cent of the youngsters in our public schools enrolled in industrial arts, and (c) with three-fourths of this enrollment in general shop, woodworking, and mechanical drawing? Are we so steeped in the practices and methodologies of late nineteenth century vintage that we fail to take cognizance of modern educational thought and mid-twentieth century industrial change

and progress? Is there a need for *all* teachers and supervisors of industrial arts education to re-examine and re-evaluate their offerings, so that our program will "concern itself with the materials, processes, and products of manufacture, and with the contribution of those engaged in industry."[28] Are our teachers today familiar with modern industry and with the needs of mid-twentieth century adolescents?

In Parma, Ohio (a residential suburban center in the highly industrialized metropolitan Cleveland area), a new industrial education center has been built to serve the youth of the community. In the community survey for the center the following was noted:[29]

The greater portion of the residents are younger families who are actively interested in the schools for the advantages they can provide their children and themselves. Industries in the immediate area where most of these people are employed are among those pioneering in the trend toward "Automation" — hailed by many as the beginning of a second industrial revolution. Conferences with the management of these concerns revealed some of the consequent factors to be considered in planning a program for industrial education:

a) That industry is subject to rapid change — constantly producing new products with new materials and consequent new procedures.

b) That of necessity, workers from the unskilled to the professional designers and engineers are re-learning their jobs every 5 or 7 years.

c) That job opportunities are constantly diminishing for the unskilled and increasing for the technically trained worker.

d) That, at best, we can predict only the general fields of interest and aptitude of our school youth in selecting a vocation.

e) That, even then, the force of chance and circumstance further complicate vocational predictions.

f) That vocational preparation in general areas is preferable to highly selective specialization at the high school level.

g) That with *automation* will come a higher standard of living and more leisure time.

h) That in addition to the well-recognized moral values we need to develop in our youth versatility, understanding, a desire to work, good work attitudes, job background, tool knowledge, and good learning habits.

Curriculum planning in the field of industrial education, therefore, called for facilities that would provide experiences in the basic industries

[28] *Industrial Arts in Pennsylvania, Bulletin 331*, Commonwealth of Pennsylvania, Department of Public Instruction, Harrisburg, 1951, p. 3.

[29] Detrick, J. H., "New Industrial Education Center" *Industrial Arts and Vocational Education* Vol. 44, No. 3, pp. 78-80. (March 1955).

for both school-age youth and the out-of-school adults. Thus, to fully serve the community the program had to be planned to provide opportunities for exploratory, specialized, and relearning experiences to pace the problems of all age groups living in a situation where change apparently was to continue to be the most dominant and constant factor.

It would be interesting to speculate on how many of our industrial arts teacher graduates could meet the needs of the youth who attend this new industrial education center.

Tailor-made 5th year programs (M. A. or equivalent) are needed in our colleges to *strengthen* the *weaknesses* and to *meet* the *needs* of our teachers. Practical doctorate work is needed, especially in the broad area of "interpreting our industrial society" to adolescents. It would seem imperative that the American Council on Industrial Arts Teacher Education establish a committee on higher education.

Perhaps a fitting statement for the conclusion of this chapter would be a note on guidance. It is not new — but it is certainly still valid. John Locke, in the year 1695, gave us the following. "He therefore that is about Children, should well study their Natures and Aptitudes, and see, by often Trails, what Turn they easily take, and what it is fit for; he should consider what they want; whether they be capable of having it wrought unto them by Industry, and incorporated there by Practice; and whether it be worthwhile to endeavor it . . . Every one's natural Genius should be carry'd as far as it could; *but to attempt the putting another upon him, will be but Labour in vain . . . . .* "

REFERENCES

1. American Council on Industrial Arts Education, *Inventory-Analysis of Industrial Arts Teacher Education Facilities, Personnel and Programs.* Yearbook 1, 1952.

This is the first yearbook sponsored by the American Council on Industrial Arts Teacher Education. Through the combined efforts of the members of the Industrial-arts teaching profession, information is provided the reader for an accurate overview of the current status of industrial arts teacher education.

2. American Vocational Association, *A Guide To Improving Instruction in Industrial Arts.* 1010 Vermont Avenue, N. W., Washington 5, D. C., 1953.

A revision of "Standards of Attainment in Industrial Arts" and "Improving Instruction in Industrial Arts." It is a broad treatment of the field and is especially prepared to assist the teacher of industrial arts in improving the quality of industrial arts instruction.

3. American Vocational Association, *Studies in Industrial Education.* Bulletin No. 4, Washington, D. C., 1949.

A bibliography listing 2,002 studies in the field of industrial education completed during the period January 1930 to September 1948. Comments or annotations are included on 1,396 of the studies. This bibliography provides a ready source of information to graduate students, teachers, supervisors, and administrators, on materials not ordinarily available in standard textbooks. Now out of print but available at most college libraries.

4. Anderson, Stuart, "How Does Industrial Arts Rate?" *School Shop,* Vol. XI, No. 7, March 1952, pp. 5-6.

This article presents some opinions on industrial arts as expressed by students. Mr. Anderson quoted from a research report by Remers, Drucker, and Kirk, Youth Looks Toward the Future in Education, Report of Poll No. 29, Purdue Opinion Panel, Lafayette, Indiana, Division of Educational Reference, Purdue University, May 1951.

5. Bennett, Charles A. *History of Manual and Industrial Education 1870 to 1917.* Peoria, Illinois: Chas. A. Bennett Co., Inc. 1937.

In 1926 Charles A. Bennett published the first of two volumes on the history of industrial education. Volume one, History of Manual and Industrial Education Up to 1870 begins with labor and learning before the Renaissance and closes with the development of art education in relation to industry. The book is well illustrated and has a chronological chart which summarizes dates and events of industrial education in America, Switzerland, Germany, France, and England. In 1937 Bennett published Volume two, History of Manual and Industrial Education - 1870 to 1917. This book begins with the Russian system of teaching the mechanic arts and closes with the Vocational Education Movement. The book includes a chart of significant dates to focus attention on significant events in the development of manual and industrial education. These two volumes are probably the best sources for anyone interested in the evolution of industrial education.

6. *Biennial Survey of Education in the United States, 1948-1950.* Chapter 5, "Offerings and Enrollments in High School Subjects" Washington 25, D. C.: Superintendent of Documents, U. S. Government Printing Office.

Enrollment figures for all secondary school subject areas are charted. Excellent comparisons can be made and emphasis noted.

7. Detrick, J. H., "New Industrial Education Center" *Industrial Arts and Vocational Education* Vol. 44, No. 3, March 1955, pp. 78-80.

An article by the Director of Industrial Education of Parma, Ohio explaining recent improvement in the educational facilities of a rapidly growing community. It presents some of the plans for the new physical facilities for industrial education.

8. Dewhurst, J. Frederic, and Associates. *America's Needs and Resources.* New York: The Twentieth Century Fund, 1947. See especially "Energy Output from Mineral, Fuels, and Water Power, Compared with Work Animals, and Humans, 1850-1960," p. 812.

An excellent source of information on energy comparisons in the United States. A new and enlarged edition has recently been published under the title America's Needs and Resources: A New Survey. This volume carries forward the work on energy in the original volume and devotes a large part of a chapter and a long appendix to this subject.

Another reference by the same author is a paper entitled "Relation of Energy Output to Production in the United States" which was delivered by Mr. Dewhurst before the joint session of the American Association for the Advancement of Science, the Academy of World Economics, and the American Economic Association in Chicago, Illinois on December 31, 1947.

9. Drucker, Peter F., *The New Society - The Anatomy of the Industrial Order.* New York: Harper Brothers Publishers, 1950.

An excellent book which should be of interest to all those individuals interested in an analysis of our industrial society.

10. Florida State Department of Education, *Florida Presents A Guide to the New Technology in Industrial Arts.* Bulletin No. 12, 2nd Edition, 1948. Tallahassee, Florida.

The purpose of this guide is to present a number of the major educational needs in an age of technology, during which the science of industry has become a dominant element in our national life. The bulletin is a guide for basic procedures and covers such topics as; industrial arts in general education; industrial arts in the junior high school; industrial arts in the senior high school; administration of the program; and the teacher and the profession.

11. Gerbracht, Carlton John, *Industrial Arts Teacher Supply and Demand in the United States.* Reprinted from *Abstracts of Doctoral Dissertations,* No. 62. The Ohio State University, 1952.

An excellent report on a research study concerning the status of teacher supply and demand in industrial arts.

12. Pennsylvania Department of Public Instruction, *Industrial Arts in Pennsylvania,* Bulletin 331. Harrisburg, 1951.

This bulletin presents to school administrators, supervisors, and teachers, the various aspects of providing, organizing, and conducting industrial arts in the secondary schools.

13. Struck, Theodore F., *Creative Teaching - Industrial Arts and Vocational Education.* New York: John Wiley & Sons, Inc. 1938.

This text was prepared as an aid to teachers in service and presents the principles, procedures, and techniques of teaching the practical arts and vocational education. The book emphasizes that learning is a creative experience and discusses appropriate methods of teaching the industrial arts and vocational education to help the teacher attain his desired goals.

14. The University of the State of New York, *Industrial Arts Syllabus in Comprehensive General Shop.* Albany, New York, 1949.

This bulletin is for use primarily in grades 7, 8, and 9. It is a flexible syllabus which may be adapted to conditions found in industrial arts shops

in city and village schools. It is a synthesis of operations, processes, projects, suggested records, etc. for the industrial arts areas of printing, electricity, textiles, woodwork, metalwork, and ceramics. This syllabus is proposed as a prerequisite for any senior high school industrial arts course because of its comprehensive offerings.

15. Wilber, Gordon O., *Industrial Arts in General Education.* Scranton, Pennsylvania: International Textbook Company, 1954.

Dr. Wilber wrote this book for both young and mature teachers with the aim of promoting thinking in the areas of general education and particularly in the problems of industrial arts. The book has been adopted by many colleges as a text for classes dealing with principles and methods of teaching industrial arts. The book presents an excellent overview of the place of industrial arts in the general education program.

APPENDIX TO CHAPTER V

Items 2 through 9 are various *samples* of method or assignment sheets. They are designed for the public school industrial arts student and are "tried out" by student teachers.

1. Pages 123 through 127 are examples of comprehensive general shop and laboratory lay-outs. Teachers who are content to teach a single type of work in a unit shop would not be able to handle any of the programs represented by these floor plans.

2. Pages 128 and 129 represent a questionnaire for self-analysis. This questionnaire is to be used at the beginning of a semester by the public school shop teacher. An attempt is thus made to gather pertinent information concerning each student to help the teacher project his program more meaningfully.

3. Page 130 is a suggested type of plan sheet.

4. Page 131 is an assignment sheet for the student's guidance in studying a certain product or material. This outline first appeared in the New York State course of study for Comprehensive General Shops.

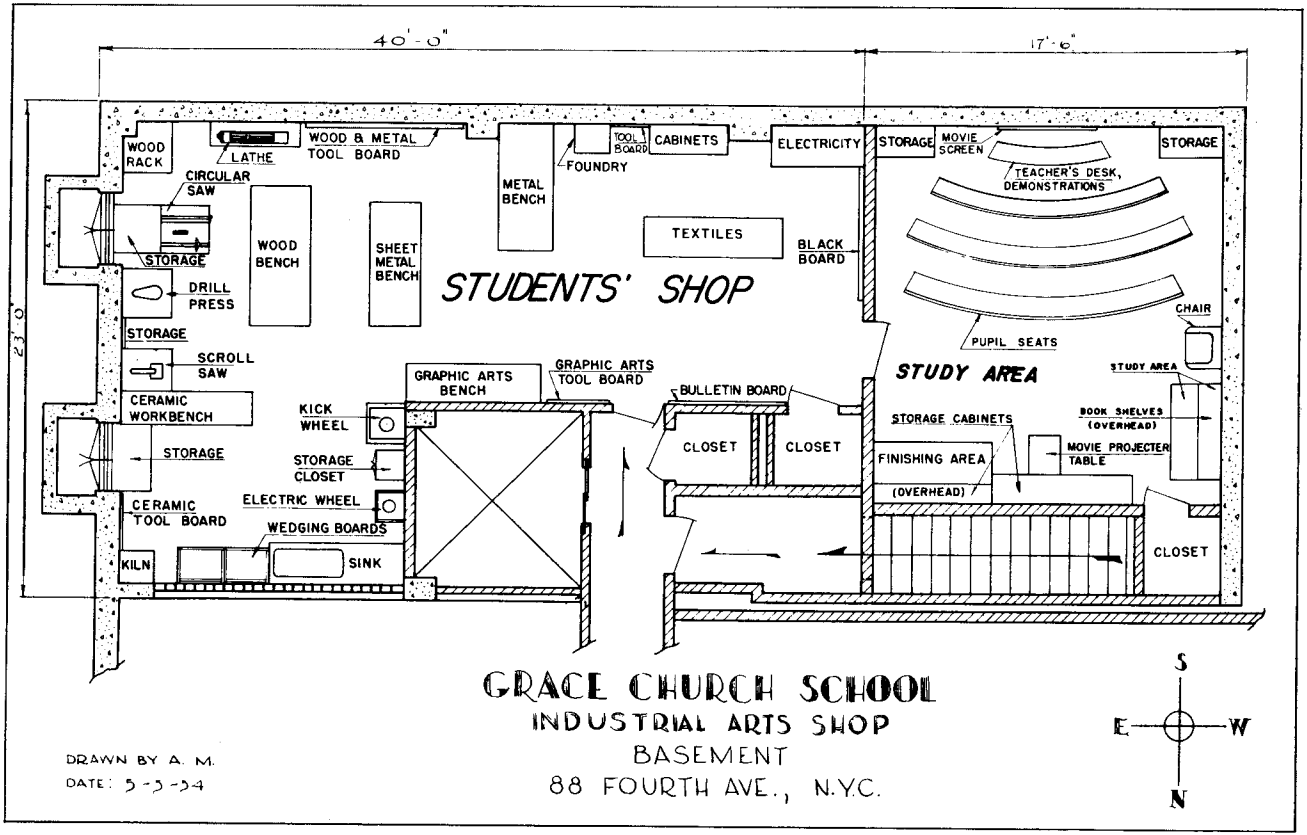
5. Page 132 is another assignment sheet suggested in the above course of study. It is the purpose of this assignment to give shop credit to those students who do after school and/or outside work with tools and materials. This work might be home-mechanics, a hobby, or direct work experience for pay.

6. Page 132 is another assignment sheet and is concerned with vocational guidance. It is a guide for a personal interview. The student is requested to contact a family member or neighbor who works in industry and discuss jobs and preparation.

7. Page 133 is a guide for outside reading concerning matters related to industrial arts. Such industrial brochures as the Romance of Leather, The Story of Cotton, An Outline of Aluminum, The Earth - A Great Storehouse, The History of Type, etc., are most acceptable. Newspaper articles and stories in magazines may also be considered acceptable as a "book report."

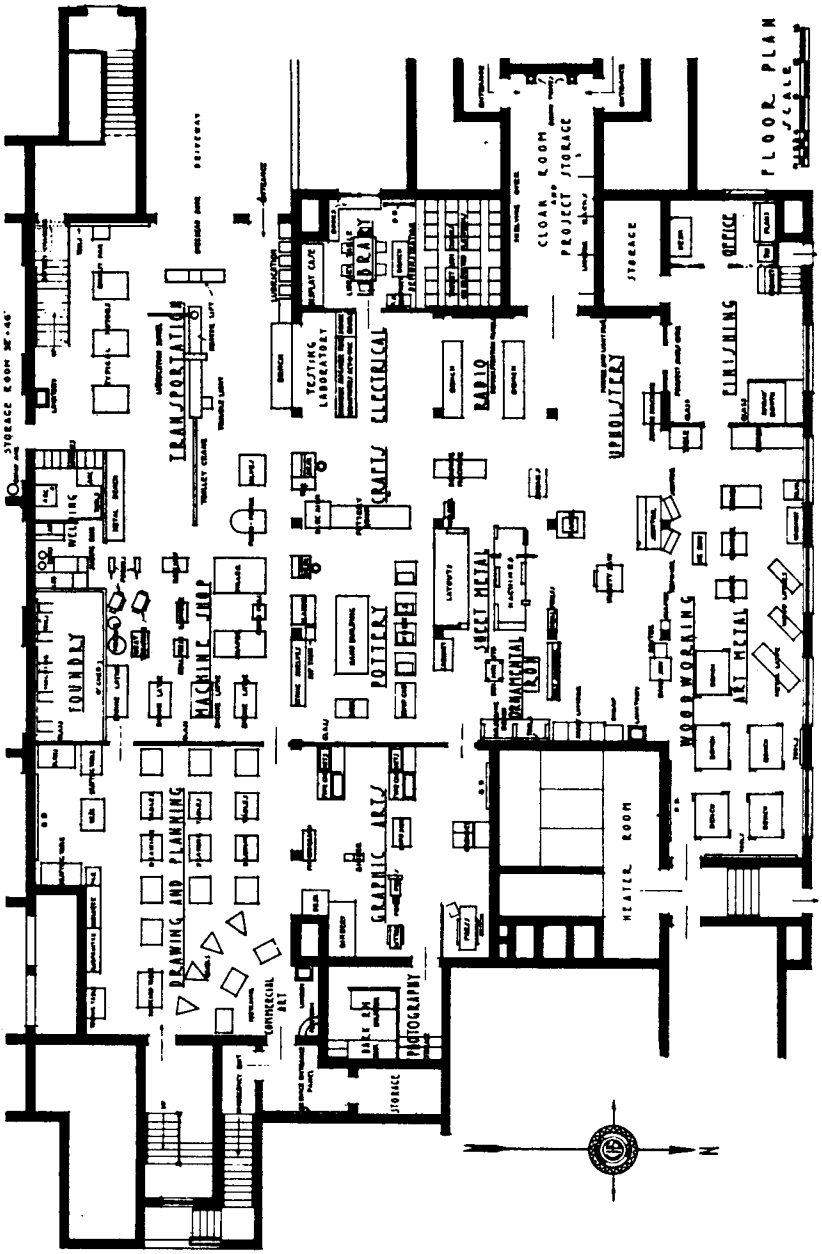
8. Pages 134 and 135 are samples of evaluation forms used by pupil personnel groups in general shops or laboratories. The rating scale for foreman is generally filled out by the individual area foreman with the help of the shop superintendent. The personal analysis form is generally filled out by the shop superintendent with the help of the teacher. Thus certain desirable educational intangibles are practiced by students in an industrial-arts educational laboratory.

9. Pages 136 to 140 contain the outline of a presentation by Professor Keane on a mass production project.

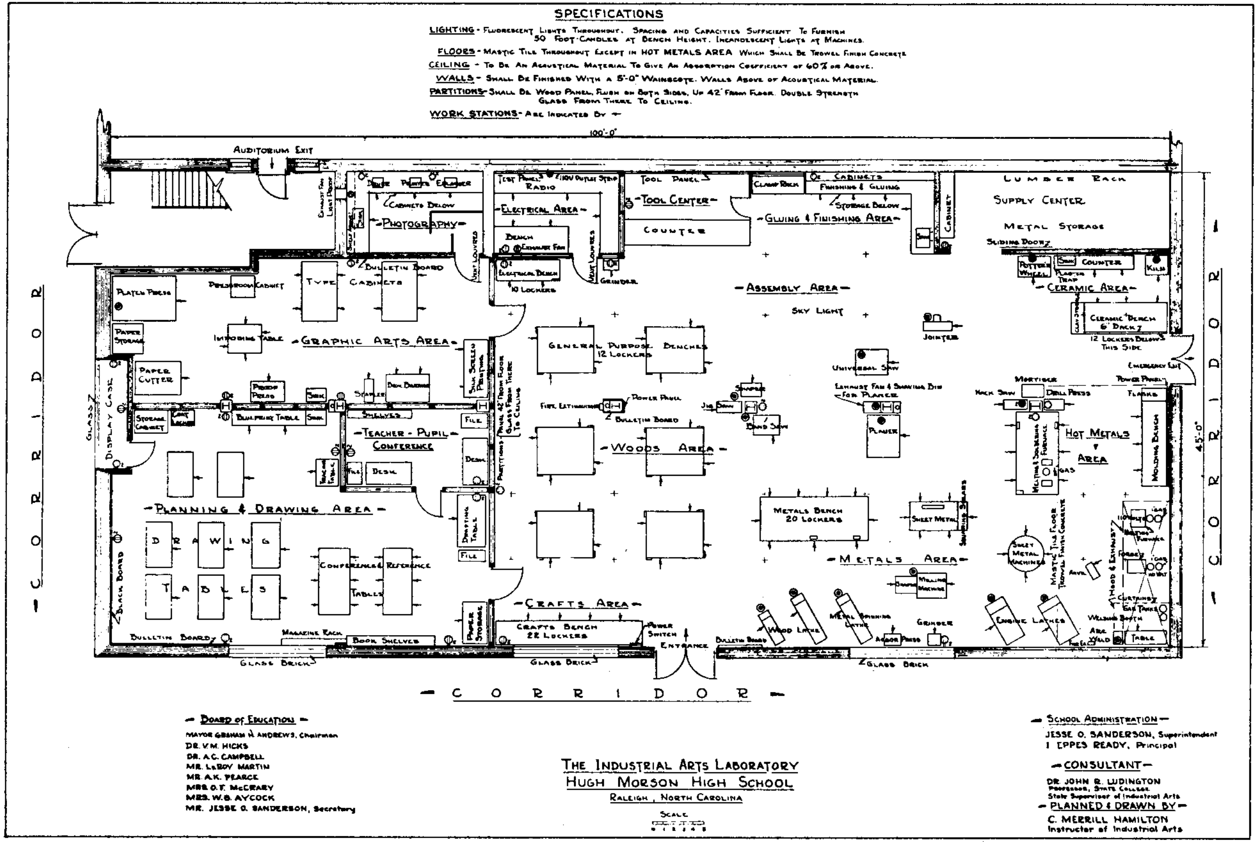


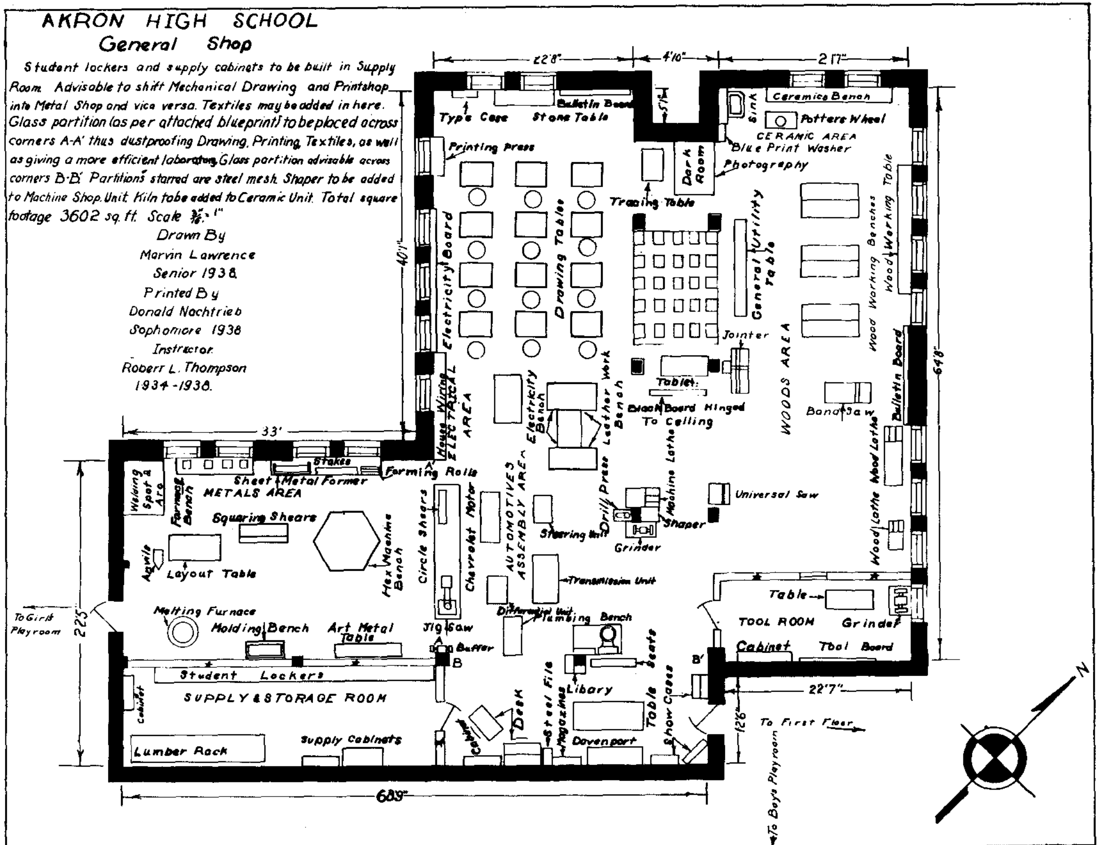
GRACE CHURCH SCHOOL
INDUSTRIAL ARTS SHOP
BASEMENT
88 FOURTH AVE., N.Y.C.

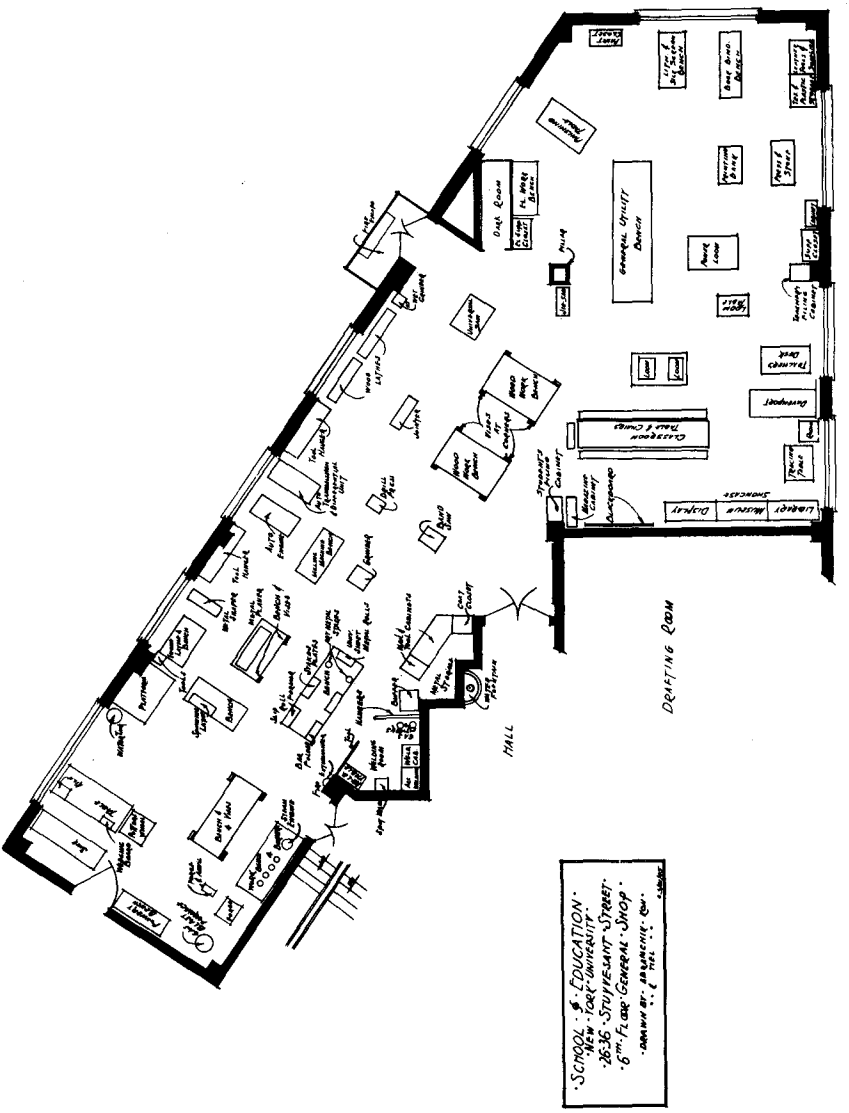
DRAWN BY A. M.
DATE: 5-3-34



Arts and Industries Laboratory in the High School at Cambridge, Ohio. Reprinted by permission from "The American School and University," 1943.


SPECIFICATIONS
LIGHTING - Fluorescent Lights Throughout. Spacing and Capacities Sufficient To Furnish 50 Foot-Candles at Bench Height. Incandescent Lights at Machines.
FLOORS - Mastic Tile Throughout Except in HOT METALS AREA Which Shall Be Trowel Finish Concrete
CEILING - To Be An Acoustical Material To Give An Absorption Coefficient of 60% or Above.
WALLS - Shall Be Finished With a 5'-0" Wainscote. Walls Above of Acoustical Material.
PARTITIONS - Shall Be Wood Panel, Flush on Both Sides, Up 42" From Floor. Double Strength Glass From There To Ceiling.
WORK STATIONS - Are Indicated By →
100'-0"
Auditorium Exit
Photography
Electrical Area
Tool Center
Counter
Gluing & Finishing Area
Lumber Rack
Supply Center
Metal Storage
Assembly Area
Sky Light
Ceramic Area
Graphic Arts Area
Type Cabinets
Platen Press
Paper Cutter
Teacher - Pupil Conference
General Purpose Benches
Woods Area
Hot Metals Area
Planning & Drawing Area
Drawing Tables
Conference & Reference Tables
Metals Bench 20 Lockers
Metals Area
Crafts Area
Crafts Bench 22 Lockers
Entrance
Glass Brick
Engine Lathes
Wood Lathe
Metal Spinning Lathe
Corridor
45'-0"
— Board of Education —
Mayor Graham H. Andrews, Chairman
Dr. V.M. Hicks
Dr. A.C. Campbell
Mr. LeRoy Martin
Mr. A.K. Pearce
Mrs. O.T. McCrary
Mrs. W.B. Aycock
Mr. Jesse O. Sanderson, Secretary
The Industrial Arts Laboratory
Hugh Morson High School
Raleigh, North Carolina
Scale
— School Administration —
Jesse O. Sanderson, Superintendent
I. Eppes Ready, Principal
— Consultant —
Dr. John R. Ludington
Professor, State College
State Supervisor of Industrial Arts
— Planned & Drawn By —
C. Merrill Hamilton
Instructor of Industrial Arts


AKRON HIGH SCHOOL
General Shop
Student lockers and supply cabinets to be built in Supply Room. Advisable to shift Mechanical Drawing and Printshop into Metal Shop and vice versa. Textiles may be added in here. Glass partition (as per attached blueprint) to be placed across corners A-A' thus dustproofing Drawing, Printing, Textiles, as well as giving a more efficient laboratory. Glass partition advisable across corners B-B'. Partitions starred are steel mesh. Shaper to be added to Machine Shop Unit. Kiln to be added to Ceramic Unit. Total square footage 3602 sq. ft. Scale 3/16"=1'
Drawn By
Marvin Lawrence
Senior 1938
Printed By
Donald Nachtrieb
Sophomore 1938
Instructor
Robert L. Thompson
1934-1938.
22'8"
4'10"
21'7"
5'1"
40'1"
33'
64'8"
22'5"
68'9"
22'7"
12'6"
Type Case
Stone Table
Bulletin Board
Printing Press
Sink
Ceramics Bench
Potters Wheel
CERAMIC AREA
Blue Print Washer
Photography
Dark Room
Tracing Table
Drawing Tables
Electricity Board
General Utility Table
Wood Working Benches
Wood Working Table
Jointer
WOODS AREA
Table
Black Board Hinged To Ceiling
House Wiring
ELECTRICAL AREA
Electricity Bench
Leather Work Bench
Band Saw
Bulletin Board
Wood Lathe
Machine Lathe
Universal Saw
Drill Press
Shaper
Grinder
Sheet Metal Former
Stakes
Forming Rolls
Welding Spot & Arc
Forming Bench
METALS AREA
Squaring Shears
Circle Shears
Chevrolet Motor
AUTOMOTIVES ASSEMBLY AREA
Steering Unit
Hex Machine Bench
Anvils
Layout Table
Transmission Unit
Differential Unit
Plumbing Bench
Table
TOOL ROOM
Grinder
Cabinet
Tool Board
To Girls Playroom
Melting Furnace
Molding Bench
Art Metal Table
Jig Saw
Buffer
B
B'
A
Seats
Student Lockers
SUPPLY & STORAGE ROOM
Cabinet
Lumber Rack
Supply Cabinets
Desk
Steel File
Magazines
Library
Table
Show Cases
Davenport
To First Floor
To Boys Playroom
N


SCHOOL OF EDUCATION
NEW YORK UNIVERSITY
26-36 STUYVESANT STREET
6TH FLOOR GENERAL SHOP
DRAWN BY
HALL
DRAFTING ROOM
CLASSROOM
LIBRARY
DISPLAY
SHOWCASE

NEW YORK UNIVERSITY
School of Education

INDUSTRIAL-ARTS EDUCATION

Questionnaire for Self-Analysis

1. Name ..... Date .....
2. Age .....
3. Occupations of parent or guardian .....
4. Occupations of other relatives which have interested you .....
5. What schooling have you had? .....
6. Have you had any special industrial or commercial training? .....
   If so, what? .....
7. What studies interest you most? .....
8. What studies do you dislike most? .....
9. Are you studious by nature, or does studying come hard to you? .....
10. What claims most of your attention in school, your studies or outside activities, social, athletic, etc.? .....
11. What sort of books, magazines, etc. do you read? .....
12. How do you spend your spare time? .....
13. Do you "get by" in school with little or no study, or do you have to "plug hard" in order to pass?
14. Do you like to invent things or devise improvements on things around you? .....
15. Have you mechanical ability? .....
16. Do you like to draw? ..... Free-hand? ..... Mechanical?.....
17. Do you like music? ..... What instrument do you play? .....
18. Do you express yourself well in writing? ..... In speech? .....
19. Are you timid, a "go-getter" or neither? .....
20. Have you a hobby that makes large demands upon your spare time? .....
21. To what organizations do you belong, if any? .....
22. Do you take an active part in club meetings or in similar occasions or do you prefer to leave that to others? .....
23. Are you a "good mixer"? .....
24. Have you any particular ambition or vision for the future? .....
25. Are you naturally healthy? .....
26. Are you strong physically? .....
27. Name any physical handicaps .....

28. Do you prefer to be the director of things, or are you willing to do your share while someone else directs and assumes responsibility? .....
29. Are you able to concentrate on the work you are doing, or does your mind wander off to other things? .....
30. Do you get along well with others and they with you? .....
31. Do you stick to an idea or to a certain job until the end, or are you easily discouraged? .....
32. Which sort of work appeals to you most — methodical, repetition or work of wide variety? .....
33. Do you prefer mental activity, physical activity, or work involving both? .....
34. Can you work well under high pressure, or do you work better when you have time and leisure? .....
35. Have you a good imagination? .....
36. Do you naturally pay attention to small details, or are you more interested in broad planning without giving much thought to methods of carrying out your plans? .....
37. Have you a good memory for names? ..... For faces?..... For facts? .....
38. Do you keep your desk or room always in order, or do you allow things to accumulate until you are forced to clean up? .....
39. Are you systematic in your work, or otherwise? .....
40. Are you self-reliant? .....
41. Are you tactful, or do you say what you think without consideration of effect? .....
42. Are you careful and conservative in taking a step, or are you impulsive and careless of consequence? .....
43. Are you quick or slow in your movements? ..... In your mental processes? .....
44. Are you talkative, or taciturn and a good listener? .....
45. Do you grasp an explanation quickly, or do things have to be explained to you in detail? .....
46. Do you insist on accuracy and perfection in everything, or are you satisfied with "good enough"? .....
47. Do you take pride in your personal appearance, or are you careless or indifferent? .....
48. Do you enjoy meeting strangers? .....
49. Are you happiest when you are busy, or do you enjoy your leisure most? .....
50. Do you prefer to be indoors or outdoors? .....

PLAN SHEET

Comprehensive General Shop

Students Name .....Period.....

Name of Project .....Date Started .....

Fill in the following bill of material. Do all work in the study center. Catalogs will be found in the bottom drawers of the student's file.

Name of part	Number alike	T	W	L	Kind of Material	No. bd. ft.	Lin. ft.	Wgt.	Sq. Unit in. price	Total cost

Number of coats	Finish	Estimated Cost	Quantity	Hardware	Cost	Other Materials	Cost

List three *materials* associated with this project. The materials may be part of the project or a meterial which contributed to the manufacture of the project. When the *instructor* has *approved* the materials which you have listed, *read* the information (about *each* material) which you will find in the second drawer of the student's file in the study center. On a separate sheet of paper, write a summary paragraph (approximately 300 words) about each material. The following outline may help you summarize: a) history, b) source, c) manufacture, and d) uses. Clip the extra shets to this plan sheet.

1. ..... 2. ..... 3. .....

Turn this plan sheet over. On the top half, make a *drawing* or *sketch* of your project. On the bottom half of the page, *list* the step-by-step procedure followed in the manufacture of the project.

Date project was finished .....Total time used .....

Total cost of project .....Instructor's grade .....

OUTLINE FOR PRODUCT FOLDER

Explanation. This is a survey of one of the listed manufactured products by means of pictures, drawings, clippings and essays.

Outline for development of product folder —

Trace development of product

Raw material

Kinds required

Sources of

Tools and equipment used

Workers represented

Transportation of raw materials

Manufacture
- Buildings and equipment
- Manufacturing processes
- How and where product is used

Workers
- Occupations represented
- Remuneration
- Health and safety conditions
- Education and preparation required

Suggested Product Folder Topics

Glues
Abrasives
Finishing materials
Hand tools
Lumber products
Hardware
Furniture
Wood substitutes
Screens
Doors
Yachts
Motor boats
Outboard motors
Woodworking machines
Houses and buildings
Rope
Wire
Building materials
Cement and concrete
Boats
Airplanes
Upholstered articles

Suggested Collections and Exhibits

Abrasives
Airplane models
Building materials
Boat models
Charts showing grades of workmanship on a given process
Cross sections of tree
Color samples
Files
Glass
Kinds of hardware
Kinds of screws
Kinds of nails
Kinds of string and rope
Leaves of local trees
Moldings
Pictures of automobiles
Pictures of airplanes
Pictures of birds
Pictures of bird houses
Pictures of trees in history
Old style hand tools
Pictures of freak trees
Puzzles
Rubber articles
Safety pictures
Upholstery materials
Veneers - plywoods
Woods - lumber
Wood substitutes
Wood finishing samples
Woodworking joints
Wood fasteners

NEW YORK UNIVERSITY

INDUSTRIAL-ARTS EDUCATION

Outside Preparation Report

Pupil's Name .....
Address .....
School .....
Grade ..... Date .....
Subject .....
Nature of work performed .....
.....
Hours required for study ..... Hours required for shop work .....
Tools used .....
.....
Materials used .....
.....
Did you follow written directions? Yes ..... No .....
If so, where were they found? .....
Title ..... Author ..... Publisher .....
Other books which you need or would like to have .....
.....
Describe on the other side of this sheet what you did. Make a sketch or drawing on the back of this sheet showing the article made or type of work done. Remember that 80% of your grade depends on a carefully and well-written report. EXPLAIN your work FULLY.
Did you enjoy this work? ..... Did you have any assistance?.....
If so who helped you? .....
Signature of parent .....
Signature of instructor .....
Date turned in ..... Grade .....

IMPORTANT — DRAWING AND DESCRIPTION ON THE BACK OF THIS SHEET — IMPORTANT

SURVEY SHEET ON THE ..... OCCUPATION

in the .....area

(Obtained by pupil through personal interview with occupational worker)

Name of person interviewed .....
Age Requirements
Your age on entering the occupation .....
Your present age .....
Ordinary retirement age .....
Qualifications necessary for success
Personal qualifications .....
Physical strength .....

Mental ability .....
Personality .....
Habits .....
Responsibility .....
Educational training desirable .....
Completion of what grade .....
Which subjects are most valuable .....
Years of high school desirable .....
Which course is best .....
Years of college desirable .....
Which course is best .....
Special school training desirable .....

Working time

Hours of work per day .....
Days of work per week .....
Sundays and vacations .....

General Information

Chance for reasonable income .....
Steadiness of employment .....
Is field overcrowded .....
Opportunity for advancement .....
Distance to work .....
Is it necessary to move often .....
Is work indoors or out .....
Is work day or night .....

Advantages

.....
.....
.....

Disadvantages

.....
.....
.....

NEW YORK UNIVERSITY

School of Education

Comprehensive General Shop

Book Review Form

Purpose: The following outline will help you to get more information from the books you read. Others, reading your report, should be able to judge whether the book would be of use to them. The technical books that form our library are more difficult to read, and report on, than most books; therefore you will find the outline more exacting. If you wish to report on some book not in the shop library, consult your instructor.

— OUTLINE —

(Please follow this outline when making your book report)

1. HEADING	Your Name Class Date	
2. TITLE	Book Review	
3. BIBLIOGRAPHY	Authors last name, First name, Initial. Complete title of book. Library index number. Where book may be obtained.	
4. Paragraph 1.	Tell why you chose this particular book to read.	
5. Paragraph 2.	Tell why this book fits well into the industrial arts work. (See aim of industrial arts in library)	
6. Paragraph 3.	What can you say about this book to recommend it to others.	
7. Paragraph 4.	Tell *one* or *more* significant facts about the matter treated in the book that you remember above all others. *This paragraph is the most important of all.*	
8. Paragraph 5.	Tell how long it took you to read the book. How many chapters and pages in the book and whether the book is illustrated by drawings, photographs or paintings. Report should average 500 words.	

NEW YORK UNIVERSITY

School of Education

Industrial — Arts Education

A Rating Scale for Foreman

This scale has been used with marked success in grading foremen in school shops. It is fairly objective in its nature and evaluates the work of the foreman quite satisfactorily.

1. Consider his success in winning confidence and respect through his appearance and manner.	Inspiring	Favorable	Indifferent	Unfavorable
2. Consider his success in doing things in new and better ways and in adapting improved methods in his own work.	Highly Constructive	Resourceful	Fairly Progressive	Routine Order
3. Consider his success in winning the cooperation of his subordinates, in welding them into a loyal and effective working unit.	Capable Forceful Leader	Handles Workers Well	Fails to Command Confidence	Frequent Friction In Area.

4. Consider his success in organizing the work of his department or unit, by delegating authority wisely and making certain that results are achieved.	Effective Even under Difficult Circumstances	Effective Under Normal Circumstances	Lacks Planning Ability	Inefficient
5. Consider his success in making his department or unit a smoothly running part of the whole organization.	Exceptionally Cooperative	Cooperative	Not Difficult	Difficult to handle
6. Consider his success in improving his subordinates by imparting information, creating interest, developing talent and arousing ambition.	Develops Workers of High Caliber	Develops Workers Satisfactorily	Neglects to Develop Workers	Discourages Workers
7. Consider his success in applying specialized knowledge in his particular field, whether by his own knowledge of ways and means or through his use of sources of information.	Expert	Competent	Uninformed	Negligent and misinterprets

Date ..... Final Rating..... Total Rating.....

1. Adapted from a similar scale in "Personnel Management," by Scott and Clothier.

NEW YORK UNIVERSITY
School of Education
INDUSTRIAL ARTS EDUCATION
Personal Analysis Chart

				Score
I. Personality & Character: (Personal characteristics) Tact, Initiative, Loyalty, Thoroughness, Judgment, Pleasantness of manner, Self-confidence, Self-control, Firmness and Decision, Appearance and Neatness.	Very strong and effective	Strong	Not very strong	Weak and ineffective

II. Mechanical skill: Do you have the mechanical skill required in connection with the cooperation of your department?	Very highly skilled	Skilled	Fairly competent	Unskilled
III. Organizing and planning ability: Have you ability to secure results by organizing and planning the work of the department?	Effective even under difficult circumstances	Effective	Not very effective	Ineffective
IV. Ability to observe: Have you the ability to observe clearly the vital points of your job and visualize what is necessary to have it operate effectively?	Very observant Broad vision	Observant	Fair ability	Limited vision
V. Leadership and executive ability: Have you the confidence and respect of students, secure cooperation and maintain discipline?	Capable and forceful leader	Handle men well	Fair leader of men	Frequent friction in department
VI. Instructing ability: Have you ability to train and develop your students and arouse their ambition?	Exceptional developer of students		Satisfactory developer of students	Moderate ability
VII. Physical energy — pep: Do you keep yourself physically fit, capable of meeting the problems of each day with energy and pep?	Exceptionally energetic and physically fit	Physically strong	Fairly energetic	Physically weak

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UNDERSTANDING INDUSTRY AS PART OF GENERAL EDUCATION

Industry has become such a determinant factor in our society, that the present period is described by historians as the Industrial Era. To arrive at an understanding of this industrial era, many studies have been made in the separate fields of economics, technology, sociology and psychology. The major characteristics of industry however, cut across these

traditional subject areas and involve a synthesis of many concepts. The important concepts of industry are relational — dependent on concepts in related fields for full understanding. For example, the concept of design in industrial products involves not only art or engineering, but also financial, social and psychological considerations. The purpose of this paper is to describe a method of obtaining experiences in our schools that will provide an understanding of industry through its related concepts. This method employs mass production, organization and processes as educational experiences through which typical industrial activities are examined. This experience can be student organized and directed. It is structured for participation by school groups concerned with various aspects of industry such as industrial and fine arts classes, social studies classes, vocational and business education classes and teacher education classes.

There are six parts of the plan to be considered:

1. The introduction of the idea by the teacher
2. Developing the idea through class discussion
3. Organizing the class for responsibilities
4. Organizing the class for production
5. Discussion sessions
6. Supplementary material

HOW IT IS ORGANIZED

I. INTRODUCTION OF IDEA — INDUSTRY IN OUR LIVES — BY TEACHER

A. Historical development

B. Mass product vs. Individually made

1. Design
2. Function
3. Tools, materials and processes
4. Manufacture
5. Financing
6. Costs
7. Markets & consumers
8. Profits
9. Social and political problems

II. DEVELOPING IDEA THROUGH CLASS DISCUSSION — HOW THE CLASS MAY PRODUCE A SALABLE ARTICLE AND EXAMINE AND EXPERIENCE THE VARIOUS PROBLEMS THAT INDUSTRY ENCOUNTERS. IT SHOULD BE STUDENT DESIGNED — FOR THE STUDENTS AND MARKETABLE.

A. Questions arise as to:

1. What purpose is served
2. Kind of article to be made by the group
3. Design of the article
4. Costs to the students
5. Materials — Kinds — Availability
6. Time to prepare — To produce
7. Facilities available

8. Skills needed
9. Direction and knowhow
10. Financing
11. Marketing and distribution

B. Most of these questions have to be deferred until:
1. Type of project
2. Design of project
3. Facilities available to produce have been decided

(It is soon observed that these decisions cannot be made until more information is available, and that the larger group is too unwieldly to reach such decisions. A few students volunteer to report this information back to the larger group for their decision.)

III. ORGANIZING THE CLASS

A. Delegating responsibilities

(It can be pointed out that the questions fall into three areas. Engineering and Design — Production — Finance, and that three students, or if a large group, six students can assume responsibilities for obtaining the information and getting the work planned in each area. It is pointed out that areas are specialized but dependent on each other.)

B. Research to be made by committee on:
1. Sources of information
2. Kinds of articles to be made
3. Problems in the three areas

Engineering	*Production*	*Business*
Design	Skills	Financing
Facilities	Production Schedule	Usefulness
Materials	Job Schedule	Market Value
Number to be produced	Preliminary Work	Costs
	Sub-Contracting	Sales

C. Committee reports to full group for its decision on article to be made (discusses the following items about suggested projects)

Design	Production	Time Schedule
Facilities	Job Schedule	Financing

IV. ORGANIZING FOR PRODUCTION

A. After article has been decided, time for production and financing arranged, the committee does preliminary work on:

1. Pilot models	Machine Set-ups
Jigs and Fixtures	Training of workers
Purchasing	Sub-Contracting

2. Set up of job schedule
Skills — Method — Time
3. Set up of production schedule
Amount — Time — Material

B. Conducts a training session (single period) and preliminary run through of job.
C. Makes changes necessary for production
D. Conducts production session (usually a single block of two or three consecutive class periods)

V. DISCUSSION SESSIONS

A. Discussion Sessions #1 & #2 led by committee members (time and content varies with group level)

1. Engineer report
   Number produced
   Rate of production (by graph)
   Anticipated production (by graph)
   Critique on quality of article
   Suggestions for production improvement
2. Production foreman report
   Worker problems
   Finishing, packaging and shipping

B. Discussion Sessions #3 & #4 (Business Manager's Report)

1. Costs
   a. Labor - wages-minimum-prevailing-fair
   b. Management - responsibilities & decisions
   c. Equipment - available and commercial
   d. Materials - kinds & prices
   e. Rent -- atmosphere and location
   f. Taxes - kinds and purpose
   g. Utilities - sources, kinds, and prices
   h. Insurance - needs and required
   i. Social Security - purpose and administration
   j. Workmen's Compensation - purpose & benefits
   k. Advertising - purpose and kinds
   l. Packaging problems
   m. Shipping methods
2. Investment
   a. Capital invested - How? Wh
   b. Interest rates - time & paym
   c. Depreciation - purpose
   d. Management Costs
   e. Production Costs
   f. Profits
3. Sales
   a. Markets - kind, place, size
   b. Competition
   c. Sales price
   d. Arranging sales

VI. SUPPLEMENTARY MATERIAL

The above outline suggests the activities of the students in the school situation. These activities are supplemented by films, visits to industry, industrial literature and samples, and assignments and study in the community and from appropriate texts.

The method described is suggested as a means of understanding industry within the context of our conventional industrial arts courses, not as a substitute for such.

CHAPTER VI

Concepts of Evaluation

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Continuous and significant improvements in industrial arts education are heavily dependent upon the manner in which evaluation is conceived and upon the precision and rigor with which evaluative processes are employed. It is therefore appropriate that this yearbook, which has as a primary purpose the treatment of basic problems and issues in the interest of stimulating further improvement in industrial arts teacher education, include a chapter on evaluation. Since the problems of evaluation are such that they cannot be treated in comprehensive and exhaustive fashion within the limits of the present chapter, an appropriate purpose of this chapter can be only that of stimulating thinking with reference to these problems and suggesting leads to their solutions. With this purpose in mind, consideration is given first to some of the more crucial problems and issues which perplex personnel who are concerned with evaluation. The intent here is to present these problems briefly, and in instances where there seems to be significant disagreement, to indicate the opposing views which give to each the property of an issue. Characteristic features of a broadly-conceived and effective program of evaluation are then suggested. A position with reference to each problem and issue to which attention is directed is assumed and defended. It is intended that implications for the preparation of industrial arts teachers will become apparent to the reader and thus the concluding statements of this chapter deal with some of the more important implications for industrial arts teacher education.

PROBLEMS AND ISSUES

While the appraisal of pupil progress in any phase of education is an intricate and involved process, the evaluation of achievement in industrial arts education becomes especially complicated and difficult, and for several reasons. In the first

place, industrial arts is a relatively new facet of the general education program which was introduced at a time when drastic changes and innovations in education, both in theory and practice, were being inaugurated. Industrial arts has been and is to this day affected by the issues and controversies which characterize education in general. At the same time, industrial arts has been on the educational scene long enough to permit the development, within its own ranks, of a chasm between the traditional and the contemporary, between the old and the new, between the conservative and the liberal, between the complacent and the dissatisfied, between those who seek authority and standardization and those who would encourage the involvement of the many in the evolvement of an ever-improving, dynamic program which remains in tune with and appropriate for an industrial-technological society which may be characterized by the expression *accelerating change.*

Among the many issues which serve to complicate the problem of evaluation in industrial arts education may be mentioned the fact that objectives of industrial arts remain the subject of some of the most heated controversies which engage the attention of industrial arts personnel. Controversial as the appropriate aim of education has always been, surely personnel in other phases of general education do not devote time and energy to the question of purpose in the same proportion as do industrial arts people. While one group in the field continues to debate the question of what the major objectives of industrial arts should be, another group urges, with some display of impatience and disgust, that it is high time that this issue be settled and that objectives be standardized in order that the profession may get on with its work. At the height of this controversy, a third group suggests that there may be some virtue in considering what the objectives of industrial arts should be, but that the real problem, says this group, is to define the processes whereby professional school personnel, pupils, and patrons of the school may evolve objectives appropriate for industrial arts in a particular community. This group would deem it of primary importance that each pupil evolve and clarify his own individual goals and levels of aspiration and that instruction be altered to provide for the accomplishment of individual as well as group goals and needs.

Since evaluation, to have meaning and validity, must be conducted in terms of purpose, the present state of affairs with reference to the objectives appropriate for industrial arts ren-

ders evaluation in this field a most difficult problem. A conception of instructional objectives, their derivation and function, is a prior question to which attention must be directed and for which a solution must be evolved before an effective program of evaluation can be formulated.

Not only does the matter of substantial disagreement concerning objectives tend to complicate the problem of evaluation, but this area of controversy gives rise to such additional issues as: content and the criteria and bases for its selection and organization; media and activities appropriate for industrial arts; and methods of instruction which will realize industrial arts objectives.

Assuming that there should be a standard body of content which should become the common core of all industrial arts programs, many members of the profession attempt to determine what these common elements are. It follows that this group is essentially the same as the one which seeks standardization of objectives. Included also are persons who would answer the question, once and for all, concerning media appropriate for industrial arts. Some would likewise standardize activities and projects. In the case of method, this group is inclined to assume that there is a definite set of specific teaching procedures which should be followed. An opposing view holds that, since objectives are to be evolved locally by individuals and small groups, content, media, activities, and method must, if consistency is to be maintained, also be selected with a considerable degree of freedom of choice. Plans for evaluating achievement presuppose a decision concerning content, media and activities, and method.

Aside from the many issues and problems which have to do with objectives, content, and method, there are many controversial questions which appropriately fall under the heading of evaluation and which add to the difficulty of the task at hand. Among these are the following: What are the appropriate purposes of evaluation? By what practical means may the teacher who relies upon measuring devices of his own construction determine and improve the validity of these instruments? How can he ensure objective and reliable measurements? On the basis of what standards should evaluations be made? Should there be uniform standards which remain the same for all pupils, or, should the standard vary from pupil to pupil, depending upon innate learning ability? What about past performance of the individual pupil as a basis for evaluating

present performance? Should evaluation be conducted only in terms of subject matter achievement, or, should such manifestations of behavior and behavioral change as attitudes, interests, habits, willingness to work, and cooperation with others also be taken into account?

To what extent should the pupil's perception of his own goals and levels of aspiration be considered in evaluating his performance? Is the individual performance of the individual pupil the only major consideration in evaluation, or does it also become important in a democratic order that his performance as a member of his group be taken into account in evaluating his performance? Since group performance is of primary importance in a democratic society, should effort be made to evaluate such performance? If so, how is the performance of the group to be evaluated? On the basis of what standards? What data are to be collected? What instruments and devices are to be employed? How should group evaluation be reported?

Who should participate in the evaluation process? Is this the full responsibility of the teacher to the exclusion of others, or, should pupils also participate? Parents? Other teachers and other school personnel? If pupils are to take part, should their participation be limited to self-appraisal, or, should they also participate in the evaluation of their peers?

What uses should be made of evaluative reports? To whom should these reports go? By whom should they be prepared? What types of data and interpretations should they include? How can the extent of mastery of content in terms of a uniform standard, growth in terms of innate learning ability, rate or extent of pupil gain, and such concomitants as attitude, cooperation, and effort be accurately reflected in a report? How does the teacher who feels strongly about all of these resolve the dilemma he faces when he attempts to combine these factors in a single letter mark or other symbol?

How can the conscientious teacher do a good job of evaluating without letting the process consume a disproportionate amount of the instructional time? What is meant by the oft-repeated statement to the effect that evaluation is an integral phase of the instructional process? If evaluation is to remain integral with instruction, what conditions must obtain?

Before concluding this attempt to identify problems and issues which complicate the task of evaluating achievement in industrial arts, reference should be made to the basic features of the field of work which tend to add to the complexity of the

problem. Assuming universal consensus with reference to purpose, content, activities, and method in industrial arts, and assuming agreement on the issues and problems in the area of evaluation, the nature of industrial arts is such that pupil appraisal would remain quite difficult. Any agreement reached relative to purpose would probably involve acceptance of the concept that industrial arts should contribute to the realization of the fundamental aims of general education, and that, in addition, there are certain unique contributions which industrial arts should make. These contributions, if industrial arts is to maintain its identity, will probably be dependent upon experiences with a variety of tools and materials as well as with symbols and abstract concepts. Attitudes, interests, appreciations, skills, and understandings will no doubt be included among the outcomes in terms of which evaluation will occur. These, even in isolation, and particularly in the combinations and patterns in which they develop, do not readily lend themselves to precise measurement and evaluation.

This analysis of the issues and problems which confront those who are concerned with the evaluation of pupil progress in industrial arts education is not exhaustive, but perhaps it does indicate the magnitude of the task ahead. It is apparent that there is much to be done in the way of resolving issues and solving problems. This demands much more research than has been conducted to date. The differences in the origin and nature of the various types of issues and problems imply that their solution require methods of attack which are fundamentally different. Certain issues and controversies relating to evaluation derive from differences with reference to the appropriate role of evaluation in the educational program. Still others stem from differences of opinion concerning the relative merits of alternative practices. Issues stemming from consideration of purpose suggest an approach which might be termed *philosophical,* in that the resolution of these issues calls for a careful, systematic analysis, interpretation, and validation of purpose.

The resolution of issues which arise over differences concerning relative merits of alternative processes would seem to call for a method of attack with which the term empirical may be associated. This method involves the experimental testing of hypotheses. The problem of resolving an issue becomes extremely difficult and complex when it is observed that differences concerning both purpose and method sustain the controversy. Individuals who accept the purpose as a valid one may oppose the

practice on the grounds that it is not the best or even a good way of realizing the purpose in question. Experimentation may yield objective evidence which will resolve the issue insofar as these individuals are concerned, but no amount of experimental evidence is likely to lead to the acceptance of the practice by persons who reject the purpose to which the practice contributes.

While it is evident by the statements made thus far in this chapter that the problem of evaluating progress in industrial education is complex and involved, it is by no means one of insurmountable and hopeless proportions. Progress is being made. More progress can be made. Certainly an important step in bringing about further improvement is that of identifying the crucial problems and issues pertaining to evaluation.

In stressing the point that many of the problems and issues pertaining to evaluation in industrial arts education result from the fact that there is not complete agreement which makes feasible and possible the standardization of objectives, content, activities, and methods, the intent is not to leave the impression that the registration of a plea for a high degree of standardization in industrial arts education is an order. Rather, references to the differences which exist are presented as evidence in support of the contention that evaluation in this challenging phase of education is an extremely complex and difficult problem. This means that neat, standardized and routine procedures represent inadequate solutions to the problem of evaluation in industrial arts education. Present also is the further implication that fundamental insight, the understanding of basic principles of evaluation, and the ability to apply them in a variety of circumstances are of first importance as tools over which industrial arts personnel should have command. Creativity, ingenuity, originality, and an experimental attitude are important to the implementation of an effective program of evaluation in industrial arts.

CHARACTERISTICS OF AN EFFECTIVE PROGRAM OF EVALUATION

The competencies in the area of evaluation to which industrial arts teacher education programs should make a contribution and the experiences which should be provided can be determined only after a careful examination of what constitutes an effective program of evaluation in industrial arts. In the preceding section of this chapter, an attempt has been made to identify some of the more important problems and issues

which must be faced as an evaluation program of high quality is evolved. The present section suggests characteristic features of, and principles which should underlie, an effective program of evaluation. In instances, and they are many, where statements are presented for which there is not adequate research support, such statements should be considered only as proposals or as hypotheses.

Purposes of Evaluation

Pupil progress should be appraised in the interest of realizing what particular purpose or purposes? Were there general agreement concerning the appropriate, basic purpose underlying the evaluation of pupil progress in industrial arts, the problem of evolving methods and techniques of measuring achievement and the question of factors to be considered in interpreting and evaluating the data could be greatly simplified.

What should be the purposes of evaluation becomes a problem not so much as a result of sharply-divided opinion as from the general confusion which teachers experience when they observe that purposes, as proposed in the literature, are so numerous and all-inclusive. The following are among the purposes of evaluation which would appear in the inventory of the ones frequently proposed: (1) provide a basis for assigning marks; (2) motivate pupils; (3) improve instructional procedures; (4) improve the curriculum; (5) provide a basis for reports to parents; (6) facilitate transfer of pupils from one school to another; (7) provide a basis for grade placement and grouping of pupils; (8) gather data for research purposes; (9) further the program of public relations; (10) facilitate the guidance program; (11) help identify pupils in need of remedial instruction; and (12) provide a basis for selection and admission of students to advanced education programs.

This composite list may serve to impress the industrial arts teacher with the importance of measurement and evaluation, but the question might well be raised as to whether he receives from it much assistance in the way of direction for evolving his own evaluation program, especially when he observes that each of the proposed purposes is afforded enthusiastic support by various professional workers. While an effective program of evaluation may make some contribution to many, if not all, of the purposes listed above, it would seem highly desirable that there be recognition of a central guiding purpose, or a limited number of closely-related purposes, from which the character and emphasis of the program may be determined.

At this point, it is suggested that *the central purpose of evaluation should be that of contributing maximally to the growth and development of pupils.* In other words, all decisions with reference to the employment of tests and other data-collecting devices, all judgments concerning the bases for evaluation, and all agreements relative to the content and form of evaluative reports to be issued, for example, should remain responsive to the primary purpose for which schools are conducted: the growth and development of pupils. This position concerning the central purpose of evaluation obviously reflects the acceptance of a basic principle which states that the selection of all procedures and practices to be employed in the school, in fact, all decisions affecting the school and its work, should be made on the basis of what seems to contribute maximally to pupil progress. If one accepts this principle, and, in addition, recognizes that industrial arts instructors are busy people who cannot possibly do all that specialists in education may recommend, then he is likely to agree that the central purpose of evaluation should be that of promoting optimum growth on the part of pupils. One is likely to conclude further that effort devoted to evaluation beyond the point where pupil progress is affected favorably might well be expended on other aspects of the instructional process. Thus it would become important that intelligent decisions be made, always with the objectives of the school in mind, concerning the instructional purposes to be furthered by emphasis on evaluation and the extent of that emphasis in terms of time and effort reserved for it.

This is not to say that such other purposes of evaluation as have been enumerated above are to be ignored. The many purposes frequently proposed may be just as effectively realized with this central purpose the major consideration as otherwise.

Evaluation: An Integral Phase of Good Teaching

There seems to be general acceptance of evaluation conceived as an integral phase of the instructional process. A problem arises, however, when teachers inquire into the meaning of this expression and when attempts are made to implement this concept. Is evaluation necessarily made integral with effective teaching when numerous tests and other data-collecting devices are employed and when heavy emphasis is placed upon appraisal of pupil progress? Whether evaluation remains integral with good teaching depends upon the extent to which the central purpose of evaluation as previously proposed actually

coincides with the aim of instruction and the extent to which this central purpose directs what is done in an effort to measure and appraise pupil progress.

In this sense, evaluation is integral with instruction when the following conditions obtain: (1) Time and effort are economically expended by both the teacher and the pupil in preparing for all tests and other data collecting devices. This preparation moves pupils closer to the realization of instructional objectives and more so than other activities in which they might engage. (2) The pupil's goal, as he prepares for tests, remains that of achieving the legitimate objectives of the educational activity, rather than that of merely doing well on forthcoming tests. (3) Tests and other devices employed are designed in such a way that they are conducive to the retention of instructional goals. The more they emphasize the application of things learned in the interest of realization of instructional objectives, the greater the likelihood that this condition will hold. (4) Evaluation contributes to the clarification of pupil goals. It enables pupils to comprehend the extent of their progress toward goals. (5) Evaluation is diagnostic to the point that pupils readily identify and understand their strengths as well as their weaknesses. (6) On the negative side, efforts to evaluate do not result in the cultivation of habits, interests, and attitudes which are at variance with objectives of the educational program.

Validity

Perhaps it is unnecessary, in view of the audience to which this yearbook is directed, to dwell at length upon the importance of the validity of each testing instrument and procedure employed in the program of measurement and evaluation. It happens, however, that ensuring validity in instruments and techniques employed to secure data concerning educational achievement is the most difficult, and perhaps for this reason the most neglected, problem in the field of measurement and evaluation. The validity of each instrument is dependent upon how well it measures the particular aspect of achievement for which it is designed and how successfully the instrument eliminates the effects, on the test score, of factors which are not related to the aspect of achievement in question.

Factors other than the outcomes which the test is supposed to measure may be more numerous and may have more effect on the test score than will be apparent to the person who con-

structs the test. Assuming that the test is designed to measure accomplishment or achievement in a particular subject, the instrument may be so constructed and it may be so heavily loaded with vocabulary foreign to the subject in question that the test measures not accomplishment but native intelligence and general vocabulary. For the student who, through experience in taking tests, has become "test-wise" the score may be affected more by his knowledge of how to take examinations than by his achievement in the subject. Of particular importance to the validity of written tests is the fact that two students who have achieved at equal levels in the subject in question may yield quite different test scores, the higher score going to the fast reader. A test which is designed to measure application of materials learned may actually yield test scores which are affected more by memorizing ability than by the ability to apply and make use of the information and principles covered in the course.

How is the validity of a particular instrument determined? How is its validity increased? A major difficulty lies in the fact that educational achievement is of such character that it is virtually impossible to define and to express precisely in quantitative form exterior, independent criteria against which tests may be checked and evaluated. Particularly in industrial arts education, where objectives lend themselves to such diverse interpretations and where content and activities are not standardized, this remains a problem. Even though independent criteria could be reduced to quantitative form for the purpose of computing the extent to which test scores correlate with them and thus make statistical indices of validity possible, the task of determining validity in this manner would probably be one to which only a very few industrial arts teachers would respond. There is, however, a practical approach which would, if emphasized sufficiently in teacher education and in the supervision and in-service education of teachers in the field, raise the validity of testing devices and procedures far above present levels.

The approach suggested here is that of analyzing objectives for the purpose of determining what should be evaluated and what should be measured and what factors should be taken into account as value judgments are placed upon the data collected with reference to pupil progress. Various techniques of analysis have been applied to the problem of the identification, selection, and organization of content in industrial arts education. All too often these techniques have been applied to content before ob-

jectives have been sufficiently analyzed and before they have been interpreted. An approach to analysis of objectives which should result in increased validity of the individual testing instrument and technique employed and also improve the validity of the total program of evaluation is one which provides, in considerable detail, answers to such questions as follow: Pupils who have achieved a particular objective will be expected to exhibit what specific modes of behavior? What understandings will he possess? He will have developed what skills? What should characterize his interests, appreciations, and attitudes? In what activities should he be encouraged to engage in the interest of achieving the objective? What specific evidence will need to be obtained in order to determine the extent to which the objective has been achieved? What kinds of testing instruments and techniques will yield this evidence? The preceding series of questions, if answered fully in an attempt to analyze objectives and to determine what they mean in action, should lead to a program of measurement and evaluation of high quality, insofar as validity is concerned.

Emphasis upon validity as the most important attribute of measuring devices is commonplace in the literature of evaluation. Not so common is the tendency to stress validity as a concept which should apply to the total program of evaluation. If inherent in instructional objectives is the intent that pupils learn to apply and use widely in a variety of practical, real-life situations the knowledges, understandings, and skills taught, then any individual attempt to gather data concerning achievement which calls only for relating, parrot-like, what has been taught obviously cannot be a valid venture. Just as obvious should be the fact that the total program of measurement and evaluation must accomplish the purpose which lies behind it if it is to be accepted as being valid. The major validity check to be made, in the case of the purpose of evaluation as previously proposed, would be that of determining the extent to which effort expended in measuring and appraising contributes to the realization of instructional objectives of the school. If the total program of measurement and evaluation fails to yield and provide for the interpretation of data pertaining to all of the major instructional objectives, and unless rigorous measurement and evaluation of performance results in further growth and development, the total program cannot be all that is desired. Evidence which indicates that evaluation is not contributing to, or is detracting from, progress toward legitimate educational goals

must be taken as an indication of the extent to which the program is lacking, insofar as validity is concerned.

Reference has been made to the possibility that efforts to measure and evaluate achievement may influence pupils in such a manner as to retard their progress toward educational goals. Negative attitudes toward the testing devices and procedures employed may, for example, lead to a dislike for the educational activities with which testing is associated, thus resulting in a detrimental effect upon achievement.

Reliability

Tests and other data-collecting instruments must measure accurately and consistently whatever they do measure if a high level of confidence is to be placed in the results which such devices yield. Tests which meet this condition are said to be reliable. Reliability is closely related to and may be considered an important factor which affects validity. A given test is valid when a test actually measures what it is supposed to measure and when the score is not affected by factors unrelated to the purpose of that test. When chance, or any other factor, affects the test score significantly, the test obviously does not measure accurately and consistently that which is intended. Hence, under the technical definition of reliability, a test may be completely reliable but may not be measuring the outcomes for which it was designed and thus would not be valid. Thus validity is the more important attribute of a test, but this quality cannot be maintained at a high level unless reliability also obtains.

The factors which affect reliability are more readily discernible and can be controlled with greater ease than is true of the factors which affect validity. Reliability is likely to be at a low level when the test is so short and includes such few items that the factor of chance becomes important in its effect upon the scores. Even though quite lengthy, the test may be so easy that the range of scores is so small that many reversals in position would be experienced by students when they take the same test a second time.

While various means of determining rather precisely the reliability of testing instruments are readily available, it is safe to assume that the great majority of teacher-constructed tests administered by the industrial arts and other teachers are so low in reliability that little confidence can be placed in

their results. Quite satisfactory checks upon reliability can be made, but these checks do require the use of elementary statistical procedures.

Objectivity

In the literature of measurement and evaluation much space has been devoted to the importance of and ways and means of ensuring objectivity. If a test is objective, two important conditions obtain, one having to do with the interpretation of test items by the student and the other having to do with scoring the test. From the standpoint of interpretation, a test is said to be objective when all students who know the subject matter in question place essentially the same interpretation upon all items in the test. That is, each student who knows the content understands what the individual items mean and they have the same interpretation of what the items require in the way of a response. Insofar as scoring is concerned, different individuals, once the key has been constructed, will arrive at essentially the same scores for the same test paper. One individual, upon rescoring a given paper, will arrive at identical scores. It should be apparent that objectivity relates to reliability and in turn to validity.

A word of caution in regard to over-emphasis upon objectivity, and, incidentally, reliability, is in order at this point. There is serious question as to whether all of the major objectives of industrial arts can be effectively measured by using only those instruments and devices which can be made completely objective. For example, written tests can be made completely objective, at least from the standpoint of scoring. Rating scales, at least from the standpoint of the rater variable, probably cannot be made completely objective. The results of the observation of student behavior can ordinarily be recorded with less objectivity than can scores resulting from the administration of written tests. In terms of validity, however, it may be much more important to employ rating scales and to observe student behavior than to administer written tests in an effort to determine the extent to which certain instructional objectives have been accomplished.

The concepts of reliability and objectivity, as has been suggested in the case of validity, should be applied to the review and appraisal of the total program of evaluation. For example, questions might well be raised with reference to the objectivity and reliability of interim and final evaluative reports.

Behavioral Change and Evaluation

One of the somewhat recent and significant developments in education, particularly true of industrial arts, has been the increased emphasis upon the statement and interpretation of instructional objectives in terms of desirable behavioral changes as opposed to the acquisition of information and skills only. The literature of industrial arts — professional books and journals as well as an increasing number of local and state curriculum guides — reflects quite clearly this trend. This change in emphasis in objectives, assuming that the change is desirable and granting the obvious necessity of evaluating in terms of instructional purposes, calls for a corresponding change of emphasis in the evaluation process. At this point a difficult problem arises. Traditionally, work in the area of measurement and evaluation of achievement has been oriented toward the evaluation of mastery of subject matter as the major emphasis. Relatively little has been done in the way of research necessary for the development of methods and devices for measuring and evaluating behavioral change. Furthermore, objective, reliable, and valid measures of this form of instructional outcome are far more difficult to obtain than is true in the case of direct subject matter achievement.

Proponents of the concept of behavioral change as an important consideration in education insist that it is not enough that pupils learn the subject matter taught in schools. What use does the pupil make of knowledge and skills obtained in school? What desirable behavioral changes occur as a result of increased knowledge and skill? What interests, attitudes, and appreciations are developed, and how do these bear upon his behavior?

Questions of this order suggest that there is an important relationship obtaining between knowledges, understandings, and skills on the one hand and behavioral change on the other. Apparently some enthusiastic proponents of behavioral change as an emphasis in educational purpose, teaching, and evaluation lose sight of this relationship. Their failure to clarify the relationship which does apparently exist tends to confuse teachers who have a genuine desire to improve their methods and to apply recommendations concerning emphasis upon behavioral change. Actually, a quite serious question may well be raised as to whether desirable behavioral changes can be brought about effectively by a de-emphasis upon knowledges, understandings, and skills in subject matter areas. The current issue

with reference to emphasis upon the development of skill in industrial arts education may be used to illustrate the point in question. One faction, apparently motivated in some instances at least by concern for the possibility that industrial arts education may be confused with trade training, insist that skill development is not the purpose of and should not be emphasized in industrial arts. The other faction is just as emphatic in its insistence that skill development should be emphasized in industrial arts. Both factions are prone to agree that a legitimate function of industrial arts is to develop a keen appreciation of craftsmanship. Both would insist that teaching be done in such a way that students have ample opportunity to experience pride in their own accomplishments. It would seem that, in the first place, an appreciation of craftsmanship would depend upon definite knowledge of what craftsmanship involves. It would seem further that any exhibition of pride in one's own accomplishment would at its base be false unless that accomplishment is at the highest level feasible and possible for a given student in terms of his aptitude and his previous experience.

Another approach to the interpretation of the relationship between so-called subject matter achievement and behavioral change is based on the assumption that knowing is a form of behavior and that acquisition or possession of skill is likewise behavior. This interpretation, however, is likely to relegate to a position of unimportance such outcomes as interests, appreciations, and attitudes as reflected in actions of people.

The position assumed here is that in the program of instruction and in evaluation emphasis should be placed upon both subject matter accomplishment and upon the outcomes of a type with which the expression "behavioral change" is usually associated. Assume, for example, that the industrial arts teacher faces the problem of determining the extent to which his pupils have realized this commonly-expressed objective of industrial arts: Interest in and appreciation of American industry. He would test for knowledge, on the part of his pupils, concerning industry. He would also look for evidence of the extent to which the acquisition of interest and appreciation may be affecting the actions of his pupils. It would seem appropriate that he pose and answer such questions as the following: Do the pupils in my class now seek more new information about industry than formerly? Do they read more about industry than before? Is this additional study voluntary on their part? Do they ask questions which indicate that they may consider the

possibility of industrial employment? What evidences, over and above direct questions which derive from the the content of the course, are indicative of an appreciation of the social-economic significance of industrial developments? Do they show evidence of becoming more intimately acquainted with industrial establishments in their local community? What do their reactions to visits made to local plants indicate in this regard?

Another objective of industrial arts which is frequently stressed is the development of hobby-recreational interests and competencies. Perhaps this particular objective may be used to illustrate even more clearly the kinds of evidence, in addition to that limited specifically to subject matter accomplishment, which should be collected. In addition to determining the extent to which knowledges and skills which may be exploited for hobby-recreational purposes have been acquired, evaluation of the realization of this objective requires evidence concerning the extent to which pupils actually develop an initial interest in hobby activities related to the course and concerning the actions in which this interest results. The following are examples of appropriate questions: Do the pupils join and participate in clubs and other extracurricular activities in which hobbies related to the course are pursued? Do the pupils tend to devote a significant portion of their free time at home in pursuit of hobby interests? What portion of their own funds do they invest in materials and tools essential to the pursuit of related hobbies?

Participants in the Evaluation of Progress

Teachers have assumed that it is their responsibility, and theirs alone, to evaluate the achievement of their students. Teachers have felt so strongly about this that many would be inclined to view any attempt to broaden the range of participation in the evaluative process as an encroachment upon their prerogative as teachers. Their arguments have been to the effect that they, to the exclusion of others, know the standards which should be observed, and that they have observed and know quite well the students involved. Opposition to this point of view is being afforded by an increasing number of teachers and specialists in the area of measurement who insist that in the democratic school effective evaluation involves the cooperative effort of the teacher, the pupil himself, and others who have an opportunity to observe his performance.

The strongest argument for pupil participation in evaluation is one which stresses the rewarding effects of such partici-

pation upon his educational growth and development. The pupil who learns to view with objectivity and to place appropriate values upon his own as well as his associates' accomplishments has indeed grown and developed. If he learns also to view with objectivity and to respect and benefit from the judgments of his associates relative to his own accomplishments, he has acquired a trait of primary importance to him as an individual and as a member of a democratic society. Denying the pupil the right and failing to encourage him to participate fully in the evaluation of his achievement and that of his associates eliminate the opportunity for optimal growth and development.

There is research evidence to support the hypothesis that knowledge of results is an important factor which leads to increased effort and progress. Furthermore, knowledge of past performance and achievement has implications for realistic goal-setting. Acceptance of and response to goals realistically set seem, in turn, to result in increased and more continuous and persistent effort than is obtained where the response is to nebulous goals which are unrealistic and thus clearly beyond the student's capacity. Participation in evaluation would seem to have important implications for realistic goal-setting.

If the central purpose of evaluation, as previously proposed, is to be achieved, it becomes important that pupils participate in evaluation. Even though the professional staff of the school make the assumption that all evidences needed to provide adequate evaluation of student progress could be obtained without student participation in the process, the student would still need to become involved in the evaluation of his own progress for the value such involvement has for him.

Objectives imply that the behavior with which education is concerned is not limited to that behavior exhibited by the student while in the school setting. What he does outside of the school — how he spends his leisure time, how he uses his economic resources, what he reads outside of school, how he gets along with his associates outside of the immediate school environment — may be influenced substantially by the school and should be taken into account if all facets of his progress are to be evaluated. It follows, then, that persons other than school personnel, parents particularly, should participate in the evaluative process.

Evaluation of Individual and Group Performance

Typically, all evaluative effort in the school is directed toward the measurement and appraisal of the performance of the individual. When it is observed that the performance of groups becomes more and more important in a democracy, both in work situations and in meeting the responsibilities of citizenship, school personnel began to evolve the notion that in one way or another group performance should be evaluated. Aside from isolated attempts to evaluate group performance and the limited research which has been conducted with reference to the problem, in both instances limited primarily to military and certain industrial situations, very little has been done in the way of developing instruments and techniques for this purpose. In certain situations where effective performance is clearly dependent upon the coordination of the efforts of individual members of a group, the need for the evaluation of group performance has long been apparent. The athletic coach, for example, recognizes that effective team play involves more than the summation of the efforts of individual members of the team. He continually seeks the most effective combination of individuals. This is also recognized by directors of such group activities as are involved in music and dramatic productions.

The research which has been completed to date with reference to the problem of the evaluation of group performance leaves little in the way of recommendations which may merit consideration. Aside from the practical problem of determining what data should be collected and by what means and techniques it should be gathered, such questions as the following arise: On the basis of what standards should group performance be evaluated? What should be the character of the report? How should the performance of his group affect the evaluative report concerning the individual member of a group?

While the place of the evaluation of group performance in the total program of evaluation may not be clear, it should be apparent that the appraisal of the performance of the individual pupil as a member of a group and how he functions in group situations should be taken into account in the total evaluation program. In fact, his performance as a group member may very well be more important, both in terms of educational purpose and in terms of his ultimate success in life, than how he performs as an individual in isolation.

Standards

If one is to evaluate, a supposition is that a judgment is made in terms of some type of standard. Industrial arts instructors in general will insist that they have in mind a definite standard of performance and that it is the instructor's job to teach in such a way that students have the optimal opportunity of meeting this standard. Insist, however, upon a specific definition of this standard, and teachers may conclude that the standard defies concrete description. A further complication arises when, as is now occurring with increased frequency, this question is posed: What are the alternative bases for the establishment of standards? The traditional standard to which the instructor subscribes rather generally has already been suggested. Some would argue that, in the democratic school, there should be no fixed standard which remains the same for all pupils. Instead, the argument goes, the performance of each pupil should be evaluated in terms of his aptitude for achieving. Others insist that present performance should be appraised in terms of the individual student's previous record of performance. In other words, the extent to which he has improved or gained is the important consideration. Appraisal in terms of the individual pupil's own goals and aspirations is a possibility which has been gathering enthusiastic support.

Here again, it becomes important that the central purpose of evaluation be kept in mind as a position is taken with reference to the problem of defining the standards in terms of which pupil progress should be evaluated. It is necessary also to remain aware of the objectives of the school activity in question. If, as research indicates, it is generally true that effort directed toward the realization of goals which are realistic results in a more continuous and a higher order of performance than is the case where goals are clearly beyond the reach of pupils, then it would seem desirable, in terms of the central purpose of evaluation, that the individual pupil's progress be appraised in terms of his aptitude and also in terms of his record of previous performance. Evaluations should also be conducted with uniform standards or norms as a basis, but such evaluations should be kept separate from and should not affect evaluations based on aptitude and past performance.

The position stated above with reference to aptitude and previous performance as a basis for evaluation applies only in those educational programs which are conducted for the purpose of achieving the objectives of general education. The basis for

evaluating achievement in programs which are primarily professional or vocational in purpose obviously derives from the standards established by the respective professions and vocations. Even though it is important that the pupil in such programs remain aware of his performance evaluated in terms of his capacity and his previous record he knows that there is a certain level of performance required of all who seek to enter his chosen vocation. He may show continued improvement and be working up to his capacity, but this does not justify the lowering of professional standards for him.

Sources and Ways and Means of Obtaining Data

A comprehensive program of evaluation in the area of industrial arts education requires that a variety of sources and ways and means of obtaining data be utilized. In the first place, it is essential that every teacher obtain, with reference to each of his pupils, all available information which is pertinent to the planning of an educational program for that pupil and which will make it possible to render intelligent decisions concerning the basis for evaluating the pupil's progress. Much of this information is available in the individual cumulative record which is maintained in the central offices of the school. This record may include scores on general aptitude tests, interest inventories, personality inventories, etc. The record will also include information concerning the pupil's previous achievement in the various subject matter areas. In addition, there may be recorded comments and suggestions from former teachers of the pupil. There may be a record of special reports which have been submitted by various professional personnel to whom the pupil may have been referred. Information concerning the pupil's participation in extracurricular activities, his hobby interests, educational activities participated in outside of school, and important information concerning the pupil's family and economic and social background may also be included. There may be a record of the pupil's work experience. Some cumulative records include the pupil's autobiography.

In addition to the information which may be available in the cumulative record the teacher may obtain further valuable information through teacher-pupil conferences, teacher-parent conferences, and from conferences with other teachers, counselors, and other professional personnel employed by the school. To this store of information, the teacher adds his own observations as he works with the pupil.

Particularly in the area of industrial arts, it is important that the teacher utilize a wide variety of instruments and techniques designed to obtain information concerning the pupil's achievement. Typically, the observation of daily performance and some means of evaluating completed projects, along with written tests, constitute the range of devices and techniques employed. Not only are there many more types of written test items which will measure more effectively than the ones normally used, but there are instruments which can be constructed by the teacher which will improve substantially his measurement and evaluation of the daily work of pupils in the shop as well as his evaluation of completed tasks. Observation check lists and rating scales may be designed and constructed by the instructor for use in making more objective the information which is revealed through observation of daily performance of students. Anecdotal records would also prove helpful in this regard. Rating scales and quality scales are among the instruments which can be employed to record objective data with reference to completed work. Performance tests, while difficult to administer and while requiring considerable time, are perhaps the most effective means of measuring precisely manipulative skill. Progress charts likewise have their place in the total program of evaluation.

Pupil participation in evaluation can be provided for in connection with practically all of the methods and devices employed in gathering data concerning achievement. The evaluative critique is especially effective as a means of providing for pupil participation in evaluation. Keeping their own individual progress charts is another means by which pupils can be encouraged to participate in evaluation. They can execute the check lists, rating scales, and quality scales. Those check lists and rating scales which provide for reacting to such outcomes as interests, attitudes, appreciations, habits, etc., may be executed by parents, other teachers, and employers of students, and other personnel who have occasion to observe closely the student at work or at play.

Because of the informal nature of industrial arts activities, sociometric technics offer possibilities which should be exploited by industrial arts teachers. The kinds of data which can be provided as pupils respond to these procedures would be very helpful to the teacher in evaluating such outcomes as cooperative attitudes.

The Evaluative Report

Reports designed to indicate the extent of the individual pupil's progress can do this well only if the report is as comprehensive as the program of measurement and evaluation. That is, it should contain entries which reveal the extent to which the various objectives have been achieved. It should reflect not only the relation of the pupil's achievement to norms, but it should indicate the extent to which his achievement approaches his aptitude for achieving. It should indicate mastery of content as well as the development of desirable traits, characteristics, attitudes, interests, habits, etc. As is the case with reference to the total program of evaluation, the report should be designed with a specific purpose in mind. A legitimate purpose is that of providing evaluative statements which would be helpful to the pupil and to all persons interested in his achievement as plans are made for further growth and development.

If letter marks or other symbols are used in the report, there should be a clear definition of what the symbols mean, what elements of achievement are taken into account as the symbols are recorded, and also the basis upon which evaluation is made. Alphabetical or numerical entries might possibly serve to indicate the extent of subject matter achievement, but it is exceedingly doubtful whether such symbols should be used in an effort to reflect the concomitant behavioral patterns and changes anticipated. Either some form of graphic representation opposite descriptive statements or open-ended expressions should be utilized for this purpose.

IMPLICATIONS FOR INDUSTRIAL ARTS TEACHER EDUCATION

Some of the major problems and issues which pertain to the evaluation of industrial arts outcomes have been identified. In setting forth some of the more important characteristics of a broadly-conceived program of evaluation, a position with reference to each major issue has been assumed. It is not anticipated that the reader will be in complete agreement with what has been suggested in the way of a comprehensive program of evaluation. Obtaining consensus is not the purpose of this chapter; rather, the intent is to focus attention upon the major problems and issues and to stimulate interest in them. Throughout this chapter, as seemed appropriate, principles, rather than techniques and specific procedures, have been stressed.

A safe assumption is that, if evaluation in industrial arts education is to undergo substantial improvement, more research

effort must be brought to bear on the problems of evaluation than has been the case to date. In addition, more effort must be devoted to the development of competence in the area of evaluation as prospective industrial arts teachers receive preparation for their profession.

Perhaps it will be assumed that specific suggestions should be made with reference to special courses in measurement and evaluation to be required of prospective industrial arts teachers. For those who would so assume, attention should be directed to the fact that most undergraduate industrial arts teacher education curricula are now so loaded with requirements, and thus so inflexible, that further effort to add specific, specialized courses probably should be met with resistance. Even though at least one comprehensive course in evaluation be added to the undergraduate curriculum, the recommendation here is that the development of competence in evaluation be a matter of emphasis in all laboratory and professional courses for which industrial arts teacher education personnel have major responsibility. The close relationship which obtains between how prospective teachers are taught and how they, themselves, teach suggests that an effective method of developing competence in measurement and evaluation is through the professionalization of courses included in the teacher education curriculum.

The foregoing implies, and it seems appropriate to suggest, that, in all industrial arts teacher education courses, laboratory as well as professional, ample opportunity for student participation in the evaluation process be provided. First, prospective industrial arts teachers should submit to a most rigorous and complete program of evaluation as they pursue laboratory and professional courses in their field. Essentially the same principles should be applied and the procedures employed which have been recommended for industrial arts classes in the elementary and secondary school. In addition, prospective industrial arts teachers should participate in the construction, administration, and in the analysis and evaluation of testing instruments employed. They should engage in self-appraisal and should participate in the evaluation of the performance of their fellow-students. They should likewise participate in the formulation of policies with reference to evaluation in their classes.

Whether the professionalization of each industrial arts course or the requirement of one or more specialized courses in the area of evaluation is to be the means whereby evaluation competence is to be developed, the following should be among the

important outcomes to be achieved. First, prospective teachers should learn to anticipate and to appreciate the weaknesses which are likely to characterize first drafts of written tests, performance tests, rating and quality scales, etc., regardless of how skilled the person may be who prepares these first drafts. They should learn that tests and other measuring devices vary tremendously in difficulty, and they should learn to employ the statistical procedures which will equate these instruments insofar as difficulty is concerned. They should learn the elementary statistical procedures which can be applied to test results in order to obtain indices of reliability. They should learn to increase the objectivity of measuring devices up to the point that further effort in the interest of objectivity begins to detract from the instrument, insofar as its validity is concerned. They should learn that all such instruments as checklists and rating scales which are well-designed may be executed by one person with reliable results, whereas other persons may yield results far below an acceptable reliability level. In other words, they should learn to understand and appreciate what is meant by the expression "rater-variable."

They should learn to evaluate standardized instruments which may be available, although very few merit consideration as instruments to be employed in industrial arts classes. They should learn to participate in the formulation of policies affecting the program of measurement and evaluation in the school.

Prospective teachers should develop an experimental attitude which will lead them to try, test, and evaluate a great variety of measuring and evaluating techniques. Effective measurement and evaluation in the field of industrial arts education requires ingenuity, resourcefulness, imagination and a healthy skepticism with reference to merits of evaluative techniques, procedures, and devices. Teachers as a general rule place far more confidence in the instruments which they construct and administer than careful analysis and evaluation of results would justify. By devoting more research effort to the problems and issues of evaluation and by placing more emphasis upon evaluation in industrial arts teacher education, an important contribution can be made to the further development and improvement of industrial arts as an important phase of education.

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CHAPTER VII

Concepts of General Education

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INTRODUCTION

The preceding chapters in this book have been devoted to developing some ideas about the nature of the human organism, the culture within which he lives, and the kind of education which would be most suitable for him. It has been pointed out that this human being is a purposeful kind of organism, setting up goals and striving to reach those goals. Further, the scientific method of problem solving is advanced as man's most important method of proceeding toward these goals. In addition, it has been shown that our contemporary society is a rather complicated kind of culture. It is made up of many institutions, of many kinds of jobs, of many facts and knowledges, and of many people exerting many efforts in many different directions, yet all are bound together by common understandings and by common efforts in improving the welfare and general quality of living for every individual. In this connection, and based upon these previously developed ideas and facts, it is the purpose of this chapter to deal with that area of education commonly designated as "general education."

As usually defined "general" education refers to those common learnings, of which, by the very nature of man and his culture, it is considered important that each person be made aware. These include skills, knowledges, methods of work, value patterns, and other various learnings which may be important in contemporary living.

Following this general assumption it is obvious that the most appropriate kind of general education will be those learnings which may be derived from the nature of the various needs of those human individuals who are to make up the culture, and the nature and organization of the culture which, *de facto,* has already been developed and passed on to them. For these reasons

it is important to start with the nature of this culture which requires a "general education" of all of its members.

SOCIETY AND GENERAL EDUCATION

Cooperation a Modern Feature

If called upon to locate the one outstanding feature of modern society the fact that our culture is a cooperative one would rank extremely high. This has become increasingly true during the past century so that at the present time the amount of interdependence among the various individuals composing the culture has reached almost one hundred per cent. Gone are the days when the rugged individual could sally forth and hew a livelihood from the equally rugged wilderness. Many modern developments, not the least of which is industry, has made it so that without the services and contributions of others we could survive for only a short time. This fact is well known and has been more completely dealt with in many books and articles.

Education Reflects the Society Which Supports It

It is also appropriate to mention that no adequate program of public education can be developed without taking into consideration the kind of society which will support it. Since, as has been previously pointed out, we are concerned with the democratic kind of culture it is in order to note that democracy itself is a cooperative kind of endeavor. Democracy fits well with a cooperative culture, and inversely a cooperative culture makes it requisite that the democratic form of living will be accepted. Thus, it is seen that the culture, with which we will be concerned in developing a program of general education, will be of a democratic and cooperative nature. Such a culture is the only known type which can adequately deal with the complicated kinds of activities which make up a modern civilization and yet permit those human freedoms which are so highly valued.

Cooperation Does Not Mean Absence of Competition

The above paragraph rightly stresses the importance of cooperation as an essential feature of the democratic culture but it is not to be construed as advocating an absence of competition. Competitive activities seem to fill a very real kind of human need, and when correctly used add a great deal to the satisfactions of life. Further, people under the stimulus of pressure from competitive situations are usually more productive both of actions and ideas.

Thus it is that there is no quarrel with competition, *per se,* but rather an indication that such a potent factor cannot be allowed to run free and without any checks and balances. This means that competition must be placed within a framework of rules that have been cooperatively formulated. Actually there is nothing new in this idea because it has always been used in the various sports and games. Even such a brutal competition as warfare has its rules.

In all kinds of human activities there are to be found general agreements as to what constitutes "fair" competition. Sometimes these agreements are not so "fair" and frequently they were not cooperatively formulated, but they are always present and serve as illustrations of the kinds of agreements needed to make competition function best. Also, where these agreements are vague, weak, or poorly formulated, they serve to remind of the need for cooperative action to clarify the framework of rules.

Society and Individuals are Not in Conflict

Society is made up of individuals. Dewey has noted this fact and has stated the alternatives:

> Society must exist for the sake of individuals; or individuals must have their ends and ways of living set up for them by society; or else society and individuals are correlative, organic, to one another, society requiring the service and subordination of individuals and at the same time existing to serve them.[1]

It is rather obvious that the "organic" viewpoint of the individual and his society is used in this writing. They are complimentary; each serves the other and is made possible by the other, and to take either of the other viewpoints always leads to an extreme position of placing the individual and society in conflict. Such conflicts always result in the subordination of either the individual or the society and such subordinating can only result in decreased efficiency of the total "organism." Thus, our considerations of society, and of the individual, are not for the purpose of describing competing elements, but rather are discussions of the complimentary parts of a larger whole.

THE HUMAN ORGANISM AND GENERAL EDUCATION

Having ascertained that the democratic cooperative culture is the logical choice as the setting for this program of general education, it is now appropriate to look at the type of individual

[1] John Dewey, *Reconstruction in Philosophy* (New York: Henry Holt and Company, 1920) p. 187.

which will make up this culture. What is the nature of this human organism?

Human Needs

It has been well established by the various disciplines, such as psychology, biology, and anthropology, that the human being seeks to maintain an equilibrium. When this equilibrium is upset the organism takes steps to restore its balance and this gives rise to the various human needs. Certain unbalancing features are common to all types of human societies and these are usually designated as the basic needs.

"Among the basic needs that have been identified are food, sex, shelter, protection, growth (training), hygiene, movement, and social recognition."[2]

Although it is obvious that society exists primarily for the purpose of helping in the fulfillment of these basic human needs, it is also equally obvious that these basic needs give rise to a great variety of needs which may be called "induced." For example, shelter is a basic need and many activities have been developed in the interest of meeting this need. Elaborate structures have been developed which require specialized planning ability, construction skills, tools, transportation, finance, selling, and the like. These all represent important and valid needs to those individuals engaged in the various phases of the housing industry. Thus, throughout the society there will be a great variety of human needs. Education is one of those needs which is brought about because of the various activities relevant to the basic needs.

In this connection it is assumed that the primary function of education is to give people the skills and methods of thinking which will enable them to act intelligently in their daily living. This assumption implies two things which should be made more explicit. First, the school is only one of the many institutions which society has set up to meet the needs of its individual members. Second, the function of the school should be more carefully evaluated so as to enable it to effectively carry out its role in helping the communities' citizens develop more intelligently and cooperatively the necessary know-how through the solution of appropriate problems in the various areas of living.

[2] B. Othanel Smith, William O. Stanley, and J. Harlan Shores, *Fundamentals of Curriculum Development* (Yonkers-on-Hudson, New York: World Book Company, 1950) p. 258.

Human Abilities

As was pointed out in Chapter II the human organism is a rather puny kind of physical creature but he possesses some rather amazing qualities. Alone and striving individually he does not amount to a great deal; yet he is able to cooperate with his fellow beings so as to achieve some important victories over common problems. These abilities in cooperating with fellow beings in problem solving activities seem largely to be learned kinds of abilities. As such they are important for any program of education and, as will be shown, are increasingly important in any program of general education because they are common to all of the combined efforts of the population. Further the human organism can develop abilities in communicating with others, he can engage in cooperative efforts, he can visualize objectives and purposes and can join with others in working for common purposes, and last, but by no means least, he can visualize actions so as to project their future consequences. That is, he can hypothesize solutions for his problems and can estimate with some accuracy the kinds of results which will be forthcoming. Thus we have two important factors which must be considered in outlining any program of general education. First, there is the kind of culture in which the general education is to function. It is immediately recognized that the democratic kind of culture, where cooperation and mutual efforts are the rule, would bring forth a much different kind of education than that which would be needed in the autocratic or totalitarian countries. Second, the nature of the organisms which make up the culture provides a very important element. As has been identified, the human individual is an organism that can set up goals and purposes, can use important and valuable problem solving methods in reaching those goals, can join cooperatively with his fellows in striving for common goals, and can evaluate and project future consequences from the results of past actions.

Human Weaknesses

Although many weaknesses have been ascribed to human beings, a listing of some of the basic ones will be appropriate for our discussion. That there are limitations to a human's physical strength goes without saying, and it is in this problem area that many of our power producing devices have been developed.

Of a great deal more importance are the sociological weaknesses by which man finds himself plagued. One of the more

troublesome of these is to be found in the area of inconsistent behaviors. Man has a weakness for choosing behaviors which will be adequate to relieve the problem of the moment and in this way to become free of the pressures for action. Yet, this sort of thing leads to all kinds of inconsistent behaviors.

Man has a weakness for believing those facts which will fit into his desires of the moment and in just as easily discarding those facts when they do not serve his purpose. Such a discussion of man leads directly to another point which is of the nature of a human weakness. This has to do with the unhealthy mental condition which is the price that the individual pays for using inconsistent methods and facts.

Although the above list does not by any means contain all of the human weaknesses it does point up the kind of thing which is most appropriate as a target for an attack by a well developed program of liberal (general) education.

THE ORGANIZATION OF THE SOCIAL MATRIX

Division of Labor

Obviously, the organization of the society will have a considerable bearing upon the kinds of things which will be included in a program of general education. Educational needs are the direct result of the kinds of activities in which people engage, or for which they are preparing themselves. Thus if there is no division of labor each person will be doing the same things as each and every other person and there will be no need for any kind of specialized or vocational education. What will be needed will be simply education, and it will be alike for all people. However, modern societies are not organized in this manner and for a very good reason. There are so many jobs to be done, there are so many items of information to be used, there are so many skills that could be acquired, that it is quite obvious no one person could possibly be competent in all of these. It has been found necessary to have a division of labor. (This by the way throws increasing emphasis upon the necessity of a cooperative type of society.) Division of labor is an efficiency device and has made it possible for a much higher degree of proficiency to be achieved in certain areas of work by some individuals because other areas of work were being taken care of by other specialized individuals. This fact of course is the basis for all of our programs of vocational education. This is true whether they be vocational in the sense of trade education or in the sense of a professsion.

From this viewpoint it might seem that all of the needed education is to be vocational specialized education and that there is no common ground which might be called general education. A further consideration shows, however, that such is not the case.

The Specialized Tasks

If a community is thought of in terms of the tasks to be done then it becomes obvious that a great many of these tasks are of specialized variety. The medical profession has a number of tasks to perform which deal in the area of maintaining the health status of the population. The business institution has certain tasks to perform in supplying needs, the school has tasks with regard to improving the educational status, and so on through all of the various institutions which make up the community. These are all somewhat specialized tasks, but a further look at the community will reveal that there are other jobs which are not specialized in nature but devolve upon each and every member of the population.

Common Tasks

These non-specialized tasks have to do with such things as cooperatively planning the growth and structure of the community; deciding the kinds of functions that should be performed by the school, the medical profession, the agricultural area, and each of the many other institutions; and setting up various kinds of organizational machinery which will be designed to carry out the aims of the above mentioned plans. Thus it is seen that although there are numerous specialized kinds of jobs there are also those jobs which are common and which are the responsibility of each member of the community.

Common Value Systems

A closer look at the community reveals that the tasks (jobs) of the community are not the entire story when it comes to identifying the community. There are also a number of beliefs and attitudes which are common to the members of that community. Thus under our previously defined concepts each member of the community should have certain basic beliefs regarding the democratic concept. Further, each member should also have certain attitudes regarding the worth and the dignity of each other member and each member should have an allegiance to the important methods which will be used in common problem solving efforts. It is seen that these common kinds of attitudes are

necessary before any of the important kinds of work necessary for cooperative action can go forward. That is, these common kinds of understandings, these common ways of working, and these consistent patterns of behavior, are necessary in order to make it possible for one individual to anticipate the actions of another and to be able to cooperate with him. It seems almost self-evident that the kinds of things to be included in a general education program will be those learnings which make it possible for the members of the community to work cooperatively together, to have common attitudes and common beliefs necessary for this cooperative action, and to be able to apply appropriate kinds of methods to the solving of these common problems.

Education for These Things

From these considerations there begins to appear a picture of the kind of person to be developed by this program of general education. He is a person who can cooperate and who has certain general understandings and attitudes which he holds in common with his fellow human beings. In order to set up a desirable program of general education it will be necessary to identify these items which he should hold in common with his fellows, and which will be needed to work cooperatively in the solving of problems. To do these things it will be desirable to show the relationships which occur as he strives to be a functioning member of his community. In investigating his participation in community action it first becomes obvious that there are certain tasks which it will be his duty to perform. That is, in order that the community be an ongoing and active concern there are a number of tasks which must be performed, and must be performed by *each* member of the of the community (e.g., participate in the democratic processes). Second, it will be obvious that there will be a certain amount of "know-how" needed by each person as he performs these common tasks. He will, for example, need to communicate with his fellow citizens if he is to work with them. This ability to communicate will naturally show a need for skill in the use of the tools of communication. Third, there will need to be a certain commonness of ideals and goals before the cooperative community can exist. That these ideals and common values are present in the ordinary community no one can dispute. Nevertheless, they are seldom searched out and made articulate so that they can be used more effectively in guiding the actions of the members of the community.

Elements of the General Education Program

When the common learnings (and this does not mean identical learnings) needed for each individual to be a participating member of this community have been identified, and they can be best identified in terms of (a) tasks to be done, (b) the know-how needed to perform these tasks, and (c) the basic values and attitudes which underlie the action patterns of the community, then the elements for the program for general education will have been largely identified. Furthermore, it is doubtless true that a large amount of these general education elements, which are necessary for the general action of the citizen in his community, will also be appropriate as he goes about his more specialized tasks in the community. This is to say that there will be no sharp line of demarcation between vocational education and general education and that many of the items of general education will find appropriate places wherein they will function in the individual's vocational endeavors.

GENERAL EDUCATION FOR THE INDUSTRIAL ARTS TEACHER

Education for the Development of Values

Having pointed out some of the concepts regarding the nature of general education it is now appropriate to list specifically some of the general education factors which need inclusion in a program of education. First and foremost will undoubtedly be the important value judgments and basic attitudes which make up the foundation of the individual's personality. In a democratic society it is important that the individual possess many understandings about the nature of democracy. That is, he will need to be aware of the worth and dignity of each individual. He will need to subscribe to the belief that all people have a right to share in decision making as well as in the execution of decisions. Further, he will need to understand that each individual is a unique organism and as such has a unique contribution to make to his culture. Many of these are learned simply as a member of the social group. However, it is to be observed that oftentimes these are not learned except by imitation or by the habitual following of the examples of other people. It is advanced that these ideas are not really learned until they are consciously evaluated and accepted as part of the operational beliefs under which the individual will carry out his activities.

Education for the Development of Basic Skills

Following this listing of the basic attitudes and beliefs appropriate to the social group, next to be stated is facility in the use of the basic tools of communication. This of course refers to skill in reading, writing, and communicating facts and ideas from one person to another. Just as it is very difficult to have effective cooperation without the use of common value judgment so it is also extremely difficult to have cooperation unless the participants are able to communicate freely and skillfully one with the other. Unless it be misunderstood, and some should think that this concern with communication can be met by simply having a couple of years of English grammar, the writer hastens to point out that such would hardly fulfill the idea of communication used here. This concept of communication requires a great deal of facility in drawing — mechanical and sketching — in the use of the English language, in speaking and writing, in dramatics, debating and discussing, and in all other ways which are appropriate to communicate ideas from one person to another. More will be said regarding the kinds of methods deemed appropriate to achieving these communication skills.

Education to Transmit the Culture

Wilber has carefully considered the purposes of general education and he finds transmitting and improving the culture to be among the primary functions of education.

> Careful consideration reveals, however, that when stripped of verbiage and special applications the various statements [of the purposes of general education] may be summed up as implying three basic purposes: (1) to transmit a way of life, (2) to improve and reconstruct that way of life, and (3) to meet the needs of individuals.
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> . . . . . .
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> The importance of achieving this purpose [transmitting the way of life] may be realized when one considers that, if mankind should fail in this important duty for a period of only two or three generations, the entire culture would revert to savagery.[1]

Thus, thirdly there will be listed an understanding of the culture within which the individual is living. This term "understanding of the culture" of course refers to an understanding of the stream of human experience and how it has ever accumu-

[1] Gordon O. Wilber, *Industrial Arts in General Education* (Scranton: International Textbook Company, 1954) pp. 3-4.

lated and grown so as to make possible the kind of civilization we experience today. Undoubtedly a study of the history of the human race has a great deal to contribute in this respect. Although the pure memorizing of historical facts without relating these facts to other human experiences, which have also been productive of cultural growth, is to miss the important point of the notion of transmitting the culture. Further, to transmit the culture enmasse and without subjecting it to a process of critical evaluation and assessment is indeed but another way to simply learn facts without applying them and without making it possible that the history being produced by future generations will show any improvement over that produced by those in the past.

Democracy may be cited as a good example of what is meant by not transmitting the culture *in toto* but subjecting it to a refining process so that only the best features are perpetuated. As everyone is well aware, the basic ideas of democracy are not a new human understanding but are very ancient indeed. However, history reveals that those peoples accepting democracy have always done so with certain reservations. The worth and dignity of man has always referred to the peer group and has tended to rule out as unworthy other nonconforming or "inferior" groups. Thus the ancient Greeks had democracy but it applied only to the masters and not to the slaves. Even in America, where democracy has all the respect of a religion, the same thing has been true. Certain groups have had democracy but have tended to make second class citizens of others.

However, to return to the idea of improving the culture as it is transmitted, careful observation shows that, in America at least, the peer group has continued to expand and to encompass more people. As the concepts of democracy have been transmitted more and more of its narrowly conceived notions have been eliminated. Although no claim is made that the application of democratic principles has been perfected, it is encouraging to note that there is wide agreement that its major assumptions — worth and dignity of the individual, participation in decision making, and the improvement of man — apply to all peoples and groups.

Education to Improve Problem Solving Abilities

A further element of general education which is appropriate, not only to the industrial arts teacher but to all citizens, is that which may be described as the area of important methods and

tools of problem solving. Since the scientific method of problem solving is deemed the most valid way that human beings have discovered for solving problems, it becomes obvious that each person should develop, to the limit of his ability, skills in the use of this method. Furthermore the use of the problem solving method as a common method appropriate to all the areas of community work will provide an additional means of tying the community together and making it a factual reality wherein all of the people can work more closely because they understand and are using similar methods. In addition to the scientific there are indeed other important methods such as the tool of research for fact finding.

More Courses Not the Answer

It is to be noted that the picturing of this program of general education has not been done in terms of so many courses in English, so many college hours in mathematics, so much work in industrial arts and so on through the commonly accepted list of general education subjects. This is based upon the notion that many of these courses are simply fact learning courses wherein the student is expected to memorize a body of information. It is becoming more widely recognized that this learning of sterile information is not very productive in the education of an individual. Facts and information, particularly those which are memorized without any connection to actual problem solving, are too quickly forgotten, become obsolete, or even become untrue. For this reason, this concept of general education, as may be easily observed, is based upon large understandings, values, attitudes, and methods. It is true that attitudes, methods, values, and the like do change; however it may be observed that they change more slowly and are really much more stable than the matter of learning a great many facts. Further, the important methods, values, and skills may be easily transferred from one type of problem to another. This is not true in the case of many facts and unless a particular situation calling for a fact happens to arise it is quite likely that the fact will not be used until it is forgotten and then it may not be used at all. It is an hypothesis here that subject matter which is learned by the rote method, to satisfy some teacher's notion of testing, will not be available for use, or at least not available to as great a degree, as that which is learned in another way. This other way refers to those items of subject matter which are learned when the individual is doing actual problem solving. This "problem solving"

must be those *real problems* which are the concern of the student and *for which he feels a definite responsibility.*

Industrial Arts Gets its Strength from Real Problem Solving

Industrial arts has long recognized the value of the problem solving method and for many years has used the "project method" as a very important vehicle to the achievement of its teaching aims. It is further indicated here that this problem solving method (project method) might well be applied to all of the educational activities engaged in by the student. No one would think of simply teaching a student to use a hammer. A hammer is to be used for some purpose — without such use it has no signficance. While this is quite obvious with regard to the hammer it is not so obvious in regard to general education subjects. Whereas it is recognized that a student must need to be skillful in communication it is sometimes not realized that communication is not an end in itself but is merely a tool to an end. Thus students take courses in English and are learning to use a tool, but frequently they are not learning to use it in the solving of any problem that has reality for them. They take courses in mechanical drawing but usually these are simply exercises with no actual meaning and usage to the student. That is, so far as the student ever realizes, they are not related to any problem that is appropriate to the student's concerns. They do not fit into his objectives other than his desire to pass the course and get a grade. As he passes the course and gets the grade the communication tool that he is using has served its purpose and he promptly loses most if not all of it. It is herein advanced that if he should learn these communication tools by using them for some purpose he could undoubtedly develop much greater skill in their use and further, and of more importance, they would be available for him to use in many other kinds of activities. Thus the student must learn these important skills in actual usage or they will be largely meaningless to him. It is both *uneconomical* and *unintelligent* to learn to use a tool without learning at the same time to use it for some purpose.

At a recent industrial arts luncheon the principal address was delivered by a well known administrator of elementary and secondary schools. His talk showed a great breadth of understanding as to the values and aims of industrial arts. At the end of his speech a question and answer period was provided and he was asked this question by a director of a training program

who gets boys after they leave high-school (not a college-grade program), "When the boys get to our program we have to spend a great deal of time teaching them to read, write, and work simple mathematical problems. Why is it that our schools aren't teaching our kids the 'three R's?" The superintendent's reply was something like this, "Your question is not entirely true. In fact records show that the children leaving high school today can read better, can spell better, can work mathematical problems better, than their parents did." The chief point in relating this incident is that it highlights a very real and pressing dilemma. Our school people can show by standardized tests that students *can* read, write, and work arithmetic problems better than did their parents. Yet the users of the educational product of our schools are quite right in saying that when they get these students they (the students) can neither read, write, nor work arithmetic problems with any degree of success. What is the answer to this dilemma?

Learning Which Takes Place in Problem Solving is Different from Rote Learning

It appears upon observation that both of these men were right. It *is* true that when the pupils leave high school they can do somewhat better on standardized tests than their parents did. It is also true that when they get into some real activity they are not very good at reading, at writing, or at doing mathematical calculations. The answer appears to be found in the *way* that the children learn these skills. That is, most of these skills were learned in school as rote exercises and in order to "pass the test." Thus when the standardized tests are given the children do very well on the test. However, notice that the knowledge was acquired under an artificial, non problem-solving, extrinsic kind of motivation. When the student later encounters a situation, such as in aircraft mechanic school, where he will need to solve a mathematical problem he is unable to bring what he knows to bear upon his situation. He did not learn it in a problem-solving situation. Now when it is needed in a problem-solving situation this skill is not available to help him in his work.

This is but another example of the way in which the general education program must be revised so that the things that are being learned will be learned in a situation where they will tend to become more and more available and function more and more readily in the actual problems which the learner will face. Obviously there is no better way to do this than to assist him in learning these skills under actual problem-solving sit-

uations. People have plenty of problems. There is no real reason for setting up artificial kinds of situations in order to teach communication skills, mathematical skills, important methods of problem solving, or the application of basic beliefs and values. There are plenty of real situations available and the use of so many artificial situations is inexcusable.

WHY NOT MAKE THE STUDENT MORE RESPONSIBLE FOR HIS OWN EDUCATION?

During recent times educational programs have become so highly structured, so completely organized, and to such a great degree standardized, that the student has little or nothing to say about the kind of educational work he is going to do. This of course refers to the elementary and secondary schools and not to those institutions of higher learning where greater freedom is possible. However, even in the case of the institutions of higher learning it should be pointed out that many of their programs are becoming completely standardized with very little opportunity for flexibility and individuality.

All of this is true even though psychology continues to point out that education is not effective unless it serves the learner's interests, and that each human individual has certain unique characteristics which will make it unprofitable for all individuals to be forced through the same kind of "production-line" education. This standardization of school subjects continues to be true even though it is being constantly emphasized that education is not very effective unless it is concerned with problem solving activities and that the problems are the problems of the learner and not the problems of the teacher.

The Teacher Does Most of the Problem Solving

The above is an effort to point out that most of the problem solving done in schools is being done by the teachers, and that most of the decisions being made in the schools are being made by the teachers. This does not fit in very well with the democratic notions of society nor does it appear to be very compatible with the best that psychology can offer regarding appropriate learning situations. While it is undoubtedly true that people need guidance, and students in their formative years to a crucial degree, this need for guidance does not relieve the schools of their responsibility for trying to develop their students into self-guiding, self-directing people. It has been said so often that it has almost become a cliche or trite saying, however since very little has been done about it perhaps it is worthy of re-

peating again: You cannot teach democracy in an autocratic setting, you cannot teach people to be self-directing individuals without giving them an opportunity to participate in making those decisions which affect their guidance programs, and you cannot teach them to think by having them memorize the results of other people's thinking.

These Continue to be Pressing Needs

Thus, as has been pointed out above, there are several items which need to be rectified if the school system is to provide adequate general education. *First* there is the idea of more individuality in programs. Even though it will be admitted that highly standardized procedures produce excellent automobiles it is very difficult to find any facts which substantiate this procedure as being the best way to produce fine human beings. There must be individual attention to the program of each learner. *Second,* each student must work on something which contains his interest, and for the successful outcome of which he needs to feel a keen responsibility. *Third,* each student needs to have a program which will tend to guide him into becoming a self-directing and responsible individual. *Fourth,* these educational activities need to be carried on in a democratic atmosphere so that by association as well as by practice the student will learn the basic ways of operating within a democratic context.

The Student has Interest

With these four major criteria what kind of educational program can be devised to satisfy their demands? First, perhaps, should be the business of interest. Is there something in which students, of all ages and all levels of development, are universally interested and which will serve to provide a fine, intrinsic, motivation for all their learnings? Although the notion may sound a little selfish at first, there *is something* in which each student is keenly interested. That something is *himself.* Each normal individual is interested in himself, and in the formative years of school life each individual is very much interested in discovering his capabilities, his possibilities, his various levels of development as they refer to these possibilities and capabilities, his areas of needed development, his ambitions and aims for a professional or vocational career, and the amount and kind of effort which he will have to expend in order to reach these goals.

LET THESE INTERESTS SUSTAIN THE STUDENT WHILE HE IS BECOMING EDUCATED

Self Interest is a Potent Factor in Education

No one will question but that the above mentioned interests are very potent and that they will be sustained over a long period of time. With these things in mind are there any very real reasons why the student should not become educated through his efforts at better understanding himself, in finding out his capabilities, and in proceeding to become the kind of person he wants to become? Naturally, all of this at the beginning would have to be under expert guidance and only as progress is made would the student tend to become more and more a self-directing person in these kinds of efforts. This has great implications regarding the kinds of persons needed as teachers.

We Must Help the Student Evaluate His Growth

There are a number of instruments which are available and which seem to give good indications as to such things as a person's level of development, his vocational interests, his tendencies toward certain areas of endeavor, and like kinds of things. Although many have advanced the idea that the students should not know what scores they make on tests, such as IQ tests, or aptitude tests, studies that have been made of this factor in no way substantiate such feeling. Students are interested in their levels of development and in their abilities. Furthermore, as a general rule, students can "take it" very well in terms of finding out from interest inventories, or some similar tests, that they seem not to be very well qualified for some goal which they had at one time envisioned. In fact, this seems to be almost completely true except in cases where adamant parents have forced the child to hold on to a goal even though the child was not fitted for it and knew himself that the goal was an impossible one. In cases like this the child may refuse to look at himself in an objective manner. However instances of this sort seem to be the exception rather than the rule.

LET EACH STUDENT DEVELOP HIS OWN "COMPETENCY PATTERN"

Listing Traits Not Meaningful

For many years the time honored way of describing educational progress has been in terms of traits. The student was developing in honesty, appearance, understanding, and a great many other traits. Despite its wide use the "trait method" has

never been a very successful or effective way of describing educational growth. Neither for that matter has been the business of accumulating credits and getting a high school diploma or accumulating college hours and getting a degree.

Desired Behavior Plus Needed Personal Equipment

Recently a somewhat different manner of describing this growth has come into being. It has been called the "Competency Pattern" because it deals with those elements which are designed to produce the competent person, or inversely, those elements which will be possessed by a person if he is deemed competent. This Competency Pattern notion simply assumes that a person cannot be competent in all things and therefore a clear statement must be included designating those things in which competency is to be expected. As a second element in the competency pattern there is included the idea that all important competencies require certain items of personal equipment — skills, understandings, attitudes, and the like — which will be needed as operational equipment by the competent person. As a third and final element there is to be included those basic beliefs and assumptions which make up the value pattern of the individual. That is, in simplified form the Competency Pattern notion is based upon the assumption that each person has certain things which he will do, has certain beliefs and value patterns which he will follow in the doing of these tasks, and will need certain personal equipment if he is to perform successfully.

Obviously the whole notion is based upon the idea of behavior patterns. It is a well known fact that all people have certain routines of behavior that they tend to follow. It is also well known that many of these behavior patterns are inconsistent and some even unintelligent. Likewise there is considerable evidence that through conscious evaluation and effort a person may change his behavior patterns so as to make them more appropriate, more consistent, and more intelligent.

Make Behavior Patterns the Basis of Education

Thus this notion of a competency pattern provides a good framework around which to erect a program of education. Obviously the learner will need to find out his abilities, capabilities, and inclination. This is a part of any program of improvement because it is very difficult to say what sort of training is needed before it is known what developmental level has been reached by the learner and also the direction in which he intends to go. Long ago it was discovered that education is

not inherently good just because it *is* education. You cannot train the faculties of the mind like the biceps of an arm; learning must proceed from some point towards some point and should do so in terms of the best that is known about the psychology of learning.

To Improve Personal Value Systems

It is quite apparent that many of our present social difficulties come from the lack of having consistent and well thought out value patterns. Further, it is a widely quoted objective that each student *should develop* a consistent and well thought out value pattern. When placed in the context of the competency pattern the student will have a very fine opportunity to examine and strengthen his value system because the value pattern is used in a very real way to evaluate and determine the methods of performance that will be used in accomplishing the various tasks which will accrue to him as a learner. As an example, the student will not simply have it drilled into him that cheating on examinations is bad and that he must not do it. In developing his value pattern he will have the opportunity to examine the values which support cheating and non-cheating, will have an opportunity to select those values which he finds most attractive, and will attempt to consistently follow them to their logical conclusions. It has been amply demonstrated that when the student gains an understanding of moral rules from this direction he is much more apt to put them into real practice — both when under outside supervision and when under his own direction.

To Improve Personal Know-How

Within the developing pattern of competent behavior will also be included a great deal of "know-how" which the student will need to learn. Much of this know-how will be similar to the things which are contained in the traditional curriculum. However there will be a most important difference. Under the idea of developing his own competency pattern the student will view these items of know-how in a very different light. They will become something that is very pertinent to his goals and something which will have real meaning for him. As an example, the study of English grammar will not be something that is to be endured because it is a "requirement" of the school; it will become something which it is necessary for him to understand so that he will be able to fulfill the communication objectives of his pattern of competency.

DIVISIONS OF GENERAL EDUCATION, TECHNICAL EDUCATION, PROFESSIONAL EDUCATION

In almost every instance when one reads about the type of training required for preparing successful teachers he finds that this training is divided into three major categories. These categories are usually designated as the general education, the technical education, and the professional education of the student. In some instances they may be described in other words which mean approximately the same thing.

Preparation Through Subject Matter Courses

In his description of the preparation of the general shop teacher, Newkirk has used "cultural background," "shop training," and "professional skill and point of view."[5] He indicates the kinds of courses which would be appropriate for developing the cultural background as, "Such divisions as English, mathematics, physics, chemistry, social science, graphic and plastic arts, physical education and hygiene, and modern languages, should all be familiar ground for the teacher of general shop."[6] In the area of shop training Newkirk indicates that the general shop teacher "needs at least a beginning course in drawing, electrical work, sheet metal work, woodwork, plumbing, printing, forging, foundry, concrete work, auto mechanics, finishing, and design. He should also have a course in occupations and careers."[7]

In terms of training in professional skill and point-of-view Newkirk goes on to indicate that, "The general shop teacher needs training in psychology, principles of education, history and philosophy of education, and curriculum construction in junior and senior high school. In addition, he should have special methods courses which relate to the organization of the general shop in the industrial arts field."[8]

The above quotations are taken as representatives of the traditional approach to the problem of teacher-preparation. In this approach the subject-matter is divided into the three major areas of educational preparation — general, professional, and technical. Each of these bodies of subject matter is then divided into courses and the student is required to take a certain num-

[5] Louis V. Newkirk, *Organizing and Teaching the General Shop*, (Peoria, Illinois: Chas. A. Bennett Co., Inc., 1947) pp. 21-24.

[6] *Ibid.*, p. 21.

[7] *Ibid.*, p. 22.

[8] *Ibid.*, p. 24.

ber of courses in each of these areas. Under this concept curriculum development becomes usually a matter of juggling courses around into what are thought to be better sequences, and in allowing for the inclusion of more courses in that particular area in which one happens to be teaching. That is, if a teacher is in the area of general education he is quite sure, usually, to proclaim that what the student needs is more general education. The same seems also to hold true for the areas of technical and professional education. It is important to note two basic kinds of assumptions which underlie this traditional curriculum. First, it is assumed that the best way for a student to learn anything is to take a course in that area. Second, the assumption is evident that the important thing is the subject matter. If a student only but understands the knowledge which is contained in the area he will automatically put that knowledge to work, and he will become in his behavior the kind of person who makes most adequate use of such knowledge.

Preparation as the Achievement of Quality Traits

A somewhat different way of dealing with the matter of teacher preparation is to approach the problem in terms of identifying the qualities of good teachers and then setting out to achieve these qualities in prospective teachers. The Commission on Teacher Education, as organized by the American Council on Education, made a study of some of the problems of teacher education. The Commission found that the qualities needed in teachers are (1) respect for personality, (2) community mindedness, (3) rational behavior, (4) skill in cooperation, (5) increasing knowledge, (6) skill in mediating knowledge, (7) friendliness with children, (8) understanding children, (9) social understanding and behavior, (10) good citizenship in the school as society, (11) skill in evaluation, and (12) faith in the worth of teaching.[9]

It is interesting to note that of the above twelve items only two are directly concerned with knowledge and those two are so stated that they reflect knowledge in action and not in a static kind of condition.

It is evident that our notions about teacher training have progressed, to a noticeable extent, beyond the idea of imparting to the student large quantities of subject matter in each of the areas of general, technical, and professional education. Now we

[9] Commission on Teacher Education, *Teachers for Our Times*, (Washington: American Council on Education, 1944) p. 154ff.

strive instead to reach certain qualities in his behavior. At best, therefore, the separation of education into general, technical, and professional is nothing more than a device which will enable educational institutions to handle the great mass of learning which should take place and to be able to categorize it into some kind of meaningful organization.

In addition, there has been gradually added an increased emphasis on the use of theory. It is surprising how many lists of educational objectives, which are widely accepted in our democracy, would find themselves entirely appropriate when placed in a context other than a democratic society. This does not mean that there is anything wrong with the objectives; it simply means that until they are placed under some basic theory they do not have a properly defined meaning. We are gradually coming to recognize the importance of theory as a part of any educational program.

> Teacher preparation, however, includes much more than knowledge. A teacher must, of course, know what he is to impart to others. But in addition to knowing *what* he teaches, he must also know *how* to teach it. There are good and effective ways to teach and there are poor and ineffective ways. The teacher who has a professional education knows the difference. He knows how the learning process takes place, what obstacles it may encounter, and how these difficulties may be overcome or reduced.
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> To *knowing,* and to know-*how,* we must add a third dimension — know *why.* A person who *knows* a great deal may be a scholar, a sage, a savant. He is not necessarily a teacher. A person who *knows* and *knows how* is a craftsman. But only a person who *knows* and *knows how* and *knows why* is fully entitled to claim the status of a profession.[10]

As seen above, therefore, the teacher must have certain knowledge and skills, must know how to teach these, must know why they are taught, and in addition, must know how this "why" (theory) reflects in the choosing of methods appropriate to teaching. From this kind of educational viewpoint the boundaries which have been set up as enclosing the general education, technical education, and professional education appear increasingly artificial.

Based on Common Theories

At first glance it is easily recognized that these types of education are all based on common theory. They all reflect a common theory of society, or at least they should do so, and they all reflect a common theory of learning. It would be difficult to

[10] Waurine Walker, "Teacher Education is Basic," *Phi Delta Kappan,* 36:203, February, 1955.

imagine that a person would learn differently when he is partaking of general education than he learns when he is brushing up on his professional training. Second, all of these educations — general, technical, professional — are based on common methods. If the method of intelligence — the scientific method — is appropriate for technical education, surely it will hold good for professional education. If the solving of problems is a method which is basic to learning in general education, surely it is also apropriate in the two other categories. If these things are true, it becomes evident that general education items would surely contribute to technical education and technical education would contribute to professional education and in an inverse order each would be contributing to the other so that the dividing lines become more and more indistinct.

The above points of view tend to leave the subject somewhat muddled and no clear-cut lines are in evidence. Is there then really no basis upon which education can be established and is any learning as good as any other learning, just so long as it becomes part of the educational equipment of the learner? Obviously, this cannot be true and the answer to the dilemma must be found in the jobs people do.

Specialized Jobs Require Specialized Education

Because of his unique job, and the specialized phases of that job, the teacher will require some learnings which are unique to his profession and which might be quite properly called *professional* education. Because of the nature of his teaching job there will also be certain learnings which will be of the nature of *technical* education, and, to complete the cycle, because he is a citzen in a certain type of culture there will be things which are appropriate for his *general* education. Obviously, the best way to go about finding out these things will be to analyze the types of activities in which the teacher will be engaging. Find out the kinds of understandings and know-how items that will be needed and further investigate to discover appropriate theory which will serve as guide lines for this activity. Obviously this follows the Competency Pattern concept which was outlined earlier. Also this notion does not automatically require six courses in English, plus nine courses in mechanical drawing, plus courses in the history and philosophy of education. Such requirements cannot be so simply stated because they are not a *logical* development from the analysis described above.

Analysis Helps Find Learning Needs

From this analysis there will come indications which may be thought of as the learning needs of the student. Some of these learning needs will be of the nature of subject-matter content, which, by the way, lends itself very well to the course concept of teaching. However, a great number of these identifiable learning needs will be in the areas of developing understandings, of developing skills, of improving one's point-of-view, and like matters. These kinds of learnings do not seem to lend themselves very well to the course type of teaching as it is usually carried on. They require *situation* teaching where the student is placed in certain problem-solving situations where he, with the help of the teacher, is permitted to attack his own problems. Thus, if he does not know how to use the English language very well as a communication device he will not enroll for three courses in the rudiments of English grammar. Instead, he will set out to discover the exact nature of his deficiencies and apply some of the possible remedies which will be suggested as solutions for his problem. This kind of activity will develop not only his own understanding of English but also his communication skills and his ability in problem-solving. These are such broad things and encompass all activities so who can say whether they fall in the area of general education, technical education, or professional education? They are important learnings which must be acquired by the prospective teacher and little is to be gained by putting artificial labels upon them.

SUMMARY

From the several discussions included in this chapter a number of important ideas may be distilled. The first of these ideas has to do with the nature of "general education." As is usually understood general education is a broad type of education aimed at developing attitudes, abilities, and behavior patterns which are considered desirable by the society in which the person is living, but which do not necessarily prepare him for a specific type of vocation. It is important to note in effect that this says that there are few if any discrete bits of knowledge which a person will absolutely have to have in order to be called an educated man. However, it does say that in order to achieve a general education there must be broad understandings, a variety of abilities, and consistent behavior patterns.

The second of these important ideas has to do with a concept of the society within which this general education is to

function. It is noted that the society and the individual are not in conflict but that they are complimentary parts of a larger "organismic" whole. In this connection there is to be found a greater degree of cooperative effort and a more highly organized division of labor so that the individual is becoming increasingly specialized. This may be used as an analogy with our mass production system where the task of the worker becomes more and more specialized and a similar parallel may be drawn regarding the fact that this increasing degree of specialization requires an increasing degree of behavior conformity. The actions and efforts of one person must dovetail with the actions and efforts of other people. A great amount of deviation is not permissable.

A third interesting idea has developed around these understandings regarding the individual and his culture and the human needs which arise therefrom. This discussion tended to indicate that the needs of the individual, educationally speaking, did include the acquisition of a considerable body of subject matter but of equal importance was the acquisition of the best in the way of methods, theories, behavior patterns, and attitudes. A distinct thread of criticism runs throughout the entire series of topics. This criticism is based upon the fact that the way learning activities are presently conducted, and the way that psychology understands learning to be best accomplished, shows a wide degree of divergence. We are not using the best that is known about the nature of learning when we set up our learning situations. As one example, it is known that simply telling a person a fact and having him learn that fact by memory is no indication at all that he will use that fact to make any noticeable change in his behavior. Regardless of this understanding, however, a great deal of our educational effort continues to be spent in "telling" people facts. It is known, further, that problem solving is basic to all efficient learning. Regardless of the proven validity of this method of learning, a great many of our learning situations, even in industrial arts, do not contain all of the requisite elements of a true problem solving situation.

Another facet of this same criticism is to be found in the role which is given to the learner. Even though our basic democratic concepts insist that each person must participate in decision making, and should strive to become a self-directing person, our modern learning situations show a minimum of these characteristics. First of all, the student is not required,

or even permitted, to look at himself and to understand what his deficiencies are. Without understanding his learning needs the student is unable to understand the kinds of prescriptions which we administer to him. Thus it is impossible for the learner to really have much interest in what he is doing because he seldom has the slightest notion as to why he is doing it other than that in some mysterious way it is "good for him."

A remedy was suggested for this difficulty. This remedy recommended that the student be required, or allowed, whichever the case may be, to take a more active part in the direction of his own educational program, and to become an educated man through his interests in self development, in finding out what his educational needs are, in hypothesizing some things to do to remedy those needs, and in evaluating his own growth.

Finally it was suggested that many of our present-day college courses are very poor as general education courses. This does not mean that the courses are not good for preparing a specialist in that particular area. It simply indicates that when a student takes beginning courses in chemistry he does not receive a general education course in chemistry but instead he receives an initiation into the area under the assumption that he is going to spend the rest of his life being a research specialist in chemistry. Although this may produce, after a considerable length of time in additional study, some excellent researchers in chemistry it does very little for the general education of those people who are not going to be specialists in chemistry. They learn a few techniques about how to hold a test tube, memorize a few symbols, and that is about all. The big concepts of chemistry, and perhaps of more importance, the efficacy of the scientific method, is seldom, if ever, mentioned. By and large, this criticism will be found to be true in terms of each of the college areas; be it chemistry, mathematics, English, or to a lesser degree industrial arts. Thus the need seems to be not the taking of more courses but the redesigning of learning experiences.

These learning experiences, redesigned, will have to be put into some organizational scheme. They may be called courses, if you like, but they will have little in common with what we presently recognize as courses. They will actually be well designed problem solving activities, and will cut across all areas of organized subject matter, of methods, and of theoretical understandings. The degree that they will be *general* or *special* will be dependent upon what an analysis shows to be the char-

acter of the activities that the person will perform. The learning that constitutes special education for one may be technical education for another or may be general education in a different type culture.

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CHAPTER VIII

Concepts of Technical Education

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WE ARE STILL ONE STEP BEHIND

For twenty-five years Industrial Arts has made a strong and continuous bid to serve as industry's representative in general education. We have argued that this was an industrial nation, that we live in an age of machine production, that consumers had need to select and use these products, that experiences with basic materials and processes of industry formed the basis for understanding and participating in a mechanical environment. We have argued that industrial arts is good general education for this mechanical age while industry boasts of its mechanization, its efficient production, improved working conditions, and its contribution to a better life.

THE PROJECT IS OUR FORT

The "project" in industrial arts has become the counterpart of the product in industry. Planning, designing and constructing the "project," provided learner experiences with industry's materials and processes. For purposes of motivation, the project usually centered around a personal need, and instruction almost invariably dictated by the project. Often the materials from which the project was to be constructed were selected by the instructor so that everyone might experience certain basic operations. Some basic skills were frequently required as essential to everyone in the home, and projects have been assigned to give experience in these skills.

The major point is this — throughout half a century, regardless of our claims, the organization of all manual and industrial arts has revolved around the personal project, the book ends, the foot stool, the ash tray, the centre punch and the toy electric-motor. However, during the latter half of this era we have increasingly recognized the need for information about

industry, occupations, materials and processes as well as manipulative experiences. We sense that it is the learner that is important, that his growth and development will come from the challenge and the struggle of meeting problems, appraising, analyzing, investigating, selecting, planning, cooperating, executing and evaluating. We sense all this and often express this feeling in speaking and writing. But, action is slow and stumbling as it seeks to put theory into practice and the "project," making things, is still the dominating force in industrial arts education.

WILL WE EVER CATCH UP?

Now, even as we struggle to modernize our program to help the learner meet the demands of an industrialized society, industry in itself has set new goals. We are well behind in the schedule of educational adjustment. No one need be told that tremendous, almost revolutionary, changes have been taking place in our nation and in our world, politically, economically and industrially. One may be less aware that much of this change has been due to rapid advances in science, technology and methods of production. In less than ten years the outlook of the entire world has been altered by atomic power, jet engines, television and electronic control. Labor needs are shifting from semi-skilled to skilled workers, technicians and engineers. An understanding of applied mathematics, science and graphic representation has become vital to the nation's welfare. We are moving from a mechanical era to a technical age, an age where maintenance becomes more important than operation, where man is freed to do the things that machines cannot replace, where brain replaces brawn.

THE AGE OF AUTOMATION

Whenever man's task has become arduous and laborious, whenever the work fails to call upon his full capabilities as a human being, he has sought to reduce or circumvent the situation. Power, machines and control devices have been replacing jobs considered repetitive and tedious. Today this process is accelerating and approaching complete automation. Such industries as the telephone and oil refineries are already nearly self-operative, others are moving toward full automatic production. All this is not so, merely because we have become aware of the dulling effect on the worker of robot jobs in industry. This "creeping industrial revolution" has come about because the components needed to make it possible are now at hand, man's

inquisitiveness, coupled with competition, computing machines, electronic controls and servo-mechanisms.

We are entering an era of automization. Webster says that "mechanize" means to make mechanical or replace workers by machinery while "automize" is generally interpreted in industry as "the entire accomplishment of a work task by a power-driven, integrated mechanism wholly without the direct application of human energy, skill or intelligence."[1] At least we must be made aware that we possess the tools in atomic energy and electronics that have power far beyond the factors that produced the industrial revolution.

Douglas A. Larsen, NEA Staff writer has written that: "Any industry you investigate today is rushing toward greater automation, saving on labor costs, improving quality and quantity and even creating products which would not be available without automation . . . . The absolute "push-button factory" where a few managers operate electronic machines which direct all functions of the factory is a few years away."[2] Reliable sources point out that such a plant is already in operation with others on the drawing board.

FOR INSTANCE!

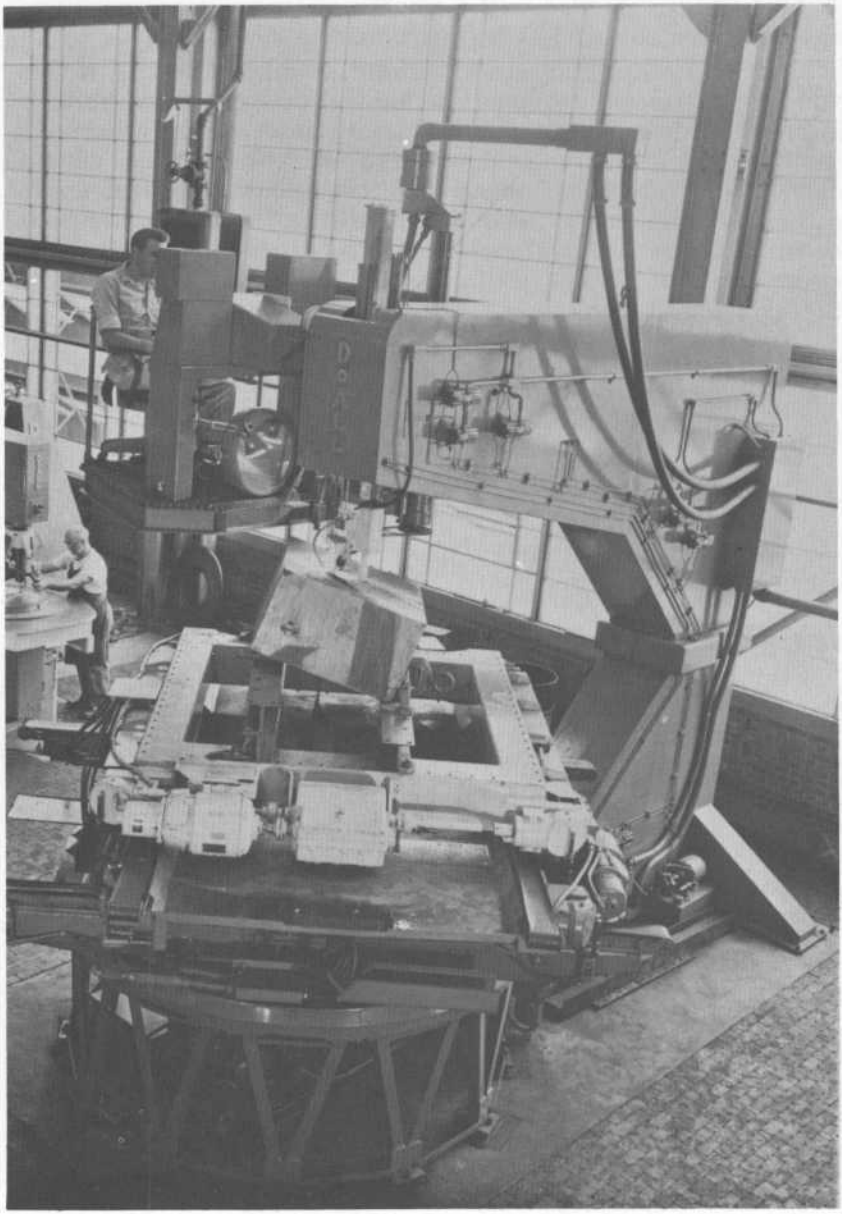
International Business Machines, well known for their development of "Mechanical Brains" have recently announced an "electronic supervisor" pushing us one more step closer to complete automation. This new device applicable in a variety of situations large and small, automatically controls lights, switches, motors, doors, valves, levers and other operations generally controlled by humans. A central control panel makes it possible for one person to check and control remote operations from a central station by watching indicator lamps on the panel to guide his operation.

The Cross Company of Detroit, manufacturers of automation equipment, have recently announced a new machine for drilling, chamfering, tapping, camshaft boring and milling of V8 cylinder blocks. This 350-foot long machine performs 555 operations with more than 100 pieces in process simultaneously.

"The roar of gigantic machines overwhelms you. Through bandsaw guided by the operator with electric and hydraulic

[1] Martin, Harold W. "The Economics of Automation." *"Minutes of Conference on Automation and Industrial Development.* 1945, Syracuse, N. Y., p. 37.

[2] Larsen, Douglas. "Automation Trend Forcing Small Firms to Merge," *New York World Telegram and Sun.* N. Y.: Feb. 1, 1955 p. 16.



This contour saw stands almost 16 feet high, weighs 16,000 lbs., occupies an area 21 x 17 feet and can handle pieces up to 26 inches thick by 52 inches in diameter weighing 10 tons. (Courtesy, The DoAll Company)

The operator views the cutting action through an arrangement of mirrors and steers the work to the saw. The simple wheel control coordinates the movement of the three power-driven tables. (Courtesy, The DoAll Company)

power from a control station suspended over the machine area. The sawer observes the cutting action through a viewer having a periscope-like arrangement of mirrors. He pilots the work through the blade by turning a wheel, to move the work into the blade he pushes the wheel forward and retracts it by pulling the wheel toward him. An indicating control system of strain-gauges provides the necessary sense of feel. Automatic safety checks prevent overloading of the cutting or feeding forces.

Douglas Larsen, NEA Staff writer describes his visit to a modern auto engine plant, he writes: "Where are all the workers? That's the first question you ask yourself when you walk into this engine plant.

The roar of gigantic machines overwhelms you. Through the smoky haze you see raw engine blocks slithering swiftly along on conveyors to clusters of gigantic cutting machines, then to drilling machines, then to tapping machines.

"You stroll along these noisy metal monsters for five minutes before you see the first man at work. He represents the fast disappearing human factor of today's new phenomenon known as "automation" or "cybernetics." Although these two new terms generally mean machines taking over the work of men, experts disagree on exact definitions. However, there is no doubt what automation looks like in this plant, rated as advanced an example of the phenomenon as exists in the industry.

"Our first visible worker is a portly, grandfather-type smoking a huge meerschaum pipe, sitting on a stool casually watching two big boards with buttons and flashing lights. One board tells him what each piece of machinery in his bank is doing. The other one tells him when a cutting tool needs sharpening, and stops the machine. Automation is behind the record production of better goods in the U. S. with decreased costs for manufacturers and safer and better working conditions for workers."[3]

The world's first Automation Show held in New York City in 1955 displayed a great array of devices and equipment to make processes more automatic, results more reliable and production time more economical. One display demonstrated the value of automatic control in the baking industry where prescribed recipes were recorded on magnetic tape and all steps in the process of producing baked goods operated from impulses recorded on the tape. Quantity of the correct ingredients, mixing time, baking and the rate of production were thus determined

[3] *Ibid.*, p. 16.

automatically. Production from ginger cookies to angel food cake can be made by simply replacing the tape with one which bears the item desired.

Automation is now big business, for 750 firms producing automation equipment did three billion dollars worth of business last year with every indication it will reach a much larger figure this year. Larsen states that: "The electronics business has automated about as fast as any industry, with startling savings in labor. It expanded output 275 percent from 1947 to 1952 but with only 40 per cent more workers."[4] A newly automated radio assembly line requires only two workers to make 1,000 radios a day instead of the 200 formerly employed.

Automation does displace labor. Reports from Ford indicate that their new engine block line cut the number of men required by more than three-fourths. Petroleum refiners increased their production by 22% from 1948 to 1954 while the petroleum workers dropped from 147,000 to 137,000. Bell telephone employed one worker for each 40 phones in 1925. Today with automatic dialing, the employees number one for every 70 phones.

Carroll Boyce said, "In a department, a plant, perhaps even in a company, Automation — like any other technological advance — is going to displace some workers. If the unit in which the displacement takes place is small enough, some layoffs may result. Or, layoffs will come if the management is so unthinking as not to take advantage of the possibilities of normal attrition of the work force and transfers and retraining of displaced workers. Even when such layoffs come, they do not represent a net reduction in the total number of jobs available. In fact, I believe I can prove to your satisfaction the reverse is true."[5]

The interesting point in Mr. Boyce's observation is that statistics bear him out. For example the Bell Telephone Company which is rapidly becoming a fully automatic industry increased its number of workers since World War II from 400,000 to 600,000. Unemployment has consistently stayed well below the 5% of frictional unemployment long considered as minimum by many economists.

WHAT HAPPENS TO THE WORKERS?

Automation is a gradual process. It does take over jobs performed by men, but they are the simpler, heavier, more

[4] *Ibid.*, p. 16.

[5] Boyce, Carroll W. "The Worker and Automation." *Minutes of Conference on Automation and Industrial Development*, New York State Dept. of Commerce, N. Y. 1954, p. 88.

dangerous jobs that offer little satisfaction to human beings. The process of automation is gradual and in the larger plants personnel can be retained and assigned to work of a higher caliber. For some it may mean temporary unemployment but the eventual result is more and better work opportunities than before. Arthur F. Vinson, Vice-President - Manufacturing, General Electric Company — quotes the late CIO President Philip Murray as saying: "I do not know a single solitary instance where a great technological gain has taken place in the United States of America that it has actually thrown people out of work. I do not know of it; I am not aware of it, because the industrial revolution that has taken place in the United States in the past 25 years has brought into the employment field an additional 20 million people."[6]

A displaced worker usually means retraining, often in the same field of work in the same department or the same company. In smaller plants it may mean retraining for work in another concern, another city, or another state. In any case the key to continued employment is "training," and this training problem is reduced when the individual's basic educational preparation is extensive rather than intensive.

Yes, we are entering upon the second industrial revolution, the automization of industry, and its effect upon us and the demands on education will be great. Its very success will be measured by education's ability to meet the challenge.

While speaking about industry's current, 10 billion dollar expansion and modernization program, Mr. Boyce, Associate editor of *Factory Management and Maintenance* said:

"To me this all adds up to a 'big picture' in which continued technological advance, including automation, will create more and more jobs. But new jobs for the most part.

— we will need lots of maintenance people.

— we will need better trained maintenance people - to cope with the complexities of the instrumentation and control systems that make automation work.

— we'll need teams of emergency repairmen, cutting across the traditional lines of crafts and specialties.

— these men will be counterparts of the hyphenated engineers we've been hearing so much about as the crying need in the design laboratories of the future.

we'll need to give the machine operator, 'the man at the console,' far greater authority to make important decisions on his own initiative —

[6] Vinson, Arthur F. *Automation in Industry*, General Electric Co., 1955, Schenectady, N. Y., p. 4.

skills become a tough problem as industry gets to be more highly mechanized. Particularly, emphasis will shift from manual to mental skills. We can replace an operator's production skills with a machine but we can't replace the knowledge needed to create the machine, to *manage* it and to service and maintain it. — More engineers, technicians and skilled maintenance men will be needed. So the automatic plant certainly won't dispense with people. It will just demand different kinds of people."[7]

AUTOMATION IS ONLY ONE ASPECT

Not all the demands on technical understanding come from the pressure of automation. Automation is important in our case principally because it effects the educational needs of so many. For a decade we have been moving steadily toward a technical society as contrasted to an industrial society. The increasing need for technical knowledge has prompted someone to say that "all trades are on the road to a profession." World War II and the post war years stepped up this tempo until the ratio of technical workers in the nation averaged 2.7 for every graduate engineer in 1931, increased to 5.2 in 1944, and is estimated in 1955 as exceeding 8 to one. The U. S. Office of Education indicated its awareness of this shift as early as 1943 when it appointed a nation-wide committee to study the need in vocational-technical education. Discussing trends and developments the committee's report says: "Among the most important changes is the rapid development of technology. Today our military forces are largely technical organizations. On the surface of land and sea, under the ocean, and in the air, technology is playing its important role in carrying on the war. Perhaps never before has technology been brought into the thinking of so many people. Yet the war is simply reflecting the developments of the years of peace, and focusing our attention on those particular aspects which loom largest. For many decades, but with accelerating speed during recent years, scientists, engineers, technicians, and skilled workers have been developing new materials, new processes, and new products. War has greatly increased the rate at which this development has taken place.

"Synthetic rubber now comes from butadiene, a product of petroleum and alcohol. Electronic tubes control the welders in our production plants. Magnesium and aluminum alloys decrease the weight and increase the strength of our airplanes. Synthetic resins bind together the wood fibers in our gliders. Precision measurement devices check the accuracy of manufactured parts to the millionth of an inch. New alloy steels provide greatly

[7] Boyce, Carroll W. *op. cit.*, pp. 94-96.

improved machine parts. New machine tools process these parts at increased speeds and with extreme precision. Radar provides new eyes and ears for our armed forces.

"These are the products of technology at work today. These and many others will be found in the industrial picture of tomorrow. With the growth of these new technologies comes increased need for technicians."[8]

Today it is important that consumers be technically informed as well as the worker. Synthetic products in textiles, rubber, plastics, oils, cleaning agents, resins and even precious stones are only a beginning. New processes, new products and new procedures require understanding and intelligent application. Between these technological developments and modern selling techniques the need for consumer intelligence has become more essential than ever. In spite of the "do-it-yourself" movement there has never been a time when people did less for themselves. Technology is at work here also, as illustrated by dishwashers, automatic washers, deep freeze, canned foods, automatic heat, complex automobiles, radio, television, refrigerators, etc. Servicing can no longer be done as easily by the home mechanic; sealed units, withheld technical information and special tools usually rule him out. Even with this limitation, "know how" rather than skill, aids him in breaking the technological barrier to home service. It's a technical world all right and you'll live more safely and effectively if you have some understanding of its operation. This is a job for industrial arts, or perhaps it might better be called "Technical Arts."

Note that in no sense does this discussion assume that an emphasis on technical understanding implies vocational-technical education, no more than industrial arts implies vocational-industrial education. However, it is good general education to use current subject material and techniques to educate for current living. Further it must be recognized that the technical aspects of industry are rich in experiences that develop those potential qualities in individuals long sought after by educators and employer alike.

No intelligent person can read or listen to industrialists without recognizing the "New Look" in industry. While much is in the future, we are already well along the road in this industrial revolution. So far in fact, that those youngsters in school today will be the workers, needed to produce, operate and main-

[8] U. S. Office of Education. *Vocational-Technical Training For Industrial Occupations*, Bulletin No. 228, U. S. Government Printing Office, 1944. pp. 8-9.

tain these production marvels of tomorrow. If one lesson is clear for educators, particularly for those concerned with industrial arts, it is the increasing emphasis on intelligence and the worker, workers with understanding, good judgment, ability to make decisions, resourceful, analytical, and dependable. The need is for workers with a broad technical background, well grounded in basic principles of science, mathematics and graphic communications. This is so vital to America that our future is closely linked with our ability to meet this demand.

Never has education had such a challenge, never has industrial arts had such a brilliant prospect. A bright future is possible if we are willing and able to re-examine our project-centered program for its value in the education of people that industry and the nation must have.

For fifty years shop teachers have concentrated on "things one should be able to do" and "things to know." We have carefully catalogued each item and used a check sheet to assure ourselves that no pupil escape. We have developed a project-centered program. We concentrate on what the pupil makes rather than on what happens to the pupil. We assume that if the pupil makes something nice, something nice happens to the pupil. Yes, we have recognized the value of initiating and planning, we urge that an area in the shop be designated as a "planning area," but even this is often reduced in practice to searching through books and magazines for a project acceptable to the teacher. Technology and continual change minimize the value of learning minute specific skills often emphasized in industrial arts shop instruction. Planned activity, rich in experience, is essential to form the basis of learning and understanding, but to be educationally valuable, it must contribute to the development of those qualities desired for individual growth. Nowhere else in the school curriculum can experiences give so much meaning to the applications of science, mathematics and drawing as in industrial arts, experiences that challenge ingenuity, vision, creativeness and adaptability, experiences that provide for experimentation, investigation, study, application, construction and evaluation.

To meet this challenge, industrial arts shops, for many pupils, must assume the character of a laboratory rather than a production shop. Emphasis must be on problem solving, investigation and experimentation. There will be need for even greater individualization of instruction. For the brighter pupils there will be less project construction, less mandated experiences,

less teacher dictation, with an increasing need for inspiration, consultation, advice and counsel. Pupil interest will be intrinsic and his access to materials limited only by the limitations of availability and personal welfare. All this is necessary because you can not educate for technical living in an atmosphere geared largely to construction.

WHAT ABOUT THE TEACHER

Industry, the pupil and the school are primary factors in determining the nature and the direction of industrial arts in general education. They prescribe the course of study, the experiences and the facilities which govern the program. But the key figure in the picture is the teacher. No matter what leaders say, write, or think, no matter what is provided in way of outlines, equipment, and materials, the results will depend upon what teachers think, believe and clearly understand. Since most teachers teach as they were taught, responsibility of improvement in industrial arts must fall on those concerned with teacher education.

Centers preparing industrial arts teachers have been faced with the almost impossible task of preparing teachers skilled in many crafts, informed on hundreds of materials and industrial processes common to all industry, expert in the profession of teaching and, of course, cultured in the ways of gracious living.

The task of acquiring a wide and varied range of manipulative skills and information in the areas of ceramics, graphic arts, electricity, mechanics, metal working and woodworking, has plagued every one involved in industrial arts education. While much thought and valuable time has been devoted to a solution any success achieved has usually been at the expense of other facets of a teacher's development.

Perhaps in seeking to accomplish the impossible we are overlooking the obvious, neglecting those significant things that can be achieved and which contribute, even though less tangibly, to better individual development. Perhaps this shift from a mechanized environment which stresses manipulative skills, to a technical world stressing knowledge and understanding, will provide the answer to our enigma. Perhaps we may find a solution when we learn to think more in terms of pupil development and less in manipulative processes and project construction. Perhaps the onrushing tide of technological development and the need for understanding will submerge the importance of hand skills. Certainly "skill of hand and eye," once so essential

to material progress, has been giving way to "know how" and understanding. Perhaps the industrial arts teacher of the future will need to be less of a skilled craftsman and more of a technician, a technician who understands young people and has an inherent interest in their development.

LOOKING AHEAD

Because our world around us is changing and changing fast, because we are, and will be, living and working differently, because of new demands upon us, there must be:

1. Increased emphasis on the technical background of industrial arts teachers. More stress on *applied* mathematics, inorganic chemistry, metallurgy, and physics, particularly as it deals with electricity, heat, light, sound, and mechanics.

2. A new approach to method that lends itself to procedures followed in experimental laboratories, individual and group assignments, freedom to plan, investigate, construct and maneuver as required. This does not mean freedom to waste time, irresponsible conduct or aimless tinkering but on the contrary a businesslike atmosphere of responsibility, planned programs, and orderly approved procedures such as one would find in well-operated commercial laboratories.

3. A continued effort to provide an extensive acquaintance with industrial materials and processes, even at the expense of some specific manipulative skills in some areas.

4. A more critical selection of those admitted to teacher education in industrial arts. Technical interest and aptitude must be in evidence in much the same degree as would be expected from the person preparing for technical employment. In fact graduates of technical high schools who possess the personal qualities becoming of a teacher should be the most likely source of teacher material. For those lacking this background the teacher-education curriculum in industrial arts might well provide a similar program for the early years in teacher preparation.

5. Since teachers invariably teach the way they were taught it becomes obvious that the techniques and methods employed in teacher education should be of outstanding character in example as well as precept.

6. Teacher education must assume leadership if our program is to progress. Little progress can be hoped for if those who prepare industrial arts teachers confine their efforts and

thinking in terms of what we have instead of what we should be doing. Remember that a teacher in preparation today is at his best as a teacher twenty years from now, and that his pupils will project his influence on their lives for another twenty-five years. Teacher education must project itself well into the future just as industry must anticipate what is to come, or education will always remain at the rear in the ranks of progress.

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CHAPTER IX

Concepts of Professional Education

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INTRODUCTION

In the field of industrial arts teacher education, it has become the practice to identify several distinct groupings of courses constituting the preparational program. These groupings are identified as: *general education,* or those courses considered essential to the background of all college graduates; *technical or specialized education,* or those courses designed to develop skills and competencies in the subject matter area to be taught; and *professional education,* or those courses designed to develop competencies and skills in teaching. While this may not represent universal usage in higher education of the terms general education, technical or specialized education, and professional education, they have been so used in this yearbook. They are used with this meaning in attempting to examine the area of professional education.

Confronted by the question, "What is professional education in the United States?" one might survey prevalent practice in arriving at an answer. In any such survey one would be led inevitably to certain conclusions on the basis of almost universal practice. He would see that undergraduate professional education for the preparation of secondary teachers is an area of the teacher's preparation having to do mainly with the theory of teaching; that it is largely provided after general education is completed; that it is severely separated from specialized or technical education; that it constitutes a relatively small segment of the teacher's preparation; and that it ends, in any organized form, with the awarding of the baccalaureate degree.

Fortunately, overwhelming practice does not determine what professional education ought to be; indeed, it may not even reflect what is thought to be best by the institutions carry-

ing on the practices. A majority of those responsible for the professional education of teachers would probably agree that none of the conclusions drawn from the survey of existing practices is indicative of what professional education ought to be. Therefore, in drawing a meaningful picture of the concepts of professional education, it is necessary to identify those areas and elements of a teacher's professional preparation which are by consensus thought to be essential. Only then is one ready to examine critically the practices carried on in professional education, and to suggest improved procedures and arrangements.

The immediately foregoing chapters have dealt with the industrial arts teacher's general education and his technical preparation. This organization is not to be interpreted as advocacy of the sharp separation and mutual exclusiveness of general, technical, and professional education. Rather, it represents a division into several traditional and recognized areas on the basis of "divide to conquer." However, a division based upon this expediency has inherent within it the inconsistency of operating upon a weakness which it might be very important to overcome. This inconsistency is recognized when fragmentation and the practical impossibility of integration of concepts and attitudes by the individual is leveled as a criticism of programs of teacher education. This structure, therefore, represents the stage we have reached in terms of our organizational abilities.

ESSENTIAL AREAS OF PROFESSIONAL PREPARATION

In spite of the universality of many practices in the professional preparation of teachers which might indicate otherwise, there is general agreement upon many of the appreciations, understandings, skills, and attitudes which must be acquired and possessed by the competent teacher. The agreement as to elements thought to be essential in the preparation of teachers is evident in the writing of individuals, the recommendations of groups working upon the improvement of teacher education, and the conclusions of committees in a number of institutions. Because of this general agreement it is possible to identify the elements which should constitute a teacher's preparation with some degree of assurance. However, it is quite difficult to group these elements into the broader essential areas on the basis of agreement. The number of areas essential to the preparation of teachers as well as the categorization of elements within these areas, reflects wide differences. This does not indicate any lack

of basic agreement, since the number and the nature of the categories established is related to the attempt to organize the elements into a program of preparation. There is nothing sacred, then, in the number of areas which might be identified as essential to the preparation of teachers, nor in the placement of many elements within one or another of these areas. The grouping hereafter used is one devised for comprehensive, yet brief and convenient discussion, of the generally agreed upon elements essential to the professional preparation of teachers. These groupings, identified as essential areas are: physical-psychological development and behavior, philosophical-social environment of American education, and design and management of the educative process.

Physical-Psychological Development and Behavior

Put in the simplest of terms, the teacher's job is to work with those whom he is teaching in such a way as to help them to learn what they need to learn in terms of their own goals and aspirations within a democratic societal setting. Obviously, then, he must understand the learning process in order to stimulate and guide it. The teacher must be an expert in his understanding of the process of learning, since learning as a product is an outcome of the teacher's effectiveness in guiding the learning process. He should be familiar with the several theories of learning and their implications for teaching practice, so that he will not be stampeded into indefensible practices because of a lack of security in his own understanding of the learning process.

Learning is only one aspect of behavior. In order for the teacher to understand learning most clearly he should have an understanding of behavior in general. He must understand and take into account the developmental nature of behavior, and the differences in interest, personality, capacity, and achievement. If the teacher is to cause as much learning to take place as possible, he should understand both learning and non-learning behavior as major bases for evaluating the effectiveness of the learning experience. He may then more appropriately continue or re-design later learning experiences for every individual.

All educators must agree that effective thinking by every citizen of a democracy is a most desirable goal for educational effort. Only as the thinking of its citizens is good can a democracy succeed or long survive. The products or decisions resulting from the democratic process can only be as good as the thinking of a majority of the participants in that process. The

majority easily can be wrong when their decisions are based upon faulty thinking. While there is no question as to the validity of this goal, there seems to be a lack of agreement and understanding of what we mean by thinking. If the teacher is to have any success in improving the thinking process of his learners, he must study the process and come to a clear definition of what it is, and lay some plans for achieving improved thinking within his area of responsibility. This is as crucial for the industrial arts teacher as it is for any other teacher in the school system.

The teacher must have an understanding and appreciation of physical and mental maturation, and their significance in terms of individual readiness for various learning experiences. He must understand the relationship of physical and mental development to behavior and social interaction in designing as well as in judging the learning experience.

Finally, the teacher must be conversant with the area of group processes and relationships, along with an understanding of the individual within the group, and of the individual's relationship with other individuals. The teacher must possess skills and understandings in the democratic operation of groups, in the broad area of group dynamics, and in the process of continuous evaluation.

Philosophical-Social Environment of American Education

If any extensive and significant program or undertaking is thought out in terms of its immediate and long-range outcomes, and in terms of its bearing on values and upon other programs, we might say that it had a philosophy. In this sense, the philosophy of an undertaking determines the projected plan of action and its bearings upon the past, present, and future. A philosophy of teaching is something which goes beyond contemplation of the nature of ultimate reality. It is the most practical possession which any teacher can possess in determining what is essential and what is unessential, what is appropriate and what is inappropriate, and what is to be encouraged and what is to be discouraged. The teacher should be aware of the major philosophies of education and the relationship between goals and the various philosophical positions, mainly to facilitate the process of developing his own consistent teaching philosophy.

The teacher's conception of American society and its goals, its beliefs, and values will make a real difference in his teaching

program. Method and subject matter, objectives, and administrative patterns all are affected. Close attention must be given by the teacher to the background of American democratic thought and to an understanding of the structure of its society. The teacher must be thoroughly familiar with the values of the democratic process as a method to be followed in the making of decisions, together with a clear understanding of the responsibilities and obligations which are attached to democratic participation. He should have an understanding of himself in his professional role as one sponsoring the democratic process, and of his function as the representative of society in that role. He should also develop a concept of his professional responsibilities to his own local community and to the profession of teaching. He must have a basic understanding of the structure and operation of the educational system in America. All of these are a part of the socio-cultural background required of every teacher in America.

Design and Management of the Educative Process

Since teaching is the process of helping learners to develop in a way that is socially satisfying, it consists of providing the opportunities, the stimuli, and the guidance that will satisfy both the expanding needs of the individual and the needs of the complex society of which he is a part. These two aspects — the socially integrating or general educating, and the individualizing which identifies and fosters differences among individuals — are both major responsibilities of every teacher. Since all teaching must function in the individualizing sense as well as in the general educating sense, it must respect the life needs of the individual learner as well as time and place. The curriculum must grow out of the local soil if it is to produce fruits appropriate to the climate and season — a northern tomato planted outdoors in September or an orange tree planted in Michigan have little chance to produce. No subject matter, course of study, technique, or procedure in itself holds the answer to providing for pupil growth — there cannot be one best curriculum for all American youth! The teacher, then, is the key figure in the educational scene with the administrator, the supervisor, the curriculum expert, and the teacher educator existing solely to facilitate the work of the teacher. The effective teacher in today's schools must be his own curriculum expert within his own classroom, since in the last analysis he is the one who determines the curriculum of the learner with whom he works. The understandings and skills necessary are in essence

an application of the skills and understandings of the physical-psychological, and the philosophical-social to the actual classroom and school program.

The teacher must be able to apply his understandings and skills to the determination of program. This includes the identification of purposes and behavior to be developed within his area of work, the selection of learning activities and their adaptation for use by individuals and by groups, the development of a wide range of instructional procedures appropriate to the improvement of reflective thought processes and insightful learning, as well as the arrangement of the sequence and scope of learning activities selected.

The teacher must have developed some basic understandings and skills in the location, utilization, and evaluation of many sorts of learning materials and community resources, as well as in the adaptation of these materials for use under various conditions. The teacher must also have a thorough knowledge of a variety of classroom practices such as diagnostic and remedial procedures, unit planning, record keeping, teacher-pupil planning, demonstration procedures, and evaluation techniques. The teacher must develop skills in working with community groups of out-of-school youths and adults, and have an awareness of the unique problems which may exist in teaching different age level groups.

WEAKNESSES OF TYPICAL PROGRAMS OF PROFESSIONAL EDUCATION

While there is substantial agreement as to the areas of professional education essential to the preparation of teachers, and in general as to what should be included in these areas, the major weakness of programs of professional education has been in the carrying out or establishment of learning experiences in these areas. As is often the case, the doing has been a far more difficult task than the identification of what needed to be done. Many programs of teacher education in America describe and outline the essential preparation along the lines previously discussed, but the great majority succumb to certain common weaknesses. These common weaknesses are: insufficient emphasis upon professional education in programs of preparation for secondary school teaching; lack of integration of understandings, attitudes, and appreciations; inappropriate learning activities and teaching techniques; misdirected methods courses; and neglect of in-service professional education.

Insufficient Emphasis Upon Professional Education

An inspection of the 1954 catalogs of 20 institutions prominent in the preparation of industrial arts teachers revealed that the most common allotment of proportionate credit to professional education in programs of industrial arts teacher preparation was 15 percent. More than one-third of this percentage was devoted to special methods and student teaching, which might be as closely identified with the technical area as with the professional area, since the direct learning of technical information and skills is probably as great as within any comparable block of technical credit. (This observation is based upon almost unanimous acceptance of such a statement by student teachers over a period of years.) Approximately one-seventh of the percentage was devoted to general psychology in all of the schools, so that actually only seven and one-half percent to eight percent of the pre-service preparation of the teacher was given over to what might be regarded as strictly professional education. Needless to say, this is shamefully small in attempting to accomplish the array of skills and understandings identified as essential to the adequate preparation of teachers, especially when this is contrasted to the common 30 percent devoted to general education, the 35 percent devoted to technical education, the 15 percent devoted to related requirements, and the 5 percent devoted to free electives. In comparison to other professional fields such as medicine, the percentage devoted to professional preparation is extremely small. Despite the general agreement on what professional education ought to be, it becomes quite evident why the actual programs are ineffective. This is perhaps the greatest of all weaknesses of that professional education designed to prepare secondary school teachers.

The question might be raised as to what has been the interest and activity of the industrial arts teacher educator in professional education. An objective answer would of necessity be that it has been small. The industrial arts teacher educator has been typically more concerned with the development of the technical area, as might be expected, while in a great many cases he has become separated from the professional education program in his own institution. In a number of cases he has opposed the extension and expansion of the professional program because he has interpreted it as a threat to his technical area. If not opposing it, he has been neither interested nor active in its improvement.

Lack of Integration of Understandings, Attitudes, and Appreciations

A major problem confronting contemporary civilization is the need for synthesis and integration of understandings, attitudes, and appreciations. There are those who suggest that perhaps we are witnessing the disintegration of western culture, with the moral bankruptcy of our institutions, corruption in politics, racketeering in labor, lack of integrity among administrative officials, juvenile delinquency, criminal behavior in high and low places, and the tremendous increase in emotional tensions and mental illness. These are in the background of the incipient drive toward synthesis and integration which is beginning to permeate much of contemporary life. Education, along with most expressions of the culture, seems to have lost its way following the path of over-specialization — that tantalizing path to the gingerbread house. This situation along with the attempt to correct it, confronts not only teacher education but probably all of the professions. There is a search under way for some principle or principles around which knowledge can be organized and made meaningful, as well as effective. This is true in the physical, biological, and social sciences. If there is need in relation to knowledge, it is as necessary in respect to ideals and attitudes.

In the organization of professional education programs, there has been fragmentation into an almost endless array of specialized courses. In the offerings of almost any teacher educating institution can be found several courses dealing with any one of the elements of the essential areas of preparation previously identified. Needless to say this fine splintering within the field has not contributed to synthesis. In addition, it is impossible for a prospective teacher to enroll in enough of these splintered courses to develop even an awareness of the existence of many elements essential to the preparation of all teachers. The splintering of courses has further undesirable effect in the narrow specialization of the personnel of professional education to the point of loss of perspective. They then become incapable of facilitating integration for the individual student - their teaching may actually interfere with his integration of understandings, appreciations, and attitudes.

The common practice among teacher educating institutions, for a variety of expediential reasons has been to provide the professional education after the substantial completion of the program of general education and after the technical education is well under way. It is as though professional education is a

veneer to be applied to the core-stock of general and technical education. To achieve any degree of integration by the individual, the general, technical, and professional education must be interrelated in such a way that one does not precede the others, nor can one proceed apart from the others. Professional education, properly oriented, must contribute heavily to both the general education and the technical education of the individual, while the latter in their turn must contribute heavily to professional education and to each other. The idea that one gets his general education only from certain areas of education and only when they are definitely separated from occupational or professional ends is a myth growing out of the traditional view of "culture" as general education, a misconception of learning, and out of man's feeble abilities in organizing learning experiences.

One might rightfully ask, "What purpose is to be served by the separation of these areas if the inter-relationships are of such crucial import?" The answer seems to be based upon the evident necessity of examining and considering one thing at a time, since presently devised techniques seem too imperfect to enable us to attack the enormous complex that is teacher education without separating out several distinct areas. Educational reformers, in their attempt to make integration easier or even possible for the individual, have proposed approaches to education based upon "life problems" rather than upon schemes for the organization of subject matter. Some of them have proposed arrangements such as the "core curriculum" to break down the narrow and arbitrary barriers of subject matter organization within the school, and to make possible the trial of such approaches as "life problems." Actually, the general shop organization of learning in industrial arts has been one of the earliest attempts along the lines of the "core curriculum." In the general shop, the hard and fast lines separating drafting, woodwork, metalwork, crafts, electricity, and mechanics, as well as work within each of these areas, have gradually been erased. As we in industrial arts know, the way is difficult and our know-how meager even within our own relatively limited field. The inability to make any unified approach to education and to teacher education is a glaring weakness of present programs.

Inappropriate Learning Activities and Teaching Techniques

Industrial arts people have been outstandingly strong advocates of the laboratory — the learning by doing of the activity approach. This is true except when it comes to the

preparation of teachers, where they have obviously felt more secure in stringing along with the more traditional academic approach of theory preceding practice. There are many comments in the literature, as to the desirability of industrial experiences as a part of the pre-service preparation of industrial arts teachers, and very few as to the need for varied and continuous teaching experiences with children and adults. Without debating the desirability of industrial experiences, the task of the teacher in developing learning situations in which the greatest possible learning will occur for every individual is dependent upon understandings and skills in working with people. It seems unbelievable that a group would value realistic experiences highly as an aspect of the learning process in one situation but not in another. If someone were to suggest that the proper way to teach industrial arts would be to provide boys and girls with all the information they needed before they started to make anything, he would be laughed to scorn.

The concept of the teacher as the final authority who must have all of the answers because his job is to pour information into the minds of the learners (or to impart skills) does not permit *any* teaching until all of the skills and knowledge have been acquired. This concept seems to be held widely among industrial arts teacher educators, yet it does not differ from the exercise approach — the making of exercise joints before a project can be made — which would be decried by these same educators. The concept of the teacher as a guide who understands the interests, needs, strengths, and weaknesses of the individual and who becomes competent in designing effective learning experiences for each individual, calls for the prospective teacher to begin teaching early in order to best develop these understandings and competencies. It postulates that learning to teach proceeds best when the teaching, and learning how to teach, go hand in hand. One approach stresses learning as a product, while the other is greatly concerned with learning as a process, feeling that the products of an outstandingly managed learning process will inevitably be outstanding.

Professional education has proceeded in such a way that the knowledge has been separated out of the essential understandings, appreciations, attitudes, and skills. This knowledge is to be imparted in the preliminary courses and put into the deep freeze, not to be brought out to thaw until the student teaching situation, when the understandings, appreciations, attitudes, and skills are developed.

While it is necessary that much of the work in professional education be concerned with other things than a study of method, yet the methods employed in the teaching of professional classes should be so diversified and excellent that they exemplify the kind of teaching desired of those in preparation. This has not characterized the usual case. Although a greater variety of methods and techniques are utilized than within most college classes, still, there are a great many classes where the assign — study — recite series is daily re-enacted, or where the lecture is the most common technique. Problem solving must become the basic method employed in professional education.

Weakness of Methods Courses

Methods courses have all too frequently been taught on the "gimmick" approach to problems, or upon the basis of specific techniques to meet every need. This has been particularly true of special methods courses in industrial arts, where a great deal of effort is expended in examining every conceivable scheme for inventorying supplies, maintaining tools, or handling any individual problem which might arise in the shop. Little attempt is ordinarily made to approach these areas in a problem-solving way. Instead, the hope seems to be to give the teacher the correct method or procedure — correct in the eyes of the teacher educator who happens to be teaching the course. The impossibility of preparing a teacher with the answers for all of his problems is immediately apparent. The situations and problems confronting the teacher in today's schools are extremely perplexing, and since they are composed of seldom repeated combinations of factors, no bag of tricks or magic chest fitted out by the most expert of industrial arts specialists can possibly contain more than an infinitesimal fraction of the appropriate solutions. The creative teacher who has developed a degree of educational perspective through the problem-solving process, is far better equipped to deal with his problems than the teacher trained to rely on a series of gimmicks — no matter how complete the equipment of his "gimmick-mobile."

The majority of methods courses, and particularly special methods courses, have made little if any attempt to stress the over-all school program and the inter-relationships and role of their particular area. Relatively little emphasis is put upon developing educational perspective in the students, perhaps because of a fear of infringement or overlapping. This of course is an outgrowth of the fragmentation of courses and the specialization of personnel.

Neglect of In-Service Professional Education

Effective professional education cannot be concerned with only one phase of the teacher's learning experiences; no more can it be conducted within a fleeting moment in the total time sequence. Professional education must begin as early as possible and extend beyond graduation into in-service education which is centered on realistic problems which teachers themselves acknowledge. The professional educator's responsibility does not end with graduation when his product, the teacher, like a manufactured dining room table, is shipped out to feed knowledge, skills and attitudes to the consumer, and is of no further concern to him unless the consumer complains or the product happens to return to the factory for installation of a drop leaf in a graduate program. The professional educator's responsibility follows the teacher from the campus to the environment where the problems arise. This represents a challenge as well as an aid, since it forces college educators to develop a realistic and at the same time forward-looking vision of what schools ought to be like, and of the rightful function of schools fully adequate to our times. Typical practice in professional education is to cut off responsibility sharply at the time of the teacher's graduation with the possible exception of offering graduate programs which would be difficult to classify as being in-service in nature. This absorption with a very small time period in the professional life of a teacher, is one of the great weaknesses of present-day professional education.

THE IMPROVEMENT OF PROFESSIONAL EDUCATION

Much criticism which is purely negative has been leveled at education with few suggestions for improvement. A large part of this criticism has shown a lack of knowledge in this area. Any adverse criticism, sincerely made, should have as its purpose, improvement of the area criticized. There is, then, a responsibility incumbent upon any critic to suggest ways and means for the improvement of the conditions he has criticized adversely. If we were to leave a consideration of professional education after pointing out many weaknesses which are quite apparent, and to which many would agree, without any attempt to indicate at least a few ways of improvement, the effort would have been somewhat diluted. To make this consideration as useful as possible and to further clarify meanings, an attempt will be made to suggest means of improvement as they relate to each of the areas identified as weaknesses.

Increased Emphasis on Professional Education

If there is to be improvement in the area of professional education, the first step that must be taken is an increase in the relative emphasis given this area in the preparation of industrial arts teachers. The industrial arts teacher educator must lend his active support to an extension of professional education, and participate directly in the work of this aspect of the preparation of his industrial arts teachers. It is his responsibility to become competent in a broader area of professional education than his industrial arts specialty, and to become involved from time to time in the teaching of work within some of the areas essential to the preparation of all teachers. It thereupon becomes his responsibility to devote his energy to the improvement of the preparation of all teachers as well as that of the industrial arts teachers.

Attaining and Improving Synthesis and Integration

Although at present we seem incapable of any total approach to education, or to teacher education, all features of the educative process must be taken jointly into account and each given its rightful place even when dissected into several parts for ease of handling. The essential point is that we cannot afford to lose sight of the over-all problem through isolating its parts for study, or that in the process of isolation we may be modifying the part being studied. We must encourage creative thinking about possible new patterns and arrangements, and we must experiment with them toward the day when a total approach may more nearly be realized.

In the meantime, while we dissect in order to handle, we have at our disposal a rather effective integrating principle. This principle is the vocational interest of students aroused, guided, and stimulated by direct contact with the real problems of their vocation. Equipped with this organizing influence, prospective industrial arts teachers are in a good position to utilize first-hand experiences as a focus and as a point of interaction for the complex inter-play of concepts relating to teaching. An attempt must be made to capture this integrating influence as soon as it is possible — perhaps within introductory experiences at the freshman level, or at the earliest feasible time after the individual enters preparation for industrial arts teaching. It must not be forgotten, however, that learning by direct observation and participation may lose in perspective what it gains in vividness and wholeness unless it is combined with thorough discussion and study of broad resource materials.

While we await the day when some sort of total approach to the education of teachers is possible, we must reverse the fragmentation of the field of professional education and the narrow specialization of its personnel. The possibility of promoting learning through problem-solving as well as the provision of a continuous sequence of significant learning experiences should be enhanced by the use of larger blocks of time in the program of professional preparation. This together with greater capitalization on the integrating influence of vocational interest should do much toward enabling the individual to integrate his understandings, attitudes, and appreciations.

Enrichment of Professional Education

Developing the content of professional education courses around problems which are of value to students as outgrowths of planned contacts with children and youth, is the most sensible approach to making the professional work meaningful. This proposes problem-solving as the central theme in professional education courses. The problem-raising phase would be, in part, the result of direct contacts with children and youth within school situations and outside of them. These contacts would lend realism and tangibility to the problems raised, in contrast to the artificiality of professor raised problems. The major purpose of the study of problems would be to conduct reflective studies of them, with much attention to the process followed in attacking the problems. This, of course, would include decisions as to what information was needed, the best sources for finding it, the identification of criteria to be used in judging possible solutions, the formation of hypotheses, and the trial of hypotheses until tentative solutions were reached and then strengthened. With this process firmly rooted in the professional life of the teacher, it would be unlikely that he would be swindled into an indiscriminate trial of any "gimmick" which was suggested.

In order to facilitate the problem-solving approach based upon realistic contacts with children and youth, it is necessary to identify and create situations in which prospective teachers can participate. Numerous possibilities exist within any college community for working with children, youth, adults, and upon community problems. The paucity of activity in this area has probably been due to either a lack of recognition of its importance or inertia, rather than to the impossibility of finding contact experiences. Some of the opportunities lie within the college campus as a community, and in the work of many campus

organizations. In the community outside of the campus there are many groups such as the Boy Scouts and Girl Scouts who are extremely eager to locate aid and leadership.

The most important aspect of the contact with children, youth, and adults is capitalization upon the teaching opportunities in these contacts. Early active attempts to teach are far more important than mere observational contacts. It may be possible to take advantage of a number of seldom identified opportunities which exist upon the college campus. Some of these might be within the several diagnostic clinics which are in operation on most college campuses or in dormitory and living-group counseling. Relatively unexplored opportunities exist within the field of industrial arts in the guidance and teaching of beginning students by more advanced students. It should be possible, within an area like industrial arts, to structure teaching situations where young children might be involved in a hobby type activity. The teaching might be based upon a one-to-one relationship so that it could be initiated for the prospective teacher as early as the freshman year. As the student progressed he might gradually be given responsibility for small groups of children, later for small groups of college students involved in a hobby type activity, and finally, as a post-student teaching experience, for small groups of faculty or their wives. The majority of professional programs have devoted little attention to the structuring of programs to provide teaching experiences other than in student teaching. The hope that teaching experiences will have been present in the random hours of required community experience, as promoted in some professional programs, is indeed an optimistic one. The structuring of teaching situations seems the only hope of realizing any great potential in the "learning by doing."

To realize the greatest insight into the problems of teaching, the contacts must be accompanied by thorough discussion and the reading of resource materials. This might well be organized to operate with advanced students as leaders of small discusion groups of less-advanced students, thereby providing opportunity for experiences in the area of group processes to the entire group, and in teaching to the leader. The approach proposed is the increasing involvement of prospective teachers into the process of teaching throughout the period of their preparation. It has the value of stimulating originality and creativity through a trial period of relatively long duration where weighty responsibility is lacking. The student does not

find himself forced into a teaching situation when he has had little if any teaching type experiences, and thus forced to imitate all of the ways in which he was taught.

The learning experiences which a student has in his professional courses should provide him with an illustration of how learning should be stimulated and guided in a democratic atmosphere. They should be closely similar to those which it is hoped the teacher will develop in his own future teaching. Desirable behavior changes occur no better at the college level than at the secondary level in an authoritarian atmosphere. An atmosphere where the teacher is the final authority, who completely dominates the learning situation, is not conducive to the development of cooperative or democratic behavior on the part of the student. The student must be given the opportunity, or rather the responsibility, for setting goals for himself and the group, planning cooperatively toward the solution of problems, and evaluating his own progress and the progress of the group toward the attainment of goals. While professional classes should have no monopoly on good teaching, they should be outstandingly good in their demonstration of varied and effective teaching techniques.

Improvement of Student Teaching

If student teaching is to even partially realize its potential as an effective unifying force and as a means for developing educational perspective, it must be a much broader and realistic experience than it typically has been in the past. A student teaching experience which is based upon one or two hours a day offers little promise in the realization of this potential, nor do experiences where several student teachers hover about in the same class offer more. Student teaching in the college laboratory school, offers relatively little opportunity to develop a realistic view of the place of the school in the culture. To attain significant development of educational perspective during the student teaching experience, off-campus student teaching on a full day basis for at least half of one semester seems the only hope for real accomplishment.

Numerous activities of the school outside of the industrial arts shop are extremely valuable as a part of student teaching. A few days spent in the principal's office give an unusual insight into the operation and functioning of the school. Likewise, time spent with the school counselor or in the school library may be of much greater significance than the same amount of

time spent teaching in the shop or drafting room. Participation in the extra-class, professional, and community activities all broaden the viewpoint of the student teacher. To make these experiences of greatest value, they must again be accompanied by thorough discussion and extensive supplementary reading.

One of the ways in which student teaching might be broadened is through several professional clinics during the term of student teaching. Student teachers might be taken from their student teaching for a full day once or twice during the term to participate in these clinics. An evening clinic might consist of a visit to the adult education program of some school system. The student teachers might plan the visit, make arrangements, and devise a list of questions to be sent in advance to the director of adult education. Other questions might be identified which could be asked of teachers and of students if the opportunity arose. Some time might be spent with the director of adult education asking him the questions of the group, and in getting an overview of the program. An attempt might be made to determine how industrial arts functions in the program, and how it might function more effectively. The student teachers might then tour the program in all of its varied activities, and finally spend some time discussing the program and its implications for a modern program of education.

The daytime clinics might be visits to two different types of school systems. The student teachers could plan the visit and prepare lists of questions to be sent in advance to the superintendent, the principal, and to the industrial arts teacher or teachers. Arrangements might be completed by the college supervisor. In the case of larger systems, questions might be sent to the supervisor, to the curriculum director, and to the guidance specialist of the main school to be visited rather than to the superintendent. Much of the time spent with administrators and other school officials could be devoted to getting their critical reaction to industrial arts and to industrial arts teachers. The industrial arts teachers might be questioned as to philosophy and as to their reasons for various practices and procedures. Later the visit might be analyzed and discussed and supplementary resource materials in curriculum, guidance, evaluation, as well as in other areas identified.

It is preferable that the student teaching experience be conducted before the student's last term or semester in school. Aside from a number of reasons relating to graduation, student teaching in the last term makes impossible the selection and

devising of experiences and courses in the light of needs uncovered during student teaching. Experiences in working with adults as well as a range of other professional experiences might be engaged in during the post-student teaching period. One such experience might be the involvement of students in carrying out some piece of research under close supervision and guidance as a learning experience.

Improvement of Methods Courses

Typically, methods courses have preceded student teaching without any contact with children or youth. Their concentration has been upon "gimmicks" as solutions to countless problems to be faced in student teaching and later in teaching. As far as the majority of students are concerned, these problems are imaginary or fancied problems in a great many cases. If on the other hand, the methods work is delayed and is made a part of the student teaching experience, the effectiveness of the student teacher is decreased since he is unprepared for the many problems which he faces at the same time. In a situation where teaching experiences are initiated early and are continued throughout the preparatory period, the methods might well precede student teaching. However, if the full potential of constant teaching experiences is realized, there probably will be less need for a methods course except as a part of student teaching.

Course planning as taught in industrial arts special methods classes, has usually been along the lines of analysis. The typical procedure has been a listing of several objectives and then an analysis of the area of work into the manipulative processes and necessary units of information. While it is excellent to analyze the medium of instruction down to its minute points, this procedure as a starting point for course planning has resulted in a lack of originality and creativity among industrial arts teachers. The starting point must shift to an analysis of the objectives into the behaviors expected, and then the design of a wide variety of activity type learning situations to stimulate learners into developing along these lines.

Under whatever arrangement methods courses are taught, they must be based upon a problem-solving approach, rather than being centered upon mastery of specialized tricks and techniques. The orientation must be in relation to the role of the school in American democratic society and in relation to the role of industrial arts in furthering these ends. The constant weighing of values can no more be avoided in a course in

methods than in a course in philosophy. To say that the course in methods is another approach to educational philosophy is a compliment of high order — a desirable goal to be attained.

Development of In-Service Education

The crucial years in the professional success of teachers are the first years of teaching. Many teachers leave teaching, or what is worse, become frustrated cynics because of unsolved problems during their first few years of teaching. The teacher educator may accept his responsibility for the continuing education of teachers after they leave the campus, in a variety of ways.

The first step toward improving in-service practices in programs of professional education might be to help teachers make plans for their in-service education during the post-student teaching period. This might take the form of making definite and specific plans for their first teaching job after they have been placed. During periods of extreme shortage of teachers, this is possible for most of the group, and the guidance of the professional teacher educator lends security to the planner. The prospective teacher might also be encouraged to make plans for advanced study during this time. He might also be made aware of the variety of in-service activities of school systems and of the particular school system in which he will work. He might be encouraged to plan summer experiences with recognition of the alternatives open to him, and the values of each. He should be made aware of the various professional organizations open to him, and of the contribution they can make to his in-service education.

The major contribution which professional education can make to the in-service education of the teacher is through a follow-up program during the first few years of teaching. This must be done in close cooperation with the school and the school system in order to be effective. It might take the form of a few visits with consultation on problems of both the design of learning activities and management of the shop. A few conferences or workshops of beginning teachers might also be held. Because of the difficulties of distance these might be handled on an area basis without regard to the graduating institution. In-service activities might be carried on less intensively over a period of years, through the distribution of research findings and instructional materials as well as through institutes, workshops, and short courses.

SUMMARY

There is a great deal of agreement among people active in the education of teachers as to the elements essential to the preparation of all teachers. Although they use a variety of differing terms, classifications, and groupings of elements, the areas of competence essential to all teachers might be identified as: physical-psychological development and behavior, philosophical-social environment of American education, and design and management of the educative process.

Despite general agreement as to the essential elements of competence, professional education is beset by a number of serious weaknesses. One of these is the insufficient emphasis given to the professional education of secondary teachers. Industrial arts teacher educators have been relatively inactive in the development and improvement of professional education; therefore, they have not been maximally effective in the professional education of industrial arts teachers.

A major weakness of programs of professional education has been fragmentation into a number of highly specialized areas and courses. The result has been the practical impossibility for students to integrate the complex array of concepts relating to teaching. The prospective teacher is bombarded with the shrapnel of specialties from the total field of professional education without any opportunity to assemble the fragments into some meaningful whole; or for that matter, realize that they are parts of a whole. Add to this the customary separation of the technical area and the general education area, and the student is faced with an almost impossible task in attempting to integrate concepts and attitudes.

Other weaknesses of programs of professional education lie in the cold storage nature of a great many of the learning experiences. The typical approach is the amassing of information about learning and teaching which is hoarded until some later year, rather than an early participation in teaching. This represents a separation of theory and practice, which says in effect, that theory must be completed before there is any attempt to perform. Surprisingly, many industrial arts teacher educators have contributed to the perpetuation of this practice through their insistence that the technical preparation of the industrial arts teacher be largely completed before he engages in any sort of teaching. At the same time, professional education and the industrial arts teacher educator have shown little concern for the in-service professional education of teachers.

They have concentrated almost their entire effort within a narrow time span in the career of teachers. It would seem that those who believe that technical preparation must be all but complete before actual teaching is done, would expend great effort upon in-service education of teachers. However, this does not seem to be the case.

Finally, a most serious weakness in programs of professional education rests in methods courses which have concerned themselves with a techniques and procedures approach — one for every occasion — rather than with a problem-solving approach. The "gimmick" for every occasion might be appropriate in the training of technicians, but is certainly not suitable to the education of professional teachers. Yet the practice persists in industrial arts methods courses, where the gimmick approach reigns undisputed in a day when monarchies are all but gone.

The weaknesses of programs of professional education can be corrected through greater emphasis upon this area in the preparation of secondary teachers and through a redirection of effort. The stimulated vocational interest of the prospective teacher together with early and continuous teaching contacts with children, youth, and adults may be capitalized upon as powerful integrating influences. Professional education must provide and structure many teaching experiences from the beginning and throughout the program of preparation. It must accompany these experiences with thorough discussion and the reading of resource materials to make them most effective as integrating influences. At the same time, much greater effort must be made in professional programs to reduce the great number of specialized courses into a basic or core program for all pre-service teachers. The sharp separation of technical, general, and professional education must likewise be reduced to enable the student to integrate his entire educational experience.

The emphasis within special methods classes, as well as within other methods classes, must shift from the specific procedures approach to the problem-solving approach. The attempt must be made to root the problem-solving process firmly in the professional life of the teacher. This process should become the central theme around which methods courses are organized and conducted.

Great potential in the professional preparation of teachers is present in the student-teaching and post-student teaching periods. With the broadening and improvement of experiences at these times, the professional education of teachers may be

greatly improved. Numerous possibilities exist for broader school participation, community participation, and guided research. Finally, professional education must be extended intensively into the first years of teaching and less extensively into the later years of teaching.

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