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TWELFTH
YEARBOOK

ACTION
AND THOUGHT

In Industrial Arts Education

AMERICAN
COUNCIL
ON
INDUSTRIAL
ARTS
TEACHER
EDUCATION

1963

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In Industrial Arts Education

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AMERICAN
COUNCIL
ON
INDUSTRIAL
ARTS
TEACHER
EDUCATION

A DIVISION OF THE AMERICAN INDUSTRIAL ARTS ASSOCIATION
AND THE NATIONAL EDUCATION ASSOCIATION

1963

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Foreword

The twelfth yearbook presents an appropriate challenge to all in the field of industrial arts. It is addressed to "action and thought." We have always associated both of these nouns with *the doing of something*. Although thinking may be accomplished without muscular activity, it is, in fact, the act of doing something. Thought has been associated traditionally with the intellect and the scholar. It involves observed problems and the scholarly contemplation of them as they are involved with the world and universe.

In the 19th century, the sculptor Auguste Rodin captivated in stone an image, *The Thinker*. For many decades it has been the symbol of scholarly learning and the search for knowledge. This image is of a person who has studied; he has observed and contemplated; and finally he has begun to develop a very profound and active thought pattern. One cannot view this image without visualizing a satisfactory conclusion to such deep thought. This is because our evolution has been marked by man's ability to act wisely only after he has carefully thought.

The accident of birth has involved those who live today with the problems of the past, the present, and the future. To understand today's problems better, it becomes necessary to study the problems of the past as well. Past and present civilizations have solved and are solving many problems. With the many physical aids which are being developed and improved, those who live today and in the future will solve many problems with increasing rapidity.

Only a fool will act without thinking. The intelligent person will integrate his actions with generalizations he has reached as a result of deductive and inductive reasoning. In contemplating a total situation he will discover certain problems for which he will advance hypothetical solutions. He will appraise all of the known facts regarding a problem and the hypothetical solutions he has advanced. It should be understood that in the

final analysis he will act. Action and observation will surely lead to further thought and study. Likewise, *Action and Thought* will doubtless lead to further action and thought.

Responsible people in the field of industrial arts education cannot devise a plan of action for themselves or others without giving full thought to the consequences. Neither can they make their thoughts known nor their actions understood without communication. *Action and Thought* communicates to all who would listen or read, the things which cause our subject matter to advance. Further, it communicates to those in the field ideas which will help them to "act" and advance the subject matter still further.

Attempts in the past to define the mission of industrial arts education have taken many particular inclinations or tendencies. The wide spectrum of that which constitutes a broad general education to that which constitutes a narrow field of specialization is involved. The following pages should clarify the many past inclinations and tendencies which have been brought to bear. It should clarify also many of the points which have been in a state of confusion for many years. To become extremely aware of past and present and to contemplate the problems are the first steps toward positive action. *Action and Thought* should assist in clarifying philosophies. It should identify many facets for action.

Ralph O. Gallington, *President*

Preface

The theory of industrial arts education can hardly be characterized as monolithic. To achieve such a goal would, in one sense, be undesirable; for without continuous re-evaluation of the old and exploration of the new, stagnation would set in. The forces that contribute to diversity are legion. To strive to reduce diversity escapes criticism; for only in the act of striving can opposing views be communicated and shared, compromises effected, common agreements found, and new and higher syntheses eventually result.

As a contribution to this on-going process *Yearbook XII* conducts a search for and an analysis of basic ideas undergirding industrial arts education. The developmental history of ideas can speak wisdom for present and future thought and conduct; what it says takes on added meaning when subjected to new analysis in the light of current social conditions and need. Thus the spirit of this yearbook is the hope of adding something to the great amalgamation currently in process.

Subsequent yearbooks have been planned to contribute to this process in their respective areas of concern. The value of discussions in the broader area of industrial arts education to teacher education will be readily apparent.

In this yearbook the responsibility for errors and for statements or ideas with which the readers might disagree must be assigned to this writer. With this understanding, appreciation is extended to Professors G. S. Wall, Stout State College and Donald Maley, University of Maryland for reading and criticizing the rough draft of the manuscript; to William J. Micheels, President of Stout State College, for influence and inspiration to study in this area of professional concern.

Appreciation for permission to quote is extended to the numerous individuals, publishing companies, and professional organizations identified in the footnotes. Even a separate sentence seems inadequate to express gratitude to McKnight & McKnight Publishing Company for genuine professional interest and their underwriting of the A.C.I.A.T.E. yearbook program.

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Contents

<i>Chapter One</i>	
Introduction	11
<i>Chapter Two</i>	
Divergent Tendencies in Everyday Affairs and Education	22
<i>Chapter Three</i>	
Manual Training Seeks Liberal Education Status	29
<i>Chapter Four</i>	
Opposition to Physical Activity in Secondary Education	39
<i>Chapter Five</i>	
The Public Mind and Liberal Secondary Education	48
<i>Chapter Six</i>	
A New Basis in Psychology	57
<i>Chapter Seven</i>	
Subsequent Development and Trends	73
<i>Chapter Eight</i>	
Status of Thought and Action in Modern Industrial Arts Education	96
<i>Chapter Nine</i>	
Summary	119
Selected Bibliography	127
Index	134



CHAPTER ONE

Introduction

A. Characterization of Industrial Arts Education

This essay is concerned with industrial arts as a curriculum area in modern education. The phrase, industrial arts education, is used in the educational vocabulary to denote one part of a larger segment of the educational effort termed industrial education. It is commonly and glibly expressed that industrial arts education is the general education phase of industrial education leaving the balance of the total area to be primarily concerned with educating for competency and specific skill in a designated trade or industrial vocation. Thus industrial arts education plus vocational industrial education is equal to industrial education.

In practice the delineation between the phases is not and, perhaps, should not be clearcut. For it is impossible and certainly undesirable to attempt to eliminate from the vocational phase everything that is not directly applicable to the job. Even if one were fairly successful in the attempt, the skills, knowledges, and attitudes necessary for the job would still serve the individual in other capacities in his contacts with the physical world and with people. With similar reasoning all that we term general education, including industrial arts experiences, changes the behavior of the individual and to that extent affects his conduct as a citizen, as a home member, or as a worker. When the assumption is accepted that education is growth, then every experience may be said to help determine how he will behave.

While these comments seem to hold truth for actual practice, for analytic and descriptive purposes this paper will present its ideas under the title of industrial arts education and will limit itself to that phase of industrial education which seeks to make significant contributions to the general education of youth.

There is quite general agreement that industrial arts education as a curriculum area in general education is to concern itself with a study of industry. This statement broadly defines the source of the teaching content, but it is of little explicit help in spelling out the details of its task and its mission. Most educators, industrial and otherwise, have a confirmed feeling that this curriculum area is important and mandatory in a culture in which industry is so predominant. Often justification is sought in the practicalness of the skills developed. At the same time it is recognized that it is impossible to acquire insight into the actual operation and influence of industry upon American life or to develop the ability to cope intelligently with problems that result directly from industrialization except by formal and intentional education. The theory of industrial arts education clothes this conviction with more meaning and depth.

It seems generally acceptable that if general education is to aid individuals to live intelligently, happily, and constructively in such an environment, a curriculum area called industrial arts would certainly seem to hold promise, by the very nature of its title, of making significant and necessary contributions.

Modern industrial arts education lays no claims to exclusiveness in attaining many of its objectives. The responsibility for the fulfillment of certain of these objectives is shared with every other curriculum area. For example, the social aims of general education become the social aims of industrial arts education when they are expressed in terms of the logical contribution which industrial arts education can be expected to make toward their achievement.

The uniqueness of industrial arts education consists in this: that behavioral changes are sought in youngsters in an environmental setting that more realistically approximates that which characterizes our society. In providing its unique content and setting industrial arts education claims to be filling a yawning gap in the learning experiences of youth.

Definitions of the area have always referred to the tools, materials, and processes of industry. This suggests in part the source of its content, but it also designates the keystones of its method. In enlightened practice it is difficult, if not impossible, to separate one from the other. The discussion immediately following makes no intentional separation.

From its inception the theory of industrial arts education has insisted that a psychology and view of human nature that refused a proper place for overt physical activity to aid in development for life in an industrial society was in error. Since the early twentieth century it has claimed to embrace the facts of experimental psychology as they were developed and has subscribed to a view of human nature that did not isolate the body from the mind and relegate it to a position inferior to that of mind.

That overt activity must continue to constitute one of its unique qualities is maintained not only because the psychology of learning demands it. Overt activity is actual content under the conception that education is not to be confined to "mental awareness" but is to include learned abilities to act intelligently.

Industrial arts education has never taken the position, *in its theory*, that it was concerned with motor activity only. True, the nature of part of its content is such that it requires motor activity to learn it. For some of the educative values arise directly out of activity of a manipulative kind in which tools, machines, construction materials, design and drawing, and basic industrial processes are predominant. Thus construction work and the resultant take-home project have become the outstanding characteristic of the area in the minds of the student, of the lay public, and of its practitioners.

Enlightened concepts recognize that the project is only a part of the teaching method. The project and its associated tool activity does serve a central, motivated purpose to suggest, to stimulate, to require for the successful completion of a task other activities of a research, study, experimental kind. Industrial arts education, from its inception, has reacted against the notion that education could take place only when the learner was occupied with books, but it does not discount the value of books as sources of data. Expression of thought by means other than the motor activities of reading, writing, and speaking has

long been one of its justifying arguments. All of this pursued in an industrial setting can result in desired learning products.

Perhaps more significantly stated, the methods of industrial arts education are closely bound up with the idea that real learning takes place only through meaningful experience; that the experiences appropriate for a study of industry are those that involve tangible materials, tools, machines, and people; that these in turn serve as initiating points of departure for further study. Thus it is that industrial arts education traditionally and persistently insists that the shop or laboratory of industry must be the school setting in which its learnings take place.

The methods of industrial arts education have developed as the area has matured. It initially arose out of the need for considering individual differences, not so much in a quantitative sense as differences in the kinds of learning ability. A strong motivational force in its early history was the recognition that traditional education was designed to utilize a verbal and abstract reasoning type of ability and to reject as less educable those who did not possess this ability in the required amount. But industrial arts education, when classified as general education, has value for all youth of all kinds and degrees of ability. Thus the content and method should be varied and made flexible to accommodate the broad heterogeneity that is now characteristic of its classes.

A statement of the age of industrial arts education as an area of formal education must be conditioned to avoid argument. The birth year is usually given as 1880. This was the year that Calvin Woodward's Manual Training School opened its doors in St. Louis. (See Chapter III). From then on the history of the area claims a continuous lineage. But there is room for the argument that what Woodward called manual training is so far removed from what we today call industrial arts that to some it seems more accurate to cite the period from 1900 to 1910 as the period of its conception. The possibility of this argument will be apparent in Chapters III and VI. In these chapters it is pointed out that Woodward conceived of manual training in a psychological context widely different from that which became acceptable in the early twentieth cen-

ture. Thus the argument is possible chiefly because of lack of agreement as to just what constitutes industrial arts education.

From another point of view instruction in the industrial arts has been a part of childhood and youth nurture since the most primitive day that man had something of the nature of technics to transmit. What the elders learned and knew was taught to the sons and daughters. They in turn added their creative bit and passed on the total accumulation to their progeny. This process continued through age after age, perhaps with interruptions, with some loss, but over the years with a net accumulation that grew in quantity and complexity until it became impossible for informal, imitative instruction to continue the process with adequacy. Whether or not this kind of instruction has any characteristics of modern industrial arts education accounts for some of the disagreements as to the age of the area.

The argument can be resolved by agreement upon the differences in definition. As previously indicated some will insist that modern industrial arts education has little direct relationship to the vocational aspects of living. To describe industrial arts education as primarily vocational in the sense of making direct and specific contribution to saleable skill development will not be allowed by very many among professional industrial arts people. A more general statement about industrial education can be made. This statement draws no line between general and special education. Industrial education can be described as a continuing effort on the part of society to include in the education of its members, whether consciously or unconsciously, those matters that are demanded by the state of its technical development to enable them not only to survive but to live intelligently, happily, and usefully. Such instruction is as old as technics.

Education that has been pursued in response to the demands of the technology of any society, however belated the response may have been, has survived since the earliest day. In its earliest stages this demand was a matter of the merest survival. This has always been a part of man's struggle. What other motives were present it is difficult to determine, but even without conscious purposes there were undoubtedly other values that

were achieved beside successfully coping with a recalcitrant nature. The intent of conscious, purposeful, industrial education of pre-industrial-revolution days was predominantly vocational. But the technology was simpler than today. The environment of the instruction was the industrial environment itself so that technical skill, broad general knowledge, and appreciations and attitudes were developed beyond the limited and conscious vocational objectives of parents and other adults. Thus a liberalizing orientation to the industrial aspects of the culture was achieved without providing for it through formal schooling.

As the industrial revolution gathered momentum, industrial processes became isolated in buildings, tool and craft processes became less a part of the firsthand experience of youth, and division of labor limited the educational aspects of industrial work to familiarity with only a small segment. As this process of isolating industry from everyday childhood experience became more complete and as industry became too complex to be a part of the common knowledge possessed by the many, the need for industrial arts education became more urgent. True, informal vocational education continued in its efforts to meet the needs of an industrial economy, but the reduction in quantity of general education of all youth commensurate with the spirit of modern industrial arts education was symbolized by signs on factory gates shouting, "No admittance; employees only."

The time arrived, as was inevitable, that society had to incorporate into formal schooling those elements of experience that were now denied developing youngsters. Thus manual training; thus manual arts; thus industrial arts. But all through its evolving history, suggested by the sequence of names in chronological order, the liberalizing quality has been declared.

B. The Problem and Its Setting

Sources of the Problem

The foregoing characterization will arouse little disagreement. Perhaps its broad general statements allow it to encompass a variety of interpretations. When greater detailing of theory is attempted and especially when the implications for

classroom and laboratory practice are extracted from the theory, points of contention arise with greater frequency.

It seems strange that a curriculum area whose existence can be so easily and logically substantiated, an area with such broad and deep sources of content and with so apparent and demanding a mission—it seems strange that such an area of study should lack prestige and be refused a position of importance equal to that of any other area in the curriculum. Moreover, the criticism of industrial arts education that arises from without as well as from within the ranks of its own practitioners appears to many to be equally surprising. This is not to say that all criticism can or should be avoided. But when the quantity and effectiveness of such criticism mounts to a crucial limit, attention to it and investigation is required.

Some of the disturbing signs of the inadequacy of current industrial arts education (whether the deficiency lies in theory, practice, or publicity) center around the disparaging attitudes of toleration exhibited by many teachers from other curriculum areas, by some administrators, and even by certain groups of students at the secondary and college levels. Most agree that there must be industrial arts for everyone, chiefly because some "hand training" is valuable but more particularly because the secondary school is burdened with many who are unable to be successful in more academic areas. Industrial arts is glad to accept the credit for these values, but acceptance on this basis only indicates a lack of understanding of the full potential of the area.

The early history of industrial arts education allows the view that it is the story of a vigorous and crusading movement always in the vanguard seeking to implement the best in educational thought. Since the advent and ostensible acceptance of the Dewey influence, it appears that industrial arts education has reduced its original vigorous efforts to exploit the functional psychology and other extremely favorable aspects of Dewey's educational theory. The statements of theory give verbal acceptance, but there is a disquieting feeling that the public mind and indeed many of the practicing teachers have not fully plumbed the meaning and mission of industrial arts education as liberalizing general education. Is it possible that under the influence of a strong conservative trend in American

society that the area is succumbing to traditional pressures? Perhaps there are other forces which quietly and rather insidiously are distracting industrial arts education from moving toward its fulfillment. Is it possible that until too recently an infectious complacency had set in under the impression that the need for defense and justification had ceased to exist? Perhaps failure on the part of many of each new generation of teachers to thoroughly understand bedrock principles in psychology and philosophy have caused general "rule-of-thumb" statements of theory to be distorted and misapplied. Perhaps a vigorous theory has been condensed to a list of dictums shallowly understood and narrowly applied.

Published, as well as oral, criticism from teachers of the fine arts and other areas of education as well as from professionals in the area of industrial arts education supplies additional evidence that perhaps the area is not exploiting the possibilities of its theory or even that its theory needs evaluation and change.

When a shop program is to be evaluated, it tends to be judged in terms of the condition of the physical equipment, the quality of the shop's project display, or the success enjoyed in state and national competitions for the best projects. When local publicity is attempted, more often than not, project displays are presented to the public as concrete evidence of the skill and technical information that has been acquired by the students. There seem to be indications that much observable industrial arts practice has been shoved into a traditional mold of stereotyped subject matter content which then exists to be taught and learned as such.

In partial response to such criticism many questions can be asked. Is the curriculum area really committed to its avowed mission of imparting general education? What shall be the nature of industrial arts learnings that allows them to be described as liberalizing general education? What can industrial arts education learn about the spirit of a liberalizing general education from more traditional areas of liberal study? Why does industrial arts education insist on laboratory activity to meet its avowed objectives? What qualities should this activity possess? What rationale justifies this activity as general or liberal education.

Statement of the Problem

The seemingly divergent criticisms and questions that were raised above have a common point of focus. In nearly every case the issue can be distilled or the question can be rephrased so that one fundamental dilemma becomes apparent. One aspect of the dilemma can be named "thought" and the other "action."

The term "thought," taken in isolation, refers to intellectual functioning. It is concerned with ideas, with reflection, with initiating, with creating, with planning, and with numerous other words that, from one point of view, describe the activities of the mind in contrast to bodily activity. From another point of view, thought is the mind itself as a biological function.

The word "action" refers to overt physical activity. As such it describes the expenditure of energy in such a way that it has a direct effect upon environment. It is expended energy that makes a difference to something or someone if only to the actor himself. It always involves muscle and movement, as in talking, writing, and in the manipulation of physical objects.

A formal statement of the problem upon which this essay concentrates involves the concepts of "thought" and "action" and their proper relationship in the pursuit of the objectives of industrial arts as liberalizing general education. Favorable public opinion is required in addition to a defensible educational philosophy. Thus a general but adequate goal to seek in our publicity efforts is also included in the following statement.

A general education curriculum that in its subject matter concerns itself with the industrial aspects of our culture (as exemplified by modern industrial arts education) can develop and flourish only in direct proportion as:

- A. this idea is accepted as an educational premise, by practitioners and public alike, that thought and action are inextricably bound up together,
- B. the content and knowledges and learnings which it is capable of imparting are deemed as educationally worthy as those of any other subject matter area.

Since intellectual activity is universally accepted as a characteristic of all education and since overt activity with tools, materials, and processes is a unique characteristic of industrial

arts education, the first proposition leads naturally to investigation in the area of psychology.

The second proposition states a minimum requirement for survival and development. Any lesser claim places industrial arts education in a subordinate position. Any greater claim seems unnecessary and, considering the current educational scene, impracticable.

These propositions will serve to initiate study and thinking about the general problem of the conditions under which manual training and later industrial arts education was conceived and developed and which are required to exist in the minds of its practitioners and the public before this curriculum area can be accepted as a respected and valid part of general education in the modern public school.

C. Initial Assumptions

The validity of this essay depends in part on the premise that some form of industrial arts education is mandatory for a complete general education of all youth in American schools.

It is further assumed that much of the practice of industrial arts education is inadequate and that certain expressions of its theory are restrictive. Thus it can also be taken for granted that the curriculum area has not reached its zenith and that the two propositions of the problem statement are not yet fully acceptable in American public education.

The terms "liberal" and "liberalizing" are defined in this brief statement of assumptions because their meaning constitutes a basic premise of this essay. These modifying terms are used in subsequent portions of this paper to offset the exclusions that the term "general education" seems frequently to contain when it is used to describe industrial arts as the general education phase of industrial education. Almost anything can be justified under the phrase "general education." The term too readily allows industrial education to complacently accept a dominant emphasis upon overt action as meeting its total commitment. Industrial arts education seeks the educational development of all youth without specific regard to any single vocational pursuit and without confining its strivings to development

of manipulative abilities of practical use in everyday living. As more fully discussed in Part A of Chapter VIII, a liberalizing general education demands for its fulfillment educational learnings from all kinds of educational activity. With regard to industrial arts education, "liberalizing" helps to ward off contentment with bare skill and technical fact as end results without minimizing overt activity as valuable and mandatory. A liberalizing industrial arts education has for at least one of its very significant purposes the freeing from ignorance regarding the ubiquitous technological aspect of our environment. "Liberal" is chosen from a traditional area of education against which industrial arts in its present practice seems to have overreacted. The connotation of intellectual activity in conjunction with the overt activity of industrial arts makes "liberal" a wholesome and needed modifier.

CHAPTER TWO

Divergent Tendencies in Everyday Affairs and Education

Americans are characteristically known as people of action, as a practical people. This usually means that they have achieved in ways that are evident to an observer. As one reads the descriptions and analyses of American life since colonial days, he is impressed with the exhibition of an abundance of energy and with the frequency of success in getting things done.

This proclivity for action was required and fostered by the conditions of colonial life. The statement requires no documentation that without prompt action and action of the most vigorous sort, life itself was lost.

The conditions of frontier days imposed some of the same demands for a predominance of action. For survival, yes, but with the added motivation of material wealth far beyond the needs for survival.

If colonial and frontier life required and fostered a predominance of action, the nineteenth century with its expanding industrial opportunities awarded the highest premiums for it. This must be considered along with the idea that Americans had been rapidly developing a standard of values that rated physical possessions near the top if not highest on the list of good things.

It is significant to note that, in general, action in American life was not a slavish kind in which menial work was performed by the masses at the direction of a few who possessed all the knowledge and did all the thinking and planning. Merle Curti

presents a concise but vivid account of the rapid development in American life of the attitude that knowledge and action are not to be isolated from each other.¹

That the attitude was developing infers that it had not always existed. The aristocratic idea that intellectual activity and bodily activity were to be performed separately by different people had a long tradition. When this aristocratic attitude first appeared on American shores as a part of the culture transplanted from Europe, it had already been under attack. Since the Renaissance, developing ideas regarding the uses of science in the attack upon man's problems, embryonic ideas about the right of common people to happier conditions, as well as the rise of the middle class with their needs for knowledge in conducting their commercial affairs — these and other factors were weakening the belief in the traditional concept regarding the separation of knowledge and action.²

The thesis developed by Curti contends that the gap between practical action on the one hand and knowledge, theory and thought on the other has been progressively closing. The trend began with the landing of the first European settlers and has continued through the whole of American history.³

Was there a parallel trend in the development of American secondary education toward the greater involvement of bodily activities as well as intellectual activity in the learning process? That there was can be easily and successfully argued, but it was only a trend. Throughout most of the nineteenth century, it is discernible even though secondary education and more decidedly general education, continued to exclude bodily activity as much as was possible from the educational process. The trend was apparent in the motives for the voluntary attendance at the secondary schools. The changes in subject matter which were demanded to satisfy these motives do, of course, reveal the same trend. Prior to the twentieth century the trend developed chiefly, although not solely, in response to industrial and vocational motives.

1 Merle Curti, *American Paradox: the Conflict of Thought and Action* (New Brunswick: Rutgers University Press, 1956), pp. 3-30.

2 *Ibid.*, pp. 6-7.

3 *Ibid.*, p. 29.

The evolutionary development of secondary education included the Latin school, the English school, the academy, and finally, the distinctively American high school. The most obvious differences among them, at least the differences significant for this study, were the changes in kinds of subject matter. The nature of the subject matter spelled the difference between one form of secondary education and its successor.

The above statements become acceptable when some of the salient facts in the historical development of secondary education in the United States are recalled. The story of this development is well recorded in numerous places. Only a brief review is necessary at this point as an introduction to a discussion of some of the factors that determined the relative and respective importance of thought and action in education.

The oldest institution of secondary education in the United States was the Latin grammar school. As a necessity for college preparation, as a requirement for a life of leadership in the church as well as in other capacities, and as a logical response to traditional demands and patterns from Europe, the Latin grammar school constituted the link connecting childhood education and the college. As its name suggests, the curriculum was narrow and classical. In its traditional form it could not continue to meet the requirements of the new nation as it grew and reached out in its many interests. The need for education in commerce, engineering, and even in cultural areas began to appear. It was inevitable that "in the course of the eighteenth century a new type of secondary education began to appear in America and to challenge the Latin grammar schools for leadership."⁴

The first of these new schools were private schools called English schools. These schools replaced the dominance of the humanistic tradition of classical scholarship with a new emphasis upon education of a more functional kind. The description of Butts and Cremin clearly indicates that these new schools "taught what the young people wanted."⁵ That they wanted education for practical action is reflected in the variety of course

4 R. Freeman Butts and Lawrence A. Cremin, *A History of Education in American Culture* (New York. Henry Holt and Company, 1953), p. 122.

5 *Ibid.*, p. 124.

offerings of the English schools in the areas of commerce and engineering in addition to the retention of occasional classical courses.⁶ Perhaps the break with tradition was too abrupt and ill-advised. Founded as private ventures, perhaps they lacked the legal sanction necessary for permanency.⁷ Nevertheless, during the last half of the eighteenth century they were replaced by the academies.

Although their appearance upon the educational scene was rather brief, the popularity of the English school illustrated the practical temper of the American public. However, it is a mistake to assume that without the restraining force of the traditional forms of education the American public would have quickly shaped their educational institutions along lines that closely paralleled the actions of expediency so vigorously pursued in the everyday affairs of business and industry. This assumption predicates two groups in opposition. It is too easy to assign the roles of villain and hero, the "bad guys" and the "good guys." The conflict was rather one of seemingly incompatible points of view struggling for expression in a public opinion that had not yet reached the level of synthesis. The conflict was part of the process of finding common ground so that the best of each position could become a part of a wholesome, American amalgamation. At any rate, the argument is strengthened that the gap between theory and practice, between thought and action, between knowledge and function was rapidly narrowing.

As the academies developed in the last half of the eighteenth century, they retained the practical approach of the English school but combined with it some of the classical approach of the Latin schools. Whereas the English school was predominantly secular, the academy reinstated some of the religious emphasis of the Latin school probably in response to public demands created by the religious awakening of the middle eighteenth century.⁸

Of special interest to the modern curriculum area of industrial education is the story of Benjamin Franklin's academy,

6 *Ibid.*, pp. 124-26.

7 *Ibid.*, p. 126.

8 *Ibid.*

chartered in 1751. His elaborate plans combined a classical school, a mathematical school, and an English school with the latter being the basis of the total program. His expanded curriculum included more than book courses and study about the practical affairs of the economic and business world. He proposed actual experience in agriculture, experimenting with gardening and planting, visits to outstanding farms, experience with machines as a means of acquiring an understanding of the applications of science and mechanics, study of the history of technology, and a broad background in natural science.⁹

The academy movement was actually an experiment in combining classical and practical education in the same institution. Franklin included more of the practical ingredient in the recipe than did the other academies. Possibly this accounts for the failure of the school to survive. Indeed, Franklin himself admitted the overwhelming opposition of the proponents of classical education. He even cited specific examples of the action undertaken by the opposition to doom the innovations of his school.¹⁰ Nevertheless, up to 1865 the most characteristic demand for secondary education was the academy.¹¹

With a less radical program than Franklin's the typical academy did succeed in maintaining a combination of classical and practical studies to an extent that attracted enough students so that it could flourish. It is estimated that by 1850 there were probably more than six thousand enrolling over a quarter of a million students.¹²

The high school first emerged in response to the demand for equal educational opportunity rather than as a reaction to a classical education. The high school was to become the people's school but not because of its curriculum. The academies, as private corporations, required tuitions to be paid. The need for a free public secondary school and for a school that was subject to public control were among the reasons in the minds

9 J. Paul Leonard, *Developing the Secondary School Curriculum* (New York: Rinehart and Company, Inc., 1953) pp. 10-12.

10 Elmer Ellsworth Brown, *The Making of our Middle Schools* (New York: Longmans, Green, and Co., 1902) pp. 189-190.

11 Butts and Cremin, *op. cit.*, p. 206.

12 *Ibid.*, p. 239.

of the founders of the English High School in Boston in 1821.¹³ This first public high school had less practical appeal than the academy. Because high schools in general were somewhat more conservative, they were less well attended during the first half of the nineteenth century.

Following midcentury, as the classical influence reasserted itself in the academies, and as the pressure of popular demand changed the curriculum of the high school, the latter came to the fore as the acceptable and most prevalent form of secondary education.¹⁴

The changes in content of secondary education from classical to a more functional kind may be viewed as the educational counterpart of the developing tendency of practical Americans to apply knowledge of all kinds in the interests of more successful action. However, action as physical activity, as motor movement, as muscular exertion continued to be excluded from formal education except in those limited amounts found necessary to read, listen, speak, or record words on paper.

To educational leaders of pre-Civil War days, practical education did not mean practical application and direct participation with things. They had reference to emphasis upon "learning-from-books-about-more-useful-things."¹⁵ This absence of physical activity continued as a characteristic of most "real" education throughout the remaining decades of the nineteenth century. Butts and Cremin furnish a concise description:

Those who built educational programs continued to assume . . . that education is something to be derived primarily from words and numbers provided by books and teachers, and therefore, that the school curriculum consists largely of a body of previously discovered facts and principles which must be communicated to the young.¹⁶

The full account of the development of secondary education in America definitely establishes that its evolution in large part consisted of changes toward subject matter of a more functional kind. But except for the ideas and rather unsuccessful

13 Brown, *op. cit.*, pp. 295-96.

14 Butts and Cremin, *op. cit.*, p. 126.

15 *Ibid.*, p. 221.

16 *Ibid.*, p. 433.

ful experiments of Franklin, the secondary school continued to merit the characterization as a place where one read and acquired facts about more functional subjects. As a step toward achieving the full unity of thought and action in the educational process this concession was important. But the fact still remains that education was thought of as exclusively an intellectual process with the absence of body and motor activity a criterion of educational worth.

In succeeding pages the movement to introduce bodily activity into the educational process will be followed as it developed in one curriculum area. Beginning as a reaction to an excessively verbal, linguistic kind of education, industrial study matured under various influences many of which it tried to encompass. After finding itself in a state of overreaction resulting in an excessive emphasis upon overt activity, it eventually revealed indications of finding its rightful orientation as a liberalizing study of the industrial aspects of the culture.

CHAPTER THREE

Manual Training Seeks Liberal Education Status

The manual training movement made an extremely significant contribution to the process of closing the gap in American secondary education between thought and action, between mind and body.

The following sentences from the two-volume work of Charles A. Bennett, historian and pioneer teacher in the area of industrial education, are noteworthy in that they furnish a rather authoritative statement that the school founded by Calvin Woodward in 1879-1880 was the first and a representative example of manual training education:

The earliest and also the most distinctive feature of the manual-training movement in America was the manual-training high school. It is a notable fact that this appeared in complete typical form in the very first institution of its class, the Manual Training School of Washington University, in the city of St. Louis.¹

By 1880 the American high school was an established and growing institution. The founding of another secondary school in St. Louis was not as phenomenal as the kind of curriculum proposed. Bennett records that Woodward's ideas were more radical than merely adding reading and recitation courses even though these courses were designed with practical implications. The new curriculum was to include the subject matter of tools,

¹ Charles Alpheus Bennett, *History of Manual and Industrial Education 1870-1917* (Peoria, Illinois: Charles A. Bennett Co, Inc., 1937), p. 347.

materials, and processes of the trades and industry. But more than that, a large segment of time in the school day was allotted to active overt experience with the physical apparatus that was a part of the working man's life in the trades and in industry. Two hours of the six-hour day were devoted to actual shopwork in carpentry, woodturning, molding, brazing, soldering, forging, and work in metals.²

The idea of the kind of secondary education embodied in the St. Louis school did not arise in the mind of Woodward without considerable antecedental thinking. Calvin Woodward was a Harvard graduate with capabilities and interests in the areas of engineering and mathematics. At Washington University, as principal of the O'Fallon Polytechnic Institute, he was authorized in 1868 to develop an engineering department for the university. To facilitate the instruction in this new department Woodward found the need to incorporate tool work into the educational programs of the students of engineering. To aid his students in visualizing the principles of applied mechanics he asked them to make certain models of wood. But the students' skills in tool work were as deficient as their ability to visualize mechanical principles in the abstract. The obvious solution to both problems was to teach tool skills. Thus began in Woodward's mind the idea of using tool instruction as a means of attaining an instructional objective further removed.³

It can be surmised that this embryo idea and educational effort initiated probing thought into the reasons for the need for this kind of education. Woodward was convinced that secondary education left undone some things that were a necessary part of the preparation for a technical education. It even seems reasonable to conjecture that Woodward's concern included not only the technical students who were unable to make simple forms from wood but that this fact aroused awareness and was evidence of a general ignorance that would find most boys of secondary school age deficient in the face of many other problems that were certain to arise as they lived their lives in a technical society. The solution to this problem was to be found

² *Ibid.*, p. 353.

³ *Ibid.*, p. 318.

within the framework of a general education for all youth of secondary age.

Beside the immediate reasons associated with the training program of embryo engineers, Woodward's motivations may be classified as a reaction to the traditional concept of the kind of education that should be required of all. As early as 1873 we have recorded evidence that he felt tool work could be justified as a part of general education. In his book, *The Manual Training School*, he included an address given seven years prior to the opening of the St. Louis Manual Training School. One justification for including the address is offered in a footnote: "It presents very clearly the necessity for manual training on the part of all children, outside as well as inside the polytechnic school."⁴ In the body of the address he points out the value of skill for all children as having practical application and as developing a feeling of gratification and pride. He summarizes with a plea for more manual education as the "best aid toward securing a wholesome intellectual culture" and as the "*only* means for making that culture of practical use."⁵ (Italics in original.)

By 1878 his educational ideas had matured to a point where he was able to discuss them publicly with sufficient justifying arguments to make them convincing. In an address given in that year he described traditional education in these terms:

The popular idea of excellence was embodied in a man of commanding intellect and extensive information, whose reasoning powers had been cultivated to the highest degree by the study of pure mathematics and the philosophy of the ancients. The practical side of life, with its thousands of material and physical problems, was looked down upon as ignoble and unworthy of serious study.⁶

But education was now required for more than just a few for whom an exclusively intellectual education might have been adequate. He continues with a proposal for a plan of education which he terms a "new departure."⁷

⁴ Calvin M. Woodward, *The Manual Training School* (Boston: D. C. Heath and Company, 1887), p. 240.

⁵ *Ibid.*, p. 256.

⁶ *Ibid.*, p. 262.

⁷ *Ibid.*, p. 262.

In the first place, the excellence of intellectual training is admitted, and the value of a certain amount of abstract mental discipline is recognized. In the second place, in returning to a just recognition of the importance of our physical powers and faculties, and of a practical knowledge of the properties and uses of material things, the new education trains youth to skillfully wield . . . the instruments of peace.⁸

It is significant to note in the above quotation that he accepted the worth of the old education. "However excellent the abstract intellectual discipline, however thorough may be the reading of written histories and the study of languages, a great want is still unsatisfied."⁹ An explicit statement from one of Woodward's addresses is more convincing:

It is scarcely necessary to add that the "new" education includes the "old." We tear down no essential parts of the old temple, but we have added at least two wings which were needed to make a symmetrical whole. The natural science wing brings in a whole world of new material, and a totally new method of developing ideas. The other wing is that of manual training, including a variety of drawing and intelligent use of a large range of typical tools and materials.¹⁰

The function of the old education to transmit the heritage of facts and principles was also fully acceptable to Woodward:

We want a fuller knowledge and a greater familiarity with the material world by which we are surrounded, through the medium of which we act for and upon each other and for our own physical well-being. A knowledge of material things and material instrumentalities can be gained only by close and systematic observation and study, and is in itself a liberal education.¹¹

Of particular note is the reference to manual training as liberal education. Stated as it was in 1878 it suggests that Woodward anticipated the later charge against manual training that inasmuch as skill development was involved there could be no other objective than a utilitarian one. And in the educational opinion of the day what was utilitarian was not educational.

To learn this liberalizing knowledge required more than symbols provided by books and teachers. The nature of the

8 *Ibid.*, p. 262.

9 *Ibid.*, p. 263.

10 *Ibid.*, p. 214.

11 *Ibid.*, p. 263.

subject matter of manual training was different. It demanded bodily activity for its acquisition.

At this point there is the temptation to jump to the conclusion that Woodward employed tool activity only as a means of attaining the "true" educative effect. This seems all the more plausible when we read in an address of 1883 that "the education of the hand is the means of more completely and efficaciously educating the brain."¹² In this sense manual training would be relegated to the position of a psychological expedient, a means of attaining the greater end of "pure" intellectual development after which the motor training that might have resulted could be left to atrophy. Manual training would thus be exploited for its value in helping to develop the mental faculties.

Opposition arguments which developed later employed this misunderstanding of the intent of the manual training movement. But for Woodward manual training was liberalizing in its own right. It was not to be isolated from intellectual development but was a requisite for it. "We believe that mental activity and growth are closely allied to physical activity and growth," he pronounced in an address given in 1885, "and that each is secured more readily and more fully in connection with the other than by itself."¹³ A reciprocal relationship existed. The "manual elements" were essential to a "liberal education." And little doubt is left as to his meaning of the word "liberal" when he writes:

I used the word "liberal" in its strict sense of "free." No education can be "free" which leaves the child no choice, or which gives a bias against any honorable occupation: which walls up the avenues of approach to any vocation requiring intelligence and skill. A truly liberal education educates for all spheres of usefulness: it furnishes the broad foundation on which to build the superstructure of a happy, useful, successful life.¹⁴

This combination of objectives had all the ingredients for arousing opposition arguments. The new approach was not content with employing physical activity as vocational training or as a method in the Pestalozzian fashion. It claimed that body

¹² *Ibid.*, p. 205.

¹³ *Ibid.*, p. 202.

¹⁴ *Ibid.*, pp. 202-203.

and mind were equally necessary in the liberal education of youth and even denied and rejected any direct vocational aims.

In the brief discussion of Woodward's justifying arguments, the many claims made are apt to impress one as statements of expediency designed to meet the numerous criticisms that attended the establishment of the manual training schools. The statements become more coherent when they are considered in the context of faculty psychology.

The developmental history of faculty psychology and its correlate, formal discipline, is long and somewhat complex. Its roots strike deeply into the history of ideas extending at least to the Age of Pericles.¹⁵ For the purposes of this study it is only necessary to record that during the nineteenth century, the period under investigation, it was the dominant descriptive view of the human mind. Butts and Cremin arrive at this conclusion:

Rooted in the European tradition of idealism and rationalism, the ideal of mental discipline was another central aim of early nineteenth century education and emphasis upon it increased as the century progressed.¹⁶

In the history of its development the variations in the exact form of its statement were many; as formulated in the nineteenth century its meaning was not stabilized. However, in educational circles the existence of mental faculties was an accepted fact. In a rather comprehensive study of the meaning of faculty psychology and mental discipline for modern education, Kolesnik points out that throughout most of the nineteenth century "the question was not, 'Are there mental faculties to be trained?' but 'How many faculties are there, and how can they best be trained?'"¹⁷ In one statement of the theory, the mind was considered to be composed of at least thirty separate entities or faculties.¹⁸ Various classifications were posited, but the most

15 Walter B. Kolesnik, *Mental Discipline in Modern Education* (Madison, Wisconsin: The University of Wisconsin Press, 1958), p. 10.

16 R. Freeman Butts and Lawrence A. Cremin, *A History of Education in American Culture* (New York: Henry Holt and Company, 1953), p. 268.

17 Kolesnik, *op. cit.*, p. 99.

18 H. Carl Witherington, *Educational Psychology* (New York: Ginn and Company, 1946), p. 124.

common seemed to be the three-fold classification which comprised the reason, understanding, or intellect; the feelings or emotions; and the will.¹⁹

A corollary to the theory of faculty psychology and an even more significant aspect of nineteenth century education was the basic method devised for training the mental faculties. This method, formal discipline, seemed to be the logical implementation of the psychological view then current in educational thinking. The training of the faculties of the mind resulted in an educated man.²⁰

Kolesnik differentiates mental discipline from formal discipline.²¹ Mental discipline is an expression which describes the psychological position that mental capacities can be developed to transfer their operating efficiency to situations other than the ones in which they were trained. The expression also refers to the philosophical view that such training should be the chief purpose of formal education.²² Thus under the term may be grouped a number of theories each proposing that schools can and should concentrate upon improving man's mind through education. It is important to note, as Kolesnik points out, that "mental discipline refers only to the intellectual."²³

Formal discipline, the particular brand of mental discipline which was most widely accepted in the nineteenth century, was not restricted in its beneficial results to improvement in the intellectual aspects only. Claims were made for its efficacy in the areas of sensori-motor and moral behavior as well.²⁴

This has significance for a discussion of the antecedents of industrial arts education because the first manual training schools were molded to fit into the framework of faculty psychology and formal discipline. In his introduction to the history of the St. Louis Manual Training School, Coates states that

¹⁹ Butts and Cremin, *op. cit.*, p. 178.

²⁰ Witherington, *op. cit.*, p. 124.

²¹ Kolesnik, *op. cit.*, pp. 4-5.

²² *Ibid.*, p. 3.

²³ *Ibid.*, p. 7.

²⁴ *Ibid.*, p. 4.

“handwork could at that time have been introduced into the schools only under the cloak of formal discipline.”²⁵ He also finds it acceptable to define manual training as “the application of the methods of formal discipline to instruction in the manual arts.”²⁶

A study of the practices in the early manual training schools confirms this and convinces one that the doctrine of formal discipline had now been extended to include the training of the bodily functions.²⁷ Many educators believed that any subject, if properly taught, would aid in disciplining the mind.²⁸ For many others the inclusion of motor activity for this purpose was a perverted extension of formal discipline. The resistance to this broadening of the theory to include motor activity in the degree and for the purposes insisted upon by manual training became the key motivation of the opposition argument following 1880.

The theory of formal discipline, taken by itself, resisted the closing of the gap between thought and action in education. As the theory developed in the nineteenth century, certain subjects became the favored ones for implementing the theory in actual educational practice. Popular pressure for a more practical curriculum forced this broadening of the theory to include any subject that could be taught verbally without involving manipulation of physical objects.

Thus formal discipline in its later stages of development, and especially as interpreted by manual training proponents, became a significant step in closing the gap between thought and action. It brought education a little closer to the time when the interrelatedness of mind and body in learning would be recognized.

Bennett records that when the full intent of Woodward's enterprise became known, a period of controversy and “heated discussion” ensued.²⁹ When all the discussion and the historical

²⁵ Charles Penny Coates, *History of the Manual Training School of Washington University* (Washington: Department of Interior, Bureau of Education, 1923) p. 7.

²⁶ *Ibid.*, p. 6.

²⁷ Bennett, *op. cit.* pp. 347-401.

²⁸ Kolesnik, *op. cit.*, pp. 12-13.

²⁹ Bennett, *op. cit.*, p. 360.

facts of this period of controversy from 1880 to 1900 are distilled, when Woodward's claims and the actual practices of the manual training schools are compared with the events and practices in secondary education prior to 1880, it becomes clear that the chief obstacle to the acceptance of manual training was not the introduction of a new content field. It was not even the introduction of bodily activity into the education of youth that aroused opposition. Claims that the content and the methods of the new area made mandatory contributions to the liberal education of secondary students, however, aroused formidable resistance. That a liberal education status should be demanded for a type of education that required bodily involvement and physical manipulation of material objects violated deep-seated educational principles and seemed to threaten a whole philosophical position.

The addition of another body of subject matter content to the secondary curriculum was not an innovation. If manual training had sought entrance as a reading course involving only books, there would have been only slightly more opposition than to the entrance previously made by other book courses. Changes in subject matter and in course offerings were acceptable even if not completely respectable. This seems a reasonable statement when the development of the curriculum of the academy is considered,³⁰ even though the high school into which manual training sought entrance, was more conservative than the academy in the extent of its curriculum changes.³¹ The verbal subject matter of manual training was not the basic point of contention. A review of the previous additions to the curriculum indicate that the only condition of admittance was that the nature of the content be verbal and intellectual.

Nor was bodily activity in educational experiences of less than college grade an innovation. European precedents were numerous so that it is not surprising to find counterparts in America. Most significant for this discussion are examples taken from the history of education in the United States prior to 1880.

30 J. Paul Leonard, *Developing the Secondary School Curriculum* (New York: Rinehart and Company, Inc., 1953), p. 15.

31 *Ibid.*, p. 24.

The Mechanics Institute movement (1820) is considered to be a forerunner of the manual training movement.³² But its curriculum was taught by the traditional lecture method and was vocationally oriented.³³ It must be noted that there were no pretensions to a liberal education status. It was popular education. It did emphasize practical learnings, verbal as well as some motor skills, but its objectives were expressly vocational. Certainly it did not arouse hostility by claims for liberal education status. Similarly, the manual labor movement was not much more than an adjunct to enable students to defray school expenses.³⁴ Even the Boston Whittling School (1871) made no general education claims other than to provide occupation for the leisure hours of boys.³⁵ Bennett provides a summary of the motivations of these early efforts to incorporate manual work into school programs: "In most places, the practical or social motive preceded the pedagogical or strictly educational motive in the elementary as well as in the secondary schools."³⁶

Opposed as a seemingly unwarranted invasion of the precincts of liberal education was not the practical subject matter, nor any direct vocational aim, but *the claim of manual training that it too could be liberalizing*. Overt activity plus intellectual activity could not possibly add up to liberal education.

However erroneous modern educational theory has proven the manual training movement to be, the spirit of manual training as conceived by Woodward was neither vocational nor did it relegate overt physical activity to the position of means only. Woodward's argument rejected "either-or" habits of thinking that required classification of educational practice as either vocational or liberal. Overt physical action was to be a valid and necessary part of a complete liberal education. Formal discipline provided the logical framework within which his iconoclastic assertions could be made convincing.

32 Bennett, *op. cit.*, pp. 317-329.

33 Lewis Flint Anderson, *History of Manual and Industrial School Education* (New York: D. Appleton and Company, 1926), p. 70.

34 *Ibid.*, p. 96.

35 Bennett, *op. cit.*, p. 403.

36 *Ibid.*, p. 411.

CHAPTER FOUR

Opposition to Physical Activity in Secondary Education

It appears to be a valid conclusion that the opposition to manual training was aimed directly at the encroachment by the affairs of everyday work upon the domain of liberal education. In the 1880's manual training was challenging a traditional concept. The antecedents of the type of educational theory that resisted this are well-established; an account of them is ably recorded in the published literature. The battle was waged on a common psychological ground; for the fact of faculty psychology was almost universally accepted by men in education, proponents and opponents alike.

Faculty psychology took for granted a view of human nature that separated mind from body.¹ It is this dualism that Dewey belabors as the source of much that is wrong with society and education.² These antecedents have not atrophied. They seem to have retained their effectiveness in conditioning current educational thought about industrial arts. For this reason and to preserve continuity it seems well to briefly recount them here.

Plato introduced "for the first time in the history of thought . . . the doctrine that the soul and body are wholly disparate things and belong to entirely different realms of

¹ Merle Curti, *Probing Our Past*, (New York: Harper and Brothers, 1955), p. 153.

² John Dewey, *Democracy and Education*, (New York: The Macmillan Company, 1916), p. 165.

being."³ This doctrine was a refinement of an earlier primitive belief that each animate object was occupied by a living spirit. For Plato, the soul which occupied the body was partially independent of it.⁴ It existed before the birth of the body and in that existence had had communion with reality. Thus the soul was at the same time the explanation of life and the agent of intellectual functioning.⁵

To know the real nature of the world required that one had had contact with it. The real world was only represented by the physical objects that existed in everyday experience and that representation was very imperfect. Only in the great universe of ideas could knowledge of the true nature of things be acquired. That the souls of certain men had inhabited this world of ideas was the source of knowledge available to men. These favored souls possessed this knowledge, for in their pre-existence they had had intimate contact with the true objects of reality. This knowledge could be made available through a process of recall induced chiefly by thinking. Certain sensory stimulation and skillful questioning could be enlisted as aids in bringing to consciousness the true knowledge. A better method of recapturing knowledge was by contemplation. This subjective process would result in the true knowledge of the good.⁶

In the philosophy of Plato several factors pertinent to our discussion must be pointed out. First, the dual nature of the human being as soul and body. Second, that knowledge of reality, knowledge of the good, can be acquired only by the activities of the soul through a process of reflection. Third, that this knowledge is beyond the realm of sense experience and, in fact, is distorted by experience. Fourth, that only a few are capable of the intellectual activity necessary to arrive at the truth.

3 David R. Major, *An Introduction to Philosophy* (Garden City, New York: Doubleday, Doran and Company, Inc., 1933), p. 78.

4 I. N. Thut, *The Story of Education* (New York: McGraw-Hill Book Company, Inc., 1957), p. 51.

5 Frederick Eby and Charles Flinn Arrowood, *The Development of Modern Education* (New York: Prentice-Hall, Inc., 1934), p. 7.

6 Thut, *op. cit.*, pp. 52-56.

Additional suggestions that will help fix the origin of the educational unworthiness of bodily activity in liberal education exist in a sketchy reference to some ideas that began with Aristotle. For Aristotle, to acquire true knowledge was to comprehend the true form of things as they would be when divested of all matter. This was an intellectual process. It was the counterpart of arriving at true knowledge of Plato's ideas by contemplation. For Aristotle, however, sense impressions were aids in that they enabled one to gather bits of information about the true form of things. True form was never completely and perfectly embodied in matter. Matter was only potentially capable of acquiring this form. Pure form, the knowledge of the good, carried with it an intrinsic value and the recommendation that it was changeless and eternal. The most valuable kind of activity was that which was concerned with pure form and this was viewed as an intellectual process exclusively. When these ideas became coupled with Christian theology, mind was easily associated with the immortal part of man and awarded a value status near the pinnacle.

The view of human nature of both Plato and Aristotle emphasized the dualism of soul and body, or in Aristotle's terms form and matter.⁷ Aristotle, however, gave a more favorable place to the senses than did Plato in the process of getting knowledge. But the hierarchy of intellectual virtues which he posited placed theoretical or speculative reason at the top of the scale with the practical occupying a lower position.⁸

The amalgamation of Platonic idealism and dualism with Christian theology furthered the disparaging outlook upon body and matter, upon sense experience and concern with the affairs of the physical world, upon action and doing. This development made considerable progress in the second to the sixth century A. D. but was not universally accepted during the medieval period.⁹ Christian doctrines were in a state of flux and were frequently challenged. But in general the emphasis upon the

7 R. Freeman Butts, *A Cultural History of Western Education* (New York: McGraw-Hill Book Company, 1955), p. 48.

8 *Ibid.*, pp. 48-49.

9 *Ibid.*, p. 97.

spiritual aspects of life and a concentration of attention on otherworldly interests was dominant.¹⁰

The slow process of making Christian theology and Greek classical thought compatible culminated in the form of the great synthesis of Scholasticism of the thirteenth century.¹¹ The intellectual history of this slow development is an intriguing study. For the present purpose it is only to be noted that the Scholastics followed

... in the tradition of Aristotle in elevating the virtues of the theoretical intellect and theoretical knowledge above the claims of practical intellect and the knowledge to be obtained from experience. This distinction has been a characteristic of the traditional intellectual outlook from the Middle Ages to the present time and provides the hard core around which much educational and philosophic controversy has revolved.¹²

The growing secular forces of the Renaissance period were a mitigating influence upon Scholasticism. The development of science and humanism tended to move the emphasis in education away from the religious orientation of the Scholastics. In this trend the influence of Humanism was dominant. As it became more and more formalized, protesting voices were raised in the interests of more realistic studies.¹³

This background suggests in part the source of the antipathy with which nineteenth century education viewed a functional education and the reluctance to accept values in education that were utilitarian and instrumental.

Under these terms any value rating would place intellectual activity higher than sensing, abstract conception of things higher than direct involvement with physical objects and the everyday affairs of living, thinking above doing, and the thinker better than the doer.

The fact of this dualism, taken by itself, is not nearly as significant as the relative importance which became associated with each. Given the dualism it was a logical step to divide the functions of the human organism into those of the soul or mind and those of the body. It is this division and the values assigned

10 *Ibid.*, pp. 138-139.

11 *Ibid.*, p. 139.

12 *Ibid.*, p. 145.

13 *Ibid.*, pp. 183-191.

to each that is important here. The idea that intellectual activity and bodily activity were to be performed separately by different classes of people has part of its origins in this division and has closely associated with it the belief that the operations of the mind are superior and of more worth than those of the body.

This separation as a part of a social philosophy is commonly and easily assigned an origin in Classical Greek thought and social organization. However, Curti designates an older body of Oriental thought as an indirect ancestor of the idea. He states that it was "especially marked in the class-structured Oriental societies where king and priest represented knowledge and power, and where ordinary people did what their betters deemed proper."¹⁴ Under the premises of Platonic idealism the function of doing was assigned a status inferior to that of knowing. Plato's *Republic* promulgated this division of knowing from doing.¹⁵

The part that social organization played in fixing this attitude is so concisely stated by Dewey that a full paragraph from *The Quest for Certainty* is here quoted:

The depreciation of action, of doing and making, has been cultivated by philosophers. But while philosophers have perpetuated the derogation by formulating and justifying it, they did not originate it. They glorified their own office without doubt in placing theory so much above practice. But independently of their attitude, many things conspired to the same effect. Work has been onerous, toilsome, associated with a primeval curse. It has been done under compulsion and the pressure of necessity, while intellectual activity is associated with leisure. On account of the unpleasantness of practical activity, as much of it as possible has been put upon slaves and serfs. Thus the social dishonor in which this class was held was extended to the work they do. There is also the age-long association of knowing and thinking with immaterial and spiritual principles, and of the arts, of all practical activity in doing and making, with matter. For work is done with the body, by means of mechanical appliances and is directed upon material things. The disrepute which has attended the thought of material things in comparison with immaterial thought has been transferred to everything associated with practice.¹⁶

¹⁴ Merle Curti, *American Paradox: the Conflict of Thought and Action* (New Brunswick, New Jersey: Rutgers University Press, 1956), p. 5.

¹⁵ *Ibid.*, pp. 5-6.

¹⁶ John Dewey, *The Quest for Certainty: A study of the Relation of Knowledge and Action* (New York: Minton, Balch and Company, 1929), pp. 4-5.

Few would contest the opinion of Wahlquist and others that idealism is the basic American tradition.¹⁷ The major professional philosophical positions of the whole of American history up to the twentieth century may be placed under the general heading of idealism. The reactionary transcendentalism of the first half of the nineteenth century was the American expression of European idealism as represented by such men as Kant, Fichte, and Schelling.¹⁸

But it is the idealism of the period after the Civil War that is of primary interest for this discussion. Of this general period Butts and Cremin state:

It is probably not too much to say that idealism became the most influential academic point of view taught by professional philosophers in the colleges and universities of America in the latter part of the nineteenth and early twentieth centuries.¹⁹

This is relevant when we consider that secondary education was primarily concerned with preparation for higher education and as a result its general pattern was determined by the entrance requirements of the colleges.

While the formal philosophical position of idealism did not express itself directly in educational terms, it nevertheless influenced the arguments and the pronouncements of those opposed to the advent of manual training into secondary education.²⁰

The salient characteristic of nineteenth century secondary education that was inimical to the introduction of physical activity into its programs of study was the requirement that formal school education be an exclusively intellectual activity. One of the most active critics of the new manual training movement, Superintendent A. P. Marble of the Boston schools, flatly stated as much in a prepared paper in 1885. After accepting that education in a wide sense included development of the physical, the intellectual, and the moral aspects of man he

¹⁷ John T. Wahlquist, *The Philosophy of American Education* (New York: The Ronald Press Company, 1942), p. 51.

¹⁸ *Ibid.*, pp. 33-34.

¹⁹ R. Freeman Butts and Lawrence A. Cremin, *A History of Education in American Culture* (New York: Henry Holt & Co., 1953), pp. 328-29.

²⁰ *Ibid.*, pp. 328-331.

stated, "The public school is primarily a place for intellectual training and incidentally for moral and physical training."²¹ In a later speech he remarked that "there is no information stored up in the plow, hoe handle, steam engine, but there is information stored up in books."²²

Other opposition arguments were many and varied, but most of them found their logical basis in the same undergirding philosophical position that had supported secondary and higher education since colonial days and before that in Europe.

Transcendentalism played a significant role in establishing an intellectual climate favorable to the entrance of physical activity into the educational domain. The ideas of the Enlightenment, which appeared to be rising toward dominance following the Revolutionary period, has been considerably reduced in influence by the reassertion of religious revivalism and protestant evangelism. In point of time, first Unitarianism and then transcendentalism stood as curbs to traditional supernatural religious ideas that would have threatened the development of cooperation in founding public schools. Large numbers of the intellectual leaders of the first half of the nineteenth century were sympathetic to the views of human nature held by transcendentalists. These views did allow room for sense realism in education without insisting upon the extreme mechanistic conception contained in some of the Enlightenment ideas.²³

Thus transcendentalism accepted physical activity and sense impressions in the learning process and can be counted as a favorable antecedent to the introduction of manual training into the curriculum. It allowed room for a faculty psychology to develop which was broad enough to make provision for the development of spiritual, mental, and physical faculties.

But this does not tell the whole story. It says nothing about the relative worth attached to the mental and spiritual as compared with the physical. Transcendentalism was viewed as a kind of compromise between sectarian religious thought and Enlightenment influence; a compromise that allowed bodily in-

²¹ *Report of the Commissioner of Education for the Year 1893-1894*, Vol. I (Washington: Government Printing Office, 1896), p. 918.

²² *Ibid.*, p. 887.

²³ Butts and Cremin, *op. cit.*, p. 165.

volvement in education in the inferior status of a means to the higher end of intellectual development.

With reference to transcendentalism, and in large measure true of the idealism of the last half of the nineteenth century, David Major gives a concise description. He recounts the long tradition supporting the secondary and dependent relationship of the temporal world to the real world and the consequent inferior quality of the former.

In the Christian religion the world of time and space is contrasted with the eternal, heavenly world beyond the skies. Again, Plato's conception of a world of Ideas of which the things in this world are, in some measure, copies, is an expression of this dualistic view of the world; and the contrast between the mystic contemplation of the realm of eternal truths and the mere glimpses of ultimate truth which mortal eyes occasionally obtain is also a reflection of this widespread belief in the existence of two worlds. The same contrast is implied in Kant's distinction between the "noumenal" world, the world of things-in-themselves, and the phenomenal world, what we call our world; again in Hegel's distinction between Being, the truly real, and "existence," the world of appearance.²⁴

The most vocal and penetrating critic of Manual Training in the period following 1880 was William T. Harris. He was a thorough-going Hegelian idealist. Perhaps his most fundamental arguments are developed in a paper read before the Department of Superintendence of the National Education Association in 1889.²⁵

Discussing the psychology of manual training the paper exemplified the educational premise of idealism. It attacked the justifying argument which manual training counted upon most heavily that education should be the "full and harmonious development of all faculties." It was attacked by Harris on the basis that manual training made no discrimination among the faculties, that faculties were not "coordinate," and that "any sort of bodily training is subordinate to the end for which it is used."²⁶ The placing of soul and body on the same plane was

²⁴ Major, *op. cit.*, pp. 409-410.

²⁵ William T. Harris, "The Psychology of Manual Training," as published in Isaac Edwards Clarke, *Art and Industry: Education in the Industrial and Fine Arts*, Part II (Washington: U.S. Bureau of Education, 1892), pp. 905-916.

²⁶ *Ibid.*, p. 907.

"the fundamental error of such an educational psychology."²⁷ Thus Harris did not accept the broadened base of faculty psychology which would include overt physical action.

A second argument of Harris was directed at the involvement of senses in the learning process. "We do not get at the true reality by sense-perception, but by thought."²⁸ Through a dialectical process, man, by taking thought, approaches the underlying reality which causes all these sense data. Manual training was indicted for being concerned exclusively with the elements of sense-perception in the world of material things.

These indictments may have been true of manual training practice. But it is most important to note that the general tenor of the educational philosophy of that period could not conceive of physical activity in any other sense than as a separate and completely isolated area of human behavior. It existed and had to be taken into account, but at the level of secondary general education, provision for it was of an extremely inferior quality.

²⁷ *Ibid.*, p. 907.

²⁸ *Ibid.*, p. 910.

CHAPTER FIVE

The Public Mind and Liberal Secondary Education

Thus far some of the forces opposing the uniting of thought and action in education have been discussed as they were represented in the expressions of professional educators and in the history of ideas.

But the nature of education in a free society is not determined solely by the thinking of professional educators or of men of ideas in other fields. To promote the fortunes of industrial arts education in the years ahead, the evaluative opinion of the public must also be considered. In contrast to the "widespread assumption that the institutions of a people flow directly and inevitably from the thoughts of its theorists," Counts adds:

Certainly in the case of education in the United States such a simple view of causation can find little support. Again and again the evolution of American educational institutions has proceeded with but little regard for the pronouncements of leading educators.¹

This seems consistent with a statement of Butts and Cremin that "people act as they do, at least in part, as a result of the inherited values and ideals that live on in them as traditions."² To this Counts adds, "To an unusual degree the development of education in America has been shaped by the desires and aspirations of ordinary men and women."³

¹ George S. Counts, *The American Road to Culture* (New York: The John Day Company, 1930), p. 4.

² R. Freeman Butts and Lawrence A. Cremin, *A History of Education in American Culture* (New York: Henry Holt and Company, 1953), p. vii.

³ Counts, *op. cit.*, p. 6.

An extended statement of Tugwell and Keyserling continues this thought:

Principles do not cause affairs to happen thus and so, of course, any more than the law of gravity causes heavy objects to fall to the ground. They serve merely as a thread of reference, a sort of index number of behavior. But there is this to be said of them, besides; they get themselves into people's heads. When they do, their operation in social affairs contrasts somewhat with physical laws. Inside people's heads they can become operative, casual. Even if principles only seem to become actively operative in this sense at the critical juncture of social development, they may be operative in a more negative sense quite continuously. They may prevent, even if they do not initiate, change. When they have prevented developments which otherwise might logically have been expected to appear, having regard to the technological scene, one is justified in examining a certain range of history to discover the origin and the depth of their root-⁴edness.

Thus in seeking an answer to the question as to why American secondary education was so tardy in making room in its general education for a direct study of the industrial aspects of its culture, this discussion next reviews some of the most relevant factors that entered into the formation and development of those "desires and aspirations," those "values and ideals," of the American people. For contained within the reasons for the belated entry may be the cue to forces which shaped (or mis-shaped) subsequent development of industrial arts education.

It has previously been indicated that Americans have always been characterized as a practical people. At the outset of their experiences on this continent this was a requirement for survival. The need for vigorous and practical activity on the part of the colonist and the frontiersman is well known.

Thus the paradox exists that the practical needs of colonial living and the independence and ingenuity of these hardy people were so belated in issuing forth and finding expression in their secondary education. It would have been quite logical for the school to respond to the obvious needs of the period. Yet this was not the case. As developed previously, secondary education as liberal education persisted in the traditional vein,

⁴ Rexford G. Tugwell and Leon H. Keyserling, *Redirecting Education* (Vol. I, *The United States*; New York: Columbia University Press, 1934), p. 29.

refusing to allow the admission of overt bodily activity in connection with the learning process.

A partial explanation can easily be found in the simplicity of colonial life. People lived close to nature and skilled occupations were few in number. Farmers and a few tradesmen accounted for most of the population.⁵ There was no industry as we know it today with its ubiquitous influences. Familiarity with the world of work was common to all because of the intimate part which the entire family played in it.

An addition to the explanation of the apparent enigma of practical people continuing to value education with traditional liberal arts characteristics is contained in Kallen's statement:

Insofar as the industrial arts enable more and more people to live above the level of subsistence, they render striving to be as good as one's betters a practicable thing. And since the betters are customarily distinguished as beneficiaries of "liberal education," it is this liberal education that people emulatively acknowledge as the most desirable.⁶

Class consciousness, perhaps, prompted some of the people to avoid overt bodily activity in education as menial and uncharacteristic of success. Butts and Cremin recount an occurrence in 1830 when Robert Owen proposed a vocational curriculum of trade training for the children of workingmen. It was opposed by the workingmen. In explanation these two writers state:

In the spirit of the middle classes they wanted for their youngsters what the youngsters of the upper classes had received for decades — a classical education. They were not quite sure of just what advantages would accrue from such an education, but they steadfastly believed that it would help their children along the road to success.⁷

A further contribution to an explanation for the paradox resides in the fact that the most highly trained member of the early communities was the clergyman.⁸ He exercised almost

⁵ William A. Smith, *Secondary Education in the United States* (New York: The Macmillan Company, 1932), p. 2.

⁶ Horace M. Kallen, *The Education of Free Men* (New York: Farrar, Straus and Company, 1949), p. 292.

⁷ Butts and Cremin, *op. cit.*, p. 269.

⁸ *Ibid.*, p. 2.

exclusive control of the educational policy.⁹ Learning to read and write was the chief part of the educational diet. The protestant leaders of Europe had marked these as the essentials of education by insisting that each individual learn to read and interpret the Scriptures for himself.¹⁰ For everyday practical living there was neither time nor did there seem to be need for education beyond the essentials required by the clergy.

The academic education of a more advanced nature which they had inherited from Europe seemed to have little relevance except for the few. Counts uses these words:

The theory that the school should be made to serve the community and that the program of instruction should be related to ordinary life activities was . . . entirely foreign to their mode of thought.¹¹

But the public mind was changing in its attitude toward education. It began to respond to the influence of the eighteenth century French Enlightenment thinkers with such ideas that men were born equal, that the individual contained within himself the possibilities for success, that environment somehow determined what he was to become. All of these ideas became rooted in the public mind during the first half of the nineteenth century.¹²

That the beginning of the structure of public education took place during this same period is not coincidence. The two, faith in the potential of man and the development of an educational environment to realize that potential, seemed destined to evolve together. They were compatible. For the common man to believe in the potential of education to eradicate inequalities was a logical development. Education whose form and purpose could be controlled seemed the ready-made formula to produce successful men.

It is not strange that the people attached a strong faith to education and its formal organization, the school.¹³ However right or wrong, this faith grew stronger throughout most of

⁹ Counts, *op. cit.*, p. 156.

¹⁰ Smith, *op. cit.*, p. 3.

¹¹ Counts, *op. cit.*, p. 157.

¹² *Ibid.*, p. 15.

¹³ *Ibid.*, pp. 16-17.

the nineteenth century. The everlasting hope of the poor and the less successful was attached to the school as the agent of education.

But success was measured in material terms. Money, material possessions, seemed the key to rising above the station into which one was born. Thus many Americans began a demand for an education that would contribute directly to this objective. Here we find a force exerted in the direction of *preparing* for action. But it is a fact of educational history that the resulting education did not allow action as a necessary part of the learning process.

It was noted earlier that the responsibility for the pattern of education in early New England was left to the clergy. For the mass of the people their main source of ideas and instruction was the clergy plus the consequent thinking and discussion that centered on the practice of Christianity as their religion. Clergymen were the "great shapers of public opinion in all matters, including education."¹⁴

One of the assumptions underlying this formal and informal education was the duality of human nature. Butts is referring to the mass of the people when he states:

They assumed and were constantly reminded by their preachers that human nature is . . . divided into material and spiritual elements, the body partaking of nature and the soul linking man's spirit to the highest spirit of all.¹⁵

The lengthy evolutionary process of this dualism had been discussed previously. The colonial people were thoroughly imbued with the concept. It was woven into the very fabric of Christianity and became an accepted fact for each generation as it grew and developed.

The separateness and unworthiness of the body and bodily functioning as opposed to the eternal and spiritual nature of the soul (or mind) is to be noted as well as the simple dualism itself. It is this evaluation of the two parts of the dualism which has persisted in conditioning the popular American mind in its judgments about American education.

¹⁴ R. Freeman Butts, *A Cultural History of Western Education* (New York: McGraw-Hill Book Company, 1955), p. 245.

¹⁵ *Ibid.*, p. 255.

In considering the influence of the popular mind upon the development of the schools, the assertion is here made that the people did not discount the value of nor neglect vocational training which required the development of skills and the education of the body. But thorough indoctrination in the elements of Calvinistic theology made it unthinkable that such bodily activity should be included in a formal education that was designed to operate on the mind in such a fashion as to compensate for the baseness of the body.

Meanwhile, adventuresome and reflective minds were responding to the influences from abroad in the form of the more liberal ideas of the Enlightenment. Naturalism and deism with a consequent emphasis upon science was being accepted, adapted, and assimilated in the intellectual world. During the seventeenth century its effect had not been noteworthy. Following the colonial period it rapidly increased in its influence of American thought among intellectuals.¹⁶

For a time during the first two or three decades following the revolutionary period it looked as though the secular ideas of the Enlightenment might become a dominant intellectual pattern of American thought.¹⁷

But there were countermovements of thought. Unitarianism, attempting to reconcile Christian theism with the optimism and the liberal social ideals of the Enlightenment, was replaced by the more reactionary transcendentalism during the middle decades of the nineteenth century.

The Great Awakening of the mid-eighteenth century, initiated by Jonathan Edwards in Connecticut¹⁸ reasserted much of the harshness of Calvinistic doctrine. The revival of 1800 was another intensified upsurge of an evangelical protestantism that had been continuously shaping the mind and thought of the American people. Gabriel states that at mid-nineteenth century the hold of Christianity upon the people had not been shaken.¹⁹

16 Butts and Cremin, *op. cit.*, p. 50.

17 *Ibid.*, p. 165.

18 Ralph Henry Gabriel, *The Course of American Democratic Thought* (New York: The Ronald Press Company, 1940), p. 32.

19 *Ibid.*, p. 27.

For the purposes of this paper it is asserted that the net result was a reduction in the disciplinary and harsh aspects of Calvinism, but little reduction in the emphasis upon the dualistic view of human nature. In spite of the changes in thought and ideas among intellectuals, the average American persisted in his ideas of soul and body in the orthodox tradition. When he was called upon to make judgments and choices that involved a consideration of human nature, this was the concept to which he made reference. It seems plausible, therefore, that when he thought about education he counted all kinds of learning valuable and to be sought after; but "true education" meant the development of the mind in the approved humanistic vein.

The point to be noted here is that the religious view, the Christian conception, of human nature continued to be a factor in determining in the public mind what the nature of the schools should be.

The exclusion of bodily activity from among learning activities, whether for vocational or for cultural purposes, is usually accounted for by placing the responsibility upon traditional Humanism with its almost exclusive emphasis upon the study of literature and languages. Prior to 1800, at any rate, with the support of religion and the clergy behind it, the Humanistic tradition can accurately be said to have overridden the voices that, discerning an economic need, spoke up for including vocational education in the schools.²⁰ But this opposition was also voicing the acquiescence of the mass of the people. They could accept the utilitarian characteristics of vocational education so long as it was segregated from "real" education. Not that the people had independently arrived at the conclusion that liberal education should logically remain as it was. The impression is left from reading the intellectual and social histories that they had been convinced that the education presented to them was right.

During the nineteenth century there were voices clamoring for an education that was more practical. Economic interests as well as the faith in education for improving each individual's lot were active motives. But it is crucial to note (as previously discussed in connection with the development of secondary edu-

²⁰ Butts, *op. cit.*, p. 260.

cation in the United States) that more practical, functional subject matter was introduced without any concession made to the inclusion of bodily activity.

It is pertinent to recall a portion of a quotation cited previously from Tugwell that when a principle gets into the heads of the people it may prevent if not initiate change. The principle of the duality of mind and body had gotten into the heads of the American people. The least educated of the people understood it, at least in its simplest statement. It is quite probable that most were able to verbally express it in some form.

Describing the intellectual climate around the midpoint of the nineteenth century and with reference to the duality of mind and body, to the body as the seat of base impulses or original sin, to the mind as made up of faculties which could be trained to negate the baser influences of the body — with reference to these ideas Curti was able to write, "These ideas had so long been dominant in the thinking of leading Americans that they were commonplace even among the masses."²¹

Butts furnishes a reinforcing summary statement:

Throughout the nineteenth century the traditional beliefs in supernatural religion continued to be influential among the masses of people as well as among religious leaders. Christian theism remained the most common conception of the world and of the relation of man to nature. The world of spirit was sharply defined in contrast to the world of matter. God created the world, as described in the Bible. Man consists of a soul and a body, the two elements in him being set off by an impassable gulf from the rest of nature by virtue of the spiritual qualities given to man by God.²²

All the intricacies of philosophical thinking and argument overshot the understanding of most of the people. But the central idea was thoroughly implanted so that to enlist the support of the public it was only necessary to appeal to the simple idea that man was in essence spiritual, and so should be his education.

It would be difficult to demonstrate that any public suppressive force more powerful existed than an unexpressed acquiescence with the more vocal intellectuals. Had any radical

²¹ Merle Curti, *Probing Our Past* (New York: Harper and Brothers, 1955), p. 155.

²² Butts, *op. cit.*, pp. 473-74.

change been proposed that violated deep-seated convictions, an immediate protest would have arisen. This proved to be the case in the 1880's in connection with the advent of manual training.

The views of the public about the duality of human nature invite speculation as to its subsequent influence upon the fortunes of industrial arts education in the twentieth century.

A New Basis in Psychology

Thus far an attempt has been made to show that the introduction of overt physical activity into education and the claims made for it as liberal was an iconoclastic event. Some of the sources of opposition feeling have already been pointed out as well as some of the supporting argument of Calvin Woodward.

The manual training movement in secondary education had two opposing forces with which it had to come to terms. One was the traditional idea of education which, as already pointed out, resisted the inclusion of bodily activity and that which was utilitarian. The other was the voice of business and industry and, to some extent, the dissatisfaction of parents who were seeking a more functional kind of education. Recalling the discussion of the preceding chapter the assumption is here made that the people were convinced that the welfare of the economy and of society demanded a program of vocational industrial education but that deep-seated ideas about education as spiritual stood as a barrier to their uninhibited support of tool activity in liberal education.

Woodward's solution to the dilemma developed slowly in the course of the verbal battle that was waged following 1880. The arguments and the complete defense were finally formed in terms of an industrial education which was liberal but liberal in a new sense, the sense that the body was to be disciplined as well as the mind so that transfer could take place to any problems, technical, mechanical, or intellectual. To do this the bodily counterpart of mental faculties had to be posited.

It is important to note that the argument depended upon the concept of transference. Schooling was to develop the faculties that would enable competency in any activity. The traditional stigma attached to education for specialized ends could be avoided.

The proponents of manual training did not feel it necessary to dissolve the dichotomy of liberal education and vocational education. Most of them were content to accept a subordinate position for the new addition to secondary education. They felt compelled to work within the limits and requirements of the existing conception of education. Referring to the manual training school in Philadelphia, Superintendent MacAlister in 1889 insisted:

It is in no sense a trade school; but, recognizing the actual needs of society, it seeks to develop and train every power and faculty of a human being in such harmonious relations as shall produce a broader culture, and, at the same time, a more practical ability to meet the demands which the world makes upon the great majority of men and women.¹

This is representative of numerous statements in the literature of the period. Tax supported trade schools had not yet been accepted by the American taxpayer, and yet the pressures upon education for some kind of preparation to fill the gap left by the decay of the apprenticeship system and to meet the need of developing industry were exceedingly heavy. Industrial education historian Anderson notes that manual training leaders carefully pointed to the valuable though incomplete preparation which the new studies provided for any form of skilled handwork.²

These arguments were not entirely arguments of expediency. To be sure the first manual training schools depended upon business and industry for buildings and other financial support. They needed the support of other educators and of the public if they were to attract enrollments that would allow them to flourish. Woodward, at least, was sincerely convinced that

¹ Isaac Edwards Clarke, *Art and Industry. Education in the Industrial and Fine Arts*, Part II. (Bureau of Education, United States Department of the Interior. Washington: Government Printing Office, 1892), p. LXXXII.

² Lewis Flint Anderson, *History of Manual and Industrial School Education* (New York: D. Appleton and Company, 1926), p. 165.

manual training was the logical and valid expansion of psychological and educational theory necessary to meet the needs of American society.

A reading of Woodward's speeches and arguments, statements from which have been previously presented in this essay, convinces one that he was attempting to give expression in educational terms of forces and ideas, long in the process of development, that had, as yet, been unable to throw off the suppressive weight of older ideas and make themselves evident. He saw the economic need of a fast developing industry and business for trained workers. It is plausible that he was aware of democratic urges for more equality of opportunity. Perhaps he had visions of opportunities for esthetic experience even in the everyday affairs of living. All of these and more seem to have been straining for expression in Woodward's discussions of manual training. Whatever were his motivations and inner thoughts, the historical fact remains that he confined his basic theory to an expanded faculty psychology and the philosophy that traditionally supported it.

While training of the body was argued as necessary for the complete development of all the faculties, it nevertheless was relegated to a subordinate position as a means of achieving the higher end of complete mental development. This is apparent in a statement made by Nicholas Murray Butler in 1888. Bennett concluded that the Butler statement was the final mediatory pronouncement in the long verbal struggle over manual training.³ The Butler statement also serves as an authoritative and exemplary summary of the general psychological position of most educators of that day.

It has been incontestably established that the powers of thought, expression by delineation and construction, the judgment and the executive faculty, must be trained as well as the observation, the memory, and the power to learn . . . If shopwork is used as a means of manual training, it is because of its disciplinary value, not because of its utility. It is only a means, not an end. It will be discarded whenever anything better adapted to accomplish the end in view is discovered, just as an old geography is thrown away when a better one is made. . . . If the term manual training

³ Charles Alpheus Bennett, *History of Manual and Industrial Education 1870 to 1917* (Peoria, Illinois: Chas. A. Bennett Co., Inc., 1937), p. 360.

is used in antithesis to mental training, it is wrongly understood. Manual training, as I use the term, is mental training. It is mental training by means of manual training. It is included in the psychologically determined course of study because it reaches important mental faculties which no other studies reach.⁴

Similarly, a rather lengthy article, which appeared in *Popular Science* in 1898, exhibited deference to mental development even after a rather promising preface spoke out for the unity of human nature. The author rejected the philosophical dualism of mind and matter as the most unhappy of partners. He declared, "I conceive this unity of man to be the very basis of the new education. It is certainly the foundation of all that we do in manual training."⁵ The philosophy of manual training was plainly monistic, he continued. Mind and body acted together, for a mental act preceded every bodily act, and there was a mental reaction to every bodily sensation. Manual training arranged a series of bodily acts for the sake of the mental reactions that followed these acts, and "the real purpose and essence of the training are mental."⁶

While such statements were favorable to manual training, the absence of organic wholeness is to be noted. Thought and action were both allowed room to operate but one was still subordinate. The gap between the two was closing but not closed.

Manual training was assured, for a time at least, of a position in the education of secondary youth by these and other statements of its contributions to mental development. But the foothold gained for involvement of bodily activity in the learning process would have indeed been very precarious if the economic motivations had not existed. It seems plausible to state that psychological justification was necessary for entrance of bodily activity into the sanctum of liberal education; however, economic justification insured for it a secure position until the time when the psychological basis would be better established. In Richards' estimate, written in 1906, its support by schoolmen rested almost entirely on arguments drawn from

⁴ Clarke, *op. cit.*, pp. 445-46.

⁵ C. Handford Henderson, "The Philosophy of Manual Training," *Popular Science Monthly*. 53:154, July, 1898.

⁶ *Ibid.*, p. 157.

psychology, but public support resulted from "a serious, though vague, belief in its industrial values."⁷

But for some time ideas had been developing that threatened this psychological justification. In time these new ideas resulted in an even stronger psychological basis upon which industrial arts education as liberal education at the secondary level could rest.

At least as early as the beginning of the twentieth century, the history of psychology had exhibited a trend increasingly favorable to the development of industrial arts education. The faculty psychology of the nineteenth century was also an adequate basis upon which liberalizing industrial education could operate. The social need existed and somehow room was made within the precincts of psychology to justify an education to meet the need. With the advent of a more scientific approach to human psychology and in particular to the psychology of learning, the psychological basis for industrial arts education has become more firmly established in fact. But large areas of the new science have been and are still subject to question. Thus any philosophical position in education is able to find substantiating psychological argument to support itself. Similarly, industrial arts education has found it less difficult, as the century has progressed and as psychological knowledge has advanced, to formulate for itself a tenable position. Subsequent discussion will indicate doubt that the area has taken advantage of this opportunity.

Considering that the basic objection to manual training was the inclusion of bodily activity in the liberalizing educational process, it is readily apparent that any psychological thinking or fact which developed the inter-relatedness of mind and body was favorable to industrial arts education. This has been the demonstrable trend in the history of psychology.

Hobbes, Berkeley, Hume, and Locke led the way in establishing association as the foundation of a modern psychology of experience. Not only did they formulate a naturalistic explanation of mind (as opposed to the classic concept), but the early associationists were the first "to view mind as a mental

⁷ Charles R. Richards, "Is Manual Training a Subject or a Method of Instruction?" *Educational Review*, 27:369, April, 1904.

activity, *as a process carried on through human experiences.*"⁸ (Italics in original)

Throughout the nineteenth century speculative psychology with introspection as its method continued, but more and more the facts from the sciences of physiology and physics become involved. Beginning as early as 1740 with Hartley, a pioneer in developing associationism, the reflex-arc concept had rather quickly developed.⁹ "The study of physiological psychology . . . had not gone very far before it began to appear that the interdependence of mind and body was much more extensive and intimate than had first been supposed."¹⁰ That the mind could act in complete independence from the body soon came to be regarded as an unfounded assumption. The conception and development of the reflex-arc concept, as well as other investigations, "gradually led men to doubt the validity of the theory that man's intellectual powers are independent of the mechanics of natural processes."¹¹

The conditioned-response psychology initiated by Pavlov was followed closely by the extensive investigations of Thorndike at the end of the nineteenth and the beginning of the twentieth centuries. In both, the reflex-arc concept, involving the central nervous system, played a key role.

Old explanations of human behavior has been offered in terms of "mind." The new psychologies accepted this only as a name for something that happened. They preferred an explanation in terms of the physical structures and functions of the body. In this the reflex-arc concept was crucial. Experimental verification was now possible, a necessity if psychology was to become an exact science. Mental behavior was now describable as a physical function.

Even before the turn of the century, the reflex-arc was recognized as the key concept in the associationist theory. But

⁸ Harold Rugg and William Withers, *Social Foundations of Education* (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1955), pp. 370-371.

⁹ Gardner Murphy, *Historical Introduction to Modern Psychology* (New York: Harcourt, Brace and Company, Inc., 1949), p. 33.

¹⁰ Boyd H. Bode, *Conflicting Psychologies of Learning* (Boston: D. C. Heath and Company, 1929), p. 112.

¹¹ I. N. Thut, *The Story of Education* (New York: McGraw-Hill Book Company, Inc., 1957), p. 269.

specific behaviors in response to specific stimulations promoted the concept of human behavior as machine-like. Many felt that no provision was made for purposive behavior, a seemingly observable characteristic of human behavior. Mechanical cause and effect explanations left out intention and purpose to steer behavior in the right direction. Formerly "mind" or "consciousness" had been accepted as the source of the function of guidance and purpose.

As early as 1890, Dewey and his functional psychologists had been concerned with "active response as one of their basic ideas."¹² They were not willing to accept the purposelessness of the reflex-arc explanation of how we behave. In 1896, sometime before the mechanistic position of early connectionists and of behaviorism became well known, Dewey published his criticism of the reflex-arc concept. In a general way he accepted it as a fundamental explanation of the process of learning. Agreeing with the general principle, he asserted that it had not gone far enough in displacing traditional psychological explanations. "The older dualism of body and soul finds a distinct echo in the current dualism of stimulus and response."¹³ The idea of a stimulus producing some kind of mystical reaction in the nervous system prior to energizing a motor nerve seemed to require the assumption, if not of a substantive mind, at least of a non-physical or spiritual ability capable of turning a stimulus into a percept and endowing it with intent so that it could issue forth as a purposive motor activity. Nor was the mechanistic explanation whereby each stimulus caused a response, any more satisfying. Dewey called the process "a patchwork of disjointed parts, a mechanical conjunction of unallied processes."¹⁴ He wished, rather, to view the reflex-arc as a "coordination." The distinction between stimulus and response did not represent plain facts of science. At one point in his analysis and criticism he declared:

It is a survival of the metaphysical dualism, first formulated by Plato, according to which sensation is an ambiguous dweller on the border land

¹² Rugg and Withers, *op. cit.*, p. 377.

¹³ John Dewey, "The Reflex Arc Concept in Psychology," *The Psychological Review*, 111 (July, 1896), p. 358.

¹⁴ *Ibid.*

of soul and body, the idea (or central process) is purely psychical, and the act (or movement) purely physical. Thus the reflex-arc formulation is neither physical (or physiological) nor psychological; it is a mixed materialistic-spiritualistic assumption.¹⁵

As a coordination the whole process of stimulus and response was to be considered as being initiated by the organism without benefit of external pressures to explain it. The stimulus itself was an act of the organism: it was actually a motor response to a prior or antecedent set. This implied that the organism was already active before any stimulus came into being. The organism was indeed active in seeking a sensation.

Neither mere sensation, nor mere movement, can ever be either stimulus or response; only an act can be that; the *sensation* as stimulus means the lack of and search for such an objective stimulus, or orderly placing of an act; just as mere movement as response means the lack of and search for the right act to complete a given coordination.¹⁶ (Italics in original)

A stimulus was not a passive affair for the organism. The acts of sensing were things that the organism did. "In such a coordination *the individual or organism undergoing the experience contributes to the nature and quality of the act as effectively as does the environment.*"¹⁷ (Italics in original)

The implication of Dewey's criticism of the reflex-arc were more extensive, of course, than indicated here. Of greatest significance for the discussion of thought and action in education was Dewey's emphasis upon the spontaneous and creative activity of the whole organism in a stimulus-response situation. The basic character of the points he established relative to purposive behavior crop out again and again in his subsequent writings.

Thus a passage from his *Logic* will bring the discussion back to the reflex-arc concept:

The particular sensory excitation occurs, but it is coordinated with a larger number of other organic processes — those of its digestive and circulatory organs and its neuro-muscular system, autonomic, proprioceptor and central. This coordination which is a state of the total or-

¹⁵ *Ibid.*, p. 365.

¹⁶ *Ibid.*, p. 367.

¹⁷ I. N. Thut, *op. cit.*, p. 330.

ganism, constitutes a *stimulus*. . . . The so-called stimulus, being the total state of the organism, moves of itself, because of the tensions contained, into those activities . . . which are called the response. The stimulus is simply the earlier part of the total coordinated serial behavior and the response the later part.¹⁸ (*Italics in original*)

The human organism begins life exhibiting this kind of organic behavior. But because the human infant is born into an environment that is already cultural, its behavior takes on additional qualities and it learns to act in ways that are described as intellectual. Mind is not to be viewed as some supernatural force or as an inborn entity.¹⁹ It is not something with which the infant enters the world "factory-equipped." It is rather to be described as a function, as an aspect of the human being's behavior. The origins of mind must be sought in the activities of man in controlling his environment. Mind is an ability achieved as a result of experience.²⁰

The development of the individual human being within an existing physical and cultural environment is a pattern of the origin of intellectual functions in the history of the human race. This naturalistic explanation is fully developed in *Logic: The Theory of Inquiry*.²¹ Mental functions are biological developments; they are part of a continuous process in which the organism contends with its environment. Reflective thinking as a mental function exists on a continuum with all organic behavior. It is a developed mode of organic behavior. Intellectual behavior arises when the organism's environment includes the society of others of like kind. Dewey accounts for "the transformation of purely organic behavior into behavior marked by intellectual properties" by a consideration of "the development of language (in its widest sense) out of prior biological activities."²²

"Widest sense" is exceedingly important for our discussion because language refers to more than oral and written speech:

¹⁸ John Dewey, *Logic: The Theory of Inquiry* (New York: Henry Holt and Company, 1938), pp. 29-30.

¹⁹ John Dewey, *Democracy and Education* (New York: The Macmillan Company, 1916), p. 153.

²⁰ *Ibid.*, pp. 39, 120, 370.

²¹ Dewey, *Logic, op. cit.*, pp. 23-59.

²² *Ibid.*, pp. 43-44.

It includes also not only gestures but rites, ceremonies, monuments and the products of industrial and fine arts. A tool or machine, for example, is not simply a simple or complex physical object having its own physical properties or effects, but is also a mode of language. For it *says* something, to those who understand it, about operations of use and their consequences. To the members of a primitive community a loom operated by steam or electricity says nothing. It is composed in a foreign language, and so with most of the mechanical devices of modern civilization. In the present cultural setting, these objects are so intimately bound up with interests, occupations and purposes that they have an eloquent voice.²³ (Italics in original)

Language, of course, is of greatest importance in gaining knowledge and thus in education. But when used as a means of communication it must take on meanings that are common to all participants. These common meanings are not arrived at simply by arbitrary agreement. Stated positively Dewey declares:

The convention or common consent which sets it apart as a means of recording and communicating meaning is that of agreement in *action*; of shared modes of responsive behavior and participation in their consequences. The physical sound or mark gets its meaning in and by conjoint community of functional use.²⁴ (Italics in original)

Geiger points out more succinctly the significance of the assertion that language developed out of prior biological activities. The pre-linguistic forms of sounds and gestures, whether of the infant or in the history of the development of the human species, were forms of organic behavior. These took on common meanings in the course of sharing experience. Observation of the consequences of these experimental activities eventually developed meanings that were attached to symbols—meanings that grew out of conjoint action and use.²⁵

Mind emerges when an organism becomes aware of the same meaning of a sign as it evokes in another organism. Then communication and language exist. Thus Dewey can write: "Mind as a concrete thing is precisely the power to understand

23 *Ibid.*, p. 46.

24 *Ibid.*

25 George R. Geiger, *John Dewey in Perspective* (New York: Oxford University Press, 1958), pp. 147-48.

things in terms of the use made of them."²⁶ Geiger summarizes Dewey's analysis:

Language begins to appear when, because of the evolutionary need for shared experience, gestures become significant and, as symbols, call out similar responses and indicate common objects. When this kind of activity appears we are in the presence of mind.²⁷

With reference to childhood development Dewey writes:

Things come to him clothed in language . . . and this garb of communication makes him a sharer in the beliefs of those about him. These beliefs coming to him as so many facts form his mind.²⁸

This brief discussion of Dewey's explanation of the origins of mental functions has seemed necessary to establish human development as a process in which the human organism has been extremely active. It is the basis of the philosophy of education which provides a favorable place in education for organic bodily activity including overt manipulation of the appliances of industry. This is in contrast to a philosophy which tends to separate intellectual activity from organic activity which has then been relegated to permanent position as means only. At the more sophisticated and complex levels of learning this unitive activity of the entire organism continues.

As soon as the elements of experience begin to take on meanings or significance, the process of knowledge-getting begins. This, of course, is the description of what happened in the discussion of the origins of language and of mental functions. It is also the description of the way knowledge is created as well as the way learning takes place. Without this process sensations are but background awareness of the immediate environment. They are not knowledge in Dewey's definition of knowledge.

The method of arriving at knowledge is the core of educational practice. It is the experimental method, commonly known in educational circles as problem-solving. The experimental

²⁶ Dewey, *Democracy and Education*, *op. cit.*, p. 39.

²⁷ Geiger, *op. cit.*, p. 150.

²⁸ John Dewey, *Reconstruction in Philosophy* (New York: The New American Library of World Literature, Inc., 1948), pp. 86-87.

method is the method of thought or inquiry and it is also the method whereby we learn.

Method is not some artificial, newly invented sequence of operations. When these are discussed, it is only to describe a process that goes on when men learn. Dewey states:

The existence of inquiries is not a matter of doubt. They enter into every area of life and into every aspect of every area. In everyday living, men examine; they turn things over intellectually; they infer and judge as "naturally" as they reap and sow, produce and exchange commodities.²⁹

In Geiger's interpretation: "Dewey urges that theory of knowledge be based on the way problems are really solved, especially through scientific method, rather than on dialectical ingenuity."³⁰

Organic behavior of even the most primitive type can be characterized as a state of need and imbalance, followed by expanded energy and efforts to restore balance, and finally the achievement of a recovery in fulfillment of the need.³¹

This furnished the general pattern of how men think. It "foreshadows" the more developed method of inquiry.³²

Certain things that happen in the process of getting knowledge by this method need to be elaborated upon so as to show that the two propositions of the original problem of this paper reach their fulfillment in Dewey's philosophy. Not only are thought and action inextricably bound up in educational practice and in industrial arts education practice, but there is no discriminatory evaluation made as to the worth of bodily activity and of industrial arts activities in particular. Under the premises of Dewey's educational thought the gap between thought and action is closed, if Dewey would allow that a gap exists. For to speak of a gap between two things emphasizes the separate identity of the two when in Dewey's reality thought and action are one.

The construction of a project by a student is such a common practice in industrial arts education that it can almost be described as a characteristic of the area and of its method. In

29 Dewey, *Logic, op. cit.*, p. 102.

30 Geiger, *op. cit.*, p. 69.

31 Dewey, *Logic, op. cit.*, p. 27.

32. *Ibid.*, pp. 23-24.

many school shops the project is exploited for the opportunities it provides to acquire skill and for motivating the study of related information. When used in enlightened practice it becomes the problem situation from which the broader learnings of the area result. As a problem situation demanding a solution, it requires reflective thought. For Dewey this is tautological because inquiry (problem solving) and reflective thinking are synonymous.³³

If we pursue the thought that "thinking is method, the method of intelligent experience,"³⁴ the synonymous relationship becomes clear. A beginning can be made by considering what Dewey means by experience.

Experience as a key term in Dewey philosophy is a name for all that goes on between an organism and its surroundings. "Experience itself primarily consists of the *active* relations subsisting between a human being and his natural and social surroundings."³⁵ (Italics in original) Not all "experiencing" is experience in Dewey's definition. Many things that happen to us, even many that involve energetic activity, do not meet his criteria of experience.³⁶ True experience is that activity from which we learn by making "a backward and forward connection between what we do to things and what we enjoy or suffer from things in consequence."³⁷ Numerous repetitions of this idea occur in his writings. In discussing experiences as experiment he writes:

The combination of what things *do* to us . . . in modifying our actions, furthering some of them and resisting and checking others, and what we can do to them in producing new changes constitutes experience.³⁸ (Italics in original)

Experience involves the learner and the environment. As such, experience is both active and passive.³⁹ The learner does

33 *Ibid.*, p. 21.

34 Dewey, *Democracy and Education*, *op. cit.*, p. 180.

35 *Ibid.*, pp. 319-320.

36 *Ibid.*, pp. 163-164.

37 *Ibid.*, p. 164.

38 *Ibid.*, p. 317

39 *Ibid.*, p. 163.

something to his environment and in turn the environment does something to the learner. Both are changed, each by the other. They interact. The learner is able to associate the consequences of his act with what he did, and thus he learns.

The general pattern of a learning experience can be illustrated by reference to the sound of a woodworking power saw. The noise it makes is, at the moment, normal. One is hardly aware of it. Existence flows smoothly. But now a new, and added, sound is given out. There is an interruption in the smooth flow of existence. Irritation begins, for the full meaning of the new sound is lacking. Investigation takes place. Possibilities that arise out of past experience with saws are considered. One of these suggests the cause to be a sliver of wood rubbing against the blade. Observation rejects this possibility. A loose nut on the arbor next presents itself as a possible cause. A wrench, a tightening of the nut, and the irritating noise disappears. The idea of "loose nut" proves to be the correct solution. Once again serenity with respect to the saw is restored. The entire process was one of action including reflective thought, culminating in knowledge.

The meanings that developed out of this experience were the solution to a problem. They played a part in the actual conduct of life. Dewey would limit the use of the word knowledge to the outcome of inquiry or problem solving.⁴⁰ Knowledge apart from inquiry has no meaning. To say that knowledge is the end of inquiry is a truism, for the very definition of knowledge is that which is the outcome of inquiry.⁴¹ Reflective thinking, the process of inquiry, plus testing of hypotheses is knowing. Proposed solutions are not blindly selected but are formulated on the basis of observation which employs data (itself the outcome of prior inquiry but re-examined for its appropriateness for the new situation) for use in intelligently predicting consequences. Any hypothesis that withstands this intellectual process and gives promise as the result of intelligent forethought is subjected to test. If it satisfies the original "intermediate"⁴² or unsettled situation, it becomes knowledge. "Becomes" is used

⁴⁰ *Ibid.*, p. 177.

⁴¹ Dewey, *Logic*, *op. cit.*, pp. 7-8.

⁴² *Ibid.*, p. 105.

advisedly in the sense that knowledge does not come ready-made but, from the learner's point of view, is constructed.⁴³

Two important characteristics of any learning experience must be pointed out. Enlarged meanings accrue with reference to the subject matter of the investigation. The enlarged meanings themselves become additional data for future inquiries. The learner approaches each succeeding inquiry with a greater fund of facts to draw upon in imaginatively devising ideas that show promise of solutions in each new inquiry. Thus, he is better able to control future experience. These ideas are repeated in Dewey's technical definition of education:

It is that reconstruction or reorganization of experience which adds to the meaning of experience, and which increases ability to direct the course of subsequent experience.⁴⁴

Activity is blind if pursued without any idea of consequences. The more meaning one is able to attach to an act, the better able he will be to utilize it in subsequent activity. In other words, the more inquiries one successfully completes, the more data one will have for use in additional inquiry and the more able he will be in making connections among things and directing his experience.⁴⁵ Dewey is most concerned with knowledge (as the outcome of inquiry) for its use in dealing with the future. Education becomes reconstruction or reorganization of experience, then, in the sense of new meaning being added to experience.⁴⁶ This increase in meaning and this establishment of more and more connections between present and past activity results in a greater ability to predict additional connections, to predict more reliably future consequences of proposed acts.⁴⁷ All of this simply says that one is better able to evaluate the worth of tentative solutions to problems because he has more basis for evaluation. Thus, continuing use of the method of thinking continuously reconstructs experience and continuously advances ability to direct future experience. This is the under-

⁴³ Dewey, *Democracy and Education*, *op. cit.*, p. 187.

⁴⁴ *Ibid.*, pp. 89-90.

⁴⁵ Dewey, *Logic*, *op. cit.*, p. 119.

⁴⁶ Dewey, *Democracy and Education*, *op. cit.*, p. 90.

⁴⁷ *Ibid.*, pp. 90-91.

lying meaning of education as progressive, of education as continuity of experience and growth.

This indicates that even the introductory phases of industrial arts education should embody the elements of problem solving in simple, concrete form. For even at this level opportunities must be exploited for collection of data, imaginative formulation of ideas, and for testing of hypotheses by application to the task that is underway. Through energy expended in response to a major problem and to a host of subproblems, meaning begins to be attached to the subject matter of industry. These meanings, these connections between what happens and what one did to cause it to happen, add up, one by one, to increase the fund of meanings for use in future problem situations.

CHAPTER SEVEN

Subsequent Development and Trends

By 1916, with the publication of *Democracy and Education*, a complete development of Dewey's educational theory was available to educators. His functional psychology was woven into a social philosophy in a form that furnished an extremely favorable theoretical basis for educational orientation into an industrial culture.

In terms of the initial proposition of this present paper, there was now established the key to the theoretical justification for the complete closure of the gap between mind and body, between thought and action, between knowing and doing in secondary general education. The traditional psychological barrier to the acceptance of industrial arts education as *liberalizing* general education had been removed.

The schools did change in response. A traditional psychology that had already adjusted itself to the concept of the reflex-arc subsumed to a view of mind as mental states, now found another barrier in the developing psychology of Dewey beginning with his criticism of the reflex-arc concept. Dewey's contributions made it less possible to view learning as a passive enterprise. It is well known that the greatest difference was noted at the elementary level. John Dewey's comment in 1901 has relevance here:

The manual-training movement has been greatly facilitated by its happy coincidence with the growing importance attached in psychological theory to the motor element. The old emphasis upon strictly intellectual elements, sensations and ideas, has given way to the recognition that a

motor factor is so closely bound up with the entire mental development that the latter cannot be intelligently discussed apart from the former.¹

For industrial arts education the twentieth century began bravely and well. Calvin Woodward had based much of his argument for manual training upon an idea expressed in the dictum, "put the whole boy to school." In the terms of reference he used, Woodward probably would have been more precise if he had declared that the rest of the boy should be put to school; part of him had, traditionally, always been there. From our modern vantage point, the ostensible spirit of manual training, as expressed by Woodward when he described its liberalizing qualities, is laudable even though the means of imparting these liberalizing qualities was invalid. The emphasis of Dewey's theory upon the unity of the human organism (as exemplified in the Chicago experiment) expressed the Woodward spirit but placed it upon a psychological foundation that was compatible if not in complete accord with new scientific psychology.

The influence of Dewey's experimental work at Chicago as well as the new scientific psychology is given due credit by Snedden and Warner for a change in point of view toward manual training.² Roughly within the framework thus provided, the Sloyd system of handwork (which replaced abstract manipulative exercises with dictated models of useable objects), and the Arts and Crafts influence (which was adapted to improve thought content by emphasizing the aesthetic qualities of construction work) became a part of the amalgamation under a new name, manual arts.

As manual arts, this improved form of manual training, in its very name, implied a departure from the formalism and the disciplinary objectives of manual training. However, it still took as predominant content the skills and technical information of its predecessor. To enlist pupil interest with useable projects in place of exercise pieces or to introduce external decoration and variations in contour of the objects constructed did not, of course, exhaust the possibilities of Dewey's intent.

¹ John Dewey, "The Place of Manual Training in the Elementary Course of Study," *Manual Training Magazine*, 2:194, July, 1901.

² David Snedden and William E. Warner, *Reconstruction of Industrial Arts Courses* (New York: Bureau of Publications, Teachers College, Columbia University, 1927), pp. 3-4.

To many early twentieth century leaders in education it was apparent that a further departure from the nineteenth century orientation was necessary for the continued vitality of this industrial area of study. The new psychology and the beginnings of the scientific study of education as well as the successful work of Dewey at Chicago furnished, in part at least, the background for the historic pronouncements of Richards, Russell, and Bonser. The criticisms and positive suggestions of these men, though originally concerned with elementary education, did play an influential part in the changes which manual arts underwent.

Among the men with national reputations in the field of manual training, one of the first to criticize manual training and its handwork for muscular control was Charles R. Richards. In numerous articles and speeches he reflected the influence of Dewey's Chicago experiments.³

In 1903, Richards pointed out that defects in the manual training area would begin to be remedied when teachers "recognize larger ends than mere skill in manipulation, and when they see their subject in broader relations both to industrial life, on the one side, and to child life, on the other." He reiterated the need for the introduction of "richer content and more thought material" into the work of manual training; more attention to breadth of information and insight.⁴

In 1904 he had arrived at a point in his thinking that prompted him to write an editorial suggesting and urging a change of name to "Industrial Arts." Most significant in this plea was his reference to content as "the elements of the industries fundamental to modern civilization" and developing "an insight into the basic industries of our times."⁵

In the same year, writing in *Educational Review*, Richards indicted the failure of industrial arts to realize the significance of the things made. The content of idea and thought was meager

³ Charles A. Bennett, *History of Manual and Industrial Education, 1870-1917* (Peoria, Illinois: Chas. A. Bennett Co. Inc., 1937), pp. 452-53.

⁴ C. R. Richards, "Some Practical Problems in Manual Training," *The Journal of Proceedings and Addresses of the National Education Association* (Washington, D. C.: National Education Association, 1903), pp. 278-85.

⁵ C. R. Richards, "A New Name," *Manual Training Magazine*, 6:33, October, 1904.

because these received too little consideration. A new approach would "conceive the activity as valueless unless it is conjoined to thought and feeling."⁶

A prophetic statement referring to industrial activity in the schools was written in 1907 by Richards:

Is it not a serious question whether work that means so much of difficulty and expense will long be tolerated by the tax payer unless it serves in itself to present a content rich in ideas — ideas that in themselves will make possible a better understanding of and a more effective participation in our social order?⁷

In 1910 Richards made an appraisal that recognized the advances made in the area of industrial study at the elementary level, but at the secondary level he felt that neither practice nor philosophy had changed much from that which characterized manual training.⁸

Russell's chief contribution was a devastating argument against traditional handwork as valuable in and of itself. He disclaimed any magical effect in hand and eye training. His positive proposals promoted the concept of an area in which industrial study and knowledge would better equip youth for living in that kind of an environment.⁹

It was left for Bonser to expand and further promote a proper concept of industrial arts education at the elementary level and later in the secondary school.¹⁰

After the turn of the century many other friends and critics of manual training were keenly aware of its deficiencies. Criticism of the lack of thought content was frequent in the historical literature.¹¹

6 C. R. Richards, "Is Manual Training a Subject or a Method of Instruction?" *Educational Review*, 27:369-70, April, 1904.

7 C. R. Richards, "The Relation of Manual Training to Industrial Education," *Manual Training Magazine*, 9:4, October, 1907.

8 C. R. Richards, "Some Notes on the History of Industrial Education in the United States," *The Journal of Proceedings and Addresses of the National Education Association*, 110, p. 678.

9 James E. Russell, "The School and Industrial Life," *Educational Review*, 38:433-50, December, 1909.

10 Frederick G. Bonser, *Industrial Arts for Public School Administrators* (New York: Bureau of Publications, Teachers College, Columbia University, 1930), pp. 42-91.

11. Bennett, *op. cit.*, p. 439; and Arthur W. Richards, "The Thought Side of Manual Training," *Manual Training Magazine*, 3:61-79, January, 1902.

Manual training, at its inception and throughout the period when it was most vigorous, insisted that tool skill and the attendant technical information was the subject matter most vital to attaining its objectives. The Dewey-Richards-Russell-Bonser emphasis criticized the predominance of manipulative activity as an end. It did not seek to reject overt activity. It would spend its efforts in utilizing the overt activity suggested by industry to attain meaning and insight into all aspects of industry including the fabrication of industrial products. Not that overt activity was to be relegated to a position of a psychological expedient; not that activity was to be only an aid to learning. Industrial arts education was unique in that overt action was to be a necessary part of its subject matter as well as a psychological aid to learning.

Historical perspective allows the generalization that the predominant criticisms of the early twentieth century were efforts to return from an over-reaction against an exclusively verbal education; a return to a middle ground just far enough to include the manipulative as well as the ideas and thought content of industry. These efforts constituted a major development in the slow process of combining thought and action in a field of study designed to orient developing youth to the industrial aspects of the culture. These efforts were only a promising beginning. They were not a culmination in the general practice of secondary education. They occurred in a period of intensive pressure to strengthen in the public schools vocational industrial education for a specific job.

In discussions of the historical antecedents of modern industrial arts the two different emphases have come to be identified as the Woodward-Runkle emphasis and the Dewey-Bonser emphasis.¹²

An analysis of these two movements shows that they had in common a denial that they were taught with vocational intent. Manual training's denial was based on the assertion that by teaching the elements of all the trades rather than for a specific trade it could not be classified as specifically vocational. But it was always implied and sometimes expressed that it

¹² R. Lee Hornbake, "Philosophical Viewpoints, "A Sourcebook of Readings in Education, Sixth Yearbook, American Council on Industrial Arts Teacher Education (Bloomington, Illinois: McKnight & McKnight Publishing Company, 1957), p. 49.

could make a direct and valuable contribution to any student who wished to pursue a specialized mechanical occupation. The Dewey-Bonser theory placed less emphasis upon tool skill and construction for their direct value in use. This theory sought justification in enlarging the industrial knowledge of the pupils through the use of manipulative activities that characterized this industry which was to be studied. The influence of Dewey is unmistakable.

Herein is contained a crucial point that must be further expanded. Manual training exhibited a predominance of overt action. Originally it had employed rather abstract exercises for practice in mastering tool skills that required coordination of "hand and eye." The interest of the student was later taken into account by having skill development take place in conjunction with a useable project. But the salient characteristic was the overt physical activity.

The Dewey-Bonser emphasis is somewhat more difficult to state succinctly. Overt manipulative activity was a critical factor, but the dominant emphasis was placed upon learning about industry. The thought and knowledge content received primary emphasis. It utilized overt activity in the process not only for reasons of learning psychology but because the tool activity was itself a key characteristic to be experienced.

Stated in this way the two emphases became the issue of argument among educators. Manual training had the weight of tradition to reinforce its position. In addition it embodied the hopes of all those who were interested in ways of fulfilling the need for more direct vocational education in the public school. In a period before the movement for direct vocational education had gotten underway, it remained the most promising avenue for expanding specialized trade training. For vocational purposes its inception and continued promotion at the secondary level added to its promising potential.

The Dewey school at Chicago had proved its point. But only at the elementary level. Russell and Bonser likewise were, in the beginning of their activities, concerned only with elementary education. This was a disadvantage to any effort to expand the concept to secondary education.

Once manual training based on faculty psychology had been discredited, it would seem that the logical development of in-

dustrial study for general education purposes would have taken place along the well-reasoned course that Dewey and Bonser indicated. However, several forces can be discerned which tended in other directions.

The inertia of tradition can never be rejected as a shaping force. This is true even though it is equally valid for Baker to discern that the tendency following 1900 to react against anything traditional led to the view that anything new and different was better and that much change was effected with regard to underlying theory.¹³ Even today this kind of "bandwagon" action can easily result in practice which is a perversion of a valid philosophy.

Another tendency oblique to fulfillment of Deweyan theory is contained in I. N. Thut's observation that the connectionist psychology of Thorndike and the behaviorist psychology with John Watson as its chief exponent exerted the greatest influence upon education in the first fifty years of the twentieth century.¹⁴ Rugg and Withers add that of these two Thorndike's connectionist trial-and-error view was most influential.¹⁵ The psychological basis of the old manual training had been rejected by most of those who wrote about it in the professional literature of the early twentieth century. Development of specific bodily and mental faculties by disciplinary methods was to be replaced by teaching specific skills and learnings derived by analysis of life's needs. In its new form and presumably on a modernized psychological foundation, manual training continued to exist as manual arts. Connectionist psychology fit very well an industrial study that sought to impart specific skills and technical information in a sequential order. Teaching method was modified so that Thorndike's learning laws were fully satisfied. It seems quite plausible that method may have been a factor influencing the selection and rejection of content. The magnitude of influence of connectionist psychology is hard to determine, but acceptance of only the bare scientific fact of con-

13 Melvin C. Baker, *Foundations of John Dewey's Educational Theory* (New York: King's Crown Press, Columbia University, 1955) p. 3.

14 I. N. Thut, *The Story of Education* (New York: McGraw-Hill Book Company, Inc., 1957) p. 330.

15 Harold Rugg and William Withers, *Social Foundations of Education* (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1955), p. 388.

nectionist psychology did violence to the wholeness of Deweyan theory.

Pressures for fully recognized vocational training in the public schools stand in history as another barrier to acceptance of Deweyan theory. Some reasons for rejection of Deweyan theory by vocational proponents will receive consideration later in this chapter. To account for his rejection by manual arts proponents we must recall some historical conditions partially responsible for manual arts involvement with vocational objectives.

In 1906 two events took place. In that year the Massachusetts Commission on Industrial and Technical Education (Douglas Commission) made its report.¹⁶ In that same year the National Society for the Promotion of Industrial Education was founded.¹⁷ That year marked the intensification of a campaign to introduce industrial education into the public secondary school. (It must be understood that in that day the term "industrial education" referred exclusively to education for vocational purposes.)

It is quite clear from a reading of the proceedings of the National Education Association that manual training, including manual arts, was one object of attack. The manual subjects insisted that they were general in the same terms that Woodward had argued: They were teaching the elements of the trade and thus preparing for more specific training in a specialized mechanical occupation. In the minds of many, the manual subjects seemed the one best hope for the training of the many craftsmen needed in industry. But the new industrial education found it necessary to seek the destruction of this concept. If it could be discredited, the need for direct and specific training for an occupation would be more apparent. A reference to A. B. Mays verifies and points out that in the period leading up to the passage of the Smith-Hughes Act in 1917 the values of manual arts for direct vocational purposes

¹⁶ Report of the *Massachusetts Commission on Industrial and Technical Education*, (New York: Columbia University, Teachers College Educational Reprints, No. 1, April, 1906).

¹⁷ National Society for the Promotion of Industrial Education, *Proceedings of the Organizational Meetings*, Bulletin No. 1, January, 1907.

were reasserted and more firmly embedded in the guiding theory of manual arts.¹⁸

The attack upon manual arts might well have resulted in its obliteration if the older curriculum area had persisted in its traditional position. As referred to above, revisions in its content and method prior to 1906 had been quite largely confined to improved design of the Arts and Crafts movement and to the acceptance of larger segments of the Sloyd influence. Hand processes in woodworking, metalworking, and drawing predominated. Its basic defect consisted in failure to take into account the phenomenal changes which had occurred and which were continuously taking place in the industrial world. The attacks of those men concerned with promoting the movement for vocational industrial education virtually forced change upon manual arts.¹⁹ The change amounted to a greater dependence upon the trades and industry as sources of content.

It is doubtful that the efforts of Richards and Russell and Bonser to inject more of the "elements of industry" into industrial study were motivated by the vocational industrial education movement. The statements of Russell and Bonser were made with reference to elementary education. Richard's original appeal came in 1903 although later he was extremely active in the Society for the Promotion of Industrial Education. It is a certainty that other Manual Arts leaders developed and advocated vigorously a theory of Manual Arts Education in which skill and technical learnings drawn directly from the trades and industry would serve the objective of both general and vocational industrial study.

Thus two pressing needs persisted in their demands for representation in the school program of study: (1) the economic need for trained trade and industrial workers; (2) the growing conviction of educators that the character of the culture more and more urgently required some form of industrial study for successful citizenship. Both sought a more realistic assessment of what industry actually was. Both demanded that industrial

18 A. B. Mays, *The Determining Factors in the Evolution of the Industrial Arts in America*, (Milwaukee: The Bruce Publishing Company, 1924), p. 28.

19 *Ibid.*, p. 30.

study involve its students with real industrial activity and learning. Arts, crafts, and the Sloyd influence did not make manual arts really representative of American industry. Neither was it providing the skilled workmen so urgently needed by the economy.

The two needs were not diametrically opposite nor were they entirely compatible. As industrial arts education slowly evolved from manual arts, the respective influence of the two demands is to be noted. The nature of these changes is reflected in a number of books published during and after the period of revaluation and reformulation of manual arts purposes — a period extending from 1906 to World War I. To compare the ideas there presented with majority opinion concerning industrial arts today will reveal how extremely influential these books were in determining the character of the curriculum area long after the original validity of the books applied.

One of the first of such influential books was *Manual Arts for Vocational Ends* written by Crawshaw in 1912.²⁰ Of this book Mays wrote that it exemplified and recorded the two chief points of change and justification. Industrial practices, and their related information content, were combined with a new emphasis upon social readjustment to constitute the two signal characteristics of the revitalized industrial area of study.²¹ Both before and after the publication of Crawshaw's volume, numerous periodical articles had articulated similar ideas.

The title of Crawshaw's book is indicative of the tactics he employed to preserve the allegiance of the old and to strengthen the position of existing areas of industrial instruction with respect to the new. The book criticized but did obeisance to the manual training tradition, but it was written in response to the growing pressures for vocational trade and industrial education in tax-supported secondary schools.

Thus Crawshaw may well be called the great compromiser. While many critics favored the complete destruction of manual training, Crawshaw sensed the value of industrial study for all

²⁰ Fred D. Crawshaw, *Manual Arts for Vocational Ends* (Peoria, Illinois: Chas. A. Bennett Co., Inc., 1912).

²¹ A. B. Mays, *The Growth and Trends of the Literature of Industrial Arts* (Bloomington, Illinois: McKnight & McKnight Publishing Company, 1934), pp. 10-11.

youth. He agreed with the vocational industrial education forces that manual training had become formal and had lost its possible vocational value. In his preface he very frankly makes the following statement:

Believing that the manual arts should and may have a very prominent place in that branch of vocational education known as industrial education, the author has urged upon his auditors in classroom and lecture room the need of a reorganization and an extension of the manual arts to meet the needs of the newer education.²²

The reorientated manual arts was to be vocational and at the same time "retain the educational value, mental, moral, and all the rest, which the manual training of the past has claimed."²³

In the light of the contention of this paper that Crawshaw's emphasis played an exceedingly significant and formative role as an antecedent of modern industrial arts education, it is interesting and important to note his resistance to and criticism of Dean James E. Russell's proposals of 1909.²⁴ Russell had proposed the division of public school instruction under three headings of the humanities, the sciences, and the industries. Crawshaw's fundamental opposition centered around the lack of attention given to development of skill. A clear idea of his position is concisely presented when he stated, "Whenever technique of skill is the goal of handwork it becomes a subject with a definite content of its own and may be given a strong vocational or industrial value."²⁵

Crawshaw repeatedly emphasized the necessity "to educate for the industries rather than to train for them," but in the same statement he reiterates the requirement "to emphasize skill, technique, and workmanship by the employment of industrial standards."²⁶

Few industrial arts proponents have or would reject either element of thought or action. A comparison of Crawshaw's

²² Crawshaw, *op. cit.*, p. 6.

²³ Crawshaw, *op. cit.*, p. 13.

²⁴ Russell, *loc. cit.*

²⁵ Fred D. Crawshaw, *The Teaching of Manual Arts*, High School Series, No. 11 (Madison: The University of Wisconsin, 1912), p. 95.

²⁶ Fred D. Crawshaw, *Manual Arts for Vocational Ends op. cit.*, p. 27.

theoretical discussion with the Dewey criterion leaves little room for criticism. Nevertheless, a novice, reading the latter portion of Crawshaw's book, would come away with the impression that one need only emphasize technique at the beginning levels and skill and workmanship at the higher levels to somehow adequately meet the requirements of Cranshaw's theoretical discussion.

In Crawshaw's period his book was a valuable contribution. It is here suggested that the Crawshaw emphasis plus the continuing potent influence of the vocational industrial education movement stereotyped and cast in the trade-approach mold the general character of industrial arts education. The similarity of his proposals to what is observable in many current industrial arts programs is so great as to be disconcerting.

The Smith-Hughes vocational act was passed by Congress in 1917. In that same year an extremely influential book was written and published by C. A. Bennett, *The Manual Arts*.²⁷ Federal subsidization was a large step toward complete acceptance of vocational education in the secondary public schools. But in 1917 this fact was only partially effective in abating opposition to manual arts. The tenor of Bennett's book seemed to be additional justification for the manual arts in public education. The argument was designed not only to show that manual arts could make supplementary but valuable contributions to vocational industrial education, but that it could at the same time be a valuable part of general or "cultural" education.

It is interesting to note that in 1880 the vocational education values of manual training were present in the guise of liberal arts values. In 1917, as a defense against a different enemy, manual arts made a strong case for its contribution to vocational values while still maintaining its general education objectives.

The publication of *The Manual Arts* followed about one year after the publication of *Democracy and Education. School and Society* (1899) and possibly *How We Think* (1910) were the only major educational expressions of Dewey that could

27 C. A. Bennett, *The Manual Arts* (Peoria, Illinois: Chas. A. Bennett Co. Inc., 1917).

reasonably be expected to have influenced the ideas presented in *The Manual Arts*. Bennett's widely read book reflected the very significant changes in the curriculum area that had taken place thus far in the twentieth century. Connectionism was clearly established as the foundation psychology. Several direct quotations from Thorndike and from Bagley, especially in support of the imitative method of teaching, were included.²⁸ There was no direct reference to Dewey although one discerns Deweyan influence.

Bennett accepted social efficiency as the ultimate end of education.²⁹ To achieve this end the educative process must employ both direct and indirect experience. He recognized the need for organized educational efforts to impart skills and knowledges required by an expanding and complex industry. At the same time a wider knowledge of principles and processes of industry would meet the requirements for intelligent use of the products of this industry. Manual arts was to serve general and vocational purposes. He pointed to vocation as motivation for broader education and an effective point of focus for many students. His general view is summarized when he states:

While making a student, it produces a man — an efficient social unit. The best vocational education, then, is also cultural, and the best cultural education may come through a training that is fundamentally vocational.³⁰

The general statement of this concept exhibits rather complete agreement with Dewey. A closer inspection of the resulting practice might conceivably raise some questions as to the nature of the "best vocational education" or the "best cultural education."

The skills were to be taught systematically and with accuracy. There was but minor emphasis upon the principles underlying the machines and processes but an overwhelming concern that the fundamental skills be selected by analysis from the respective trades and that they be practiced until they became habitual. The manual arts of 1917 were to be rather

²⁸ *Ibid.*, pp. 105-106.

²⁹ *Ibid.*, p. 24.

³⁰ *Ibid.*, p. 50.

dictatorially taught, the student would be a rather passive viewer of demonstrated processes and a recipient of related information. He would become physically active only in practicing the processes, in giving back the related information in recitation, and in doing some reflective thinking within the rather narrow limits of the sequentially arranged project plans.

Bennett's chapter on method discusses the imitative method, the discovery method, and the inventive method. The imitative method was fundamental.³¹ He did not encourage the use of the discovery method when he pointed out that it violated the principles of habit formation and proved discouraging to those pupils who had not developed "sufficient reasoning power."³² For Bennett the inventive method seemed suitable for developing the few who must originate ideas and direct others, but it was entirely unsuited to the many who were destined to follow instructions.³³

The discussion of method centered around the best means for teaching skills. That this discussion reflected no inclination to enthusiastically implement Dewey's psychology or method seems a justifiable conclusion.

Three years after *The Manual Arts* another book, widely used in teacher education, was published. *Teaching Manual and Industrial Arts*³⁴ is significant for this study because it represented further movement in the direction of closer union of thought and action in industrial study for general education purposes. The general tone of the volume indicated a relaxing of pressures to justify the area of study in vocational terms as a primary objective. Obviously reflecting criticism from educators outside the field of industrial arts (the preface specifically cited such a criticism), Griffith frankly discussed the weaknesses and strengths of conventional industrial arts practice. He made a strong case for teaching with methods that accentuated and purposefully aimed for objectives of resource-

31 *Ibid.*, p. 106.

32 *Ibid.*, pp. 109-10.

33 *Ibid.*, p. 110.

34 Ira S. Griffith, *Teaching Manual and Industrial Arts* (Peoria, Illinois: Chas. A. Bennett Co. Inc., 1920).

fulness, imagination, and the development of the procedures of effective problem solving.

It is to be noted that his definition for industrial arts was taken from the "Report of Committee on Vocational Education" of the National Education Association and is quoted here in full:

Industrial arts, those forms of training and study based upon industrial pursuits designed to enhance the general intelligence and appreciation of the field of industrial occupations.³⁵

Later on he stated, "Industrial arts have in them the beginnings of serious trade or industrial vocational education."³⁶

It is important to note that he distinguished among the qualitative levels of teaching and learning by considering the individual differences in the learners. He labelled them as "low type and high type" depending on the mental capacity and physical ability of the student.³⁷ To appreciate what it meant to manipulate materials was valuable education for every boy and might be even more valuable as general education when most of the class was made up of vocational students.³⁸

It is also important to note that in spite of the rather elaborate discussions of psychological principles and how industrial arts meets their requirements, the predominant characteristics of industrial arts education was action of the trade and industrial fabrication variety. He made no apology for time spent in the development of skill and technical efficiency. These were the manual arts which the student developed as a means for further development of breadth and experience.³⁹

The validity of Griffith's text for the developmental stage of industrial arts of his time is not here questioned. With reference to recognition of Dewey's influence, it represents a decided advance. He included in his chapter bibliographies a total of five references to Dewey's works. Four of these referred to

³⁵ *Ibid.*, p. 9.

³⁶ *Ibid.*, p. 10.

³⁷ *Ibid.*, p. 58.

³⁸ *Ibid.*, p. 14.

³⁹ *Ibid.*, p. 58.

How We Think and one to *Democracy and Education*. However, in only one place in the text material was there direct citation. At that point he rejected complete dependence upon the Herbartian method in favor of the problem-solving approach as presented in *How We Think*.⁴⁰

Content and Methods of the Industrial Arts is also numbered among the influential texts that are representative of the slowly developing theory of industrial arts education.⁴¹ Written in 1924, it more clearly reflected a Deweyan point of view than any prior industrial arts professional text.

As Vaughn and Mays defined vocation and the part that industrial education plays in preparation for it, the similarity to the gist of Dewey's statement⁴² in *Democracy and Education* is at once apparent. The sum of one's surroundings and experiences influenced the degree to which one would be successful in a specific vocation; industrial arts education made its necessary contribution as one more of these developmental experiences.⁴³

Vaughn and Mays recommended the problem-solving method as best suited to attain the objectives of industrial arts education. With this approach pupils might use a high grade of logical, clear thinking.⁴⁴

A variety of courses should be offered in the senior high school. The variation would be in terms of ability levels and interests.⁴⁵ This suggests an improvement still urgently needed in modern programs, the consideration of individual differences by means other than merely increasing the quantity or the complexity of the project fabrication activity.

John Friese's book, *Exploring the Manual Arts*,⁴⁶ and the previously discussed volume by Vaughn and Mays, were se-

⁴⁰ *Ibid.*, pp. 155-56.

⁴¹ Samuel J. Vaughn and Arthur B. Mays, *Content and Methods of Industrial Arts* (New York: The Century Co., 1924).

⁴² John Dewey, *Democracy and Education* (New York: The Macmillan Company, 1916), pp. 358-74.

⁴³ Vaughn and Mays, *op. cit.*, p. 56.

⁴⁴ Vaughn and Mays, *op. cit.*, p. 121.

⁴⁵ Vaughn and Mays, *op. cit.*, pp. 73-74.

⁴⁶ John F. Friese, *Exploring the Manual Arts* (New York: The Century Company, 1926).

lected as the last of the formative texts on the assumption that they are as representative in their essential points and their basic philosophic direction as any literature of national influence produced prior to the last ten years. This assumption is reinforced by the opinion of Stombaugh, written in 1936,⁴⁷ and by Hornbake,⁴⁸ one of the more astute observers of the modern scene.

Friese's text had for its major concern the promotion of the non-manipulative values of industrial arts. He was careful to point out that they were not more important than the manipulative aspects nor should they be given more time.⁴⁹

He criticized teaching procedure that ignored the development of ingenuity, initiative, and constructive thinking.⁵⁰ A rather lengthy chapter was devoted to the problem-solving method.⁵¹ The use of this approach was based on the assumption that the problem would be the construction of some article. Selecting an article, designing, making the working drawings, and devising specifications of materials, construction features, and final finish comprised the problem-solving activities. Compared with the common practice of teacher-supplied plans (all ready for the student to execute), this kind of problem-solving was an improvement. But Friese is representative of tradition when he limited problem-solving activity to that which resulted in the school counterpart of an industrial product.

One portion of Friese's discussion of problem-solving implied that the imitative method had been predominant because it was the easy way to conduct industrial arts classes. He urged exploration and experimentation with the problem-solving method as an answer to criticism and a means of de-emphasizing the traditional dictated "project."⁵²

47 Ray Stombaugh, *A Survey of the Movements Culminating in Industrial Arts Education in Secondary Schools*, Contributions to Education, No. 670 (New York: Bureau of Publications, Teachers College, Columbia University, 1936), p. 130.

48 R. Lee Hornbake, *Professional Progress in Industrial Arts Education* (Columbus, Ohio: Epsilon Pi Tau, Inc., 1951), pp. 1-15.

49 Friese, *op. cit.*, p. 86.

50 Friese, *op. cit.*, p. 69.

51 Friese, *op. cit.*, pp. 263-293.

52 Friese, *op. cit.*, p. 274.

Considering the importance for industrial arts education attached by this essay to Dewey's thought, it seems strange that direct citation of his words and works has been so sparse in the professional literature reviewed above. An investigator into this formative period of industrial arts history, knowing the favorable position which Dewey theory could provide for the new curriculum area, would expect to find numerous citations calling upon the authority of Dewey for support. The investigator is disappointed. There is seldom an outright rejection. There is evidence of indirect influence, but few direct references.

Perhaps this realization prompted Charles A. Bennett, the leading historian of the curriculum area, to record in 1925 that the progress made in the area during the first quarter of the century had been very largely in the direction indicated by Dewey's *School and Society*.⁵³ He further stated, "Workers in the field have been trying, sometimes consciously but more often unconsciously, to realize in public-school practice the ideals set forth by Professor Dewey."⁵⁴ (It could be countered that Bennett's statement was not necessarily an endorsement of Dewey's proposals for reaching the ideals.) He gave credit to Dewey for the greatest gain of the first twenty-five years, "the shifting of the center of gravity from skill and the technical processes to the child, his interests, his capacities, and his future occupation."⁵⁵ Additional influences ascribed to Dewey were a change from abstract projects to experiences less isolated from actual life, an emphasis upon related information "which is essential to an adequate understanding of what he (the pupil) is doing," and a new regard for an appreciation of the products of art and industry.⁵⁶

Particularly significant for this study, and to be elaborated upon below, is the final point of Bennett's appraisal that Dewey was to be credited for the new emphasis upon requiring each

53 Charles A. Bennett, "Changes in Manual Arts Instruction in Relation to Changes in the Philosophy of Education," *Industrial Education Magazine*, 26:363, June, 1925.

54 *Ibid.*

55 *Ibid.*, pp. 362-63.

56 *Ibid.*, p. 363.

student "to make his own analysis of the problem or job, in terms of individual processes, before he begins work on it."⁵⁷

Five years later Bennett wrote on the subject of Dewey's influence. He noted that little had been said about Dewey's influence on manual and industrial education. It was an oversight that he intended to correct.⁵⁸ After declaring that Dewey wrote more specifically upon industrial education prior to the passage of the Smith-Hughes Act, Bennett expressed the opinion that Dewey's ideas were more acceptable in 1930 than when they were written. It is doubtful that Bennett "corrected the oversight," but his article makes clear that Dewey's ideas were not completely acceptable before 1930.

It is surprising that Bennett, a nationally recognized leader and historian of the field, in articles purported to assess the influence of Dewey upon the field, confines his references to *School and Society* and omits any reference to *Democracy and Education* with its rather specific comments about the nature of industrial education.

Indeed, Bennett's standard historical record of industrial education, written in 1937, cites Dewey in only two places. These are with reference to kindergarten⁵⁹ and to teacher-education at the University of Chicago.⁶⁰

What is the significance of this silence? Was it failure to understand Dewey except in his simpler, directed related pronouncements? Did understanding exist only to encounter opposition from other forces and interests?

It is inconceivable that Dewey was not read and understood by the more scholarly and influential leaders in the area of industrial study of the period prior to the passage of the Smith-Hughes act. We assume this. If we also tentatively assume rather complete acceptance of Dewey theory as a basis for industrial arts education, we would expect to find more evidence to implement it at the teacher-education level. Convincing evi-

⁵⁷ *Ibid.*

⁵⁸ C. A. Bennett, "John Dewey and Industrial Education," *Industrial Education Magazine*, 32:146, November, 1930.

⁵⁹ Charles A. Bennett, *History, op. cit.*, p. 450.

⁶⁰ *Ibid.*, p. 489.

dence of this kind is lacking in the influential texts by the accepted leaders. The conclusion remains that other factors stood in the way of complete acceptance.

During the very period when industrial arts was seeking new philosophical orientation, vocational industrial education was saturating professional and public thought with arguments for industrial courses that would achieve direct vocational ends. The warnings Dewey sounded against a too narrow vocational education must have seemed forbidding to professional (and perhaps business) men seeking direct results. In 1915, right at the time when the campaign for Federal subsidization of vocational industrial education was most intensive, Dewey wrote in the *New Republic* that he did not identify vocations with "such trades as can be learned before the age of, say, eighteen or twenty." On the same page he refused to identify education "with acquisition of specialized skill in the management of machines at the expense of industrial intelligence based on science and knowledge of social problems and conditions."⁶¹ Any support of the industrial education movement by men of business and industry would be certain of alienation by this declaration:

The kind of vocational education in which I am interested is not one which will "adapt" workers to the existing industrial regime: I am not sufficiently in love with the regime for that. It seems to me that the business of all who would not be educational time-savers is to resist every move in that direction, and to strive for a kind of vocational education which will first alter the existing industrial system, and ultimately transform it.⁶²

These statements were typical of Dewey's insistence upon efficiency of industrial intelligence rather than a technical trade efficiency. This expressed the difference between the Woodward-Runkle and the Dewey-Bonser emphases. In its general statement the Deweyan position constituted the foundation upon which industrial arts education should be built and practiced.

But those who presided over the campaign to save and promote industrial arts education were occupied with defense and compromise. An alliance with Dewey and a forthright

61 John Dewey, "Education vs. Trade-Training," *The New Republic*, 3:42, May, 1915.

62 *Ibid.*

promotion of his philosophy for industrial education, in its fullness, was not an action of expediency. Such a course of action could do nothing but prolong and intensify the antagonisms already in existence between the general and specific phases of the industrial area of study.

Perhaps this accounts in part for the failure of industrial arts educators to pay more explicit attention to Dewey and his precepts. It can also be one reason for recognizing the influence of Dewey's *School and Society* and *How We Think* and for the virtual rejection of *Democracy and Education* by the men who wrote the formative literature cited above.

The foregoing discussion exemplifies that throughout the history of the industrial area of study much of the difference in opinion and the ensuing discussion has focused on the concept of overt activity in education. In 1880 it was the simple question of shall it be allowed in the curriculum. Since its acceptance the controversy has centered around the purposes of overt activity and what qualifications it must have to fulfill these purposes.

To find opportunity for activity in industrial arts education has never been a problem. The assumption that such activity was capable of being educational experience has always been a part of the theory. Industrial arts is unique in its insistence upon laboratory activity with tools and materials. However the qualities of industrial arts activity that were necessary for it to have educational value have been less certain.

During the critical formative years under consideration in this chapter, no better rationale existed for overt activity in education than that provided by Dewey's thought. The concept of experience embodying the experimental (problem-solving) approach to learning has been designated (Chapter VI) as making possible the closing of the gap between thought and action and making of the two one unified whole in the educational process.

If the nature and purpose of industrial arts activity has been and is the bone of contention and if the Dewey rationale is acceptable as an aid in determining the proper nature and purpose of such activity, the ingredients of a criterion for evaluation and criticism are available. With such a criterion a better judgment can be made of the evolutionary development

of industrial arts as revealed in the books reviewed above. Such a criterion follows in the form of a discussion of specific statements of Dewey on the subject of thought and action at the level of school practice.

We learn by doing, but the doing must have certain qualities and be surrounded by certain intelligently devised conditions to make it educatively effective. For general education purposes, "doing" may be a necessary condition for learning but not a sufficient condition. Not all activity or experience is educative. Some sort of intellectual qualification is required. Dewey declares:

Practical activities *may* be intellectually narrow and trivial; they *will* be in so far as they are routine, carried on under the dictates of authority, and having in view *merely* some external result. (Italics in original.)⁶³

Dewey's declaration is less negative when he writes:

When one bears in mind the social environment of the Greeks and the people of the Middle Ages, where such practical activities as could be successfully carried on were mostly of a routine and external sort and even servile in nature, one is not surprised that educators turned their back upon them as unfitted to cultivate intelligence. But now that even the occupations of the household, agriculture, and manufacturing as well as transportation and intercourse are instinct with applied science, the case stands otherwise.⁶⁴

The constructed project, the school counterpart of the industrial product, is a traditional factor in industrial arts education. One valid purpose of project construction is suggested by Dewey:

The active occupations in which appliances are brought to bear upon physical things with the intention of effecting useful change is the most vital introduction to the experimental method.⁶⁵

In relation to vocational training but applicable to all shop experiences he writes:

⁶³ John Dewey, *Democracy and Education*, *op. cit.*, p. 319.

⁶⁴ *Ibid.*, p. 321.

⁶⁵ *Ibid.*, p. 237.

In schools, association with machines and industrial processes may be had under conditions where the chief conscious concern of the students is insight.⁶⁶

Shop activity "may be intellectually narrow and trivial" and thus unfit for liberal industrial arts education purposes. Overt activity is subject to criticism in direct proportion to the extent that (1) it is authoritatively imposed by the teacher, (2) it is routine when "routine" means accepting what has been customary as though it contains the fullest measure of possibility,⁶⁷ or (3) the goal of the activity is only a physical product (either an article, a skill, or even a dutifully learned fact) rather than meaning, understanding, and insight.

Overt activity can be educationally productive when used to investigate and to satisfy curiosity just for the sake of intelligent awareness; when used to initiate and verify appraisal and criticism; when used in suggesting and developing solutions to problems of design, of construction, or involving principles of applied science.

This criterion of intellectualized activity will condition the appraisal and criticism in the following pages.

66 *Ibid.*, p. 368.

67 *Ibid.*, p. 171.

CHAPTER EIGHT

Status of Thought and Action in Modern Industrial Arts Education

The writers of the books reviewed in the previous chapter enjoyed reputations in educational circles and occupied positions of responsibility. Undoubtedly, a professional spirit motivated them to write as they did, but they also expected their books to be sold in substantial quantities and widely read. Thus we can assume that they made a realistic assessment of the developmental state of industrial arts practice and acceptable theory. We can assume that they were not simply reinforcing the practice as they found it in the schools nor were they risking the label of radical by expressing ideas too far in advance of the rest of the profession. Therefore any trends discernible in the succession of books should be representative, quite valid, and thus worthy of discussion.

These trends are the culmination of factors and forces made evident by the historical and philosophical analysis conducted in the first seven chapters. In this chapter, conclusions and recommendations will be derived from this combination of factors and forces and will be discussed under seven major topics.

A. With Reference to General Education

The earliest of the writers reviewed in the last chapter were able to preserve the very existence of industrial study as a part of general education. This was a contribution worthy of

remark. For a period when vocational industrial education seemed to many to be the only justifiable form of industrial study, the defense tactics they adopted were and are beyond criticism. Their additional insistence on general education values kept alive and preserved a place for this developing concept of industrial study in secondary education. The fundamental argument for industrial arts education has, since its inception, been contained in the phrase, "general education." Woodward insisted upon the liberal education values of manual training using the word "liberal" in a day when its special denotation was required to lend meaning and force to his argument.

From time to time this paper has used the phrases "liberal education" "liberalizing qualities." It is hoped that the use of these words will help to offset the restricted meaning which "general education" has come to have for industrial arts practice and to eliminate qualities of industrial arts education which tend to become excluded by a narrow interpretation of the contributions which it can make to general education. Industrial arts education must bring back into the sphere of its conscious intent much more of that which may be denoted as the liberalizing spirit.

John Macdonald defines a liberal education as:

. . . an education which tends to liberate or free the mind. Free it from what? From the impact of forces and conditions which determine its behavior without any clear awareness on its part of their existence or mode of operation.¹

He then adds that even if liberal education did not give some aid in controlling the forces and conditions in life, the fact that one knows about them makes a difference.²

William Burton conceived of a liberal education in similar terms:

That which frees men from petty narrow considerations and from exclusive emphasis on personal ends, which brings intelligent insight into contemporary civilization, giving refined standards of taste and manners,

¹ John Macdonald, *Mind, School, and Civilization* (Chicago: The University of Chicago Press, 1952), p. 2.

² *Ibid.*, p. 3.

and develops ability in those skills and methods useful in attacking the problems of life.³

For industrial arts education the liberalizing spirit requires concern for a wide range of learnings about the industrial aspects of our culture; learnings that promote understanding of and communication with others; learnings that enable not only understanding but control in the Deweyan sense; learnings that contribute to human development those characteristics that are conducive to further education; and learnings that provide knowledge just for the sake of being intelligently aware of environment.

The Dewey-Bonser emphasis encompassed this broad interpretation. The formative literature reviewed earlier gave promising evidence of a progressive approach toward the ideal. Many theoretical statements since the early twentieth century are capable of that same interpretation. But observation of practice, the published protests from time to time since the first of the century, and, more convincingly, the practice in some sections of the country of classifying industrial arts education as one of the practical arts witness to a predominant concern for "practical" overt activity.

While "practical arts" is only a phrase and as such is relatively innocuous, its use is indirectly harmful to the fortunes of industrial arts education. The phrase identifies one quality of industrial arts education, but in its commonly accepted meaning it excludes from the public image certain other liberalizing qualities of industrial arts education. It, therefore, does not contribute to closing the gap between thought and action. When we consider the evolutionary change from manual training to industrial arts, the use of the phrase, "practical arts," seems a reversal of a trend.

Industrial arts education must not reject the value of teaching how to be practical in tool manipulation nor should it reject the value of the study of practical arts when they are considered as occupations or trades. But the very use of the term, "practical arts," is restrictive. It is an unwarranted restriction. Its use establishes an atmosphere wherein overt ac-

3. William H. Burton, *Introduction to Education* (New York: D. Appleton-Century Company, 1934), pp. 44-45.

tivity tends to become separated from intellectual activity. Both history and current practice reveal too much of the physical overriding the intellectual.

It is true that a practical arts approach may satisfy all the conditions demanded by a definition of liberal education in the elementary stages of secondary education. But a perversion of the concept of industrial arts education results when the practical arts approach is continued beyond elementary familiarity with basic processes.

A liberalizing educational experience is not totally dependent upon any magical qualities of the subject matter. The nature of the teaching-learning environment is also a critical factor. But subject matter is important. A practical arts concept tends to employ the subject matter of tools and materials with an object in view of learning how to make, how to do, and how to operate. At elementary levels of instruction this can be liberalizing if liberalizing methods of instruction are employed. But when advanced levels of industrial arts education simply increase the complexity of the object constructed and use valuable time in prolonged occupation with advanced machine operations, the experience approaches trade training.

Chests of drawers in woodworking, welding practice to achieve the uniform bead of the expert, molding patterns of increasing complexity in the foundry area, and making stretch-out drawings of numerous transition pieces are illustrative of learnings that most students will never again find valuable. To have experienced the general nature of activities of this kind is one thing. To sacrifice the many other possible exploratory experiences on the altar of prolonged contact with a favored few is akin to searching out all the minute detail surrounding Paul Revere's ride at the expense of ignorance regarding the many factors leading up to the nation's independence.

To justify "practical arts," or any other concept of industrial arts education which excessively emphasizes tool skills for practical use, appeal is erroneously made to Dewey for a criterion of action and usefulness. But "usefulness" must be more inclusive than making, repairing, and operating. For example, learnings can be useful for increased joy and fullness of living. Doing is not, *ipso facto*, learning. Doing must include

the opposite of passive reception of fact in favor of the active pursuit of learning in response to interest. Overt involvement with physical materials and appliances is a requirement for realizing the objectives of industrial arts education, but there must be intelligent awareness of a foundation philosophy to insure a proper place and use of physical activity in method and as subject matter. Reference is made here to the previous chapter for criteria by which to judge the educational value of any proposed activity.

The recent statement of the Educational Policies Commission of the National Education Association calls upon education to concentrate upon rational power as its central purpose.⁴ This is the ability to think. In Dewey's terms this is the method of inquiry, problem solving. This statement of the Educational Policies Commission in no way restricts industrial arts education. In fact it might very well serve as a guide book for the renovation of the practice of the curriculum area. As repeatedly stated previously, when thought and action combine in the pursuit of the objectives of general education for living in our culture, a necessary result will be an increase in the ability to think rationally in the face of myriad problems of everyday living.

Another recent publication which complements the Educational Policies Commission statement is the conference report of the Woods Hole Conference under the title of *The Process of Education*.⁵ This report is concerned not only with the psychology of learning but presents some ideas significant for industrial arts education concerning the structure of subject matter. Robert Swanson refers to this publication in a recent monograph of the American Industrial Arts Association. Cued by some of the ideas of the conference Swanson predicts that "Industrial arts of the future will teach at lower levels many concepts now reserved for advanced levels."⁶ His choice of

4 Educational Policies Commission, *The Central Purpose of American Education* (Washington: National Education Association, 1961).

5 Jerome S. Bruner, *The Process of Education* (Cambridge: Harvard University Press, 1960).

6 Robert Swanson, *Industrial Arts Tomorrow* (Monograph No. 1; Washington: American Industrial Arts Association, 1961), p. 5.

precision measurement with its implications for production is an excellent example of such a concept.

A curriculum area can more justly claim general education status when, with appropriate method, it seeks progressively at the various grade levels to achieve understanding of such fundamental concepts. This requires that concepts be identified and arranged to produce a representative, structured subject matter. Method must involve industrial activity to make these concepts alive with real meaningfulness.

B. With Reference to the Influence of Vocational Industrial Education

A trend to be noted in the latest of the books reviewed in Chapter VII was a relaxing of pressures to prove the worth of manual arts by making claims that it was making direct additions to vocational skill and knowledge. All that the theory requires today is a claim that industrial arts education adds its unique qualities to vocational fitness in the same *indispensable* way that any other general education area does. Moving in this direction conforms to a description of vocational preparation which is in agreement with Dewey's definition and does not obligate industrial arts education to be excessively concerned with development of skill and memorized technical fact except as necessary to meet general education objectives.

While the relaxing of pressures to prove vocational worth was noted as a trend in the formative literature reviewed, in more recent years no significant improvement has been generally noted in expansion of content beyond that which also has vocational industrial education value.

Earlier in this paper it was shown that manual training had a psychological theory which convinced most educators of its worth, but at the same time its survival also depended upon the support of business and industry and their belief in its vocational values.

In the early years of the twentieth century the old psychological basis was gradually replaced in the minds of professional educators. Industrial arts education continued to merit the support of educational generalists for new psychological and philosophical reasons. At the same time pressures for vo-

cational industrial training were increasing, culminating in Federal subsidization of vocational education through the Smith-Hughes Act of 1917. Because industrial arts education worked in the same craft areas and used the same tools and materials as vocational industrial education, it seems quite plausible that some of the public support for the vocational phase lent support to industrial arts education as well. There is a danger here to be currently avoided. (Additional discussion of this point occurs in Part F of this chapter.)

To present a united front to any opposition, and for other reasons as well, many leaders in industrial education have, down through the years, insisted that industrial arts education and vocational education be united under the one banner of industrial education, a term that formerly described only the vocational phase. Just as manual training had been able to placate both the liberal and the vocational forces with its *stated* objectives, so has industrial education. With the demise of faculty psychology, a new basis, common to both phases, was required. In more recent years a cursory reading of *Democracy and Education* (especially Chapter XXXIII on vocation and education) was sufficient to satisfy most that John Dewey, as the masterful dissolver of dualisms, could be called upon as an authority who would reject the separation of industrial arts from vocational industrial education. Far from pursuing and bringing to full realization his educational thought, common cause tended to be sought in the similarity of subject matter. Differentiation between the two aspects of industrial education in many instances of school practice appeared to boil down to differences in the complexity and the degree of specialization of the learnings. The significant point to be made is that tool skill and technical fact have become more and more firmly established as the chief components of these learnings. At successively higher levels, industrial arts tends to develop a trade specialty instead of encouraging a deeper penetration into an understanding of industry in *all* of its ramifications. Protests have been voiced that industrial arts is but diluted vocational education.

For this and perhaps other reasons there have been those who insisted that a distinct separation be made between industrial arts and vocational industrial education. The "separa-

tists" are not to be indicted as opponents of vocational education nor must it be inferred that the "unionists" are necessarily ardent disciples of John Dewey, possessing a full understanding of the implications of his educational theory.

The above statements are not intended as a recommendation for a sharp cleavage between the two phases. Neither can a policy that all is sweetness and light be tolerated if there is any validity to the protests in periodical literature of the last decade directed at the current industrial arts education.

The state of technology and industry and the requirements for successful participation in that kind of society are such that a change in emphasis is needed as a common basis for these two phases of industrial education. *The two can be compatible, but the basis of this compatibility must be arrived at on liberalizing general education terms and not by arbitrarily assigning general education values to a predetermined elementary vocational curriculum.* To be unfettered in selecting industrial arts content and to attain organic unity of thought and action requires this basic premise.

C. With Reference to Expansion of Content

If industrial arts is no longer under primary obligation to develop saleable skills, it should seek enlargement and expansion of industrial understanding and appreciation by means which are in addition to the time-consuming project. This new freedom should be particularly valuable at advanced levels of industrial arts and for capable youngsters regardless of their vocational destiny. It opens up new opportunities for involvement of thought and action in areas of industrial subject matter heretofore neglected.

The revitalizing effect of the attacks on manual arts by vocational industrial education proponents has been noted in previous pages. From today's vantage point one of the signal values of that period for industrial arts was the industrialization of its content. The criterion for selecting content was that it should be an addition to an understanding of industry. (This is to be contrasted with abstract exercise work and with Sloyd handcraft articles and knowledge.) The formative, influential books were instrumental in promoting this criterion. However,

from Crawshaw to Vaughn and Mays the fabricated project was the means used to effect those industrial learnings. A lamentable fact is that the learnings about industry were largely confined to what the tradesman and the industrial wage earner did and needed to know. The fabrication of industrial products by means of custom, school shop procedures has persisted in excessive degree beyond the period when the introduction of the practice was an innovation and a valued improvement.

This trend to industrialize content was one of the first to be stopped in its developmental tracks and become stagnant. Throughout the period represented by the books reviewed and up to the present, little change of real significance is observable.

Industrial arts seemed to assume that physical activity in itself was educative. In this sense it seemed to forget that there was no educational magic in tool work. With apparent disregard of the implications of Dewey's elaborated concept of experience in education, industrial arts subject matter became formalized and almost stereotyped into lists of manipulative operations and related information topics. While it talked of interpreting industry and of keeping abreast of the technology, it persisted in teaching trade skills and a smattering of disjointed related technical information. These were dutifully presented by the teacher. The student constructed his project as means of mastery. Somehow it was hoped that this activity in the setting of the industrial arts shop would result in the expected educational development.

To some extent the project has been employed as a vehicle to facilitate learnings other than physical dexterity. But restricting the activity to making a school counterpart of an industrial product has also restricted the range of what the curriculum area terms related information. This information has usually consisted of facts about the tools and materials that were needed in the construction process. In the usual instance of school practice, much of this related information was imparted in a special classroom apart from the shop and, most significantly, quite divorced from the physical activity.

There is no criticism warranted when the study of industry is *begun* with manipulative fabrication processes; nor when technical information learnings which are necessary to the satisfactory conclusion of the project are involved in a psy-

chologically wholesome way. But there exists a multitude of learnings that are hardly touched under current teaching procedures unless rather isolated periods of instruction are set aside to "give out" these blocks of related information. Admittedly, not all the concepts of our industrial and technological content lend themselves readily to acquisition through overt physical activity with the apparatus of industry. But many opportunities for student learning through direct involvement are excluded by the insistence that the activity be restricted to a "take-home" project.

There is nothing wrong with related information, but a trump card is wasted by divorcing it from the manipulative. In one sense the curriculum area has set up its own little dualism by separating much of its intellectual content from the physical activity. This is symbolized by the separation of the classroom and the shop and exemplified by the limited coverage of industrial content which the conventional project provides.

Few modern critics from among industrial arts professionals direct their darts at elementary tool and machine skill development. Nor do they decry experience with more advanced machine operations as a means of gaining appreciation of the processes and capabilities of modern machines. Advanced experiences must not consist in more complex fabrication for the sake of the object made or the advanced skills developed. There is a point beyond which the learning of how to use tools and machines should be gradually replaced with manipulative activity designed to produce greater dividends in depth and quantity of meaning and understanding.

Criticism is warranted when time-consuming project construction precludes opportunities to employ construction activity for investigation, research, and experiment in almost unlimited areas of industrial knowledge. The intellectual possibilities inherent in the subject matter of industry are so unlimited that restriction of activity to learning how to make, how to operate, how to use, and a patchwork of related technical facts seems unpardonable.

Conventional teaching procedures and content are undoubtedly an advance beyond the manual training concept. And perhaps they were adequate as a developmental stage in one era

of industrial arts history. The extension of the trend to industrialize content, noted in the formative books, must not be confined to merely adding more isolated related information lessons, even though this seems to lend an air of increased academic respectability.

Nor must industrial arts fall off the other side of the path by merely increasing the complexity of the fabrication processes and thus become guilty of losing liberalizing qualities in favor of trade education. Keeping in mind the vast expansion and extent of industrial application of scientific and mechanical principles as well as the capabilities and interests of a large segment of our school population, intellectualized activity in adventuresome pursuit of more profound understanding, meaning, and insight must become more characteristic of industrial arts education.

In the section on general education earlier in this chapter, reference was made to isolating concepts to give basic structure to subject matter. Currently we fragmentize our areas of instruction and teach under such headings as wood, metal, or plastics. In other phases of the total program we label our content as printing, electricity, and auto mechanics. If these divisions are necessary, then increasing the number of teaching areas would make our content more representative. The task of developing a structured subject matter composed of fundamental concepts would appear to be easier and more appropriate if a new orientation were used. Within the last decade the professional literature has included several suggestions.

The doctoral dissertation of Delmar W. Olson calls for such a complete reorientation for the selection and organization of content.⁷ This is more succinctly recorded in a conference report from the U.S. Office of Education.⁸ Refusing to be confined to the fabrication, operating, and servicing aspects of industry and the trades, Olson proposes the vast expanse of industry and technology as the almost unlimited field of content from which to select and organize a structured subject matter.

⁷ Delmar W. Olson, *Technology and Industrial Arts* (Ph. D. dissertation, The Ohio State University, 1957; distributed by Epsilon Pi Tau, Columbus, Ohio).

⁸ Marshall L. Schmitt (ed.), *Improving Industrial Arts Teaching* (Washington: U.S. Government Printing Office, 1962).

In a similar vein *The Minnesota Plan* seeks a new orientation for teacher education.⁹ The industrial education staff at the University of Minnesota undoubtedly realized that to revise teacher-education programs is to change practice at lower educational levels. Their proposals for an ultimate program take into account the broad expanse of content available. At the same time proposals for immediate action during a transitional period accept the realities of the current status of industrial arts education.

Efforts such as these are commendable examples of industrial arts professionals taking a fresh look at the sources of our content, reconsidering the needs of our youth and of our society, and designing programs with new dimensions and new directions for liberalizing industrial study. They are profound, scholarly efforts and deserve wider and more concentrated attention to translate them into forms more inviting to practicing teachers and teacher educators.

Donald Maley reports the rationale, the details of organization, and the results of an experimental venture at the junior high school level.¹⁰ The imaginative expansion of content and method here described illustrates well the kind of sorties into the unknown that should occur much more frequently.

Following closely upon Maley's report is the excellent volume of Arthur W. Earl describing numerous experiments with materials and products of industry.¹¹ A reading of this volume suggests innumerable other ways of injecting broader experience and acquaintance with technological subject matter into existing programs.

It is almost unthinkable to expect a revolution in content formulation in the face of what has become traditional practice in industrial arts education. Following the cue of Maley it is not too much to expect that adventuresome teachers and teacher educators conduct small experimental excursions into this un-

9 William J. Micheels and Wesley S. Sommers (eds.) *The Minnesota Plan for Industrial Arts Teacher Education* (Bloomington, Illinois: McKnight & McKnight Publishing Company, 1958).

10 Donald Maley, "Research and Experimentation in the Junior High School," *The Industrial Arts Teacher*, 18:12-16, March-April, 1959.

11 Arthur W. Earl, *Experiments with Materials and Products of Industry* (Bloomington, Illinois: McKnight & McKnight Publishing Company, 1960).

tried expanse of subject matter seeking practicable ways of teaching it. Historically we know that changes come slowly but if change is to occur some beginning must be made, some initiating efforts must be expended.

Perhaps subject matter is the key to the future of industrial arts education. But first a balance must be regained between thought and action. For no change in content or no isolation and printing of structured concepts will have much effect in the lives and living of our youth if we continue to insist upon unduly exploiting overt activity in our practice and publicity.

D. With Reference to Problem Solving

The most promising trend discernible as the formative books were reviewed was the increasing attention given to the problem-solving approach to industrial arts learnings. Closely associated with problem-solving were the pages discussing the need for more emphasis upon thought content to complement the action content. At the beginning of the formative period the thought-content criticism was met by encouraging more attention to related information and to the aesthetic aspects of the project. The formative books in succession revealed a growing awareness that the problem-solving method contained possibilities for intellectualizing the bare physical activity. The development progressed only far enough to encompass project fabrication as the basic problem. Only activities and knowledges deemed important in the past became incorporated in a process whereby the student was made more responsible for finding his own answers to construction problems. Thus confined, the spirit of inquiry (problem solving) was undoubtedly possible, but the body of content in which it was allowed to operate was meager. However, compared with authoritatively imposed activities and knowledge, it was a creditable addition.

The very use of the term, problem solving, was an indication that more attention was being directed to the essence of Dewey's thought. Formerly the overwhelming influence of connectionist psychology allowed only deference to be paid to Dewey. Overt action in the form of manipulative skills was demonstrated with exactness, and close observation by the

teacher insured that all the rules of habit formation were observed. Similar procedures obtained for the learning of related information.

Currently, the employment of activity within the framework of the experimental concept gives hope of dethroning physical activity (not excluding it), and making it more and more a part of method in addition to its treatment as content only. Under an expanded problem-solving approach, the information content will become less isolated from action.

The reasons for failure to exploit the full possibility of the problem-solving method in practice lie in the insistence that content was primarily the learnings associated with "how-to-do," "how-to-make," and "how-to-operate." The problem-to-be-solved quite naturally became synonymous with the project-to-be-constructed. As far as it went and for elementary familiarity with one aspect of industry, there was nothing wrong with this. It was possible for the student to gain confidence and ability that would carry over to future construction problems. Properly handled, it constituted enlightened teaching practice.

The best practice of this kind found today adapts the elements of the experimental approach to a construction problem. The student is encouraged to identify a need that can be met by a constructed article. The first problem to be met is the design of the article. To copy plans of others is a practice to be discouraged. Such plans are used for ideas and suggestions only. The procedures used by the industrial designer will be studied and used. These procedures will involve the student in research as to kinds of material, construction features, and general shape and contour. Numerous trial solutions and sketches finally yield a design solution. A complete working drawing follows. Then a bill of materials and a list of anticipated steps of procedure are formulated. In the actual construction process numerous smaller problems arise which were not anticipated in the planning stage. These call for additional initiative and struggle.

Experiences of this kind under the guidance of a teacher who is not overly concerned whether the completed project will receive first prize at the county fair, are undeniably an indispensable part of the industrial arts experience. But this

practice is by no means universal in our public schools. And even if it were, its repetition through intermediate and advanced arts study would not be ideally adequate.

Such repetition invites two criticisms. The first is that valuable time is consumed in lengthy repetitive processes which increase trade skill but do not contribute their time's worth to meaning and understanding. Sanding several large surfaces, making several joints of the same kind, are examples in the woods area. Watching a metal shaper or a metal lathe perform its operations by the hour, winding coils in electricity, setting type day after day in graphic arts, spending lengthy periods in reproducing letters of the alphabet at the drafting table are other examples. Even though a usable project is being constructed, long periods of time spent at one operation merits the same criticism as do Woodward's abstract exercises. At levels above the elementary introduction to tools, any activity is excessively prolonged when it continues beyond the stage where familiarity with the process as well as knowledge of any hazards have been derived.

The second criticism of confining problem solving to project construction results because the possibilities for developing understanding and insights are only partially exhausted. The customary type of project has value but usually not for further learning in the area of industries and technology. Construction activity engaged in for the purpose of aiding investigation or demonstration of a principle has not received enough emphasis in industrial arts study. Illustrations can be multiplied to the limits of ingenuity.

What is the effect of moisture on the expansion of wood in its width and in its length? Can apparatus be devised to measure and compare these expansions? Can the expansion movements be magnified or enlarged so that they are easily observable? Are solid surfaces of wood always needed for construction purposes? How can wood strips of small cross section be assembled in properly engineered geometric shapes to resist breaking under certain pressures or weights? What kinds of jigs can be devised to enable quantity production of interchangeable parts?

Why is corrugated metal or paper stronger than flat sheets? What mechanical principle makes the common pliers valuable?

Why does a hammer have a handle and why must the head be made of steel? Or is it a requirement? How does a sharp tool edge look when it is placed under a microscope? Is a piece of sanded wood really smooth when viewed with that same instrument? Set up a display or a demonstration to show one or more generalizations about the cutting action of all tools.

Investigate and demonstrate the principle underlying a metalworking shaper. Show the principle of translating rotary motion into reciprocating motion. Investigate by disassembly or other means the basic mechanical principles of any of a thousand and one devices in everyday use in home and industry.

When problem solving is mentioned as being a desirable addition to industrial arts procedures, its connotation for many is a rather complex process of some difficulty suitable only for the better than average student. But problems come in all sizes and ranges of difficulty. There are contained within the broad reaches of industry and technology problems suitable for every level of interest and ability. There is no hope of covering all of them. An important criterion of selection must be the ability and interest of the individual student.

Problem solving is not an efficient procedure for getting articles made or construction jobs done. It is an effective means of education. It must, however, be conducted as an adventurous process with enough eventual successes to instill confidence that success is possible. It can ultimately lead to an independence of action and thought that does not require the guidance or inspiration of the teacher. This approaches the ideal.

E. With Reference to Individual Differences

A trend promoting concern for individual differences was noted in the formative literature. This trend received its most promising treatment by Vaughn and Mays. Their recommendation for differentiated courses at the high school level to fit differences in intellectual ability, in present interests, and in vocational destination is becoming more practicable now that reorganization of schools into larger units is the vogue.

Manual training was a reaction against a secondary education designed for one segment of youth. The area continues to claim value for all youth. Yet it has set up its lists of tool

operations and related information topics and made differentiation chiefly in the quantity, quality, and complexity of the projects constructed. This is especially true in its advanced courses and for its more mechanically capable. The trend to provide industrial study for the intellectually and physically adroit as well as for the dextrous must be promoted.

As a general pattern, Industrial Arts is a required course in the seventh and eighth grades. At subsequent grade levels, teachers complain that they retain too few of the "better" students. At least one reason may be the failure to provide challenging, meaningful, investigative programs of industrial study. The serious high school student as well as his parents and advisers are able to discern the differences between advanced experiences with trade and fabrication activities and a rigorous experimental investigation of technological content.

For expanded use at more advanced levels, with capable students, and with industrial content beyond that of the fabrication processes, the possibilities seem unlimited. In an enlightened approach to industrial arts teaching and learning, thought and action (the intellectual and the physical) become intimately involved and interdependent.

Recognition of individual differences in vocational objectives of individual students requires vocational industrial education for some at the appropriate age level. But that is a different matter from conditioning lower secondary school courses to meet the possibility that some of the students might choose to enter vocational classes later in their high school careers.

Insistence upon sequential lists of trade skills and knowledge has persisted as the dominant characteristic of industrial arts education. To continue this at successively higher levels means the virtual exclusion of all but those for whom bare manual training represents the limit of ability, and those who are intent upon pursuing a trade or a manipulative occupation as a life's work.

To meet the criterion imposed by the fact of individual differences, industrial arts education will employ its opportunities for manipulative activity and its wealth of technical fact to establish meaning and understanding in the minds of its

students when they think about industry and technology. It will carry its students beyond the fabrication and servicing aspects of industry seeking to employ thought and action in close conjunction in both large and small problem-solving situations. This it will do to the limits of the various and respective degrees of intellectual and physical abilities possessed by its students.

F. With Reference to the Public Image

The deep-seated conviction in the public mind that bodily involvement in education reduced its value as "real" education was discussed in Chapter V. Eighty years after the advent of manual training, this conviction is still active in determining the character of secondary education.

Today it operates beneficially for industrial arts education. Formerly, overt activity had to struggle for acceptance against popular opinion of what liberal education should be. Today, overt activity assumes a position of such dominance that the same public conviction, formerly adverse, now becomes a valuable corrective.

As an inference from an initial assumption, the lay public has accepted industrial arts education but not on equal terms with the traditional subjects. Part of the argument of this paper has indicated doubt that industrial arts, in its practice at least, has been worthy of equal status. The lack of prestige may be viewed as public rejection of industrial arts education as general education when that claim is based on a program of study that is excessively concerned with overt activity as an end in itself.

It may well be true that the public as well as many of those educators who are not directly involved with the teaching area do not have an adequate understanding of the meaning and possibilities of the industrial arts curriculum area. In the shops they see boys at work making objects that are representative of commercial products produced by modern industry. In adjoining classrooms they hear lessons in related technical information. At the end of the school year and perhaps at the county fair they see the best of these handcrafted projects on display. Observers picture industrial arts as a place where one

acquires the skill and the necessary information to use these skills intelligently. The average person regards these learnings as valuable for home maintenance, for developing more intelligent buyers and users of commercial products, for introductory vocational preparation, and perhaps for its guidance values. "Practical arts" describes these observations and seems an adequate term for what the public expects this curriculum area to be.

What the average lay observer does not recognize are the latent opportunities for youngsters to struggle with technical problems; opportunities to satisfy curiosity; opportunities to be critical and creative about every small element of industry with which he comes into contact; and opportunities to build toward the broad understandings that are the key to a fuller appreciation and realization of the significance of industry and technology in American life.

Nor is the average lay observer aware of the possibilities in industrial subject matter that lie beyond learning how to fabricate and how to service and repair. That industrial arts is applied mathematics and science, opening up new areas of educational exploration, is not made apparent by observation of industrial practice and publicity.

Industrial arts education has failed to publicize characteristics other than those that are directly observable. Coupled with this is the unfortunate fact that what is observable (overt activity and its resultant product) is the very element of general education which, if actually found in isolation, can be justifiably criticized. Unless these observations are referred to modern psychological theory and thus evaluated, there is a broad invitation to the lay public to apply an older and more understandable criterion of educational worth based on development of mind as a spiritual entity. The net result may easily become a description of industrial arts education as a necessity for training boys to "work with their hands."

When industrial arts education accepts and applies the Dewey criterion of experience to its overt activity, when the manipulative content of industrial study is intellectualized, and when the resultant program is publicized as such, the public will award their support and prestige.

G. With Reference to Teacher Education

The nature and quality of education is in large part directly dependent upon the point of view and the actions of the teachers. It is almost redundant to state that the key to change and improvement in public education is the nature and quality of teacher education. This is particularly true in industrial arts education. In this area teachers have more freedom in the choice of method and of content, and thus more responsibility, than do teachers in certain other and older curriculum areas. Consequently, industrial arts teacher education has a greater responsibility.

Teacher-education programs have suffered from the same restrictive forces that mark public school practice. For the key to a flourishing and valuable industrial arts education at the secondary level is to exploit the full potential of intellectualized overt activity at the teacher-education level. "Full potential" and "restrictive forces" indicate, respectively, what industrial arts teacher education can be and what keeps it from being.

One of the basic failures of industrial arts teacher education lies in its neglect of an experimental problem-solving approach to industrial study. The history of industrial arts education is, in part, an account of lost opportunities to take advantage of Dewey's profound thought in this regard. Whether or not modern teacher education makes reference to Dewey, a profound understanding of the meaning and worth of the problem-solving approach is required.

However, an understanding of Dewey's functional psychology and his application of it to industrial study would not be wasted time if employed as a prelude to the study of more modern developments in field psychology. When discussion of the problem-solving method is confined to learning the formalized steps of the "scientific method," the process degenerates to a set of dictums and rule of thumb procedure. The formalized planning steps which are commonly advocated as a requirement for project construction exemplify this wooden approach to problem solving. The application of problem solving to project construction can be and, in the hands of many teachers, is a proper and valuable use. But the possibilities for com-

bining action and rigorous thought extend far beyond the fabrication of a project.

To expand problem-solving applications beyond industrial fabrication content and into areas of technology requires science education for the potential teacher. Science education requires mathematics beyond algebra. But these additional studies will not be of maximum value unless they find application and use in industrial arts laboratories of teacher education departments and replace some of the time and effort expended on project making.

When the values of activity which is intellectualized in keeping with the problem-solving spirit are realized, the expansion of content into the technological area of industry will be almost inevitable. But not quite, for under the name of industrial arts education many colleges and high schools are committed to the dual function of meeting explicit vocational objectives as well as general education objectives. In other colleges and high schools industrial arts education has not demonstrated its liberalizing purposes forcefully or convincingly enough to establish itself in the public mind or even in the minds of many of its graduates as an area that stands independently and equally with vocational industrial education under the common banner of industrial education. The difficulties of differentiating between the two phases of industrial education without bias is a demonstrated fact whether in national professional organizations, at the state and local school administrative levels, or in teacher-education departments and city school systems. To modernize the image of industrial arts education in the public mind and to allow industrial arts education to develop free and unfettered requires that the industrial arts teacher leaves his undergraduate college with something more profound than a myopic view of his function as a teacher of tool and machine processes applied to materials and products. He needs to possess at least the beginnings of a sound philosophy of education, a philosophy which sees industrial arts education dedicated to a liberalizing orientation and understanding in an area of American culture not provided for by any other curriculum area in the school.

One other restrictive force will be mentioned. This concerns the nature and the inclination of the students who enter

industrial arts teacher education. They do so with initiating reasons that include a view of industrial arts as a study of the craftsman's arts. They are "mechanically inclined" and find appeal in a kind of study and teaching that seems so obviously to be learning how to use and construct. The difficulties which this fact adds to efforts to change industrial arts education is apparent.

But teacher education can capitalize on this characteristic of its charges. It can realize that any additional learning that takes place after graduation when the graduate is in his job, will be most likely to occur in the area of his inclination and interest. Least likely will be study in the area of philosophy, method, psychology, and other professional topics. If there is too much to teach at the teacher-education level for the time available, it would seem wise to reduce emphasis upon the time-consuming project in favor of more productive procedures for gaining knowledge of tools, operations, and materials. The additional time could more profitably be devoted to professional study in the area in which the student is least likely to conduct self-initiated learning.

The study of industrial content in the problem solving spirit should imbue the student with the same spirit. To find learning adventuresome and exhilarating helps insure the continuation of learning in response to the many unanswered problems that will challenge him when he teaches. Teacher-education laboratories conducted in this spirit will change the emphasis upon overt activity and set an example to which embryo teachers will constantly refer.

The slow rate of change in education is universally recognized. Revolution in industrial arts theory and practice is hardly possible, nor is it desirable. But change there must continuously be. The pace of change, however, can be quickened by a more widespread acceptance of the urgent need for change. It is at the teacher-education level that this attitude will be most effective. Taking into account the requirements placed upon graduating teachers by their employing schools precludes teacher-education programs radically different from general public school practice. On the other hand, to graduate teachers who are only adequate to support the status quo makes no contribution to progress. Teacher education should be in the van-

guard, always a bit ahead of public school practice. Coupled with the small innovations in theory and practice that can be taught to prospective teachers there should pervade every teacher-education department a wholesomely critical spirit, a candid consideration and evaluation of the good and the not so good in industrial arts theory and practice. To the extent that teacher education indoctrinates its charges to accept and support the status quo without criticism, the seeds of progress die.

CHAPTER NINE

Summary

The basic problem of this study arose out of a concern for the lack of full acceptance of industrial arts education when its general education values were compared with those of older areas of secondary education. A consideration of numerous questions that were raised and observations that were made revealed a common focal point. Nearly every disturbing question or doubtful practice suggested and pointed to an inadequate understanding and use of overt physical activity and its relationship to reflective thought. How this relationship fared in various periods of history, in various social situations, and in the philosophy of education constitutes the main thread running throughout the study.

The paradox exists that the American people from the beginning were people of energetic action in practical, everyday affairs; but in their concept of what constituted a proper education they invoked principles that rejected physical activity.

The first concession to those who criticized traditional education was the acceptance of a more practical education so long as "practical" did not include overt bodily activity. It was more practical in the sense that the subject matter was more closely related to contemporary need of business and industry. Vocational industrial education had long been accepted but only as an institution completely isolated from liberal education.

Eventually manual training sought and gained entrance as a part of liberal secondary education. The acceptance of overt activity as a part of liberal education was an outstanding event. It happened in the face of a long tradition supported by en-

grained philosophical concepts and familiar patterns of education.

Even then the insistence that the body and overt physical activity could be liberalizing remained a principal point of contention. The development of manual training as a part of liberal secondary education took place as an extension of the old, exclusively intellectual education. Within the framework of a broadened view of faculty psychology and formal discipline, it was eventually accepted as a justifiable and logical extension. This constituted one of the milestones in the struggle to close the gap between knowing and doing in liberal secondary education.

Realizing the need to augment the national supply of craftsmen, many among the lay public did support manual training. But, at the same time, an engrained concept of education as spiritual, coupled with social ambition, caused individual parents to look askance at this new education for their own children. An education that involved them with the physical world of things appeared to them to be somewhat divorced from mind development. A stigma was attached to educational activity and learnings drawn from areas of work in which people made their livings.

To discover and discuss the causes for the opposition can be a clue to the solution of some of the problems which modern industrial arts education is facing. Some of these causes lie in the undergirding philosophy of the nineteenth century, a philosophy whose roots in turn trace back to Greek classical philosophy and to its amalgamation with Hebrew-Christian ideas.

The resultant nineteenth century description of human nature continued to be dualistic. But more significant for this study was the relative worth attached to each part of the dualism. Educators and other men whose opinions were influential in determining the pattern of American education subscribed to some form of philosophical idealism. The resultant educational views, however diverse in many details, had this in common: that secondary liberal education was a spiritual affair and was to be intellectual in the sense of excluding any bodily involvement other than the minimum and necessary amount. Whatever physical activity that was eventually allowed was

carefully categorized as physical training and given no credit for any direct contribution to the "real" educational result.

The general public, though probably less consciously, based their judgment as to what constituted liberal secondary education on a similar view. While many were less conscious of philosophical reasons, nevertheless, through the influence of religion and the clergy the mass of the people were firmly convinced that the education of real worth must be spiritual and concerned with the mind.

Manual training was a reaction. It was a reaction that tried to correct by addition. It was a groping for something more suited to the times. It was an attempt to modernize by modification without rejecting completely that which preceded it. It recognized the gap existing between thought and action in education as an unrealistic gap because it did not reflect the world of work and everyday living. It made attempts to close the gap by introducing manual activity.

Its foundational rationale was in error. Within the limits imposed by conformity to the psychology then in vogue, it did its job well. As an antecedent to industrial arts education, it served its purpose. It was the beginning of the educational idea at the secondary level that a study of industry, properly conceived, could be an addition to liberalizing general education.

It was a tenuous acceptance which manual training enjoyed. The movement continued to engage the opposition on a psychological field of combat. Most educators eventually came to accept manual training for reasons compatible with the faculty psychology of the period. If training the hand and the eye had direct vocational values as well as liberal, intrinsic ones, it could be counted as an extra dividend.

Equally important to the survival of manual training was the support of men of business and industry. In their view manual training made direct contributions to vocational fitness and thus to the needs of an expanding industrial society. The promising prospects of manual training as vocational education carried weight. They saw the movement as a partial answer to their need for skilled craftsmen. Their influence, arguments, and financial assistance sustained the movement during a critical period when it was seeking a place of more widespread and

permanent acceptance in a rather hostile educational environment.

This support, however, constituted pressures to influence manual training in the direction of engrossment with skill development and technical fact for their direct value as ends. In addition, toward the close of the nineteenth century the psychological arguments for physical activity in liberal secondary education weakened in their insistence upon a place of equality. The historical record of the period leaves the impression that a compromise position became acceptable. This tacit retreat placed manual training in the subordinate position of serving as a means to the end of intellectual development.

All of this was very unstable ground for manual training and was of doubtful value as a foundation for modern industrial arts education. Any conditions that were conducive to the establishment of a hierarchy of subject matter, or a scale of values, with respect to what elements of the organism were to be involved in the learning process were conditions unsuitable to an area of study that employed these very elements which were rather low on the scale. Required was a psychological justification that would enable industrial study to stand in a position independent of specialized education and be accorded status as liberalizing education.

Since the beginning of the twentieth century, the opportunities that have opened up to industrial arts education for real respectability as liberalizing general education have been unlimited. The areas for the selection of its content have been ever deepening and broadening. This has made it mandatory that a vigorous effort to change, reorganize, and refine content be a continuing process. While this concern for the qualities of its content is most important, an even more critical requirement has existed in the areas of philosophy and psychology.

The new psychology that began to be influential in the early twentieth century gave promise of meeting this requirement. It was adapted and woven by John Dewey into an educational philosophy that furnished a logical and solid basis for industrial activity in the general educational development of American youth.

Richards, Russell, and Bonser were among the men who, early in the century, recognized the favorable position provided

by Dewey's thought. These were the men who formulated the general outlines for a modern program of liberalizing industrial study.

By 1916, when John Dewey's *Democracy and Education* was published, an educational philosophy ideally suited to industrial arts education was made easily available to adventuresome educators. This philosophy included a functional psychology that made no invidious distinction between mental and bodily activity. Rather it considered the two as one piece of cloth. Here were guidelines in psychological and philosophical thought which held educational promise beyond what had yet been realized. By 1916, then, the theoretical basis for modern industrial arts education was available and waiting for application to teaching and learning in this new curriculum area.

The exact degree in which Dewey's educational ideas were adapted and woven into the theory of industrial arts education is difficult to ascertain. That his ideas have enjoyed wide influence in educational thinking and in formulation of theory is well known. Through the years they have conditioned the interpretations of what others thought modern education should be. Final arrival in actual practice in the classroom has required additional interpretation.

In subsequent developments of the first quarter of the century, industrial arts education continued to reflect the influence of Dewey, but it did not accept him completely. Only selected portions of his thought became a part of a rather strange amalgamation which then amounted to a perversion of Dewey's real intent. Several factors were responsible for the development and survival of this mixture:

1. Dewey's refusal to accept trade education in the form of bare manipulative efficiency. His criticism included general education study of industry to the extent that this study adopted any of the objectionable characteristics of trade education.

2. The powerful influence of vocational industrial education in shaping the character of industrial arts education. This amounted to the Woodward-Runkle influence overriding the Dewey-Bonser influence; an overreaction to traditional classical education that left out the liberalizing concept.

3. Public acceptance of an industrial arts education in terms of its value as "practical arts." The public refused equal

status as liberalizing general education to a curriculum area that did not demonstrate convincingly that it met the real criteria of liberalizing education.

A remedial course of action is difficult to prescribe in detail. The seven sections of Chapter VIII made some suggestions. Corresponding to each of these sections, seven generalized statements of action follow:

1. Restore the liberalizing qualities latent in industrial arts education by seeking out the modern extensions of Dewey's psychology of experience in education. This means the investigation of industry and its technology by problem-solving methods involving overt activity and reflective thought.

2. Offer resistance to any force which seeks to confine the theory and practice of industrial arts education to trade and fabrication activities and fact.

3. Seek broader content, now available in modern industry and technology, to provide a proper medium for activity and reflective thought.

4. Promote problem solving as an experimental approach to learning. Avoid formalization of it into a fixed pattern. Encourage its adventurousness as the true spirit of teaching and learning. Accept rational power as a focal point.

5. Recognize individual differences in capacity and interests by establishing courses to suit and by implementing problem solving at all levels of ability and achievement.

6. Include the five preceding points in clear statements of theory, make valiant efforts to apply them in practice, and publicize them by means that are in addition to the display of the physical products which result.

7. In teacher education promote a profound understanding of the modern extension of Dewey's educational theory. Pursue a critical study of the history of industrial arts education, not of events only but of developing ideas, diverting forces, and favorable trends. Thus may the potential teacher be aided in developing a standard of values to help him resist perverting influences.

However faithful or unfaithful modern industrial arts' interpretation (or misinterpretation) may have been to the consistent wholeness of Dewey's educational thought, that thought continues to exist as a defensible *ideal* for industrial arts edu-

cation. In place of a psychology that allowed only a subordinate role for physical activity, Dewey presents a position of equality with previously accepted areas of secondary education.

The gap between thought and action in industrial arts education can now be closed by a rationale that makes them parts of the same whole. Sense experience has been moved out of its former passive role and given an indispensable status in the process of educational development. The material things of the culture can now be part of educative experience without bias.

The basis for resolving the dichotomy between vocational and general industrial education is also available. Education for living and education for making a living can now be viewed as possessing the same qualities that mark all educative activities worthy of the name. Tools and materials and processes can be invested with an intellectual content not for the sake of the intellectual content as something better, but because these physical implements are intimately involved in the total coordinated process.

No longer need industrial arts apologetically state that tools and materials are a means to a greater end. Properly conceived, selected, and organized these very physical things and manipulations are part and parcel of the total development of the learners. Now they become data, no more and no less than the linguistic symbols and verbal content of an older education.

If industrial arts education had continued faithful to the theoretical thought which gave it life and if it had continued to develop in accordance with a standard of educational values such as posited by Dewey, its position today would be one of strength and respect in all quarters as an indispensable part of secondary general education.

Why does industrial arts education continue to play a vigorous role in secondary education? Lay opinion has understood and accepted the motor-skill-and-technical-fact aspect for its value in mechanical manipulation. Industrial arts education has been accepted for reasons other than the general education claims which it makes for itself. The public has given it acceptance in the name of practical skill and vocational objectives without according it value as general education equal to other and older areas.

At the same time the curriculum area has tended to deny

its true theoretical justification by accepting public favor in the public's own terms of understanding. The worth of these terms, as such, has not and is not here denied; but preoccupation with technical fact and skill fosters methods of instruction that preclude liberalizing values.

When the modernizing tenets of John Dewey's educational thought are applied in the laboratories and classrooms of industrial arts education, mind and body will not be separate considerations; thought and action will be inextricably bound up together in the educational process; and, with publicity programs growing out of this enlightened practice, equal status will eventually be awarded.

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Index

- Academics, 25
Acceptance, of manual training, 121
Action, 19
Activity, intellectual, 44
Activity, overt, 13, 20, 28, 38, 44, 47, 50, 57, 60, 67, 77, 78, 93, 95, 98, 108, 117, 124
 acceptance of, 119
 as education, 69, 94
 and intellectual development, 37
 and knowledge, 23
 and public, 113
American life, 22
Americans, values of, 49, 52, 119
Anderson, Lewis F., 58
Aristotle, 41

Baker, Melvin C., 79
Behavior, organic, 65
Bennett, Charles A., 29, 36, 38, 59, 84, 85, 86, 90
Bonser, Frederick G., 75, 76, 78, 81, 98, 122, 123
Burton, William, 97
Butler, Nicholas Murray, 59
Butts, R. Freeman, 24, 27, 34, 44, 48, 50, 52, 55

Calvinistic doctrine, 53, 54
Change, rate of, 117
Clergy, influence of, 50, 52
Coates, Charles P., 35
Colonial life, nature of, 50
Concepts, teaching industrial, 101, 106
Conditioned-response psychology, 62
Content, of industrial arts, 103
Counts, George S., 48, 51
Crawshaw, Fred D., 82, 83, 84, 104
Cremin, Lawrence A., 24, 27, 34, 44, 48, 50

Culture, change in, 81
Curriculum, broadening, 36
Curti, Merle, 22, 23, 43, 55

Deism, 53
Designer, industrial, 109
Dewey, John, 17, 39, 43, 63-71, 78, 80, 84-88, 90-94, 98-104, 108, 114, 115, 122-126
Discipline, formal, 32, 35, 36, 38, 74, 79, 120
Discovery method, 86
Doing —
 and learning, 94, 99
 status of, 43
Dualism, of mind and body, 39, 40, 41, 46, 52, 54, 55, 56, 60, 63, 64, 73, 102, 120

Earl, Arthur W., 107
Education, 71, 85
 development of secondary, 24
 evolution of, 48
 as growth, 11, 33
 progressive, 72
 value of, 51
Edwards, Jonathan, 53
Emphases, in industrial arts, 77, 92, 98, 123
Engineering, and skills, 30
English school, 24
Enlightenment, 45, 51, 53
Experience, 69
 and education, 62, 65, 71, 88, 94, 114
 learning, 12, 14, 70
 with machines, 105
Experiment, as method, 67, 93, 107, 109, 110, 124
Evaluation, of industrial arts, 18

Faculty psychology, 34, 39, 45, 57, 59, 61, 79
Federal Aid, 84

- Formalism, 74
Franklin, Benjamin, 25, 26, 28
Friese, John, 88, 89

Gabriel, Ralph H., 53
Geiger, George R., 66, 67, 68
 General education, 11, 12, 19, 20,
 96, 97
 liberalizing, 17
Griffith, Ira S., 86

Harris, William T., 46
 Herbartian method, 88
 High school, public, 26
Hornbake, K. Lee, 89
 Humanism, 42, 54

 Idealism, 44, 46
 Imbalance, state of, 68
 Imitative method, 86, 89
 Individual differences, 87, 111,
 124
 Industrial arts —
 as curriculum area, 11
 status of, 17
 Industrial education, 11, 15, 102,
 116
 Industries —
 elements of, 75
 approaches to study, 107
 changes in, 81
 and content, 103, 104
 study of, 12
 Information, related, 77, 104, 112,
 113, 122
 Inventive method, 86
 Inquiry, method of, 68

Kallen, Horace M., 50
Keyserling, Leon H., 49
 Knowledge, 67, 70
 and action, 23
 to Plato, 40
 status of, 43
 use of, 71
Kolesnik, Walter B., 34, 35

 Language, 67
 importance of, 66
 Latin grammar school, 24
 Liberal education, 32, 54, 57, 61,
 98
 desire for, 50
 Liberal and liberalizing, 20, 33,
 38, 73, 99, 106, 116, 120, 123,
 124
 education, 97
 values, 84

MacAlister, Supt., 58
Macdonald, John, 97

Major, David, 46
Maley, Donald, 107
 Man, unity of, 60, 74, 85
 Manual Training School, 29
Marble, A. P., 44
Mays, Arthur B., 80, 82, 88, 104,
 111
 Methods, 14, 86, 89
 scientific, 115
 of teaching, 79
 Mind, 66
 freeing, 97
Minnesota Plan, The, 107

 Naturalism, 53, 61, 65
 Need, state of, 68
 Noumenal world, 46

Olson, Delmar W., 106
Owen, Robert, 50

 Phenomenal world, 46
 Philosophy, of industrial arts, 116
Plato, 39, 40, 63
 Practical arts, 98, 114, 123
 Practical education, 27, 119
 Principles, and actions, 49
 Problem solving, 67, 70, 72, 87-91,
 93, 95, 100, 108-111, 114-116,
 124
 Professional study, 117
 Project, 13, 74, 89, 94, 104, 105,
 109, 110, 116
 and problem, 69
 Protestantism, 51, 53
 Psychology —
 behaviorist, 79
 connectionist, 79, 85
 experience, 124
 functional, 63, 73, 123
 mechanistic, 63
 and philosophy, 61, 73, 122, 123
 Public opinion, 19, 113

 Reflex-arc concept, 62, 63, 64
 Related information, 21, 104, 105
Richards, Charles R., 60, 75, 76,
 81, 122
Russell, James E., 75, 76, 78, 81,
 83, 122
Rugg, Harold, 79
Runkle, 123

 Scholasticism, 42
 Science, development of, 42
 Senses, in learning, 47
 Skills, 12, 21, 30, 75, 77, 78, 83,
 85, 90, 99, 102, 103, 104, 108,
 112, 114, 122, 125
 Sloyd, 103
 Smith-Hughes Act, 80, 84, 91, 102

- Snedden, David*, 74
 Social aims, 12
 Social efficiency, 85
 Souls of men, 40
 Standards, industrial, 83
 Stimulus-response, 64
Stombaugh, Ray, 89
 Subject matter, divisions of, 106
 Success, measure of, 52
Swanson, Robert, 100

 Teacher education, 115
 Technology, of industry, 124
 demands of, 15
 Theism, 55
 Thought, 19
Thut, I. N., 79
 Tools, materials, processes, 13, 30
 Trades, 87, 98, 102, 104
 education for, 123
 elements of, 77
 schools for, 58

 Transference, 58
 Transcendentalism, 44, 45, 46, 53
Tugwell, Rexford G., 49, 55

 Unitarianism, 45, 53

 Values, of Americans, 22
Vaughn, Samuel J., 88, 104, 111
 Vocational industrial education,
 11, 16, 57, 77, 78, 80, 82, 87,
 88, 92, 95, 97, 101, 112, 116,
 121, 123, 125

Wahlquist, John T., 44
Warner, William E., 74
Withers, William L., 79
 Woods Hole Conference, 100
Woodward, Calvin, 14, 29-33, 36-
 38, 57-59, 74, 80, 97, 110, 123
 Workers, need for trained, 81
 Work, status of, 43
 World, true nature of, 40